United States Department of Agriculture

Botanical Species Not Recommended as Species of Conservation Concern Draft Evaluations

Tongass National Forest Plan Revision

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Forest Service | Alaska Region | Tongass National Forest | March 2026

Cover Photo: Mountain Lady's slipper (*Cypripedium montanum*), a species proposed as a Species of Conservation Concern for the Tongass National Forest. Photograph by Rosalee de la Forêt. CC-BY-SA-3.0.

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Preface

The USDA Forest Service is pleased to share the individual draft species evaluations of the botanical species not recommended as Species of Conservation Concern (SCC) for the Tongass National Forest. This document presents the collection of draft species evaluations prepared for the Tongass National Forest as part of the Species of Conservation Concern (SCC) identification process. Each draft evaluation summarizes the best available scientific information relevant to a species' distribution, habitat conditions, population trends, and ecological needs within the Tongass.

The purpose of these draft evaluations is to provide a clear, science-based foundation for determining whether there is substantial concern for a species' long-term persistence in the plan area, as required under the 2012 Planning Rule. Each assessment follows a consistent format—documenting conservation status, key threats and stressors, habitat and population trends, and life-history factors that may influence vulnerability.

Together, these draft evaluations reflect a comprehensive effort to understand the conservation needs of native species across the Tongass and to support a forest plan that sustains ecological integrity, resilience, and biodiversity for generations to come.

Why are we sharing these evaluations?

We are now inviting review and feedback from Tribes, Alaska Native Corporations, cooperating agencies, local knowledge holders, partners, and the public. Your insight is essential. Incorporating Indigenous knowledge through traditional ecological knowledge (TEK), place-based observations, and new scientific information strengthens our understanding of species' ecological needs and helps refine both the Proposed SCC List and the foundations of the revised Forest Plan.

What we are asking from you

We welcome any information that may help verify, refine, or supplement what is presented in the draft evaluations, including:

- Recent observations or monitoring data
- Traditional ecological knowledge, including long-term or place-based species observations
- Information about species distributions, declining or expanding populations, or changes noticed over time
- Knowledge of habitat conditions, disturbances, or local stressors
- Documentation of threats such as climate-related changes, invasive species, recreation impacts, or habitat loss
- Information indicating that a species may have been overlooked or mischaracterized

This stage of engagement is an opportunity to highlight species that may need additional attention or to identify where information gaps remain. All input received will be reviewed and incorporated into draft species evaluations or the Proposed SCC List where appropriate, before the list moves forward to the Regional Forester for consideration.

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How to Participate

All SCC-related documents—including the full report, species evaluations and background materials—are posted on the Tongass Plan Revision SCC Identification Process webpage. Comments and supporting information may be submitted through the Tongass Plan Revision Comment Site.

Thank you for taking the time to review these evaluations and for contributing your knowledge to help shape a forest plan that reflects the ecological, cultural, and community values of Southeast Alaska. Your involvement is vital to ensuring that the Tongass continues to sustain resilient ecosystems, vibrant communities, and thriving populations of native species for generations to come.

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Botanical Species Draft Evaluations

(Inclusive of vascular plants, bryophytes, lichens and fungi)

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Abies amabilis

Photo: © 2021 Scot Loring (CalPhotos 2025)



Abies amabilis Douglas ex J. Forbes

Pacific silver fir

Global Rank: **G5**
Alaska State Rank: **S3**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy OR gaps Pacific silver fir (*Abies amabilis*) is known from 11 estimated occurrences in the southern Tongass National Forest (Tongass NF) (ANHP ACCS 2025, CPNWH 2025, USFS 2025). We define an estimated occurrence as a grouping of individuals that are separated by less than 0.62 miles (1 km) . These occurrences are located on north Prince of Wales Island (1 occurrence), on northcentral Kosciusko Island (1), on the eastern side of Gravina Island (1), on central (1) and southeastern (1) Revillagigedo Island, and scattered over a stretch of approximately 19.26 miles (31 km) within the Misty Fjords National Monument on the southern tip of continental southeast Alaska (6). In Alaska, *Abies amabilis* is only known from these 11 occurrences (ANHP ACCS 2025, CPNWH 2025, USFS 2025). Habitat information provided on herbarium specimen labels indicates that Pacific silver fir grows in temperate rainforest on the Tongass NF; associated species include *Tsuga heterophylla*, *Picea sitchensis*, *Chamaecyparis nootkatensis, Alnus*, *Menziesia ferruginea*, *Oplopanax horridus*, *Rubus* spp., and *Nephrophyllidium crista-galli* (Appendix 1; USDA 1980, Klinkenberg 2020, CPNWH 2025). Although this forest habitat is common (Smith 2016), the few observations/specimens of *Abies amabilis* from the Tongass NF would indicate that its seed dispersal, succession, substrate, light level, hydrology, or other needs are not commonly met within the Forest. The southern Tongass and adjacent British Columbia is the northern limit of this species' range. Some occurrences of *Abies amabilis* are associated with limestone substrate, but it is also found on other substrates and in a variety of ecological situations, preferring cool, moist sites with mineral soil (USFS 1980, Stone 2021, CPNWH 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF Global Rank G5 (Apparently Secure), Alaska State Rank S3 (Vulnerable) British Columbia and Oregon (S5, Apparently Secure), California (S2, Imperiled), Washington state (SNR, No Status Rank) The occurrences from Prince of Wales and Kosciusko islands in the Tongass NF are the northern extent recorded for this species, and Pacific silver fir does not occur in Alaska outside of the Tongass NF (ANHP ACCS 2025, CPNWH 2025, USFS 2025). However, the species is widely distributed outside of Alaska. "Pacific silver fir ranges from extreme southeastern Alaska southward through coastal British Columbia and Vancouver Island, the Olympic and Cascade mountains of Washington state, and the Cascade Range of Oregon, reaching its southern limit in northern California where it is rare" (Cope 1992, Stone 2021, CNPS 2025, NRCS 2025). Based on herbarium data, the closest recorded location outside of Alaska is in the mountains of British Columbia approximately 80 miles to the east of a Tongass NF occurrence located 35 mi SE of Ketchikan, in the Misty Fjords National Monument Wilderness (ANHP ACCS 2025, CPNWH 2025). It is unclear if the Tongass NF occurrences are disjunct; dispersal of this species may be limited to shorter distances, but there are several scattered occurrences known across the southern end of the Tongass NF on various islands and the mainland, which suggest it is able to disperse through suitable habitat. Pacific silver fir is found in climates with abundant precipitation, moderate humidity, long growing season, and small seasonal and daily variation in temperature (Sudworth 1967). It is usually found on well-drained, shallow, gravelly sand to moist, sandy loam, or rocky soils. Good drainage is necessary for this species as is abundant, freely flowing soil moisture (Sudworth 1967). Pacific silver fir commonly occurs in late seral or climax mixed-conifer stands. Throughout its range the most commonly associated conifer is western hemlock (*Tsuga heterophylla*) (Cope 1992).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat Due to inefficient dispersion of seed by wind, migration of this species is slow (Cope 1992). The seeds are heavier than seeds of most Pacific Northwest conifers except noble fir, and they often do not travel far from the parent tree (Crawford and Oliver 1990). Unfertile (empty) seeds are carried farther than sound seeds; in one study, only nine percent of the fertile seeds were found more than 375 ft (114 m) from the stand edge (Crawford and Oliver 1990).

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Pacific silver fir is only found in the southern Tongass NF. Of the known Tongass NF occurrences, two have been censused, and several have anecdotal information on abundance (Appendix 1). Occurrence 8 from Prince of Wales Island has a count of four individuals, and occurrence 9 from Kosciusko Island has count of 100. Anecdotal comments include "rare and scattered," "localized stand, trees of all ages," and "uncommon." Therefore, based on the number of occurrences (11) and comments about the occurrences, this species is uncommon on the Tongass NF.
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Population trends for known occurrences of *Abies amabilis* on the Tongass NF are unknown.
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. As mentioned above, Pacific silver fir is found in well-drained forest habitat on the Tongass NF. Turner and Mallot (2025) assessed the integrity of the different ecosystems found on the Tongass, and found that there are approximately 3.5 million acres of unharvested well drained forest, and that it exhibits high ecological integrity, because it is generally unaffected by frequent large-scale or catastrophic natural disturbances, and human disturbances such as timber harvest have occurred on a relatively small portion of this ecosystem, with a current trend toward less harvest, particularly in old-growth stands. The key ecosystem drivers are frequent small-scale disturbances from windthrow, landslides, and insect and disease infestation that create small openings in the forest canopy (gap-phase dynamics) (Turner and Mallot 2025).
7 Habitat vulnerability or modification;	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Climate change, timber harvest, and fire may impact the habitat of Pacific silver fir. Alaska's annual average temperatures have increased twice as fast as the rest of the U.S. over the past 50 years, and seasonal temperatures in Southeast Alaska are projected to increase most significantly in autumn (Wiles and Warren 2025). The main stressors of the well-drained

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Criteria	*Rank*	*Rationale*
other threats		forest habitat, where Pacific silver fir occurs on the Tongass NF, are warming temperatures, shifts in the amount and type of winter precipitation (from snow to rain), and decreases in snow accumulation due to changing climate (Turner and Mallot 2025). Increased temperatures may lead to increased evapotranspiration and therefore decreased soil moisture, and growing season water deficit may lead to drought stress for species with high soil moisture requirements, such as Pacific silver fir (Turner and Mallot 2025, Wiles and Warren 2025, Cope 1992). For example, detailed research on the water requirements of this species indicates that the absorptive capacity of the roots of Pacific silver fir limit this species to sites with plenty of soil water. High mortality can result when seedlings are exposed to moisture stress (Kotar 1972). Of the 10 million acres of the forested portion of the Tongass National Forest, around 430,000 acres have been logged (Turner and Mallott 2025). A disproportionate amount of this timber harvest occurred in temperate karst rainforest (Boggs et al. 2019). Therefore, the region around occurrences 8 and 9 may have been disturbed by past timber harvest, and they are not currently in a designated wilderness area; those occurrences in previously harvested timber areas have regenerated (USFS 1992). The six southernmost occurrences of Pacific silver fire are located within the Misty Fjords National Monument Wilderness; this may provide some protection from future logging. In addition, the Red River Research Natural Area, along the Red River near Marten Arm, Bocas de Quadra, was established within the Misty Fjords National Monument partly due to the high density of Pacific silver fir within its boundaries (USFS 1980). Pacific silver fir is a fire-avoiding species throughout all stages of its life, and fire frequency is a limiting factor in its range. It is extremely fire sensitive and is easily killed by fires; this is because of its thin bark that provides little insulation for the cambium, shallow roots that are susceptible to soil heating, and highly flammable foliage (Cope 1992). Currently, fire is not an important part of the ecology of the Tongass NF (Turner and Mallott 2025). However, if climate change leads to changes in historical fire regime frequency and intensity, both on and off the plan area, this species could decrease in numbers throughout its range.
8 Life history and demographic	**B**	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known.

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Criteria	*Rank*	*Rationale*
s		Pacific Silver fir is a long-lived, late seral species with a low rate of reproduction. Its low reproductive rate is attributed to poor seed production and germination requirements. Pacific silver fir often has low pollen production, a four-to-six-week period of pollen dormancy after pollination, and a short time period for pollen germination and fertilization; it also produces many empty seeds, with the percentage of viable seed ranging from 6.3 to 35% (Stone 2021). Good seed crops are generally produced every two to three (or six) years (Stone 2021). The seeds, normally shed by the end of October, are winged but relatively heavy and do not disperse far by wind (Stone 2021). Seeds generally overwinter under snow, and germinate the following spring, preferring cool, moist sites with mineral soil (Stone 2021). Pacific silver fir is a late-seral species, and its initial growth may be in the shady understory (Cope 1992). Although seedlings are shade-tolerant, they require full sunlight for maximum growth (Crawford and Oliver 1990, Stone 2021). Early mortality of seedlings is attributable to germination on snow, adverse climatic effects, and competing vegetation (Stone 2021). "In certain habitats at low elevation, where moisture availability is not a critical factor, Pacific silver fir is apparently excluded because of inability to compete with faster-growing vegetation [...]" (Kotar 1972). "Early height growth from seeds is generally considered very slow; nine or more years are usually required to reach breast height" (Crawford and Oliver 1990). Although seedling growth in the understory is slow, once the overstory is removed, growth can be very rapid. After an initial lag following overstory removal (as by avalanche, windstorm, or clearcutting), growth rates of 50 cm (20 in) or more per year can occur (Crawford and Oliver 1990); this creates a multi-aged, old-growth forest with a major component of Pacific silver fir that will be self-perpetuating, barring a major disturbance (Crawford and Oliver 1990). This may occur after one to three centuries, with individual trees living to 500 years (Crawford and Oliver 1990).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Pacific silver fir (*Abies amabilis*) is not recommended as a Species of Conservation Concern based upon the rationale below:

- **Significant threats:** Timber harvest could impact Abies amabilis; however, occurrences in areas of prior harvest have had abies amabilis regenerate. Life history and demographics information suggest this species may be able to persist or recolonize following disturbance events. Abies amabilis requires large amounts of soil water and drought can lead to seedling mortality, so climate change may impact this species.

- **Declining trends:** Population trends for Abies amabilis on the Tongass are unknown. The ecological integrity of well-drained forests as high. Information available does not suggest that habitat is declining.

- **Restricted ranges:** Pacific silver fir is at the northernmost edge of its range, with the nearest occurrences outside of Alaska approximately 80 miles east in British Columbia, Canada. Pacific silver fir is widely distributed outside of the Tongass.

- **Low population numbers:** Pacific silver fir is uncommon on the Tongass; the current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but in combination with highly variable environmental factors, could pose a threat. Four of the 11 occurrences have multiple populations or high numbers of individuals.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 0.62 mi (1 km) are grouped into estimated occurrences, which represent populations separated by more than 0.62 mi (1 km). Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Information	Threats
1*	**ANHP ACCS_Mar25 (EO 4) [No date]**	**[Misty Fjords National Monument Wilderness] Southern Misty Fiords, main land point south of Just Island, west of Male Point. Survey site #M93-27.**			
2*	**ANHP ACCS_Mar25 (EO 8) [7/8/1993]**	**[Misty Fjords National Monument Wilderness] Just Island, mouth of Fillmore Inlet, stream entering inlet**	**Open forest**		
2	CPNWH_20250307 (UAM:Herb:10032) [7/8/1993]	[Misty Fjords National Monument Wilderness] Just Island, mouth of Fillmore Inlet, stream entering inlet, Prince Rupert Quad.	Open Sitka spruce / Nootka cedar forest.		
3*	**ANHP ACCS_Mar25 (EO 3) [No date]**	**Southern Misty Fiords National Monument, Just Island area, at mouth of Filmore Inlet, along stream feeding into small inlet. Survey site #M93-25.**	**streamside**		
4*	**ANHP ACCS_Mar25 (EO 7) [7/8/1993]**	**[Misty Fjords National Monument Wilderness] W side of Nakat Inlet, 2 miles S of head of inlet**	**Woodland**		
4	CPNWH_20250307 (WTU-408331 , UAM:Herb:9979) [7/8/1993]	[Misty Fjords National Monument Wilderness] West side of Nakat Inlet, 2 miles south of head of inlet, forested slope. Prince Rupert D-3.	Sitka spruce / western hemlock / Pacific silver fir woodland with Alnus, Menziesia, and Fauria.		
4	ANHP ACCS_Mar25 (EO 2) [7/8/1993]	Southern Misty Fiords National Monument, Nakat Inlet, 2 miles south from head of inlet, west side , approximately 164 feet (50 meters) south of stream. Survey site #M93-23.	north facing slope of stream drainage		
5*	**ANHP ACCS_Mar25 (EO 6) [7/24/1972]**	**[Misty Fjords National Monument Wilderness] 35 mi SE of Ketchikan, Very Inlet**	**hemlock-sitka spruce forest. Tree to 80ft., 18 in dbh. Bark dark gray, smooth, with resin blisters.**	**Tree to 80ft., 18 in dbh. Bark dark gray, smooth, with resin blisters. Rare and scattered**	
5	ANHP ACCS_Mar25 (EO 6) [7/24/1972]	[Misty Fjords National Monument Wilderness] 35 mi SE of Ketchikan, Very Inlet	hemlock-sitka spruce forest. Tree to 80ft., 18 in dbh. Bark dark gray,	Tree to 80ft., 18 in dbh. Bark dark gray, smooth,	

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Information	Threats
			smooth, with resin blisters.	with resin blisters. Rare and scattered	
5	ANHP ACCS_Mar25 (EO 1) [No date]	[Misty Fjords National Monument Wilderness] Very Inlet, 35 mi. southeast of Ketchikan.			
6*	**ANHP ACCS_Mar25 (EO 9) [7/9/1997]**	**Alexander Archipelago, [Central] Revillagigedo Island, E side of Thorne Arm, ca. 2.5 mi (4 km) NE of Elf Point and 2.5 mi (4 km) SE of mouth of Gokachin Cr.**	**steep hillside with NE aspect, closed canopy forest dominated by *Abies amabilis*, in localized stand at northern edge of range, trees of all sizes, many 3-4 ft. dbh**	**in localized stand at northern edge of range, trees of all sizes, many 3-4 ft. dbh**	
6	CPNWH_20250307 (WTU-408563, UAM:Herb:19196) [7/9/1997]	[Central] Revillagigedo Island on east side of Thorne Arm, about 2.5 mi northeast of Elf Point. About 2.5 mi southeast of mouth of Gokachin Creek.	Steep hillslope with northeast aspect, closed canopy forest dominated by *Abies amabilis* with Tsuga heterophylla, Piceca sitchensis with some Chamaecyparis nootkatensis. Abies in localized stand at northern edge of range, trees of all ages, many 3-4 foot dbh	localized stand at northern edge of range, trees of all ages, many 3-4 foot dbh	
6	ANHP ACCS_Mar25 (EO 10) [7/9/1997]	Tongass National Forest, SealevelTS,U133,UpSealevelCrk 3 mi	Slope = 60; Aspect= NE		
6	USFS_TESPPLY_20250221 (100552P000056) [7/9/1997]	[Central Revillagigedo Island]			
6	ANHP ACCS_Mar25 (EO 11) [8/26/1997]	Tongass National Forest, SealevelTS,U126,Sealevel Creek			
6	USFS_TESPPLY_20250221 (100552P000052) [8/26/1997]	[Central Revillagigedo Island]			
6	CPNWH_20250307 (UAM:Herb:144097) [8/26/1997]	Thorne Arm, [Central] Revillagigedo Island, ca. 2 miles up Sealevel Cr., 0.5 mile W of creek, Ketchikan Quad, Tongass National Forest.			
7*	**ANHP ACCS_Mar25 (EO 12) [7/29/1998]**	**[Gravina Island] Tongass National Forest, GravinaTS,Silver Fir Bowl**		**Multiple populations.**	
7	ANHP ACCS_Mar25 (EO 12) [7/29/1998]	[Gravina Island] Tongass National Forest, GravinaTS,SilverFirBowl,So.SpotMtn		Multiple populations.	

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Information	Threats
7	ANHP ACCS_Mar25 (EO 12) [7/29/1998]	[Gravina Island] Tongass National Forest, GravinaTS,Silver Fir Bowl,SpotMtn		Multiple populations.	
7	USFS_TESPPLY_20250221 (100552P000105) [7/29/1998]	[Gravina Island]			
7	USFS_TESPPLY_20250221 (100552P000102) [7/29/1998]	[Gravina Island]			
7	USFS_TESPPLY_20250221 (100552P000108) [7/29/1998]	[Gravina Island]			
8*	**ANHP ACCS_Mar25 (EO 13) [7/15/2013]**	**[Prince of Wales Island] S of Pt. Baker, E of Mt Calder, Flicker Ridge, along FS road to Flicker Ridge.**	**Calcareous rock outcrop road cut.**	**Uncommon**	
8	USFS_TESPPLY_20250221 (100554P000528Y13) [7/15/2013]	[Prince of Wales Island]		4 genets	
8	CPNWH, March 2025 (UAM:Herb:250713) [7/15/2013]	S of Pt. Baker, E of Mt Calder, Flicker Ridge, along FS road to Flicker Ridge, Petersburg Quad, Alexander Archipelago, Prince of Wales Island.	Calcareous rock outcrop road cut.	Uncommon	
9*	**ANHP ACCS_Mar25 (EO 13) [6/19/2010]**	**[Kosciusko Island] Tongass National Forest**			
9	USFS_TESPPLY_20250221 (100554P000342) [6/19/2010]	[Kosciusko Island]		100 plants	
10*	**USFS_TESPPLY_20250221 (100552P000321Y12) [7/11/2012]**	**[SE Revillagigedo Island]**			
10	USFS_TESPPLY_20250221 (100552P000319Y12) [7/11/2012]	[SE Revillagigedo Island]			
10	USFS_TESPPLY_20250221 (100552P000318Y12) [7/11/2012]	[SE Revillagigedo Island]			
10	USFS_TESPPLY_20250221 (100552P000320Y12) [7/11/2012]	[SE Revillagigedo Island]			
11*	**ANHP ACCS_Mar25 (EO5) [8/16/1948]**	**[Misty Fjords National Monument Wilderness] Martin Arm, Boca de Quadra**			
11	ANHP ACCS_Mar25 (EO5) [8/16/1948]	[Misty Fjords National Monument Wilderness] Martin Arm, Boca de Quadra			

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Acrobolbus ciliatus

Acrobolbus ciliatus [(Mitt.) Schiffn., 1893]

liverwort

Global Rank: **G3?**

Alaska State Rank: **S2**



photo: Blanka Aguero. CC BY-SA 4.0

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Isolated. *Acrobolbus ciliatus* is known from one estimated occurrence on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is located on Baranof Island east of Sitka below Blue lake in a canyon on a humid cliff shelf (ACCS 2025, USFS 2025a). There is one occurrence of this species in southeastern Alaska outside of the Tongass NF to the northwest in Glacier Bay National Park and Preserve (ACCS 2025, CBH 2025). Across its range, *Acrobolbus ciliatus* is typically found in shady, boulder-rich areas near creeks or other water sources (CBH 2025). There are no other species in the genus *Acrobolbus* or subspecies in TNF that may be confused for *Acrobolbus ciliatus*, though this species may be confused for other liverwort species (CBH 2025, iNaturalist 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	B = Widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF. Global Rank G3?, Alaska State Rank S2 *Acrobolbus ciliatus* is scattered in distribution in a number of disjunct regions around the world including the Himalayan Mountains, Japan, Greenland, southeast Alaska, the Aleutian Islands, and the southern Appalachian Mountains (CBH 2025). In North America, *Acrobolbus ciliatus* is present in U.S. states Tennessee, North Carolina, and Virginia centered in the Appalachian Mountains, but is not present in any Canadian provinces or territories (CBH 2025). Beyond the one other known occurrence in southeast Alaska in Glacier Bay National Park, the next closest known locations are approximately 1700 miles away on the Aleutian Islands (CBH 2025). Across its range, *Acrobolbus ciliatus* occurs on moist rocks or soil in hardwood or sometimes coniferous forests, often along a creek or river at elevations of 0 m to 3,613 m (CBH 2025). Where it occurs, it is generally limited in extent and restricted to moist rock habitats (CBH 2025). It is typically found in shady and very wet areas, such as in the spray zone of waterfalls (CBH 2025). The rocks where this species are found are typically described as granite boulders, mica schist, or siliceous cliffs (CBH 2025).
3 Dispersal capability	A	A = Very limited dispersal ability. *Acrobolbus ciliatus* is a leafy liverwort with a terrestrial growth habit on rocks or soil (CBH 2025). Its main dispersal mechanism is by clonal growth. Most populations are Pleistocene relicts and underwent a bottleneck, leaving unisexual populations (only males in Japan and only females in the southern Appalachian Mountains and elsewhere; Frey and Kürschner 2011). This significantly limits the dispersal ability of *Acrobolbus ciliatus*.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The sole occurrence does not have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The one occurrence on the Tongass NF was relocated in 2023 (iNaturalist 2025). However, no population estimates are recorded for either the 1968 or 2023 records, so population trends are unknown.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The habitat for the sole occurrence of *Acrobolbus ciliatus* on the Tongass NF is deciduous and coniferous riparian forest (CBH 2025). (Turner and Mallott 2025). The construction of a dam on Blue Lake, a campground on Sawmill Creek, and a road to both of these locations, may have impacted the habitat of the one occurrence. Many invasive species (including reed canarygrass, *Phalaris arundinacea*) are recorded along the road, in the campground, and near the dam. The impact of these invasive species on the habitat of *Acrobolbus ciliatus,* however, is unclear. Timber harvest has not occurred in the recent past near the sole occurrence but is widespread nearby on Baranof Island (USFS 2025d) and may have impacted potential habitat.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Invasive species, timber activities, and climate change may impact the habitat of *Acrobolbus ciliatus*. The habitats most vulnerable to invasion by non-native species on the Tongass NF include riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025). On the Tongass, reed canarygrass was historically used in the seed mix spread to prevent erosion. Because of this, reed canarygrass is widespread in many watersheds where it has entered riparian habitat at road crossings and then spread downstream. It out competes native plants particularly well in more palustrine streams, beaver pond areas and lakeshores. Very shady, rocky habitat that this species is expected to occur in will likely be less affected by invasive species. Recent timber harvest activities have not occurred directly in the vicinity of the riparian forest ecosystem at the one occurrence (USFS 2025d), but timber harvest activity will likely continue on Baranof Island in the future. However, if the

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Criteria	*Rank*	*Rationale*
		hydrology of these riparian forest ecosystems remains intact, the deciduous and coniferous riparian forests on the Tongass are not expected to change in the short or long term (Turner and Mallott 2025). Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for moisture-dependent species such as *Acrobolbus ciliatus* (Turner and Mallott 2025, Wiles and Warren 2025). Streamflow and discharge patterns will change across the Tongass as temperatures rise and precipitation patterns change (Shanley et al 2015, EcoAdapt 2014). In glaciated watersheds in the short term, as temperatures rise, stream flows will increase with peaks in late summer (Shanley et al 2015). In snow melt dominated watersheds, winter flows will be higher and late summer flows will be lower (Hodgkins 2009). Precipitation changes and rain on snow events are likely to contribute to increased and larger magnitude floods and erosion (EcoAdapt 2014, Hamlet and Lettenmaier 2007). Longer duration and increased depth of flooding generally decrease riparian species diversity in temperate regions with relatively stable stream flows (Garssen et al 2015). A study of riparian vegetation across temperate Europe found that functional diversity also declined in flooded conditions (Baatrup-Pedersen et al 2018). In addition, increased variability in stream flow will be accompanied by increased movement of sediment, which can deposit on plants, reducing photosynthesis or bury them completely (Nilsson and Svedmark 2002).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Acrobolbus ciliatus* is a leafy liverwort with flattened, creeping shoots. It is not reported to produce sporophytes within its North American range and probably reproduces by the deciduous cilia of the leaves (Schofield 2002).

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

Acrobolbus ciliatus is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Timber harvest and the effects of climate change (including changes to stream flow and flooding) may pose a threat to this species, but without more information it is unknown how significant these threats are.
- **Declining trends:** Population trends are known. Habitat may have experienced declines (including road buildling and other construction near the one occurrence) but the degree to which this has impacted habitat suitability for *Acrobolbus ciliatus* is unknown.
- **Restricted ranges:** The species' global distribution is widely disjunct, with far flung, apparently isolated patches. Beyond the one other known occurrence is southeast Alaska, the next closest occurrence is over 1700 miles away on the Aleutian islands.
- **Low population numbers or restricted ecological conditions:** On the Tongass NF, there is just one occurrence of unknown size. Bryophytes are not typically recorded in botanical surveys so it may be more common than survey data indicates. However, population numbers are rare globally so undiscovered high population numbers on the Tongass NF would be the exception. Ecological conditions are apparently not restricted on the Tongass NF, but it is possible there are specific microhabitat requirements.
- **Other factors:** Dispersal may be limited by lack of spore production.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Agoseris aurantiaca var. aurantiaca

photo: Steve Matson
(CC BY-NC) (iNaturalist 2025)



Agoseris aurantiaca (Hook.) Greene var. *aurantiaca*

Orange Agoseris

Global Rank: **G5TNR**
Alaska State Rank: **S1S2**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated. *Agoseris aurantiaca* var. *aurantiaca* is known from two occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 0.62 mile (1 km) (NatureServe 2025). Both occurrences are on the mainland in the Coast Mountains on the east side of the Forest (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Occurrence 1 is at Goat Lake northwest of Skagway, 1.2 air miles from the northern boundary of the Tongass NF and five air miles west of the border between Alaska and British Columbia. Occurrence 2 is north of Juneau in the Juneau Ice Field approximately 10 air miles west of the border between Alaska and British Columbia. In addition to these two Forest occurrences, there are nine other occurrences close to and north of the Forest, with one near Haines, two along the Haines Highway, three at Glacier Bay National Park, two near Haenke Glacier at Disenchantment Bay, and one on Takhin Ridge (Appendix 1; Klinkenberg 2020, ANHP ACCS 2025, CPNWH 2025). On the Tongass NF, *Agoseris aurantiaca* var. *aurantiaca* has been observed in deglaciated moraine habitat growing in cobbles to boulders with lichens and vegetation between rocks. Occurrence 1 was observed in 1993 on moraine that had been recently deglaciated (as of 1993). Occurrence 2 was observed in 2011 on moraine that had been deglaciated some time ago (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Associated species mentioned by the collector or observer or collected at the same time include *Micranthes lyallii*, *Dryas octopetala*, *Arnica latifolia*, *Hieracium triste*, *Poa leptocoma, Gentiana glauca*, *Dryas* sp., *Epilobium* sp., and *Botrychium* sp. (Appendix 1; CPNWH 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	C = Widely distributed outside of the Tongass NF. Global Rank: G5TNR (Species is Secure, Variety Not Ranked), Alaska State Rank: S1S2 (rounded to S1, Critically Imperiled) (NatureServe 2025) State Ranks: Canadian provinces and territories: S3 (Vulnerable): Yukon; S5 (Secure): British Columbia; all others are SNR (Not Ranked) or not present; United States: S3 (Vulnerable): Nevada, Wyoming; all others are SNR (Not Ranked) or not present (NatureServe 2025). *Agoseris aurantiaca* var. *aurantiaca* is a North American perennial herb that has been found in Alaska, Yukon, Northwest Territories, Alberta, British Columbia, and Quebec (as a disjunct), and the states of California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming (Baird 2006, NatureServe 2025, NRCS 2025). Across its range, *Agoseris aurantiaca* var. *aurantiaca* occurs in upper montane to alpine zones in wet to dry areas in forest openings, meadows, shrublands, marshes, stream and lake margins, bogs, and muskegs (Baird 2006, Klinkenberg 2020, Gucker and Shaw 2021, Oregon Flora 2025). It occurs on a variety of soil types, including nutrient poor soil, and is often found in disturbed areas such as roadsides (Baird 2006, Gucker and Shaw 2021, CPNWH 2025). Elevations given in most references range from approximately 657 to 11,811 feet (200 to 3600 meters) (Baird 2006, Klinkenberg 2020). However, some Alaskan specimens have very broad elevational ranges that start at sea level (ANHP ACCS 2025, CPNWH 2025). Alaskan records are at the northwestern edge of the taxon's range, where it occurs from the northern Alexander Archipelago northwest to Valdez-Cordova (Haines and Hoonah-Angoon) (ANHP ACCS 2025, CPNWH 2025). The two records on the Tongass NF are the southernmost records in Alaska (ANHP ACCS 2025, CPNWH 2025). It is widespread in British Columbia, occurring in the upper montane to alpine zones (Klinkenberg 2020, CPNWH 2025).

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Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	B = Disperses only through suitable habitat The small, one-seeded fruits (achenes or cypselae) of *Agoseris aurantiaca* var. *aurantiaca* are wind-dispersed by the delicate white, umbrella-like structure (pappus) attached at one end (Jensen 2007). It is thought to be disturbance adapted and an early colonizer of disturbed sites in full sun (Gucker and Shaw 2021). With these dispersal characteristics, this species should be able to disperse through suitable habitat in the forest that is mainly available on the mainland.
4 Abundance on Tongass NF	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Agoseris aurantiaca* var. *aurantiaca* is known from only two occurrences in the northeast Tongass NF. Only occurrence 2 near Gilkey Glacier has information on population size at the location which states that there were several individuals (Appendices 1 and 2; USFS 2025a).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, population trends for known occurrences of *Agoseris aurantiaca* var. *aurantiaca* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. *Agoseris aurantiaca* var. *aurantiaca* is only found in the northeast part of the Forest on moraine substrate at upper elevations near glaciers (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). In off Forest occurrences in Southeast Alaska it is found on scree, talus, and moraine substrates in the subalpine and recently deglaciated areas, as well as a river floodplain and beach habitat (ANHP ACCS 2025, Arctos 2025, CPNWH 2025). This habitat is broad and likely stable. Recently deglaciated habitat may be impacted by succession and colonization by other plant species, but additional habitat will be added as glaciers continue to melt.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Scree and talus habitat may be impacted by changes in temperature, precipitation as snow, and evapotranspiration rates, all of which may alter water availability (Turner and Mallott 2025, Wiles and Warren 2025). The loss of snow and ice and glacial retreat in southeast Alaska is already evident, but it is unclear how changes in these ecosystems would impact *Agoseris aurantiaca* (Turner and Mallott 2025). The species may be disturbance adapted because it is often an early colonizer (Gucker and Shaw 2021). It could be impacted by changes that allow for woody encroachment into habitat, although in scree and talus lack of soil likely limits tree establishment.
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** *Agoseris aurantiaca* var. *aurantiaca* is a perennial herb that grows each season from a simple to branched underground stem (caudex) and a strong, deep taproot; it has a life span that has been described as both short- and long-lived (Baird 2006, Gucker and Shaw 2021). It is thought to be disturbance adapted and an early colonizer of disturbed sites in full sun (Gucker and Shaw 2021). All the leaves are basal, and the herbage exudes a milky juice when damaged (Gucker and Shaw 2021). Flowers are produced in the summer months, with the fruits ripening quickly after pollination; the plants normally produce one to three flower heads per year, but they can produce more, depending on moisture availability (Jensen 2007, Gucker and Shaw 2021). Flower heads are produced singly at the end of upright leafless stalks (Baird 2006, Gucker and Shaw 2021). The flowers are bisexual and pollinated by insects; this species has been known to be visited by flies, bees, and butterflies (Gucker and Shaw 2021). The one-seeded fruits (achenes or cypselae) are wind-dispersed by the delicate white, umbrella-like structure (pappus) attached at one end (Jensen 2007). The seeds are mature when the fruit pappus spreads open (Jensen 2007). Seed viability was 79% for dry seed stored for 34 days at 15% relative humidity and -4 degrees F (Gucker and Shaw 2021). After three weeks of stratification, most seeds germinated within two weeks; 50% of unstratified seeds germinated after 70 days (Jensen 2007, Gucker and Shaw 2021).

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

- **Significant threats**:
  - There are no localized threats to occurrences in the plan area.
  - Changing climate is expected to increase growing season water deficit and increase loss of snow and ice and glacial retreat potentially impacting habitat.
- **Declining trends**:
  - No data is available on population trends of *Agoseris aurantiaca* var. *Aurantiaca* in the plan area.
  - Habitat in Southeast Alaska is broad, found in areas with talus, scree or thin soils on the Northern edge of the forest. Habitat trends are difficult to discern; habitat may expand as glaciers melt, but existing habitat is altered as temperatures rise and more precipitation falls as snow.
- **Restricted ranges**:
  - This species is not endemic to the plan area.
  - Occurrences in the plan area are not disjunct from the species overall range.
  - Occurrences in the plan area are near but not at the edge of the species range.
- **Low populations or restricted ecological conditions:** There are only two known occurrences of this species in the plan area making it vulnerable to local extirpation. The species is an early colonizer and may be disturbance adapted.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ANHP-ACCS_Mar25 (EO10)[7/27/1993]**	**Skagway Quadrant; Goat Lake, 7 miles northeast of Skagway, south end of lake.**	**Recently de-glaciated terminal moraine, cobbles to boulders with lichens and vegetation between rocks.**		
1	CPNWH_April2025(ALA-UAM:Herb:9567); Arctos 2025 [7/27/1993]	Coast Mts., Goat Lake, 7 miles NE of Skagway, S end of lake, Skagway Quad, Tongass National Forest.	Recently de-glaciated terminal moraine, cobbles to boulders with lichens and vegetation between rocks. [Also collected in same place and habitat on same date: Micranthes lyallii, Dryas octopetala, Agoseris glauca, Arnica latifolia, Hieracium triste, Poa leptocoma, Gentiana glauca, Dryas]		
2*	**ANHP-ACCS_Mar25 (EO7)[8/05/2011]**	**Paradise Valley, between the Bucher and Gilkey Glaciers on the Juneau Icefield**	**western slope of valley on lateral moraine of long-ago retreated hanging glacier, along mt goat trail, exposed steep moraine, E-facing 20 degree slope. [Collected on same date at same place and in same habitat: Botrychium]**		
2	CPNWH_April2025(ALA - UAM:Herb:246006); Arctos 2025 [8/05/2011]	Paradise Valley, between the Bucher and Gilkey Glaciers on the Juneau Icefield, Juneau Quad, Tongass National Forest, Alexander Archipelago.	Western slope of valley on lateral moraine of long-ago retreated hanging glacier, along mt goat trail, exposed steep moraine with Epilobium, E-facing 20 degree slope, few plants.		
2	USFS-TESP_Mar25 (100533P001038Y11)[8/05/2011]	Site name: paradise valley west side		several individuals only one collected	
		Occurrences North of the Tongass NF in SE Alaska			
3*	**ACCS_Mar25 (EO1)[no date]**	**Ridge 2.5 km N of confluence with Disenchantment Bay. Near Haenke Glacier. Gulf of Alaska.**			

3	ACCS_Mar25 (EO1)[7/26/2003]	St. Elias Mts. near Disenchantment Bay, Haenke Glacier, ridge 2.5 km N of confluence with Disenchantment Bay	on ridge in open, shale area with sparse vegetation cover		
4*	**ACCS_Mar25 (EO2)[no date]**	**Talus field and ridge N of glacier. Near Haenke Glacier.Disenchantment Bay.Gulf of Alaska.**	**Talus field and ridge**		
4	ACCS_Mar25 (EO2)[7/26/2003]	St. Elias Mts. near Disenchantment Bay, Haenke Glacier, talus field and ridge N of glacier	talus field and ridge on unstable, 25% unvegetated scree and moss		
5*	**ACCS_Mar25 (EO4)[6/22/2000]**	**GLACIER BAY, WOLF, MUIR INLET**	**BEACH REGION**		
6*	**ACCS_Mar25 (EO12)[8/15/2001]**	**Glacier Bay, Muir Inlet, near terminus of Muir Glacier, N side of inlet, UTM 427301.42N, 6551135.9W, T 32 S, R 55 E, S 15**	**25¬ colluvial slope**		
7*	**ACCS_Mar25 (EO6)[8/11/2001]**	**Glacier Bay, W side of Willoughby I., N of VABM Will , UTM 434344.93N, 6495305.8W, T 38 S, R 56 E, S 10**	**limestone summit, subalpine open low willow-herbaceous mosaic with exposed, thin organics covering bedrock, 7¬ slope**		
8*	**ACCS_Mar25 (EO8)[7/08/1946]**	**Haines Highway mile 42.**			
9*	**ACCS_Mar25 (EO9)[7/01/1964]**	**Haines highway mile 95.**			
9	ACCS_Mar25 (EO9)[7/01/1968]	Haines hiway, mile 95.5.			
10*	**ACCS_Mar25 (EO11)[7/20/2000]**	**Haines Alaska, Takhin River Floodplain.**	**Abandoned airstrip, open poplar forest and active river floodplain.**		
11*	**ACCS_Mar25 (EO13)[7/18/2000]**	**St. Elias Mts., Takhin Ridge, W end, upper Takhin R. valley**	**limestone outcrops and subalpine mesic meadows with scattered shrubs**		

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Agoseris glauca

photo: © Gerald D. Carr (Oregon Flora 2025)



Agoseris glauca (Pursh) Raf.

Prairie Agoseris

Global Rank: **G5**

Alaska State Rank: **S2**

Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	D	D = Insufficient information – no confirmed location on the Tongass National Forest (Tongass NF). CNPS was tasked with evaluating the species *Agoseris glauca*, and a location spreadsheet was prepared. In the Deliberative Record, the only comment is "Specimen collected by MS at Goat Lake (north of Skagway) on NFS land 11/29/23" (USFS 2025c). The only record for this species on the Tongass NF is a collection made by Mary Stenvold at Goat Lake on 27 July 1993 (Klinkenberg 2020, Arctos 2025, CPNWH 2025). That collection was identified by Carolyn Parker in 1993 as *Agoseris glauca*, and one duplicate is now housed at ALA (ALA-UAM:Herb:9567), and one is housed at WTU (WTU333164) (Arctos 2025, CPNWH 2025). In 2015, Carolyn Parker changed the determination on the ALA duplicate to *Agoseris aurantiaca* var. *aurantiaca* (Arctos 2025, Webb 2025 pers. comm.), and that specimen is the basis of EO 10 of *Agoseris aurantiaca* var. *aurantiaca* in the Alaska Natural Heritage Program database (ANHP ACCS 2025). However, the WTU duplicate still needs to be redetermined and continues to display under *Agoseris glauca* in the CPNWH (2025).

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Criteria	Rank	Rationale
		Given that the only specimen record of *Agoseris glauca* on the Tongass NF has been redetermined, this species cannot be confirmed as being on the Tongass NF and cannot be considered as a Species of Conservation Concern.
2 Distribution in surrounding geographic area	C	C = Widely distributed outside of the Tongass NF [While the Alaskan records are most likely *Agoseris glauca* var. *dasycephala*, they have not been identified to variety, so the information provided in this document is for the species.] Global Rank: G5 (Secure), Alaska State Rank: S2 (Imperiled) (NatureServe 2025) State Ranks: Canadian provinces and territories: S3 (Vulnerable): Northwest Territories; S4 or S5 (Apparently Secure or Secure): Alberta, British Columbia, Manitoba, Ontario, Saskatchewan; SNR (Not Ranked): Yukon; United States: S2 (Imperiled): Michigan; S4 or S5 (Apparently Secure or Secure): Montana, Wyoming; all others are SNR (Not Ranked) or not present (NatureServe 2025). *Agoseris glauca* is a North American perennial herb that occurs in Alaska, Ontario, Manitoba, Northwest Territories and the rest of western Canada, and in Michigan and all states west of (and including) Minnesota, Iowa, Nebraska, Kansas, and New Mexico (Baird 2006, NatureServe 2025, NRCS 2025). Across its range, *Agoseris glauca* occurs in a wide variety of habitats including sagebrush steppe, pinyon-juniper woodland, montane coniferous forest, alpine meadow, northern prairie, and arctic tundra (Baird 2006, Klinkenberg 2020, Gucker and Shaw 2023, Oregon Flora 2025). Sites may be wet or dry and are often on coarse-textured gravelly or rocky soils (Baird 2006). Elevations range from 657 to 11,811 feet (100 to 3600 meters) (Baird 2006). Alaskan records are at the northwestern edge of the taxon's range and are confined to an area of approximately 656.37 sq. mi (1,700 sq. km.) in the vicinity of Haines and Skagway near the border with British Columbia (ANHP ACCS 2025,

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Criteria	Rank	Rationale
		CPNWH 2025). *Agoseris glauca* is widespread in British Columbia, where it occurs from the steppe to alpine zone (Klinkenberg 2020, CPNWH 2025).

Conclusion Rationale

Species is not known to occur on the Tongass NF, as such, it is not being considered for inclusion as an SCC.

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Andreaea sinuosa

Andreaea sinuosa [B. Murr., 1986]

a rock moss

Global Rank: **G2**

Alaska State Rank: **S1**

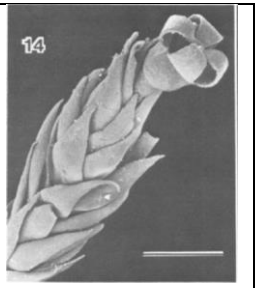


photo: Murray, B.M

Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Andreaea sinuosa* is known from one estimated occurrence on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The single occurrence is located on Wrangell Island, approximately 9 miles SSE of the Borough of Wrangell, in subalpine muskeg at approximately 2380 feet (CPNWH 2025, USFS 2025a). The habitat for the one occurrence is described as open, west-facing muskeg with saturated slopes surrounding a subalpine lake with *Tsuga heterophylla* and *Callitropsis nootkatensis* along the margin (Appendix 1). The microhabitat is described as an area with seepage that is mostly exposed, with a substrate of thin soil over rock (Appendix 1). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025). This species may be confused for other *Andreaea* species which are also present nearby (iNaturalist 2025). The species it is most likely to be confused with in the field is the polymorphic *A. rupestris* (Murray 1986).

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Criteria	Rank	Rationale
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside the Tongass NF, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF. Global Rank G2, Alaska State Rank S1 British Columbia S3? *Andreaea sinuosa* is found in isolated populations in three disjunct regions, Coastal British Columbia/southeast Alaska, the Aleutian Islands, and Scotland (Murray 1986). It occurs on rocks and soil in areas that get high amounts of snow that lasts late into the spring at elevations of 600 m to 1300 m (CBH 2025). Known populations are limited to a few sites in these three regions (CBH 2025, Murray 1986). It is likely, however, that the species occurs in other regions with similar climates and habitats (Murray 1986). The closest occurrences to the Tongass NF occurrence are over 200 miles to the south on Haida Gwaii, and over 2000 miles to the east on Attu Island (Murray 1986, CPNWH 2025, CBH 2025). *Andreaea sinuosa* occurs on acidic rock in mountainous regions with a humid temperate climate. In British Columbia, it is found in the subalpine and alpine zones at 1800-4500 feet (550-1375 meters). All of the British Columbia localities are on boulders in late-lying snow areas. In Scotland, *Andreaea sinuosa* is a snow-bed specialist (Murray 1986).
3 Dispersal capability	**D**	D = Insufficient information to draw inferences about criterion. *Andreaea sinuosa* is an acrocarpous moss with a terrestrial growth habit (FNA 2025). Its main dispersal mechanisms are by spores and clonal growth (Murray 1986). Spores are apparently dispersed by wind. The small number of widely dispersed sites may be a function of limited dispersal ability and relict populations or limited appropriate habitat.
4 Abundance on Tongass NF	**A**	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Andreaea sinuosa* is known from one occurrence on the Tongass NF (Appendix 1). The occurrence does not have a population estimate or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).

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Criteria	Rank	Rationale
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Population trends of *Andreaea sinuosa* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	**A**	A = Decline in habitat quality or quantity. The habitat for the occurrence of *Andreaea sinuosa* on the Tongass NF is an open west-facing muskeg at approximately 2400 feet. Based on satellite imagery, the location for the occurrence appears to be a muskeg that sits in a montane-subalpine transition zone. Across its range, *Andreaea sinuosa* appears to be a snow-bed specialist, thus it is likely to be restricted to late-lying snow areas on the Tongass as well. Loss of snow and ice in southeast Alaska due to shifting climate is already evident (Turner and Mallott 2025). As snow and ice distribution on the Tongass changes, it is unknown if this species will be able to disperse to new suitable microhabitats. There is a road approximately 0.5 miles downslope from the occurrence with mapped invasive plants, including reed canarygrass (*Phalaris arundinacea*) (USFS 2025b). A 40 acre stand clearcut from 1996 is mapped just below the same road. Due to the distance and downslope location, the road, invasive plants, and clearcut are not likely to be affecting habitat quality at the *Andreaea sinuosa* occurrence.
7 Habitat vulnerability or modification; other threats	**A**	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. In the future, more precipitation is expected to fall as rain rather than snow on the Tongass NF (Halofsky et al DRAFT), likely leading to spatial shifts in suitable habitat for this species. In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for some species (Turner and Mallott 2025, Wiles and Warren 2024). However, habitat for *Andreaea sinuosa* is normally bare rock, so expected decreased soil moisture may not impact this species in the same way as rooted plants.

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Criteria	Rank	Rationale
		Persistent snowpack protects low-stature alpine vegetation from severe winter temperatures and wind, which also prevents trees and tall shrubs from establishing and thus maintains the extent of alpine plant communities (Turner and Mallott 2025). Climate change may lead to upslope shift in elevation of tree line and an increased proportion of woody vegetation relative to herbaceous (Halofsky et al DRAFT). *Andreaea sinuosa* is only known from open, unshaded locations, so encroachment of trees and tall shrubs would likely decrease habitat suitability.
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. *Andreaea sinuosa* is an acrocarpous moss with an erect/leafy growth habit (Murray 1986). It produces leafy stems with ecostate leaves that are simple (Murray 1986). Specialized asexual reproduction is absent for this species. It is not known whether this species has frequent recruitment in occupied habitat, or if it is largely persistent in stable habitat. Most Andreaea species occur in habitats with seasonal extremes of moisture and tolerate extreme desiccation as well as submergence. Snow-bed species have a short growing season and are seasonally submerged, but after the snow melts they may be very dry and exposed. Lack of competition in such sites could also be a factor affecting their distribution (Murray 1986).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☒	☐	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☒	☐	☐

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Conclusion Rationale

Andraea sinuosa is not recommended as a potential Species of Conservation Concern based upon the following:

- Significant threats: Climate change is expected to lead to a continuing trend of decreased snow and ice, an upslope shift in elevation of tree line, and an increased proportion of woody vegetation relative to herbaceous. *Andreaea sinuosa* is a snow-bed specialist species that grows on rock in full sun at higher elevations. Decreased snow and increased woody vegetation may render existing habitat unsuitable. It is unknown if the species would be able to disperse upslope quickly enough to new habitat.
- Declining trends: Population trends are unknown. Loss of snow and ice across the region indicates a decline in habitat.
- Restricted ranges: *Andreaea sinuosa* is known globally only from disjunct populations in Alaska, British Columbia, and Scotland. Known populations are limited to a few sites in these three regions. The next nearest records to the Tongass NF occurrence are over 200 miles to the south on Haida Gwaii.
- Low population numbers or restricted ecological conditions: There is one known occurrence of *Andraea sinuosa* on the Tongass NF. In other portions of its range, the species is known to be a snow-bed specialist and is likely to be on the Tongass NF as well. Alpine and subalpine habitats with late lying snow are not uncommon on the Tongass, but are known to be decreasing and changing
- Other factors: Bryophyte surveys on the Tongass NF have been very limited so the species may be more widespread than is currently known. However, rarity across its range (few records worldwide and a global ranking of G2, Imperiled) indicate that the species may also be rare on the Tongass NF despite limited surveys.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Androsace chamaejasme lehmanniana

Androsace chamaejasme ssp. *lehmanniana*

[(Sprengel) Hultén, 1948]

Lehmann's Fairy-candelabra

Global Rank: **G5T5**

Alaska State Rank: **SNR**



photo: (cc0) Cecelia Alexander

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy or gaps. *Androsace chamaejasme* ssp. *lehmanniana* is known from seven estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located in the southern portion of the Tongass NF including on Prince of Wales Island (Occurrences 1, 3, and 4), Heceta Island (Occurrence 2), Dall Island (Occurrence 5), and Coronation Island (Occurrences 6 and 7) (Appendices 1 and 2; CPNWH 2025, USFS 2025). Records for both *Androsace chamaejasme* and *Androsace chamaejasme* ssp. *lehmanniana* were included; previously a second subspecies *andersonii* had been reported from Tongass National Forest, but this subspecies has since been synonymized with ssp. *lehmanniana;* additionally Flora of North America places all North American individuals of the species in subsp. *lehmanniana* (CPNWH 2025, FNA 2025, ITIS 2025). Therefore, all specimens for *Androsace chamaejasme* in the Tongass are assumed to be ssp. *lehmanniana.* Within the Tongass NF boundary, this species occurs in alpine talus meadows associated with humus, karst stone, and limestone (Appendix 1). Occurrence 1 was collected on humus between karst stones and in a forb and graminoid

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Criteria	*Rank*	*Rationale*
		dominant location (Appendix 1). Occurrences 2 and 4 were collected on alpine talus meadow (Appendix 1). Occurrence 3 was collected on the northeast side of a limestone ridge, growing in accumulated soil (Appendix 1). There is an additional occurrence of this species in southeastern Alaska near Juneau, recorded in 1980 (CPNWH 2025). The exact location of this occurrence is uncertain; the locality is Powerline Ridge with a recorded elevation of 100-150 ft; this suggests the observation was made outside the Forest (possibly at the trailhead that leads to the ridge), as the Forest boundary in the area of the ridge is at a minimum of 2000' elevation; therefore it was excluded from the reported occurrences within the Forest. Across its range, *Androsace chamaejasme* ssp. *lehmanniana* is typically found in rocky open habitats in tundra at elevations of 0 to 4,000 m (FNA 2025). It occurs on calcareous soils (Jaques 1973). In Southeast Alaska, it occurs on limestone primitive surfaces of Prince of Wales Island and is considered a calcicolous species (Jaques 1973).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank GNR, Alaska State Rank SNR *Androsace chamaejasme* ssp. *lehmanniana* is broadly distributed throughout much of western North America from Alaska and western Canada to the Rocky Mountain states (FNA 2025). Across its range, *Androsace chamaejasme* ssp. *lehmanniana* occurs in open tundra habitats at elevations of 0 m to 4,000 m (FNA 2025). It is typically found in open and rocky habitats with full sun (FNA 2025). In southeastern Alaska this species is known from seven occurrences on the Tongass NF, as well as one occurrence near Juneau with insufficient location uncertainty to determine if it is on the Tongass NF. The next closest occurrences are near Haines Junction, approximately 200 miles from the Juneau occurrence (CPNWH 2025).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. *Androsace chamaejasme* ssp. *lehmanniana* is a perennial herb with a growth habit that forms loose to dense mats (FNA 2025). Its main dispersal mechanism is by seed but its mat forming habit may also contribute to local spread (Chambers et al. 2022).

Criteria	*Rank*	*Rationale*
		This species habitat is calcareous alpine/subalpine which is a patchy habitat type often separated by long distances.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Androsace chamaejasme* ssp. *lehmanniana* on the Tongass NF are unknown (USFS 2025, CPNWH 2025).
6 Habitat trend on Tongass NF	A	A = Decline in habitat quality or quantity Habitat for *Androsace chamaejasme* ssp. *lehmanniana* on the Tongass NF is high elevation, rocky open habitats associated with limestone (FNA 2025). In adjacent locations including in the Rocky Mountain and western Canada, it also occurs in rocky, open tundra or alpine habitats with calcium rich soils and areas with limestone (Appendix 1; Jaques 1973; FNA 2025). These habitats can be grouped under Alpine Vegetation which occurs above the tree line and consists mainly of herbaceous and dwarf shrub species (Turner and Mallott 2025). Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). Timber harvest has occurred in the recent past approximately 800 m (0.5 miles) from Occurrence 3 (USFS 2025d), but due to the habitat for this species being high elevation, open, rocky locations, timber harvest is not likely to contribute to decline in habitat quality.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on the natural range of variation. Alpine vegetation on the Tongass is expected to be impacted broadly in the future by climate change, as well as potential localized impacts from communication sites, mining, and recreational use (Turner and Mallott 2025). There is no information about threats specific to *Androsace chamaejasme* ssp. *lehmanniana* at the seven known locations on the Tongass NF (Appendix 1). Species occurring in alpine ecosystems are considered highly vulnerable to impacts of reduced snowpack, subalpine species encroachment, altered interactions with pollinators, and rising temperatures as a result of climate change (Inouye 2020, Halofsky et al. 2025). It is uncertain how community composition of alpine ecosystems will shift with variance in site specific conditions as topographic heterogeneity may offer a buffer to alpine habitat loss (Halofsky et al. 2025, Seastedt and Oldfather 2021, Wiles and Warren 2024). In addition, climate change is predicted to warm temperatures and increase rainfall and shift winter precipitation from snow to rain, which will decrease snow accumulation and may negatively affect this species (Halofsky et al. 2025, Turner and Mallott 2025, Wiles and Warren 2024).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Androsace chamaejasme* ssp. *lehmanniana* is a perennial herb with a growth habit that forms loose to dense mats (FNA 2025). It produces flowers and fruits with seeds, and flowers during the summer (FNA 2025). Flowers are likely pollinated by insects, similar to other species in *Androsace* (CPC 2025). Seeds may require cold-stratification prior to germination, similar to other species in *Androsace* (Baskin and Baskin 2014). The life span of *Androsace chamaejasme ssp. lehmanniana* is not well documented but other species may be long-lived (more than a century) (Tong et al. 2016).

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☐
Declining populations or habitat trends	☐	☐	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☐
Other factors (see conclusion rationale)	☐	☐	☐

Conclusion Rationale

Under development.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (UAAH12796) [7/3/2018]**	**Prince of Wales Island, north end, Perue Peak, karst alpine.**	**On humus between karst stones, forb and graminoid dominant location.**		
2*	**CPNWH_April2025(ALA) [7/23/1993]**	**Heceta Island, Bald Mountain, westernmost peak, Craig Quad, Tongass National Forest, Alexander Archipelago.**	**Alpine talus meadow.**		
3*	**CPNWH_April2025(ALA) [6/1/2005]**	**NW end of island, about 4.15 km SE of the head of Port Protection, ridge just SW of Flicker Cr., Petersburg Quad, Alexander Archipelago, Prince of Wales Island.**	**NE side of limestone ridge, growing in accumulated soil at the base of an E-facing limestone face.**		
4*	**CPNWH_April2025(ALA) [7/20/1993]**	**Prince of Wales Island, Perue Mt., N of Calder, Petersburg Quad, Tongass National Forest.**	**Alpine talus meadow.**		
5*	**CPNWH_April2025(ALA) [8/15/1990]**	**Alexander Archipelago, Dall, I., Thunder Mtn., Craig Quad, Alexander Archipelago.**	**Low-growing herb-dwarf shrub alpine.**		
6*	**CPNWH_April2025(ALA) [6/04/1988]**	**Alexander Archipelago, Coronation I., Craig Quad, Tongass National Forest, Alexander Archipelago.**	**Needle Peak summit. NE-facing.**		

7*	**CPNWH_April2025(ALA) [6/09/1959]**	**Alexander Archipelago, Coronation I., Pin Peak, Craig Quad, Alexander Archipelago.**			

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Anemone multifida

Anemone multifida Poir.

Cutleaf Anemone

Global Rank: **G5**
Alaska State Rank: Not Ranked



Photo: Erik Schiff (CC0 iNaturalist 2025)

Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	*A*	A = Scarce or isolated *Anemone multifida* is known from four estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 0.62 miles (1 km). The four occurrences are located at low elevation (near sea level to 410 feet (125 m)) on Chichagof Island (records 1 and 2), Admiralty Island (record 3), and on the mainland in the Yakutat Foreland (record 4) (Appendix 1; Arctos 2025, CPNWH 2025). In addition, there are eight other occurrences of *Anemone multifida* that are located in southeast Alaska outside of the boundaries of the Tongass NF (Appendix 1; Arctos 2025, CPNWH 2025). The habitats recorded for these occurrences are limestone outcrops near beach; calcareous, gravelly streamside in Sitka spruce-hemlock forest; open dry slope in coastal cove; coastal sand dunes in dry sand; and stabilized sand dunes near river mouth (Arctos 2025, CPNWH 2025). Associated species that were collected at the same place and habitat on the same dates are (limestone outcrop near beach) *Polygonum aviculare*, *Polemonium pulcherrimum*, *Carex garberi*; (calcareous gravelly streamside in conifer forest) *Prunella vulgaris*, *Pyrola chlorantha*, *Astragalus robbinii* var. *harringtonii*, *Campanula rotundifolia*; open dry slope of bay) *Lappula* sp.; (coastal sand dunes or stabilized sand dunes) *Oxytropis varians*, *Moehringia lateriflora*, *Astragalus alpinus*, *Sagina maxima* ssp. *crassicaulis* (Arctos 2025, CPNWH 2025).

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Criteria	Rank	Rationale
		Elsewhere in southeast Alaska, outside of the Tongass NF boundary, *Anemone multifida* has been observed in similar low elevation habitats on river terraces, cliffs, and beaches (Appendix 1; Arctos 2025). According to the *Flora of North America*, two varieties of *Anemone multifida* (var. *multifida* and var. *saxicola*) occur in Alaska (Dutton et al. 1997). These varieties are not recognized by the Flora of Alaska project, and the Tongass NF specimens cited in this evaluation are not determined to variety (Ickert-Bond et al. 2019, Arctos 2025, CPNWH 2025). The two varieties are difficult to distinguish, differing in the number of flowers in the inflorescence (2-7 in var. *multifida* and 1-3 in var. *saxicola*) (Dutton et al. 1997). However, early-season plants of *Anemone multifida* var. *multifida* have solitary flowers and will key to var. *saxicola* (Dutton et al. 1997).
2 Distribution in surrounding geographic area	*C*	C = Widely distributed outside of the Tongass NF. Global Rank: G5 (Secure), Alaska State Rank: SNR (Not Ranked) (NatureServe 2025) State Ranks: Canadian provinces and territories: S1 (Critically Imperiled): Nova Scotia; S3 (Vulnerable): New Brunswick, Newfoundland; all others are S4 (Apparently Secure), S5 (Secure), SNR (Not Ranked) or not present. United States: SX (Presumed Extirpated): New York; SH (Possibly Extirpated): Minnesota; S1 (Critically Imperiled): Maine, Vermont; S2 (Imperiled): Nevada; all others are S4 (Apparently Secure), SNR (not ranked), or not present (NatureServe 2025). *Anemone multifida* is a perennial herb in the Ranunculaceae with a broad distribution in North America (Dutton et al. 1997). Its distribution continues north to northern Alaska (Appendix 1; Arctos 2025, CPNWH 2025). To the east, *Anemone multifida* is widespread in British Columbia (Klinkenberg 2020, CPNWH 2025). It occurs in all Canadian provinces and territories (Dutton et al. 1997, NatureServe 2025). In the United States, it occurs in Alaska and in all other states bordering Canada except for New Hampshire, and it is now possibly extirpated or presumed extirpated from Minnesota and New York, respectively (Dutton et al. 1997, NatureServe 2025, NRCS 2025). It occurs in the Pacific Coast states south into California and in all the Rocky Mountain and upper midwestern states (Dutton et al. 1997, NatureServe 2025, NRCS 2025). It is also native to alpine areas of South America (Dutton et al. 1997). Throughout its range in North America, *Anemone multifida* occurs in wet to dry sites in open forests, shrublands, meadows, grasslands, and in rocky areas at elevations ranging from sea level to approximately 10,500 ft (3200 m)

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Criteria	Rank	Rationale
		(Dutton et al. 1997, Klinkenberg 2020). It is considered an early seral species that grows on calcareous gravels, as well as sandy and lighter soils in a pH range of 6 to 7.5; it is thought to have a low tolerance to drought (NRCS 2025).
3 Dispersal capability	*B*	B = Disperses only through suitable habitat. The densely hairy achenes are thought to be adapted to wind-dispersal (Hill 1883, CYSIP 2025). In addition to dispersal by seed, mature plants likely can reproduce asexually by division of the underground stems (Smreciu et al. 2014). Once the fruit is dispersed, this species would only be successful in early seral habitats with appropriate soil and humidity conditions, similar to the few, mostly coastal, locations where it is found on the Tongass NF.
4 Abundance on Tongass NF	*B*	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Anemone multifida* has four occurrences on the Tongass NF, none of which have population information (Appendix 1). The number of occurrences would indicate it is uncommon. Since this is a perennial plant that can thrive in early seral habitats and may be able to reproduce asexually, it is likely that the current abundance is large enough to avoid rapid extinction.
5 Population trend on Tongass NF	*D*	D = Insufficient information to draw inferences about criterion. Population trends for known occurrences of *Anemone multifida* on the Tongass NF are unknown due to lack of repeat visits to the occurrences (Arctos 2025, CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	*B*	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitats recorded for *Anemone multifida* on the Tongass NF are limestone outcrops, slopes, sandy dunes, and stabilized dunes near the ocean and on calcareous, gravelly substrate near a stream in Sitka spruce-hemlock forest; all of the occurrences are at relatively low elevations (Appendix 1; Arctos 2025, CPNWH 2025). Tidal wetlands, such as those mapped at or adjacent to occurrences 1, 3 and 4 and the beach meadow habitat of occurrence 4 are considered to be

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Criteria	Rank	Rationale
		moderately stable ecosystems on the Tongass NF (Turner and Mallot 2019). The coastal limestone outcroppings and dry slopes where *Anemone multifida* is found on the Tongass NF are not well characterized or analyzed in Turner and Mallot (2019). Occurrence 1 is 400 ft downslope from a road with many mapped weeds including *Taraxacum officinale, Phalaris arundinacea*, *Dactylus glomerata*, *Trifolium repens*, *Plantago major*, and *Schedonorus arundinaceus* (USFS 2025b). The degree to which these weeds have migrated downslope toward occurrence 1 is not known.
7 Habitat vulnerability or modification; other threats	*B*	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The habitat for this species on the Tongass NF is difficult to generalize and includes several less common habitat types. Riparian and upper beach meadow habitat of this species is vulnerable to infestation by invasive species that may be dispersed by air or water (Turner and Mallot 2025). Invasives are known near one occurrence. Coastal beach meadow or tidal wetland habitat may be negatively impacted by projected changes in sea level (rise or drop) and increased storm frequency and intensity (Turner and Mallot 2025, Halofsky et al 2025). Additionally, beach habitat may be impacted by recreation. Plants in riparian habitat may also be adversely impacted by projected increases in large storm events and flooding (Halofsky et al 2025).
8 Life history and demographics	*C*	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.** *Anemone multifida* is a perennial herb with a branched taproot that grows each season from a short, underground, upright stem (a caudex) (Dudley 1930, Dutton et al. 1997, Klinkeberg 2020). The one to several above-ground, erect stems usually grow no more than 27.6 in (70 cm) tall and terminate in an inflorescence of one to seven, long-stalked

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Criteria	Rank	Rationale
		flowers (Dutton et al. 1997, Klinkeberg 2020). Each flower has five to nine showy sepals to 0.7 in (17 mm) long, no petals, up to 80 stamens, and numerous separate pistils, each with an ovary with one ovule (Dutton et al. 1997, Klinkenberg 2020). The stamens and the pistils mature asynchronously, with the styles of the pistils maturing before the pollen is released from the anthers (Dudley 1930). This means that within a single flower, the pollen from the stamens cannot fertilize the ovules within the pistils. In some *Anemone* species this is thought to have resulted in self-incompatibility which means that pollen from another plant is needed to fertilize the ovules (Horovitz 1990, Douglas and Cruden 1994). *Anemone multifida* is thought to be insect-pollinated (Smreciu et al. 2014); other *Anemone* species are pollinated by beetles, flies, and bees (Horovitz 1990, Douglas and Cruden 1994, Smreciu et al. 2014, Streinzer et al. 2019, CPC 2025). Therefore, phenological changes and disruption in pollinator/plant interactions that are predicted to occur with climate change may negatively affect *Anemone multifida* (Hülber et al. 2010, Scaven and Rafferty 2013). Each ovary becomes a separate, one-seeded, woolly to long-hairy, dry fruit (an achene) with a short beak; the fruits are arranged in an ovoid to spherical ball (Dutton et al. 1997, Klinkenberg 2020). The seeds are mature when the achenes are brown and cottony with hairs fully expanded (Luna et al. 2008), and then the fruit and seed are dispersed as a unit (Dutton et al. 1997). The densely hairy achenes are thought to be adapted to wind-dispersal (Hill 1883, CYSIP 2025). Seeds are thought to be viable for at least 15 years when kept at low temperature and humidity (Smreciu et al. 2014), and studies have found germination rates of between 60 and 100% with varying temperature and light regimes (Luna et al. 2008, Smreciu et al. 2014, Dean 2021). Shoot growth is limited to the first year after germination which means it takes two years to reach maturity (Luna et al. 2008). In addition to propagation by seed, mature plants can be cloned through dividing the underground stems in the spring (Smreciu et al. 2014).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

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Conclusion Rationale

Cutleaf Anemone (*Anemone multifida*) is not recommended as a Species of Conservation concern based upon the rationale below:

- **Significant threats:** This species occurs in several habitat types on the Tongass NF so it is difficult to assess threats. Invasive species and recreation may impact beach meadow occurrences.
- **Declining trends**: No trend data available for the species. Increased flooding in riparian areas and sea level change and increased storms at coast may adversely affect habitat.
- **Restricted ranges:** The range is not restricted.
- **Low population numbers:** There are only four known occurrences of this species on the Tongass NF from Admiralty Island, Chichagof Island and Yakutat vicinity. There are eight other occurrences in Southeast Alaska on non-NFS lands, so there may be additional undocumented occurrences on the Tongass NF. The species is described as early seral so may recover from disturbances.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:142542) [8/17/2004]**	**Alexander Archipelago, Chichagof Island, N of Freshwater Bay, Wukuklook Ck. estuary and beach, Sitka Quad, Tongass National Forest.**	**S aspect, limestone outcrop near beach. [Collected at same place on same date: Polygonum aviculare, Polemonium pulcherrimum, Carex garberi. In record for Polemonium pulcherrimum, there is mention of limestone rocky headland and bluffs near the Wukuklook River outlet.]**		
2*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:11797)[7/15/1994]**	**Chichagof Island, Game Creek, Sitka Quad, Tongass National Forest.**	**Sitka spruce-hemlock forest, calcareous gravelly streamside. [sounds like karst forest] [Collected in same place and habitat on same date: Prunella vulgaris, Pyrola chlorantha, Astragalus harringtonii, Campanula rotundifolia]**		
3*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:42700)[8/15/1984]**	**Alexander Archipelago, Snug Cove, Admiralty Island, Gambier Bay E of Snug Cove, Sumdum Quad, Alexander Archipelago.**	**Growing on open dry slope. [Collected in same place and habitat on same date: Lappula sp.]**		
4*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:50895)[6/30/1977]**	**Yakutat Foreland, between Lost and Situk R. mouths, Yakutat Quad.**	**Coastal sand dunes, in dry sand. [Collected in same place and habitat on same day: Oxytropis campestris, Moehringia lateriflora, Astragalus alpinus ssp. alaskanus, and Sagina maxima subsp. crassicaulis]**		
4	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:3881)[6/29/1991]	Yakutat Foreland, Situk R. estuary, Yakutat Quad.	Stabilized sand dunes NW of river mouth. [Collected in same place and habitat on same day: Oxytropis campestris]		
		Not on the Tongass NF			

5*	**Arctos 2025 (ALA-UAM:Herb:27890) [1948/07/19]**	**Hoonah, Chichagof Island, Juneau Quad, Tongass National Forest, Alexander Archipelago**	**Near road from town to cannery**		
6*	**Arctos 2025 (ALA-UAM:Herb:27891) [8/9/1952]**	**Yakutat Foreland, Yakutat, Yakutat Quad**	**Grassy area near beach**		
7*	**Arctos 2025 (ALA-UAM:Herb:50926) [1952]**	**Yakutat Area, Yakutat Foreland, Yakutat Quad [this is georeferenced by airstrip of Yakutat Airport, not sure why. There is nothing in the label data to suggest this.]**			
8*	**Arctos 2025 (ALA-UAM:Herb:32228) 8/10/1996]**	**Wrangell Mts., May Cr.-Nizina R., airstrip at May Creek, McCarthy Quad, Wrangell-St. Elias National Park and Preserve**	**growing in semi-disturbed margin of airstrip at margin of cottonwood stand, common**		
9*	**Arctos 2025 (ALA-UAM:Herb:250961) [6/27/1999]**	**Mainland, Glacier Bay, West Arm, Queen Inlet, NW shore, W side of the river, Mt. Fairweather Quad**	**mosiac of beach gravel and open, mossy-lichen meadow habitats**		
10*	**Arctos 2025 (ALA-UAM:Herb:146592) [8/11/2001]**	**Glacier Bay, Drake I., near Streveler 5, UTM 429571.95N, 6503340.9W, Mt. Fairweather Quad, Glacier Bay National Park and Preserve**	**limestone cliffs, associated with Picea sitchensis, Alnus crispa, Populas trichocarpa, and Tsuga heterophylla.**		
11*	**Arctos 2025 (ALA-UAM:Herb:74844) [6/25/2003]**	**St. Elias Mtns., Lower Alsek R., 0.5 km W of border, N side of Alsek, T28S R44E S30, site 191, Yakutat Quad, Glacier Bay National Park**	**river terrace, scattered on moist, thick moss and lichens over river cobbles in open Dryas-seral herb gravel bar on 0-5¿ slope, 30% vegetation cover. Associated with Populus balsamifera and Dryas drummondii.**		
12*	**Klinkenberg 2020 (MIN956152) [8/17/1952]**	**Glacier Bay National Monument. Sandy Cove. [Glacier Bay National Park]**	**Beach meadow.**		

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Apotreubia nana

Apotreubia nana [(Hatt. et H. Inoue) Hatt. et Mizut., 1977]

liverwort

Global Rank: **G3G5**

Alaska State Rank: **S2**



photo: (CC-BY-NC) Brian Starzomski

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy OR gaps. *Apotreubia nana* is known from seven estimated occurrences on the Tongass National Forest (Tongass NF) (Fig. 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Wrangell Island near Salamander Creek (Occurrence 1) and East Fork Pat Creek (Occurrence 2), on Prince of Wales Island near Flicker Creek (Occurrence 3) and Alder Creek (Occurrence 4), on Etolin Island near Mosman Inlet (Occurrence 5 and 6), and on northwest Chichagof Island (Occurrence 7) (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in a variety of habitats, including calcareous fen, low elevation muskeg with unknown pH, high elevation forest with limestone bedrock, and subalpine mixed forest/muskeg with unknown pH (Appendix 1). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025). Across its range, *Apotreubia nana* is typically found in moist forest floor or boggy areas (CBH 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF. Global Rank G3G5, Alaska State Rank S2 *Apotreubia nana* is distributed in a few moist coastal mountain areas in the northern hemisphere, ranging from coastal British Columbia and southeast Alaska to Japan and the Russian far east (CBH 2025). It occurs in moist forest floor or boggy areas at elevations of 400 m to 2,400 m (CBH 2025). Most collections are from British Columbia; there are only a few collections in western Asia (CBH 2025). In Alaska this species is only known from the Tongass NF (CPNWH 2025, CBH 2025), and these records are the northern extent of its known range.
3 Dispersal capability	**D**	D = Insufficient information to draw inferences about criterion. *Apotreubia nana* is a leafy liverwort with a terrestrial growth habit. It is known to produce spores and likely can persist and spread via vegetative growth, but the relative importance of these dispersal mechanisms have not been reported (Hattori et al. 1966)
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Apotreubia nana* is known from seven occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (CPNWH 2025, USFS 2025a).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Apotreubia nana* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).

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Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. The habitat for the 7 occurrences of *Apotreubia nana* on the Tongass NF is variable, including calcareous fen, low elevation muskeg with unknown pH, subalpine forest with limestone bedrock, and subalpine mixed forest/muskeg with unknown pH (Appendix 1). These habitats can be grouped under forested and non forested wetlands, with or without limestone influence. Wetland habitat generally has high ecological integrity on the Tongass NF but may be impacted by rising temperatures and altered evapotranspiration (Turner and Mallot 2025). Invasive species that can survive in or near wetlands, such *Phalaris arundinacea*, are known to occur within 1 km from occurrences 1, 2, and 6 (USFS 2025b). Timber harvest has occurred in the recent past within 100 m from occurrences 1, 2, and 6, and within 250 m from Occurrence 5 (USFS 2025c). Timber harvest at occurrences 1 and 2 was downslope so is unlikely to have impacted habitat. Additionally, occurrence 3 is along a road. Logging and road building activities may alter evapotranspiration and surface water flows, and could have impacted adjacent wetland habitat.
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025). Due to the proximity of known invasive infestations, the habitat of *Apotreubia nana* may be impacted by invasive species in the future. Recent timber harvest activities have occurred in the vicinity of the subalpine and muskeg habitat at Occurrences 1, 2, 5, and 6 (USFS 2025c), and this activity will likely continue on Wrangell Island and Etolin Island in the future. Timber harvest alters evapotranspiration and as a result can alter hydrology in adjacent wetlands. However, habitat would persist and it is unclear if indirect effects from timber harvest would affect the persistence of *Apotreubia nana*. This species occurs in low productivity forested muskeg or subalpine forest on the Tongass NF and is unlikely to be directly impacted by timber harvest.

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Criteria	*Rank*	*Rationale*
		In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for wetland species (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. The life history of *Apotreubia nana* is largely unknown. It is a leafy liverwort with a prostrate growth habit. It produces leafy stems with entire leaves with no midrib.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Apotreubia nana is not recommended as a Species of Conservation Concern based upon the rationale below:

- **Significant threats:** Timber harvest has occurred and is likely to continue around a majority of documented occurrences, but is unlikely to directly impact low productivity forest where this species has been found.

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- **Declining trends:** Forested and non forested wetland is likely to be impacted by increasing temperatures and evapotranspiration which will likely lead to growing season water deficit. It is unknown whether and to what extent *Apotreubia nana* is tolerant to changes in water availability.
- **Restricted ranges:** This species is mainly known from British Columbia with a few collections in eastern Asia and Russia. The Tongass NF occurrences are the northern edge of the range.
- **Low population numbers:** There are seven occurrences of *Apotreubia nana* from Prince of Wales to Chichagof Island. Life history traits of this species and its vulnerability to climate change are unknown.
- **Other factors:** taxonomy, diversity, and important ecological function of the species, where any of these factors are of importance in determining the likelihood of long-term persistence of the species in the plan area (Any of the eight criteria can be used)]

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [3/19/2016]**	**Salamander creek, Southeast Alaska panhandle, Wrangell Island. Approximately 10 miles SSW of the Borough of Wrangell. Salamander Trailhead is accessed via logging**	***Callitropsis nootkatensis/Tsuga mertensiana* dominated subalpine woodland interspersed with sloping sphagnum muskeg. wet,**		

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
		road ~ 2 miles north of Lower Salamander Campground.	**partially shaded. Substrate: humic soil.**		
1	ACCSBryo_Oct24 [3/19/2016]	Salamander creek, Southeast Alaska panhandle, Wrangell Island. Approximately 10 miles SSW of the Borough of Wrangell. Salamander Trailhead is accessed via logging road ~ 2 miles north of Lower Salamander Campground.	*Callitropsis nootkatensis/Tsuga mertensiana* dominated subalpine woodland interspersed with sloping sphagnum muskeg.		
1	CBH 2025 (MO) [03/19/2016]	Salamander Creek Watershed: Salamander Trailhead. Southeast Alaska panhandle, Wrangell Island. Approximately 10 miles SSW of Wrangell. Salamander Trailhead is accessed via logging road ca. 2 miles north of Lower Salamander Campground.	Partially shaded moist humic soil		
2*	**ACCSBryo_Oct24 [3/19/2016]**	**East Fork Pat Creek, Southeast Alaska panhandle, Wrangell Island. Approximately 9.5 miles SSE of the Borough of Wrangell, with access via the Middle Ridge Road.**	**small toeslope muskeg skirted by mostly undisturbed coniferous forest dominated by *Pinus contorta, Picea sitchensis, Tsuga heterophylla* and *Callitropsis nootkatensis.* moist, partially shaded. Substrate: humic soil.**		
3*	**ACCSBryo_Oct24 [5/07/2016]**	**Flicker creek, Southeast Alaska panhandle, Prince of Wales Island. Approximately 7.25 miles SE of Point Baker. Access via the Flicker Ridge logging road.**	**Roadcut in undisturbed coniferous forest dominated by *Tsuga* spp and *Picea sitchensis.* moist, partially shaded. Substrate: humic soil.**		
4*	**ACCSBryo_Oct24 [5/07/2016]**	**Alder creek, Southeast Alaska panhandle, Prince of Wales Island. Approximately 6 miles due SE of Port Protection. Access via Flicker Ridge logging road.**	**Fairly open subalpine forest over limestone and karst. Forest dominated *by Tsuga mertensiana* mixed with *Callitropsis nootkatensis* and *Abies lasiocarpa*. moist, partially shaded. Substrate: forest floor.**		

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Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
5*	ACCSBryo_Oct24 [10/04/2017]	Mosman Inlet, Southeast Alaska panhandle, Etolin Island. Approximately 21 miles SW of the Borough of Wrangell.	Muskeg surrounded by micro ridges with dwarf open forest dominated by *Picea sitchensis, Tsuga heterophylla* and *Callitropsis nootkatensis*. moist, partially shaded. Substrate: humic soil.		
6*	ACCSBryo_Oct24 [6/08/2018]	Mosman Inlet, Southeast Alaska panhandle, Etolin Island. Approximately 21 miles SW of the Borough of Wrangell.	Muskeg with scattered *Pinus contorta* and *Tsuga heterophylla* with high conductivity from limestone bedrock. Conductivity 250 mS, pH 8.1 wet, mostly shaded. Substrate: humic soil.		
7*	ACCSBryo_Oct24 [7/11/2022]	Southeast Alaska Panhandle, NW Chichagof Island.	wet, partially shaded. Substrate: muck.		

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Aquilegia flavescens

photo:
iNaturalist.org 2025



Aquilegia flavescens S. Watson

Yellow Columbine

Global Rank: **G5**
Alaska State Rank: **SNR**

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. *Aquilegia flavescens* has been observed an estimated one time on the Tongass National Forst (Tongass NF) (Appendix 1; Arctos 2025, CPNWH 2025, USFS 2025a). It was observed and collected by Cindy Lagoudakis on 23 July 1999 in a meadow along Yehring Creek; only one plant was present (Arctos 2025, CPNWH 2025). This collection was the first record of this species in Alaska (CPNWH 2025, USFS 2025a). As discussed under Criterion 2, once poorly georeferenced Canadian specimen records are removed from the species distribution, the northernmost location of *Aquilegia flavescens* is in the Rocky Mountains of southwest Alberta (Klinkeberg 2020, CPNWH 2025, LEA 2025, RBC 2025). Therefore, the Tongass NF is far out of range for this species. Justin Whittall, an expert on the genus *Aquilegia*, is aware of the Tongass NF collection and doubts that this population is a natural occurrence. He writes: "A colleague of mine from Alaska, Matt Carlson, reminded me of this conversation we had about this enigmatic collection a few years back. Here's the short of it: *It's associated with a private in-holding /*

Criteria	*Rank*	*Rationale*
		cabin and I think it is from a "wildflower" mix. A fair amount of botanizing has occurred up that river as a lot of or interior species spill over, and there are no other records or collections of Aquilegia flavescens." In examining the location, it is indeed near several cabins. In light of this information from an expert on the genus indicating that it may have been a waif introduced from a wildflower mix, this species should be removed from consideration for Species of Conservation Concern for the Tongass NF.
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF. Global Rank: G5 (Secure), Alaska State Rank: Not yet mapped or ranked (NatureServe 2025) State Ranks: Canadian provinces and territories: S4 (Apparently Secure): Alberta; S5 (Secure): British Columbia; United States: S4 (Apparently Secure): Montana, Wyoming; all others are SNR (Not Ranked) or not present (NatureServe 2025). *Aquilegia flavescens* is a North American perennial herb that has been found in Alaska, Alberta and British Columbia, and the states of Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming (Whittemore 1997, NatureServe 2025, NRCS 2025). It is found in moist meadows and rocky slopes in the subalpine and alpine zones from 2,428 to 11,483 ft (740 to 3500 m) in elevation (Whittemore 1997, Klinkenberg 2020) Note that in the distribution map for this species in Klinkenberg (2020), a specimen from the University of Lethbridge Herbarium (acc.# 18285) displays at the same latitude as the Tongass NF, but this specimen is mistakenly georeferenced in northern Alberta, whereas its actual location is in SW Alberta at Gravenstafel Lake, collected for the Flora of Westcastle project (LEA 2025). Similarly, Klinkenberg (2020) and the CPNWH (2025) display a specimen from the Royal British Columbia Museum (Acc. # V058028) at the same latitude as the Tongass NF, but this specimen is also mistakenly georeferenced in northern Alberta, whereas its actual location is near Vernon, due east of Vancouver (RBC 2025). Lastly, the CPNWH (2025) displays another specimen from the University of Lethbridge Herbarium at the same latitude as the Tongass NF in northern Alberta, but this specimen was collected on the west slope of Mt. Rae in southern Alberta. Therefore, the three specimens that display in northern latitudes in central-west Canada are all mistakenly georeferenced. Unfortunately, the next northernmost mapped location for this species in Canada as displayed in the CPNWH (2025) (RBCM:Botany:V111372) is also mistakenly georeferenced at Mount Becker, rather than Becher Lake,

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Criteria	*Rank*	*Rationale*
		which is much further south in British Columbia (RBC 2025). Therefore, the northernmost specimen of this species displayed correctly in the CPNWH (2025) is from the Persimmon Range in the Rocky Mountains of southwestern Alberta.

Conclusion Rationale

Expert opinion is that the one known occurrence on the Tongass was likely introduced due to its proximity to private cabins, and the lack of any additional known occurrences, despite significant botanical work being completed in the surrounding area. As such, it does not qualify as a potential SCC.

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Hodges, Scott. 2025. Professor, UC Santa Barbara and expert on *Aquilegia*. Email correspondence about only Alaskan occurrence of *Aquilegia flavescens*. Personal Communication 16 July 2025.

Appendix 1. Abbreviated Location Table

Individual occurrences within 0.62 mi (1 km) are grouped into estimated occurrences, which represent populations separated by more than 0.62 mi (1 km). Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025; Arctos 2025 (ALA-UAM:Herb:141871) [7/23/1999]**	**Yehring Cr., lower Taku R., Taku River Quad.**	**Meadow at creekside, found only at this site. [no other taxa collected at this site on this day]**		
1	USFS-TESP_Mar25 (100533P000018)[7/23/1999]				

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Arnica mollis

Arnica mollis Hook.

Hairy arnica

Global Rank: **G5**
Alaska State Rank: **S2**



photo: M.L. Carlson 2010

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce OR isolated. There is estimated to be one known location on the Tongass National Forest (Tongass NF) at the south end of Shakes Lake in the vicinity of the Stikine River. The habitat is a low gravel island emerging from the south end of the lake at 15 m elevation. The islands were described as the remains of the terminal moraine of the Shakes Glacier (Duffy 1993). The islands appear to be anomalous of the area because the habitat and vegetation were extremely similar to high alpine tundra of the area. The microsites experience very cold winds from the glacier over the lake (Duffy 1993). This population is associated with *Saxifraga* spp., *Sibbaldia procumbens*, *Carex lenticularis* var. *dolia*, and dwarf *Salix* sp. Another population occurs on Chichagof Island in Gallagher Creek Drainage, approximately 4.8 km from the Tongass NF boundary in a wet subalpine meadow (2200 ft elevation), aspect 20°, slope 35°. Plants were growing next to a rill draining a pond. It was co-occurring with *Gentiana platypetala, Petasites frigidus*, and *Juncus ensifolius* (CPNWH 2025). This habitat appears to be frequent but patchy in the area and the taxon may occur on Tongass NF lands on Chichagof Island.

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2 This taxon is not ranked in the adjacent territories of British Columbia, and Yukon. It is not ranked in the western and Rocky Mountain states with the exception of Nevada (S3), Alberta (S3), Montana (S4). *Arnica mollis* is listed as possibly extirpated in Northwest Territories (NatureServe 2025). The range of *Arnica mollis* extends from Alaska down through the Cordellera and Cascade Mountains (Wolf 2006, CPNWH 2025, NatureServe 2025), with its main distribution occurring around and in the central Rocky Mountains in Montana and Idaho. Thirteen populations are known for Alaska, all of which are widely disjunct from one another. Numerous records are known from adjacent British Columbia (USDA FS 2025, CPNWH 2025, ACCS 2025). Occurrences on the Tongass NF are approximately 125 miles (200 kilometers) from the closest occurrence in British Columbia along the Haines Road at Three Guardsmen Lake. The habitat preference of *Arnica mollis* is generally mesic or moist meadows from mid-elevations to alpine (Knoke & Giblin 2004-2015), and also including coniferous forests, stream banks, and snowbeds (Wolf 2006). In the Alaska Range, this species was found in a mesic dwarf shrub tundra (ACCS 2025). Other Alaska populations are strongly associated with subalpine meadows and alpine shrub tundra (ACCS 2025). Some of the closest records in British Columbia were found in a grassy roadside willow scrub along a creek (CPNWH 2025). *Arnica mollis* can be difficult to identify using the nebulous descriptions in Hultén (1968) rather than updated treatments by Wolf (2006). Current vouchers should be reviewed to confirm that identification is not a different species with tawny pappus (e.g., *A. ovata, A. chamissonis*). Because of these factors, targeted surveys would be required to determine the true distribution and abundance of this species on the Tongass.
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. *Arnica mollis* produces light seeds with pappus and are wind and gravity dispersed. Other species of *Arnica* are considered to have moderate to high dispersal capabilities (Strykstra et al. 1998, Sugier et al. 2022). *Arnica mollis* is

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Criteria	*Rank*	*Rationale*
		described with short thick rhizomes (Wolf 2006) which isn't likely to contribute to significant spreading or vegetative reproduction.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The population size on the Tongass National Forest is unknown; however, it is likely very small and restricted in scope due to the small size of the occurrence (approx. 5,000 m^2) based on the locality description by Duffy (1993). The population on Gallagher Creek Drainage, adjacent to Tongass National Forest land, describes the population as "abundant and rhizomatous" (CPNWH 2025).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for *Arnica mollis* on the Tongass NF are unknown. The Shakes Lake population is not known to have been revisited (ACCS 2025).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable habitat. Alpine habitat is anticipated to decrease but glacial moraine habitat is abundant on the Tongass NF and may be increasing with glacial retreat (Bennetsen et al. 2023). Indeed, glacial moraine is expected to increase but there is a time lag for a transition to suitable habitat for vegetation due to the lack of soil. The Shakes Lake population occurs on glacial moraine and Chichagof Island population occurs in subalpine meadows, suggesting broader range of suitable habitat for *Arnica mollis*.
7 Habitat vulnerability or modification;	D	*D: Insufficient information to draw inferences about criterion.* The Shakes Lake population occurs at 15m elevation on a lightly elevated gravel island, likely susceptible to stochastic flooding events. Additionally, the population is at the south end of the lake, a narrowing, susceptible to potential ice damning events and general freeze thaw cycles. Icebergs are observed from satellite imagery of the lake (ESRI 2025). The closest population of an invasive plant are *Phalaris arundinacea* populations within 7 km from Shakes Lake (USDAFS 2025).

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Criteria	*Rank*	*Rationale*
other threats		Timber harvest activity has occurred in the area near the Chichagof Island occurrence, particularly between Neka Bay and Mud Bay and Humpback Creek to the south and west of Gallagher Creek. It is unlikely that subalpine habitat at this occurrence would be disturbed by timber harvest or associated road-building in the future.
8 Life history and demographics	D	D: Insufficient information to draw inferences about criterion. Unknown life history and demographics in Alaska or elsewhere. Assumed to be a long-lived species based on short rhizomatous behavior. For related species, *Arnica montana*, deterministic growth rate and flowering in eight populations declined with increasing temperatures and precipitation (Vikane et al. 2019). Both precipitation and temperatures are expected to increase in Southeast Alaska in the near and long-term future (Bennetsen et al. 2023).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Arnica mollis* within the plan area based upon the following:

- **Significant threats:** The Shakes Lake occurrence may be susceptible to flooding and ice damning events. Rising temperatures and altered precipitation patterns could alter habitat characteristics for Arnica mollis and could lead to increased competition from shrubs or trees in subalpine habitat.

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- **Declining populations or habitat trends:** Population trends for the one known occurrence of *Arnica mollis* on the Tongass NF are unknown. There is a lack of scientific information to fully describe the ecological niche of the species on the Tongass NF, given that in Southeast Alaska it occurs in subalpine meadow and on a gravelly island at the end of a glacier fed lake. In general, a large amount of wet subalpine meadow habitat remains intact, but may be impacted by modern stressors in the future.
- **Restricted range:** *Arnica mollis* has a wide range outside of Alaska. Occurrences on the Forest are approximately 125 miles (200 kilometers) from the next known occurrence.
- **Low population numbers or restricted ecological conditions:** There is just a single documented occurrences on the Tongass NF, but identification of Arnica species is subtle and subalpine and deglaciated habitats do not have high survey intensity. Therefore targeted surveys may identify more occurrences of this species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
2	ACCS_Mar25 (EO3)[no date]	Stikine River, Shakes Lake, south end. Survey site #R93-24. T59S R84E S23 NE4 center 50'	low gravelly island. Tundra like community on low terminal moraine islands. Assoc. with Saxifraga spp., Sibbaldia procumbens, Carex lenticularis var. dolia, dwarf Salix sp.	Null	Null
2	ACCS_Mar25 (EO2)[7/30/1993]	Shakes Lake, S end of lake	low gravelly island	Null	Null
2	CPNWH_April2025(ALA)[7/30/1993]	Shakes Lake, S end of lake, Petersburg Quad, Tongass National Forest.	low gravelly island	Null	Null
9	ACCS_Mar25 (EO9)[9/01/1981]	Chichagof Island. Icy Strait. Gallagher Creek Drainage.	Aspect 20; Slope 35%; wet subalpine meadow; next to a rill draining a pond.	Null	Null
9	ACCS_Nov25 (EO9)[9/01/1981]	Chichagof Island. Icy Strait. Gallagher Creek Drainage. T43S R60E S3	Aspect 20; Slope 35%; wet subalpine meadow; next to a rill draining a pond, growing with Gentiana platypetala, Petasites frigidus, Juncus ensifolius.	Locally abundant. Rhizomatous	Null

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Ascocoryne turficola

Ascocoryne turficola [(Boud.) Korf, 1971]

Bog jellydisc

Global Rank: **GNR**

Alaska State Rank: **SNR**



photo: Britt Bunyard CC0 via MycoPortal

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Ascocoryne turficola* is known from two estimated occurrences on the Tongass National Forest (Tongass NF)(Fig. 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile) (NatureServe 2025). The occurrences are located north of Sitka on Baranof Island and on Prince of Wales Island (Appendix 1; iNaturalist 2026, USFS 2025a). Both known occurrences were in muskegs in very saturated soils (iNaturalist 2026). There are no known occurrences of this species in Alaska outside of the Tongass NF (MycoPortal 2025). Across its range, *Ascocoryne turficola* is typically found in sphagnum bogs, sometimes submerged under water (iNaturalist 2025, MycoPortal 2025). In Southeast Alaska, the species co-occurs with *Sphagnum* spp. *Carex* spp., *Cassiope mertensiana* and *Nephrophyllidum crista-galli* (Bunyard et al 2008, Coscarelli-Trott 2024, iNaturalist 2025).

Criteria	*Rank*	*Rationale*
		This species may be confused for *Ascocoryne sarcoides* which is also present nearby but grows on wood and is more purple than green (iNaturalist 2025). There are no known subspecies of *Ascocoryne turficola*.
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside the Tongass NF, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF. Global Rank GNR, Alaska State Rank SNR (No Status Ranks) *Ascocoryne turficola* is narrowly distributed throughout parts of Europe, Russia, and eastern North America (MycoPortal 2025). Across its range, *Ascocoryne turficola* occurs in sphagnum bogs at elevations estimated from 0 m to 425 m (British Columbia topographic map 2025, Bunyard et al. 2008, iNaturalist 2025). In North America, there are isolated records of *Ascocoryne turficola* in Canadian provinces British Columbia and Newfoundland and Labrador, as well as Alaska, Michigan, Minnesota, and New York, US (iNaturalist 2025, MycoPortal 2025). The soils where this species is found are typically saturated with plentiful sphagnum moss, bringing the pH of the soil down to be more acidic (Siegel et. al. 2025, MycoPortal 2025). In public databases like iNaturalist and Mushroom Observer, this species is often found near the coast of North America or on the coast of the Great Lakes (iNaturalist 2025, Mushroom Observer 2025). In pictures, *Ascocoryne turficola* is seen in bogs which have standing water and the fungus is sometimes pictured submerged in water, which is rare for fungi (iNaturalist 2025). *Ascocoryne turficola* is reported to be abundant at a pH of 4.3 in northern Michigan (Coscarelli-Trott 2024). In Alaska this species is only known from the Tongass NF; its range continues south 755 km to Calvert Island, BC, Canada (iNaturalist 2025).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Ascocoryne turficola* is an Ascomycete jelly mushroom-forming species which grows on moss, including a variety of *Sphagnum* spp., in wetland bog ecosystems (Bunyard et al 2008). Its main dispersal mechanism is by sexual spores which are typically dispersed by wind (Bunyard et al. 2008). One source reports *Ascocoryne turficola* to be adapted for long distance dispersal due to the size and shape of the sexual spores, or ascospores, and the forcible discharge mechanism (Coscarelli-Trott 2024).

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. The two known occurrences do not have population estimates or any indication of abundance, nor can this information be inferred from ascocarp presence alone (Appendix 1; MycoPortal 2025, USFS 2025a).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Ascocoryne turficola* on the Tongass NF are unknown (USFS 2025a, iNaturalist 2025).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. *Ascocoryne turficola* occurs in "muskeg," meaning bog or wetland habitat on the Tongass NF (iNaturalist 2025). In adjacent locations including Central Coast, BC, Canada, it also occurs in acidic open peat bogs or at the edge of forest among a variety of *Sphagnum* spp. and *Carex* spp. (Bunyard et al. 2008, iNaturalist 2025). These habitats can be grouped under forested and non-forested wetlands which are common and relatively stable on the Tongass NF (Turner and Mallott 2024).
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Projected increases in air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit may lead to drought stress for wetland species with high soil moisture requirements such as *Ascocoryne turficola* (Turner and Mallott 2024, Wiles and Warren 2024). It is unknown how the species may adapt to drought.
8 Life history	**D**	D = Insufficient information to draw inferences about criterion. The life history of *Ascocoryne turficola* is largely unknown (Bunyard et al. 2008, Coscarelli-Trott 2024, Stasinska and Sotek 2004). *Ascocoryne turficola* is a gelatinous cup fungus that produces apothecia with a distinct margin and a tapering

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Criteria	*Rank*	*Rationale*
and demographics		stipe (Bunyard et al. 2008). *Ascocoryne turficola* is a presumed decomposer - all other species in the genus *Ascocoryne* occur on wood - found exclusively in bogs which may include subsphagnic wood bits, which produces sporocarps typically from August to October (Bunyard et al. 2008, iNaturalist 2025, Stasinska and Sotek 2004). The life span of *Ascocoryne* fungi has not been measured (Bunyard et al. 2008, Stasinska and Sotek 2004).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Ascocoryne turficola is not recommended as a species of conservation concern for the following reasons:

- **Significant threats:** There are no localized threats to occurrence #1. Observation #2 is within 500 feet of a previously harvested timber unit but appears protected by a riparian buffer. Suitable habitat is widespread in the planning area and isn't expected to be impacted by management activities. However, growing season water deficit may adversely impact this species if it cannot adapt to dry periods.
- **Declining trends:** Population trends cannot be determined due to limited occurrences and population data. Habitat is relatively stable and expected to remain so.
- **Restricted ranges:** *Ascocoryne turficola* has a global distribution but is rare throughout its range. Occurrences appear to be isolated with two occurrences in AK, one occurrence in BC, and the next closest occurrence in MN. Alaskan occurrences represent the northern and western edge of the known range for this species.

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- **Low population numbers:** The low occurrence incidence makes this species vulnerable to extirpation by stochastic events.
- **Other factors:** Given the commonness of suitable habitat for this species across the planning area and its diminutive size, additional occurrences of this species may exist but have been overlooked, or more specific habitat requirements are unknown, or life history limits the species ability to reproduce or disperse.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Asplenium trichomanes quadrivalens

Asplenium trichomanes quadrivalens

[Linneaus, 1753]

Limestone Maidenhair Spleenwort

Global Rank: **T5**

Alaska State Rank: **S2**



photo:(CC0) Oliver Stöhr

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy or gaps. *Asplenium trichomanes* ssp. *quadrivalens* is known from seven estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). These occurrences are known from Baranof Island near Red Bluff Bay (Occurrence 1); Prince of Wales Island near Cannery Point on Moira Sound (occurrence 2) and Halibut Harbor (occurrence 7); Coronation Island (occurrence 3); Two Crack Island 110 km SW of Wrangell (occurrence 4); Gravina Island (occurrence 5); and Rudyerd Island in the Misty Fjord National Monument (occurrence 6) (Appendices 1 and 2; CPNWH 2025, USFS 2025a). Specimens identified as *Asplenium trichomanes* were assumed to be ssp *quadrivalens* if they occurred on limestone; presence on limestone is a diagnostic break in the Flora of North America key that indicates *A. trichomanes* ssp. *quadrivalens* (FNA 2025). Within the Tongass NF boundary, this species occurs on rocky limestone cliffs which is typical for this species (Appendix 1; FNA 2025). There are no occurrences of this subspecies in southeastern Alaska outside of the Tongass NF (CPNWH 2025).

Criteria	*Rank*	*Rationale*
		The taxon could be confused with the other subspecies of *Asplenium trichomanes*, namely *ssp. trichomanes,* which also has a dark reddish-brown rachis but is only very rarely found on calcareous rocks (preferring non-calcareous substrates such as sandstone, basalt, and granite) (FNA 2025). As of 2016, the presence of *Asplenium trichomanes ssp. trichomanes* is not confirmed in Alaska (Metzgar 2016).
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2, British Columbia Province S4 *Asplenium trichomanes* ssp. *quadrivalens* is broadly distributed with a large population in Europe, and smaller populations found in Africa, the Middle East, Australia and New Zealand (GBIF 2025, FNA 2025, iNaturalist 2025). In North America, *Asplenium trichomanes* ssp. *quadrivalens* is present in three Canadian provinces and territories as well as 18 US states including in the west and east coast (FNA 2025). Across its range, *Asplenium trichomanes* ssp. *quadrivalens* occurs in lithic habitats at elevations of 0 m to 3,000 m (GBIF 2025, FNA 2025). It is typically found on moist calcareous rocks but may tolerate substrate with minimal calcium (FNA 2025, BSBI 2025). In southeastern Alaska this species is only known from the Tongass NF, which is the northern extent of its range in North America; the nearest populations are in Haida Gwaii and on Vancouver Island in British Columbia (CPNWH 2025, iNaturalist 2025).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Asplenium trichomanes* ssp. *Quadrivalens* is known to disperse by spores (GBIF 2025, FNA 2025). Spores are born on monomorphic fertile fronds in late winter to early spring and are dispersed by wind and gravity mostly within 1-10 meters of the parent plant (FNA 2025, Rose and Dassler 2017, Schneller 1995).
4 Abundance on Tongass	**D**	D = Insufficient information to draw inferences about criterion. *Asplenium trichomanes* ssp. *quadrivalens* is known from seven occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).

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Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Asplenium trichomanes* ssp. *quadrivalens* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat for the seven occurrences of *Asplenium trichomanes* ssp. *quadrivalens* on the TNF is rocky limestone cliffs (FNA 2025). This habitat is not well described as one of the terrestrial ecosystems of the TNF and may be considered under "other land cover" (Turner and Mallott 2025). Timber harvest has not occurred in the recent past within 1 km from all occurrences (USFS 2025c). There are few anthropogenic activities that have impacted limestone cliffs. Dispersed recreation (specifically exploration of caves that are associated with karst) may have an impact on this habitat. The habitat is uncommon on the TNF but is likely relatively stable.
7 Habitat vulnerability or modification; other threats	**D**	D = Insufficient information to draw inferences about criterion. This species is often found on cool, moist cliffs. Increased temperatures and altered precipitation patterns may impact water availability (Turner and Mallot 2025). Timber harvest directly adjacent to habitat could also alter light and moisture regimes. Habitat is not well mapped but is uncommon and patchy on the Tongass NF, which may make this species vulnerable to change.
8	**D**	D = Insufficient information to draw inferences about criterion.

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Criteria	*Rank*	*Rationale*
Life history and demographics		*Asplenium trichomanes* ssp. *quadrivalens* is a perennial fern with a cespitose growth habit (FNA 2025). It produces spores from late winter to early spring (GBIF 2025). Plants are outcrossing but are also highly inbreeding and capable of single spore colonization (Suter et al. 2000). Gametophytes are more likely to produce sporophytes if other gametophytes are present (Suter et al. 2000). The life span of *Asplenium trichomanes* ssp. *quadrivalens* and other species of *Asplenium* are not well described.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☒	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Asplenium trichomanes ssp quadrivalens is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Limestone cliff habitat is uncommon and patchy. Because habitat is not well mapped it is difficult to assess threats. Habitat may be impacted by alterations to moisture availability due to timber harvest or climate change.
- **Declining trends:** Population trends are not known. Limestone cliff habitat is uncommon but likely relatively stable
- **Restricted ranges:** The Tongass NF occurrences are at the northern edge of the range for this sub species in North America.

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- **Low population numbers or restricted ecological conditions:** There are seven known occurrences broadly distributed on the southern half of the forest from south Prince of Wales Island to Baranof Island. Little is known about life history or dispersal

.

- **Other factors:** It is unknown whether other factors may exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO1) [7/19/2003]**	**Baranof Island. About 40 km SE of Sitka near Red Bluff Bay. Near a rock overhang that looks like a cave from Red Bluff Bay.**	**Collected along a rocky cliff. *Asplenium viride* also growing in cracks along cliff.**		
2*	**ACCS_Mar25 (EO2) [8/11/1993]**	**Cannery cove, North arm of sound, South west side of cove.**			
2	CPNWH_Mar25 (WTU333409) [8/11/1993]	Cannery cove, North arm of sound, South west side of cove.			
2	CPNWH_April2025(ALA) [8/11/1993]	Prince of Wales Island, Moira Sound, Cannery Cove, N arm of sound, SW side of cove, Craig Quad, Tongass National Forest, Alexander Archipelago.	Limestone cliffs just inside hemlock-spruce forest, growing in cracks in rocks.		
3	CPNWH_April2025(ALA) [8/04/1959]	Coronation Island, Craig Quad, Alexander Archipelago, Coronation Island.	Limestone rock		
4	TESP_Mar25 (USFS 2025a) (100554P000427) [9/10/2011]	Two Crack Island	Plants growing across the height (~50') and half the length (~500') of limestone cliffs on an island with a few large faults in the limestone bedrock. Where the cliffs became overhanging (too little light) or too shallow-angled (too much light)	200 Genets counted. Plants distributed along a large limestone cliff that extends the width of Two Crack Island	

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Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
5	TESP_Mar25 (USFS 2025a) (100552P000140) [7/13/2000]	Gravina Is.	Puppets cliffs, calcareous		
6	TESP_Mar25 (USFS 2025a) (100552P000238) [8/23/2005]	RUDYERD ISLAND	ON MARBLE/LIMESTONE CLIFFS OVERLOOKING SHORT PASS	MISTY WEED INVENTORY, RUDYERD ISLAND, 50 IND. ON MARBLE/LIMESTONE CLIFFS OVERLOOKING SHORT PASS	
7	TESP_Mar25 (USFS 2025a) (100554P000340) [5/17/2010]	cliff about 200 feet in from Halibut Harbor shore	Several hundred individuals were found on a large limestone cliff. The cliff was about 80 feet high and spanned a distance of about 1/3 mile. ASTR was dispersed across the height and length of the cliff. The limestone was about 200 feet in from the sea.	500 counted. ASTR2 distributed on cliff about 80 feet high, 1/3 mile long	

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Astragalus robbinsii var. harringtonii

Astragalus robbinsii var. *harringtonii* [(Rydb.) Barneby, 1928]

Robbins' Milkvetch

Global Rank: **G5T3**

Alaska State Rank: **S3**



Photo: (CC BY-NC) Brigham Young University

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy OR gaps. *Astragalus robbinsii* var. *harringtonii* is known from five estimated occurrences on the Tongass National Forest (Tongass NF) (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). These occurrences are located near Yakutat (Occurrence 1 and 2), near the mouth of the Endicott River (Occurrence 3), Chichagof Island near Freshwater Bay (Occurrence 4), and Dall Island near Gold Harbor (Occurrence 5) (Appendix 1; CPNWH 2025, USFS 2025a). Specimens labeled as *Astragalus harringtonii* were included in the analysis as this is a synonym of *Astragalus robbinsii* var. *harringtonii*; however this did not affect the total number of occurrences as records for those specimens from other sources are labeled as *Astragalus robbinsii* var. *harringtonii* (ACCS 2025, CNPWH 2025, ITIS 2025, Appendix 1). Within the Tongass NF boundary, this species occurs in riparian areas (Occurrence 1), meadows (Occurrence 2 and 3), limestone pavement (Occurrence 4), and southeast facing alpine talus (Occurrence 5) (Appendix 1).

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Criteria	*Rank*	*Rationale*
		There are five estimated occurrences of this species in southeastern Alaska outside of the Tongass NF, at Glacier Bay National Park, Yakutat Foreland, White Mountain on Dall Island, and near Game Creek on Chichagof Island (ACCS 2025, CPNWH 2025). Across its range, *Astragalus robbinsii* var. *harringtonii* is typically found in gravel bars and banks in alder, spruce, and birch woods. This species could be confused with *Astragalus alpinus* or *Astragalus robbinsii var. minor* which also occur in southeast Alaska.
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside the Tongass National Forest. Global Rank G5T3, Alaska State Rank S3 *Astragalus robbinsii* var. *harringtonii* is narrowly distributed throughout Southeastern and Southcentral Alaska; also known disjunctly from sites in Southwestern Alaska (NatureServe 2025). *Astragalus robbinsii* var. *harringtonii* is present in at least 20 sites in remote areas, there are more sites likely to be discovered (NatureServe 2025). Across its range, *Astragalus robbinsii* var. *harringtonii* occurs in gravel bars and banks at elevations of 10 m to 400 m (FNA 2025). In southeastern Alaska this species is known from the Tongass NF; its range continues east and north in Alaska and is approximately 640 km (400 miles) from the nearest occurrence near Anchorage (CPNWH 2025).
3 Dispersal capability	**D**	D = Insufficient information to draw inferences about criterion. *Astragalus robbinsii* var. *harringtoni* is a perennial herb, with a cespitose growth habit similar to other *Astragalus* species (OregonFlora 2025).

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. *Astragalus robbinsii* var. *harringtonii* is known from 5 occurrences on the Tongass NF (Appendix1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of A*stragalus robbinsii* var. *harringtonii* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. The habitat for the 5 occurrences of *Astragalus robbinsii* var. *harringtonii* on the Tongass NF is in riparian areas (Occurrence 1), meadows (Occurrence 2 and 3), limestone pavement (Occurrence 4), and southeast facing alpine talus (Occurrence 5) (Appendix 1). Due to the highly varied habitat and lack of revisits to the populations, it is difficult to evaluate habitat trends. Habitat requirements appear to be broad. The invasive species *Taraxacum officinale* and *Linaria vulgaris* are known to occur in or near the coordinates for occurrence 3 (USFS 2025b). Timber harvest has occurred in the recent past approximately 1 km (0.6 miles) from occurrence 3 on the Chilkat Peninsula (USFS 2025c). This might indicate a negative trend in habitat quality at this site.
7 Habitat vulnerability or modification;	**D**	D = Insufficient information to draw inferences about criterion. Due to the varied habitat types of occurrences of *Astragulus robbinsii* var *harringtonii*, it is difficult to draw conclusions about overall habitat vulnerability. Invasive species, timber activities, and climate change may impact the habitat of *Astragalus robbinsii* var. *harringtonii.* In adjacent locations including Wrangell-St, Elias National Park, it is also threatened by mineral development (NatureServe 2025).

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Criteria	*Rank*	*Rationale*
other threats		The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025). Therefore, the habitat of *Astragalus robbinsii* var. *harringtonii* could be impacted by invasive species in the future. *Taraxacum officinale* and *Linaria vulgaris* have been reported within 1 km of occurrence 3 (USFS 2025b) Recent timber harvest activities have occurred in the vicinity of the meadows at occurrence 3 (USFS 2025c), and this activity will likely continue on the Chilkat Peninsula in the future. *Astragalus robbinsii* var. *harringtonii* may be affected by climate change by increased precipitation and decreased snowpack. The growing season is expected to be longer in the Tongass with changes in climate-driven hydrology of the region are expected to impact nutrient cycling in aquatic and terrestrial habitats (Halofsky et al. 2025).
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. *Astragalus robbinsii* var. *harringtonii* is a perennial herb with a cespitose growth habit (OregonFlora 2025). It flowers from June to August (OregonFlora 2025). Flowers are likely pollinated by insects, similar to other species in *Astragalus* (CPC 2025). Seeds are orthodox (Kholina 2012). Seeds have physical dormancy and require scarification for germination (Baskin and Baskin 2012). The lifespan of this species is not well described.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒

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Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Astragalus robbinsii var *harringtonii* is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** *Astragalus robbinsii* var *harringtonii* is found in a broad range of habitats in Southeast Alaska, including streamside gravel, wet meadow, beach meadow, limestone talus, and alpine meadow. It is difficult to assess forest wide threats when habitat is variable. With apparently broad habitat requirements, suitable habitat is likely to persist.
- **Declining trends:** Population trends are unknown. Increased temperatures and altered precipitation patterns may impact occurrences or habitat but *Astragalus robbinsii* var *harrington* appears to tolerate a wide range of habitat conditions.
- **Restricted ranges:** *Astragalus robbinsii* var *harrington* is known only from Alaska. The occurrences in Southeast Alaska may be disjunct from occurrences further north.
- **Low population numbers:** There are five known occurrences on the Tongass NF and five additional occurrences in Southeast Alaska, ranging from Dall Island at the southern end of the forest to Yakutat. None of the occurrences indicate population size.
- **Other factors:** The moderate number of documented occurrences and the broad geographic range indicate that it likely occurs in additional places on the Tongass.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO17) [6/22/1991]**	**Yakutat Foreland, Harlequin Lake - Dangerous River area**	**Raised gravel river terraces; under willows**		
1	CPNWH_April2025(ALA) [6/22/1991]	Yakutat Foreland, Harlequin Lake - Dangerous River area, Yakutat Quad.	Raised gravel river terraces; under willows.		
2*	**ACCS_Mar25 (EO20) [7/22/1999]**	**Yakutat area, Dry Bay, just S of the Alsek R., just N of the Sitka Sound Seafoods landing strip.**	**Open grassy meadow along the river bank.**		
3*	**ACCS_Mar25 (EO21) [7/30/1999]**	**Juneau Quad.: mainland, E side of Chilkat Peninsula, ca. 1 km N of the Endicott R. mouth, E os the landing strip**	**upper beach meadow.**		
3	CPNWH_Mar25 (UAAH10485) [7/30/1999]	Juneau Quad.: mainland, E side of Chilkat Peninsula, ca. 1 km N of the Endicott R. mouth, E os the landing strip	upper beach meadow.		
3	CPNWH_Mar25 (UAAH10488) [7/30/1999]	Juneau Quad.: mainland, E side of Chilkat Peninsula, ca. 1 km N of the Endicott R. mouth, E os the landing strip	upper beach meadow.		

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Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
3	CPNWH_Mar25 (UAAH10489) [7/30/1999]	Juneau Quad.: mainland, E side of Chilkat Peninsula, ca. 1 km N of the Endicott R. mouth, E os the landing strip	upper beach meadow.		
3	CPNWH_April2025 (ALA) [6/30/1999]	Mainland, E side of Chilkat Peninsula, ca. 1 km N of the Endicott R. mouth, E os the landing strip, Juneau Quad, Alexander Archipelago.	Upper beach meadow.		
4*	**ACCS_Mar25 (EO25) [7/16/2013]**	**Chichagof Island, Freshwater Bay area.**	**Sparsely vegetated limestone pavement.**		
4	CPNWH_April2025(ALA) [7/16/2013]	Chichagof Island, Freshwater Bay area, Tongass National Forest.	Sparsely vegetated limestone pavement.		
5*	**ACCS_Mar25 (EO18) [7/19/1993]**	**Dall Island, Gold Harbor, "Rose Karst" area E of harbor, knob between Twin Peaks and Grace Mountain**	**SE-facing alpine limestone talus**		
5	CPNWH_April2025(ALA) [7/19/1993]	Dall Island, Gold Harbor, "Rose Karst" area E of harbor, knob between Twin Peaks and Grace Mountain, Dixon Entrance Quad, Tongass National Forest.	SE-facing alpine limestone talus.		

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Atrichum flavisetum

Atrichum flavisetum [Mitten, 1859]

smoothcap moss

Global Rank: **GU**

Alaska State Rank: **S1**



photo: (CC-BY-NC) Stephan Grey

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Atrichum flavisetum* is known from 2 estimated occurrences on the Tongass National Forest (Fig. 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Farm Island approximately 11.5 miles NNE of the Borough of Wrangell (Occurrence 1) and on Kuiu Island, approximately 17.75 miles SSW of the community of Kake (Occurrence 2) (Appendix 1; CBH 2025, USFS 2025a). The habitat for Occurrence 1 is from mineral soil on a rootfall mound atop a non-calcareous rock outcrop in undisturbed coniferous forest, and the habitat for Occurrence 2 is a thin humic soil over crushed rock in a limestone rock quarry (Appendix 1). Across its range, the habitat for *Atrichum flavisetum* is typically described as bare soil on ravine banks, roots of fallen trees, ravines in rock crevices and other similar sites in forests (CBH 2025, FNA 2020). There is one occurrence of this species in southeastern Alaska outside of the Tongass NF in Glacier Bay National Park (ACCS 2025, CPNWH 2025).

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Criteria	*Rank*	*Rationale*
		This species may be confused for other *Atrichum* species which are also present nearby (iNaturalist 2025). It is almost inseparable from *A. undulatum* by leaf characters alone but can be distinguished by the multiple sporophytes per stem (FNA 2025).
2 Distribution in surrounding geographic area	**B**	B = Patchy or gaps. Global Rank GU, Alaska State Rank S1 Brittish Columbia S3 *Atrichum flavisetum* is broadly distributed throughout North Temperate zone forested areas. In North America, the species is rare (FNA 2020). There are two collections from British Columbia near Vancouver and two from Washington (an 1894 collection from along the Columbia River and a 1974 collection from Whatcom County (CBH 2025). There are many collections in Europe and Asia, extending from Scandinavia and the Alps, through Russia to the Himalayan Mountains and Japan (CBH 2025). It occurs on soil in forests at elevations of 0 m to 3000 m, with one collection from India reported at 6000-7000 m (CBH 2025). In Alaska this species is only known from the Tongass NF and Glacier Bay National Park (CPNWH 2025).
3 Dispersal capability	**D**	D = Insufficient information to draw inferences about criterion. *Atrichum flavisetum* is an acrocarpous moss with a terrestrial growth habit (FNA 2025). It is reported to produce sporophytes, but there is no information on its important recruitment methods (FNA 2025). The species occupies bare soil patches, a relatively ephemeral habitat. One study in the Moscow, Russia area documented a relative increase in abundance as changes in forestry practices over recent decades, suggesting that the species is capable of dispersal into appropriate habitat (Goryushko et al. 2024).
4 Abundance on Tongass NF	**A**	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Atrichum flavisetum* is known from 2 occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Atrichum flavisetum* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. There are just two occurrences of this species on the Tongass, with habitat for one a root mound from a fallen tree on non-calcareous rock outcrop in undisturbed forest, and the other from thin soil over crushed rock in a limestone rock quarry (Appendix 1). It is difficult to draw conclusions about habitat from these occurrences. Rock outcrops are patchy habitat on the Tongass NF and are not well mapped. Additionally, this species is rare in North America (FNA 2020), and specific unknown habitat requirements may contribute to rarity. The invasive species *Pharlaris arundinacea* often grows on the road system and in rock quarries on the Tongass. While not mapped in the same quarry as Occurrence 2, it is known to occur on a nearby and connected road system (USFS 2025b). Timber harvest has occurred in the recent past within 1km from Occurrence 2 on Kuiu Island (USFS 2025c). It is unclear if this would impact habitat at this site.
7 Habitat vulnerability or modification; other threats	**D**	D = Insufficient information to draw inferences about criterion Invasive species, timber activities, and climate change may impact the habitat or occurrences of *Atrichum flavisetum*. Life history and specific habitat requirements of this species are not well known so it is difficult to assess how this species would be impacted by disturbance or climate change. Its occurrence in a rock quarry indicates it may be tolerant of or benefit from some types of disturbance. However, *Atrichum flavisetum* is rare in North America and it may have more narrow habitat requirements.

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	**C**	C = species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. *Atrichum flavisetum* is an acrocarpous moss with an erect/ leafy growth habit (FNA 2025). It produces leafy stems with simple leaves with a midrib (FNA 2025). *Atrichum flavisetum* produces sporocarps frequently (FNA 2025). Specialized asexual reproduction is absent for this species (FNA 2025). A study of *Artichum flavisetum* in western Russia described the preferred habitat as vertical bare soil of upturned root wads or ravine banks (Goryushko 2024). The authors suggest that changes in forest management have resulted in an increase in these type of habitats that has led to the colonization of this forest by *Atrichum flvisetum* and subsequent increase in abundance since 2001 (Goryushko et al. 2024). This suggests that *Atrichum flavisetum* is capable of colonizing naturally disturbed areas and readily dispersing across a landscape; however, this study is from Europe, where the species is more common, perhaps other factors limit the species in southeast Alaska.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

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Conclusion Rationale

Atrichum flavisetum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Atrichum flavisetum and its habitat may be impacted by invasive species, timber harvest or climate change. However, life history and specific habitat requirements of this species are not well known so it is difficult to assess how this species would be impacted by disturbance or climate change.
- **Declining trends:** Atrichum flavisetum is known from mineral soil on a rock outcrop and thin soil in a rock quarry. Rock outcrops are patchy habitat on the Tongass NF and are not well mapped. Additionally, this species is rare in North America (FNA 2020), and specific unknown habitat requirements may contribute to rarity.
- **Restricted ranges:** Atrichum flavisetum is rare in North America and there are only three occurrences in Alaska that appear to be disjunct from the occurrences in British Columbia approximately 600 miles away.
- **Low population numbers:** On the Tongass NF, Atrichum flavisetum is known from only two occurrences on Kuiu Island and the central mainland. Bryophytes are not typically recorded in botanical surveys so this species could be more common than is documented.
- **Other factors:** In Russia, where this species is more common it may benefit from soil disturbance. The occurrence in a rock pit suggests it may also benefit from disturbance on the Tongass NF.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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[USFS] USDA Forest Service. 2025b. Tongass NF Invasive Plant Species dataset.

[USFS] USDA Forest Service. 2025c. Region 10 Young Growth Forest dataset.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [3/27/2016]**	**Southeast Alaska panhandle, Farm Island. Approximately 11.5 miles NNE of the Borough of Wrangell.**	**Steep non-calcareous outcrop and cliffs in undisturbed coniferous forest. partially shaded, , rootfall mound. Substrate: mineral soil.**		
1	CBH 2025 (DAV) [03/27/2016]	Tongass National Forest. Southeast Alaska panhandle, Farm Island. Approximately 11.5 miles NNE of the Borough of Wrangell. Watershed: Stikine River. Sitename: Farm Island cliff	Steep non-calcareous outcrop and cliffs in undisturbed coniferous forest. Slope: 45°; Aspect: 100°. Substrate: partially shaded moist rootfall mound; mineral soil.		
2*	**CBH 2025 (DAV) [07/14/2017]**	**Tongass National Forest. Southeast Alaska Panhandle, Kuiu Island. Approximately 17.75 miles SSW of the community of Kake. Watershed: Kadake Creek, unnamed tributary. Sitename: Kuiu limestone Quarry**	**Limestone rock quarry with floor of wet, thin humic soil over crushed rock. , Slope: 245°; Aspect: 270°. Substrate: Mostly exposed moist compacted; on limestone.**		
2	ACCSBryo_Oct24 [7/14/2017]	Tongass National Forest. Southeast Alaska Panhandle, Kuiu Island. Approximately 17.75 miles SSW of the community of Kake. Watershed: Kadake Creek, unnamed tributary. Sitename: Kuiu limestone Quarry	Limestone rock quarry with floor of wet, thin humic soil over crushed rock. Substrate: mostly exposed moist compacted; limestone.		

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Blepharostoma arachnoideum

Blepharostoma arachnoideum [M.A. Howe, 1899]

liverwort

Global Rank: **G3G4**

Alaska State Rank: **S2**



photo: (CC BY-NC-SA) M. Goff

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Blepharostoma arachnoideum* is known from two occurrences on the Tongass National Forest (Tongass NF) (Fig. 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Farm Island, approximately 13.5 miles north of Wrangell (Occurrence 1) and Farragut Bay, on the mainland just north of Kupreanof Island (Occurrence 2) (Appendix 1; CPNWH 2025, USFS 2025a). The habitat for Occurrence 1 was described as river terrace with mature *Populus balsamifera* and suppressed-intermedia *Picea sitchensis* and scattered *Alnus rubra* (Appendix 1). Occurrence 2 is from 1899 and does not have a habitat description beyond the locality of Farragut Bay. There is one occurrence of this species in southeastern Alaska outside of the Tongass NF; an iNaturalist occurrence from April 2024 at Magoun Islands State Park near Mt. Edgecumbe (iNaturalist 2025, Matt Goff pers. comm.). The habitat for this occurrence was described as “on dead wood (underside of suspended log without bark, near waterfall)”.

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside the Tongass NF. Global Rank G3G4, Alaska State Rank S2 British Columbia S2, Oregon S2 *Blepharostoma arachnoideum* is narrowly distributed throughout northwestern North America from Lake Tahoe, Nevada, northern California, Oregon, western Montana, through Washington and British Columbia, to Southeast Alaska (Wagner 2024). There are also older collections that could extend the range to the Aleutian islands, northern Alaska, and the Jasper area of Alberta, Canada (CBH 2025). Across its range, *Blepharostoma arachnoideum* occurs in coarse woody debris in moist forest, but there are a few collections from aquatic habitat including hundreds of feet deep in lake Tahoe and in a spring creek in Mount Rainier National Park (CBH 2025). *Blepharostoma arachnoideum* occurs at elevations from near 0 m to 1,300 m (CBH 2025). Where *Blepharostoma arachnoideum* occurs, it can be relatively common, but populations are often clumped and it tends to be relatively rare across the region (Wagner 2024). In southeastern Alaska this species is known from three locations; it also occurs scattered in northern and western Alaska (CPNWH 2025). David Wagner on his website "Guide to Liverworts of Oregon" has this to say about the microhabitat of *Blepharostoma arachnoideum*: "Shortly after a field bryology workshop in 2017, a number of Willamette National Forest botanists began finding this species in numerous localities in their ranger districts. They were able to recognize a particular likely microhabitat: wet logs at the edge of streams. This species is locally abundant, similar to the situation with *Macrodiphyllum rubrum* on the coast, where there is a concentration of sites in a coastal strip in two counties. These clusters of populations do not justify removing the species from ORBIC conservation status because other than these hot spots the species are not abundant" (Wagner 2024).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Blepharostoma arachnoideum* is a leafy liverwort with a mostly terrestrial growth habit, but a few populations are aquatic (Wagner 2024). This species reproduces through both spores and gemmae (Wagner 2024).

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	**A**	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Blepharostoma arachnoideum* is known from two occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Blepharostoma arachnoideum* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Across its range, *Blepharostoma arachnoideum* occurs in coarse woody debris in moist forest. Habitat for occurrences in Southeast Alaska are consistent with this range wide habitat description, with the exception that the Farm Island occurrence is on a silty substrate. Forested habitat is common on the Tongass NF. Forested habitat has been impacted by timber harvest but remaining old growth forest as well as older second growth forest is likely stable. Based on Wagner's observation that this species is locally abundant in a small part of Oregon but rare elsewhere, there are likely more specific microhabitat requirements for this species or life history or dispersal characteristics that contribute to its rarity on the Tongass NF.
7 Habitat vulnerability or modification;	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Forested habitats on the Tongass NF are generally stable with low vulnerability to stressors. Ongoing timber harvest is likely to impact habitat for this species. Additionally, increased temperatures and evapotranspiration and altered precipitation patterns are likely to alter moisture availability and may create stress for this species.

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Criteria	*Rank*	*Rationale*
other threats		
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. The life history of *Blepharostoma arachnoideum* is largely unknown. It is a small, thread-like plant with frequent lateral branches. Gemmae are frequent toward the stem apex. (Wagner 2024).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

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Conclusion Rationale

Blepharastoma arachnoideum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Timber harvest and climate change are likely to impact forest habitat for this species. However, little is known about microhabitat requirements or life history to determine how *Blepharostoma arachnoideum* might respond to these threats.
- **Declining trends:** Population trends are unknown. Broadly described wet forest habitat is abundant and stable on the Tongass NF, however, there are likely more specific microhabitat requirements that contribute to rarity.
- **Restricted ranges:** The Tongass NF occurrences may be disjunct from occurrences to the north and south but it is difficult to assess because bryophytes are undersurveyed and life history and dispersal traits of this species are not well known.
- **Low population numbers or restricted ecological conditions:** Only known from two occurrences on the Tongass, but bryophytes are under surveyed and it may be more common than is documented.
- **Other factors:** It is unknown whether other factors may exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [3/26/2016]**	**Southeast Alaska panhandle, Farm Island. Approximately 13.5 miles north of the Borough of Wrangell.**	**First river terrace with mature Populus balsamifera and suppressed-intermediate Picea sitchensis and scattered Alnus rubra on the rivers edge. mostly shaded. Substrate: wet, silt.**		

2*	**CBH 2025 (WTU) [6/5/1899]**	**Farragut Bay.**		**With Kurzia sp. [WTU-B-033844], Lepidozia reptans [WTU-B-035969], Scapania oakesii, Scapania bolanderi. [Filed under Blepharostoma trichophyllum.]**	
2	ACCSBryo_Oct24 [no date]	Farragut Bay.			

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Boechera stricta

Boechera stricta [(Graham) Al-Shehbaz, 2003]

Drummond's rockcress

Global Rank: **G5**

Alaska State Rank: **SNR**



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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Boechera stricta* is known from one estimated occurrence on the Tongass National Forest (Tongass NF) (Appendix 1). We define an occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is located in Murder Bay on the southern tip of Admiralty Island in an upper beach meadow (Appendix 1; CPNWH 2025, USFS 2025a).
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank SNR *Boechera stricta* is broadly distributed throughout North America from Alaska south to New Mexico and east to Nova Scotia (NatureServe 2025, GBIF 2025). Across its range, *Boechera stricta* occurs in a broad range of habitats (NatureServe 2025), most commonly on rocky slopes and gravelly soil in sagebrush and open conifer, hardwood forests, and alpine meadows at elevations of 2296 ft to 12795 ft (700 m to 3,900 m) (FNA 2025).

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Criteria	*Rank*	*Rationale*
		Regionally, *Boechera stricta* is widespread in British Colombia and the Yukon Territory (CPNWH 2025). In Alaska, this species is less common, found between Admiralty Island in the south and Anchorage and the Kenai Peninsula to the north (CPNWH 2025). The closest occurrences of this species outside the planning area are approximately 170 miles to the north in the vicinity of Haines and approximately 200 miles to the east in British Columbia (Klinkenberg 2020).
3 Dispersal capability	**D**	D = Insufficient information to draw inferences about criterion. *Boechera stricta* is a biennial or short-lived perennial herb (FNA 2025). Its main dispersal mechanism is by seeds (FNA 2025). Studies of *Boechera stricta* populations in the Rocky Mountains suggest low levels of seed dispersal and high frequency of self-pollination may explain the spatially restricted gene-flow observed in these populations (Song et al. 2006, Anderson et al. 2015)
4 Abundance on Tongass NF	**A**	A = Rare. *Boechera stricta* is known from one occurrence on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends for the occurrence of *Boechera stricta* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. The habitat for the one occurrence of *Boechera stricta* on the Tongass NF is an upper beach meadow (Appendix 1). In adjacent locations including throughout BC and the United States it occurs in mesic to dry rock outcrops, talus slope, gravelly soils, open forests, and roadsides (E-Flora BC 2025). The single Tongass occurrence appears to be an atypical habitat for this species, therefore it is difficult to generalize habitat type for this species across the Forest.

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Criteria	*Rank*	*Rationale*
		The occurrence is just south of a lodge, so trampling from foot traffic, introduced invasives, or other activates associated with the lodge could impact habitat quality. Invasive species that can survive in or near upper beach meadows, such as *Ranunculus repens, Elymus repens, Trifolium repens,* and *Galeopsis tetrahit* are known to occur in or near the coordinates for Occurrence 1 (USFS 2025b). Without follow-up visits to the beach meadow at the single Tongass NF occurrence, there is not enough information to decide if the habitat has declined. However, meadows in general on the Tongass NF are thought to have high ecological integrity (Turner and Mallott 2025).
7 Habitat vulnerability or modification; other threats	**D**	D = Insufficient information to draw inferences about criterion. While Meadows in general are considered to have low vulnerability on the Tongass (Turner and Mallott 2025) the beach meadow that is habitat for the one occurrence of *Boechera stricta* is less than 200 feet from a developed area. Activity from the lodge could cause impacts to the beach meadow, including introducing invasives species or creating disturbance where invasive species could thrive. Invasive plants were mapped in the vicinity of the occurrence in 2000 and 2005, but revisits have not been made. Meadow habitats are particularly vulnerable to invasive species (Chestnut 2025, Wiles and Warren 2025). Therefore, the habitat of *Boechera stricta* may be vulnerable to invasive species in the future. There is uncertainty regarding the effects of climate change on this habitat. Potential causes for loss of ecological integrity are changes to hydrologic and disturbance patterns related to climate change (Turner and Mallott 2025).
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. *Boechera stricta* is a perennial herb with a cespitose growth habit (FNA 2025). It produces flowers and fruits with seeds (FNA 2025). It flowers from May to August (FNA 2025). Flowers are pollinated by insects (CPC 2025). Plants are apomictic, self-pollinating and have the ability to cross fertilize within *Boechera* species (Song et al. 2006, Rojek et al. 2018). *Boechera* species seeds are orthodox (Baskin and Baskin 2012). Seeds have physiological and physical dormancy and may require a period of cold and scarification for germination (Baskin and Baskin 2012).

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Criteria	*Rank*	*Rationale*
		The life span of *Boechera stricta* was a few years (3.2 years) for experimental plants in the Rocky Mountains (Hamann et al. 2021). *Boechera stricta* germination phenology and longevity may be threatened by climate change where less germination is likely with reduced snowfall (Hamann et al. 2021, Johnson 2014). Climate change could induce maladaptive plasticity which could reduce fitness, and stall adaptation and migration (Anderson et al. 2015). *Boechera stricta* is known for being promiscuous and has formed apomictic hybris with over 15 other *Boechera* species (FNA 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Boechera stricta is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** The single occurrence in the planning area is near a lodge and infestations of several invasive plant species. However, it is unclear to what extent these factors may impact this species or its habitat, which is atypical for the species.

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- **Declining trends:** There is no available data to assess population trends of this species on the Tongass NF. The beach meadow habitat where this record occurs is thought to have low vulnerability across the planning area, but specific trend data is not available. *Boechera stricta* occupies a variety of habitats across its range; there is not currently enough information to determine habitat preferences or trends within the planning area.

- **Restricted ranges:** The two closest known occurrences of this species outside the Tongass NF are approximately 170 miles north near Haines, AK, and 200 miles east in British Columbia, Canada. While distance and multiple geographical barriers do separate the Tongass occurrence from other known populations, this species is neither endemic to the planning area, nor does the plan area represent the edge of this species range.

- **Low population numbers or restricted ecological conditions:** No indication of abundance is provided for the single record of *Boechera stricta* on the Tongass NF, and the research currently available does not indicate a narrow preference for specific ecological conditions.

- **Other factors:** The beach meadow habitat where this species occurs on the Tongass NF is atypical for the species across the rest of its range. Without additional information it cannot be determined why *Boechera stricta* has only been observed in this habitat or what threats it may face.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO24) [8/20/2000]**	**S end of island, Murder Cove, E shore just S of lodge buildings**	**upper beach meadow**		
1	CPNWH_April2025(ALA) [8/20/2000]	S end of island, Murder Cove, E shore just S of lodge buildings, Sitka Quad, Alexander Archipelago, Admiralty Island.	upper beach meadow		

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Botrychium alaskense

Botrychium alaskense W.H. Wagner & J.R. Grant [2002]

Alaska moonwort

Global Rank: **G4**
Alaska State Rank: **S3**



Photo: Jason Grant (CC-BY iNaturalist 2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce or isolated. *Botrychium alaskense* is known from one estimated occurrence on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The occurrence is on the mainland east of Wrangell (ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). The plants were observed on limestone substrate at the top of a ridgeline of a limestone mountain in a vegetated alpine meadow; associated plants either observed or collected at the same location included *Coeloglossum viride*, *Aconitum delphiniifolium*, *Anemone narcissiflora*, *Botrychium pinnatum* and *B. minganense* (Appendix 1; Arctos 2025, CPNWH 2025, USFS 2025a). This occurrence is the only population of *Botrychium alaskense* in southeast Alaska and is the southernmost report from Alaska (Klinkenberg 2020, Arctos 2025, CPNWH 2025). The taxon was described in 2002 and the authors described the species as, "obvious because of their unusually large size, characteristic trophophore shape, and shining, bright green color" (Wagner and Grant 2002). However, surveying for moonwort populations is difficult, because so much of the moonwort life cycle is spent below ground, mature plants are often dormant, and the sporophytes are small and inconspicuous (Fryer 2014).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside of the Tongass NF. Global Rank: G4 (Apparently Secure), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: S4 (Apparently Secure): British Columbia, Yukon. United States: Only occurs in Alaska (NatureServe 2025). *Botrychium alaskense* is a perennial herb in the Ophioglossaceae with a relatively narrow distribution in western North America in Alaska, British Columbia, and Yukon (Wagner and Grant 2002, Klinkenberg 2020, Arctos 2025, CPNWH 2025). There is one occurrence of *Botrychium alaskense* from the Tongass NF ~ 10 miles east of Wrangell near Virginia Lake (ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). The nearest Alaskan record is ~ 475 miles to the northwest near the Bering Glacier (Arctos 2025, CPNWH 2025). There are fewer than 25 widely scattered records farther to the northwest in Alaska (Wagner and Grant 2002, Arctos 2025, CPNWH 2025). To the east, there are five scattered records from southeastern to northwestern British Columbia (Klinkenberg 2020). Botrychium species can be overlooked due to their cryptic nature, size and dormancy tendencies. Additionally, the species is capable of self-fertilization, so a single spore can establish a new occurrence, which increases the chances of long-distance dispersal (See Criteria #3). However, long distance dispersal events are likely uncommon, so it is difficult to determine if the Tongass NF occurrence is disjunct. *Botrychium alaskense* often occurs in open areas including moist meadows, burned forests, road edges and ditches, river sandbars, and edges of oxbow lakes at elevations ranging from approximately 390 to 5250 feet (120 to 1600 m) (Wagner and Grant 2002, CPNWH 2025). Some level of disturbance is present at most collection locations, including naturally disturbed sites, such as along new river sandbars and oxbows, or by human-disturbed sites, such as roadsides, ditches, or fields and lawns that see infrequent mowing (Wagner and Grant 2002).

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Criteria	*Rank*	*Rationale*
3 Dispersal capability	**B**	B = Disperses only through suitable habitat. *Botrychium* spores can be carried long distances by air currents, water, and animals (Smith 1972, Fryer 2014, Farrar and Stensvold 2017). However, studies have shown that most *Botrychium* spores typically fall close to the parent plant (Fryer 2014, Peck et al. 1900). In a homosporous fern like *Botrychium alaskense*, intragametophytic selfing means that a single spore may be the founder of a new population (Peck et al. 1990, Stensvold 2007, Dauphin et al. 2024). *Botrychium alaskense* would only establish successfully in a moist environment with soil water sufficient for the sperm to swim to the egg and where the necessary gametophyte fungal associates are present (Fryer 2014).
4 Abundance on Tongass NF	**A**	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Botrychium alaskense* is known from only one occurrence in the eastern part of the Tongass NF. It is unknown how many individuals are present at the occurrence, but records indicate the species was uncommon (Appendix 1).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Population trends for known occurrences of *Botrychium alaskense* on the Tongass NF are unknown due to lack of repeat visits to the occurrence (ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	**A**	A = Decline in habitat quality or quantity Throughout its range, *Botrychium alaskense* is found in a wider range of habitats. Although there are three occurrences known in British Columbia that are further south, these occurrences are inland in colder interior climates. In the more moderate maritime climate of the Tongass NF the species may be limited to alpine habitat.

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Criteria	*Rank*	*Rationale*
		The Tongass NF occurrence of *Botrychium alaskense* is on limestone substrate at the top of a ridgeline of a limestone mountain in a vegetated alpine meadow. Alpine limestone habitat is uncommon on the Tongass NF. Generally, alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice (Turner and Mallot 2025). Mining has had a limited impact in alpine habitat, but it is unlikely that limestone areas would be targeted for mining. No invasive plants or timber activities are mapped within two miles of the *Botrychium alaskense* occurrence.
7 Habitat vulnerability or modification; other threats	**D**	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors. Alpine ecosystems and highly vulnerable to stressors including warming temperatures, loss of snow pack, upslope movement of tree line, increased proportion of woody vegetation relative to herbaceous, and fragmentation and loss of alpine plant communities (Halofsky et al. DRAFT). Additionally, mining activities occur in alpine habitat in limited areas of the Tongass NF and could alter habitat for this species. *otrychium*
8 Life history and demographics	**B**	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. The life cycle of *Botrychium alaskense* is divided into an underground gametophyte generation, during which sperm and eggs are produced (and the egg is fertilized), and an above-ground, leafy sporophyte generation that grows from the fertilized egg (USFS 2010, Fryer 2014). The gametophyte of *Botrychium alaskense* lives entirely below-ground where it is dependent on arbuscular mycorrhizal fungi for its nutrition (Stensvold 2007, Dauphin et al. 2014, Fryer 2014). The gametophyte produces both male and female reproductive parts. Water is needed to move the sperm to the egg and the sperm can travel limited distances leading to a large amount of self fertilization and low genetic diversity (Hauk and Haufler 1999, Ahlenslager and Potash 2007, Stensvold 2007, Stensvold and Farrar 2017). Thus, the Tongass NF population may be an important source of genetic diversity. The young, subterranean sporophyte is slow-growing and reliant on symbiotic fungi (Winther & Friedman 2007). Several years may pass before the sporophyte is large enough to

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Criteria	*Rank*	*Rationale*
		produce its first above-ground leaf (Farrar and Johnson 2024). Above-ground sporophytes may fail to produce spores when there is drought during the spring growing season (Muller 1992 as cited in Johnson-Groh and Lee 2002). The size and health of the below-ground structure bank is critical for sustaining the long-term above-ground population (Johnson-Groh et al. 2002, Popovich et al. 2024). Thus, with relatively long generation times, specific requirement for symbiotic fungi, and low genetic diversity, *Botrychium alaskense* may struggle to respond to disturbance.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☒	☐	☐
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☐

Conclusion Rationale

Botrychium alaskense is recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Increasing temperatures and loss of snow may lead to upslope movement of tree line, increased proportion of woody vegetation relative to herbaceous, and fragmentation and loss of alpine plant communities (Halofsky et al. 2024), which may alter habitat for *Botrychium alaskense*.

- **Declining trends:** Population trends for the one occurrence on the Tongass NF are not known. Alpine habitat has moderate ecosystem integrity and is highly vulnerable to stressors.

- **Restricted ranges:** *Botrychium alaskense* is only known from British Columbia, Yukon and Alaska. The one Tongass NF population is approximately 475 miles from the nearest known population, but due to potential for long distance dispersal, it is unclear if the occurrence on the Tongass NF is disjunct.

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- **Low population numbers or restricted ecological conditions:** There is one occurrence on the Tongass NF in alpine limestone habitat. This habitat is rare on the Tongass NF. With relatively long generation times, specific requirement for symbiotic fungi, and low genetic diversity, *Botrychium alaskense* may struggle to respond to disturbance.

- **Other factors:**

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**USFS_TESP_Mar25 (100522P000207Y13)[7/30/2013]**	**Karst Mountain near Virginia Lake**	**Growing with forbs and other Botrychium such as BOMI, BOPI [associated plants collected or observed at the same location, habitat, and day included Coeloglossum viride, Aconitum delphiniifolium, Anemone**	**1 plant seen; Collected a variety of ferns from the location, so not knowing identity in the field may result in more of this species than accounted for.**	

			narcissiflora, Botrychium pinnatum and B. minganense]		
1	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:250715)[7/30/2013]	Mainland, S of Virginia Lake, NE of Madan Bay, Petersburg Quad, Tongass National Forest.	Top of ridgeline of limestone mountain, vegetated alpine meadow with limestone substrate, uncommon.		
1	ANHP-ACCS_Mar25 (EO15)[7/30/2013]	Mainland, S of Virginia Lake, NE of Madan Bay.	Top of ridgeline of limestone mountain, vegetated alpine meadow with limestone substrate.	Uncommon.	

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Botrychium pinnatum

Botrychium pinnatum H. St. John

Northern Moonwort

Global Rank: **G5**
Alaska State Rank: **SNR**

Photo: Ellyne Geurts (CC0 iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce or isolated. *Botrychium pinnatum* is known from five estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The five occurrences are located on: the mainland in the Yakutat Forelands; the mainland east of Wrangell; Prince of Wales Island; Admiralty Island; and West Chichagof (Arctos 2025, CPNWH 2025, USFS 2025a). On the Tongass NF, *Botrychium pinnatum* is found in the following habitats: in a vegetated alpine meadow on limestone; along a road that passes through young *Thuja plicata*, *Picea sitchensis*, *Tsuga heterophylla* forest; along a road through Sitka Spruce forest [USFS 2025e, ACCS 2025]); in subalpine habitat near limestone (from aerial imagery); and in alpine rock outcrops (Appendix 1). At occurrence 1 in limestone alpine meadow habitat, associated plants either observed or collected at the same location included *Coeloglossum viride*, *Aconitum delphiniifolium*, *Anemone narcissiflora*, *Botrychium pinnatum* and *Botrychium minganense* (Appendix 1; Arctos 2025, CPNWH 2025). There is one other occurrence of *Botrychium pinnatum* in southeast Alaska outside the boundaries of the Tongass NF (Appendix 1; Arctos 2025). This occurrence is west of the Chilkat River in the St. Elias Mountains, and the habitat is described as limestone alpine heath and mesic meadows (Arctos 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF. Global Rank: G5 (Secure), Alaska State Rank: SNR (Not Ranked) (NatureServe 2025) State Ranks: Canadian provinces and territories: SH (Possibly Extirpated): Newfoundland, Northwest Territories; S2 (Imperiled): Quebec; S3 (Vulnerable): Yukon; all others are S4 (Apparently Secure), S5 (Secure), or not present. United States: S1 (Critically Imperiled): Arizona, Nevada, Utah, Wyoming; S2 (Imperiled): California, Colorado, Idaho; S3 (Vulnerable): Montana, Oregon, Washington (NatureServe 2025). *Botrychium pinnatum* is a perennial herb in the Ophioglossaceae with a broad distribution in western North America. It has been reported from Alaska south to California and east to New Mexico, Colorado, Wyoming, Montana, Manitoba, and (formerly) the Northwest Territories (FNA, NRCS 2025). NatureServe includes disjunct occurrences in Quebec and formerly Newfoundland (NatureServe 2025) and USDA Plants includes Greenland (NRCS 2025). Discrepancies between maps from different sources may be based on misidentified collections of *Botrychium boreale* (FNA 2025). The nearest non-Forest Alaskan record is west of the Chilkat River (west of Skagway) in the St. Elias Mountains, which is 113 miles east of Yakutat (Arctos 2025, CPNWH 2025). There are scattered records throughout Southcentral Alaska and southwest into the Aleutian Islands (Arctos 2025, CPNWH 2025). To the east, the species is widely distributed but infrequent in British Columbia (Klinkenberg 2020, Arctos 2025). *Botrychium pinnatum* occurs in mesic to moist fields, grassy or shrubby slopes, woods, meadows, heath, and along stream banks in the montane and subalpine zones at elevations ranging from near sea level to approximately 9190 feet (2800 m) (Wagner and Wagner 1993, Klinkenberg 2020, Farrar and Fawcett 2024). It is commonly associated with other *Botrychium* taxa such as *Botrychium lanceolatum* and *Botrychium lunaria* (Wagner and Wagner 1993).
3 Dispersal	**B**	B = Disperses only through suitable habitat. *Botrychium* spores can be carried long distances by air currents, water, and animals (Smith 1972, Fryer 2014, Farrar and Stensvold 2017). However, studies have shown that a majority of fern spores fall close to the parent plant (Peck 1990). In

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Criteria	*Rank*	*Rationale*
capability		a homosporous fern like *Botrychium pinnatum*, intragametophytic selfing means that a single spore may be the founder of a new population (Peck et al. 1990, Stensvold 2007, Dauphin et al. 2024). *Botrychium pinnatum* would only establish successfully in a moist environment with soil water sufficient for the sperm to swim to the egg and where the necessary gametophyte fungal associates are present (Fryer 2014).
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Botrychium pinnatum* has five occurrences on the Tongass NF, with two on the mainland, one on Admiralty Island, one on Chichagof Island and one on Prince of Wales Island (Appendix 1). Occurrence 2 on Prince of Wales Island has a population count of more than 74 plants and occurrence 5 on West Chichagof has a plant count of 25. (Appendix 1; USFS 2025a). Occurrence 1 on the mainland east of Wrangell has a qualitative observation that the plants were "common."
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Population trends for known occurrences of *Botrychium pinnatum* on the Tongass NF are unknown due to lack of repeat visits to the occurrences (Arctos 2025, CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Two of the occurrences are roadside, two are in alpine limestone habitat, and one is in alpine rock outcrops. Roadside occurrences may be impacted by road maintenance activities or recreation. Alpine ecosystem integrity is moderate and is trending toward lower ecological integrity largely due to climate change (Turner and Mallot 2025). Climate change may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al. 2025). Roadside habitat is frequently disturbed by brushing and road maintenance and use activities. However, establishment in disturbed areas suggest that these disturbances may be beneficial for Botrychium pinnatum.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	**A**	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors. At roadside occurrences, invasive species may out compete *Botrychium pinnatum*. There are numerous mapped non-native plants in the vicinity of occurrences 2 and 4 (USFS 2025b). Occurrence 2 on Prince of Wales Island is located along a decommissioned road with *Phalaris arundinacea* (reed canary grass), *Plantago major* (broadleaf plantain), *Trifolium repens* (white clover), and *Poa palustris* (fowl bluegrass) (USFS 2025b). Occurrence 4 in the Yakutat forelands is 200 feet from mapped polygons of *Lupinus polyphyllus* (bigleaf lupine) along Forest Hwy 10 (USFS 2025b). Forest Service Road 10 has numerous mapped non-native plants including *Phalaris arundinacea* (reed canary grass), *Poa pratensis* (Kentucky bluegrass), and *Trifolium repens* (white clover) (USFS 2025b). The occurrence near Greens Creek mine, as well as other alpine occurrences, may be impacted by future mining or exploratory drilling. Additionally, Botrychium species require wet soils during the growing season, that allow sperm to fertilize egg in the soil (Johnson-Groh et al. 2002). Projected warming temperatures, increased evapotranspiration and growing season water deficit (Halofsky et al. 2025) may impact Botrychium reproduction. The loss of snow and ice in alpine habitats in southeast Alaska is already evident, and the rate of loss of alpine habitat is likely to increase in the future (Turner and Mallott 2025); these changes will likely affect the alpine habitat of *Botrychium pinnatum*. Loss of snow and growing season water deficits may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al. 2025 DRAFT).
8 Life history and demographics	**B**	**B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known.** The fern *Botrychium pinnatum* is a short-lived perennial herb 3–12 cm high (Farrar 2011). Its life cycle is divided into a gametophyte generation, during which sperm and eggs are produced and the egg is fertilized, and an above-ground, leafy sporophyte generation that grows from the fertilized egg (USFS 2010, Fryer 2014). During the sporophyte

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Criteria	*Rank*	*Rationale*
		generation, *Botrychium pinnatum* produces one above-ground leaf per year in mid to late spring that persists until late summer (Wagner and Wagner 1993, Johnson-Groh and Lee 2002, Farrar and Johnson 2024). In dry years, the leaf may be of shorter duration or may not appear at all (Johnson-Groh et al. 2002, Farrar and Johnson 2024, Popovich et al. 2024). The leaf is characteristically divided into a sterile segment and a spore-bearing segment (Farrar and Johnson 2024). The gametophyte of *Botrychium pinnatum* is bisexual, non-photosynthetic, and lives entirely below-ground where it is dependent on arbuscular mycorrhizal fungi for its nutrition (Stensvold 2007, Dauphin et al. 2014, Fryer 2014). Using genetic analysis, the fungal symbionts have been identified as members of the genus *Glomus* (Winther & Friedman 2007). Water in the soil is required for the sperm to travel to the egg, and because the soil likely inhibits movement of sperm between gametophytes, there is a high level of self fertilization, leading to low genetic variability at the population level (Hauk and Haufler 1999, Ahlenslager and Potash 2007, Stensvold 2007, Stensvold and Farrar 2017). The young, subterranean sporophyte is slow-growing and also reliant on symbiotic fungi (Winther & Friedman 2007). Several years may pass before the sporophyte is large enough to produce its first above-ground leaf (Farrar and Johnson 2024). Above-ground sporophytes may fail to produce spores when there is drought during the spring growing season (Muller 1992 as cited in Johnson-Groh and Lee 2002). The disturbance ecology of *Botrychium pinnatum* is not well understood; it can occur in naturally and artificially disturbed sites, but then it may be displaced by the same activities that first favored its growth (Natureserve 2025). The size and health of the below-ground structure bank is critical for sustaining the long-term above-ground population and in buffering it from extinction (Johnson-Groh et al. 2002, Popovich et al. 2024).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

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Conclusion Rationale

Botrychium pinnatum is not recommended as a Species of Conservation Concern for the following reasons:

- ***Significant threats:*** Roadside occurrences are vulnerable to disturbance from maintenance and competition from invasive species. Alpine occurrences may be impacted by mining; one occurrence is near Greens Creek. Additionally, climate change may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities. Drought during the growing season may impede fertilization of gametophytes because soil water is necessary to transport sperm to egg.
- **Declining trends:** Population trends of *Botrychium pinnatum* are not known. Alpine ecosystem integrity is moderate and is trending toward lower ecological integrity largely due to climate change. Roadside occurrences may experience disturbance or succession, but Botrychium species are typically disturbance adapted, so it may be resilient to some disturbances. However, sometimes the same disturbance processes that first promoted Botrychium growth can displace them.
- **Restricted range:** *Botrychium pinnatum* is not endemic, populations are not disjunct, and the Tongass NF is not the edge of the range.
- **Low population numbers or restricted ecological conditions:** There are five occurrences on the Tongass NF from Yakutat to Prince of Wales Island. The wide geographic distribution suggests the species may be more common than documented or has sufficient dispersal mechanisms to disperse to new habitat. Additionally, *Botrychium pinnatum* likely has long generation times and exhibits dormancy, which makes it difficult to track population dynamics and may lead to some occurrences being missed.
- **Other factors:** It is unknown whether other factors may exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:250714)[7/30/2013]**	**Mainland, S of Virginia Lake, NE of Madan Bay, Petersburg Quad, Tongass National Forest.**	**Top of ridgeline of limestone mountain, vegetated alpine meadow with limestone substrate. [associated plants collected or observed at the same location, habitat, and day included Coeloglossum viride, Aconitum delphiniifolium, Anemone narcissiflora, Botrychium alaskense and B. minganense]**	**common.**	
2*	**CPNWH_Mar25 (UAAH16191)[8/30/2021]**	**Prince of Wales-Hyder Census Area: Tongass National Forest, about 3.6 air miles SE of the Coffman Cove Rd and North Prince of Wales Rd junction, forest road 3035400**	**in road bed adjacent to a young growth stand. Growing under and near Thuja plicata, Picea sitchensis, and Tsuga heterophylla saplings; with dense moss cover and scattered grass.**	**plants are dehiscent and yellow. Population is extensive along road.**	
2	USFS_TESP_Mar25 (100554P00617)[8/30/2021]	It takes about 1 hr and 45 minutes to drive out here from Craig. The road is very uneven in places, so we drove almost to where road 3035000 intersects	In road bed adjacent to young growth stands. NW-facing aspect. Full sun. Plants are mostly growing in dense moss with scattered grasses; under and near red cedar, Sitka spruce, and western hemlock	74 plants counted. Plants have dehisced and are mostly yellow. Population appears to be extensive and there was not enough time	Road maintenance activities that would disturb the soil is a threat since plants are growing along the sides

		with road 3035400. Sensitive plant flagging was placed along stretches of the road where plants were found.	saplings. At least some of the grasses the plants are growing with appear to be non-native	to fully map and document it. We didn't actually stop finding plants, we just stopped looking. Most plants were found along the sides of the road, especially the south side, but 13 plants were found growing in the middle of the road. Sensitive plant flagging was placed near plants.	and in the middle of the road. The buds appear to be near the surface of the soil.
3*	**USFS_TESP_Mar 25 (100533P000911)[8/04/2009]**	**[Maps to Admiralty Island, SE of Hawk Inlet, Admiralty Island National Monument]**	**Aerial imagery shows it on the ridge north of Greens Creek mine (approximately one mile), at approximately 2800 feet. Very close to known karst (<500ft). NFS survey data indicates the area was surveyed because there were proposed drill sites located nearby.**		
4*	**USFS_TESP_Mar 25 (100535P000016)[7/26/1999]**	**9 MILE FARRAR AT IA STATE ELECTRO [Maps to Yakutat Forelands near Situk River Fish Ponds along Dangerous River Road (Road 942, Forest Hwy 10). Perhaps at mile 9 according to location notes]**	**[Roadside of Forest Road 10 in Sitka spruce forest (Tongass NF Vegetation Map)]**		
5*	**USFS_TESP_Sept 25 (100531PT00006) [8/21/2009]**	**Pegmatite Mtn, West Chichagof**	**Chichagof Is., Pegmatite Mtn. area Population on top of rock outcrop and around the flank, scattered clusters**	**25 plants**	
		Not on the Tongass			
6*	**Arctos 2025 (ALA-UAM:Herb:33973) [8/22/2000]**	**St. Elias Mts., Four Winds Mt., ridge trending SE from summit, Skagway Quad**	**rocky alpine heath and mesic meadows, limestone substrate**		

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Botrychium spathulatum

Botrychium spathulatum W.H. Wagner

Spathulate moonwort

Global Rank: **G3**
Alaska State Rank: **S1**



photo: Gary Fewless

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce or isolated. Only one estimated occurrence is known from a calcareous subalpine ridge on the Tongass National Forest (Tongass NF) in the West Chichagof-Yakobi Wilderness on Chichagof Island. A much larger second occurrence is known from a beach meadow at Sea Lion Cove on Kruzof Island on land that is managed by the state of Alaska but surrounded by the Tongass National Forest (USDA FS 2023). Additional populations may occur within unsurveyed subalpine and beach meadow habitat on the Tongass National Forest, however currently only a single occurrence on the Tongass National Forest is known. This species is known to frequently grow with, and is easily confused with, the more widely documented *Botrychium minganense* and *Botrychium ascendens*. Additionally, *Botrychium spathulatum* has been shown to hybridize with *Botrychium minganense* (Chadde and Kudray 2001). There is some disagreement on the validity of the single occurrence attributed to the plan area, as digitized specimens do not exist in any consulted herbarium records, and this observation is missing from survey and occurrence data in the TESP database.
2 Distribution in surrounding	**B**	B = Widely disjunct taxa for which main distribution is a significant distance from the Tongass NF. Global Rank G3, Alaska State Rank S1

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Criteria	*Rank*	*Rationale*
geographic area		British Columbia Province Rank S3S4, Yellow List; Alberta S3, Manitoba S1S2, Northwest Territories SH, Ontario S2S3, Quebec S1, Yukon Terr. S2S3, Colorado S1, Michigan S2, Minnesota S1, Vermont S1, Wisconsin S1 An early observation of this species in Alaska was recorded in 2003 on Kruzof Island, on state lands adjacent to the Tongass National Forest. An earlier specimen collected in 1944 was described in 1990 and represents the first recorded Alaska occurrence. Elsewhere in Alaska, *Botrychium spathulatum* is known from the Wrangell-St. Elias mountains (ANHP ACCS 2023). In eastern North America, it is known from the St. Lawrence Valley of Quebec as well as the maritime provinces (New Brunswick, Nova Scotia, and Prince Edward Island). It is also known from around the margins of the upper Great Lakes and lower James Bay, with occurrences is central Minnesota and (historically) central Ontario in this region as well. In western North America, it is known from western Alberta and adjacent northwestern Montana and southeastern British Columbia. It is also known from the southern Yukon Territory, adjacent Northwest Territories (NatureServe 2026, Farrar 2011, Farrar et al. 2017). This species is ranked in many states and territories. Seventeen occurrences are currently believed extant (Farrar et al. 2017). Nine occurrences are known to British Columbia (BCCDC 2015). The Tongass occurrence is within 50 kilometers of the occurrence at Sea Lion Cove on Kruzof Island, but these two occurrences are widely disjunct from the main distribution of the species, with the closest occurrence in Yukon Territory over 300 kilometers away (CPNWH 2023). Across its range, this species is known to occupy open or partially shaded sand dunes, grassy railroad sidings, and old fields. The occupied habitat is often early successional due to disturbance (NatureServe 2026).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat. Moonworts disperse through windborne spores, which most commonly germinate within a short distance of the parent plant (Peck 1990). Plants may be trampled by human, animal or vehicular traffic, which prevents spore production for a year. Successful reproduction requires the right soil type and other factors to complete its life cycle (Goldstein et al. 2009). Long distance dispersal may be possible, as evidenced by widely disjunct mountain populations. There is also evidence that moonworts are dispersed by birds, such as the arctic tern, which nests in moonwort habitat in Yakutat (Stensvold personal communication).

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	**A**	A = Rare. Current abundance is low enough that stochastic and other factors could lead to potential imperilment. This species is only known from two locations in southeastern Alaska. One population occurs on Kruzof Island at Sea Lion Cove on land adjacent to the Tongass National Forest but managed by Alaska State Parks. The only known population on the Tongass National Forest, found near Whitestripe Mountain in the West Chichagof-Yakobi Wilderness, consisted of fewer than 30 individuals (ACCS ANHP 2003, CNPWH 2023). More populations may additionally occur in unsurveyed subalpine or beach habitats.
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. No population monitoring has occurred for the occurrence of this species on the Tongass National Forest.
6 Habitat trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. While the limited known occurrences of this species in southeast Alaska are known to occupy beach meadow and calcareous subalpine, it is found in more generalized early successional habitat across the remainder of its range, including fields, tailings piles, and roadsides (NatureServe 2026). Pacific Uplifted Tidal Marsh habitat is considered a habitat of conservation concern (S3) described as declining due to human activity and potential impacts of sea-level changes (Boggs et al. 2019). Beach meadow habitats are also subject to modern stressors such as off-road vehicular traffic, invasive species and other recreation activities, such as outfitting and guiding. In addition, vegetative succession has caused declines in some beach habitat quality, as this species occurs in sparsely vegetated habitat (USDA FS 2017). Isostatic rebound and tectonic uplift has resulted in the rising of some coastline habitat, while other coastline areas are falling due to tectonic down-warping (Boggs et al. 2019). It is unknown whether plants are able to respond to these changes and disperse into suitable habitat created through isostatic rebound. Karst alpine heath habitat that is considered suitable habitat for this species is considered rare but secure (S4) and unlikely to change over the short or long term due to its remote alpine location (Boggs et al. 2019).

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	**A/B**	A (beach meadow habitat) = Beach meadow habitat modification is likely to result in conditions departing from NRV; habitat is impacted by modern stressors. B (alpine and subalpine habitat) = Alpine and subalpine habitat is currently resilient but may be vulnerable to vegetation shifts with climate change. The population that occurs in the West Chichagof-Yakobi Wilderness area receives very little recreation pressure. Large areas of potential subalpine and alpine habitat are likely to fall within the Natural Range of Variation (NRV), however movement of trees into treeless areas with predicted warmer temperatures under climate change may result in changes to habitat at the lower reaches of subalpine or alpine habitat (Boggs et al. 2019). Alpine habitats are not undergoing substantial modification. However, increases in recreation, mineral exploration, and communications sites may affect habitat (Goldstein et al. 2009). Beach meadow habitats are being impacted by modern stressors, such as recreation and invasive species. Habitat modification has occurred in some areas including North Beach on Kruzof Island, where a rebuilt trail to Sea Lion Cove has become popular with commercial tour guides, substantially increasing foot traffic in the area. *Botrychium* habitat in sandy upper beach meadows on the Yakutat forelands is also being affected by increased recreation use. (Goldstein et al. 2009). Beach habitat in general is dynamic, and vulnerable to severe erosion caused by winter storms or natural geomorphic processes. One suspected deleterious consequence of climate change is the indirect effect of an increase in storm intensity and/or frequency, resulting in higher wind speeds and larger storm swells accelerating coastal erosion. Specifically, wind speed is projected to increase 2–4% by 2050 (Abatzoglou and Brown 2011). Such conditions, and associated erosion events, pose a continued threat beach meadow habitats. Isostatic rebound, tectonic uplift, and tectonic downwarping all have the potential to alter beach meadow habitats, either through increased erosion or altered hydrology, however local trends across southeastern Alaska are difficult to predict (Boggs et al. 2019). It is unknown whether plants can respond to these changes and disperse into any suitable habitat created through isostatic rebound.

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	**B**	B = Low reproductive rate. Moonworts typically have a low reproductive rate, especially where suitable habitat is patchy. Spores from *Botrychium* species generally do not disperse long distances (Peck 1990). Some beach meadow habitats may create ideal conditions for a relatively high reproductive rate, but these areas are also more vulnerable to disturbance (Goldstein et al. 2009).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Due to concerns over the validity of the single occurrence within the plan area, the species is not recommended as a Species of Conservation Concern despite the following concerns:

- **Significant threats:** Beach meadow habitat for this species on the Tongass NF experiences threats from stressors such as off-road vehicular traffic, invasive species and other recreation activities, such as outfitting and guiding. Beach meadow habitat is susceptible to changes from isostatic rebound, tectonic uplift, and tectonic down-warping, which may result in habitat alteration occurring at a pace that is too rapid for plants to colonize new potential habitat. In addition, vegetative succession has caused declines in some beach habitat quality, as this species occurs in sparsely vegetated habitat. Subalpine habitat where this species is known to occur on the Tongass National Forest is vulnerable to shifts in vegetation associated with climate change, as shrubs and trees may encroach into formerly open habitat, although overall this habitat type is considered stable. The known occurrence is within the West Chichagof-Yakobi Wilderness Area, which receives very little recreation pressure.

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- **Declining habitat trends**: Beach meadow habitat for this species is considered a habitat of conservation concern (S3) described as declining due to human activity and potential impacts of sea-level changes. A declining habitat trend is not documented for subalpine habitat. Additionally, while not observed occupying this habitat in the plan area, this species is found in human-disturbed and early successional habitats across the bulk of its range. Without additional information on habitat preferences in the plan area, meaningful inferences in habitat trends can not be made.
- **Restricted range:** Although the global distribution of this species is broad, the Tongass NF occurrence is widely disjunct from the main body of the species' range, with one occurrence known to state-managed lands 50 kilometers from the single known Tongass NF occurrence, but over 300 kilometers to the next closest occurrences in Yukon Territory. More information is necessary to draw substantial conclusions on range restrictions or ecological limitations for this species, as our current knowledge is complicated by the extreme resemblance of this species to *Botrychium minganense*. Additional complications are introduced by records of hybridization between these two species in other areas.
- **Low population numbers:** *Botrychium spathulatum* is ranked as critically imperiled within the state of Alaska and is currently known to just two locations in Southeast Alaska, one of which is in subalpine habitat on the Tongass National Forest in the West Chichagof-Yakobi Wilderness. The other is on state lands on Kruzof Island just adjacent to the Tongass National Forest. The limited number of occurrences in the plan area indicate a vulnerability to extirpation through stochastic events, though this is complicated by disagreement on the validity of the single record. It is speculated that additional surveys in beach meadow, subalpine, and early successional habitat may reveal additional occurrences in the plan area. Further, there exists a possibility that occurrences of the morphologically similar and more commonly observed *Botrychium minganense* and *Botrychium ascendens* may include individuals or hybrids of *Botrychium spathulatum*, or that the single record may be a misidentification of either of these more common species.
- **Other factors:** Additional factors for consideration are conflicting in their implications of warranted substantial concern. A low reproductive rate and a necessity for specific mycorrhizal partners would indicate restrictions to the ability of this species to persist in the plan area. However, a preference for disturbed habitat implies some tolerance to disturbance that may broaden the suitable habitat available in the plan area, as well as potentially offset the threats posed by off-road vehicles and recreation activities. Furthermore, disagreement on specimen record validity, combined with this species' complicated genetic background and noted ability to hybridize with more common *Botrychium* species, lead to the conclusion that the impacts of these myriad factors can only be disentangled through more extensive research and monitoring.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	ACCS_Mar25 (EO1)[6/22/2003]	Kruzof Island, northwest end at Sea Lion Cove	north end of beach adjacent to area where trail meets the beach on a sandy substrate; early seral stage among logs decked in a 20 year old storm event	NA	NA
1	ACCS_Mar25 (EO1)[8/10/2003]	Kruzof Island, Alexander Archipelago, Sea Lion Cove, North end	sandy area just below vegetation		

Botrychium tunux

Botrychium tunux Stensvold and Farrar

Moosewort

Global Rank: **G3G4**

Alaska State Rank: **S2**



photo: Google images

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy OR gaps. *Botrychium tunux* is known primarily from the Yakutat Ranger District on the Tongass National Forest (Tongass NF), where an estimated nine locations have been mapped on sandy beach meadows in the Yakutat area (Appendix 1) (USDA FS 2023). Botanists searched for one of these locations in 2017 and did not find the Botrychium, noting that natural beach meadow succession had reduced habitat quality. Two additional locations have been inventoried in limestone influenced subalpine habitat: one on the Wrangell Ranger District on the mainland on the ridgeline above Virginia Lake, and another on Admiralty Island on the ridge above Greens Creek Mine (USDA FS 2023). Additional locations are known to exist, but are not inventoried, on Dall Island, northeast Chichagof Island, and the Whitestripe area of West Chichagof Island (Goldstein et al. 2009). Subalpine and alpine mountain habitats include sparsely vegetated erosional slopes and rocky stream terraces, where it is often associated with calcareous substrates (USDA FS 2023, Farrar 2011).
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside of the Tongass National Forest. Global Rank G3G4, Alaska State Rank S2 British Columbia Province Rank S4, Yellow List; Alberta S1S2, Nunavut SU, Ontario S1, Yukon Terr. S3S4, California S1, Colorado S2, Montana S1, Nevada S1, New Mexico SNR *Botrychium tunux* is known from widely separated high elevation sites in Montana, Idaho, Colorado, New Mexico, Nevada and California (Farrar 2011, NatureServe 2023, BCCDC 2023). Fifteen extant occurrences are known to British

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Criteria	*Rank*	*Rationale*
		Columbia (BCCDC 2021). The closest occurrence to the Tongass NF is in Haida Gwaii. Botrychiums are known for infrequent long distance dispersal events, so it is difficult to assess if Tongass NF occurrences are disjunct. In Southeast Alaska Botrychium tunux is also known from Glacier Bay National Park (iNaturalist 2025). *Botrychium tunux* is more common in Wrangell-St. Elias National Park in Alaska and in adjacent Kluane National Park in Yukon Territory.
3 Dispersal capability	**B**	B = Disperses only through suitable habitat. Moonworts disperse through wind-born spores, which most commonly land within a short distance of the parent plant (Peck 1990). *Botrychiums* are homosporous so a single spore may be the founder of a new population (Peck et al. 1990, Stensvold 2007, Dauphin et al. 2024). Plants may be trampled by human, animal or vehicular traffic, which prevents spore production for a year. Successful reproduction requires the right soil type and other factors to complete its life cycle (Goldstein et al. 2009). Long distance dispersal happens occasionally as evidenced by widely disjunct mountain populations. There is also evidence that moonworts are dispersed by birds, such as the arctic tern, which nests in moonwort habitat in Yakutat (Stensvold personal communication).
4 Abundance on Tongass NF	**D**	D = insufficient information to draw inferences about criterion. This species is known from two distant locations in subalpine habitats and from nine locations found on beach meadows in Yakutat (USDA FS 2023, Goldstein et al. 2009). Although less than half of the available beach meadow habitat on the Yakutat Ranger District has been surveyed, this species would still be considered rare within this habitat type if detection rates approximated those in surveyed habitat. While there are several locations in beach meadow habitat, their concentration on the Yakutat peninsula may make them vulnerable to stochastic threats impacting that beach coastline. *Botrychium tunux* occurred in five monitoring plots established in 1998 or 2002 and was found to occur in three of those plots in 2017. The three plots contained a total of 27 plants in 2017 (USDA FS 2017). Surveys have been conducted on the sandy beaches (and Copper River dunes) from the Cordova area east to the southern side of Malaspina Glacier, and none have been found on these sandy habitats. Isolated locations are known to alpine habitats on Dall Island, northeast Chichagof Island and in the Whitestripe area of West Chichagof Island (Goldstein et al. 2009). Very little survey work has occurred in subalpine and alpine habitats, which could provide large areas of suitable habitat for this species (USDA FS 2023, Goldstein et al. 2009).

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion (alpine, subalpine habitats). Population trends could not be inferred from the five permanent plots established in 1998 and 2002, due to changes in plant locations when revisited in 2017 (USDA FS 2017). The dynamism of suitable habitat presents a challenge to plot-based monitoring of this species, with vegetative succession noted as having occurred within the fifteen-year span of the monitoring study (USDA FS 2017). Plant numbers are thought to be declining in beach habitat due to vegetative succession (Goldstein et al. 2009).
6 Habitat trend on Tongass NF	**A**	A = Decline in habitat quality or quantity. This species has been found in beach and alpine habitat within the Tongass National Forest (USDA FS 2023). Alpine habitat has moderate ecosystem integrity and has high vulnerability to stressors, largely due to climate change (Turner and Mallot 2025). Beach meadow habitat around Yakutat is threatened by changing sea level. Isostatic rebound and tectonic uplift has resulted in the rising of some coastline habitat in southeast Alaska, while other coastline areas are falling due to tectonic down-warping (Boggs et al. 2019). In Yakutat, sea level is predicted to drop 1.8 meters by 2108 after accounting for both sea level rise and the high rates of isostatic rebound seen in the Yakutat Peninsula (Johnson et al. 2019). It is unknown whether plants can respond to these changes and disperse into suitable habitat created through isostatic rebound. Vegetative succession also represents a decline of beach habitat quality, as this species occurs in sparsely vegetated habitat. Beaches in Yakutat shift and change dramatically, resulting in dynamic and heterogenous patterns of vegetative succession. The monitoring study noted evidence of succession from bare dunes to herbaceous meadow to closed canopy forest within suitable beach habitat on the Yakutat forelands (USDA FS 2017).
7 Habitat vulnerability or modification;	**A**	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. The Yakutat Forelands are classified as Pacific Uplifted Tidal Marsh, which is considered a vulnerable habitat (S3) within the state of Alaska (Boggs et al. 2019). Primary threats include development and human activity. Isostatic rebound, tectonic uplift, and tectonic downwarping all have the potential to alter beach meadow habitats, either through

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Criteria	*Rank*	*Rationale*
other threats		increased erosion or altered hydrology. The Yakutat Peninsula is experiencing high rates of isostatic rebound and sea level drop, however, local trends are difficult to predict (Boggs et al. 2019, Johnston et al. 2019). Upper beach meadow habitat is vulnerable to modification by OHV traffic and other recreation, including outfitting and guiding. While these impacts can be regulated, current management practices have allowed significant damage to the beach meadows in the Yakutat forelands. Additionally, invasive plant species may outcompete B*otrychium* tunux in beach meadow habitat. Leucanthemum vulgare and Phalaris arundinacea are known in places along Yakutat's beaches. Beach habitat in general is dynamic, and vulnerable to severe erosion caused by winter storms or natural geomorphic processes. However, climate change may lead to an increase in storm intensity and/or frequency, resulting in higher wind speeds and larger storm swells accelerating coastal erosion (Halofsky et al in draft). Such conditions, and associated erosion events, pose a continued threat to Yakutat beach meadow habitats. However, due to their ability to disperse wind born spores, moonworts should be able to colonize new beach habitat and may be resilient to natural successional changes (USDA 2017, Williams 2021). Alpine habitat is highly vulnerable to climate change. Climate change may lead to upslope movement of tree line, increased proportion of woody vegetation relative to herbaceous, and fragmentation and loss of alpine plant communities (Halofsky et al. DRAFT), which may alter alpine habitat. Additionally, alpine habitat may be impacted by mining, communication sites and other special uses.
8 Life history and demographics	**B**	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both. Moonworts typically have a low reproductive rate, especially where suitable habitat is patchy. Spores from *Botrychium* species generally do not disperse long distances (Peck 1990). Some beach meadow habitats may create ideal conditions for a relatively high reproductive rate, but these areas are also more vulnerable to disturbance (Goldstein et al. 2009).

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

There is NOT substantial concern for the long-term persistence of *Botrychium tunux* within the plan area based upon the following:

- **Significant threats:** Beach meadow habitat is threatened by recreation activities, including OHV traffic, as well as invasive species.
- **Declining trends:** Population trends are not known. Beach meadow habitat is naturally dynamic, but sea level change may lead to accelerated succession, which may result in habitat alteration occurring at a pace that is too rapid for plants to colonize new potential habitat. Alpine habitat is vulnerable to shifts in vegetation associated with climate change.
- **Restricted ranges:** Botrychium tunux is known from scattered populations in western North America. There are populations to the south of the Tongass NF in Haida Gwaii and to the north in Glacier Bay National Park.
- **Low population numbers:** *Botrychium tunux* is known from 11 documented occurrences on the Tongass NF. Nine of these are concentrated in the Yakutat forelands and two are in alpine habitat. The species is adapted to the dynamic beach habitat and is resilient to change. It is unclear how it will respond to accelerated rates of change due to isostatic rebound and climate change. However, it is adapted to multiple habitat types on the Tongass NF, which suggests adaptibility to change.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	ACCS_Mar25 (EO1)[7/30/2013]	Mainland, S of Virginia Lake, NE of Madan Bay.	Top of ridgeline of limestone mountain, dry limestone gravels in alpine.	NA	NA
1	TESP_Mar25 (100522P000208Y13)[7/30/2013]	Mainland, S of Virginia Lake, NE of Madan Bay.	Top of ridgeline of limestone mountain, dry limestone gravels in alpine.	2	
1	CPNWH_April2025(ALA)[7/30/2013]	Mainland, S of Virginia Lake, NE of Madan Bay, Petersburg Quad, Tongass National Forest.	Top of ridgeline of limestone mountain, dry limestone gravels in alpine, locally abundant.		
2*	TESP_Mar25 (100533P000910)[8/04/2009]	Greens Creek, ridge north of mine	Alpine with limestone influence		Mine exploration
2	ACCS_Mar25 (EO2)[8/04/2009]	Tongass National Forest			
3*	TESP_Mar25 (100535P000011)[7/25/1999]	Yakutat, Dry Bay, NW mouth, near spit	From aerial imagery looks like beach meadow habitat		
3	ACCS_Mar25 (EO3)[7/25/1999]	Tongass National Forest, DRY BAY STENSVOLD 7644			
4*	ACCS_Mar25 (EO4)[7/31/2000]	Yakutat Foreland, Akwe Beach dunes, on long NW-oriented sandspit near the mouth of the Akwe R. about 3 km W of the confluence of the Akwe and Ustay R. and about 150 m SW of the airstrip	marine beach meadow, on the landward side of the first vegetated dune from the Pacific Ocean, on sandy soil at ecotone between graminoid vegetation domited by Leymus and forb vegetation domited by Fragaria and Achillea, growing just inside the Fragar		
4	ACCS_Mar25 (EO4)[no date]	on long NW-oriented sandspit near the mouth of the Akwe R. about 3 km W of the confluence of the Akwe and Ustay R. and about 150 m SW of the airstrip			
5*	ACCS_Mar25 (EO5)[7/15/1998]	Tongass National Forest, AKWE PLOT 1		*Likely extirpated	

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5	TESP_Mar25 (100535P000033)[7/26/2017]	Yakutat, Akwe River Spit, near landing strip	Monitoring plot installed in 1998 could not be located. No plants seen in the area. Natural beach meadow succession has probably reduced habitat quality.		
5	TESP_Mar25 (100535P000033)[no date]				
5	ACCS_Mar25 (EO5)[7/15/1998]	Tongass National Forest, AKWE DUNE REVISITED 2002 POTENTIAL PLOT			
5	TESP_Mar25 (100535P000045)[7/26/2017]			No plants found	
5	TESP_Mar25 (100535P000045)[no date]				
6*	ACCS_Mar25 (EO6)[no date]	AKWE BEACH DUNES. YAKUTAT FORELAND, 62.4 km SE of Yakutat T31S R39E S789			
6	ACCS_Mar25 (EO6)[6/27/1996]	Yakutat Foreland, Akwe Beach dunes, ca. 62.4 km SE of Yakutat, T31S, R39E, S7,8,9	beach dunes, along side of ATV track, sandy soil		
6	CPNWH_April2025(ALA)[6/27/1996]	Yakutat Foreland, Akwe Beach dunes, ca. 62.4 km SE of Yakutat, T31S, R39E, S7,8,9, Yakutat Quad.	Beach dunes, along side of ATV track, sandy soil, scattered individuals.		
7*	ACCS_Mar25 (EO7)[7/24/2004]	Yakutat forelands, ca, 23 km SE of Yakutat on Blacksand Spit	open sand having ca. 70% vegetation cover		
7	TESP_Mar25 (100535P000037)[no date]				
7	TESP_Mar25 (100535P000037)[7/25/2017]	Yakutat forelands, ca, 23 km SE of Yakutat on Blacksand Spit	open sand having ca. 70% vegetation cover	5	
7	CPNWH_April2025(ALA)[7/24/2004]	Yakutat forelands, ca, 23 km SE of Yakutat on Blacksand Spit, Yakutat Quad.	Open sand having ca. 70% vegetation cover. Growing with Leymus mollis, Fragaria sp., Festuca rubra, and Achillea sp.		
8*	ACCS_Mar25 (EO7)[7/27/2001]	Yakutat Forelands, Blacksand Spit, N side of spit about 150 m from saltwater	on open sand		
8	ACCS_Mar25 (EO7)[no date]	BLACKSAND SPIT. YAKUTAT FORELAND, N side of spit about 150 m from saltwater			
8	TESP_Mar25 (100535P000059)[no date]				
8	TESP_Mar25 (100535P000059)[7/25/2017]	Yakutat, Blacksand Spit North, near ATV trail	open sand with little vegetation	6	
8	ACCS_Mar25 (EO7)[7/26/2003]	Yakutat forelands, Blacksand Spit, ca. 7 km SE of Situk Land, just SE of the trail running from the inside of the spit to the ocean	open sand with little vegetation		
8	ACCS_Mar25 (EO7)[7/20/2002]	Tongass National Forest, BLKSD N PLOT STENSVOLD 8056			
8	CPNWH_April2025(ALA)[7/27/2001]	Yakutat Forelands, Blacksand Spit, N side of spit about 150 m from saltwater, Yakutat Quad.	On open sand with scattered Fragaria chiloensis, Festuca rubra,		

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			Achillea millefolium, Equisetum variegatum, Leymus mollis, Oxytropis campestris, Castilleja ulaschcensis, Gentianella amarella, Moehringia lateriflora, Botrychium yaaxudakeit, B. luria an		
8	CPNWH_April2025(ALA)[7/26/2003]	Yakutat forelands, Blacksand Spit, ca. 7 km SE of Situk Land, just SE of the trail running from the inside of the spit to the ocean, Yakutat Quad.	Open sand with little vegetation. Growing with Leymus mollis, Fragaria chiloensis, Festuca rubra, Moehringia lateriflora, Castilleja ulaschcensis, Anemone multifida, Achillea sp, and Oxytropis campestris		
9*	TESP_Mar25 (100535P000056)[7/20/2002]				
9	ACCS_Mar25 (EO8)[7/20/2002]	Tongass National Forest, BLACKSAND 1 MI NW STENSVOLD 8061			
9	TESP_Mar25 (100535P000052)[7/20/2002]				
9	ACCS_Mar25 (EO8)[7/20/2002]	Tongass tiol Forest, BLACKSD 1.5 MI NW STENSVOLD 8062			
9	ACCS_Mar25 (EO8)[7/20/2002]	Tongass National Forest, WOLVERINE CABIN STENSVOLD 8069			
9	TESP_Mar25 (100535P000049)[7/20/2002]				
10*	ACCS_Mar25 (EO9)[7/25/2001]	Yakutat, about 5 km west of downtown, just east of Ankau Cemetery, located on Phipps Peninsula about 1.5 km southeast of Point Carew, just north of the mouth of the Ankau River and saltchucks.	On sandy substrate near sandy beach/shrubby zone ecotone.		
10	ACCS_Mar25 (EO9)[no date]	about 5 km W of downtown Yakutat just E of Ankau Cemetary on Phipps Peninsula about 1.5 km SE of Pt. Carrew just N of the mouth of Ankau R. and saltchucks			
10	ACCS_Mar25 (EO9)[7/14/1998]	Tongass National Forest, ANKAU FIRST FARRAR VISIT STENS 7280			
10	TESP_Mar25 (100535P000023)[7/14/1998]				
10	TESP_Mar25 (100535P000131Y17)[7/28/2017]	Yakutat, Ankau Beach	Aerial imagery is on edge of beach fringe	10	
11*	TESP_Sept25 (100535P000061Y25) [5/13/2025]	Yakutat, Cannon Beach Road	Upper beach road, primarily sandy interchange between mixed Leymos/Lupine and PISI forest. All individuals found within and	175	

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			between sparsely vegetated ATV/UTV tracks		

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Brasenia schreberi

Brasenia schreberi [J.F. Gmel., 1791]

Water-shield

Global Rank: **G5**

Alaska State Rank: **S1**



photo: (cc0) Gabriel Campbell

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR Isolated. *Brasenia schreberi* is known from and estimated two locations on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Duke Island (Occurrence 1), and the south end of Prince of Wales Island (Occurrence 2) (Appendix 1; ACCS 2025, CPNWH 2025, USFS 2025a). A site reported from Gravina Island was excluded as the exact location is uncertain and there is a mix of land ownership on the island (ACCS 2025). Within the Tongass NF boundary, this species occurs in aquatic habitats including ponds (Appendix 1). Occurrence 1 and 2 were collected in a pond and lake (Appendix 1). These habitats are typical for this species. Apart from the previously mentioned site on Gravina Island, there are no occurrences of this species in southeastern Alaska outside of the Tongass NF (ACCS 2025, CPNWH 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass National Forest. Global Rank 5, Alaska State Rank 1 *Brasenia schreberi* is broadly distributed throughout the Americas, Asia, Africa, and Australia (FNA 2025). In North America, *Brasenia schreberi* is present throughout much of the continent except the American southwest (FNA 2025). Across its range, *Brasenia schreberi* occurs in aquatic areas including ponds, lakes, and slow-moving water at elevations of 0 m to 1,600 m (FNA 2025). In southeastern Alaska this species is only known from the Tongass NF and it does not occur elsewhere in Alaska (CPNWH 2025, FNA 2025). The southern Tongass is the northwestern edge of its range. The next nearest record is roughly 500 miles south on Vancouver Island (CPNWH 2025). Flora of British Columbia states that this species is common in SW BC and less frequent in SC BC (Klinkenberg 2020).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Brasenia schreberi* is an aquatic perennial herb with a floating leaf growth habit that forms dense floating mats of leaves at the water surface (FNA 2025). It disperses long distances by seeds and short distances through rhizomatous growth. Fruits containing seeds detach and float on water's surface where they are dispersed by wind and wave action (Osborn and Schneider 1988). Eventually seeds sink to bottom before germination (Osborn and Schneider 1988). Plants also grow clonally by rhizomatous growth (FNA 2025).
4 Abundance on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. *Brasenia schreberi* is known from two occurrences on the Tongass NF (Appendices 1 and 2). Occurrences 1 and 2 were noted to have several hundred and 2 individuals or plants, respectively (Appendix 1). Given this species has a rhizomatous growth habit, it is unclear if the observers took this into account and as such abundance information is not reliable as data could represent ramets and genets.

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Brasenia schreberi* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat for the two occurrences of *Brasenia schreberi* on the Tongass NF is aquatic including ponds and lakes (Appendix 1). Lakes and Ponds which are common on the Tongass NF (Chestnut and Tucker 2025). However, some freshwater bodies have already shrunk (Halofsky et al 2025). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2025). The Duke Island occurrence is located within the Duke Island Zoological Area, and the southern Prince of Wales occurrence is located within the South Prince of Wales Wilderness. No invasive plants, timber harvest units, roads, or established recreation sites are recorded within at least one mile of either occurrence (USFS 2025b, 2025c).
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Projected increases in air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit may lead to drought stress for aquatic species such as *Brasenia schreberi* if water tables or lake water levels are affected (Turner and Mallott 2025, Wiles and Warren 2025). Lake shores are vulnerable to invasive plants, particularly the extremely invasive reed canarygrass (*Phalaris arundinacea*) (USFS 2008). Under the 2016 Forest Plan, lakes are protected by a 100' no-cut commercial harvest buffer.

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. It is an aquatic perennial herb with a floating leaf growth habit that forms dense mats of leaves at the water surface (FNA 2025). It produces flowers and fruits with seeds (FNA 2025). It flowers during the late spring and summer (FNA 2025). It is pollinated by wind though flies do visit the flowers (Osborn and Schneider 1988). Its flowers only open for 2 days; during day 1 flower emerges and stigmas emerge and are receptive during sunlight, then bend at dark to submerge flower and stigmas are no longer receptive; then during day 2 the flower remerges and pollen is shed, preventing self-pollination of a single flower, though some self-pollination occurs (OregonFlora 2025, Osborn and Schneider 1988). Germination requirements are not well documented for this species. The life span of *Brasenia schreberi* is not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Brasenia schreberi is not recommended as a Species of Conservation Concern based upon the rationale below:

- **Significant threats:** This species occurs in the South Prince of Wales Wilderness and on the remote Duke Island. There are no known localized threats. Invasive species, such as reed canarygrass, may impact vulnerable lake shore habitat but would not likely compete with

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this aquatic species.

- **Declining trends:** Population and habitat trends are not known. Increasing temperatures and evapotranspiration may lead to growing season water deficits, which could cause low lake and pond water levels during the summer and may stress this aquatic species.

- **Restricted ranges:** The Tongass NF occurrences are the northwestern edge of the range. This species occurs in lakes and ponds, which are by nature separated from each other. The closest known occurrences to the Tongass NF are over 500 km away but it is unclear if they are disjunct.

- **Low population numbers or restricted ecological conditions:** There are two occurrences on the Tongass NF from southern Prince of Wales and Duke Island. Habitat is broad and this species is likely uncommon on the Tongass NF because it is the northern edge of the range.

- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

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Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO2) [7/28/2005]**	**Alexander Archipelago, Duke I.**	**shallow freshwater lake, only immature buds found**	**several hundred individuals found in one lake only**	
1	ACCS_Mar25 (EO2) [9/1/2004]	Tongass National Forest, DUKE ISLAND. 0.5 miles NW of northern-most part of Hall Cove	Emergent from shallow water (70-100cm) with sand/mulch bottom Assoc. Species: Juncus sp., Nuphar polysepalum, Potamogeton natans	>30 INDIVIDUALS IN PONDS. NO FERTILE STRUCTURES PRESENT.	
1	CPNWH_April2025(ALA) [7/28/2005]	Alexander Archipelago, Duke I., Prince Rupert Quad, Tongass National Forest.	Shallow freshwater lake, only immature buds found, several hundred individuals found in one lake only.		
1	TESP_Mar25 (100552P000160) [9/1/2004]	DUKE ISLAND		>30 INDIVIDUALS IN PONDS; NO FERTILE STRUCTURES PRESENT, no floristic survey conducted	
2*	**TESP_Mar25 (100554P000456Y12) [8/28/2012]**			**Two plants were found, with several leaves each. No plants were collected due to small population size, but overall plants seemed healthy. Potamogeton was common along the shorelines, but this was the only population of BRSC found along the stretch of s**	

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Bunodophoron melanocarpum

Bunodophoron melanocarpum [(Sw.) Wedin, 1995]

Northern fan-coral lichen

Global Rank: **G5**

Alaska State Rank: **S2**



photo: (CC0) Dan Tucker

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy or gaps. *Bunodophoron melanocarpum* is known from 14 estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). These occurrences are located on: Revillagigedo Island (3), Dog Island, Dall Island, South Prince of Wales Wilderness, Etolin Island, mainland, Gravina Island (2), Duke Island, Misty Fjords Wilderness on Kanagunut Island, Coronation Island and San Fernando Island (Appendix 1; CLH 2025, CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in forests of *Callitropsis nootkatensis*, *Picea sitchensis*, *Tsuga heterophylla, Thuja plicata*, *Abies lasiocarpa, Populus* sp., and *Salix* sp. in the southern part of Tongass NF, often near rivers, lakes, and coasts (USFS 2025a). Occurrence 1 was collected near Ward Lake, Revillagigedo Island in forested wetland ecosystem on "deadfall" bark (CLH 2025). There are two occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025).

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Criteria	*Rank*	*Rationale*
		Across its range, *Bunodophoron melanocarpum* is typically found in old growth forests in or outside of floodplains, along river and lake edges and on beaches (CLH 2025). In Southeast Alaska, the species tends to co-occur with *Tsuga heterophylla*, *Thuja plicata, Picea sitchensis*, and *Abies lasiocarpa*, and can be found on large boulders including schist, or bark (CLH 2025). This species may be confused for *Sphaerophorus tuckermanii* which is also present in moist forests of Alaska nearby but has round branches in contrast to the flattened branches of *Bunodophoron melanocarpum* (McCune and Geiser 2023). There are no subspecies of *Bunodophoron melanocarpum* in Tongass NF. *Bunodophoron melanocarpum* is known as a species complex, but species boundaries are currently unresolved (Wan and Ellis 2020, Wedin 1995).
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2, Washington State Rank S1, British Columbia Province Rank S4 *Bunodophoron melanocarpum* is broadly distributed throughout Europe, Asia, Oceania, eastern Africa, the Caribbean, and extensively along the west coast of North and South America (GBIF 2025, NatureServe 2025). In North America, *Bunodophoron melanocarpum* is present in Canadian province British Columbia as well as northwest Washington, U.S. close to Vancouver, Canada and potentially California, U.S. (CPNWH 2025, USDA & BLM 2017). Across its range, *Bunodophoron melanocarpum* occurs in moist forests and wetlands dominated by *Thuja plicata,* and bog habitats at elevations of 0 to 1329 ft (405 m) (CPNWH 2025). It is typically found in a range of ecosystems, from coastal heaths and dense lowland forests to moist mountainous areas and upland bogs (NatureServe 2025). This species is reportedly found on moss-covered rocks and downed or standing dead wood (NatureServe 2025, USDA & BLM 2017). In southeastern Alaska this species is predominantly known from the Tongass NF; its range continues northwest in Alaska about 746 mi (1200 km) to a known occurrence at the Alaska Maritime National Wildlife Refuge (CPNWH 2025). Nearby Tongass NF *Bunodophoron melanocarpum* is found in British Columbia, Canada, then the range is disjunct with the next closest populations found in Central America and Japan (GBIF 2025).

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Criteria	*Rank*	*Rationale*
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Bunodophoron melanocarpum* is a fruticose lichen species which grows primarily as an epiphyte, or on rocks (CLH 2025, CPNWH 2025). Its main dispersal mechanisms are by ascospores held in mazaedia, and by pycnidia commonly found on terminal branchlets which are asexual propagules described as fragile and easily broken off (Medina, Prieto, and Wedin 2018, USDA & BLM 2017). Dispersal distances for clonal propagules are limited, often falling between 15 to 30 meters from the lichen, and depend on wind direction, wind speed, forest density, and moisture levels (Armstrong 1994, ECCC 2018, Pasiche-Lisboa et al. 2019, Ronnås et al. 2017). Generally, asexual propagules are distributed with more abundance during periods of increased wind velocity and decreased humidity (Pasiche-Lisboa et al. 2019). For *Bunodophoron melanocarpum,* sexual propagules, or ascospores, are released from mazaedia passively, and thus are not expected to travel great distances from a lichen thallus (Wedin 1993). In this species, the mazaedia are reported to be subapically exposed, meaning pointing slightly downwards (Medina, Prieto, and Wedin 2018, Wedin 1993). For epiphytic *Bunodophoron melanocarpum* lichens, this could help spores travel downward from the tree canopy to disperse; whereas for lichens growing on deadfall, bark or rocks on the ground like occurrences 1, 4, 5, 6, 7, 9, 11, and 13, subapically exposed mazaedia would not enable ascospores to travel very far (USFS 2025a).
4 Abundance on Tongass NF	**B**	B = Uncommon. *Bunodophoron melanocarpum* is known from 13 occurrences on the Tongass NF (Appendix 1). There is limited abundance information for the confirmed occurrences on Tongass NF; occurrence 1 reports *Bunodophoron melanocarpum* as “very rare” (Appendix 1, CLH 2025).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Bunodophoron melanocarpum* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).

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Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat for the 14 occurrences of *Bunodophoron melanocarpum* on the Tongass NF is cedar forests, bogs, and river edge habitats (CLH 2025, USFS 2025a). In adjacent locations including Vancouver Island, it also occurs in bog slopes and on *Chamaecyparis* sp. and *Thuja plicata* trunks at shoreline (Appendix 1; CLH 2025). These habitats can be grouped under moist, old growth forests or forested wetlands with rocks at the edge of water that are common on the Tongass NF (Turner and Mallott 2025). Timber harvest has affected forested ecosystems, with approximately 430,000 acres logged on the Tongass NF, accounting for 4% of forest land and 8% of productive forest land (Engelmann 2024, Halofsky et al. 2025). Timber harvest has occurred in the recent past within 400 m from occurrence 12 and is widespread in the vicinity of occurrences 1 and 7 on Revillagigedo Island (USFS 2025d). This might indicate a negative trend in habitat quality at those sites. In Washington, threats to *Bunodophoron melanocarpum* include logging of cedars in the mature maritime forests and bogs where this lichen lives as a top threat (USDA & BLM 2017).
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Continued timber harvest would remove habitat for this species. *Bunodophoron melanocarpum* is reported as sensitive to acid deposition and oligotrophic to nitrogen deposition, thriving under a low nitrogen deposition regime (USFS 2025e). Occurrences near recreational areas could be impacted by deposition due to boat or vehicle traffic or fires. Numerous occurrences of *Bunodophoron melanocarpum* on Tongass NF are located near hiking trails, like occurrence 1 at the Ward Lake Recreation Area and occurrence 3 at the Settlers Cove State Recreation Site (USFS 2025a). It is unknown how *Bunodophoron melanocarpum* will respond to warming temperatures and projected summer drought stress projected for the region (Halofsky et al. DRAFT). However, many lichens have peak growth during wet seasons with little to no growth when it is dry (Ellis 2013), so changes in precipitation may affect growth patterns.
8 Life history	**D**	*D = insufficient information* *Bunodophoron melanocarpum* is a fruticose green algal lichen that grows as an epiphyte or on rocks (USDA & BLM 2017, Wedin 1993). *Bunodophoron melanocarpum* generally sexually reproduces with apothecia in the form of

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Criteria	*Rank*	*Rationale*
and demographics		mazaedia (Medina, Prieto, and Wedin 2018, Wedin 1993). Asexual reproduction is through pycnidia and branch fragmentation (Medina, Prieto, and Wedin 2018, USDA & BLM 2017). The life span of *Bunodophoron* lichens has not been measured (Wedin 1993). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature (Ellis 2013).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Bunodophoron melanocarpum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Air quality and timber harvest may impact *Bunodophoron melanocarpum* although air quality on the Tongass NF is generally good, and many occurrences of this species grow on rocks or snags, which are less likely to be impacted by timber harvest. Additionally, many of the occurrences are in habitats with higher light (beach edge, "lower alpine", rocky gull nest area, trails, riparian) so it is less likely to be impacted by edge effects. Increased summer drought caused by climate change may stress this species, possibly slowing growth, but these impacts are not well studied.

- **Declining trends:** Population trends for *Bunodophoron melanocarpum* are unknown. Old growth forest habitat has been impacted by historical timber harvest, but large amounts of mature forest remain.

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- **Restricted ranges:** On the Tongass NF *Bunodophoron melanocarpum* is not a narrow endemic, disjunct or at the edge of its range

- **Low population numbers or restricted ecological conditions:** *Bunodophoron melanocarpum* is known from fourteen occurrences on the Tongass NF, which is enough that it is likely not vulnerable to stochastic events but impacts to habitat could contribute to decline. It is likely slow growing, which may reduce resilience to disturbance.

- **Other factors:** It is unknown whether other factors may exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

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Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (WTU) [08/29/1989]**	**Ketchikan, Revillagigedo Island, Trail to Perseverance Lake.**		**Very rare.**	
1	CPNWH_April2025(UBC) [5/15/1968]	Trail to perseverance lake from ward lake road. ketchikan.	On deadfall.		
1	CLH 2025 (UBC) [05/15/1968]	trail to perseverance lake from ward lake road. ketchikan	on deadfall.		
2*	**CLH 2025 (WIS) [07/13/1990]**	**Tongass National Forest/Ketchikan Area, Dog island, beach midway along Dog Cove.. Prince Rupert (D4),**	**Tsuga heterophylla, Thuja plicata, Gauhheria shallon community. Substrate: dead standing snag. Associated taxa: Tsuga heterophylla, Thuja plicata, Gauhheria shallon.**		
2	CLH 2025 (ALA) [07/13/1990]	Dog Island, Dog Cove, beach edge E side., Tongass National Forest	Growing on snag. Picea sitchensis, Chamaecyparis nootkatensis, Tsuga heterophylla, Vaccinium sp.		
3*	**CLH 2025 (OSC) [07/02/2009]**	**Ketchikan, Lurch Creek trail, 1.2 mi in , to the right of trail. HRAK18**	**Old growth stand of TSHE, THPL, and PISI. Substrate: Epiphytic.**		
4*	**CLH 2025 (ALA) [06/30/1997]**	**Dall Island, 0.75 mile up ridge from Solyenka Point., Tongass National Forest**	**Growing on beach rock. Picea sitchensis, Alnus rubra, beach forbs.**		
4	CLH 2025 (OSC) [06/30/1997]	Tongas National Forest. Dall Island, 0.75 miles up ridge from Solyenka Point. T77S R82E Sec. 10 SE of NE.	Tsuga heterophylla, Vaccinium. Substrate: Soil.[sic actually bark].		
5*	**CLH 2025 (ALA) [06/09/1999]**	**Prince of Wales Wilderness, near Hessa Island, on beach., Tongass National Forest**	**Growing on schist in salt spray.**		
6*	**CLH 2025 (ALA) [06/20/2006]**	**Etolin Island., Tongass National Forest**	**Growing on rock in gull nest colony.**		
7*	**CLH 2025 (ALA) [06/19/2002]**	**Revillagigedo Island, Neets Bay, south side, between Rockfish and Fire Cove., Tongass National Forest**	**Growing on schist in salt spray.**		
8*	**CLH 2025 (ALA) [10/05/1992]**	**Mainland, N. Arm of Stikine River at Mallard Slough., Tongass National Forest**	**Growing on Abies lasiocarpa bole. Abies forest along river.**		

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Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
9*	**CLH 2025 (ALA) [08/09/1999]**	**Gravina Island, east side of Bostwick Inlet, beach fringe forest., Tongass National Forest**	**Growing on rock at lake edge.**		
10*	**CLH 2025 (ALA) [06/06/1999]**	**Duke Island, Judd Harbor, Tongass National Forest**	**Growing on Populus bole. River edge habitat with Populus sp., Salix sp., Alnus sp., Cornus stolinifera.**		
11*	**CLH 2025 (ALA) [07/30/2003]**	**Misty Fjords Wilderness, Kanagunut Island, SW side of island at narrow isthmus., Tongass National Forest**	**Growing on large boulder. Lower alpine belt.**		
12*	**CLH 2025 (OSC) [06/23/2007]**	**Tongass National Forest. FIA Site # 11940**	**Flat or fairly level, wooded site outside of floodplains. Forest Type: Western redcedar.**		
13*	**CLH 2025 (OSC) [06/19/2006]**	**Tongass National Forest. FIA Site # 30692**	**Forest Type: Western hemlock. Physiographic Class: Rolling uplands. Substrate: Cedar.**		
13	CLH 2025 (OSC) [06/20/2006]	Tongass National Forest. FIA Site # 30692	Forest Type: Western hemlock. Physiographic Class: Rolling uplands.		
14*	TESP [7/19/2025]	Tongass National Forest, Coronation Island	Low ridgeline muskeg mixed forest habitat. epiphytic on mountain hemlock		

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Callitropsis nootkatensis

Callitropsis nootkatensis (D. Don) D.P. Little

yellow-cedar, Nootka cypress, yellow cypress

Global Rank: **G4G5**

Alaska State Rank: **SNR**



photo: Hennon et al. 2015

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy OR gaps. Habitat is broadly distributed across the planning area, but gaps exist within this distribution. It is estimated that the *Callitropsis nootkatensis* (yellow-cedar) is broadly distributed in most areas of the Tongass National Forest (Tongass NF), except to the northeast around Hoonah, Admiralty Island, the Juneau area, and Lynn Canal. Yellow-cedar occurs sparingly in these areas but is absent or rare over large portions of the landscape that appear to represent suitable habitat. Hennon et al. (2016) hypothesize that this incomplete colonization is attributed to the past and current yellow-cedar migration from the outer coastal Pleistocene refugia towards the northeast. The rarity of yellow-cedar in the Juneau area may indicate that yellow-cedar is just now arriving via this easterly or northeasterly migration. Several locations with very small populations, including a few lone yellow-cedar trees occur on Douglas Island. The unique stand of yellow-cedar near Haines may be an example of a founder population that is ahead of the main migration (Hennon et al. 2016).
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank G4G5, Alaska State Rank SNR Yellow-cedar is known to occur from the northern tip of California (Griffin and Critchfield 1972), through the Siskiyou and Cascade Mountains in Oregon and Washington, and north into coastal areas of British Columbia and Alaska to Prince William Sound (Little 1971). Two well-known small, disjunct populations of yellow-cedar occur further east in the Aldrich Mountains of Oregon (Frenkel 1974) and near Slocan Lake and Evans Lake, north of Nelson in interior British

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Criteria	*Rank*	*Rationale*
		Columbia (Perry 1954). Yellow-cedar is more widespread and abundant in British Columbia compared to parts of its range farther south (Hennon et al. 2016). The distribution of yellow-cedar in other areas of Alaska includes Glacier Bay National Park, where few reported observations and inventory plots are known. This is an important area, as it marks the northwest extent of the main yellow-cedar range in southeast Alaska. Yellow-cedar is abundant along the west coast of Glacier Bay extending to an area just northwest of Cape Fairweather. Another small population of yellow-cedar was known near Icy Bay just west of Lawrence Creek (Icy Bay is in the large expanse between Glacier Bay and Prince William Sound), but was harvested in 2002, and it is not clear if any yellow-cedar seedlings might be present among the natural regeneration growing after the harvest. The occurrence of yellow-cedar in Prince William Sound has been described as a phytogeographical problem because the origins of these populations are unclear owing to their considerable geographic isolation from the more contiguous range farther south. Populations occur around the Cordova-Hawkins Island area of the eastern sound and the Cedar Bay-Unakwik Inlet area of the western sound.
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). Yellow-cedar reproduces sexually by seed and asexually by layering. Regeneration is non-uniform and does not occur on all sites. The reproductive capacity of yellow-cedar is considered to be low, but some seed is produced every year. Key factors limiting natural regeneration include irregular seed crops, limited cone production, low rates of seed viability and germination, reduced seed source in areas of forest decline, competition with other species, seedling vulnerability to spring root and foliar freezing injury, and preferential deer browsing (Hennon et al 2016). Yellow-cedar begins to produce pollen and seed cones at an early age, often by the time seedlings reach seven to eight years old. Flowering (cone initiation) takes place from April to May, depending on latitude. Cones form on previously vegetative shoots that are 1 to 2 years old. Pollination takes place during a two-week period in late spring or early summer approximately one year after flower initiation. Pollen is wind-dispersed (Hennon et al. 2016). Seed cones take two full years to mature, or 28 months across three growing seasons from the time of cone initiation to seed maturity. There is evidence that cones can develop in one year on sites with longer growing seasons. Seed

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Criteria	*Rank*	*Rationale*
		dispersal takes place from fall to spring, primarily during periods of dry weather. Dispersed seeds overwinter in the snowbank over much of the range of yellow-cedar. Empty cones persist on trees for a year or more after seed dispersal. Seed dispersal distance is notably short, averaging just 4.65 m from stand edges—implying a range expansion rate of 0.07 km per century into areas of favorable habitat. The frequency of stochastic jump-dispersal events in this species is not known, but stand boundaries appear to have remained unchanged for at least 200 years (Krapek and Buma 2018). On average, cones produce seven seeds, but seed viability is generally low and highly variable. In British Columbia, only 29 percent of seeds were viable. Highest germination rates are achieved on bare mineral soil; however, alder and spruce tend to have a competitive advantage on bare microsites. Yellow-cedar, like many species, requires stratification, exposure to temperature conditions that break the dormancy of the seed embryo. Warm stratification followed by cold stratification has been shown to dramatically improve germination rates for many conifers. Large seed crops are produced every 4 to 7 years, but seed production is never known to be abundant compared to associated conifers, whose seeds readily germinate with little or no stratification. New quantitative genetic research findings show that seed can be moved great distances from source areas without expressing maladaptive traits (Hennon et al. 2016). Yellow-cedar also reproduces asexually by layering, as an aerial stem (i.e., lower branch) can develop roots while still attached to the parent plant, and later detach to form an independent clone (ramet) of the parent (genet) plant. For yellow-cedar, layering is most common on open, bog sites, where live lower branches are retained and are in direct contact with the ground (Hennon et al. 2016).
4 Abundance on Tongass NF	**C**	C = Common – current abundance is large enough that species persistence is not threatened by demographic stochasticity in combination with environmental variation. Recent analysis estimates that yellow-cedar occurs on 2 million hectares (5 million acres) of National Forest System lands on the Tongass National Forest. Of this, approximately 881,000 hectares (2 million acres) are classified as yellow-cedar forest, with yellow-cedar as the dominant species (Hennon et al. 2016, Barrett and Pattison 2017).

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Criteria	*Rank*	*Rationale*
		Yellow-cedar has a competitive advantage on harsh sites with poor nutrient availability, where it faces low competition from other tree species (Hennon et al. 2016). On productive sites with deep soils, it reaches its greatest heights but is less competitive and occurs as a more minor forest component, outcompeted by western hemlock and Sitka spruce. On average, yellow-cedar represents approximately ten percent of the estimated net volume of growing stock on timberland in southeast Alaska (Hennon et al. 2016). Yellow-cedar has peak abundance at middle elevations, occurring at higher elevations than western redcedar and lower elevations than mountain hemlock.
5 Population trend on Tongass NF	**A/B /C**	A/B/C = Trend varies by location and elevation. A - Significant downward or suspected downward population trend. B - Stable population. C - Upward population trend. Extensive, long-term mortality of yellow cedar within its natural range, known as yellow-cedar decline, has been estimated to occur on 200,000 hectares (500,000 acres) on the Tongass National Forest, or 22% of the area where yellow-cedar has been mapped (Hennon et al. 2016, Barrett and Pattison 2017). This decline peaked in a high rate of mortality from the mid-1960s to the 1980s (Hennon et al. 2016). Barrett and Pattison (2017) concluded that the population of yellow-cedar was stable 1995 and 2013, based upon an analysis of Forest Inventory and Analysis plots resampled during that interval (Barrett and Pattison 2017). However, as noted by Bidlack et al. (2017), this study does not capture longer-range trends (which is important because there can be a 10-15 year lag time between decline and mortality). This study further undersamples wilderness areas and low-volume forests where much yellow-cedar decline has been observed. It is generally understood that yellow-cedar decline has been in process for over a century (Bidlack et al. 2017). Where forests are in decline, mortality rates average 70% (Hennon et al. 2016, Barrett and Pattison 2017, Bidlack et a. 2017). Aerial detection surveys inventoried 4,735 hectares of active yellow-cedar decline on the Tongass National Forest in 2022, which represented a moderate increase from previous years (USDA FS 2023, Figure 1). Active decline was also mapped on Kupreanof and Mitkof Islands (688 hectares); Wrangell, Zarembo and Etolin Islands (283 hectares) Prince Wales Island (1,538 hectares); and Duke, Annette, Gravina, and Revillagigedo Islands; and the Cleveland Peninsula (526 hectares). Survey routes bypassed most of Baranof Island, Kruzof Island, and the parts of Chichagof historically impacted by decline (Hoonah Sound, Duffield Peninsula, western Peril Strait, and the coastline along the Gulf of Alaska).

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Criteria	*Rank*	*Rationale*
		In healthier areas of the species range on the Tongass National Forest, including higher elevations, higher latitudes, deeper soils, and north-facing slopes, gains in yellow-cedar biomass were documented between 1995 and 2013 (Barrett and Pattison 2017). Commercial logging may be an additional factor in population trends; however, the magnitude of this effect is difficult to quantify. While prior to the 1990s most logging was concentrated in old growth forest on high productivity, low elevation sites where yellow-cedar was not present in abundance, timber harvest by the late 1990s had begun to occur across a more diverse range of age classes, including sites with a larger yellow-cedar component. Approximately half of yellow cedar stands on the Tongass National Forest are located within development Land Use Designation units, and approximately half are within non-development units (Hennon et al. 2016). Limited information is available on yellow-cedar regeneration after timber harvests in southeast Alaska. Yellow-cedar is observed regenerating in some harvest units but not in others (Hennon et al. 2016). No data was found to quantify whether timber harvest is exceeding growth of yellow-cedar across the Tongass National Forest, which would represent a declining population trend due to this factor. Preliminary calculations by the state of Alaska in 2018 suggested that the current harvest was well below the sustainable level (ADFG 2018). Diseases and insect pests are not primary causes of yellow-cedar decline (Hennon et al. 2016) Predicted future population trends are predicted to be variable across southeast Alaska, ranging from no risk to high risk depending on location and elevation. A detailed risk assessment was conducted for 33 geographic units in coastal Alaska, with estimates of yellow-cedar decline in 2013, as well as projected risk of decline in 2020, 2050, and 2080 (Hennon et al. 2016,see Appendix 1). Areas with high projected percentages of yellow-cedar decline by mid-century include Kruzof Island, West Kupreanof Island, Gravina Island, Annette Island, and Duke Island.
6 Habitat trend on Tongass NF	**A/B**	A/B = A - Decline in habitat quality or quantity. B - Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Yellow-cedar decline has been documented in Southeast Alaska for at least 100 years, as climate has warmed since the end of the Little Ice Age. These areas of widespread mortality have cumulatively affected over 500,000 acres of forest in Southeast Alaska. Research suggests that climate change plays a key role in the increased rate of mortality, specifically frost damage to the species' shallow roots on moist sites due to low winter temperatures combined with a reduced

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Criteria	*Rank*	*Rationale*
		protective snowpack (Hennon et al. 2016, Halofsky et al. DRAFT).The presence of yellow-cedar decline within 22% of yellow-cedar habitat on NFS lands on the Tongass National Forest represents a long-term trend of declining habitat quality where the lack of snow cover has rendered yellow-cedar trees vulnerable to root injury from sudden and extreme cold events on nutrient poor sites with wet soils (Hennon et al. 2016, Buma and Barrett 2015). Across some remaining yellow-cedar habitat, some research suggests a stable trend (Barrett and Pattison 2017). The greatest extent of existing yellow-cedar decline acreage is found in management zones in the middle portions of the panhandle. Together, Kuiu Island, Kupreanof Island West, Baranof Island, and Chichagof South account for 43 percent of the mapped decline in Alaska (Hennon et al. 2016).
7 Habitat vulnerability or modification; other threats	**A/B**	A/B = A - Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. B- Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. On the Tongass NF, the future vulnerability of yellow-cedar to yellow-cedar decline is highest on poorly drained sites where it has previously held a competitive advantage. Freezing sensitivity has been identified as a key vulnerability of yellow-cedar on sites with poor drainage and nutrient availability. On these sites, yellow-cedar roots shallowly, exposing roots to greater fluctuations in air and soil temperature. Yellow-cedar trees are protected from spring freezing injury where snow is present in spring and able to insulate tree roots and prevent premature de-hardening and freezing. Recent modeling predicts that by 2070, 75% of yellow-cedar's range in Alaska will experience winter temperatures above -2°C (B. Buma personal communication in ADFG 2018), potentially exposing roots to freezing injury if periods of cold weather occur in late winter. There are strong geographic patterns of near-term and longer-term (2020 to 2080) future risk of yellow-cedar decline. These general patterns on the Tongass National Forest include: 1) low snow regions where yellow-cedar previously experienced mortality and risk increases only marginally, 2) transitional regions that were previously protected by snow but warming in the next century is expected to trigger mortality, and 3) high snowfall areas where yellow-cedar forests remain intact due to sufficient snow cover to protect yellow-cedar by the year 2080 even with warming. These three general patterns, described below, are arrayed broadly from south to north, coastal to interior mainland, and more locally by elevation (Hennon et al. 2016).

Criteria	*Rank*	*Rationale*
		Low snow regions of the southern coastal management zones are expected to experience only a modest increased risk of yellow-cedar decline in the future because most vulnerable stands have already been impacted. This future trend is likely in areas such as Gravina Island, Prince of Wales South, Prince of Wales North, and Heceta. Modest future increases in risk to yellow-cedar decline are predicted for higher elevations of the southern coastal management zones where existing snow cover is predicted to be further reduced. Although the risk remains high, the initial waves of mortality have already killed many of the mature yellow-cedar trees in vulnerable microsites and some of these forests are recovering with a lower yellow-cedar component (Hennon et al. 2016). Transitional regions where snow cover is predicted to decrease with climate change, are highly vulnerable to yellow-cedar declines by mid-century. The management zones of Admiralty, Kuiu, and Kupreanof Island West contain approximately 15% of the yellow-cedar acreage in Alaska and also have a relatively high percentage of high risk to yellow-cedar decline. These zones appear particularly vulnerable in the future projections. These areas combined with Prince of Wales Island have an aggregated total of 30% of the yellow-cedar acreage, which is at or above a risk value of approximately 30% in the future high-risk category. The high risk increases to 51% on Kruzof and Baranof Islands. The most dynamic change to yellow-cedar forests in the next century may be in areas of the northern panhandle, just beyond the current distribution of yellow-cedar decline. Yellow-cedar forests in Chichagof North, Juneau, and Admiralty management units have only small acreages of existing yellow-cedar decline. By 2080, however, the risk increases to between 27% and 41%. Anticipated increases in yellow-cedar decline in these areas represent yellow-cedar forests that were previously protected by snow but become impacted as snow accumulation is reduced in future years (Hennon et al. 2016). High snowfall areas are predicted to be fairly resilient to climate change through 2080. Yellow-cedar forests along the mainland adjacent to the border with British Columbia are expected to remain relatively healthy into the future. Yellow-cedar is abundant in the Tracy Arm, Stikine, and Misty Fjords; currently there are only small amounts of yellow-cedar decline now, all in the coastal regions of these management zones. The Misty Fjords and Revillagigedo Island East and West management zones have approximately 30% of the yellow-cedar acreage in Alaska, but the acreage at high risk does not rise appreciably by 2080 (e.g., not above 20%) and approximately one half or more of these forests are expected to remain at low risk by 2080. These three general patterns, described below, are arrayed broadly from south to north, coastal to interior mainland, and more locally by elevation (Hennon et al. 2016).

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	**B**	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. Temper conclusions based on life-cycle considerations and whether population growth is likely to be more sensitive to changes in reproduction or age-specific mortality. Our extensive knowledge of this species and its history as an important commercial timber product suggest populations have an intermediate ability to recover from disturbance events. Yellow-cedar is a slow-growing conifer and can reproduce sexually through seed or asexually through vegetative layering (USDI FWS 2018). Individuals reach sexual maturity after seven years, and commonly live for 500-750 years, and occasionally as long as 1,000 years (Krapek and Buma 2018); they can reach a height of 30 meters, and a diameter of 2 meters (Hennon et al. 2016). Large seed crops are produced every 4 to 7 years, but seed production is generally low (USDI FWS 2018). While rates of reproduction can be high, recruitment is often poor (USDI FWS 2018). The roots of yellow-cedar are less cold-hardy than the foliage, and overall this species is less cold-tolerant than many other conifer species, a factor that has contributed to yellow-cedar decline as described above (USFWS 2018).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☒	☐	☐
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Yellow-cedar (*Callitropsis nootkatensis*) is not recommended as a Species of Conservation Concern based upon the following:

- **Significant threats:** As reduced snowpack associated with climate change increases the risk of freezing-induced mortality, yellow-cedar decline is expected to continue where currently observed and has a high potential to spread to more northern latitudes and higher elevation sites across the Tongass NF. However, yellow-cedar is expected to persist in areas where snow cover is sufficient to prevent frost

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damage. Risk levels between 2020-2080 vary widely based upon site elevation and latitude. While this threat is substantial, it is unlikely to cause the extirpation of yellow-cedar on the Tongass NF over the next 60 years. Recent timber harvest is not believed to be above sustainable levels.

- **Declining populations or habitat trends:** Yellow-cedar decline has been documented on 22% of the area where yellow-cedar is mapped. While this decline has been happening for over a century, the highest rates of mortality were observed from the mid-1960s to the 1980s.

- **Restricted range:** Yellow-cedar ranges widely across the Tongass NF, and the distribution is contiguous with the distribution in British Columbia and south into Washington and Oregon. Its range continues to the north into southcentral Alaska.

- **Low populations or restricted ecological conditions:** Yellow-cedar is abundant, comprising approximately ten percent of the estimated net volume of growing stock across 2 million hectares (5 million acres) of National Forest System lands on the Tongass National Forest. Ecological conditions for the species are not highly restricted.

- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Campylopus gracilis

Campylopus gracilis [(Mitt.) A.Jaeger, 1872]

Synonym *Campylopus schwarzii*

Schwarz's swan-neck moss

Global Rank: **GNR**

Alaska State Rank: **S1**



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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce OR isolated. *Campylopus gracilis* is known from an estimated three locations on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). These occurrences are located on Baranof Island near Davidof Lake (Occurrence 1), on Baranof Island approximately 8 km due east of Sitka (Occurrence 2), and on Etolin Island (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in forests and muskeg habitats. Occurrence 1 was collected in a mossy, grassy shingle flat adjacent to a major stream in soil among other mosses (Appendix 1). Occurrence 2 was collected in a forest dominated by *Picea sitchensis*, *Tsuga heterophylla*, *Pinus contorta* and *Callitropsis nootkatensis,* with 90° slope and 355° aspect, and mostly shaded moist rock shelf (Appendix 1). Occurrence 3 was collected in a muskeg with scattered *Pinus contorta* and *Tsuga heterophylla* with a soil that has a high conductivity (250 mS) from limestone, a pH of 8.1, and is mostly exposed, moist and humic (Appendix 1). These habitats are typical for this species. In Southeast Alaska, there is one additional occurrence of this species on the outer coast of Glacier Bay National Park in an exposed rock crevice (ANHP ACCS 2025).

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Criteria	*Rank*	*Rationale*
		Across its range, *Campylopus gracilis* is typically found in moist forest, heath, tundra, or grassland (CBH 2025). This species may be confused for *Campylopus atrovirens* which is also present nearby (iNaturalist 2025).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank GNR Alaska State Rank S1 British Columbia S4 *Campylopus gracilis* is broadly distributed globally. There are numerous collections in the British Islands, Scandinavia, the Alps, the Himalayan Mountains, East Asia, coastal areas on the American Northwest from Western Alaska to Oregon (CBH 2025). There are also a few isolated collections from Mexico and South America that should be confirmed before being included in the accepted range (CBH 2025). There are several occurrences in the Queen Charlotte Islands and near Prince Rupert British Columbia, approximately 160 miles south of the Etolin Island occurrence (CBH 2025). It occurs at elevations from near sea level in northern areas to around 7,000 m in the Himalayas on soil or rock in moist forest, heath, tundra, or grassland (CBH 2025). There is one additional record of this species in western Alaska on the Alaska Peninsula south of King Salmon (CBH 2025).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. *Campylopus gracilis* is an acrocarpous moss with a terrestrial growth habit (FNA 2025). Its main dispersal mechanism is by spores, clonal growth, and broken leaf tips (FNA 2025). The rapid spread of the invasive moss *Campylopus introflexus* across the North American west coast suggests that species in this genus have strong dispersal abilities, but there is little information about *Campylopus gracilis* (Carter 2014).
4 Abundance on Tongass	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Campylopus gracilis* is known from three occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).

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Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Campylopus gracilis* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat for the 3 occurrences of *Campylopus gracilis* on the Tongass NF is forests and muskeg habitats (Appendix 1). These habitats can be grouped under Forested and Non-Forested Wetlands which are common on the Tongass NF (Turner and Mallott 2025). On the Tongass NF, wetlands have high ecosystem integrity and generally low vulnerability to stressors, but they may be impacted by climate change driven changes to the water table (Turner and Mallot 2025, Halofsky et al draft). Invasive species that can survive in or near forests and muskeg habitats, such as *Phalaris arundinacea*, are known to occur near the coordinates for Occurrence 3 (USFS 2025b). Timber harvest has occurred in the recent past about 100 m north from occurrence 3 and a road bisects the top of the muskeg (USFS 2025d). This might indicate a negative trend in habitat quality at this site. Additionally, given that wetland habitat is common on the Tongass NF, but *Campulopus gracilis* is rare, there may be additional microhabitat requirements for this species.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Recent timber harvest activities have occurred in the vicinity of the forests and muskeg habitats at occurrence 3 (USFS 2025d), and this activity will likely continue on Etolin Island in the future. Timber harvest and road building can alter hydrology which could impact habitat for *Campylopus gracilis*. In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for wetland species with high soil moisture requirements such as *Campylopus gracilis* (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. The life history of *Campylopus gracilis* is largely unknown. It is an acrocarpous moss with an erect growth habit (FNA 2025). It produces leafy stems with costate leaves (FNA 2025). *Campylopus gracilis* produces sporocarps frequently within its Tongass NF range (FNA 2025). Specialized asexual reproduction is in the form of broken leaf tips that can grow into new ramets (FNA 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

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Conclusion Rationale

Campylopus gracilis is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Invasive species and timber harvest activities are known near one of the three occurrences. Invasive species and timber harvest activities are likely to impact wetland habitat across the forest.

- **Declining trends:** Population trends are not known. Increased temperatures may drive increased evapotranspiration, which could lead to a water deficit particularly during the summer. Habitat may be impacted by changes in the water table, particularly during summer. This could allow encroachment of more woody plants into wetland areas. Additionally, given the rarity of *Campylopus gracilis* on the Tongass NF, there may be additional microhabitat requirements.

- **Restricted ranges:** The species is widespread globally. There are known occurrences to the south in British Columbia and to the north in Alaska.

- **Low population numbers:** There are only three occurrences of this species on the Tongass NF on Baranof and Etolin Islands. Little is known about life history and dispersal characteristics to understand how this species would respond to change. Additionally, bryophytes are not often recorded in surveys, so this species may be more common than is documented.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [7/27/1968]**	**Davidof Lake., Baranof I.**	**Mossy, grassy shingle flats adjacent to major stream entering head of lake. Substrate: On soil among other mosses.**		
1	CBH 2025 (UBC) [07/27/1968]	mossy, grassy shingle flats adjacent to major stream entering head of davidof lake, baranof isl.	on soil among other mosses.		
2*	**ACCSBryo_Oct24 [5/06/2019]**	**Tongass National Forest. Southeast Alaska Panhandle, Baranof Island. Approximately 8km due east of Sitka, Alaska. Collection area along switchback trail along cliff south of Sawmill Creek. Watershed: Sawmill Creek. Sitename: BeaverFirstShelf**	**Forest dominated by Picea sitchensis, Tsuga heterophylla, Pinus contorta and Callitropsis nootkatensis., Slope: 90°, Aspect: 355°;**		

			mostly shaded moist rock shelf.		
2	CBH 2025 (DAV) [05/06/2019]	Tongass National Forest. Southeast Alaska Panhandle, Baranof Island. Approximately 8km due east of Sitka, Alaska. Collection area along switchback trail along cliff south of Sawmill Creek. Watershed: Sawmill Creek. Sitename: BeaverFirstShelf	Forest dominated by Picea sitchensis, Tsuga heterophylla, Pinus contorta and Callitropsis nootkatensis., Slope: 90°, Aspect: 355°. Substrate: Mostly shaded; on moist rock shelf. Associated taxa: Bazzania sp.		
3*	**ACCSBryo_Oct24 [8/05/2017]**	**Tongass National Forest. Southeast Alaska panhandle, Etolin Island. Approximately 21 miles SW of the Borough of Wrangell. Watershed: Mosman Inlet. Sitename: Cypripedium montanum wetland**	**Muskeg with scattered Pinus contorta and Tsuga heterophylla with high conductivity from limestone bedrock. Conductivity 250 mS, pH 8.1; mostly exposed moist; humic soil.**		
3	CBH 2025 (DAV) [08/05/2017]	Tongass National Forest. Southeast Alaska panhandle, Etolin Island. Approximately 21 miles SW of the Borough of Wrangell. Watershed: Mosman Inlet. Sitename: Cypripedium montanum wetland	Muskeg with scattered Pinus contorta and Tsuga heterophylla with high conductivity from limestone bedrock. Conductivity 250 mS, pH 8.1. Substrate: mostly exposed moist; humic soil. Associated taxa: Neoorthocaulis floerkei.	Identification remarks: Need to compare with a named specimen..	

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Cardamine angulata

Cardamine angulata Hook.

Seaside bittercress

Global Rank: **G5**
Alaska State Rank: **S1S2**



photo: Steve Sullivan

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy OR gaps. There are six occurrences of *Cardamine angulata* on the Tongass National Forest (Tongass NF). All occurrences are within the Craig Ranger District on the Prince of Wales Island and the surrounding outer islands in the vicinity of Craig, Alaska. Locations of the six occurrences are as follows: • adjacent to Hunter Bay within South Prince of Wales Wilderness, Prince of Wales Island • adjacent to Nichols Bay at the southernmost end of Prince of Wales Island • within a forested wetland near Trocadero Bay, Prince of Wales Island • on a trail south of the Harris River, Prince of Wales Island • off NFS road 2100000, south of Twelvemile arm, Prince of Wales Island • on Cone Island There is one additional herbarium record with an uncertain location. It is unknown if it occurs on National Forest land or adjacent non-Forest land. Records indicate it is south of Craig, AK. (ARCTOS , 2023).

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Criteria	*Rank*	*Rationale*
		There are an estimated two records within the Tongass National Forest (Tongass NF) (Appendix 1) administrative boundary on non-Forest Service lands. They are located north of Big Salt Lake adjacent to Thorne Bay Highway; and directly south of Craig, AK adjacent to, or within, the cemetery (ANHP ACCS, 2023) (USDA FS, 2023). There is one additional herbarium record with an uncertain location. It is unknown if it occurs on National Forest land or adjacent non-Forest land. Records indicate it is south of Craig, AK. (ARCTOS , 2023).
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF. Global Rank G5, Alaska State Rank S1S2 California S3, Oregon SNR, Washington SNR, British S3 Blue listed *Cardamine angulata* is restricted to the Pacific Northwest with populations in British Columbia, Washington, Oregon, Northwestern California, and Southeastern Alaska (Detling, 1937). The Tongass NF is the northernmost edge of its range. The occurrences on the Forest appear to be clustered, with several on Graham Island. This cluster is approximately 640 kilometers (400 miles) from its main distribution, although there is another disjunct occurrence approximately 230 kilometers (140 miles) east of Graham Island. Elsewhere in British Columbia, occurrences are located on Vancouver Island (BCCDC, 2023) and Haida Gwaii (CPNWH, 2023). In British Columbia, *Cardamine angulata* has a provincial conservation rank of S3, special concern, and is on the "Blue List". Species of Special Concern (S3 in British Columbia) have characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Blue-listed species are at risk, but are not extirpated, endangered or threatened (BCCDC, 2023) Herbarium records indicate *Cardamine angulata* is more common in Washington (64 records concentrated within the Seattle area) and Oregon (84 records concentrated in northwest and west-central Oregon). The California Native Plant Society (CNPS) ranks *Cardamine angulata* as 2B.2, rare, threatened or endangered in CA; common elsewhere. NatureServe (2025) states the species is, "common on the west coast of North America, with thousands of occurrences."

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Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Cardamine angulata* produces 6 to 16 seeded siliques with oblong seeds approximately 2x1 mm (eFloras, 2008). Species in the genus *Cardamine* employ ballistic seed dispersal by which seeds are sprung by contracted valves in the mature silique which allows for short distance dispersal (Kimata, 1983, Carlsen et al. 2009). Additionally, rhizomes allow for spread clonally into adjacent suitable habitat. When moist, *Cardamine* seeds can become mucilaginous and attach to terrestrial animals and birds, extending its dispersal capability (Carlsen et al. 2009). It is likely that this long-distance dispersal method led to the genus rapidly colonizing and diversifying in the Northern Hemisphere between 2 and 8 million years ago (Carlsen et al. 2009).
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Five of the six occurrences of *Cardamine angulata* on the Tongass NF have population census information. Populations were estimated to be between 10 and 200 individuals (USDA FS, 2023) (ANHP ACCS, 2023). Three occurrences had 50 or fewer individuals, while two had over 100 individuals. The abundance is likely large enough that stochastic events would not pose a threat to the species persistence on the Tongass NF.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trend information for *Cardamine angulata* on the Tongass NF is not available.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. On the Tongass NF, *Cardamine angulata* is known from forested wetland and riparian habitat (stream edges, above stream bank, gravel bar in stream). Additional occurrences on Prince of Wales Island on private land are in roadside habitat. Wetland and riparian habitat integrity is high with low and moderate vulnerability to stressors, respectively (Turner and Mallot 2025). Historically, riparian forest was targeted for timber harvest because of the quality of trees and ease of access, so habitat may have been impacted by logging, particularly on Prince of Wales Island. However, since this species occupies several habitat niches, sufficient habitat for *Cardamine angulata* likely remains.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The occurrence south of the Harris River, Prince of Wales Island was documented growing on an excavator trail above the streambank with logging slash in a human made forest opening (ANHP ACCS, 2023). It is unclear whether or how the occurrence was impacted by the disturbance. One population is located in the South Prince of Wales Wilderness and can be assumed to have limited human disturbance. Climate change will likely alter temperature and precipitation patterns which will affect the water table, especially in summer, and would alter suitable wetland and riparian habitat for *Cardamine angulata* (Turner and Mallot 2025). Additionally, the timing and frequency of large rain events and rain on snow events that contribute to flooding will be altered under future climate scenarios (Halofsky et al. DRAFT). Peak flows and floods can scour riparian areas, erode stream channels, undercut riparian trees and alter plant community composition (Halofsky et al. DRAFT). Furthermore, riparian, wetland, and roadside habitats are all highly vulnerable to invasion by invasive species, which could out compete *Cardamine angulata*.
8 Life history and demographics	B	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Cardamine angulata* is a perennial species associated with moist habitats. Plants typically flower early in the growing season, from April to June (eFloras 2008). The perennial and rhizomatous nature of *Cardamine angulata*, combined with short term ballistic seed dispersal, suggests it may persist at a site for multiple years or longer if conditions remain favorable. Long distance seed dispersal may allow the species to colonize suitable habitats. There is no available information on lifespan, germination rates, disease or predation.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒

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Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Cardamine angulata is not recommended as a Species of Conservation Concern in accordance with the following rationale:

- **Significant threats:** There is insufficient information to determine whether significant threats exist for the limited occurrences known from the plan area. One occurrence of *Cardamine angulata* occurs in a human modified habitat (on a trail) and may be threatened by recreational use, but baseline population data were not collected, and site revisits have not occurred. While it is unlikely climate change would reduce overall quantity of habitat, flooding and drought could result in population declines or local extirpations of *Cardamine angulata*. These impacts may be countered by specialized dispersal methods and rhizomatous growth.
- **Declining populations or habitat trends:** There is no information on population trends within the plan area. Climate change and invasive species are likely to alter riparian and wetland habitat. However, *Cardamine angulata* appears to occupy a generalized assemblage of habitat niches; sufficient suitable habitat likely exists in abundance across the plan area.
- **Restricted Range:** The Tongass NF populations of *Cardamine angulata* are at the northernmost edge of its range and are disjunct from the primary distribution of the species.
- **Low populations or restricted ecological conditions:** There are six known occurrences of this species on the Tongass NF; extirpation of all known occurrences by stochastic events is unlikely. The species is perennial and thus may be more likely to tolerate disturbances with access to this energy reserve and capacity for vegetative growth. However, riparian and wetland habitat is likely to be impacted by expected changes in climatic conditions, though it remains uncertain how *Cardamine angulata* will respond without additional data.
- **Other factors:** Life history characters indicate a lessened concern for persistence of the species in the plan area. The perennial and rhizomatous nature of *Cardamine angulata*, combined with short term ballistic seed dispersal, suggests it may persist at a site for multiple years or longer if conditions remain favorable. Long distance seed dispersal may allow the species to colonize suitable habitats.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.

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☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO1)[8/21/2010]	Prince of Wales Island, Tongass National Forest	Substrate= Gravel; Parent Material= Alluvium; Soil Moisture= Wet; Soil Texture= sand; Light Exposure= Partial Shade	NA	NA
1	TESP_Mar25 (100551P000186)[8/21/2010]		Growing within a gravel bar of low gradient fish stream		
2	TESP_Mar25 (100554P000453Y12)[8/29/2012]				
2	ACCS_Mar25 (EO2)[8/19/2010]	Prince of Wales Island, Tongass National Forest	Parent Material= Sand		
2	TESP_Mar25 (100551P000335)[8/19/2010]		Growing along edge of the streambank, for a fairly decent sized salmon stream.		
3	ACCS_Mar25 (EO3)[6/29/2014]	Prince of Wales Island, near Twelvemile Arm	Forested wetland on small floodplain in flood courses and pools; mostly dry with several small pools still with water		
3	CPNWH_Mar25 (UAAH8986)[6/29/2014]	Prince of Wales Island, near Twelvemile Arm	Forested wetland on small floodplain in flood courses and		

			pools; mostly dry with several small pools still with water		
3	CPNWH_Mar25 (UAAH9405)[6/29/2014]	Prince of Wales Island, near Twelvemile Arm	Forested wetland on small floodplain in flood courses and pools; mostly dry with several small pools still with water		
3	CPNWH_Mar25 (UAAH9417)[6/29/2014]	Prince of Wales Island, near Twelvemile Arm	Forested wetland on small floodplain in flood courses and pools; mostly dry with several small pools still with water		
4	TESP_Mar25 (100551P000913)[6/12/2024]	Prince of Wales Island, 12Mile Cave Creek		50	
5	ACCS_Mar25 (EO5)[6/28/1994]	Siketi Sound, Cone I., N shore of island	sitka spruce-hemlock forest, wet mossy stream edge in understory		
6	ACCS_Mar25 (EO6)[7/07/2009]	Fubar Cr., near Hydaberg Hwy, about 1.47 km S of highway connecting Klawock and Hollis	growing on excavator trail above the streambank with 2 year old logging slash, human made opening in forest		
6	CPNWH_April2025(ALA)[7/07/2009]	Fubar Cr., near Hydaberg Hwy, about 1.47 km S of highway connecting Klawock and Hollis, Craig Quad, Alexander Archipelago, Prince of Wales Island.	Growing on excavator trail above the streambank with 2 year old logging slash, human made opening in forest.		
	Occurrences not on the Tongass				
7	TESP_Mar25 (100551P000911Y12)[6/21/2012]		Found along roadside against an alder forest		
8	ACCS_Mar25 (EO4)[6/05/1983]	Alexander Archipelago, Craig, Prince of Wales I.	Along logging road, ca. 6 km from town. Coordinates for this occurrence are inaccurate, placing it on Sumez Island south of Craig. Location cannot be confirmed but much of the land within 6 km of town (assuming this refers to Craig, but also accurate for Klawock) is private ownership		
9	TESP_Mar25 (100551P000404)[8/01/2011]		In PISI-Alnus forest growing primarily under Alnus.		
9	ACCS_Mar25 (EO7)[8/01/2011]	Tongass National Forest			
9	ACCS_Mar25 (EO7)[7/31/1936]	Craig	Woods		

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Cardamine pensylvanica

Cardamine pensylvanica Muhl. ex Willd.

Pennsylvania bittercress

Global Rank: **G5**
Alaska State Rank: **S1**


photo: Craig Althen

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Population is naturally distributed as isolated patches, with limited opportunity for dispersal among patches. *Cardamine pensylvanica* is known from four estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The four occurrences are widely spaced, with one each on Wrangell and Ketchikan-Misty Fjords Ranger Districts and two on Prince of Wales. Habitats for these occurrences include a rocky streamside at the forest-beach ecotone, a bank of a hot spring at Chief Shakes Hot Springs, a clearcut forested wetland with a dense regrowth, and a moist drainage near a creek (USDA FS 2023, ACCS 2023). While only four locations are known on the Forest, the habitats for those locations, as described, are broad and widely available across the Tongass. It is unclear whether this species has been undercollected due to its similarity to the common *C. umbellata,* or if there are unknown conditions restricting its distribution.
2 Distribution in surrounding geographic	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S1 Outside of the Tongass NF, there is one other occurrence in Alaska, from Valdez (Cordova-Valdez Borough) at the edge of shrub line above the beach, over sandstone and mudstone bedrock (ANHP ACCS 2023).

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Criteria	*Rank*	*Rationale*
area		This species is widespread throughout most of Canada and the United States from coast to coast (NatureServe. 2023). The occurrences on the Tongass NF are approximately 100 miles (160 kilometers) from the occurrences to the southwest on Haida Gwaii and 60 miles (100 kilometers) to the west in British Columbia where it is scattered throughout (CPNWH 2025). Habitat is described as marshes, streams, swamps, ditches, seepage, springs, lake margins, mesic bottomland and upland forests, wet areas, ledges of sheltered bluffs, banks and shallow water of streams and spring branches (Flora of North America 2023).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). Dispersal capability specific to *Cardamine pensylvanica* is unknown. *Cardamine hirsuta* is capable of explosive seed dispersal whereas *Cardamine parviflora* is reported to have the majority of seeds fail to launch effectively (Neumann and Hay 2020). Explosive seed dispersal of *Cardamine* spp. is not expected to occur across landscapes in either case. It is possible in streamside locations that plant propagules are transported by water. Woodland herbs in general disperse extremely slowly and likely have relied on occasional long-distance dispersal events to expand their ranges (Cain et al. 1998).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population numbers for the four occurrences on the Tongass are unknown (USDA FS 2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. No population numbers are available and no revisits have been made to the known locations, so population trends for the four occurrences are unknown (USDA FS 2023).

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Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Habitat for the four occurrences on the Tongass are a variety of wet habitats. Specimens list habitat as: on a rocky streamside at the forest – beach ecotone, the bank of a hot spring, and in a clearcut forested wetland with dense regrowth. Habitat across the species range is also a variety of wet habitats: marshes, streams, swamps, ditches, seepage, springs, lake margins, mesic bottomland and upland forests, wet areas, ledges of sheltered bluffs, banks and shallow water of streams and spring branches (FNA 2023). This species has a broad range of potential habitat on the Tongass NF that includes both common and uncommon habitat types, as well as habitats with various levels of prior disturbance. Occurrence 2 is in the vicinity of recent timber harvest, approximately 100 feet from a road. The occurrence was in dense regenerating second growth when collected in 2014, and this habitat is likely rapidly changing as trees continue to regenerate. Additionally, Occurrence 4 is near the Chief Shakes Hot Spring and may be impacted by recreational activity or reed canarygrass, which is known at the recreation site.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The biggest likely threats to the broad variety of wet habitats that this species occupies are invasive species and climate change. Many watersheds have been invaded by reed canarygrass, which can form a monoculture, excluding native plants (Huette 2003). All streams in roaded areas are vulnerable to invasion due to the past widespread use of reed canarygrass in the erosion control seed mix. Climate change is likely to drive changes in water dynamics on the Tongass NF, with increased precipitation in fall/winter and summer drought (Shanley et al. 2015, Bennetsen et al. 2023). These stressors may impact habitat for *Cardimine pensylvanica*, but a large amount of suitable habitat will likely remain. One of the four known locations was in a recently clearcut area ("clearcut forested wetland with dense regrowth, trees 1 to 5 m tall"), suggesting that this species may have some ability to persist after disturbance (USDA FS 2023).
8	D	D = Insufficient information to draw inferences about criterion.

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Criteria	*Rank*	*Rationale*
Life history and demographics		*Cardamine pensylvanica* is an annual or biennial herb. In some locations, it is a greenhouse weed. In the greenhouse context, seeds from this species can germinate within a week of reaching a suitably moist environment and those individuals begin to set seed approximately 2 months after germination. (Crone and Taylor 1996, Molofsky 1999).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Cardamine pensylvanica* within the plan area based upon the following:

- **Significant threats:** Timber harvest and invasive species are likely to impact habitat for this species.
- **Declining trends**: Population trends are not documented for this species. Riparian and wetland habitat where this species is found are likely to be impacted by projected summer droughts.
- **Restricted ranges:** *Cardamine pensylvanica* is widespread throughout most of Canada and the United States from coast to coast.
- **Low population numbers:** While only four locations are known on the Forest, the habitats for those locations, as described, are broad and widely available across the Tongass. It is unclear whether this species has been undercollected in southeastern Alaska due to its similarity to the common *C. umbellata,* or if there are unknown conditions restricting its distribution. Additionally, this species has been noted as weedy in greenhouses suggesting it has life history characteristics that allow it to reproduce efficiently.
- **Other factors:** None known.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO5)[8/09/1993]	Prince of Wales Island in Clover Bay. Tongass National Forest.	Moist drainage bottom.	NA	NA
2	ACCS_Mar25 (EO7)[6/29/2014]	Prince of Wales Island, east of Trocadero Bay	Clearcut forested wetland with dense regrowth, trees 1 to 5 m tall; growing along small streams and pools		
2	CPNWH_Mar25 (UAAH8985)[6/29/2014]	Prince of Wales Island, east of Trocadero Bay	Clearcut forested wetland with dense regrowth, trees 1 to 5 m tall; growing along small streams and pools		
3	ACCS_Mar25 (EO1)[7/16/1993]	Mouth of Ella Cr., Ella Bay, Behm Cal	On rocky streamside at forest - shore ecotone		
3	CPNWH_April2025(ALA)[7/16/1993]	Mouth of Ella Cr., Ella Bay, Behm Cal, Ketchikan Quad.	On rocky streamside at forest - shore ecotone.		
4	ACCS_Mar25 (EO2)[7/30/1993]	Coast Mts, Chief Shakes Hot Springs	hot springs bank		
4	CPNWH_April2025(ALA)[7/30/1993]	Coast Mts, Chief Shakes Hot Springs, Petersburg Quad, Tongass National Forest.	Hot springs bank.		

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Carex bebbii

Carex bebbii Olney ex Fernald

Bebb's sedge

Global Rank: **G5**
Alaska State Rank: **S1**



photo: Wikipedia

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Two estimated occurrences are known on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Both occurrences are on the Petersburg Ranger District. One is located on a moraine near Oasis Glacier on the mainland east of Thomas Bay, another is known from muskeg habitat along Goose Cove Road (FS Road 6031) near Portage Bay on northern Kupreanof Island (Note: The township/range and written description on this herbarium specimen differ by approximately 6 miles). There is an additional occurrence in southeast Alaska from 1913 located near Juneau with no additional information (USDA FS 2023, CPNWH 2023, ACCS 2023). It is unclear if this occurrence was collected on the Tongass NF. The habitat preference of *Carex bebbii* on the Tongass is difficult to determine based on two occurrences in two distinct habitats. Additionally, due to their more cryptic nature, *Carex* species often have a higher likelihood of not being identified. Because of these factors, targeted surveys would be required to determine the true distribution and abundance of this species on the Tongass.

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S1 British Columbia Province Rank S5, Yellow List; Alberta S5, Yukon Territory S3, Washington SNR, Oregon S4, state rankings vary among other more distant states and provinces. The range of *Carex bebbii* extends across boreal North America (NatureServe 2023), with its main distribution occurring around and in the central Rocky Mountains in Montana, Idaho, Washington, and southern British Columbia. It is common in southern British Columbia in and east of the Coast-Cascade Mountains, becoming infrequent in southwestern and northern British Columbia (BCCDC 2023, Klinkenberg 2023). Occurrences on the Forest are approximately 80 miles (128 kilometers) from the closest occurrence in British Columbia, which is on the other side of the Coast Mountains in Mount Edziza Provincial Park, British Colombia (CPNWH 2023). An additional occurrence is known to the Knik Arm area near Anchorage, Alaska (CPNWH 2023). Habitat in British Columbia is described as mesic to dry meadows, grasslands, rocky slopes and ridges and forest openings in the montane to subalpine zones (Klinkenberg 2023), in the Pacific Northwest generally as wet meadows, stream banks, irrigation ponds, roadside ditches, generally in areas with basic to neutral pH (Wilson et al 2014), and by the Flora of North America as wet places with calcareous or neutral soils, gravelly lakeshores, stream banks, meadows, and forest seeps.
3 Dispersal capability	**C**	C = Readily disperses across landscapes with few habitat-related limitations *Carex bebbii* produces seed contained within perigynia arranged in dense spikes. *Carex bebbii* may reach reproductive stage from seed in a single season and can behave as a facultative annual (FNA 2020). Pollen is presumed to be, as for most other *Carex* species, dispersed by wind (Friedman and Barrett 2009). While information specific to the dispersal of *Carex bebbii* seeds could not be found in the scientific literature, *Carex* in general have many dispersal mechanisms, with different species known to be dispersed by sea currents, wind currents, as well as external and internal animal transport (Villaverde et al 2017).

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. The number of plants at the two occurrences is unknown (USDA FS 2023). Due to the factors stated in Criteria 1, targeted surveys would be required to determine the true distribution and abundance of this species on the Tongass.
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Population trends are unknown.
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The two occurrences on the Tongass occur in two different habitat types (muskeg and glacial moraine). A recent analysis of muskeg habitat on Prince of Wales Island found that transitional areas between open habitat, woodland scrub, and forested habitats have become increasingly forested between 2000-2020, however it is unknown whether these shifts are outside of the historical range of variation (Bennetsen et al. 2023) and a large amount of suitable habitat remains. Glacial moraine habitat is abundant on the Tongass NF and may be increasing with glacial retreat (Bennetsen et al. 2023). Because only two populations have been documented on the Tongass NF, yet glacial moraines and muskeg habitats are common, there may be specific microhabitat requirements or other factors that contribute to the local rarity of this species.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The collection made on Kupreanof Island is described and mapped as occurring in a muskeg habitat adjacent to a gravel road (CPNWH 2023), which may make the occurrence vulnerable to road maintenance activities and invasive species like reed canarygrass (*Phalaris arundinacea*), but it is unknown how close the occurrence is to the road or how far beyond the road it extends. Tree encroachment and densification within muskeg habitat for *Carex bebbii* may change the immediate growing environment for this species. Because this species is a wetland obligate, this species may be sensitive to changes in water dynamics. Projected increased temperatures are likely to increase evapotranspiration, which may affect available water within habitat for this species (Shanley et al. 2015, Bennetsen et al. 2023). Changes to water dynamics can alter plant community composition and competitive dynamics and may result in encroachment by trees or shrubs. It is unknown whether these shifts are outside of the historical range of variation (Bennetsen et al. 2023) and a large amount of suitable habitat remains. Climate change may additionally result in changes to the distribution of glacial moraine habitat. It is anticipated that glaciers will recede and snowpack decrease (Bennetsen et al. 2023), which has the potential to expose additional glacial moraine habitat. It is unknown, however, whether or how rapidly this species could adapt to changes in habitat distribution.
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. *Carex bebbii* may reach reproductive maturity from seed in a single season and can behave as a facultative annual. The implications of this for the demographics of this species, however, are unknown. Species susceptibility to disease, predation and competition are unknown. Species response to disturbance is unknown. In Oregon it has been considered rare, but it appears to be exploiting human disturbance to expand its range along roadsides and irrigation ditches (Wilson et al 2014).

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Carex bebbii* within the plan area based upon the following:

- **Significant threats:** The collection made on Kupreanof Island is described as occurring in a muskeg habitat adjacent to a gravel road, which may render the occurrence vulnerable to road maintenance activities and invasive species. However, the exact location of this occurrence and whether it is threatened by road maintenance or invasive species is unclear. Uncertainty regarding specific habitat requirements indicates a lack of sufficient information to show substantial concern for the persistence of this species.
- **Declining populations or habitat trends:** Population trends for the known occurrences of *Carex bebbii* on the Tongass NF are unknown. There is a lack of scientific information to fully describe the ecological niche of the species on the Tongass NF, given that it occurs in two widely disparate habitat types (muskeg and moraine). In general, a large amount of muskeg and glacial moraine habitat remains intact but may be impacted by modern stressors in the future.
- **Restricted range:** *Carex bebbii* has a wide range outside of Alaska. Occurrences on the Forest are not considered to be at the edge of the species' range. Occurrences in the plan area are approximately 80 miles (128 kilometers) from the nearest known occurrence and are not considered to be disjunct from the greater population.
- **Low population numbers or restricted ecological conditions** – There are just three documented occurrences on the Tongass NF, but targeted surveys would be required to determine the true abundance of this species on the Tongass.
- **Other factors:** There are no known additional factors that may indicate substantial concern for the persistence of this species in the plan area.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO5)[7/20/2011]**	**Northern Kupreanof Island, near Portage Bay. On north side of FS Road 6031.**	**Plants growing in muskeg adjacent gravel road.**		
1	CPNWH_Mar25 (WTU414215)[7/20/2011]	Northern Kupreanof Island, near Portage Bay. On north side of FS Road 6031.	Plants growing in muskeg adjacent gravel road. Aspect: 0 degrees. Slope: 0%. Associated species: Ledum groenlandicum, Tsuga mertensia, Pinus contorta, Andromeda polifolia, Platanthera dilatata, Platanthera saccata, Cornus cadensis, Vaccinium sp., Rubu		
2*	**ACCS_Mar25 (EO6)[7/13/2017]**	**Tongass National Forest, Petersburg Ranger District, mainland, Oasis Glacier.**			
2	CPNWH_Mar25 (UAAH12557)[7/13/2017]	Tongass National Forest, Petersburg Ranger District, mainland, Oasis Glacier	Moraine		
2	TESP_Mar25 (100521P0000132Y17)[7/13/2017]		moraine boulder field		
	Unclear if record below was located on the Tongass NF				
3*	**ACCS_Mar25 (EO2)[9/05/1913]**	**Juneau.**			

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Carex bicolor

Carex bicolor Bellardi ex. All.

Two-color sedge

Global Rank: **G5**
Alaska State Rank: **SNR**



photo: © Mattia Pallanza (CC BY-NC) (iNaturalist 2025)

Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	**B**	B = Patchy or Gaps. *Carex bicolor* is known from eight estimated occurrences on the Tongass National Forst (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Seven of the occurrences are on the mainland, with one south of Yakutat at the Situk River mouth, four in the vicinity of Mendenhall Lake, River and Glacier, one in the vicinity of Gilbert Bay, and one in the vicinity of Taku Glacier. The eighth occurrence is on Chichagof Island at Sitkoh Bay (Appendix 1; CPNWH 2025, USFS 2025a). In addition to these eight occurrences, there are three other occurrences in southeast Alaska, one in Glacier Bay National Monument, one in Glacier Bay National Park, and one in Wrangell-St. Elias National Park and Preserve (Appendix 1; CPNWH 2025). On the Tongass NF, this species has been observed on schist substrate in a peaty pool edge by a lake near Mendenhall Glacier (occurrence #1), in low wet areas of an upper beach meadow near Taku Glacier (occurrence #2), streamside on glacially scoured rock areas by Mendenhall Glacier (occurrence #3), in a moss bed on glacially scoured granite by Mendenhall Glacier (occurrence #4), in a flooded area at the edge of the Mendenhall River (occurrence #5), in coarse sand on an active alluvial surface at a creek mouth by Sweetheart Lake (occurrence #6), in roadside gravel by Sitkoh Bay

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Criteria	Rank	Rationale
		(occurrence #7), and on coastal sand dunes at the mouth of the Situk River (occurrence #8) (Appendix 1; CPNWH 2025, USFS 2025a). Although this species is reported to often grow on calcareous substrates (Ball and Reznicek 2003, Aiken et al. 2007), none of the Tongass NF occurrences map to calcareous soils (NRCS 2025b). Two occurrences map to glacier substrate, one to lithic bedrock, one to sand, and the others to gravelly or sandy loam, with none specifying calcareous substrate (NRCS 2025b). The phenomenon of species on the edge of their ranges switching to a different habitat or soil type has been documented previously, and authors have hypothesized that the atypical habitat may provide an environment with less interspecific competition (Griggs 1914, Stanton-Geddes et al. 2012). Therefore, it might not be unusual for substrate preferences to differ at the range's northern edge (Aiken et al. 2007) and southern edge (Tongass NF). Associated species mentioned by the collector or observer or collected at the same time include *Alnus* sp., *Salix stolonifera*, *Euphrasia disjuncta*, *Castilleja unalaschcensis*, *Pedicularis parviflora*, *Ranunculus macounii*, *Parnassia kotzebuei*, *Pyrola asarifolia*, *Cryptogramma crispa*, *Hedysarum alpinum*, *Glehnia littoralis*, *Agrostis scabra*, *Arctopoa eminens*, *Poa macrocalyx, Poa alpina*, *Carex kelloggii*, *Eleocharis kamtshatica*, and *Juncus alpinoarticulatus* (Appendix 1; CPNWH 2025). *Carex bicolor* is morphologically similar to *C. garberi* which also occurs on the Tongass NF (CPNWH 2025). Both are placed in *Carex* section *Bicolores* (Ball and Reznicek 2003). *Carex garberi* differs from *Carex bicolor* in having light to medium brown scales subtending the perigynia (versus dark brown to black) (Ball and Reznicek 2003).
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF. Global Rank: G5 (Secure), Alaska State Rank: SNR (No Status Rank) (NatureServe 2025) Canadian State Ranks (does not occur in the lower United States): Possibly Extirpated: Saskatchewan; S1 (Critically Imperiled): Alberta, Manitoba; S2 (Imperiled): New Foundland; S3 (Vulnerable): British Columbia, Québec. All others are S4 (Apparently Secure) (BCCDC 2025, NatureServe 2025). *Carex bicolor* is a sedge with a circumpolar distribution that encompasses Alaska and all Canadian states and territories; it is not present in the lower 48 United States (Ball and Reznicek 2003, NatureServe 2025, NRCS 2025a). The occurrence on Chichagof Island in the Tongass NF is the southernmost occurrence of this species in western North America

Criteria	Rank	Rationale
		(CPNWH 2025). Outside of Alaska and Canada, it occurs in Greenland, Iceland, and Eurasia (Klinkenberg 2020). The closest Canadian location to the locations in the Tongass NF is near Bear Camp, 75 miles from Haines along the road to Haines (CPNWH 2025). The Alaskan distribution continues north from the Tongass NF, following both the coastal and inland mountain ranges as well as glacier-fed areas (CPNWH 2025). In studies of the distribution of the sedges of Saskatchewan (based on herbarium specimens), *Carex bicolor* was found to have an arctic-submeridional range and was notable in occurring only in the Taiga Shield ecozone, the ecozone with the fewest sedge species and the coldest temperatures (Danylyk and Kricsfalusy 2020, Kricsfalusy et al. 2025). It can only grow in non-arctic regions by inhabiting high elevation alpine areas and can be considered a relict of glacial periods (Danylyk Kricsfalusy 2020). This species is rare in northern and central British Columbia where it is found in moist to wet meadows and shorelines in the montane to alpine zones (Klinkenberg 2020). In the Canadian Arctic Archipelago, it is typically found in small patches with other *Carex* on seashores (on upper sandy beaches) and imperfectly drained moist areas on sand, silt, bare wet mud, or other substrates with low organic content (Aiken et al. 2007). Some sources specify that it is usually found on calcareous substrates (Ball and Reznicek 2003, Aiken et al. 2007). In Russia this species is considered rare in arctic and alpine areas where it is found on pebble and sand banks, along the sides of rivers and lakes, and in damp meadows, sometimes near springs (Shekhovtsova 2021). In the Julian Alps of Slovenia, it occurs in melting snowbanks and springs as well as on the shores of a lake fed by snow melt; it is considered a pioneer species of glacier margins, riverbanks, and springs fed by cold, percolating, mineral-rich water (alkaline or slightly acidic) (Dakskobler and Martinčič 2022).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat. The seeds of *Carex* are dispersed within a structure called a perigynium by water, wind, and animals (Wilson et al. 2014). Many *Carex* are also able to disperse and reproduce clonally by rhizomes (McClintock and Waterway 1993, Wilson et al. 2014), and *Carex bicolor* has short rhizomes (Klinkenberg 2020) that could break off and be carried by water and soil movement.

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Criteria	Rank	Rationale
		Carex bicolor is found in open rock, sand, alluvium, and silt habitats with cold water temperatures. It is not found in all the varied wetlands present on the Tongass NF. Therefore, it is likely that it would only successfully disperse through suitable open, cold water, pioneer habitat on the Forest.
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Carex bicolor* is known from eight occurrences on the Tongass NF, with one on Chichagof Island and the other six on the mainland (Appendix 1). In addition to these eight occurrences, there are three other occurrences in southeast Alaska, one in Glacier Bay National Monument, one in Glacier Bay National Park, and one in Wrangell-St. Elias National Park and Preserve (Appendix 1; CPNWH 2025). Only occurrence 6 at Sweetheart Lake by Gilbert Bay has a population estimate (one plant with three stems) (Appendix 1; USFS 2025a). In addition, the plants at occurrence 2 near Taku Glacier were observed to be "common" (Appendix 1; CPNWH 2025). None of the other Forest occurrences have any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a). Based on the number of occurrences, *Carex bicolor* is uncommon on the Tongass NF. Although it was observed to be common at occurrence 2, this species is often scarce where found, such as at occurrence 6 (Aiken et al. 2007, Klinkenberg 2020, Shekhovtsova 2021, Dakskobler and Martinčič 2022). A true understanding of the abundance of this species would likely require targeted surveys (USFS 2025c).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, population trends for known occurrences of *Carex bicolor* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass	**A**	A = Decline in habitat quality or quantity. *Carex bicolor* is found in pioneer, open rock, sand, alluvium, and silt habitats with cold water temperatures. On the Tongass NF it occurs at lake and river edges, roadside gravel, wet areas of beach meadow and glacially scoured rock. This habitat is difficult to generalize. Riparian habitat at lake and river edges is relatively stable; on the north end of the

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Criteria	Rank	Rationale
NF		forest in the described habitats, it is unlikely to have been significantly impacted by timber harvest. Beach meadow habitat is relatively rare on the Tongass NF, and may have been impacted by sea level changes, storm events, timber harvest or recreation. Additionally, glacially scoured habitat may be changing rapidly as glaciers recede, providing a flux of melt water and then reduced water supply. All of these habitats may have been altered by climate change induced changes to water availability, including a shift from snow to rain during the winter, so less water is stored on the landscape and released as melt through the spring and summer (Halofsky et al. 2025) Three occurrences are near the Mendenhall Lake and wetlands, which have extensive recreational use. Close proximity to human activities increases the likelihood of exposure to disturbed habitat with introduced non-native taxa, and the habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut 2025, Wiles and Warren 2025). *Phalaris arundinacea* and *Hieracium aurantiacum*, grow along roads that intersect the wetland system at the outlet of Mendenhall Lake (USFS 2025b). The occurrence on Chichagof Island is also on a road system where invasive non-native taxa, including, *Phalaris arundinacea* are known (USFS 2025b). Additionally, one occurrence near Mendenhall Glacier was documented in 1981, "near west shore of lake at the face of Mendenhall Glacier". The glacier receded roughly 1 mile between 1984 and 2023 and vegetational succession has occurred (NASA 2023), so this occurrence has experienced much change, if it is still there.
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Invasive species are present in many disturbed areas or the Tongass NF, including roads and trails. This provides source propagules for invasion into vulnerable meadows and riparian corridors (Chestnut 2025, Wiles and Warren 2025). Therefore, the habitat of *Carex bicolor* may be impacted by invasive species in the future. In addition, timber harvest, which could affect wetland hydrology has occurred in the recent past within 0.25 mile of occurrence 7 (USFS 2025d), and this activity will likely continue in the future. Furthermore, at the time occurrence 6 was documented (2012), a hydroelectric project was under consideration for Sweetheart Lake at Gilbert Bay which would raise the level of the lake

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Criteria	Rank	Rationale
		seasonally by 60 feet (USFS 2025a). This project is still under consideration, and if implemented as planned in 2025, it would completely alter the hydrology of the lake and likely extirpate occurrence 6. Climate change will likely be the main stressor for this species. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for the species in these habitats (Turner and Mallott 2025, Wiles and Warren 2025). Additionally, a shift in precipitation as snow to rain will lead to less stored water and dryer summers. Riparian habitat is likely to be impacted by increased storm frequency and intensity with more frequent large-scale floods in the fall and winter as well as dryer summers (Halofsky et al 2025). In addition, beach meadow habitat may be affected by a drop in sea level on the north end of the forest due to isostatic rebound, as well as increased storm frequency and intensity, which may cause coastal erosion (Halofsky et al 2025). However, glacial melt may open up more habitat for this species. It is difficult to assess habitat vulnerability because this species is described as a pioneer species elsewhere and may persist in disturbed habitats.
8 Life history and demographics	**C**	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.** The life span of *Carex* plants has been measured for very few species and ranges from 30–50 years or longer (Newhouse et al. 1995). *Carex* seeds are usually dormant when they first mature, preventing germination until the next growing season; if conditions are not suitable the next growing season, then the seeds can remain viable for years in the soil seed bank (Wilson et al. 2014). *Carex bicolor* is a pioneer species with the seeds germinating in open habitat at the margins of glaciers and on riverbanks and seashores in moist sand, silt, and mud fed by cold water (Aiken et al. 2007, Dakskobler and Martinčič 2022). The growth form is a loosely tufted herb from short rhizomes with leaves 2 to 6 cm long which are born on the lower one third of the stem; the stems are 5-30 cm tall and terminate in an inflorescence (Ball and Reznicek 2003, Klinkenberg 2020). *Carex bicolor* is a plant in which flowering is initiated simply by long days, a pattern that is unusual in northern sedges; individual shoots complete flowering in one year (Heide 1997). Most *Carex* flowers are wind-pollinated (Wilson et al. 2014). The flowers are unisexual, borne on the same plant in separate clusters called

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Criteria	Rank	Rationale
		spikelets, and the female flowers are enclosed in an envelope called a perigynium (Ball and Reznicek 2003, Wilson et al. 2008). The seeds are dispersed within the perigynium (Wilson et al. 2014).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Carex bicolor is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Potential threats to *Carex bicolor* include recreation, hydropower, and invasive species. This species is also vulnerable to the expected alteration of habitat associated with changing climatic conditions, including potential decreases in sea level at beach meadows, altered hydrology in glacial landscapes, and increased extreme storm conditions in riparian and beach meadow habitat. Changes in precipitation volume and seasonal patterns may also lead to water deficits during the typical growing season.

- **Declining populations or habitat trends:** There is insufficient data available to infer trends in population or habitat for this species.

- **Restricted range:** *Carex bicolor* is neither a narrow endemic nor disjunct from the nearest conspecific populations. However, occurrences in the plan area do exist at the southernmost edge of the species' range on the western coast of North America and may be more vulnerable to continued seasonal changes in temperature and precipitation.

- **Low populations or restricted ecological conditions:** The eight known occurrences of this species exist solely on north end of forest, and while there is a risk of extirpation from the plan area by stochastic events, total extirpation would require extreme or repeated disturbance events. However, elsewhere in its range *Carex bicolor* is a known pioneer species with an affinity for germination in open,

disturbed habitat that may indicate a strong likelihood of recolonization of suitable habitat.

- **Other factors:** Additional factors do not indicate substantial concern for the persistence of this species in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (WTU346647)[6/14 /1997]**	**By lake at base of Mendenhall Glacier, Burough and city of Juneau.**	**Peaty margin of pool, schist bedrock, with Alnus, Salix. [collected at same place on same date: Carex kelloggii var. limnophila]**	**Rhizomatous, leaves glaucous. Flowers and fruits present.**	
2*	**CPNWH_Mar25 (WTU414070)[6/25 /1997]**	**Juneau Quad.: mainland, about 23 kilometers northeast of Juneau at Grizzly Bar, just south of Taku Glacier's face, east side of the bar, ca [about] 1.6 kilometers south of Taku Point.**	**Upper beach meadow, mosaic of plant associations, growing in low wet areas of beach meadows. [Collected on same date at same place: Eleocharis kamtshatica, Poa macrocalyx, Ranunculus macounii]**	**Plants very robust.**	
2	CPNWH_April2025(ALA-UAM:Herb:251136)[6/25/1997]	Mainland, about 23 km NE of Juneau at Grizzly Bar, just S of Taku Glacier's face, E side of the bar, ca. 1.6 km S of Taku Pt., Juneau Quad, Alexander Archipelago.	Upper beach meadow, mosaic of plant associations, growing in low wet areas of beach meadows, plants very robust.	Common in small clumps.	
3*	**CPNWH_Mar25 (WTU282685)[7/09 /1981]**	**About 10 miles north of Juneau near west shore of lake at the face of Mendenhall Glacier. Between glacier and visitor center.**	**Open area with silt flats and glacially scoured rock areas. At margins of small stream growing both in and out of the water.**		
4*	**CPNWH_April2025(ALA-UAM:Herb:9474)[7/06/1993]**	**Mendenhall Glacier Recreation Area, Photo Point, ca. 1/8 mile N of Visitor's Center, Juneau Quad, Tongass National**	**Glacially scoured granite. [Collected on same day and place: Carex kelloggii, Juncus alpinoarticulatus, Parnassia kotzebuei, Pyrola asarifolia, Agrostis scabra, Cryptogramma crispa, Euphrasia disjuncta, Poa alpina}**		

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		Forest, Alexander Archipelago.			
4	CPNWH_April2025(ALA-UAM:Herb:9467)[7/06/1993]	Mendenhall Glacier Recreation Area, Photo Point, ca. 1/8 mile N of Visitor's Center, Juneau Quad, Tongass National Forest, Alexander Archipelago.	Glacially scoured granite, growing in moss covering rock.		
5*	**TESP_Mar25 (100533P001037Y13)[6/15/2013]**	**Mendenhall River at trail from Moose Lake dike**	**Flooded area at river edge, in depression along informal trail**	**10% cover**	
6*	**TESP_Mar25 (100533P001027Y13)[7/15/2012]**	**Gilbert Bay area, Sweetheart Lake, NE end**	**Active alluvial surface at the mouth of a creek: Coarse sand to gravel at depth. On moist sand on alluvial parent material. In full sun.**	**3 ramets; 1 plant with 3 stems**	**Hydroelectric project: lake will flood to 25'; up to 60' seasonally. Hydrological regime changes; includes alterations to wetland habitats (e.g., peatlands, aquatic habitats) that might result indirectly from management activities elsewhere in the watershed. [this project has not yet been implemented as of June 2025 but may begin this year]**
7*	**CPNWH_April2025(ALA-UAM:Herb:129344)[7/05/2006]**	**Alexander Archipelago, Chichagof I., Sitkoh Bay, USFS road 7540, Sitka Quad, Tongass National Forest.**	**Roadside gravels.**		
8*	**CPNWH_April2025(ALA-UAM:Herb:50889)[6/25/1977]**	**Yakutat Foreland, Situk R. mouth, ADF&G fish and wildlife protection cabin, Yakutat Quad.**	**Coastal sand dunes. [Collected on same date, same place, and habitat: Hedysarum alpinum, Salix stolonifera, Glehnia littoralis, Castilleja unalaschcensis, Pedicularis parviflora, Arctopoa eminens]**		
9*	**CPNWH_June2025(ALA-UAM:Herb:146607); Arctos Database June 2025; [7/27/2003]**	**Icy Bay, Yana Stream, inland gravel bar behind breakwater spit, Icy Bay Quad, Wrangell-St. Elias National Park and Preserve.**	**Inland gravel bar behind breakwater split. Patchy in silty sand and moss 25% (unvegetated) near stream outlet on sandy back beach. Potentilla egedii, Juncus alpinus, Equisetum arvense, Juncus arcticus.**		
10*	**CPNWH_June2025(WS020863)[8/21/1952]**	**Cooper Station 26, Glacier Bay National Monument.**			
11*	**CPNWH_June2025(ALA-UAM:Herb:43366); Arctos Database**	**St. Elias Mts., Glacier Bay, Muir Inlet, Nunatak Cove, hill crest above S shore of cove, Mt. Fairweather Quad,**	**Sparsely vegetated area of dried mud.**	**Dominant plant but not numerous.**	

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	June 2025; [7/15/1968]	**Glacier Bay National Park and Preserve.**			
11	CPNWH_June2025(ALA-UAM:Herb:43365); Arctos Database June 2025; [6/29/1967]	St. Elias Mts., Glacier Bay, Muir Inlet N of Goose Cove, 0.4-0.8 km N of Goose Cove, Mt. Fairweather Quad, Glacier Bay National Park and Preserve.	Clay-gravel knoll in wet drainageway.		

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Carex crawfordii

Carex crawfordii Fernald

Crawford's sedge

Global Rank: **G5**
Alaska State Rank: **S4**

Photo: © 2025 Robert Carr with permission (Oregon Flora 2025)



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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce or isolated. *Carex crawfordii* is known from one estimated occurrence in the southeast Tongass National Forest (Tongass NF) (Appendix 1; USFS 2025c), and this location is the only location for this species in southeast Alaska (CPNWH 2025). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The one occurrence is located on the mainland, with the specimen label description specifying "mile 8 [along the road] north of Hyder;" on the east side of the Salmon River (CPNWH 2025). The original coordinates were provided by the collector on the specimen label with low accuracy (the herbarium estimated accuracy at 3615 m or 2.25 miles) (Arctos database 2025). Based on a report written by DeLappe (1994), better location information was obtained, and the location was re-georeferenced with high accuracy by Justin Fulkerson (2025 pers. comm.). The habitat is described as muddy beaver

Criteria	*Rank*	*Rationale*
		pond edge, wet sedge meadow, and tall willow scrub (DeLapp 1994, CPNWH 2025). Associated species collected at the same place on the same date are *Salix lucida*, *Ranunculus aquatilis*, *Rorippa curvisiliqua*, *Barbarea orthoceras*, *Sparganium angustifolium*, *Carex kelloggii*, *C. stipitata*, and *Potamogeton alpinus* (CPNWH 2025). This species is part of the difficult *Carex* section *Ovales* (Hipp et al. 2006) and can resemble the more common *Carex athrostachya*, but the inflorescence is usually narrower, and the inflorescence bract is usually not prolonged beyond the end of the inflorescence (Wilson et al. 2014).
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF. Global Rank: G5 (Secure), Alaska State Rank: S4 (Apparently Secure) (NatureServe 2025) State Ranks: Canadian provinces and territories: SH (Possibly Extirpated): Northwest Territories; S3 (Vulnerable): Labrador and Yukon; all others are S4 (Apparently Secure) or S5 (Secure): British Columbia; United States: S1 (Critically Imperiled): Colorado, Illinois, New Jersey, Oregon; S2 (Imperiled): Iowa; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked): Washington, or not present in that state (BCCDC 2025, NatureServe 2025). *Carex crawfordii* is a North American sedge that has been found in Alaska, all Canadian states and territories, all northern U.S. states that border Canada (with the exception of North Dakota), the states of Colorado, Oregon, Illinois, Iowa, Missouri, New Jersey, and Tennessee, and the New England states at elevations of 100–1500 m (Ball and Reznicek 2003, NatureServe 2025, NRCS 2025a). The location in Missouri is believed to have been introduced, and this species has also been introduced to parts of Europe (Wilson et al. 2014, Koopman et al. 2025). The distribution of *Carex crawfordii* continues south to Oregon and northwest to the Gates of the Arctic National Park and Preserve (CPNWH 2025). The closest collection location is approximately 130 miles to the south near Lakelse Lake, British Columbia (CPNWH 2025). It is common throughout British Columbia south of 56 degrees N and rare northward; it grows in the lowland, steppe, and montane zones and on the west slopes of the Coast-Cascade Mountains (Klinkenberg 2020).

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Criteria	*Rank*	*Rationale*
		In some areas, this species can be found in open, sandy soils in dry or moist habitats (Hermann 1941, Ball and Reznicek 2003). It is also described as occurring in standing water in moist to wet places such as mesic or wet meadows, lakeshores, swamps, and bogs (Hermann 1941, Wheeler and Ownbey 1984, Newhouse et al. 1995, Ball and Reznicek 2003). In the Pacific Northwest, it grows in a bathtub ring around pond margins that are wet in the spring and other seasonally wet spots (Wilson et al. 2014). In addition, this species has been introduced to cranberry bogs in Washington, Oregon, and Wisconsin (Dzhus 2014, Wilson et al. 2014). It has also been seen along roadsides and in road ditches in Oregon, Minnesota, and Washington (Wheeler and Ownbey 1984, Wilson et al. 2014).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat. The seeds of *Carex* are dispersed within a structure called a perigynium by water, wind, and animals (Wilson et al. 2014). Many *Carex* are also able to disperse and reproduce clonally by rhizomes (McClintock and Waterway 1993), but this cespitose species lacks long rhizomes that could help disperse the plant (Wilson et al. 2014, Klinkenberg 2020). Based on the varied habitats where this species is found elsewhere in North America and Europe (as detailed above in criterion 2), this species likely has few habitat-related dispersal limitations. However, *Carex crawfordii* does not normally occur below 100 m (325 ft) in elevation (Ball and Reznicek 2003); this might prevent this species from dispersing through low-elevation areas of the Tongass NF. Therefore, it is likely that it would only move through suitable habitat on the east side of the Forest on the west slopes of the Coast-Cascade Mountains as detailed by Klinkenberg (2020).
4 Abundance on Tongass NF	**A**	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Carex crawfordii* is known from only one occurrence in the southeast Tongass NF with no information on abundance at the location (Appendix 1; CPNWH 2025).

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, population trends for known occurrences of *Carex crawfordii* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat of the one occurrence of *Carex crawfordii* is described as muddy beaver pond edge, wet sedge meadow, and tall willow scrub (DeLapp 1994, CPNWH 2025). These habitats can be grouped under the broad category of forested and non-forested wetlands (or palustrine wetlands) which is a freshwater, non-tidal influenced vegetation type with saturated soil that is very common on the Tongass NF (Turner and Mallott 2024). In general, freshwater wetlands on the Tongass NF have historically been very stable ecosystems, with some persisting for thousands of years, but climate change may alter hydrology in these systems (Turner and Mallott 2024).
7 Habitat vulnerability or modification ; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Invasive species and climate change may impact the habitat of *Carex crawfordii*. In 2017 (eight years ago) the invasive species *Galeopsis bifida* was mapped south of the one occurrence of *Carex crawfordii* (USFS 2025b). It is unknown if this species has expanded its range north toward the occurrence. The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut 2024, Wiles and Warren 2024). Therefore, the habitat of *Carex crawfordii* may be impacted by invasive species in the future. Climate change is considered to be the main future stressor of forested and non-forested wetlands on the Tongass NF (Turner and Mallott 2024). Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for wetland species with high soil moisture requirements such as *Carex crawfordii* (Turner and Mallott 2024, Wiles and Warren 2024). Additionally, declining water table depth in wetlands may allow for tree encroachment but this process appears to be slow. Some freshwater bodies in Alaska have shrunk due to decreased precipitation and increase temperature driven

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Criteria	*Rank*	*Rationale*
		evapotranspiration (Halofsky et al 2024). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2024).
8 Life history and demographics	**C**	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.** The life span of *Carex* plants has been measured for very few species and ranges from 30–50 years or longer (Newhouse et al. 1995). *Carex* seeds are usually dormant when they first mature, preventing germination until the next growing season; if conditions are not suitable the next growing season, then the seeds can remain viable for years in the soil seed bank (Wilson et al. 2014). *Carex* seeds generally germinate in moist, sunny, disturbed openings, and seedlings are not often seen in mature meadows with little open soil (Wilson et al. 2014). *Carex crawfordii* is a cespitose sedge, with the stem and leaves arising from a very short rhizome with many fibrous roots (Ball and Reznicek 2003, Wilson et al. 2014). The stems, which terminate in an inflorescence, can grow to 85 cm tall and the leaf blades can grow to 22 cm long and 4 mm wide (Ball and Reznicek 2003). Most *Carex* flowers are wind-pollinated (Wilson et al. 2014). The flowers are unisexual, borne on the same plant in separate clusters called spikelets, and the female flowers are enclosed in an envelope called a perigynium (Ball and Reznicek 2003, Wilson et al. 2008). The seeds are dispersed within the perigynium (Wilson et al. 2014). The specific life history of *Carex crawfordii* is not well-researched, but it has been recorded as a weed in cranberry bogs in the United States and Europe as well as a weed of roadsides and ditches, indicating it has the ability to adapt to varied habitats (Wheeler and Ownbey 1984, Dzhus 2014, Wilson et al. 2014).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐

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Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Carex crawfordii is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** *Carex crawfordii* faces significant threats from invasive species and climate-related habitat changes. The known invasive *Galeopsis bifida* has been recorded in the vicinity, and while this non-native species ranks relatively low in invasiveness, the habitat occupied by *Carex crawfordii* in the plan area is particularly vulnerable to encroachment by highly competetive non-native species like reed canary grass (*Phalaris arundinacea*). Expected increases in temperature and evapotranspiration rates may also negatively impact this habitat through decreases in the local water table.
- **Declining trends:** There is not enough information to assess trends in habitat or population for this species on the Tongass NF.
- **Restricted ranges:** *Carex crawfordii* is not narrowly endemic to the plan area or disjunct from other conspecific populations. The single occurrence of this species on the Tongass NF is not at the edge of its known range, which extends considerably to the north and south of the plan area.
- **Low population numbers or restricted ecological conditions:** There are no known restrictions on ecological conditions for growth and establishment of this species. While *Carex crawfordii* may be overlooked or undersurveyed in the plan area, until focused surveys reveal additional occurrences on the Tongass NF, the single known occurrence of the species remains vulnerable to extirpation from the plan area.
- **Other factors:** Available information on this species potentially indicates a lessened concern for its persistence in the plan area. The similarity of *Carex crawfordii* to other native *Carex* species may have resulted in overlooked occurrences during past surveys. Additionally, this species is known to display weedy tendencies where it is found, potentially underlining and increased tolerance to disturbance.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025(ALA - UAM:Herb:8949); Arctos Database 2025; Fulkerson 2025 pers. comm.; DeLapp 1994; [8/04/1993]**	**Mile 8 N of Hyder, Bradfield Canal Quad, Tongass National Forest. [from DeLapp (1994): Hyder area, beaver pond; Mile 8.0 from Hyder intersection, east of road. N 56 01' 13" W 130 04' 11", T67S R99E, S35 NW4NW4]**	**Muddy beaver pond edge. [From DeLappe (1994): muddy pond margin; wet sedge meadow and tall willow scrub. With Rorippa curvisiliqua, Carex stipitata]. Other plants collected at same place on same date: Ranunculus aquatilis, Rorippa curvisiliqua, Carex kelloggii, Sparganium angustifolium, Barbarea orthoceras, Salix lucida, Carex stipitata, Potamogeton alpinus.**		

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Carex echinata echinata

Carex echinata Murray ssp. *echinata* [1770]

Star sedge

Global Rank: **G5T5**

Alaska State Rank: **S1S2**



photo: (CC-BY-SA) Barbara Wilson

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Carex echinata* ssp. *echinata* is known from 3 estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Zarembo Island (Occurrence 1 and 2) and the Game Creek watershed on Chichagof Island (Occurrence 3) (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in fens (Appendix 1). This habitat is fairly typical for this species (FNA 2025). There are no known occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025). This subspecies may be confused with *Carex echinata* ssp. *phyllomanica,* which is common on the Tongass (USFS 2025c).
2 Distribution in	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank G5T5, Alaska State Rank S1S2

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Criteria	*Rank*	*Rationale*
surrounding geographic area		*Carex echinata* ssp. *echinata* is broadly distributed throughout much of North America except for the great plains and southeastern USA (FNA 2025). Across its range, *Carex echinata* ssp. *echinata* occurs in wetland areas including bogs, swamps, streams and lake edges, and wet meadows at elevations of 0 to 3,200 m. It is typically found in acidic soils (FNA 2025), but on the Tongass it is recorded as being in rich calcareous fens. The phenomenon of species on the edge of their ranges switching to a different habitat or soil type has been documented previously, and authors have hypothesized that the atypical habitat may provide an environment with less interspecific competition (Griggs 1914, Stanton-Geddes et al. 2012). In southeastern Alaska this species is only known from the Tongass NF; its range continues north in Alaska approximately 800 km (500 miles) with one record near Paxson (CPNWH 2025).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Carex echinata* ssp. *echinata* is a perennial herb with a cespitose growth habit (FNA 2025). Plants likely rely on seed dispersal as it lacks a rhizomatous growth habit. Dispersal mechanism by seed is not well documented for this species. It may be dispersed by water and/or animals such as birds similar to other species of *Carex*.
4 Abundance on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. *Carex echinata* ssp. *echinata* is known from 3 occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Carex echinata* ssp. *echinata* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend	**A**	A = Decline in habitat quality or quantity.

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Criteria	*Rank*	*Rationale*
on Tongass NF		The habitat for the three occurrences of *Carex echinata* ssp. *echinata* on the Tongass NF are fens (Appendix 1). Calcareous fens are an uncommon subset of the Non-forested Wetland habitat type described by Turner and Mallot (2025). Invasive species that can survive in or near fens, such as *Phalaris arundinacea*, are known to occur in or near the coordinates for occurrences 1 and 2 (USFS 2025b). Timber harvest and road building has also taken place in close proximity to these occurrences (USFS 2025d). This might indicate a negative trend in habitat quality at those sites.
7 Habitat vulnerability or modification; other threats	**A**	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. Invasive species, timber activities, and climate change may impact the habitat of *Carex echinata* ssp. *echinata*. Recent timber harvest activities have occurred in the vicinity of the fens at all 3 occurrences (USFS 2025d), and this activity will likely continue on in the future. This habitat is susceptible to change, impacting habitat quality at all 3 occurrences. Calcareous fens require specific inputs conducive to habitat suitability for *Carex echinata* ssp. *echinata* as well as other species of concern such as *Cypripedium monantum*. If the hydrology of these fens remains intact, data indicate that the fens on the Tongass are not expected to change in the short or long term (Turner and Mallott 2024). In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for wetland species with high soil moisture requirements such as *Carex echinata* ssp. *echinata* (Turner and Mallott 2024, Wiles and Warren 2024).
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. *Carex echinata* ssp. *echinata* is a perennial herb with an emergent growth habit (FNA 2025). It produces flowers and fruits with seeds (FNA 2025). It is likely pollinated by wind similar to other species in *Carex*. It produces fruits from late spring to early summer (2025). Seeds of *Carex echinata* require cold-stratification for high germination (Fernández-Pascual 2016). The life span of *Carex echinata* and other *Carex* species is not well documented.

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Carex echinata ssp. e*chinata* is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** The limited occurrences known in the plan area are subject to threats from timber harvest activities, invasive species encroachment, and changing climatic conditions. Timber harvest actions have taken place in close proximity to all three occurrences; it is expected that these actions will continue into the future. Infestations of the invasive reed canarygrass (*Phalaris arundinacea*) are recorded within, or in close proximity to, two of the three *Carex echinata* ssp. *echinata* occurrences. Habitat where this species occurs on the Tongass NF is known to be vulnerable to reed canarygrass infestation. This fen habitat is also vulnerable to changes in hydrology that may be introduced by the shifting precipitation patterns expected under current climate change models for the region.
- **Declining trends:** There is not enough information to infer trends in population for this species. The calcareous fens occupied by *Carex echinata* ssp. *echinata* on the Tongass NF are uncommon in the plan area and vulnerable to changes in local hydrology. Specificity for this habitat by *Carex echinata* ssp. *echinata* is inferred from known records of the species, but confirmation of this habitat specificity cannot be confirmed without focused surveys for this potentially overlooked graminoid. Thus, there is not currently enough information to accurately define habitat trends in the plan area.
- **Restricted ranges:** *Carex echinata* ssp. *echinata* is not a narrow endemic, and while the known occurrences are somewhat disjunct from the nearest records in British Columbia, this cryptic species may be more widespread than current records and survey data would indicate. If not for an occurrence 500mi north of the Tongass NF, the occurrences in the plan area would be the most northern records for this species. There is not enough information to determine potential edge effects or changes in habitat preference that these northern

representatives of the species may experience.

- **Low population numbers:** The three known occurrences of *Carex echinata* ssp. *echinata* are themselves vulnerable to extirpation from stochastic events. It is possible that additional occurrences of this species exist within the plan area, as it is a cryptic species that can be easily overlooked. Though they occupy the uncommon calcareous fen habitat in the plan area, there is currently not enough information to determine whether individuals of this species display a reliance on a strict range of ecological conditions.
- **Other factors :** There is insufficient information to determine whether any additional factors may impact the ability of this species to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO9) [7/20/2020]**	**Tongass National Forest: Zarembo Island, Center Road**	**valley bottom mineral influence rich fens in mosaic with forested**		
1	CPNWH_Mar25 (UAAH16206) [7/20/2020]	Tongass National Forest: Zarembo Island, Center Road	valley bottom mineral influence rich fens in mosaic with forested		
2*	**ACCS_Mar25 (EO10) [7/19/2020]**	**Tongass National Forest: Zarembo Island, Zizag Road**	**rich fen**		
2	CPNWH_Mar25 (UAAH16207) [7/19/2020]	Tongass National Forest: Zarembo Island, Zizag Road	rich fen		
3*	**ACCS_Mar25 (EO8) [9/9/2012]**	**Hoonah Game Creek**	**Fen, pH 4.7**		
3	CPNWH_Mar25 (UAAH18125) [9/9/2012]	Hoonah Game Creek.	Fen, pH 4.7		

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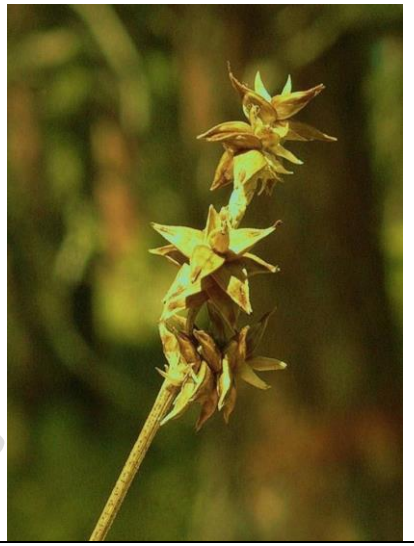
Carex interior

Carex interior L.H. Bailey

inland sedge

Global Rank: **G5**
Alaska State Rank: **S3**

photo: © Bruce Newhouse,
Creative Commons by nc/4.0
(Oregon Flora 2025)



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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy or Gaps. *Carex interior* is known from nine estimated occurrences in the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Admiralty Island (2), Chichagof Island (3), Prince of Wales Island (1), Mitkof Island (1), on the mainland on the Point Agassiz Peninsula (1), and on the mainland north of Juneau (1) (Appendix 1; ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Three additional occurrences are located near - but outside - the Tongass NF boundary: two are on the mainland on the east and west sides of the Haines Airport and one is on private timberlands on Admiralty Island (Appendix 1; ANHP ACCS 2025, CPNWH 2025). Habitat data and observations by Forest botanists on the Tongass NF indicate that this species is found on and off alkaline, calcareous habitat (Appendix 1; Johnson 2025 pers. comm., USFS 2025c). It has been observed in calcareous or limestone-influenced fens (occurrences 4, 5, 6), muskeg or a wetland adjacent to muskeg with soil that maps to mucky peat (occurrences 7, 8, 9), a beaver pond with mucky peat soil (occurrence 1), and saltwater beach fringe in old growth floodplain (occurrence 3) (ANHP ACCS 2025, CPNWH 2025, NRCS 2025b, USFS 2025a). Occurrence 2 has no habitat

Criteria	*Rank*	*Rationale*
		data, and soils data do not indicate poorly draining soil (ANHP ACCS 2025, NRCS 2025b, USFS 2025a). Outside the Forest boundary by the Haines Airport, it is found in silty wet floodplain and marsh habitat adjacent to the Chilkat River near where it meets saline water at Chilkat Inlet (ANHP ACCS 2025, CPNWH 2025). Associated species mentioned by the collector or observer or collected at the same time include *Picea sitchensis*, *Tsuga heterophylla*, *Malus fusca*, *Viburnum edule*, *Cornus stolonifera*, *Agrostis alaskana, Calamagrostis canadensis*, *Deschampsia cespitosa*, *Carex flava, C. gmelinii*, *C. sitchensis*, *C. pluriflora*, *Eriophorum viridicarinatum*, *Canadanthus modestus*, *Caltha palustris*, *Primula pauciflora*, *Platanthera stricta*, *Sanguisorba menziesii*, *Epilobium ciliatum*, *E. glandulosum*, and *Equisetum pratense* (Appendix 1; ANHP ACCS 2025, CPNWH 2025). *Carex interior* is morphologically similar to and can be confused with the more common *C. echinata* which also occurs on the Tongass NF (Cusick 1996, Wilson et al. 2014, CPNWH 2025). Both are placed in *Carex* section *Stellulatae* which is a difficult group of species to identify; differences among the species can be subtle and identification may require careful observation of perigynium shape and size (Ball and Reznicek 2003). *Carex interior* differs from *C. echinata* in having perigynia that abruptly taper at the tip to a short beak versus the long gradually tapering beak in *C. echinata* (Wilson et al. 2014). The two also differ ecologically with *Carex interior* usually found in shallow, permanent, moving water (for example a sloping perennial seep), while *C. echinata* is found more often in still, more seasonal water (Wilson et al. 2014).
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF. Global Rank G5 (Secure), Alaska State Rank S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: Nunavut and Yukon S2 (Imperiled); Labrador and New Foundland S3 (Vulnerable); all others are S4 (Apparently Secure) or S5 (Secure); United States: Possibly extirpated: West Virginia; S1 (critically imperiled): Arizona, Arkansas, Kansas, Maryland, Tennessee, Virginia; S2 (imperiled): Nevada; S3 (Vulnerable): Wyoming, Illinois. All other states are S4 (Apparently Secure), S5 (Secure), or SNR (not ranked) (BCCDC 2025, NatureServe 2025).

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Criteria	*Rank*	*Rationale*
		Carex interior is a North American sedge that has been found in Alaska, all Canadian states and territories, all the western United States south to Chihuahua, Mexico, and then the northern and central United States to the east of New Mexico. It has not been reported from Texas, Kentucky, and most of the southeastern states (Ball and Reznicek 2003, NatureServe 2025). The locations of *Carex interior* within the Tongass NF are part of a spotty and interrupted distribution of this species from British Columbia (and parts south) to northern Alaska (CPNWH 2025). It is infrequent in southwest British Columbia and has not yet been collected in Haida Gwaii (Klinkenberg 2020, CPNWH 2025). Therefore, the closest collection location to the south is near Kimsquit, British Columbia and then Vancouver Island (CPNWH 2025). To the north, the species has a gap in its Alaskan distribution until near Anchorage, with just a few locations beyond that (CPNWH 2025). This species is typically found in springs, seeps (especially seepy canyon walls), wet meadows, wet prairies, bogs, fens, coniferous and deciduous swamps, river and lakeshores, and seeps from 0–2700 m (Ball and Reznicek 2003, Wilson et al. 2014, Klinkenberg 2020). It has often been found in locations with surface water pH > 6 and high calcium, although it can be in wetlands with pH as low as 4.4 and as high as 7.5 (Motzkin 1994, Anderson et al. 1996, Anderson and Davis 1998, Gignac et al. 2004). In Michigan, it is reported from a wide range of habitats in both acidic or strongly alkaline habitats (Hermann 1941). Although often reported as occurring in more or less open sites in full sun (Ball and Reznicek 2003), this species is considered shade tolerant and a wooded fen species (Anderson et al. 1996, Gignac et al. 2004). It is often found in shallow, permanent, moving water (Wilson et al. 2014) and in the wettest peatlands (Gignac et al. 2004). When encountered, *Carex interior* is often present in low numbers (Anderson and Davis 1998, Angstamm et al. 2006). However, whereas it was once thought to be rare in the Pacific Northwest, *Carex interior* is now considered widespread but uncommon in its limited habitat (Wilson et al. 2014).
3 Dispersal capability	**D**	D = Insufficient information to draw inferences about criterion. The seeds of *Carex* are dispersed within a structure called a perigynium by water, wind, and animals (Newhouse et al. 1995, Wilson et al. 2014). All perigynia can float (Wilson et al. 2014), but the perigynium of *Carex interior* is pithy at the base (Wilson et al. 2014), and this feature may aid in flotation. Many *Carex* are also able to disperse and reproduce clonally by rhizomes (McClintock and Waterway 1993, Newhouse et al. 1995), but this cespitose species lacks long

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Criteria	*Rank*	*Rationale*
		rhizomes and mainly arises from fibrous roots (Wilson et al. 2014, Klinkenberg 2020). However, little is known about the dispersal capabilities of this specific Carex species.
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Carex interior* is known from nine occurrences on four islands and the mainland on the Tongass NF (Appendix 1). Three more occurrences, two from near the Haines airport and one on private timberland on Admiralty Island, are adjacent to the Forest (Appendix 1). Only occurrence 8 on the Point Agassiz Peninsula has a population estimate (five plants) (Appendix 1; USFS 2025a). None of the other occurrences have any indication of abundance (Appendix 1; ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Based solely on the number of occurrences and number of plants observed, *Carex interior* is uncommon on the Tongass NF. However, those familiar with this plant on the Forest and elsewhere believe that it is easily overlooked, especially when growing with other sedges and grasses, and it can be infrequent where found (Anderson and Davis 1998, Angstamm et al. 2006, Wilson et al. 2014, Johnson 2025 pers. comm.). In the Pacific Northwest, it is now considered a widespread but uncommon plant, whereas it was once thought to be rare (Wilson et al. 2014).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, population trends for known occurrences of *Carex interior* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Within the Tongass NF, *Carex interior* has been observed in calcareous fens, muskeg, beaver pond, and old growth beach fringe habitat (Appendix 1; ANHP ACCS 2025, CPNWH 2025, NRCS 2025b, Johnson 2025 pers. comm., USFS 2025a).

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Criteria	*Rank*	*Rationale*
		Eight of the nine occurrences can be grouped under the broad category of forested and non-forested wetlands (or palustrine wetlands) which is a freshwater, non-tidal influenced vegetation type with saturated soil that is very common on the Tongass NF (Turner and Mallott 2024). Wetlands generally have high ecosystem integrity but may be altered by climate change driven changes in evapotransipiration and water availability (Turner and Mallot 2025). Timber harvest may alter wetland hydrology and occurred in the 1950s and 1960s directly adjacent to the wetland at occurrence 8, within a half mile of the karst fen at occurrence 5 in 1992, and 0.8 mile away from the calcareous fen at occurrence 4 in 1993 (USFS 2025d). The calcareous fen at occurrence 6 is 0.2 mile south of karst *Tsuga heterophylla-Picea sitchensis* forest that aerial imagery indicates has been very recently clear cut; occurrence 6 is also 0.25 mile west of timber activity that took place in 1977 (USFS 2025d). Non-native species, including Phalaris arundinacea, could outcompete *Carex interior* and are present near occurrences 6 and 7 (USFS 2025b). *Phalaris arundinacea* (reed canarygrass) is known to be an invader of wetland habitats in Alaska (APMC 2014). It occurs along a road that intersects the drainage feeding the fen at occurrence 6 and is along a road downhill of the wetland at occurrence 7.
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. As mentioned above, invasive species are known to be present in the vicinity of occurrences 6 and 7, and non-native species are present in the forest, especially along forest service roads (USFS 2025b). The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut 2024, Wiles and Warren 2024). Therefore, the habitat of *Carex interior* may be impacted by invasive species in the future. Timber harvest is likely to continue across the forest and may impact hydrology at adjacent fens or muskegs. Calcareous fens rely on specific waters with underlying carbonate geology and any to changes could alter species composition. Additionally, increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit may lead to drought stress for wetland species with high soil moisture requirements such as *Carex interior* (Turner and Mallott 2024, Wiles and Warren 2024). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2025).

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	**D**	**D = Insufficient information to draw inferences about criterion.** The life span of *Carex* plants has been measured for very few species and ranges from 30–50 years or longer (Newhouse et al. 1995). *Carex* seeds are usually dormant when they first mature, preventing germination until the next growing season; if conditions are not suitable the next growing season, then the seeds can remain viable for years in the soil seed bank (Wilson et al. 2014). *Carex* seeds generally germinate in moist, sunny, disturbed openings, and seedlings are not often seen in mature meadows with little open soil (Wilson et al. 2014). *Carex interior* is a cespitose sedge, with the stem and leaves arising from a very short rhizome with many fibrous roots (Ball and Reznicek 2003, Wilson et al. 2014). The stems and leaves of *Carex interior* are very fine and narrow, and the leaves are shorter than the stems which bear the flowers (Ball and Reznicek 2003, Wilson et al. 2014, Klinkenberg 2020). Most *Carex* flowers are wind-pollinated (Wilson et al. 2014). The flowers are unisexual, borne on the same plant in separate clusters called spikelets, and the female flowers are enclosed in an envelope called a perigynium (Ball and Reznicek 2003, Wilson et al. 2008). The seeds are dispersed within the perigynium (Wilson et al. 2014). However, little is known about the life history of *Carex interior* specifically.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

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Conclusion Rationale

Carex interior is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** *Carex interior* occurs in various wetland habitats on the Tongass NF. This habitat is vulnerable to invasion from non-native species and reed canarygrass is present near two of the nine known occurrences. Additionally timber harvest has occurred and is likely to continue near several known occurrences and may alter hydrology in adjacent Carex interior habitat.

- **Declining trends:** Population trends for *Carex interior* are not known. Wetland habitat is relatively stable, although it may be impacted by increased temperatures, increased evapotranspiration, and resulting drought stress and woody encroachment.

- **Restricted ranges:** *Carex interior* is not a narrow endemic and is not at the edge of the species range.

- **Low population numbers**: There are nine occurrences of Carex interior on the Tongass NF from Prince of Wales Island to Juneau in calcareous and non-calcareous wetland habitat. The broad geographic distribution and common habitat suggest it may be more common than documented. In the Pacific Northwest the species is widespread, but uncommon where it is found.

- **Other factors:** *Carex interior* is morphologically similar to and can be confused with the more common *C. echinata* which also occurs on the Tongass NF.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ANHP_ACCS_Mar25 (EO2)[7/29/2004]**	**[Kootznoowoo Wilderness] Tongass National Forest [maps to Admiralty Island, north side of Thayer Creek, in wetland system that drains downslope to creek]**			
1	USFS_2025_TESP_Mar25 (100534P000015)[7/29/2004]		sedge/herbaceous meadow in abandoned beaver pond, with pools	0.62 acres	
2*	**ANHP_ACCS_Mar25 (EO5)[8/27/2010]**	**[Perhaps Admiralty Island NM?} [Admiralty Island] Tongass National Forest [maps upslope and to south of Greens Creek]**			
2	USFS_2025_TESP_Mar25 (100533P000929)[8/27/2010]			0.01 acres	
3*	**CPNWH_Mar25 (WTU280704)[8/21/1979]**	**[West Chichagof-Yakobi Wilderness] Tongass National Forest. Chichagof Island (west part). Just east of Khaz Bay, north end of Lake Anna, northwest of the passage to Sister Lake. T49S R58E S12 NW 1/4**	**Salt water beach fringe. [Also collected by Muller at same place on same date: Calamagrostis canadensis, Deschampsia cespitosa, Carex gmelinii]**		
3	ANHP_ACCS_Mar25 (EO3)[8/21/1979]	Tongass National Forest, saltwater beach fringe on west part of Chichagof Island, just east of Khaz Bay, at north end of Lake Anna, northwest of the passage to Sister Lake.			
4*	**ANHP_ACCS_Mar25 (EO4)[7/15/1994]**	**Chichagof I., Game Creek**	**sitka spruce-hemlock forest, open moist to wet graminoid calcareous fen**		
4	CPNWH_April2025(UAM:Herb:11792; ALA 11792)[7/15/1994]	Chichagof I., Game Creek, Sitka Quad, Tongass National Forest.	Sitka spruce-hemlock forest, open moist to wet graminoid calcareous fen. [Also collected by Parker on same date and in same place: Agrostis alaskana, Carex flava, Malus fusca, Equisetum pratense, Viburnum edule, Canadanthus		

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			modestus, Sanguisorba menziesii, Epilobium ciliatum, Epilobium glandulosum, Primula pauciflora, Cornus stolonifera, Eriophorum viridicarinatum, Platanthera stricta]		
5*	**ANHP_ACCS_Mar25 (EO20)[6/27/2017]**	**Game Creek area, Alexander Archipelago, Chichagof Island.**	**Calcareous fen, soils wet and organic rich, growing with Carex sitchensis, Caltha palustris . Organic rich substrate.**		
5	CPNWH_April2025(ALA)[6/27/2017]	Game Creek area, Alexander Archipelago, Chichagof Island.	Calcareous fen, soils wet and organic rich, growing with Carex sitchensis, Caltha palustris. [Also collected by Wells on same day at same place: Carex leptalea]		
6*	**ANHP_ACCS_Mar25 (EO21)[6/10/2019]**	**Tongass National Forest. Prince of Wales Island. Naukati Creek.**	**limestone influenced fen.**		
6	CPNWH_Mar25 (UAAH15062)[6/10/2019]	Tongass National Forest. Prince of Wales Island. Naukati Creek.	limestone influenced fen.		
7*	**USFS_2025_TESP_Mar25 (100521P000124Y16)[6/21/2016]**	**[Maps to wetland area on Mitkof Island, on hill west of Papkes Landing, South of Falls Creek, East of 3 Lakes Loop Road]**	**[Aerial imagery looks like muskeg south of a body of water.]**	**0.18 acres**	
8*	**USFS_2025_TESP_Mar25 (100521P000140Y19)[8/14/2019]**	**[Maps to Point Agassiz Peninsula on mainland just W of Muddy River]**	**Found in small opening within forested wetland transitioning to larger muskeg complex.**	**1 percent cover. Approximately 5 genets.**	
9*	**ANHP_ACCS_Mar25 (EO6)[9/11/1980]**	**[Mainland, S of Berner's Bay, N of Juneau] Berner's Bay area north of Juneau. About 6 miles south of the head of Echo Cove in muskeg above and just west of the south fork of Cowee Creek, west of Yankee Basin.**	**Growing in muskeg, on northeast-facing twenty degree slope.**		
9	CPNWH_Mar25 (WTU289107)[9/11/1980]	Tongass National Forest, Berners Bay area north of Juneau, about 6 miles south of the head of Echo Cove, just west of the south fork of Cowee Creek, west of Yankee Basin. T38S R64E S10 S1/8	Growing in a muskeg above creek. [Collected by Muller on same day in same place: Carex pluriflora]		
		Occurrences outside of the Tongass NF boundary			
10*	**ANHP_ACCS_Mar25 (EO1)[5/28/2015]**	**[Prince of Wales Island] SeaAlaska Corp., Soda Bay, near West Creek. [outside Tongass NF]**	**Tufa "pavement". [Aerial imagery shows this location is directly adjacent to clear cut and system of logging roads and other clearcuts]**		
10	CPNWH_May2025 (UAM:Herb:253136;	[Prince of Wales Island] SeaAlaska Corp., Soda Bay, near West Creek.	Tufa "pavement". [Collected by Krieckhaus at same place on same date: Carex anthoxanthea,		

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	ALA 253136) [5/28/2015]		Carex buxbaumii, Carex capillaris, Carex flava, Carex limosa, Triglochin maritima]		
11*	**ANHP_ACCS_Mar25 (EO7)[7/21/2000]**	**[Mainland to the east of Glacier Bay National Park] Haines Airport, wetland at end of runway. [outside of Tongass NF]**	**Marshy area.**		
11	CPNWH_May2025 (BABY-03003) [7/21/2000]	[Mainland to the east of Glacier Bay National Park] Haines Airport, wetland at end of runway.	Marshy area at end of runway.		
12	**ANHP_ACCS_Mar25 (EO8)[6/11/1997]**	**Southeast Alaska. North shore of Chilikat River, 0.1 miles west of Haines airport, mainland. [outside of Tongass NF]**	**Silty wet floodplain, with Carex viridula, full sun.**	**Fertile. Cespitose.**	
12	CPNWH_May2025 (WTU369769) [6/11/1997]	Southeast Alaska. North shore of Chilikat River, 0.1 miles west of Haines airport, mainland.	Silty wet floodplain, with Carex viridula, full sun. [also collected or observed by Zika at same place on same date: Carex lyngbyei, Eriophorum scheuchzeri, Equisetum fluviatile]	Fertile. Cespitose.	

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Carex lasiocarpa

Carex lasiocarpa Ehrh.

Slender sedge

Global Rank: **G5**
Alaska State Rank: **SNR**



Photos: © 2025 Robert Carr with permission (Oregon Flora 2025)

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated *Carex lasiocarpa* is known from three estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are on Prince of Wales Island (2) and on Admiralty Island (1)(Appendix 1; CPNWH 2025, USFS 2025a). Occurrences 1 and 2 on Prince of Wales Island are separated from Occurrence 3 on Admiralty Island by approximately 178 km (111 mi). Within the Tongass NF boundary, this species occurs in wet meadows and fens, as well as near lake shores. Occurrences 1 and 2 on Prince of Wales Island were both collected in fens on limestone substrates (CPNWH 2025, Johnson 2025 pers. comm., USFS 2025c), and occurrence 2 maps to limestone substrate (NRCS 2025b). The exact location of occurrence 1

Criteria	*Rank*	*Rationale*
		and the habitat surrounding it are not known with any certainty, as the coordinates provided in the CPNWH have a georeferencing error of 4 miles. Occurrence 2 was collected with *Carex diandra* on Naukati Creek Lake (Johnson collection made on 6/10/2019 accessed in CPNWH 2025). Occurrence 3 is in a wet meadow near Stillwater Anchorage, Admiralty Island, and does not map to limestone soil (NRCS 2025b), but karst is present in the vicinity of the occurrence. The label data for occurrence 3 lists the following associated species: *Carex livida*, *C. utriculata*, *C. buxbaumii*, *C. viridula*, *Scheuchzeria palustris*, *Hierochloe odorata*, *Poa palustris*, *Eriophorum angustifolium*, *Glyceria pauciflora*, *Drosera rotundifolia*, *Aster subspicatus*, *Myrica gale*, *Ledum groenlandicum*, *Cicuta douglasii*, and *Vaccinium vitis-idaea* (Appendix 1; Arctos Database 2025). There are no occurrences of this species in southeastern Alaska outside the Tongass NF (CPNWH 2025). Across its range, *Carex lasiocarpa* is usually found in bogs and minerotrophic fens with a water pH of 3.6 to 6.7 (McClintock and Waterway 1994). However, it has been documented in rich fens (with a pH above neutral) in the northeastern United States (Motzkin 1994). In Southeast Alaska, the species tends to co-occur with limestone. Sampling from streams and lakes in the same area as occurrence 2 indicated a pH of 6 to 6.5 (Johnson 2025 pers. comm.). The other occurrence on Prince of Wales Island is also associated with limestone; therefore, it is likely to have a similar water pH. The water pH for the occurrence on Admiralty Island is unknown. Karst is mapped in the vicinity but may or may not be influencing the water chemistry where the occurrence is located. Lower pH wetlands, which appear to be suitable habitat for this species, are common on the Tongass (Turner and Mallott 2024), so it is unclear why there are so few records, and why the records that do exist seem to have a trend of co-occurring with limestone geology. The phenomenon of species on the edge of their ranges switching to a different habitat or soil type has been documented previously, and authors have hypothesized that the atypical habitat may provide an environment with less interspecific competition (Griggs 1914, Stanton-Geddes et al. 2012).
2 Distribution in surrounding geographic	**C**	C = Widely distributed outside of the Tongass NF. Global Rank G5 (Secure), Alaska State Rank SNR (No Status Rank) (NatureServe 2025) State Ranks: Labrador, Utah, Illinois, West Virginia, Virginia, North Carolina: S1 (Critically Imperiled); California, Colorado, Iowa, Wyoming: S2 (Imperiled); Northwest Territories, North Dakota, Illinois, Ohio: S3 (Vulnerable); all other states and territories S4 (Apparently Secure), S5 (Secure), or SNR (No Status Rank) (BCCDC 2025, NatureServe 2025).

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Criteria	*Rank*	*Rationale*
area		*Carex lasiocarpa* occurs in North America and Eurasia, although the sometimes-recognized infraspecific taxon *americana* is restricted to North America (Fernald 1942, Ball and Reznicek 2003). In North America, *Carex lasiocarpa* is present in most Canadian provinces and territories as well as Alaska, the Pacific states, Idaho, Montana, Utah, North Dakota, Nebraska, and Colorado and then east through the mid-west to Maine, Virginia, and North Carolina (NRCS 2025). Across its range, *Carex lasiocarpa* occurs in very wet areas like fens, bogs, sedge meadows, lakeshores, stream banks, and sometimes floating mats at elevations ranging from 0 to 1,300 meters (Ball and Reznicek 2003). It is typically found in bogs and mineral-rich fens but is also a member of emergent marsh communities (McClintock and Waterfall 1994). The soils where this species is found are usually high in organic matter and usually range from acidic (Oregon Flora 2025) to neutral pH (Anderson et al. 1996). In Alaska this species' range continues northward 1115 km (693 mi) to the Yukon Flats National Wildlife Refuge (CPNWH 2025). In British Columbia it is frequent south of 56 degrees north, but rare northward, and absent on Haida Gwaii (Klinkenberg 2020).
3 Dispersal capability	**C**	C = Readily disperses across landscapes with few habitat-related limitations. The seeds of *Carex lasiocarpa* are surrounded by a structure called a perigynium; the perigynia of *Carex* are dispersed by water, wind, and animals (Wilson et al. 2008). The inflated perigynium of *Carex lasiocarpa* floats easily on water and can be carried long distances on water currents (McClintock and Waterway 1993). Long distance dispersal by birds could explain the genetic patterns seen in widely separated populations of this species in North America (McClintock and Waterway 1993). This species can also reproduce by rhizomes, persisting as clones without sexual reproduction (McClintock and Waterway 1993). *Carex lasiocarpa* is known for forming large clonal stands with no fertile culms in boreal regions (Ball and Reznicek 2003), and *Carex* rhizomes have been observed floating and being dispersed by water (McClintock and Waterway 1993). Occurrence 3, in a wet meadow may not be able to disperse far by water or wind movement and may have to rely on animal dispersal. The other two occurrences are close to waterways and should be able to disperse by water, wind, and animals.

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. None of the occurrences on the Tongass NF have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025). This species is a perennial that can form large clones in suitable habitat, so each occurrence could be a small or large patch.
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Population trends for known occurrences of *Carex lasiocarpa* on the Tongass NF are unknown due to lack of repeat visits to the occurrences (CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat for the three occurrences of *Carex lasiocarpa* on the Tongass is wet meadows, fens, and emergent wetlands along lake shores and creeks (Appendix 1; CPNWH 2025, Johnson 2025 pers. comm., USFS 2025a, USFS 2025c). These habitats can be grouped under palustrine wetland, which is a freshwater, non-tidal influenced vegetation type with saturated soil (marshes, swamps, fens, wet meadows) that is very common on the Tongass NF (Turner and Mallott 2024).While this broad habitat type is common on the Tongass, *Carex lasiocarpa* may have an affinity for limestone-associated wetlands, which are much less common. In general, freshwater wetlands on the Tongass NF have historically been very stable ecosystems, with some persisting for thousands of years (Turner and Mallott 2024), and the approximately 213,000 acres of lakes and ponds are considered stable (Chestnut 2024). Invasive species that can survive in or near wetlands, such as white clover (*Trifolium repens*) and reed canary grass (*Phalaris arundinacea*), are known to occur in or near the coordinates for occurrence 1, but the location of this occurrence is not known with certainty (USFS 2025b). Timber harvest has occurred in the recent past 0.3 mile east of occurrence 2 and is widespread in the vicinity of occurrence 1 on Prince of Wales Island (USFS 2025d). This might indicate a negative trend in habitat quality at those two sites. Since fens occupy niche places on the landscape and require mineral-rich water, their integrity depends on how

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Criteria	*Rank*	*Rationale*
		the immediate landscape is affected, and any changes to the flows that maintain them may alter their composition (Turner and Mallott 2024).
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Wet meadow habitat is highly vulnerable to invasive species, especially reed canarygrass (Wiles and Warren 2025), so habitat and occurrences of this species may be impacted in the future. Additionally, timber harvest activities will continue on the Tongass NF and may impact adjacent wetland habitat by altering hydrology. Projected increases in air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit may lead to drought stress for wetland species with high soil moisture requirements such as *Carex lasiocarpa* (Turner and Mallott 2024, Wiles and Warren 2024).
8 Life history and demographics	**C**	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.** *Carex* seeds are usually dormant when they first mature, preventing germination until the next growing season; if conditions are not suitable the next growing season, then the seeds can remain viable for years in the soil seed bank (Wilson et al. 2008). *Carex* seeds generally germinate in moist, sunny, disturbed openings, and seedlings are not often seen in mature meadows with little open soil (Wilson et al. 2008). The higher genetic diversity and smaller size of *Carex lasiocarpa* plants in pioneer (disturbed, open soil, open water) sites suggests that this species establishes from seeds more commonly at those sites (McClintock and Waterfall 1993). However, in many field studies of *Carex lasiocarpa*, seedlings have never been encountered (McClintock and Waterway 1993). The life span of *Carex* plants has been measured for very few species and ranges from 30–50 years or longer (Newhouse et al. 1995). The flowers of *Carex lasiocarpa* are unisexual with the female flowers enclosed in an envelope called a perigynium. If perigynia are present, the hairs present on the surface make this species distinctive (Klinkenberg 2020, USFS 2025c). The male and female flowers are borne on the same plant in separate clusters called spikelets (Ball and Reznicek 2003). Most *Carex* are wind pollinated. However, this species is "outcrossing," in other words it prefers to not

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Criteria	*Rank*	*Rationale*
		self-pollinate and receive pollen from another individual (McClintock and Waterway 1993). In an allozyme study conducted in northeastern states, patches of this species were found to vary considerably in genetic diversity, ranging from completely monoclonal to nearly every shoot belonging to a different clone. In addition, between-population differentiation was high for a wind-pollinated species (McClintock and Waterway 1993). As mentioned above, this species can also reproduce by rhizomes, persisting as clones without sexual reproduction (McClintock and Waterway 1993), and *Carex lasiocarpa* is known for forming large clonal stands with no fertile culms in boreal regions (Ball and Reznicek 2003). The well-developed below-ground network of rhizomes and roots does not tolerate deep soil disturbance (Newhouse et al. 1995, Wilson et al. 2008).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Carex Lasiocarpa is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Timber harvest, invasive species and climate change may impact habitat or known occurrences but habitat is relatively broad (non-forested wetlands, maybe an association with limestone).
- **Declining trends:** Population trends are not known. Wetland habitat may be impacted by increasing temperatures and evapotranspiration and resulting growing season water deficit.
- **Restricted ranges:** This species is widespread in North America and Eurasia.

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- **Low population numbers or restricted ecological conditions:** There are only three known occurrences of this species on the Tongass NF.

- **Other factors:** Life history characteristics suggest it may be able to recover from disturbance.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Populations are grouped into estimated occurrences with occurrences defined as those being separated by at least 1 km. Parent occurrence rows are in bold font with additional data belonging to that occurrence in regular font below the parent occurrence. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (UAAH15057); Johnson 2025 pers.comm. [6/13/2019]**	**Tongass National Forest. Naukati unit,**	**TSHE/VACCI forest along creek. Fen.**		
2*	**CPNWH_Mar25 (UAAH15059, UAAH15060); Johnson 2025 pers.comm. [6/10/2019]**	**Tongass National Forest. Prince of Wales Island. Naukati Creek Lake.**	**limestone outcropping along shoreline. Fen. With *Carex diandra*.**		
3*	**CPNWH_April2025(ALA-UAM:Herb:146493); ArctosDatabase_April2025 (ALA-UAM:Herb:146493) [8/25/2004]**	**Alexander Archipelago, Admiralty I., Turn Pt., Mitchell Bay, 0.5 mile NNE of Turn Point, N side of Stillwater Anchorage in Kootznahoo Inlet, Sitka Quad, Tongass National Forest.**	**In a wet sedge/grass meadow below an abandoned reservoir on organic soil. Prominent associated plants include: Carex livida, C. utriculata, C. buxbaumii, C. viridula, Scheuchzeria palustris, Hierochloe odorata, Poa palustris, Eriophorum angustifolium, Glyceria pauciflora, Drosera rotundifolia, Aster subspicatus, and scattered Myrica gale, Ledum groenlandicum, Cicuta douglasii, and Vaccinium vitis-idaea, especially in the outer margins.**		
3	USFS-TESP_Mar25 (100534P000010) [8/25/2004]	Adm. Is n of Angoon, Thayer Hydro rd survey	In moist meadow formed in abandoned reservoir. (Field Survey)		

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Carex leptalea

Carex leptalea Wahlenb.

bristly-stalked sedge

Global Rank: **G5**
Alaska State Rank: **SNR**



photo: © Bruce Newhouse, Creative Commons by nc/4.0 (Oregon Flora 2025)

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B = Patchy or Gaps. *Carex leptalea* is known from seven estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Kuiu Island (2 occurrences), Kupreanof Island (1), Chichagof Island (2), on the mainland on the Point Agassiz Peninsula (1), and on the mainland on the Cleveland Peninsula (1) (Appendix 1; CPNWH 2025, USFS 2025a). An additional occurrence from Prince of Wales Island on the southern shore of Control Lake is in an inholding, directly adjacent to the Tongass NF boundary. Outside of the Tongass NF, this species is often found on alkaline calcareous substrates but can also be found on more acidic soils (Motzkin 1994, Ball and Reznicek 2003, Waterway et al. 2016). Occurrences 1, 3, and 5 map to calcareous substrate or mention calcareous in the habitat data (Appendix 1; ACCS 2025, NRCS 2025b). Occurrence 1 at Cool Lake on Kuiu Island maps to karst *Tsuga heterophylla-Picea sitchensis* forest and limestone soil (Boggs et al. 2019, ACCS 2025, NRCS 2025b). Occurrence 3 in a meadow on Kupreanof Island maps to limestone soil (NRCS 2025b). Occurrence 5 at Game Creek on Chichagof Island maps to a karst fen (Boggs et al. 2019, ACCS 2025).

Criteria	*Rank*	*Rationale*
		Occurrence 6 along Lyouktug Creek on Chichagof Island is 5000 ft northeast of mapped karst habitat (ACCS 2025). In addition, occurrence 4 is in a meadow fed by a geothermal spring and the waters flowing from many geothermal springs in southeast Alaska are alkaline (Boggs et al. 2019, ACCS 2025). Within the Tongass NF, *Carex leptalea* has been observed in wet meadows (including the one influenced by a geothermal spring), sedge wetlands, lakeside in a limestone influenced wetland, a freshwater fen in peatlands, a calcareous fen, and on a sphagnum mat growing on a log in a beaver-influenced wetland. On the southern side of Control Lake, outside the Tongass NF boundary, it grows in muskeg (Appendix 1; Johnson 2025 pers. comm.). Unless growing in standing water adjacent to a lake or creek, this species is found in poorly draining landforms that usually have organic matter such as muck or peat in the top layers of the soil (NRCS 2025b). Associated species mentioned by the collector or observer or collected at the same time include *Pinus contorta*, *Tsuga mertensiana*, *Rhododendron groenlandicum*, *Carex flava, Carex interior*, *Carex sitchensis*, *Carex viridula* subsp. *viridula*, *Juncus supiniformis*, *Canadanthus modestus*, *Caltha palustris*, *Nephrophyllidium crista-galli*, *Platanthera dilatata*, *Ranunculus occidentalis*, *Conioselinum pacificum*, *Swertia obtusa*, *Deschampsia cespitosa*, *Oxycoccus microcarpus*, *Polemonium caeruleum* ssp. *villosum*, *Epilobium leptophyllum*, and *Castilleja unalaschcensis* (Appendix 1; CPNWH 2025). Some sources recognize subspecies within *Carex leptalea*, and if recognized, the plants on the Tongass NF are *Carex leptalea* subsp. *pacifica* Calder & Taylor (Ickert-Bond et al. 2019, Klinkenberg 2020, NRCS 2025a). Compared to the more widespread subsp. *leptalea*, which occurs in Alaska and Canada east of the Coast-Cascade mountain axis, subsp. *pacifica* has larger perigynia (3–4.7 mm long vs 1.5–3.5) and floral bracts with brown margins, with the lower floral bracts with a distinct point or awn (Wilson et al. 2008). Currently, the *Flora of North America* and the Consortium of Pacific Northwest Herbaria do not recognize subsp. *pacifica* (Bell and Reznicek 2003, CPNWH 2025).
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF. Global Rank G5 (Secure) (NatureServe 2025), Alaska State Rank SNR (ACCS) State Ranks: Canadian provinces and territories: Nunavut is S3 (Vulnerable), all others are S4 (Apparently Secure) or S5 (Secure); United States: S1 (critically imperiled): California, Iowa, Oklahoma, Utah; S2 (imperiled): Arkansas, Colorado, Illinois; S3 (Vulnerable): Idaho, North and South Dakota, South Carolina. All other states are S4 (Apparently Secure), S5 (Secure), or SNR (not ranked) (BCCDC 2025, NatureServe 2025).

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Criteria	*Rank*	*Rationale*
		Carex leptalea has the widest geographic range of any North American sedge. It has been found in all regions of North America (including Mexico) except Nevada, Arizona, Nebraska, and Kansas (Ball and Reznicek 2003, NRCS 2025a); it is also present in the Dominican Republic (Ball and Reznicek 2003). This species is common in the northern parts of its range (including British Columbia) and uncommon in much of the contiguous United States (Klinkenberg 2020, NatureServe 2025). The locations of *Carex leptalea* within the Tongass NF are part of the continuous distribution of this species from British Columbia (and parts south) to northern Alaska (CPNWH 2025). The closest Alaskan locations to the north are both in Glacier Bay National Park. To the south, the closest locations are on Graham and Dixon Islands off the coast of British Columbia (CPNWH 2025). It is typically found in mossy or wet woods, willow or alder thickets, conifer swamps and bogs, wet meadows, fens, swales, lakeshores, stream banks, damp rock ledges, and swampy ditches from 0–2700 m (Anderson et al. 1996, Ball and Reznicek 2003, Wilson et al. 2008, NatureServe 2025). It is often found on calcareous substrates and often occupies sites with an alkaline pH (Anderson et al. 1996, Ball and Reznicek 2003). However, studies have shown that it can grow in neutral or acidic soils as well (Waterway et al. 2016). *Carex leptalea* is a morphologically variable species, varying over its distribution in the size of the plants, stem width, leaf width, and the size and features of the inflorescence and fruits (Ball and Reznicek 2003). As explained above, the plants on the Tongass NF may eventually be recognized as subsp. *pacifica*. If so, the range includes the Alaskan panhandle, the offshore islands and mainland coast of British Columbia, and coastal areas west of the Coast-Cascade mountain axis south to Thurston County, Washington (Ball and Reznicek 2003).
3 Dispersal capability	**C**	C = Readily disperses across landscapes with few habitat-related limitations. The seeds of *Carex* are dispersed within a structure called a perigynium by water, wind, and animals (Wilson et al. 2008, NatureServe 2025). *Carex* are also able to disperse and reproduce clonally by rhizomes (McClintock and Waterway 1993, Wilson et al. 2008). Therefore, it is likely that this species can disperse by its short rhizomes, if the soil is moved by water or animal activities. Given the habitat preferences of this species, its wide distribution, and the approximately 213,000 acres of lakes and ponds and over 3 million acres of forested and non-forested wetlands on the Tongass NF (Chestnut and Tucker 2025,

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Criteria	*Rank*	*Rationale*
		Turner and Mallott 2025), this species should be able to disperse across the Forest landscape with few habitat-related limitations.
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Carex leptalea* is known from seven occurrences on the Tongass NF located on three islands and the mainland (Appendix 1). An eighth occurrence from Prince of Wales Island on the southern shore of Control Lake is in an inholding, directly adjacent to the Tongass NF boundary (Appendix 1). Those familiar with this plant on the Forest and elsewhere believe that because of its small stature, it is easily overlooked; targeted surveys might be required to determine its true range extent (Wilson et al. 2008, Johnson 2025 pers. comm., USFS 2025c). Two of the occurrences have population estimates; occurrence 1 has approximately 16 plants, and occurrence 7 has approximately 30 plants. None of the other occurrences have any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a). Based solely on the number of occurrences and number of plants observed, *Carex leptalea* is uncommon on the Tongass NF. However, since this is a perennial, colonial herb that can form mats from fine rhizomes, each individual could be a small or large patch.
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, population trends for known occurrences of *Carex leptalea* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. *Carex leptalea* has been observed in a broad variety of non-forested wetlands on the Tongass NF (Appendix 1; CPNWH 2025, Johnson 2025 pers. comm., USFS 2025a). Non-forested wetlands on The Tongass NF are considered stable, with high ecological integrity and low vulnerability to stressors (Turner and Mallot 2025).

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Criteria	*Rank*	*Rationale*
		However, landscape position, soil drainage, and hydrology are important drivers for non-forested wetlands with the level of soil saturation a factor in the species composition of a particular wetland (Turner and Mallott 2025). This would indicate that activities in the immediate vicinity that change hydrology could cause a negative habitat trend. This is especially true of calcareous fens (occ. #s 1 and 5) which require mineral-rich water; changes to this the quantity or composition of this flow could alter fen composition (Turner and Mallot 2025). Timber harvest, which could affect hydrology occurred in the year 2000 directly adjacent to the limestone-influenced fen in karst *Tsuga heterophylla-Picea sitchensis* forest at occurrence 1, in the year 1969 at the meadow at occurrence 3, and in the 1950s and 1960s at the beaver wetland at occurrence 7. In addition, timber harvest occurred in the year 1992 within 0.3 mile of the karst fen at occurrence 5 and in 1989 at the sedge wetland at occurrence 6 (USFS 2025d). Karst fens frequently occur in watersheds that are heavily managed for timber harvest and may be adversely impacted by the increased runoff after timber harvest on upgradient karst (Boggs et al. 2019). Reed canarygrass (*Phalaris arundinacea*), which could outcompete *Carex leptalea* are present at occurrence 1 and ca. 2000 ft downslope from occurrence 3 (USFS 2025b). The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025).
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. As mentioned above, invasive species are known to be present at occurrence 1 and in the vicinity of occurrence 3, and non-native species are present in the forest, especially along forest service roads (USFS 2025b). Wet meadow habitat for this species is vulnerable to invasion by non-native species on the Tongass NF (Chestnut and Tucker 2025, Wiles and Warren 2025). Timber harvest will continue on the Tongass NF and may alter wetland hydrology. Additionally, predicted increases in air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit may lead to drought stress for wetland species with high soil moisture requirements such

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Criteria	*Rank*	*Rationale*
		as *Carex leptalea* (Turner and Mallott 2025, Wiles and Warren 2025). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2025).
8 Life history and demographics	**C**	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.** The life span of *Carex* plants has been measured for very few species and ranges from 30–50 years or longer (Newhouse et al. 1995). Studies have shown that *Carex leptalea* produces roots above the water table, growing on low to high hummocks with a diversity of other species (Waterway et al. 2016). Its rhizomes are short and threadlike, but may form mats (Ball and Reznicek 2003, Wilson et al. 2008, Waterway et al. 2016). The well-developed network of rhizomes and roots in *Carex* does not tolerate deep soil disturbance (Newhouse et al. 1995, Wilson et al. 2008). The stems of *Carex leptalea* are very fine and narrow (Ball and Reznicek 2003). The wind-pollinated flowers are unisexual, borne on the same plant in separate clusters called spikelets, and the female flowers are enclosed in an envelope called a perigynium which in this species resembles a rice grain (Ball and Reznicek 2003, Wilson et al. 2008). The seeds develop and are dispersed within the perigynium (Ball and Reznicek 2003). *Carex* seeds are usually dormant when they first mature, preventing germination until the next growing season; if conditions are not suitable the next growing season, then the seeds can remain viable for years in the soil seed bank (Wilson et al. 2008). *Carex* seeds generally germinate in moist, sunny, disturbed openings, and seedlings are not often seen in mature meadows with little open soil (Wilson et al. 2008). In a germination study that included 51 *Carex* species, the seeds of *Carex leptalea* failed to germinate under any treatment (Bond 1999).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information

Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

[Provide a rationale for the conclusion checked above. This should include a summary of the criteria rankings that substantiates the conclusion that was reached

Rationale for substantial concern will use the following crosswalk between substantial concern factors (numbers) and the 8 species evaluation criteria (letters):

Carex leptalea is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Timber harvest, invasive species and climate change may impact habitat or known occurrences, but habitat is relatively broad (non-forested wetlands, maybe an association with limestone).
- **Declining trends:** Population trends are not known. Wetland habitat may be impacted by increasing temperatures and evapotranspiration and resulting growing season water deficit.
- **Restricted ranges:** This species is widespread in North America.
- **Low population numbers or restricted ecological conditions:** There are seven estimated occurrences of Carex leptalea on the Tongass NF. It is likely more overlooked than rare.
- **Other factors**: It is unknown whether other factors may exist that could impact the persistence of this species in the planning area.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (UAAH12609)[7/16/2015]**	**Tongass National Forest, Petersburg Ranger District, Kuiu Island, lake west of Saginaw Bay [maps to Cool Lake].**	**Lake side, likely limestone influenced system. [Carex diandra, Johnson JJ2015043, collected at the same day and place]**		
1	USFS TESP_Mar25 (100521P000117Y15)[7/16/2015]	Kuiu Isl, lake near Skanax Bay, site 100521S000251Y15		0.5 cover. Approximately 16 genets. 0.11 acre.	
2*	**CPNWH_April2025(ALA: UAM:Herb:137877); Arctos Database 2025 [7/23/1999]**	**Alexander Archipelago, Kuiu I.,[X]Hiller Lake, Petersburg Quad, Tongass National Forest.**	**Peatlands, lacustrine fen.**		
3*	**CPNWH_Mar25 (WTU414219; WTU-V-031339)[7/27/2011]**	**Kupreanof Island, east of Hamilton Bay, Road 6314.**	**Plants growing in diverse wet meadow near gravel road. Aspect: 0 degrees. Slope: 0%. Associated species: Tsuga mertensiana, Pinus contorta, Ledum gorenlandicum, Nephrophyllidium crista-galli, Platanthera dilatata, Carex leptalea, Ranunculus occidentalis, Conioselinum pacificum, Swertia perennis, Deschampsia cespitosa, Carex flava, Oxycoccus oxycoccus. [Also collected by Beck on same day and at same place: Polemonium caeruleum ssp. villosum, Epilobium leptophyllum, Castilleja unalaschcensis]**		Harvested in 1969
4*	**CPNWH_Mar25 (WTU289114)[7/29/1982]**	**Tongass National Forest. About 45 miles north-northeast of Ketchikan on the Cleveland Peninsula. One-quarter mile up Spring Creek from Lake Shelokum. One-half mile northeast of Bailey Bay. Collected in vicinity of hot**	**Base of hillslope where springs occur. Meadow where hot water meets Spring Creek floodplain. [Also collected by Muller at same place on same day in meadow below hot springs: Carex viridula ssp. viridula, Canadanthus modestus]**	**In fruit**	

		springs. T68S, R89E, Sec. 9, SW 1/4. [On mainland on eastern side of Tongass NF, Cleveland Peninsula]			
4	CPNWH_Mar25 (WTU408479; WTU-V-022754)[7/29/1982]	Southeastern Alaska. Tongass National Forest. About 45 miles north northeast of Ketchikan on the Cleveland Pen. Collected in vicinity of hot springs 1/4 mile up Spring Creek from Lake Shelokum. 1/2 mile northeast of Bailey Bay.	Base of hillslope where springs occur. Meadow where hot water meets floodplain.	Fertile	
4	Arctos Database, May 2025 (UAM:Herb:41600). [7/29/1982]	Vicinity of hot springs 1/4 mile up Spring Creek from Lake Shelokum. About 45 miles NNE of Ketchikan on the Cleveland Pen. 1/2 mile NE from Bailey Bay. United States, Alaska, Ketchikan Gateway Borough.			
5*	**CPNWH_April2025(ALA: UAM:Herb:255732)[6/27/2017]**	**Chichagof Island. Game Creek area, Alexander Archipelago.**	**Calcareous fen, soils wet and organic rich, growing with Carex sitchensis, Caltha palustris. [Also collected by Wells on same day at same place: Carex interior]**		
6*	**CPNWH_April2025(ALA: UAM:Herb:137719)[7/13/2006]**	**Chicagof Island, Lyouktug Cr. area, Juneau Quad, Alexander Archipelago.**	**Sedge wetland. [Also collected by Krieckhaus on same day at same place in sedge wetland: Carex flava]**		
7*	**USFS-TESP_Mar25 (100521P000141Y19)[8/14/2019]**	**Site Name: 100521S000320Y19 [maps to mainland, eastern side of Tongass NF. Point Agassiz Peninsula, NW of Muddy River drainage]**	**On sphagnum mat growing on log across beaver palustrine system; open sun**	**1 percent cover. Approximately 30 genets.**	On edge of 1958 harvest; slated for YG harvest as part of Thomas Bay sales
8*	**CPNWH_April2025(ALA: UAM:Herb:41711)[7/01/1979]**	**Prince of Wales Island, Control Lake Jct. On Road To Craig, S of lake, Craig Quad, Tongass National Forest, Alexander Archipelago. [Maps in inholding outside of Tongass NF Boundary}**	**Muskeg. [Also collected by Vorobik on same day at same place in muskeg south of the lake: Juncus supiniformis]**		
9*	**CPNWH_May2025(ALA: UAM:Herb:146630); Arctos Database, May 2025 [8/20/2001]**	**Yakutat Forelands, Dry Bay, NW of Traotor Trail and SW of Bear I. , UTM 300370.51N, 6560287.2W, T 32 S, R 41 E, S 23, Yakutat Quad. Glacier Bay National Park and Preserve.**	**In wet meadow with Eleocharis spp., Equisetum spp., and moss.**		

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10*	**CPNWH_May2025(ALA: UAM:Herb:43654); Arctos Database, May 2025 [7/12/1967]**	**St. Elias Mts., Bartlett Cove, Glacier Bay, 2.4 km from cove, Juneau Quad, Glacier Bay National Park and Preserve. [label actually says 1.5 mi from Bartlett Cove on Gustavus Road. Old cleared turn-around area]**	**Scattered Salix and Alnus; open meadow of Equisetum, Epilobium, Habenaria, Spiranthes, Carex and Juncus.**		

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Carex phaeocephala

Carex phaeocephala Piper

mountain hair sedge

Global Rank: **G5**
Alaska State Rank: **S3**

Photo: Peter Zika (iNaturalist 2025)



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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Carex phaeocephala* is known from three occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of indiviuals that are separated by less than 1 km (0.62 miles). The three occurrences are on the mainland in the Coast Mountains on the east side of the Forest: one at the Juneau Icefield, one at Leduc Lake in the Misty Fjords National Monument, and one at the Oasis Glacier on the mainland in the Petersburg Ranger District (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). A fourth Tongass NF occurrence from atypical habitat on Dead Tree Island off Baranof Island (ANHP EO 32 based on Muller 3528 at WTU) has been redetermined by *Carex* expert Peter Zika to *Carex pachystachya* (ANHP ACCS 2025, CPNWH 2025, Wilson 2025 pers. comm., Zika 2025 pers. comm.). In addition to the three Forest occurrences, there are three other occurrences close to the Forest in Wrangell St Elias National Park, with two at Hubbard Glacier and one at Haenke Glacier (ANHP ACCS 2025). On the Tongass NF, *Carex phaeocephala* has been observed in typical habitat for the species in the Coast Mountains on moraine, boulder field, colluvium, and talus in alpine habitat near an ice field (occurrence 1), a lake (occurrence 2), and a

Criteria	*Rank*	*Rationale*
		glacier (occurrence 3) (Klinkeberg 2020, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). These occurrences are in habitat that can be ephemeral, appearing after glacial retreat (Johnson 2025 pers. comm.). The general elevation given for *Carex phaeocephala* in North America is 1200–4000 m (Ball and Reznicek 2003). This is higher than the elevations of occurrences 2 and 3 in the Coast Mountains in the eastern Tongass NF (422–610 m) (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Associated species mentioned by the collector or observer or collected at the same time include *Salix sitchensis*, *Salix barclayi*, *Salix stolonifera*, *Elliottia pyroliflora*, *Phyllodoce empetriformis*, *Micranthes pacifica*, *Luetkea pectinata*, *Saxifraga oppositifolia*, *Cryptogramma acrostichoides*, *Dryopteris expansa*, *Diphasiastrum sitchense*, *Carex bebbii*, *Carex mertensii*, *Trisetum spicatum*, *Poa paucispicula*, *Podagrostis aequivalvis*, *Juncus drummondii*, *Luzula piperi*, *Luzula wahlenbergii*, and *Luzula arcuata* ssp. *unalaschcensis* (Appendix 1; CPNWH 2025). This species is part of the difficult *Carex* section *Ovales* which is the largest section of *Carex* and consists mostly of North American taxa (Ball and Reznicek 2003, Hipp et al. 2006). *Carex phaeocephala* is said to be nearly identical in general appearance to *Carex tahoensis* from which it is distinguished by characteristics of the perigynium and which is not known to occur in southeast Alaska (Wilson et al. 2014, CPNWH 2025).
2 Distribution in surrounding geographic area	**C**	C = Widely distributed outside of the Tongass NF. Global Rank: G5 (Secure), Alaska State Rank: S3 (Vulnerable) State Ranks: Canadian provinces and territories: Yukon Territory S3 (Vulnerable), Alberta S4 (Apparently Secure), British Columbia S5 (Secure), Northwest Territories SU (No Status Rank); United States: Nevada S3 (Vulnerable), Wyoming S4 (Apparently Secure), Montana S5 (Secure), not ranked in CA, CO, ID, OR, UT, WA (BCCDC 2025, NatureServe 2025). Note that NRCS (2025) indicates that this species also occurs in New Mexico, but no other source supports that distribution. The Tongass NF locations of *Carex phaeocephala* are part of continuous western North America distribution from California, Utah, and Colorado to northern Canada and southern Alaska (Ball and Reznicek 2003, CPNWH 2025, NatureServe 2025, NRCS 2025). The northernmost Alaskan collection is along the Denali Highway (CPNWH 2025). In British Columbia, *Carex phaeocephala* is common in the south-central and southeast region but less frequent northward

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Criteria	*Rank*	*Rationale*
		and on the southwest coast; it is rare on south Vancouver Island and absent on the Queen Charlotte Islands and adjacent mainland (Klinkeberg 2020). In general, this species occurs in montane subalpine to alpine areas in mesic to dry meadows and rocky slopes (Ball and Reznicek 2003, Klinkeberg 2020). It occurs near or above treeline in rocky soils, talus and scree slides, and moraines (Carlson et al. 2004, Luna et al. 2008). *Carex phaeocephala* is a frequent colonizer of rocky slopes and soils with little development at high elevations and is highly useful for restoration of impacted high elevation sites with poor soil development (Luna et al. 2008). The general elevation given for *Carex phaeocephala* in North America is 1200–4000 m (Ball and Reznicek 2003).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat. The seeds of *Carex* are dispersed within a structure called a perigynium by water, wind, and animals (Newhouse et al. 1995, Wilson et al. 2014). Many *Carex* are also able to disperse and reproduce clonally by elongate rhizomes which can break off and be dispersed by soil or water movement (Newhouse et al. 1995, McClintock and Waterway 1993). However, *Carex phaeocephala* is a caespitose species with very short rhizomes and a densely matted root system (Ball and Reznicek 2003, Luna et al. 2008). Although not as easily broken off, if the root and rhizome system is divided, clonal plants grow easily (Luna et al. 2008). As detailed in Criteria 1 and 2, *Carex phaeocephala* is a successful colonizer of moraine, boulder field, colluvium, and talus substrate in alpine habitat. It is not found in the wetland systems present on the Tongass NF. Therefore, it is likely that it would only successfully disperse through suitable open, alpine habitat which is mostly located in the Coast Mountains on the east side of the Forest. In addition, its preferred habitat can be ephemeral, appearing after glacial retreat (Johnson 2025 pers. comm.).
4 Abundance on Tongass	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.

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Criteria	*Rank*	*Rationale*
NF		*Carex phaeocephala* is known from three occurrences on the Tongass NF in typical alpine areas on the mainland (Appendices 1 and 2). In addition to these three Forest occurrences, there are three other occurrences close to the Forest, in Wrangell St Elias National Park (ANHP ACCS 2025). None of the Forest occurrences have any indication of abundance (Appendix 1; ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Based on the number of occurrences, *Carex phaeocephala* is uncommon on the Tongass NF. A true understanding of the abundance of this species would likely require targeted surveys (USFS 2025c).
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, population trends for known occurrences of *Carex phaeocephala* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. In the Coast Mountains on the eastern side of the Tongass NF, three occurrences of *Carex phaeocephala* have been observed in moraine, boulder field, colluvium, and talus substrate in alpine habitat near an ice field, a lake, and a glacier (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). The habitat for this species is dynamic, appearing in recently deglaciated habitat or colluvium below a cliff. Habitat availability for this species is likely changing; glacial ice melt and rockslides create habitat and plant succession and competition then reduces habitat suitability. Glacial melt and rockslides are likely to continue and possibly increase so habitat for this species should remain available and may expand in the short term.
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress (Turner and Mallott 2024, Wiles and Warren 2024). The loss of snow and ice and glacial retreat in southeast Alaska is already evident, which may create habitat for this species in the short term (Turner and Mallott 2024).

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Criteria	*Rank*	*Rationale*
		The known occurrences of this species are in remote areas that are unlikely to be impacted by anthropogenic activities.
8 Life history and demographics	**C**	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.** The life span of *Carex* plants has been measured for very few species and ranges from 30–50 years or longer (Newhouse et al. 1995). *Carex* seeds are usually dormant when they first mature, preventing germination until the next growing season (Wilson et al. 2014). Under cultivation, the seeds of *Carex phaeocephala* are surface-sown in the fall to satisfy a light requirement, and then they undergo a five-month, outdoor, cold, moist stratification (Luna et al. 2008). Under cultivation, the seeds germinate in early spring with a 50-80% germination rate (Luna et al. 2008). As is true of most alpine sedges, the seedlings grow rapidly, a necessity for establishment in a short growing season (Wilson et al. 2014). Under cultivation, seedlings produce two to four true leaves by four weeks after germination (Luna et al. 2008). The mature plants are densely cespitose with a highly matted root system, and the leaves are folded and somewhat tough (Mackenzie 1908, Ball and Reznicek 2003, Luna et al. 2008, Wilson et al. 2014). The stems (culms) are (5–)15–45 cm tall, exceeding the leaves, and terminate in the inflorescence which has overlapping spikelets (Ball and Reznicek 2003, Wilson et al. 2014, Klinkeberg 2020). Most *Carex* flowers are wind-pollinated (Wilson et al. 2014). The flowers are unisexual, borne on the same plant within the spikelets, and the female flowers are enclosed in an envelope called a perigynium (Ball and Reznicek 2003, Wilson et al. 2008). The seeds are dispersed within the perigynium (Wilson et al. 2014). Additionally, the species appears in disturbed habitat such as colluvium and glacial moraines.

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Carex phaeocephala is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Climate change may alter hydrology of glacial moraine systems contributing to drought stress for *Carex phaeocephala*. However, climate change is also likely to increase glacial melt which could create more habitat for this species in the short term. There are no specific threats known for the occurrences on the Tongass NF.

- **Declining trends:** Population trends are unknown. Suitable habitat for *Carex phaeocephala* appears to be dynamic; trends for these varied habitats in the plan area cannot be determined with available information.

- **Restricted ranges:** *Carex phaeocephala* is not a narrow endemic. Occurrences of this species are neither disjunct nor at the edge of the species' greater range.

- **Low population numbers or restricted ecological conditions:** *Carex phaeocephala* is known from three occurrences on the Tongass NF, from the Misty Fjords National Monument to Juneau. Life history is not well described but the species appears to be a successful colonizer of moraine, boulder field, colluvium, and talus substrate in alpine habitat.

- **Other factors:** There is insufficient information to determine whether other factors may exist which would indicate concern for the persistence of this species in the plan area.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	ANHP-ACCS_Mar25 (EO8)[7/02/1952]	**Coast Mts., Juneau Icefield**			
1	CPNWH_April2025; Arctos 2025; (ALA-4867 ,UAM:Herb:43639) [7/02/1952]	Coast Mts., Juneau Icefield, Juneau Quad, Tongass National Forest, Alexander Archipelago.	[Also collected on July 2, 1952 at Juneau Ice Field by Argus: Luetkea pectinata on dry talus ridge, Saxifraga oppositifolia on talus between nunatak]		
2*	ANHP-ACCS_Mar25 (EO11)[8/06/1999]	**Coast Mts., Leduc Lake [Misty Fjords National Monument Wilderness]**	**lakeshore area, colluvium at base of cliff with some duff**		
2	CPNWH_April2025; Arctos 2025 (ALA-V154238, UAM:Herb:146970) [8/06/1999]	Coast Mts., Leduc Lake, Ketchikan Quad, Tongass National Forest. [Misty Fjords National Monument Wilderness]	Lakeshore area, colluvium at base of cliff with some duff. [Also collected by Woolwine at Leduc Lake on Aug 6, 1999: Cryptogramma acrostichoides]		
3*	ANHP-ACCS_Mar25 (EO30)[7/13/2017]	**Tongass National Forest, Petersburg Ranger District, mainland, Oasis Glacier.**			
3	USFS-TESP_Mar25 (100521P0000130Y 17)[7/13/2017]	Site name: Oasis Moraine	boulder field moraine		
3	CPNWH_Mar25 (UAAH12628)[7/13/ 2017]	Tongass National Forest, Petersburg Ranger District, mainland, Oasis Glacier.	Moraine. [Collected by Johnson on same day and in same place: Elliottia pyroliflora, Carex bebbii, C. mertensii, Trisetum spicatum, Poa paucispicula, Podagrostis aequivalvis, Juncus drummondii , Luzula piperi, Luzula wahlenbergii, Luzula arcuata ssp. unalaschcensis, Salix sitchensis, S. barclayi, S. stolonifera, Phyllodoce empetriformis, Micranthes pacifica, Cryptogramma acrostichioides, Dryopteris expansa, Diphasiastrum sitchense]		

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4*	**ANHP-ACCS_Mar25 (EO3)[7/26/2003]**	**SE tip extending into Hubbard Glacier. Mount Foresta. Wrangell St. Elias National Park and Preserve.**			
5*	**ANHP-ACCS_Mar25 (EO5)[7/26/2003]**	**Ridge 2.5km N of confluence with Disenchantment Bay. Haenke Glacier. Wrangell St. Elias National Park and Preserve.**			
6*	**ANHP-ACCS_Mar25 (EO17)[7/28/2003]**	**St. Elias Mts. near the Hubbard Gl., Variegated Glacier, adjacent to small stream, near confluence with Hubbard Glacier**	**on unstable scree slope near small rivulet**	**patchy**	

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Chimaphila umbellata

Chimaphila umbellata (L.) W.P.C. Barton

Pipsissewa

Global Rank: **T5**
Alaska State Rank: **S2**

photo: Wikimedia Commons



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. This species is known from three estimated occurrences on the Tongas National Forest (Tongass NF) (Appendix 1): two on the Taku River, and one north of Hyder. The dates on the records are: 1917, 1987, and 1993 (USDA FS 2023, ACCS 2023). The habitat for the Hyder record is described as open Sitka spruce forest on river bar. The Taku river records do not include habitat descriptions. There are six other records for this species in southeast Alaska not on the Tongass, these records are all from the northern part of the region.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank T5, Alaska State Rank S2 Alberta: SNR, British Columbia: S5, Island of Newfoundland: S2, Manitoba: S4S5, New Brunswick: S5, Northwest Territories: SNR, Nova Scotia: S4, Ontario: S5, Prince Edward Island: S4, Quebec: S5?, Saskatchewan: S3S4, Yukon Territory: S1, Wyoming: S4, SNR in other states *Chimaphila umbellata* has an extensive distribution across much of North America. Populations also exist in Europe and Asia (Hulten 1968, NatureServe 2024). It is common in the Pacific Northwest south of southern British Columbia (CPNWH 2024).This plant can tolerate a wide range of soil types, soil moisture regimes, and forest types across its range, though most commonly occurs in mixed and coniferous forest on dry, well-drained, rocky or sandy soils (Matthews 1994). In coastal British Columbia it has a scattered to sporadic presence in coniferous forests, associated with moderately dry to very dry nitrogen poor-soils in montane boreal, temperate, and cool mesothermal climates. Prevalence decreases with increasing elevation and precipitation and increases with continentality (Klinka et al. 1989). Habitat is described by Flora of North America as "dry, coniferous forests". The Tongass is mostly temperate rainforest with a maritime climate so suitable habitat for this species across the Forest is generally rare, though there may be substantial pockets of suitable habitat on the northern and eastern edges of the Forest. Southeast Alaska is the northwestern edge of this species' range in North America.
3 Dispersal capability	**B**	B = Disperses only through suitable habitat. Members of the tribe Pyroleae produce dust seeds, the smallest among angiosperms. Dust seeds contain minimal nutrient reserves and rely on fungal host associations to obtain carbon for germination and development of underground seedlings. Adults are putatively mixotrophic, relying on their fungal links as well as photosynthesis. The initial phase of germination is likely a bottleneck for recruitment. Planting experiments have found that microsite availability was the main limiting factor for the species and that germination rates were positively associated with ectomycorrhizal fungal diversity, indicating that it may be relatively specific concerning its fungal hosts during germination and areas with higher fungal diversity are more likely to have the specific hosts (Johansson and Eriksson

Criteria	*Rank*	*Rationale*
		2012, Johansson et al. 2017). Despite their potential buoyancy in air, a vast majority of dust seeds are deposited very close to the seed source (82.5% within 1 m and 95.7% within 5 m). However, an individual plant can produce 7800 seeds, leaving the number of potentially long-distance dispersing seeds still relatively high (Johansson et al. 2014). *Chimaphila umbellata* can also spread vegetatively through rhizomes. In the Cascade Mountains an individual was found with 57 meters of connected rhizomes (Antos et al. 2021).
4 Abundance on Tongass NF	**A**	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. There are three known occurrences on the Tongass NF, none of which have population counts associated with them.
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. There is no information available about population trends of *Chimaphila umbellata* on the Tongass NF.
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The species can be found in all stages of succession and occurs in both old and young forests but is probably more frequent in mid-successional stages and mature forests (Matthews 1994). Forest ecosystems in Southeast Alaska have been most greatly affected by the logging industry. However, a significant amount of logging has not occurred near the known occurrences of this species (Smith 2016).
7 Habitat vulnerability or modification;	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The non-native plant *Galeopsis bifida* is known approximately 0.7 miles upstream and 0.25 miles downstream of the occurrence near Hyder (USFS 2025). It is Old growth, well-drained forest on the Tongass is thought to have high ecological integrity and moderate vulnerability (Turner and Mallot 2024). In general, climate change, insect damage, timber harvest, and fire may impact the habitat of

Criteria	*Rank*	*Rationale*
other threats		*Chimaphila umbellata* in the future. Alaska's annual average temperatures have increased twice as fast as the rest of the U.S. over the past 50 years, and seasonal temperatures in Southeast Alaska are projected to increase most significantly in autumn (Wiles and Warren 2024). The Tongass NF is predicted to be affected by climate change as follows: more precipitation will occur overall, but more precipitation will fall as rain, rather than snow; stream flows will increase in winter and decrease in summer; the growing season will lengthen causing evapotranspiration to increase in many locations; and occasional droughts are expected to create some seasonal water deficits, especially in the summer growing season (Wiles and Warren 2024). Warming temperatures and drier summers due to climate change could lead to larger insect outbreaks of longer duration, possibly leading to widespread mortality (Turner and Mallott 2024, Wiles and Warren 2024). Though *Chimaphila umbellata* may be found in earlier successional phases and younger forest stands, it appears to prefer intact, older forests and may be sensitive to disturbance, both in initial survival and limited post-disturbance recovery. Disturbances such as canopy removal, soil upheaval, or fire may significantly reduce growth, with recolonization coming from undisturbed microsites (Halpern 1989, Ingersoll & Wilson 1989). This species is also sensitive to trampling with low potential for recovery (Matthews 1994), possibly leaving it vulnerable to recreational activities. Populations may suffer significant long-term decreases from overstory removal and increased light intensity caused by forest insect epidemics (Armour 1982).
8 Life history and demographics	**B**	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Chimaphila umbellata* is a rhizomatous, perennial, slightly woody herb with whorled evergreen leaves and stout, generally erect stems, that are often branched. It grows 10-30 cm tall with 3-10 small pink flowers pollinated by bumblebees and capsule fruit (Standley et al. 1988, Klinkenburg 2020). This species has a low germination and seedling survival rate compared to other Pyroleae members (Johansson et al. 2017). It is adapted to low soil nutrient levels and increasing soil nutrient content has a negative effect on seedling size and likely continued development of seedlings (Johansson and Eriksson 2013). This may be associated with the decrease of ectomycorrhizal fungi with higher soil nitrogen (Kranabetter & MacKenzie 2010). This could leave populations vulnerable to excess environmental nitrogen inputs, such as atmospheric deposition from industrial or agricultural sources, that may be contributing to declines in other portions of its range (Lilleskov et al. 2002, Johansson and Eriksson 2012).

Criteria	*Rank*	*Rationale*
		Seedling and adult *Chimaphila umbellata* appear to be relatively fungal host-specific, which may limit their distribution to the areas with those fungi present (Johansson et al. 2017). However, once established, the species has extremely persistent, long-lived, and connected rhizome systems. Individuals may live for close to a century (Antos et al. 2021). In reproductive experiments *Chimaphila umbellata* doesn't appear to set fruit from self-pollination, indicating that insect visits are required for pollination (Standley et al. 1988).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☒	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Chimaphila umbellate is not recommended as a Species of Conservation Concern based upon the rationale below:

Significant threats Invasive species are known near one occurrence of *Chimaphila umbellata*. Additionally, climate change, insect damage, and timber harvest may impact the habitat of *Chimaphila umbellata* in the future, but in general old-growth well-drained forest on the Tongass is thought to have high ecological integrity and moderate vulnerability.

Declining trends Population trends are unknown. The Tongass is mostly temperate rainforest with a maritime climate so suitable habitat for this species across the Forest is generally uncommon, mostly on mainland areas of the forest towards the border with British Columbia. However, these areas are difficult to access so are infrequently impacted by anthropogenic activity and old growth forest generally has high ecological integrity.

Restricted ranges Southeast Alaska is the northern edge of this species' range in North America.

Low population numbers: There are three known occurrences of this species on the Tongass NF, with two up the Taku River and one by Hyder. These inland areas of the forest are infrequently surveyed so there may be more occurrences than documented.
Other factors:

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

Conclusion Rationale

[Provide a rationale for the conclusion checked above. This should include a summary of the criteria rankings that substantiates the conclusion that was reached]

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO1)[8/06/1993]**	**Hyder, N of town, Mile 3.9 from Hyder intersection**	**open sitka spruce forest on river bar**	**Na**	**NA**
1	ACCS_Mar25 (EO2)[no date]	Hyder, river bar forest at 2nd dike, mile 3.9 from main town intersection, at end of dike. Survey site #M93-52.			
2*	**ACCS_Mar25 (EO4)[6/26/1987]**	**Tongass National Forest, LABOUNTY Tongass NFS 3152 LOC APPROX**			
3*	**ACCS_Mar25 (EO5)[9/17/1917]**	**Taku River**			
	In SE but not on Tongass NF				
4	ACCS_Mar25 (EO3)[5/11/1941]	Gull Island, Lynn Cal	woods		
5	ACCS_Mar25 (EO6)[8/15/1985]	St. Elias Mts., Beardslee Is., Glacier Bay			
6	ACCS_Mar25 (EO7)[6/26/2004]	St. Elias Mtns., Klehini R. valley, vic. mouth of Herman Cr., Porcupine Road 100 yards W of Herman Cr. bridge			
7	ACCS_Mar25 (EO8)[7/08/1946]	Haines	Mile 35 Haines Highway		
8	ACCS_Mar25 (EO9)[7/08/1946]	Haines Hwy mi 36			
9	ACCS_Mar25 (EO10)[7/29/1966]	Haines Hwy mi 37	sandy gravel, in spruce-cottonwood woodland		
9	ACCS_Mar25 (EO10)[7/27/1966]	Haines hwy mile 37.	Cottonwood and alder.		

Cirsium edule var. macounii

Cirsium edule var. macounii (Greene) D.J. Keil

Edible thistle

Global Rank: **G5T5**
Alaska State Rank: **S2**



photo: Leslie Koepke

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**B**	B1 = Patchy OR gaps. Habitat exists primarily as patches, some of which are small or isolated to the degree that species interactions are limited by movements between patches. Local sub-populations in most of the species' range interact as a metapopulation or patchy population, but some patches are so disjunct that sub-populations in those patches are essentially isolated from other populations. Potential habitat of moist to mesic meadows, avalanche tracks, and open forests in upper montane to lower alpine zone (Douglas et al. 1998) is patchy or in gaps on the southern Tongass National Forest, restricted to Misty Fjords mainland and Revillagigedo Islands. Ketchikan Misty Fjords Ranger Districts only, Carroll Inlet on Revillagigedo Island east to mainland to Blossom River. Eleven locations inventoried by Tongass National Forest, including Nooya Lake, LeDuc Lake, Hidden Lake, Punchbowl Lake, Shoal Cove on Revillagigedo, Blossom River, Walker Lake, Chickamin River and near Hyder (USDA FS 2023). One location has been referenced in Misty Fjords (Hultén 1968), Delapp (1992) identified a single population along a glacial stream, and Welsh reported a population near Hyder (Welsh 1974). There is some question as to the identity of *Cirsium edule* var. *macounii* on the Tongass National Forest. *Cirsium edule* var. *macounii* and *Cirsium brevistylum* are very similar, and it may be possible that the Tongass has both species. Without flowering individuals from Alaska available in herbaria, it cannot be determined with certainty that *Cirsium*

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Criteria	*Rank*	*Rationale*
		edule var. *macounii* is in all locations that have been documented as such on the Tongass. However, the northernmost confirmed occurrences of *Cirsium brevistylum* are from Haida Gwaii, south of the Tongass National Forest.
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF. Global Rank G5T5, Alaska State Rank S2 British Columbia Province Rank S5, Yellow List; Oregon SNR, Washington SNR This species occurs in the coastal mountains of southeastern Alaska and British Columbia to Vancouver Island, the Olympic Peninsula, and northern Cascades of Washington, and the mountains of northwestern Oregon (FNA 2023, CPNWH 2023). Most populations outside of the Tongass National Forest are in Washington, Oregon, and across British Columbia. *Cirsium edule* is a polymorphic species much in need of an in-depth field-based investigation. R. J. Moore and C. Frankton (1962) noted that in the northern part of its range, *Cirsium edule* occurs mostly at elevations from 1000 feet (300 m) to over 6800 feet (2100 m). However, along the Oregon coast the species occurs on sea bluffs a few meters above the surf. Populations from montane sites are often rather different in appearance from those of lowland areas, and coastal plants differ from those of nearby more interior areas. Both montane and strictly coastal plants tend to be compact with heads tightly crowded and usually with very densely arachnoid involucres. Plants of non-montane interior sites tend to be taller and more openly branched. Plants of interior sites in southern Washington and Oregon have smaller heads with less densely arachnoid involucres than those farther to the north or along the seashore. The spiny tips of the phyllaries may be ascending or may radiate from the head forming a dense, spiny ball (Keil 2006). Hybridization may have played a role in the diversification of *Cirsium edule*. Hybrids between *Cirsium edule* var. *macounii* and *C. brevistylum* in southern Canada have been named as *Cirsium ×vancouveriense* (Moore and Frankton 1962). *Cirsium edule* and *C. brevistylum* overlap extensively in parts of their ranges and hybrids may occur throughout their area of sympatry. Some of the variation in the southern part of the range of *Cirsium edule* may be a result of past introgression with various forms of *C. remotifolium*.

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Criteria	*Rank*	*Rationale*
		Cirsium brevistylum is found on Vancouver Island, Haida Gwaii, and British Columbia (Douglas et al. 1998). The range of *Cirsium edule* var. *macounii* overlaps that of *C. brevistylum* on Vancouver Island and in southern British Columbia yet also occurs north to near 56 degrees latitude. It does not occur in Haida Gwaii (CPNWH 2023).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). Seeds of *Cirsium edule* are characterized by a downy pappus that may assist with wind dispersal (University of Washington 2006). Some occurrences are known to disturbed sites such as helipads and road edges (USDA FS 2023). This taxon is a biannual and/or perennial plant that does not flower every year. There is low fecundity due to the biannual nature, has 50% germination rate, and flowers the second year (USDA NRCS 2023, University of Washington 2006).
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Eleven occurrences with 125 known individuals (8 of 13 records have individual counts) have been inventoried on NFS lands (USDA FS 2023); it is unknown as to how many are flowering individuals. It is unknown whether other reported occurrences are on National Forest System lands (DeLapp 1992, Hultén 1968, Welsh 1974). Because the number of occurrences (eleven) is low, and the numbers of plants within these occurrences are low (with a single plant found at some sites), known occurrences may be vulnerable to imperilment by stochastic events, however much available habitat in the vicinity of known occurrences remains unsurveyed.
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Insufficient evidence due to little or no monitoring. Only two occurrences have been visited more than once. No plant counts were taken at the LeDuc Lake population at Misty Fjords. The population at Shoal Cove on Revillagigedo Island was assessed as having 43 plants in 2011, and 30 in 2019.
6 Habitat trend	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.

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Criteria	*Rank*	*Rationale*
on Tongass NF		In British Columbia the habitat is moist to mesic meadows, avalanche tracks, open forests in upper montane to lower alpine zone (Douglas et al. 1998). On the Tongass National Forest, habitat includes glacial river edge, gravel bar in river, gravel by edge of road, sandy beach at confluence of lake inlet, granitic face above lake and below a snowfield. These habitats are difficult to group under broad habitat groups but may be encompassed by alpine and riparian habitat. Alpine habitat has moderate ecosystem integrity and is trending lower largely due to climate change (Turner and Mallot 2025). Riparian habitat is likely relatively stable but may also be trending lower due to climate change.
7 Habitat vulnerability or modification; other threats	**A**	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors Potential habitat of moist to mesic meadows, avalanche tracks, and open forests in upper montane to lower alpine zone (Douglas et al. 1998) patchy or in gaps on the southern Tongass National Forest, restricted to Misty Fjords mainland and Revillagigedo Islands. Ketchikan/Misty Fjords Ranger Districts only, Carroll Inlet on Revilla Island east to mainland to Blossom River. In alpine habitat and open meadows, changes in temperature, precipitation and evapotranspiration may lead to increased proportion of woody vegetation relative to herbaceous and loss of plant communities. Habitat below snowfields may have altered hydrology due to increased temperatures and decreased precipitation as snow (Halofsky et al draft). Additionally, riparian habitat is likely to have more frequent and extreme flood events due to climate change (Halofsky et al draft), which may impact plant communities. However, with the broad range of habitats that this species is known to, it may be able to acclimate or disperse to new habitat if it is disturbed in current habitat. Two records are along roads (Shoal Cove and Quartz Hill) and may be impacted by off-road vehicle traffic. Reed canarygrass is documented along Shoal Cove Road and Oxeye Daisy is along the Quartz Hill road and may out compete Cirsium edule. One record cites ecological succession as a threat to the occurrence on a gravel bar in the Chickamin River (USFS 2025). Hydro-energy development in alpine lake habitats may also impact habitat for this plant; however, none are currently proposed in any of the known locations. These projects would have relatively low footprint compared to the total available habitat in wilderness areas in the southern Tongass National Forest.

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Criteria	*Rank*	*Rationale*
		This species is susceptible to misidentification as invasive thistle (bull or Canada thistle) causing people to pull it. High elevation sites considered more protected than those locations located on roads. Two known occurrences are in human-disturbed habitats, but comprise over half the known individuals in the plan area.
8 Life history and demographics	**B**	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Cirsium edule* is a monocarpic colonizer, growing as a low rosette of leaves for a number of years, then sending up the tall flowering stem in spring, with the plant dying after seed maturation. It is shade intolerant, and requires moist soil. *Cirsium edule* is a perennial, growing to 2 meters in height, and grows in colonies. Individual lifespan is estimated at three to four years (University of Washington 2006, Klinkenberg 2023). There is no information on species demographics in Alaska. Some occurrences are known to disturbed sites such as helipads and road edges (USDA FS 2023).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Cirsium edule* var. *macounii* within the plan area based upon the following:

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- Significant threats – Climate change may allow woody encroachment into meadow and alpine habitat. Riparian habitat may be degraded by increased frequency and intensity of flooding. Two occurrences are along roads and may be impacted by invasive species and off-road vehicle traffic. One may be impacted by natural riverside succession. One occurrence is below a snowfield that is likely to decline as temperatures warm and more precipitation falls as rain.
- Declining populations or habitat trends – There is insufficient information on population trends due to little or no monitoring. Habitat is likely to be degraded by climate change.
- Restricted range – The occurrences on the Tongass NF are the northern edge of the range. This species occurs in the coastal mountains of southeastern Alaska and British Columbia to Vancouver Island, the Olympic Peninsula, and northern Cascades of Washington, and the mountains of northwestern Oregon (FNA 2023, CPNWH 2023). Most populations outside of the Tongass National Forest are in Washington, Oregon, and across British Columbia.
- Low populations or restricted ecological conditions – Because the number of occurrences is moderately low (eleven), and the numbers of plants within these occurrences are low, species persistence on the Tongass NF may be somewhat vulnerable to imperilment by stochastic events, however much available habitat in the vicinity of known occurrences remains unsurveyed. Suitable ecological conditions do not appear to be restrictive, though llittle is known about the specific habitat requirements for *Cirsium edule* var. *macounii*. Habitat from elsewhere within the range of this taxon has been described as moist to mesic meadows, avalanche tracks, and open forests in upper montane to lower alpine zone.
- Other factors – The available data on life history factors for this species is insufficient to conclude substantial concern for persistence in the plan area. Long distance wind dispersal can assist in the colonization of suitable habitat, however, fecundity is low and seeds are reported to have a 50% germination rate. Further, a tolerance for disturbed habitat is reported for the species, indicating a capacity for persistence through intermediate disturbance events, but the delay in flowering of one to several years post-germination may negatively impact ability to colonize new suitable habitat.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	ACCS_Mar25 (EO0)[8/11/1995]	Tongass National Forest, Hidden Inlet Lake inlet, Misty FNM		NA	NA
1	ACCS_Mar25 (EO4)[no date]	PEARSE INLET, HIDDEN INLET LAKE, near major stream inlet on south shore of lake.	Sandy beach		
2*	ACCS_Mar25 (EO0)[9/27/2011]	Tongass National Forest			
2	TESP_Mar25 (100552P000312)[9/27/2011]		Plants are located along the road edge, under williow re-growth. It occurs within a distance of approximately 30 feet. The plants do not extend to the rock sidefill, nor are they occuring immediatly on the side of the road in the ditch.		
3*	TESP_Mar25 (100552P000311)[7/15/2019]		Carygrass		
3	TESP_Mar25 (100552P000311)[no date]		Plants growing around permimeter of paved helipad. Site highly disturbed. All vegetation around the helipad likely removed in the past and/or brushed.		
3	TESP_Mar25 (100552P000311)[no date]		Carygrass		
3	TESP_Mar25 (100552P000311)[no date]		Plants growing around permimeter of paved helipad. Site highly disturbed. All vegitation around the helipad likely removed in the past and/or brushed.		
3	ACCS_Mar25 (EO0)[6/30/2011]	Tongass National Forest	Substrate= Gravel; Parent Material= ; Soil Moisture= Dry; Soil Texture= ; Light Exposure= Full Shade		
4*	ACCS_Mar25 (EO0)[7/12/1999]	Tongass National Forest, Kayak survey, Punchbowl Cove, cut off			

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5*	ACCS_Mar25 (EO0)[8/08/2008]	Tongass National Forest			
5	ACCS_Mar25 (EO0)[8/08/2008]	Tongass National Forest			
5	ACCS_Mar25 (EO0)[8/08/2008]	Tongass National Forest			
6*	ACCS_Mar25 (EO0)[8/06/2022]	Tongass NF, Misty Fjords Ntl Monument Wilderness. Walker Lake snowfield. plants scattered at base of snowfield above the shrub community; likely under the snow as well. we did not survey the length of the snowfield for plants			
7*	ACCS_Mar25 (EO0)[8/09/2004]	Tongass NF, Misty Fjords Ntl Monument Wilderness. Confluence of S Fork Chickamin and Barrier Cr.; approximately 400 meters below the mouth of barrier creek.	gravel bar, sandy substrate, gravel bar converting to brush, Alder, small cottonwoods, willow, and grasses present. Quite a bit of moss had grown in the area.		
8*	ACCS_Mar25 (EO0)[8/09/2004]	Tongass NF, Misty Fjords Ntl Monument Wilderness. Humpy Creek			
9*	ACCS_Mar25 (EO0)[8/06/1999]	Tongass National Forest, Leduc Lake, MistyFNM			
9	ACCS_Mar25 (EO0)[10/01/1996]	Tongass National Forest, .5 mi W Leduc Lake, Misty FNM			
10*	ACCS_Mar25 (EO3)[no date]	Half mile northwest of Leduc Lake			
10	ACCS_Mar25 (EO0)[7/28/2005]	Tongass National Forest, MISTY FIORDS N.M, LEDUC LAKE	IN CRACKS OF GRANITIC FACE		
11*	ACCS_Mar25 (EO1)[no date]	Hyder, along edge of glacial streams.			
	Occurrences not on Tongass				
12*	ACCS_Mar25 (EO2)[no date]	Hyder area, road above Premier Mine, British Columbia, 18.5 miles from Hyder intersection. Survey site #M93-46.			

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Cladonia alaskana

Cladonia alaskana [A. Evans, 1947]

Alaska Cup Lichen

Global Rank: **G4**

Alaska State Rank: **S3**



photo: University of Washington Herbarium

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce or isolated. *Cladonia alaskana* is known from four estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The occurrence records are located on Crystal Mountain on Mitkof Island; east of Thunder Mountain on the mainland; Horn Cliff area on the mainland; and Kuiu Mountain on Kuiu Island (Appendix 1; USFS 2025b). The known occurrences on the Tongass NF occur in the alpine and subalpine (Appendix 1). There are no known associated species for *Cladonia alaskana* on the Tongass NF and no documented difficulties identifying this species. There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CLHb 2025).
2 Distribution in surrounding	**C**	C = Wide distribution outside the Tongass National Forest. Global Rank G4 (Apparently Secure), Alaska State Rank SNR (No Status Rank) Yukon SU (Unrankable), Northwest Territories S4S5 (Apparently Secure/ Secure)

Criteria	*Rank*	*Rationale*
geographic area		*Cladonia alaskana* ranges from Alaska, the Yukon, Manitoba, the Thelon River and northmost on the Banks Island in the Northwest Territories, Greenland, and north and northeastern Russia (NatureServe 2025, GBIF 2025, Gould 1994). It typically occurs in heath and tussock tundras at elevations of 3 m to 3000 m (CLH 2025a, NatureServe 2025). It occurs in arctic alpine tundra, south facing talus slopes, fellfields, and occasional forest floor, primarily on rock, alpine sod, and moss (CLHa 2025, Thomson and Ahti 1994, Gould 1994). Its range outside southeastern Alaska continues north to Three Guardsmen Pass in British Columbia, Canada approximately 390 km away (CLHb 2025).
3 Dispersal capability	**B**	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Cladonia alaskana* is a lichen species which grows on organic matter and on rocks (CLHa 2025, NatureServe 2025). Its main dispersal mechanisms are by ascospores and asexual propagules (pycnidia) via wind dispersal (CLHa 2025, NatureServe 2025). Dispersal of ascospores may achieve long distances, >5 km, comparable to lichens that depend on clonal reproduction (Ronnås et al. 2017). However, there is limited information on the dispersal capabilities of this lichen as it pertains to environmental conditions within the Tongass.
4 Abundance on Tongass NF	**B**	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. The four occurrences of *Cladonia alaskana* indicate abundance as either "Common (>10 individuals but less than 50 percent of boles and branches have species present)" or "uncommon" with less than 10 individuals (Appendix 1; USFS 2025e).
5 Population trend on Tongass NF	**D**	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Cladonia alaskana* on the Tongass NF are unknown (USFS 2025b).
6 Habitat trend		A = Decline in habitat quality or quantity.

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Criteria	*Rank*	*Rationale*
on Tongass NF	**A**	The habitat for the 4 occurrences of *Cladonia alaskana* on the Tongass NF are rocky alpine or subalpine forest (USFS 2025b). In adjacent locations including Tatshenshini-Alsek Provincial Park, British Columbia, it also occurs in tundra and talus (CLHb 2025). On the Tongass NF, alpine habitat has moderate habitat integrity, and it is trending lower due to climate change (Turner and Mallot 2025). Subalpine habitat ecosystem integrity is high, but it is unclear how climate change will impact this ecosystem (Turner and Mallot 2025). Given that this species was growing on mossy rock and ground, it is likely that shifts in tree species and form due to climate change may negatively impact habitat for this species.
7 Habitat vulnerability or modification; other threats	**A**	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors. Climate change may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al DRAFT). In northern Alaskan tundra, competition from vascular plants in lithic habitats due to elevated temperatures has been shown to negatively impact lichen diversity (Lang et al. 2012). It is unknown how *Cladonia alaskana* in alpine communities within the plan area will respond to warming temperatures and projected summer drought stress projected for the region (Halofsky et al. DRAFT).
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. *Cladonia alaskana* is a fruticose green algal lichen that grows on rock and organic matter (CLHa 2025, NatureServe 2025). *Cladonia alaskana* generally sexually reproduces with apothecia; Asexual reproduction is through pycnidia (CLHa 2025). No information about reproductive success and survival or mortality of *Cladonia alaskana* from the Tongass NF is available. The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Alaska cup lichen (*Cladonia alaskana*) is not recommended as a Species of Conservation concern based upon the rationale below

- **Significant threats:** Climate change is the main stressor to this species and its alpine habitat. Trends of increasing temperature and altered precipitation patterns may lead to upslope shifts in tree line elevation, potentially leading to an increased proportion of woody vegetation relative to herbaceous. These changes in community species composition would result in reduced quality and increased fragmentation of the alpine habitat most suitable to *Cladonia alaskana*.

- **Declining trends:** Research conducted on the response of this species to increased temperatures has occurred in the tundra of northern Alaska; it is unknown how this species will respond to changing climatic conditions in the alpine habitat it occupies within the plan area. Follow-up surveys of the known occurrences of *Cladonia alaskana* have not taken place; population trends for the species in the plan area are unknown.

- **Restricted ranges:** Occurrences of *Cladonia alaskana* in the plan area are disjunct from the nearest BC occurrences by 390km, but the known range of the species extends north and south of the plan area.

- **Low population numbers or restricted ecological conditions:** The species is known from four occurrences on the Tongass NF, all of which are on the Central Tongass, but spread out between the mainland, Mitkof Island and Kuiu Island. The abundances at three locations were common (>10 individuals but less than 50 percent of boles and branches have species present). Dispersal for this species does not

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appear limited and thus it may be able to disperse to new areas as alpine and subalpine habitat undergo changes in the plan area.

- **Other factors:**
- **There is insufficient information to indicate any additional factors that may contribute to the concern for this species' persistence in the plan area.**

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Tongass NF Lichen Database (USFS 2025b) [8/1/1991]**	**Mitkof Is. Crystal Mtn. NE ridge.**	***Tsuga mertensiana, Vaccinium* sp.*, Picea sitchensis, Phyllodoce galnduliflora, Empetrum nigrum***	**Uncommon (4 to 10 individuals)**	
2*	**Tongass NF Lichen Database (USFS 2025b) [7/3/1992]**	**Mainland. Stikine-LeConte Wilderness Area. On mountain east of Thunder Mtn.**	**Alpine, *Cladothamnus pyrolaeflorus, Cassiope mertensiana, Fauria crista-galli*, various mosses.**	**Common (>10 individuals but less than 50 percent of boles and branches have species present)**	
3*	**Tongass NF Lichen Database (USFS 2025b) [7/1/1997]**	**Mainland, across from Petersburg, Horn Cliff Area. Crystal Creek Drainage.**	**Alpine habitat**	**Common (>10 individuals but less than 50 percent of boles and branches have species present)**	
4*	**Tongass NF Lichen Database (USFS 2025b) [6/26/1998]**	**Kuiu Is., Tebenkof Wilderness. Kuiu Mountain summit area.**	**Alpine habitat with alpine heath, *Cassiope* sp., *Leutkea* sp., large boulders with lichens and mosses such as *Grimmea* and *andreaea*. *Lupinus* sp. growing in grassy areas between boulders.**	**Common (>10 individuals but less than 50 percent of boles and branches have species present)**	

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Cololejeunea macounii

Cololejeunea macounii [(Spruce) A. Evans, 1902]

A liverwort

Global Rank: **G3G4**

Alaska State Rank: **S1**



photo: (CC0) Randal

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	**A**	A = Scarce OR isolated. *Cololejeunea macounii* is known frrom three estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on the northeast part of Etolin Island (Occurrence 1), on the west part of Wrangell Island (Occurrence 2), and just north of Sitka (Occurrence 3) (Appendix 1; CPNWH 2025, iNaturalist 2025, USFS 2025a). Occurrence 3 was collected in a salmonberry thicket growing on salmonberry canes. The other two occurrences were found on red alder. There is one other occurrence of this species in southeastern Alaska outside of the Tongass NF, a site adjacent to the Wrangell Institute, within 400 m of the Tongass NF boundary (CPNWH 2025). Across its range, *Cololejeunea macounii* is typically found growing epiphytically in moist forests (CPNWH 2025). This species may be confused for other small epiphytic liverworts which can be present nearby (iNaturalist 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	**B**	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF. Global Rank G3G4, Alaska State Rank S1 British Columbia S3S4 *Cololejeunea macounii* is narrowly distributed in coastal regions of mostly the temperate North Pacific (CBH 20205). There are numerous collections in Japan as well as mainland Asia from Vietnam and China through the Russian far east to Korea (Bakalin 2019, CBH 2025). In North America, *Cololejeunea macounii* is present in western British Columbia and southeast Alaska (Bakalin 2019, CBH 2025). The Tongass NF occurrences are the northern edge of the species' known range. Across its range, *Cololejeunea macounii* occurs in moist forests at elevations of 0 m to 2,000 m (CBH 2025). It is typically found as an epiphyte on bark or leaves but can also be found on decaying wood or even rock in some areas (Bakalin 2019, CBH 2025). There are some collections from the southern Tongass forest, through coastal British Columbia to the border of Washington (but not in Washington), along with collections from the northern Pacific coast of Asia, but most collections are from the southern part of the Japanese island of Honshu (CBH 2025).
3 Dispersal capability	**D**	D = Insufficient information to draw inferences about criterion. *Cololejeunea macounii* is a leafy liverwort with an epiphytic growth habit (Bakalin 2019). Its main dispersal mechanism is by spores or possibly fragmentation (Bakalin 2019). *Cololejeunea macounii* is often found growing on short lived substrates like leaves and twigs, suggesting it has effective dispersal within habitats it occupies, but there is minimal information on the species in the literature.
4 Abundance on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. *Cololejeunea macounii* is known from three occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CBH 2025).

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	**D**	D = Insufficient information to draw inferences about criterion. Population trends of known occurrences of *Cololejeunea macounii* on the Tongass NF are unknown (USFS 2025a, CBH 2025).
6 Habitat trend on Tongass NF	**B**	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat for the three occurrences of *Cololejeunea macounii* on the Tongass NF is spruce-hemlock forest, in or near riparian areas, generally growing on red alder (CBH 2025). In the Baranof Island location (Occurrence 3) it is growing on salmonberry (Appendix 1; iNaturalist 2025). These habitats can be grouped under spruce hemlock forest near creeks which includes well drained, poorly drained, and riparian forests that are very common on the Tongass NF (Turner and Mallott 2025). Forested habitat generally has high to moderate ecosystem integrity, depending on whether it was harvested and if silvicultural treatments were implemented to improve stand structure, and moderate to low vulnerability to stressors (Turner and Mallot 2025). In Alaska and British Columbia, *Cololejeunea macounii* grows in moist forest types, the substrate is primarily hardwood bark, in sites that are at low elevations near the coast (CBH 2025). There are a lot of habitats in the Tongass NF that meet those criteria, but there is little information if there are more specific microclimate requirements that contribute to the rarity of *Cololejeunea macounii*. Timber harvest has occurred in the recent past within 200 m to the north, west, and east of Occurrence 3 and has been generally widespread in that part of western Baranof Island (USFS 2025d).
7 Habitat vulnerability or modification; other threats	**B**	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for epiphytic species with high humidity requirements such as *Cololejeunea macounii* (Turner and Mallott 2025, Wiles and Warren 2025). Suitable forested habitat may be impacted by ongoing timber harvest but overall habitat is likely to remain stable.

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	**D**	D = Insufficient information to draw inferences about criterion. The life history of *Cololejeunea macounii* is largely unknown. It is a leafy liverwort with a dense mat growth habit (Bakalin 2019). It produces leafy stems with bilobed leaves (Bakalin 2019). *Cololejeunea macounii* is reported to produce sporocarps and is autoicous, meaning it produces male and female structures on different parts of the same plant, however there is little information on how frequently this occurs within its Tongass NF range (Bakalin 2019). Specialized asexual reproduction is absent for this species (Bakalin 2019).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Cololejeunea macounii is not recommended as a Species of Conservation Concern based on the rationale below:

- **Significant threats:** Timber harvest may be a threat to this species, although across its range it typically grows on hardwoods. In southeast Alaska it grows on red alder and salmonberry, which could be impacted by harvest but would not be targeted. Climate change is projected to lead to increased temperatures, which would increase evapotranspiration and cause summer drought conditions. It is unclear the impact

this would have on this epiphytic species that prefers humid growing sites.

- **Declining trends;** Population trends are not known. Forested habitat is relatively stable, but there may be additional habitat requirements that result in this species' rarity on the Tongass NF.

- **Restricted ranges;** The species is known from the temperate North Pacific, with records in Asia, eastern Russia, British Columbia, and Southeast Alaska. Southeast Alaska is the northern extent of the range.

- **Low population numbers or restricted ecological conditions;** There are only three occurrences of this species known on the Tongass NF. It is unknown why this species is rare on the Tongass NF when humid forested habitat is abundant. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.

- **Other factors;** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [6/14/1968]**	**stream from kunk lake to zimovia strait etolin i. (vicinity of wrangell)-spruce hemlock forest**	**branch of alder by stream.**		
1	ACCSBryo_Oct24 [6/14/1968]	stream from kunk lake to zimovia strait etolin i. (vicinity of wrangell)-spruce hemlock forest	branch of alder by stream.		
1	CBH 2025 (UBC) [06/14/1968]	stream from kunk lake to zimovia strait etolin i. (vicinity of wrangell)-spruce hemlock forest	branch of alder by stream.		
1	CBH 2025 (UBC) [06/14/1968]	stream from kunk lake to zimovia strait etolin i. (vicinity of wrangell)-spruce hemlock forest	branch of alder by stream.		
2*	**ACCSBryo_Oct24 [1/25/2015]**	**Southeast Alaska panhandle, Wrangell Island. Approximately 12 miles SSE of the Burough of Wrangell.**	**Vegetation Type: Closed Alnus rubra dominated riparian on saturated soils. Substrate: partially shaded moist Alnus rubra trunk.**		
2	CBH 2025 (ALA) [01/25/2015]	Southeast Alaska panhandle, Wrangell Island. Approximately 12 miles SSE of the Burough of Wrangell.	Vegetation Type: Closed Alnus rubra dominated riparian on saturated soils. Substrate: partially shaded moist Alnus rubra trunk.	Identification remarks: Former nature_of_id: expert.	
3*	**iNaturalist 2025 [4/1/2025]**	**in a small thicket over a seep between two tributaries of the south fork of Starrigavan Creek, not far above their confluence**	**growing on dead salmonberry cane**		
	Occurrences not on Tongass NF				

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4	CBH 2025 (UBC) [06/05/1968]	rainbow falls trail, adjacent to wrangell inst. ca. 3 mi. s of wrangell, wrangell i.	on alder bark at edge of forest stream.		

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Crossocalyx hellerianus

Crossocalyx hellerianus [(Nees ex Lindenb.) Meyl., 1939]

Heller's Notchwort

Global Rank: G5

Alaska State Rank: S2



photo: (CC0) Braden J. Judson

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated.* *Crossocalyx hellerianus* is known from four ocurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 miles). These occurrences are located on north central Wrangell Island (Occurrence 1), on the mainland near the Stikine River (Occurrence 2), on the northwest coast of Yakobi Island, south of Glacier Bay National Park (Occurrence 3), and eastern Douglas Island, near Juneau (Occurrence 4) (Appendix 1; CBH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in moist forests, including Sitka spruce – Western hemlock and yellow cedar – mountain hemlock subalpine forests. Occurrences 1 and 2 were collected from bark or tree bases (CBH 2025). This habitat is somewhat typical for this species for the species, although it is more commonly found on rotted logs (BBS 2025). The other records do not specify the substrate. There are two occurrences of this species in southeastern Alaska outside of the Tongass NF, one near Juneau and one in Glacier Bay National Park (CBH 2025). This species may be confused with other minute liverworts that grow on old logs, but the red gemmiferous shoots are distinctive (BBS 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank S2 British Columbis S4, Alberta S3, Idaho S1 *Crossocalyx hellerianus* is broadly distributed throughout the northern hemisphere (CBH 2025). Most collections are from Northern Europe and the forested parts of the United States and Canada, but there are collections from as far south as Mexico in North America and Italy in Europe (CBH 2025). There are a few collections from the coastal areas of northeast Asia, but none from interior Asia (CBH 2025). In North America, *Crossocalyx hellerianus* is present in 11 Canadian provinces and territories as well as at least 19 US states, 2 additional states have a single questionable collection each (CBH 2025). Across its range, *Crossocalyx hellerianus* occurs in moist forests, often with species of spruce, hemlock, or cedar at elevations ranging from sea level in northern sites to over 3,000 m in Mexico (CBH 2025). It is typically found on rotted logs and dead tree trunks, generally in shady sites, there are also reports from live trees and the ground near decayed logs (CBH 2025). Collections of *Crossocalyx hellerianus* are common in Europe, northeastern North America and the Rocky Mountains from Montana through the Yukon; elsewhere it is reported from more scattered collections (CBH 2025). The habitats where *Crossocalyx hellerianus* occur typically have moist soils with high organic matter (CBH 2025). In southeastern Alaska this species is known from the Tongass NF; its range continues northwest in Alaska for about 800 km to a site on an island in Prince William Sound and about 1000 km to another site on the shore of Illiamna lake (CBH 2025). There also are 2 collections on the Canada side of the Alaska Canada Border near the Yukon River and in the southeast part of the Brooks Range, about 700 and 1,200 km north of the Tongass NF respectively (CBH 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Crossocalyx hellerianus* is a leafy liverwort with a terrestrial growth habit (BBS 2025). Its main dispersal mechanism is by spores and gemmae (BBS 2025).

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* *Crossocalyx hellerianus* is known from four occurrences on the Tongass NF (Appendix 1). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CBH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends of known occurrences of *Crossocalyx hellerianus* on the TNF are unknown (USFS 2025a, CBH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for the four occurrences of *Crossocalyx hellerianus* on the TNF is moist Sitka spruce – western hemlock forest or yellow cedar – mountain hemlock subalpine forest or mountain hemlock forest (CBH 2025). These habitats can be grouped under forest and subalpine habitat which are very common on the Tongass NF (Turner and Mallott 2025). Subalpine ecosystem integrity is high, but climate change is likely to alter this ecosystem as mountain hemlock shifts up in latitude and elevation and western hemlock and Sitka spruce expand into the lower elevations (Turner and Mallot 2025). It is difficult to predict overall impacts to the subalpine but large amounts of habitat are likely to remain. Forested habitat has moderate to high ecosystem integrity, depending on whether it was harvested and thinned and moderate to low vulnerability to stressors (Turner and MAllot 2025). Overall forested habitat is relatively stable, but given the rarity of this species, there may be additional habitat requirements. Invasive species that can survive in or near moist forests, such as *Phalaris arundinacea* and *Phleum pratense*, are known to occur in or near the coordinates for Occurrence 1 (USFS 2025b). It is unclear how non-native species might affect habitat suitability for this species.

Criteria	*Rank*	*Rationale*
		Timber harvest has occurred in the recent past within 100 m to the south from Occurrence 1 and is widespread in the vicinity south and east of Occurrence 1 on Wrangell Island (USFS 2025c). This might indicate a negative trend in habitat quality at those sites.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Timber harvest and climate change may impact habitat suitability for *Crossocalys hellerianus*. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress species with consistent substrate moisture requirements such as *Crossocalyx hellerianus* (Turner and Mallott 2025, Wiles and Warren 2025). Additionally, timber harvest is likely to be ongoing and may impact habitat or individuals in productive forest.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Crossocalyx hellerianus* is largely unknown. It is a leafy liverwort with a dense mat growth habit (BBS 2025). It produces leafy stems with ecostate leaves that are two lobed (BBS 2025). *Crossocalyx hellerianus* can produce sporocarps but there is no information on how frequently it does so within its TNF range. Specialized asexual reproduction is in the form of clusters of gemmae produced at the tips of shoots that are distinctive and consistently produced for this species (BBS 2025). The life span of individual *Crossocalyx* plants has not been measured, but it is likely vegetative spread can allow the organism to persist on the substrate for as long as site conditions remain favorable.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒

Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Crossocalyx hellerianus is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Timber harvest may impact habitat or occurrences of this species in productive forest. Climate change projected to lead to increased temperatures and evapotranspiration, which may cause summer drought stress. Little is known about life history to inform how this species will respond to climate change.
- **Declining trends:** Population trends are not known. Generally, forested and subalpine habitats are likely to remain abundant on the Tongass NF. It is unknown if there are more specific habitat requirements for *Crossocalyx hellerianus*
- **Restricted ranges:** This species is somewhat disjunct from the range going north but is not at the edge of the range or endemic.
- **Low population numbers or restricted ecological conditions:** There are four known occurrences on the Tongass NF. Bryophytes are not typically recorded in botanical surveys so it may be more common than survey data indicates. Habitat as described is broadly available, but it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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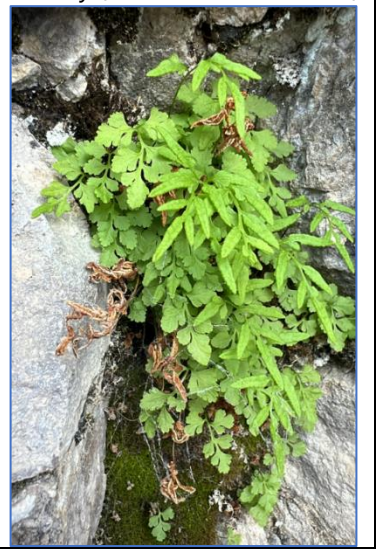
Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [3/19/2016]**	**Southeast Alaska panhandle, Wrangell Island. Approximately 10 miles SSE of the Borough of Wrangell. Salamander Trailhead is accessed via logging road ~ 2 miles north of Lower Salamander Campground.**	**Callitropsis nootkatensis/Tsuga mertensiana dominated subalpine woodland interspersed with sloping sphagnum muskeg. Substrate: bark, mostly shaded.**		
2*	**ACCSBryo_Oct24 [6/06/2020]**	**Southeast Alaska panhandle mainland. Approximately 20 miles due NNE of Wrangell. Boat only access via Stikine River.**	**Young but pristine Picea sitchensis and Tsuga heterophylla dominated forest on steep rocky ground adjacent to a small stream with with strong carbonate influence. Substrate: base, moist, mostly shaded.**		
3*	**ACCSBryo_Oct24 [7/20/2021]**	**Tongass National Forest. West Chichagof-Yakobi Wilderness, Hoonah-Angoon area.**			
4*	**ACCSBryo_Oct24 [8/03/2008]**	**Juneau, Douglas Island, Dan Moller Trail on E side of island**	**Tsuga mertensiana**		
4	CBH 2025 (TRH) [08/03/2008]	Juneau, Douglas Island, Dan Moller Trail on E side of island	Tsuga mertensiana.		

Cryptogramma stelleri

Photo: Alan Weakley (CC0: iNaturalist 2025)



Cryptogramma stelleri (S.G. Gmel.) Prantl

Fragile Rockbrake

Global Rank: G5
Alaska State Rank: S3

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated. *Cryptogramma stelleri* is known from three occurrences on the Tongass NF (Appendices 1 and 2). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). Two of the occurrences are located on Prince of Wales Island and the third is on Kosciusko Island (Arctos 2025, CPNWH 2025, USFS 2025a). On the Tongass NF, *Cryptogramma stelleri* is found on steep cliff faces or rock faces (Appendix 1). Observational and soils data, as well as aerial imagery, for occurrences 1 and 3 indicate that they are on limestone substrate in conifer forest (Arctos 2025, CPNWH 2025, NRCS 2025b, USFS 2025a). Data for occurrence 2, including observational data, aerial imagery, and soil maps, indicate the rock outcrop is surrounded by muskeg wetland without mapped limestone substrate (NRCS 2025b, USFS 2025a). Very little information about plant associates is provided for these occurrences

Criteria	*Rank*	*Rationale*
		other than that occurrence 1 was growing with "bryophytes and hepatics." These are the only locations for this species in southeast Alaska (Arctos 2025, CPNWH 2025).
2 Distribution in surrounding geographic area	C	C = Widely distributed outside of the Tongass NF. Global Rank: G5 (Secure), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: S2 (Imperiled): Labrador, Newfoundland, Northwest Territories, Nova Scotia, Nunavut; S3 (Vulnerable): Alberta, New Brunswick, Yukon; all others are S4 (Apparently Secure) or not present. United States: SH (Possibly Extirpated): New Jersey; S1 (Critically Imperiled): Connecticut, Idaho, Massachusetts, Maine, Nevada, New Hampshire, Oregon, Pennsylvania, Utah, West Virginia, Wyoming; S2 (Imperiled): Colorado, Illinois, Montana, Washington; S3 (Vulnerable): Alaska, Iowa, Michigan, Vermont; all others are S4 (Apparently Secure), SNR (Not Ranked), or not present. (NatureServe 2025). *Cryptogramma stelleri* is a perennial herb in the Pteridaceae with a broad distribution in North America and Eurasia (Alverson 1993, POWO 2025). It has been reported from most of the provinces and territories of Canada and the northwestern and northeastern United States with a gap in central Canada and the central U.S. (Alverson 1993, NatureServe 2025, NRCS 2025a). While it is widespread in North America, it is not abundant at any site, and the most recent NatureServe global status review (from 2016) estimates the species' global abundance at 2,500—10,000 individuals (NatureServe 2025). There are three occurrences of *Cryptogramma stelleri* from the Tongass NF: two on Prince of Wales Island and one on Kosciusko Island (Arctos 2025, CPNWH 2025, USFS 2025a). The nearest Alaskan records are ~ 525 miles north-northwest near the Chisana River, and ~ 670 miles to the northwest in Chugach State Park (Arctos 2025, CPNWH 2025). There are widely scattered records in central, western, and northern Alaska (Arctos 2025, CPNWH 2025). To the east,

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Criteria	*Rank*	*Rationale*
		the species is widely distributed but infrequent in British Columbia, especially in the east and southeast (Klinkenberg 2020, Arctos 2025). *Cryptogramma stelleri* occurs on calcareous substrates in sheltered wet cliff crevices and rock ledges from the steppe and montane to alpine zones at elevations ranging from near sea level to approximately 9845 feet (3000 m) (Porsild and Cody 1980, Alverson 1993, Klinkenberg 2020). It is generally restricted to calcareous substrates, but in the Northwest Territories it also occurs on moist shale slopes (Porsild and Cody 1980).
3 Dispersal capability	A	A = Very limited dispersal ability. *Cryptogramma stelleri* has a typical fern life-cycle with a conspicuous sporophyte (spore-bearing) generation alternating with a free-living but tiny gametophyte (sexual) generation (USFS 2010). Spores, rather than seeds, are the dispersal unit of ferns (USFS 2010). Spores are thought to mainly be dispersed via wind and animals (Brock 2025), although they might also be dispersed via water movement. Under the right conditions, a spore produces a gametophyte which produces sperm and eggs, and a moist environment with a film of water is required for the sperm cell to travel to the egg cell (USFS 2010). During a 20-year monitoring study in Iowa, gametophytes of *Cryptogramma stelleri* were never observed in nature, suggesting that they did not survive for long or that suitable conditions for gametophyte establishment were not present (Peck et al. 1990). *Cryptogramma stelleri* has been characterized as having a low reproductive potential (Peck et al. 1990), and a similar finding for the related species *Cryptogramma crispa* was explained by observed delays in development and fertilization of gametophytes, together with the short growing season for sporophyte establishment and scarcity of safe sites for spore germination and gametophyte establishment in its rocky habitat (Pajarón et al. 1999). In addition, Peck et al. (1990) found that in their study area the mating system of *Cryptogramma stelleri* is predominantly outcrossing (requiring two gametophytes), which may reduce the potential for new populations to become established through long-distance spore dispersal, because two spores would need to land in close proximity. Based on its low reproductive potential and low potential for long-distance spore dispersal, this fern has a very limited dispersal ability.

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Cryptogramma stelleri* has three occurrences on the Tongass NF, with two on Prince of Wales Island and one on Kosciusko Island (Appendices 1 and 2). Occurrence 2 has an undated population count (likely made in either 2011 or 2018) of about 50 plants, while occurrence 3 has a population count made in 2010 of about 10 plants (ANHP-ACCS 2025, USFS 2025a). Based on the number of occurrences (3) and the fewer than 100 plants observed at occurrences 2 and 3, *Cryptogramma stelleri* is uncommon within the Tongass NF boundary.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for known occurrences of *Cryptogramma stelleri* on the Tongass NF are unknown due to lack of repeat visits to the occurrences (Arctos 2025, CPNWH 2025, USFS 2025a). Although data indicate that occurrence 2 was visited twice, a population count was only recorded once (ANHP-ACCS 2025, USFS 2025a).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. On the Tongass NF, *Cryptogramma stelleri* is found on steep cliff or rock faces, usually in limestone substrate (Appendix 1). Based on observational and soils data and aerial imagery, occurrences 1 and 3 are on limestone substrate within or on the edge of conifer forest (Arctos 2025, CPNWH 2025, NRCS 2025b, USFS 2025a). Data for occurrence 2, including observational data, aerial imagery, and soil maps, indicate the rock outcrop is surrounded by muskeg wetland without mapped limestone substrate (NRCS 2025b, USFS 2025a). However, calcareous cliffs or outcrops are uncommon in the planning area and not well characterized. All three of the occurrences are within 0.5 mile of historical timber projects. Occurrence 1 is 0.5 mile from a 1992 timber project, occurrence 2 is 0.4 mile from several 1992 timber projects, and occurrence 3 is 0.3 mile from several timber projects from the 1970s and 1980s (USFS 2025d). It is unlikely that these historical timber projects affected the known cliff and rock face locations of *Cryptogramma stelleri*. Habitat is likely stable, although logging in limestone forests may have altered light regimes for *Cryptogramma stelleri*. Occurrence 3 is also in the vicinity of mapped non-native plants; *Phalaris arundinacea* (reed canary grass) and *Plantago major* (broadleaf plantain) have been observed 0.7 mile from occurrence 3. Given the specialized vertical cliff and rock habitat where *Cryptogramma stelleri* grows, it is doubtful that these non-native plants are a threat to its habitat.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The rock and cliff face habitat where *Cryptogramma stelleri* occurs is not well mapped on the Tongass NF. Fern gametophyte growth and sexual reproduction requires moisture and it is likely that *Cryptogramma stelleri* requires moist habitats. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for species with high soil moisture requirements such as *Cryptogramma stelleri* (Turner and Mallott 2024, Wiles and Warren 2024).
8 Life history and demographics	B	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. The fern *Cryptogramma stelleri* is a perennial herb that grows from 5–20 cm high (Alverson 1989, 1993). It has a typical fern life-cycle with a conspicuous sporophyte (spore-bearing) generation alternating with a free-living but tiny gametophyte (sexual) generation (USFS 2010). The sporophyte of *Cryptogramma stelleri* consists of a slender, creeping rhizome producing scattered, ephemeral, membranous leaves (Alverson 1989, 1993). As in other *Cryptogramma* species, the leaves are dimorphic (i.e., sterile or fertile) with the segments of the fertile leaves having their margins rolled under to protect the developing sporangia (Alverson 1989, 1993). New sporophyte growth begins during the spring season with the leaves dying back again by late summer (Alverson 1989, 1993). The spores are released at the end of the growing season and may be protected from freezing winter temperatures and desiccation under a blanket of snow (Peck et al. 1990, Pajarón et al. 1999, Pangua et al. 1999). The germination rate of *Cryptogramma stelleri* spores in laboratory culture was >90%, and gametophytes were readily established (Peck et al. 1990). Though 50% of the gametophytes were bisexual (producing both sperm and eggs), they had a low potential for self-fertilization (Peck et al. 1990, Pajarón et al. 1999). The mating system of *Cryptogramma stelleri* is thus predominantly outcrossing, which may reduce the potential for new populations to become established through long-distance spore dispersal (Peck et al. 1990). Fern gametophytes are thought to be a precarious link in the fern life-cycle since they generally consist of a single layer of cells and lack protective covering (Anderson 2021). During a 20-year monitoring study in Iowa,

Criteria	*Rank*	*Rationale*
		gametophytes of *Cryptogramma stelleri* were never observed in nature, suggesting that they did not survive for long or that suitable conditions for gametophyte establishment were not present (Peck et al. 1990). *Cryptogramma stelleri* has been characterized as having a low reproductive potential (Peck et al. 1990), and a similar finding for the related species *Cryptogramma crispa* was explained by observed delays in development and fertilization of gametophytes, together with the short growing season for sporophyte establishment and scarcity of safe sites for spore germination and gametophyte establishment in its rocky habitat (Pajarón et al. 1999). A modeling study of two species of rock-inhabiting ferns (*Asplenium adulterinum* and *Asplenium cuneifolium*) found that persistence of the long-lived sporophytes is the most important life-history stage (Bucharová et al. 2010). However, we lack information on the longevity of *Cryptogramma*. *stelleri* sporophytes, except that the rhizomes were described as shriveling in the second year following emergence of the leaves (Alverson 1989, 1993). Based on its low reproductive potential and low potential for long-distance spore dispersal, *Cryptogramma stelleri* might be inherently rare in spite of being widely distributed.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Cryptogramma stelleri is not recommended as a potential Species of Conservation Concern based upon the following:

- **Significant threats:** Timber harvest could indirectly affect suitable habitat for this species. However, the calcareous cliff and rock outcrops where this species occurs are uncommon, and it is unclear if timber harvest would directly impact this species' habitat. Expected changes in climatic conditions may increase growing season water deficit through shifts in precipitation patterns. This additional drought stress may adversely impact reproduction and establishment of this highly moisture dependent species.

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- **Declining trends:** There is insufficient data available to make inferences on the population and habitat trends for this species.
- **Restricted ranges:** *Cryptogramma stelleri* is not endemic to the plan area, and occurrences on the Tongass NF are not considered disjunct from conspecific populations off the plan area. Occurrences on the Tongass NF do not exist at the edge of this species' greater range.
- **Low populations or restricted ecological conditions:** While this species is geographically widespread, it is considered relatively rare across its range. With only three known occurrences, *Cryptogramma stelleri* is vulnerable to extirpation from the plan area by stochastic events.
- **Other factors:** There are no additional factors impacting the long-term persistence of this species in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:244126)[7/06/2010]**	**Ridge line between Red Lake and El Capitan Mountain, Petersburg Quad, Alexander Archipelago, Prince of Wales Island [Tongass NF].**	**In narrow crevice of limestone, near base of cliff, well-shaded. Growing with bryophytes and hepatics. [no other plants collected at this place and time]**		
1	ANHP-ACCS_Mar25 (EO2)[7/06/2010]	ridge line between Red Lake and El Capitan Mountain	in narrow crevice of limestone, near base of cliff, well-shaded		
2*	**USFS_TESP_Mar25 (100554P000403)[8/03/2011] Revisited 10/2/2018 but no additional information collected or noted]**	**[maps to Prince of Wales Island, E of Lake Galea on Tongass NF]**	**E-facing slope. Plants are growing on a large rock face, about 50' tall by 1000' long), about half-way up the east side of a mountain covered in muskeg**	**about 50 plants. Individuals growing on a large rock face, distributed across the length of the cliff (~1000' long) and height (~50')**	
2	ANHP-ACCS_Mar25 (EO1)[8/03/2011]	Tongass National Forest	Slope = 200; Aspect= E;		
3*	**USFS_TESP_Mar25 (100554P000552Y10)[6/19/2010]**	**[maps to Kosciusko Island, western ridge of Mount Francis, on Tongass NF]**	**NNE-facing slope. Growing along steep limestone cliffy sections of Mount Francis**	**about 10 plants. good vigor**	

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Cystopteris montana

Photo: Thompson Hyggen (CC0: iNaturalist 2025)



Cystopteris montana [(Lam.) Bernh. ex Desv.]

Mountain Bladderfern

Global Rank: G5
Alaska State Rank: SNR

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy OR gaps *Cystopteris montana* is known from 10 occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The Tongass NF occurrences are located on: Admiralty Island (1 occurrence), Chichagof Island (3), Coronation Island (1), Dall Island (1), Prince of Wales Island (3), and Heceta Island (1). Two occurrences are in Wilderness Areas: Occurrence 2 on Chichagof Island is in the West Chichagof-Yakobi Wilderness, and Occurrence 10 on Coronation Island is in the Coronation Island Wilderness (Appendix 1). There are five other occurrences in southeast Alaska that are near but outside of the Tongass NF boundary; one is in the Coast Mountains north of Skagway, and the other four are on Baranof, Dall, Kosciusko, and Prince of Wales islands (Appendix 1). On the Tongass NF, *Cystopteris montana* has been observed in the following habitats: serpentinite rock outcrop, limestone talus slope, rocky karst subalpine meadow, karst meadow sinkhole, stream side, calcareous fen margin, karst *Tsuga heterophylla-Picea sitchensis* forest, krummholz subalpine *Callitropsis nootkatensis* and fir forest, and limestone beach fringe (*Picea sitchensis*) forest from 15 to 3060 ft (5 to 933 m) (Appendix 1; Arctos 2025, CPNWH 2025). In Boggs

Criteria	*Rank*	*Rationale*
		et al. (2019) this species is listed as a component of Tongass NF karst fen vegetation based on a report by McClellan et al. (2003) on the calcareous fens of southeast Alaska. *Cystopteris montana* is generally found on calcareous substrates. Eight of the 10 Tongass NF occurrences are found on limestone substrate (Arctos 2025, CPNWH 2025, USGS 2025). Occurrence 1 is unusual in being found on ultramafic substrate that is mapped as serpentinite by the USGS (Arctos 2025, CPNWH 2025, USGS 2025). The substrate for the ephemeral stream where Occurrence 3 is located in the Game Creek watershed does not map to limestone (USGS 2025), but the location is 0.25 mile from a mapped karst fen (ACCS 2025), and this stream could be influenced by surrounding karst topography and limestone substrate. Plant associates observed or collected with *Cystopteris montana* on the Tongass NF are varied and include *Tsuga heterophylla*, *Picea sitchensis*, *Abies lasiocarpa*, *Callitropsis nootkatensis*, *Alnus sinuata*, *Vaccinium* sp., *Artemisia arctica*, *Carex macrochaeta*, *Carex scirpoidea*, *Trisetum spicatum* subsp. *alaskanum*, *Platanthera dilatata*, *Pedicularis oederi*, *Veronica wormskjoldii*, *Androsace chamaejasme* subsp. *lehmanniana*, *Ranunculus eschscholtzii*, *Hieracium triste*, and *Silene acaulis* (Appendix 1; Arctos 2025, CPNWH 2025). In addition, the coordinates of five occurrences are located in mapped Alaskan ecosystems of conservation concern: occurrence 8 is in Karst *Tsuga heterophylla-Picea sitchensis* forest, and occurrences 5, 6, and 7 are in karst meadow and heath (Boggs et al. 2029, ACCS 2025).
2 Distribution in surrounding geographic area	C	C = Widely distributed outside of the TNF Global Rank: G5 (Secure) (NatureServe 2025), Alaska State Rank: SNR (ACCS) State Ranks: Canadian provinces and territories: S1 (Critically Imperiled): Newfoundland, Ontario, Saskatchewan; S2 (Imperiled): Labrador; S3 (Vulnerable): Alberta, Northwest Territories; all others are S4 (Apparently Secure), S5 (Secure) or not present. United States: SH (Possibly Extirpated): Montana; S2 (Imperiled): Colorado; S4 (Apparently Secure) (NatureServe 2025). *Cystopteris montana* has a broad distribution in North America and Eurasia but is rare and local within that broad range (Porsild and Cody 1980, Haufler et al. 1993, POWO 2025). It has been reported from all the provinces and territories of

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Criteria	*Rank*	*Rationale*
		Canada except for Manitoba, Nunavut, and Prince Edward Island (Haufler et al. 1993, NatureServe 2025, NRCS 2025). In the United States it is only known from Alaska, Colorado, and Montana, and is presumed extirpated from Montana (Haufler et al. 1993, NatureServe 2025, NRCS 2025). There are widely scattered records in central, western, and northern Alaska (Arctos 2025, CPNWH 2025). To the east, the species is widely distributed but rare in British Columbia (Klinkenberg 2020, Arctos 2025). The closest record to the Tongass NF is just over the border into BC. Throughout its range, *Cystopteris montana* occurs in moist to wet woods, heathlands, meadows, scree, shaly slopes, rock outcrops, or along watercourses, often on calcareous substrates, in the montane and subalpine zones at elevations ranging from near sea level to approximately 11,500 feet (3,500 m) (Hultén 1968, Welsh 1974, Porsild and Cody 1980, Haufler et al. 1993, Klinkenberg 2020). The species is usually found on rocky substrates, most of which are calcareous (Blasdell 1963, Hultén 1968, Welsh 1974, Porsild and Cody 1980, Klinkenberg 2020).
3 Dispersal capability	B	B = Disperses only through suitable habitat On the Tongass NF, *Cystopteris montana* is found at a variety of sites, with all but one being calcareous or near calcareous substrates (Appendix 1). Spores are the dispersal unit of ferns (USFS 2010) and are thought to mainly be dispersed via wind and animals (Brock 2025), although they might also be dispersed via water movement. *Cystopteris montana* spores can only successfully establish in moist environments that also meet the species' ecological requirements. The broad range of the species suggests that long-range dispersal occurs; however, the species is rare and local throughout its range, suggesting the existence of limitations to spore dispersal, spore germination, fertilization, or sporophyte establishment.
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Cystopteris montana* is known from 10 occurrences on the Tongass NF, and none have population estimates (Appendix 1). Based on the number of occurrences, this species is uncommon within the Tongass NF boundary.

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, the population trends for the occurrences of *Cystopteris montana* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. On the Tongass NF, *Cystopteris montana* is known from a variety of habitats, almost always calcareous. Some occurrences are in Wilderness Areas, while others are near areas with timber harvest. The proximity of timber harvest and non-native invasive species to some occurrences may indicate a negative trend in habitat for those locations, but habitat for other occurrences is likely stable. Occurrences 3 and 4 are located within one mile of a historical timber project (USFS 2025d). Occurrence 3 was observed in an ephemeral stream with coordinates 0.25 miles from a mapped karst fen (ACCS 2025). Occurrence 3 is also 0.25 mile from a mapped 1992 timber project (USFS 2025d). Similarly, Occurrence 4, which was observed in a calcareous fen, has coordinates that are within or adjacent to mapped 1987 timber projects (USFS 2025d). It is unknown what effects these historical timber projects have had on these wetlands. The estimated coordinates of Occurrence 5 near the summit of Bald Mountain are 0.25 mile from mapped timber projects from the 1980s (USFS 2025d). However, the occurrence on Bald Mountain is upslope of the timber projects and likely was not impacted by timber activities. The estimated coordinates for Occurrence 8, along the Beaver Falls Trail in karst *Tsuga heterophylla-Picea sitchensis* (well drained) forest, are 0.1 mile from and surrounded by mapped timber projects from the 1960s and 1970s (USFS 2025d); it is likely that the habitat was impacted by timber activities. In addition, occurrence 8 along the Beaver Falls Trail is within 400 ft of numerous mapped non-native weeds that are along the 20 Road (USFS 2025b). These weeds include *Phalaris arundinacea* (reed canary grass), *Taraxacum officinale* (dandelion), *Phleum pratense* (Timothy grass), and *Agrostis gigantea* (redtop) (USFS 2025b).

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Invasive species, timber activities, and climate change may impact the habitat of *Cystopteris montana*. However, the species seems to occupy a fairly broad range of habitats, some of which are likely protected from those threats. As mentioned above, invasive species are known to be in the vicinity of occurrence 8 (USFS 2025b), and these weeds could spread into the habitat of *Cystopteris montana*. In addition, timber harvest activities have occurred in the vicinity of occurrences 3, 4, 5, and 8 (USFS 2025d), and this activity could continue in the future. Climate change is the main stressor of alpine areas, forested and non-forested wetlands, subalpine forest, and well drained forest on the Tongass NF (Turner and Mallott 2025). Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit; winters are predicted to be warmer (with more rain and less snow) and summers drier (Turner and Mallott 2025, Wiles and Warren 2025). In addition, climate change is predicted to decrease snowpack in alpine and subalpine areas; snowpack provides a consistent source of moisture as it melts in the summer and insulates plants such as *Cystopteris montana* from sub-freezing temperatures in the winter (Turner and Mallott 2025). The subalpine forest ecosystem may experience changes in integrity with some tree species shifting upward and northward in elevation (Turner and Mallott 2025). Finally, climate change is becoming a key stressor of well drained forest due to warmer and drier conditions. This may lead to higher levels of stress on mature trees, including insect and disease outbreaks, and affect seed germination and establishment (Turner and Mallott 2025).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. No published information on reproductive success or demography was found from inside or outside of the planning unit. *Cystopteris montana* is a perennial herb that grows up to 45 cm high (Haufler et al. 1993). The sporophytes of *Cystopteris montana* consist of creeping, cord-like stems with leaves produced at the stem tips (Haufler et al. 1993). Leaves die back each winter, and growth begins again during the spring season (Haufler et al. 1993). The leaves are monomorphic, meaning that they are all spore-bearing (Haufler et al. 1993). Spores may be released throughout the

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Criteria	*Rank*	*Rationale*
		growing season (Haufler et al. 1993). The species has a typical fern life cycle with a conspicuous sporophyte (spore-bearing) generation alternating with a free-living but tiny gametophyte (sexual) generation (USFS 2010). The presence of moisture is required for gametophyte germination and successful fertilization (USFS 2010). Fresh *Cystopteris* spores require about three weeks to germinate, while older spores may take as long as five weeks (Blasdell 1963). No published information was found on gametophyte formation or sporophyte longevity.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Cystopteris montana is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Invasive species, timber activities, and climate change may impact the habitat of *Cystopteris montana*. However, the species occupies a fairly broad range of habitats, and some occurrences are in Wilderness Areas.
- **Declining trends:** Population trends are unknown. The proximity of timber harvest and non-native invasive species to some occurrences may indicate a negative trend in habitat for those locations, but habitat for other occurrences is likely stable.
- **Restricted ranges:** *Cystopteris montana* is not a narrow endemic or at the edge of its range on the Tongass NF. Occurrences are scattered but with relatively short distances between them and to occurrences outside the planning area.
- **Low population numbers or restricted ecological conditions:** Based on the number of occurrences and their scattered distribution, this species is likely not vulnerable to extirpation by stochastic events. Ecological conditions for *Cystopteris montana* do not appear to be particularly restricted – while it is almost always associated with calcareous influence, other aspects of habitat are varied.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:240526)[9/07/2009]**	**Greens Creek, Juneau Quad, Alexander Archipelago, Admiralty Island.**	**Base of ultramafic rock outcrop. [geological map indicates serpentinite]**		
1	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:242466)[7/09/2004]	N end of island, ridge just N of the Greens Creek mine, Juneau Quad, Alexander Archipelago, Admiralty Island.	Alpine ridge, rock outcrop with little vegetation, growing on N side of outcrop.		
2*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:142533)[7/14/2004]**	**Alexander Archipelago, West Chichagof-Yakobi Wilderness, Chichagof I., Whitestripe Lake and Whitestripe Mt., S of lake, Sitka Quad, Tongass National Forest.**	**Rare on 35 degree slope on N aspect, limestone talus. [geological map indicates marble]**		
3*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:89218)[6/20/2003]**	**Chichagof I., Game Cr. watershed, 24 km S of Hoonah off USFS Road 8502, Sitka Quad, Tongass National Forest.**	**Along an ephemeral stream, associated with Veratrum viride, Alnus sinuata, Coptis aspleniifolia, Tiarella trifoliata, Pinguicula vulgare, Platanthera dilatata, Tsuga mertensiana and Vaccinium sp. [Maps within Callitropsis nootkatensis wetland. 0.25 mile from mapped karst fen.]**		
4*	**CPNWH_Mar25 (UAAH10019)[7/14/1994]**	**SITKA QUAD.: Chichagof Island., N Fork Freshwater Creek**	**Sitka spruce-hemlock forest, open calcareous fen within forest, at margins of fen.**		
4	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:11754)[7/14/1994]	Alexander Archipelago, N Fork Freshwater Cr., Chichagof I., Sitka Quad, Tongass National Forest.	Sitka spruce-hemlock forest, open calcareous fen within forest, at margin of fen.		
5*	**Arctos 2025, CPNWH_April2025(ALA-**	**Heceta Island, Bald Mountain, NW-facing slopes of mountain, Craig Quad, Tongass National Forest, Alexander Archipelago.**	**Moist subalpine meadow slopes, among rocks. [Geologic map indicates limestone] [Collected on same day in same place/habitat: Hieracium triste, Artemisia arctica, Mitella pentandra,**		

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	UAM:Herb:11750)[7/13/1994]		**Saxifraga adscendens, Ranunculus eschscholtzii, Tofieldia coccinea, Gentiana platypetala, Anemone parviflora , Pedicularis oederi , Saxifraga oppositifolia, Pyrola minor, Saxifraga lyallii, Silene acaulis, Erigeron humilis] [Located in mapped karst meadow and heath.]**		
6*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:21786)[8/15/1990]**	**Alexander Archipelago, Dall Island, NW side, Thunder Mtn., N side of northern peak, Craig Quad, Alexander Archipelago.**	**Exposed herbaceous-low grass alpine meadow, gently sloping N. Limestone substrate. Sinkhole, about 3 m down, growing in crack in wall. [Located in mapped karst meadow and heath.]**		
6	CPNWH (WTU-462676) [8/15/1990]	Craig Quad.: Dall I., NW side, Thunder Mtn. N side of northern peak.	Exposed herbaceous-low grass alpine meadow, gently sloping N. Limestone substrate. Sinkhole, about 3 m down, growing in crack in wall.		
7*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:8664)[7/20/1993]**	**Prince of Wales Island, Perue Mt., N of Calder, Petersburg Quad, Tongass National Forest.**	**Alpine talus meadow. [geological map indicates the substrate is limestone] [collected on same day in same place/habitat: Abies lasiocarpa, Tsuga mertensiana, Carex macrochaeta, Carex scirpoidea, Pedicularis oederi, Trisetum spicatum subsp. alaskanum, Veronica wormskjoldii, Androsace chamaejasme subsp. lehmanniana, Veronica wormskjoldii] [Located in mapped karst meadow and heath.]**		
8*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:147667)[7/10/1998]**	**Alexander Archipelago, N end Prince of Wales I., near El Capitan Pass. [this likely El Capitan Passage] on Bever [likely Beaver] Falls Tr., Petersburg Quad, Tongass National Forest.**	**[Beaver Falls trail is a karst interpretive area] [Geological map indicates limestone] [Maps to Karst Tsuga heterophylla-Picea sitchensis forest.]**		
9*	**CPNWH_Mar25 (UAAH12820)[7/13/2018]**	**Prince of Wales island, west of Big Creek, east of Green Monster Mt. and Summit Lake, south of West Arm of Cholmondeley Sound, alpine ridge of contact zone with karst geology and acidic rock type.**	**Under krumholtz yellow cedar and subalpine fir, on moss over limestone rock. [Geological map indicates marble]**		
10*	**CPNWH (WTU-414056) [7/15/2005]**	**Craig Quad.: Coronation Island Wilderness, Coronation Island, Alexander Archipelago, Egg Harbor entrance, near Nation Point, east side of bay.**	**Adjacent to landslide, understory of Picea sitchensis beach fringe forest with calcareous substrate, east-facing 20 degree slope, frequent. [geological map indicates limestone]**		
		Not on the Tongass NF			
11*	**CPNWH (WTU-325723,**	**Dall I., southwest of Grace Mountain. (Royal British Columbia Museum specimen says Grace Mountain: peak**	**Cracks in limestone, tops of fronds well below surface of rock face, large flat limestone bedrock exposure sloping west.**	**Large plants. In spore.**	

	RBCM:Botany:V177537) [8/16/1990]	**2443) [this is no longer on the Tongass NF]**			
11	Arctos 2025 (ALA-UAM: Herb:21787) [8/16/1990]	Dall I., Grace Mountain vic. N part of main mtn. spine.	Limestone karst landscape. S side of collapsed sinkhole.	Small plants rooted.	
12*	**USFS_TESP_Mar25 (100554P000537Y14)[7/30/2014]**	**[Maps to Kosciusko Island, E of Point Hardscrabble. This is no longer on the Tongass NF.]**	**Karst influenced channel. Many sections of the channel had no surface scour and were entirely subsurface. Section with CYMO3 was at the base of a steep limestone cliff on the southern side of the channel.**	**About 50 plants. Good vigor.**	
13*	**Arctos 2025 (ALA-UAM: Herb:8726) [7/21/93]**	**United States, Alaska, Prince of Wales Island, Mt. Calder [not on Tongass NF]**	**alpine talus meadow [Collected on same day at same place/habitat: Antennaria alpina, Selaginella selaginoides, Viola biflora, Carex scirpoidea, Swertia perennis, Oxytropis campestris, Androsace chamaejasme subsp. lehmanniana, Agrostis mertensii]**		
14*	**SEINet 2025 (ASC00040824) [5/19/1984]**	**Baranof Island. NW Sitka near pistol range [not on Tongass NF]**	**Hollow of tree stump with Cornus, Cystopteris, Maianthemum**		
15*	**SEINet 2025 (KLGO 48471) [7/8/2002]**	**Coast Mtns., Chilkoot Unit, N of Finnegans, approx. 1-1.5 mi N of Finnegans**	**abundant on moist organic soil in stream bank**		

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Danthonia intermedia

Danthonia intermedia [Vasey, 1883]

Vasey's Oatgrass

Global Rank: G5

Alaska State Rank: SNR



photo: (CC0) Kallum McDonald

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Danthonia intermedia* is known from two estimated occurrences on the Tongass National Forest. We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located: 1) on the west side of Bokan Mountain on Prince of Wales Island; 2) about 8 km north of Juneau on Lemon Creek Glacier (Appendix 1; CPNWH 2025, USFS 2025a). The habitat for Occurrence 1 was described as **"**fjell field, trees dwarf and shrubby" and associated species were *Pinus contorta, Callitropsis nootkatensis, Tsuga heterophylla, Myrica Gale, Juniperus,* and *Vaccinium*. The habitat for Occurrence 2 was described as "medium-low slope - east facing. Growing in fine, wet soil with much organic matter" and associated species were lichens, moss, and *Poa* (Appendix 1). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025). This species may be confused with *Danthonia spicata* which is also rare on the Tongass NF.

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank: G5 (Secure), Alaska State Rank: Not Ranked (NatureServe 2025) State Ranks: Canadian provinces and territories: S1 (Critically Imperiled): Newfoundland; S2 (Imperiled): Labrador; all others are S4 (Apparently Secure), S5 (Secure), SNR (Not Ranked), or not present. United States: S1 (Critically Imperiled): Michigan; S2 (Imperiled): Nevada; all others are S4 (Apparently Secure), SNR (Not Ranked), or not present (NatureServe 2025). *Danthonia intermedia* is broadly distributed throughout western North America to northeastern North America and eastern Russia (FNA 2025). In North America, *Danthonia intermedia* is present in most Canadian provinces and territories as well as many western states (FNA 2025, iNaturalist 2025). Across its range, *Danthonia intermedia* occurs in boreal and alpine meadows, open woods, and on rocky slopes and northern plains (FNA 2025). The closest records to the Tongass occurrences are approximately 80 miles northeast over the Coast Range (from the occurrence near Juneau) and 60 miles southeast to Dundas Island in Canada (from the occurrence on southern Prince of Wales Island).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Danthonia intermedia* is a perennial graminoid with a cespitose growth habit (UWBM 2025). Its main dispersal mechanism is by seeds. Seeds are likely dispersed short distances by wind or gravity but may also be dispersed long distances by birds or other animals (Linder et al. 2013).
4 Abundance on Tongass	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Danthonia intermedia* is known from two occurrences on the Tongass NF. Neither of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).

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Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Danthonia intermedia* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The habitat for the two occurrences of *Danthonia intermedia* on the TNF can be grouped under Alpine Vegetation and Subalpine Forest (Turner and Mallott 2024). However, habitat preferences in nearby British Columbia include a variety of habitats from the lowland to alpine, and it is unclear why there are just two occurrences on the Tongass NF with a gap of nearly 250 miles between them, so it is difficult to characterize the habitat for this species on the Tongass. Invasive species are not known to occur in or near the coordinates for either occurrence (USFS 2025b). Timber harvest has not occurred in the recent past near either occurrence (USFS 2025d).
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). However, it is unclear if habitat for *Danthonia intermedia* on the Tongass NF is restricted to the alpine. It is also unknown how changes in the alpine will affect habitat suitability for this species.

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Danthonia intermedia* is a perennial graminoid with a cespitose growth habit (OregonFlora 2025, UWBM 2025). It produces flowers and fruits with seeds. Its primarily cleistogamous reproduction (self-pollinating flowers) has probably facilitated its establishment and spread through more boreal and alpine habitats than other members of the genus (FNA 2025). The life span of *Danthonia* species is not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	☐	X	☐
Low populations or restricted ecological conditions	☐	☐	X
Other factors (see conclusion rationale)	X	☐	☐

Conclusion Rationale

Danthonia intermedia is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No significant threats are known.
- **Declining trends:** Population trends are not known. Habitat for the species on the Tongass is difficult to characterize and therefore difficult to understand trends.
- **Restricted ranges:** *Danthonia intermedia* is not a narrow endemic nor is it likely to be disjunct or at the edge of its range on the Tongass NF.
- **Low population numbers or restricted ecological conditions:** Unclear if ecological conditions are restricted beyond

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subalpine/alpine habitat. Only two known occurrences with no population counts.

- **Other factors:** Two occurrences are reported from the southeast Alaska. The two occurrences are nearly 250 miles apart and significantly closer to occurrences in British Columbia than they are to each other. Seeds may be dispersed long distances by birds which may account for the distribution.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025 (ALA-AM:Herb: 251114) [7/08/1998]**	**Prince of Wales I., Bokan Mt, W side, Dixon Entrance Quad, Alexander Archipelago.**	**Fjell field, trees dwarf and shrubby. Pinus contorta, Chamaecyparis nootkatensis, Tsuga heterophylla, Myrica Gale, Juniperus, Vaccinium**		
1	CPNWH_Mar25 (UAAH10553) [7/08/1998]	Dixon Entrance Quad.: Alexander Archipelago, Prince of Wales I., Bokan Mt, W side	fjell field, trees dwarf and shrubby, Pinus contorta, Chamaecyparis nootkatensis, Tsuga heterophylla, Myrica Gale, Juniperus, Vaccinium.		
1	CPNWH_Mar25 (WTU408481) [7/08/1998]	Dixon Entrance Quad.: Alexander Archipelago, Prince of Wales Island, Bokan Mountain, west side.	Fjell field, trees dwarf and shrubby, Pinus contorta, Chamaecyparis nootkatensis, Tsuga heterophylla, Myrica Gale, Juniperus, Vaccinium.		
1	CPNWH_April2025 (ALA-UAM:Herb: 145638) [7/08/1998]	Alexander Archipelago, Prince of Wales I., bowl on W side of Bokan Mtn., above upper lake, Dixon Entrance Quad, Tongass National Forest.	Subalpine.		
2*	**CPNWH_Mar25 (WTU334585) [7/10/1995]**	**Southeastern Alaska; Lemon Creek Glacier; Camp 17 - Foundation for Glacier and Environmental Research.**	**Medium-low slope - east facing. Growing in fine, wet soil with much organic matter. Associated species: lichens, moss, Poa.**	**Flowers & fruits.**	
2	CPNWH_Mar25 (WTU334586) [7/13/1995]	Southeastern Alaska; Lemon Creek Glacier; Vesper Peak - second tier.	Sandy, moist soil.	Flowers.	

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Danthonia spicata

Danthonia spicata [(L.) Beauv.]

Poverty oatgrass

Global Rank: G5

Alaska State Rank: S1



photo: Wikipedia

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Population is naturally distributed as isolated patches, with limited opportunity for dispersal among patches. *Danthonia spicata* is known from one estimated occurrence on the Tongass NF. We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is from southern Prince of Wales Island (Appendix 1). Habitat for this occurrence was described as "61 m, open forest with stunted trees, scattered rock outcrops" (ANHP ACCS 2023, Stensvold 2024). The bedrock mapped in this location is syenite, trondhjemite, and granite (Gehrels and Berg 1992), but it is unclear whether bedrock is specifically influencing soil nutrient availability and thus species composition in this location. An additional herbarium specimen from the west side of Bokan Mountain on Prince of Wales Island (CPNWH 2023) was initially identified as *Danthonia spicata* but later determined to be *Danthonia intermedia* by University of Alaska Museum Herbarium staff (ARCTOS 2023). As this change illustrates, *Danthonia spicata* could be confused with *Danthonia intermedia*, another rare grass on the Tongass NF. There is one other record for *Danthonia spicata* in southeast Alaska, on Gravina Island near the Ketchikan airport (not on the Tongass NF), but ACCS considers the validity of this record questionable and notes that the original data could not

Criteria	*Rank*	*Rationale*
		be located (ANHP ACCS 2025). There is also an iNaturalist record for the species in the same location; it is unclear if these records are related and the validity of the iNaturalist record has not been confirmed.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S1 British Columbia Province Rank S5, Yellow List; Alberta S3, Yukon Territory S1, Washington and Idaho SNR, Montana S4, Oregon S2? *Danthonia spicata* is widespread throughout temperate and boreal North America, particularly through northern and eastern regions (NatureServe 2023). The TNF occurrence, however, is the only confirmed occurrence in Alaska (CPNWH 2023, Hultén 1968). This occurrence is along the northwestern boundary of the range for this species, and the closest known occurrence is on Dundas Island, British Columbia, approximately 30 miles from the TNF occurrence (CPNWH 2023). Across its range, *Danthonia spicata* grows in dry, rocky, sandy, or mineral soils, generally in open sunny places (FNA 2025). In British Columbia habitat is described as mesic to dry shoreline, open forest and meadows in the lowland and montane zones (Klinkenburg 2020).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Danthonia spicata* is a perennial graminoid that is wind-pollinated or self-pollinated and produces seeds that were found to disperse between 4-24 inches from the parent plant (McCormick 1999). The species is known to have slow clonal growth, extensive cleistogamy (self-pollinating flowers), and limited dispersal (FNA 2025).
4 Abundance on Tongass	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. There is one confirmed occurrence of *Danthonia spicata* known to the TNF. The number of plants at this occurrence is unknown (USDA FS 2023).

Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trend for the single confirmed occurrence of *Danthonia spicata* on the TNF is unknown (USDA FS 2023).
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. It is not clear what category the habitat for the one occurrence on the Tongass falls into. Across its range, habitat for this species is described as mostly open and dry (Klinkenberg 2020, FNA 2025). Being a rainforest, not a lot of habitat on the Tongass can be described as "dry", which may limit this species' abundance here. The collector of the single herbarium record also confirmed that the habitat was not muskeg but did not elaborate on the habitat description. The area of the collection appears to be a unique habitat on the Tongass NF. No timber harvest or invasive plants are documented within five miles.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. It is difficult to assess habitat vulnerability without a good understanding of the habitat type and distribution on the Tongass NF.

Criteria	*Rank*	*Rationale*
8 Life history and demographics	B	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Danthonia spicata* is a perennial graminoid that is wind-pollinated or self-pollinated and produces seeds that are dispersed close (4-24 inches) to the parent plant (McCormick 1999). *Danthonia spicata* produces two different flower types. Chasmogamous flowers, located at the tip of the reproductive stalk, produce seeds in seedheads that are then dispersed by wind. Cleistogamous flowers are located within leaf sheaths along the culm, or at culm bases. Cleistogamous flowers produce seeds that are attached to the reproductive stalk until they germinate (McCormick 1999). Wind-pollinated, chasmogamous seeds were found to disperse up to 24 inches from plants in a study conducted in Michigan (McCormick 1999). Cleistogamous seeds, by contrast, were found to disperse only 4 inches from the parent plant. Individuals and populations vary in the proportion of seeds represented by chasmogamous or cleistogamous morphologies (McCormick 1999). The presence of cleistogamous flowers may reduce the reduction in seed set that occurs if flowers receive allelopathic pollen from other species (Murphy and Aarsen 1996). A study from North Carolina found that cleistogamous seedlings had higher survival rates than chasmogamous seedlings (Clay 1983). Species' susceptibility to disease and predation are unknown. Species response to disturbance is suggested through several studies across the species range. A study from Michigan found that population sizes rose following clear-cutting and fire, then declined over time with a subsequent lack of disturbance (Scheiner 1988). This species is considered early-successional in the Upper Midwest (Schroeder et al. 2012). Several herbarium records from Pacific Northwest occurrences note that the species occurs in disturbed areas such as powerline rights-of-way, roadsides, floodplains, or disturbed soils in openings (CPNWH 2023).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐

Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Danthonia spicata is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** There are no known localized threats to the confirmed occurrence. Habitat for this species on the Tongass NF is not well described so it is difficult to assess habitat threats.
- **Declining trends:** Population trends are not known. Range wide habitat for this species is described as mostly open and dry, which is incongruous with the wet temperate rainforest habitat on the Tongass NF. It is unknown where else this species may be able to persist on the Tongass NF, which makes it difficult to assess trends.
- **Restricted ranges:** The closest known occurrence is only about 30 miles to the south, but this species has limited dispersal and both occurrences are on islands. Additionally, the occurrence on the Tongass NF is at the Northwestern edge of the species range.
- **Low population numbers or restricted ecological conditions:** There is a single confirmed occurrence on the Tongass NF and habitat is likely uncommon.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section. NA = Not applicable.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO0)[8/12/1993]	Prince of Wales Island, Kendrick Bay, S side of mouth of Bay, S side of 'Outcrop Hill'	open forest wiht stunted trees, scattered rock outcrops	NA	NA
1	CPNWH_April2025(ALA)[8/12/1993]	Prince of Wales Island, Kendrick Bay, S side of mouth of Bay, S side of 'Outcrop Hill', Dixon Entrance Quad, Tongass tiol Forest.	Open forest wiht stunted trees, scattered rock outcrops.	NA	NA
	Incorrectly identified specimen				
2	ACCS_Mar25 (EO0)[7/08/1998]	Alexander Archipelago, Prince of Wales I., bowl on W side of Bokan Mtn., above upper lake	subalpine	NA	NA
	Specimen id in question				
3	ACCS_Mar25 (EO1)[no date]	Gravina Island, Ketchikan.		NA	NA

Dendriscosticta gelida

Dendriscosticta gelida [Ant. Simon, Goward & T. Sprib. 2021]

Greater green moon lichen

Global Rank: **GNR**

Alaska State Rank: **S1S2**



photo: Toby Spribille via iNaturalist (2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps* *Dendriscosticta gelida* is known from four occurrences on the TNF (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). Occurrence 1 is located in the Endicott River Wilderness, southwest of Sullivan Island State Marine Park in the Chilkat Range on the Endicott River; Occurrence 2 is about 14 km (8.7 mi) northwest of Juneau on the Crystal Lake trail; Occurrence 3 is about 14 km (8.7 mi) northwest of Juneau on the Trail of Time; and Occurrence 4 is on Mitkof Island about 2 km (1.2 mi) east of Blind River Rapids (Appendices 1 and 2; CLH 2025, CPNWH 2025, iNaturalist 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in *Picea sitchensis* forests. Occurrence 1 was collected in a *Picea sitchensis* and *Populus trichocarpa* forest from a *Picea sitchensis* branch; Occurrence 2 and Occurrence 3 were collected in riparian forest; Occurrence 4 was collected on *Picea sitchensis* in second growth forest under the drip line of *Alnus* (CNPNWH 2025, iNaturalist 2025). There are several other occurrences of this species in southeastern Alaska outside of the Tongass NF to the south on Mitkof Island near Favor Peak, near Sitka, near Skagway, and several occurrences can be found nearby to the southeast in British Columbia, Canada (ACCS 2025, CLH 2025). Across its range, *Dendriscosticta gelida* is typically found in riparian forests of old mixed-wood taxa including *Picea* and *Sorbus* species (Simon et al. 2022). In Southeast Alaska, the species is known to occur on *Picea sitchensis* or *Vaccinium sp.* near river deltas and coasts (CLH 2025, iNaturalist 2025).

Criteria	*Rank*	*Rationale*
		Dendriscosticta gelida may be confused for *D. oroborealis* which is also present nearby in western Canada (CLH 2025, Simon et al. 2022). When ranges overlap, *Dendriscosticta gelida* can be distinguished from other species by its "sturdier habit, lighter and thicker main stem, and predominantly erect thallus" (Simon et al. 2024). This species has two morphs, or a dimorphic thallus: a cyanomorph with a dark, fruticose thallus and a chloromorph with a light green foliose thallus, which can co-occur (Simon et al. 2022, Simon et al. 2024). There are no subspecies of *Dendriscosticta gelida* in TNF, though a recently used synonym in this area is *Dendriscosticta wrightii* (Simon et al. 2022).
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F.* Global Rank GNR, Alaska State Rank SNR, British Columbia S1S3 (NatureServe 2025) *Dendriscosticta gelida* is broadly distributed throughout east Asia and northwest North America (CLH 2025), ranging from China to Eurasian Russia and northwest United States and Canada (Simon et al. 2022). In North America, *Dendriscosticta gelida* is present in British Columbia, Canada as well as Alaska and Minnesota in the United States (CLH 2025, Simon et al. 2022). Across its range, *Dendriscosticta gelida* occurs in riparian forest habitats at elevations from near sea level to 45 m (CLH 2025, CPNWH 2025). It is typically found near rivers and is described from the southern aspect on tree bark in old, mixed forests (Simon et al. 2022). In adjacent locations including near Otter Mountain in Kitimat-Stikine, British Columbia, CA, it also occurs in riparian and lacustrine (lake) environments between mountains (iNaturalist 2025). In southeastern Alaska this species is known from in and outside of the Tongass NF; its range continues south and east 1000 km to the Cariboo Mountains Provincial Park in BC, Canada (GBIF 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Dendriscosticta gelida* is a lichen species which grows as an epiphyte (Simon et al. 2022). Its main dispersal mechanism is sexually by release of ascospores or asexually through fragmentation of pycnidia (Simon et al. 2022). Asexual propagules such as pycnidia can be dispersed by wind or gravity. Dispersal of asexual propagules is dependent on wind direction and speed, and distance is likely within the tens of meters (Armstrong 1994, Ronnås et al. 2017). Sexual propagules called ascospores are released from apothecia and can be transported up to more than one hundred

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Criteria	*Rank*	*Rationale*
		meters from a lichen thallus (Keller and Scheidegger 2016). *Dendriscosticta gelida* has a widespread range compared to congeneric species, which may indicate that this species is not dispersal-limited (Simon et al. 2022).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* One occurrence says, "Abundance: 3", which likely refers to an FIA abundance code where 3 = common (>10 individuals, but less than 50% of available substrate is covered) (CPNWH 2025, Jovan et al. 2020). None of the other occurrences include any population data (Appendix 1).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Dendriscosticta gelida* on the TNF are unknown (USFS 2025a, CLH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for occurrences 1 and 2 of *Dendriscosticta gelida* on the TNF is riparian forest habitat (Dillman et al. 2012), which are highly plant species-diverse ecosystems encompassing the terrestrial and aquatic zones and is common on the Tongass NF (Turner and Mallott 2025). The key ecosystem stressor for riparian forest ecosystems in TNF is climate change, especially changes in amount of precipitation and temperature (Tuner and Mallott 2024). As *Dendriscosticta gelida* is an epiphytic lichen and it is unclear how altered precipitation, temperature and resulting water balance would impact this species. Occurrence 4 is within a young growth timber stand, first harvested in 1965 (USFS 2025c). Additionally, Occurrences 2 and 3 are in the relatively young forest in the Mendenhall Glacier forelands. These occurrences suggest that the species could be resilient to timber harvest or able to establish in regenerating forests.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Recent timber harvest activities have occurred in the vicinity of the Lynn canal inlet at occurrence 1 and on Mitkof Island at occurrence 4 (USFS 2025c), and timber harvest will likely continue on the Tongass NF, which could affect habitat. Given that one occurrence of *Dendriscostica gelida* is in young growth forest, it may be able to reestablish if source populations are available. This species may receive further protections granted by the currently required riparian buffers implemented in USFS timber harvest actions. In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for epiphytic lichens such as *Dendriscosticta gelida* (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Dendriscosticta gelida* was recently described for the first time (Simon et al. 2024). *Dendriscosticta gelida* is a foliose lichen or fruticose cyanolichen (dimorphic, Simon et al. 2022) that grows as an epiphyte (Simon et al. 2022, Simon et al. 2024). *Dendriscosticta gelida* sexually reproduces with apothecia in the chloromorph (Simon et al 2022). Asexual reproduction is through fragmentation of pycnidia in the chloromorph (Simon et al. 2022). The life span of *Dendriscosticta* lichens has not been measured for species in the genus (Simon et al. 2022). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐

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Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Dendriscosticta gelida is not recommended as a Species of Conservation Concern based upon the following:

- **Significant threats:** Logging may impact habitat for this species. However, occurrences on the Tongass NF are found in young growth forest and young glacial foreland forest, indicating that this species may be somewhat resilient to forest disturbance or sufficiently capable of recolonizing suitable habitat. Increases in temperature and shifting precipitation patterns associated with expected regional climatic changes may alter water balance and availability, potentially negatively impacting epiphytic lichen growth.
- **Declining trends:** There is insufficient data available to make inferences on the population and habitat trends for this species.
- **Restricted ranges:** Occurrences of *Dendriscosticta gelida* in the plan area are not considered disjunct from the nearest populations outside the Tongass NF. This species is not endemic to the region, and the occurrences known from the plan area do not exist at the edge of the species' greater range.
- **Low population numbers or restricted ecological conditions:** This species is known from only four occurrences on the Tongass NF and is therefore vulnerable to extirpation from the plan area due to stochastic events. Given the suitable habitat described for this species, and further, the relatively common and widespread nature of this habitat in the plan area, it is unclear why the species displays apparent local rarity. *Dendriscosticta gelida* is capable of sexual and asexual reproduction; dispersal over long distances is possible and may aid in recolonization of suitable habitat.
- **Other factors:** Additional factors do not indicate substantial concern for the persistence of this species in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (UAAH16930) [8/18/2011]**	**Mainland, Endicott River. W ~ 5 mi upstream by air on N shore of R. ~42' in forest from edge of river bank.**	***Picea sitchensis*, *Populus trichocarpa*, on *Picea sitchensis* bole.**	**Abundance: 3**	
2*	**iNaturalist 2025 (105234716) [9/18/2017]**	**Juneau, AK, USA**	**riparian forest, glacial forelands**		
3*	**iNaturalist 2025 (180232898) [8/25/2023]**	**Juneau County, US-AK, US**	**glacial forelands, riparian forest**		
3	iNaturalist 2025 (180166342) [8/25/2023]	Trail of Time, Juneau, AK, US			
4*	**iNaturalist 2025 (252460239) [11/26/2024]**	**Mitkof Island, Petersburg, AK, US**	**On twigs of *Picea sitchensis* along an old road edge in second growth forest. Under the drip line of *Alnus*. Cyanomorph in close proximity**		

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Didymodon maximus

Didymodon maximus [(Syed & Crundw.) M.O. Hill, 1981]

Big Beard Moss

Global Rank: GU

Alaska State Rank: S1



Photo from Rare and Threatened Bryophytes of Ireland (2012).

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Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Isolated.* *Didymodon maximus* is known from two estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on the northwest side of Etolin Island in the Mosman Inlet watershed and on the northwest side of Prince of Wales Island in the Flicker creek watershed (Appendix 1; CBH 2025, Falcón Linero 2025, USFS 2025a). Occurrence 1 was collected in a calcareous fen, and Occurrence 2 in a limestone quarry (CBH 2025). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CBH 2025). Across its range, *Didymodon maximus* is typically found in tundra slopes on limestone outcrops or in fens and wetlands (CBH 2025).

Criteria	*Rank*	*Rationale*
		This species may be confused for *Didymodon ferrugineus* or *D. giganteus* which are both present nearby (CBH 2025). There are no subspecies of *Didymodon maximus* in TNF.
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside of the Tongass National Forest.* Global Rank GU, Alaska State Rank S1, IUCN VU in Europe *Didymodon maximus* is narrowly distributed throughout Northern North America, Northern Ireland in UK, and Russia (CBH 2025). In North America, *Didymodon maximus* is present in three Canadian provinces and territories including the Northwest Territories and Nunavut, as well as Alaska, U.S. (CBH 2025). Across its range, *Didymodon maximus* occurs in tundra meadows or wetlands at elevations of 72 m to 1,220 m (CBH 2025). It is typically found in deep, wet depressions or on tundra slopes, sometimes in calcareous fens which are fully exposed to sun (CBH 2025). The rocks where this species are found are typically limestone outcrops with high conductivity, associated with periodically flooded humic soils (CBH 2025). The next nearest occurrence to the Tongass NF occurrences is approximately 500 miles away to the northeast in the Nahanni National Park in Northwest Territories, Canada (CBH 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Didymodon maximus* is an acrocarpous leafy, moss with a terrestrial growth habit (FNA 2025, Lockhart, Hodgetts, and Holyoak 2012). Its main dispersal mechanism is assumed to be by clonal growth because sexual sporophytes and asexual gemmae are absent (Lockhart, Hodgetts, and Holyoak 2012).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Neither of the occurrences of *Didymodon maximus* on TNF have population estimates or any indication of abundance (Appendix 1; CBH 2025, USFS 2025). Bryophytes are not typically recorded in botanical surveys so it may be more common than survey data indicates.

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Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends of *Didymodon maximus* on the TNF are unknown (USFS 2025a, CBH 2025).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Habitat for Occurrence 1 is calcareous wetland; habitat for Occurrence 2 is a limestone rock quarry (Appendix 1). Global occurrences of this species typically mention the importance of limestone and periodic flooding in the habitats for *Didymodon maximus* (CBH 2025). Disturbance in and near the occurrences that may indicate a negative habitat trend include road construction, invasive species, and timber harvest. It is unclear to what degree these disturbances may impact habitat suitability for the species. It is also difficult to generalize habitat for this species on the Tongass NF due to just two occurrences in two different habitat types. Invasive species that can survive in or near muskeg meadows, such as *Phalaris arundinacea* (reed canary grass), occur near Occurrence 1 (USFS 2025b). No invasive plants are recorded near Occurrence 2, but the occurrence is in a rock pit near a road, so it is likely there are unrecorded invasive plants nearby. Timber harvest has occurred in the recent past approximately 65 m northwest of Occurrence 1, approximately 70 m northwest of Occurrence 2, and is widespread in the vicinity of these occurrences on both Etolin and Prince of Wales Islands (USFS 2025c). This widespread harvest, close proximity, and high coverage of timber harvest might indicate a negative trend in habitat quality at those sites.

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Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* With just two occurrences in two different habitat types (calcareous fen and rock pit), it is difficult to generalize threats to habitat for this species on the Tongass NF. Threats specific to calcareous fen include upslope timber harvest that could alter hydrology. Threats specific to the occurrence in the quarry include mechanical disturbance (blasting and other quarry activities). Both habitats could experience threats from invasive plants. Climate change is expected to cause region-wide shifts in precipitation and temperature, but it is unknown how that may impact this species. Range-wide threats specific to *Didymodon maximus* include mining, agriculture and ranching, and fire (IUCN 2025, Lockhart, Hodgetts, and Holyoak 2012).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Didymodon maximus* is largely unknown. It is a large, acrocarpous moss with an erect growth habit (FNA 2020). It produces leafy stems with costate leaves that are adaxially grooved along the costa (FNA 2020). Specialized asexual reproduction is absent for this species (FNA 2020). The life span of one threatened British *Didymodon* species has been observed to be at least 19 years (Porley 2021). *Didymodon maximus* is cited as likely dioicious, however fertile material has never been found so reproduction is limited or nonexistent (Lockhart, Hodgetts, and Holyoak 2012). Occurrence 2 is in a rock quarry, indicating some tolerance to disturbance.

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	X
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

Didymodon maximus is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Potential threats include mechanical disturbance, invasive plants, changes in hydrology, and climate change, but it is difficult to determine how significant these threats will be for the persistence of *Didymodon maximus* on the Tongass NF.
- **Declining trends:** Population trends are unknown. Habitat trends are difficult to determine due to two occurrences in two different habitat types.
- **Restricted ranges:** The species' global range is composed of widely separated populations. The next nearest known population to the Tongass NF occurrences is approximately 500 miles away in the Northwest Territories. However, lack of survey data and information on dispersal mechanisms make it difficult to determine if populations are genetically isolated.
- **Low population numbers or restricted ecological conditions:** Two occurrences are known on the Tongass NF. Bryophytes are not typically recorded in botanical surveys so *Didymodon maximus* may be more common than survey data indicates. Range-wide records indicate an affinity for limestone, and the two occurrences on the Tongass NF were found in limestone-influenced habitat, which indicates some ecological restriction. However, one of the occurrences was in a limestone rock quarry which seems to indicate a more generalized affinity for limestone (rather than restriction to calcareous fen).
- **Other factors:** Dispersal may be limited by lack of sporophytes and gemmae. However, one occurrence was found in a quarry, indicating some ability to disperse to new habitats.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CBH 2025 (CAS) [09/05/2014]**	**Mosman Inlet Watershed: southeast Alaska panhandle, Etolin Island; approximately 21 miles SW of the Burough of Wrangell**	***Cypripedium montanum* wetland. Muskeg with scattered *Pinus contorta* and *Tsuga heterophylla* with high conductivity from limestone bedrock. Fully exposed periodically flooded limestone influenced humic soil.**		
1	CBH 2025 (DAV) [09/05/2014]	Tongass National Forest. Southeast Alaska panhandle, Etolin Island. Approximately 21 miles SW of the Borough of Wrangell. Watershed: Mosman Inlet. Sitename: Cypripedium montanum wetland	Muskeg with scattered *Pinus contorta* and *Tsuga heterophylla* with high conductivity from limestone bedrock. Conductivity 250 mS, pH 8.1. Substrate: fully exposed periodically flooded limestone influenced; humic soil.	This was ID'd as Didymodon maximus by D. Toren	
2*	**CBH 2025 (DAV) [05/08/2016]**	**Tongass National Forest. Southeast Alaska panhandle, Prince of Wales Island. Approximately 5.5 miles SE of Point Baker. Access via the Flicker Ridge logging road. Watershed: Flicker Creek, unnamed tributary. Sitename: Quarry Camp**	**Limestone rock quarry surrounded by *Picea sitchensis* and *Tsuga* spp. dominated forest. Slope: 5°; Aspect: 35°. Substrate: Partially shaded mesic site. On boulder.**		

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Draba incerta

Draba incerta [Payson, 1917]

Yellowstone Whitlow-grass

Global Rank: G5

Alaska State Rank: S3



photo: (CC-BY-SA) Paul Slichter

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Draba incerta* is known from three estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Prince of Wales Island (Occurrence 1 near Mt. Calder and 2 near Perue Mt.) and Heceta Island near Bald Mountain (Occurrence 3) (Appendix 1; CPNWH 2025, USFS 2025a). All three occurrences are mapped on karst in the alpine/subalpine. Two of the occurrences are described as growing on rock faces. One of the occurrences (Occurrence 1 near Mt. Calder) spans Tongass and Sealaska Corp land. There are no other known occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025).
2 Distribution in	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank S3 Idaho S2, Colorado S1, Utah S1, Northwest Territories S2

Criteria	*Rank*	*Rationale*
surrounding geographic area		Montana, Oregon, Washington, and Wyoming S4, S5, or SNR *Draba incerta* occurs in western North America from Alaska and Yukon south to Nevada and Colorado (NatureServe 2025). Across its range, *Draba incerta* occurs in rocky outcrops, talus, and tundra at elevations of 0 m to 3,300 m (FNA 2025). The Tongass populations on Prince of Wales and Heceta Islands are approximately 150 miles from the next nearest populations in British Columbia, on the eastern side of the Coast-Cascade Mountains (Klinkenberg 2020).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Draba incerta* is a perennial herb with a cespitose growth habit (FNA 2025). Plants likely rely on seed dispersal as they lack a rhizomatous growth habit. Seed dispersal mechanisms are not well documented for this species.
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Draba incerta* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend	A	*A = Decline in habitat quality or quantity.* The habitat for the three occurrences of *Draba incerta* on the Tongass NF is on rock faces in alpine/subalpine karst. These habitats can be grouped under Alpine Vegetation which occurs above the tree line and consists mainly of

Criteria	*Rank*	*Rationale*
on Tongass NF		herbaceous and dwarf shrub species (Turner and Mallott 2024). Alpine vegetation has a moderate ecological integrity status due to impacts from climate change but is trending toward a lower ecological integrity (Turner and Mallott 2024).
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc.* Climate change is main stressor to alpine/subalpine habitats. Other comparatively minor, localized, or short duration stressors include communication sites, mining, and recreational use. Invasive species, timber activities, and climate change may impact the habitat of *Draba incerta*. Range-wide it is also threatened by grazing, mining, succession, and recreation (NatureServe 2025). Recent timber harvest activities have occurred in the vicinity of Occurrence 3 (USFS 2025d), and this activity will likely continue on Heceta Island and Prince of Wales Island.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Draba incerta* is a perennial herb with a cespitose growth habit that produces flowers and fruits with seeds (FNA 2025). This species flowers from June to August and is likely pollinated by insects similar to other non-apomictic *Draba* (CPC 2025, FNA 2025). It reproduces sexually and is 14-ploid with x=8 (FNA 2025). The lifespan of *Draba incerta* is not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☒	☐	☐

Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Draba incerta is not recommended as a Species of Conservation concern based upon the rationale below:

- **Significant threats:** In the plan area this species is primarily threatened by expected and ongoing changes in climatic conditions. The alpine and subalpine habitat preferred by *Draba incerta* is experiencing decreases in seasonal snowpack; expected increases in temperature and changes to precipitation patterns are anticipated to further decrease the integrity of this habitat type on the Tongass NF. Additional stressors may exist, including mining, recreation, and communication site construction and maintenance; though these actions are comparatively minor and may be highly localized and of short duration with a minimal disturbance footprint.
- **Declining trends:** There is not enough available information to infer population trends for this species. The integrity of alpine and subalpine habitat occupied by *Draba incerta* is expected to decrease in the plan area due to factors associated with a changing climate.
- **Restricted ranges:** *Draba incerta* is not endemic to the plan area, and occurrences on the Tongass NF are not at the edge of the species' range. Occurrences in the plan area are somewhat disjunct from the next nearest occurrences, though too little is known about dispersal of this species to infer the exclusivity of existing geographic boundaries.
- **Low population numbers or restricted ecological conditions:** The low number of recorded occurrences would indicate that this species is at risk of extirpation by stochastic events within the plan area. However, additional targeted surveys may reveal a greater number of occurrences for this small and potentially overlooked species.
- **Other factors:** There is not enough available information to indicate additional factors impacting the persistence of this species in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.

☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Elymus violaceus

Elymus violaceus [(Hornem.) Böcher ex J. Feilberg]

Arctic wheatgrass

Global Rank: **T5***

Alaska State Rank: S4

*taxon is listed under synonym

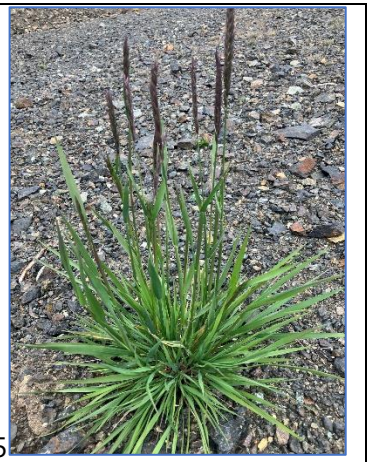


photo: Bruce Bennett 2025

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is a single occurrence on the Tongass National Forest. The occurrence is located on the lakeshore of the Mendenhall Glacier on the West Glacier Trail (CPNWH 2025). Another collection by M. Stensvold occurs at the Cordova airport next to the USFS building and landing strip, though this record is not occurring on USFS managed lands. The habitat is described as the lakeshore and an "open gravelly, sandy area." Other Southeast Alaska records are on the Tongass boundary of the Klondike Highway and further north on the Takhin River. It has been noted that the taxa within the *Elymus trachycaulus* complex are difficult to identify based on morphological features and has been contentious among experts (Sun et al. 2006, Harrison and Hebda 2011). Indeed, *Elymus violaceus* has been considered a subspecies of *E. trachycaulus* and *E. alaskana* (Harrison and Hebda 2011, Soreng et al. 2009). *Elymus violaceus* could be confused with *E. trachycaulus*, which also occurs in southeast Alaska with few records.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank: **T5**, note that the taxon is listed under synonym *Elymus alaskanus* ssp. *latiglumis* (Scribn. & J.G. Sm.) A. Love in both NatureServe and USDA Plants Database. Subspecies have a designated rank of 'T'. This is the equivalent of **G5**. Alaska State Rank **S4**. J.R. Fulkerson ranked this taxon for this species assessment. In Alaska, the species occurs from the arctic North Slope, Seward Peninsula and the Alaska Range with scattered populations in the Wrangell St. Elias region. The species occurs broadly in higher elevations in British Columbia (CPNWH 2025). The species is found across Canada in almost every province and south to the Pacific Northwest to the Rocky Mountains and south to New Mexico (NRCS 2025). In other areas of Alaska and its range, *E. violaceus* occurs in arctic, subalpine, and alpine habitats and on rocky to gravel habitats or drier substrates in tundra (Barkworth 2007, J. Fulkerson pers. obs.). The species has been documented to be associated with calcareous or dolomitic rocks (Barkworth 2007).
3 Dispersal capability	A	A = Very limited dispersal ability (restricted dispersal capability coupled with ephemeral habitats). *Elymus violaceus* is not rhizomatous and reproduces by seed (Barkworth 2007). The seeds don't have wings, limiting their dispersal to gravity within the area of the plant. There are no appendages or hairs for transport on animal or clothing (J. Fulkerson pers. obs.).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no population or abundance data for the occurrence on the Tongass National Forest.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no data to support population trends to the occurrence and there is no data indicating that the population has been revisited.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is insufficient information to determine habitat affinity of the species for the Tongass National Forest and infer habitat trends based on one occurrence.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. There are no invasive species documented less than 500 meters from the occurrence, and no timber harvest activity is documented (USDA Forest Service 2025). The occurrence is located within the proximity of the West Glacier Trail, but exact location is unclear. The population likely experiences anthropogenic disturbance of trampling by hikers from the trail, but the impact is unknown. Trampling and habitat modification would be elevated from historical conditions.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Elymus violaceous* is a perennial species but there are no data on the demography, seed germination rate, seed production, seed viability, or other life history traits.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Elymus violaceus is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: There is insufficient information to determine if the West Glacier Trail is directly or indirectly affecting the population of *Elymus violaceus*.
- **Declining trends**: There are no data on the population of the species at the one occurrence and trends cannot therefore be estimated or determined.
- **Restricted ranges:** The one population on the Tongass is the furthest south population in Alaska, but the species is common and occurs across Canada and most western United States.
- **Low populations or restricted ecological conditions**: There is only one known occurrence on the Tongass NF, but the taxon is part of a species complex that is difficult to identify, so targeted surveys are needed to determine the true distribution and ecological conditions of this species on the Tongass NF.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (WTU408512)[7/16/1995]**	**Juneau area, Mendenhall Glacier, West Glacier Trail.**	**Lakeshore; open gravelly, sandy area.**	**Null**	**Null**
1	CPNWH_April2025(ALA)[7/16/1995]	Juneau area, Mendenhall Glacier, lakeshore, W Glacier Trail, Juneau Quad, Alexander Archipelago.	Open gravelly, sandy area.	Null	null

Epilobium lactiflorum

Epilobium lactiflorum [Hausskn.]

White-flower Willowherb

Global Rank: **G5**
Alaska State Rank: **SNR**

Photo: © Gerald Carr (Oregon Flora 2025, with permission)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated *Epilobium lactiflorum* is known from one occurrence on the Tongass NF, on the mainland up Taku Inlet at Annex Creek Power Station. We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). The habitat is described as "mossy lawn areas," which may indicate that the habitat is disturbed (Arctos 2025, CPNWH 2025, USFS 2025a). Other species collected or mapped at the Annex Creek Power Sation mossy lawn area include the native *Platanthera stricta* and the non-natives *Rumex acetosella*, *Veronica chamaedrys*, *Ranunculus repens*, *Taraxacum officinale*, *Cerastium fontanum*, *Trifolium repens*, *Plantago major*, *Poa trivialis*, *Poa pratensis ssp. pratensis*, and *Poa annua* (Arctos 2025, CPNWH 2025, USFS 2025b). There is an additional 1915 specimen with just the very general location "Taku Inlet" and georeferenced in the middle of the Inlet (Appendices 1 and 2; Klinkenberg 2020, Arctos 2025, CPNWH 2025, Field Museum 2025). There is some private and state land in the area so it cannot be confirmed on the Tongass NF, or it could be in the same vicinity as the record at Annex Creek. Habitat is described as sandy terminal moraine (Field Museum 2025)

Criteria	*Rank*	*Rationale*
		The occurrences at Taku Inlet are the southernmost locations for this species in Alaska (Klinkenberg 2025, Arctos 2025, CPNWH 2025). Note that in Klinkeberg (2020) the distribution map for this species shows a location on Chichagof Island. This is a georeferencing error for a specimen from Portage, Alaska (NYBG Accession 3307144; NYBG 2025). To the north of the Forest at Klondike Gold Rush National Historic Park, the species is found along a stream bank with *Aconitum* sp., *Arnica lessingii*, *Senecio triangularis*, *Platanthera hyperborea*, *Equisetum* sp., *Angelica* sp., ferns, and liverworts. This species is part of group *Alpiniae* of section *Epilobium* which also includes *Epilobium hornemanii*, another Alaska native which is known to occur near Juneau (Kytôvuori 1972, Baum et al. 1994, Hoch 2021, CPNWH 2025). The two species are distinguished by petal color (white flowers in *E. lactiflorum* vs rose-purple to pink in *E. hornemannii*) and the pedicel length subtending mature fruits (usually greater than 15 cm in *E. lactiflorum* vs usually less than 15 cm in *E. hornemannii*) (Hoch 2021).
2 Distribution in surrounding geographic area	C	C = Widely distributed outside of the TNF Global Rank: G5 (Secure), Alaska State Rank: Not ranked (NatureServe 2025) State Ranks: Canadian provinces and territories: S1 (Critically Imperiled): Nova Scotia, Ontario; S3 (Vulnerable): Alberta, Labrador, Newfoundland, Northwest Territories, Quebec, Yukon; S5 (Secure): British Columbia. United States: SH (Possibly Extirpated): Maine, New Hampshire; S1 (Critically Imperiled): Arizona, Nevada; all others are S4 (Apparently Secure), SNR (not ranked), or not present in that state (NatureServe 2025). *Epilobium lactiflorum* is a circumboreal perennial herb that is widespread in North America (Hoch 2021). It occurs in the western Canadian states and territories of Alberta, British Columbia, Northwest Territories, and Yukon, and in the eastern Canadian states and territories of Labrador, Newfoundland, Nova Scotia, Ontario, and Quebec (Hoch 2021). In the western United States, it occurs in a block of states from Alaska to California and east to Montana, Wyoming, Colorado, and New Mexico and in the far northeastern states of Maine, New Hampshire, and Vermont (Hoch 2021, NRCS 2025).

Criteria	*Rank*	*Rationale*
		The *Epilobium lactiflorum* record from Taku Inlet on the Tongass NF is approximately 10 miles (16 km) east of Juneau (Field Museum 2025, CPNWH 2025). There are a total of six records in Southeast Alaska, and the nearest Alaskan records are approximately 95 miles north and northwest at Glacier Bay, Takhin Ridge, Chilcoot Lake, and in the region north of Skagway (Arctos 2025, CPNWH 2025, Field Museum 2025). The remaining Alaskan records are mostly near the coast of the Gulf of Alaska, including Kodiak Island, with two records in the interior in central Alaska (Arctos 2025, CPNWH 2025). To the east, *Epilobium lactiflorum* is widespread in British Columbia (Klinkenberg 2020, CPNWH 2025). Throughout its range in North America, *Epilobium lactiflorum* is found from lowlands to alpine zones with the southernmost localities in montane areas in high mountain ranges (Klinkenberg 2020, Hoch 2021). Habitats include wet meadows, stream banks, talus, moist crevices and ledges, sandy moraines, gravelly roadsides, burned woodlands, and subalpine forests at elevations ranging from 160 to 12500 feet (50–3800 m) (Hoch 2012, Klinkenberg 2020, Hoch 2021). In northern Europe, the species has been seen in meadows, along brooks, and in moist depressions, in sun or shade, and sometimes in vegetation gaps or along disturbed reindeer or sheep trails (Kytôvuori 1972).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations The fruits of *Epilobium lactiflorum* are slender capsules that open at maturity to release numerous small seeds, each one tipped with white hairs (Kytôvuori 1972, Hoch 2021). The hairs aid in wind-dispersal of the seeds, and this type of wind-dispersal is very efficient in open arctic environments; the seeds can also be dispersed by moving water (Kytôvuori 1972). In wet weather, the seed hairs can become entangled with the fruit's valves, and the entire fruit can blow across the landscape, or the valves can become entangled in animal fur and be dispersed by animal movement (Kytôvuori 1972). In addition, basal shoots can be broken off by soil or water movements, and these can produce clonal plants (Kytôvuori 1972). The leafy, cespitose, basal shoots spread quickly in wet habitats (Keating et al. 1982).
4 Abundance on Tongass NF	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. *Epilobium lactiflorum* is known from only one occurrence on the Tongass NF with no information on abundance at the locations (Appendices 1 and 2; Arctos 2025, CPNWH 2025, Field Museum 2025). Understanding the true abundance and distribution of this species on the Forest would likely require targeted surveys (USFS 2025c).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow up surveys, population trends for known occurrences of *Epilobium lactiflorum* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality The coordinates of the Annex Creek Power Station occurrence (provided by the collector) are located within a polygon containing numerous mapped non-native, invasive taxa: *Ranunculus repens*, *Taraxacum officinale*, *Cerastium fontanum*, *Trifolium repens*, *Plantago major*, *Poa annua*, *Poa trivialis*, *Poa pratensis* ssp. *pratensis*, *Rumex acetosella*, and *Veronica chamaedrys* (CPNWH 2025, USFS 2025b). The location is not near a mapped timber project (USFS 2025d). The 1915 specimen from Taku Inlet indicates that *Epilobium lactiflorum* was present historically in that area (Field Museum 2025). It was likely present prior to the construction of the power station and introduction of numerous non-native taxa. Therefore, it may be the case that the habitat for this species in the vicinity of the power station has declined. However, this species has broad habitat requirements across its range (wet meadows, stream banks, talus, moist crevices and ledges, sandy moraines, gravelly roadsides, burned woodlands, and subalpine forests; Hoch 2012, Klinkenberg 2020, Hoch 2021), and these habitats are abundant on the Tongass NF. Additionally, *Epilobium lactiflorum* is more prevalent in British Columbia and several occurrences are documented in the Skagway and Haines area to the north of the Tongass NF, suggesting there may be more occurrences on the Tongass NF.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors Invasive species and power station activities may impact the documented *Epilobium lactiflorum* occurrence on the Tongass NF. The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut 2024, Wiles and Warren 2024).

Criteria	*Rank*	*Rationale*
		Threats to this species are not well documented but may include succession, climate change, altered hydrology, recreation, and invasive species. The overall impact of these threats may be negligible given the species broad range, disturbance tolerance, and affinity for typically abundant habitats (NatureServe 2025).
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** *Epilobium lactiflorum* is a perennial herb with ascending, clumped stems to 50 cm tall growing from scaly shoots that arise from a woody, underground stem (a caudex); the scaly shoots are referred to as soboles (Keating et al. 1982, Hoch 2021). The stems terminate in open inflorescences that are nodding in bud and erect in flower, with each flower having an inferior ovary and four white to pinkish petals (Hoch 2021). Many species of *Epilobium* are self-compatible, and some can self-pollinate (Kevan 1972, Kytôvuori 1976). *Epilobium lactiflorum* and its relatives in the *Alpiniae* group are partly self-pollinating and partly pollinated by insects (Kytôvuori 1972). In *Epilobium lactiflorum*, the stamens mature before the corolla opens, allowing for self-pollination, and on days when the sun is not out, the corolla may not open at all (Kytôvuori 1972). Pollinators have not been reported for this species or its close relatives, but *Bombus* (bumble bee) species have been confirmed as pollinators for other *Epilobium* species, and seven genera of Lepidoptera are reported as floral visitors (Kevan 1972, CPC 2022). The fruits are slender capsules that open at maturity to release numerous small seeds, each one tipped with white hairs (Kytôvuori 1972, Hoch 2021). The hairs aid in wind-dispersal of the seeds, and this type of wind-dispersal is very efficient in open arctic environments; the seeds can also be dispersed by moving water (Kytôvuori 1972). In wet weather, the seed hairs can become entangled with the fruit's valves, and the entire fruit can blow across the landscape, or the valves can become entangled in animal fur and be dispersed that way (Kytôvuori 1972). At the end of the growing season, *Epilobium* species observed in the field and in the greenhouse enter a dormant phase. The dormancy is marked by formation of the specialized overwintering buds that often contain the following year's axillary buds in delayed dormancy, a pattern observed for flower primordia in many arctic and alpine plants (Keating et al. 1982). The overwintering shoots are short and stout with short internodes and small, scale-like swollen leaves (Kytôvuori 1972). These shoots can be broken off by moving soil or water and produce clonal plants (Kytôvuori 1972). Studies of seed germination in *Epilobium* suggest that germination may occur in late summer or fall, with the seedlings passing the winter in a condensed fleshy form and resuming growth in the spring, in some cases triggered by a photoperiodic response (Keating et al. 1982). In *Epilobium lactiflorum*, the seeds are able to germinate as soon as the

Criteria	*Rank*	*Rationale*
		fruit opens (Kytôvuori 1972). In addition, many species of *Epilobium* have been shown to have persistent soil seed banks (Falińska 1999).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Epilobium lactiflorum is not recommended as a Species of Conservation Concern due to a lack of scientific information to determine substantial concern:

- **Significant threats**: Invasive species and power station activities are documented at the one known location on the Tongass NF.
- **Declining trends**: Population trends are not known. Habitat at the one known location is disturbed. However, this species has broad habitat requirements range wide and is more common in British Columbia and around Skagway and Haines in Southeast Alaska, suggesting there may be additional occurrences on the Tongass NF. Range wide habitat is wet meadows, stream banks, talus, moist crevices and ledges, sandy moraines, gravelly roadsides, and subalpine forests, which are abundant on the Tongass NF.
- **Restricted ranges**: This species is not endemic or at a range edge on the Tongass NF. The Tongass NF occurrence may be disjunct but would require more targeted surveys to understand true distribution on the Tongass NF.
- **Low population numbers**: There is only one known occurrence on the Tongass NF. However, this species may be difficult to distinguish from more common Epilobium spp. and there is low survey intensity on the northern end of the Tongass NF where it is likely to occur. Therefore, there may be additional occurrences of this species on the Tongass NF. Additionally, this species is disturbance tolerant and produces numerous seeds with several dispersal mechanisms.
- **Other factors**: Very efficient wind dispersal.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025, Arctos 2025 (ALA, UAM:Herb:248512) [7/17/2012]**	**Taku Inlet, vicinity of Annex Creek Power Station, Juneau Quad, Tongass National Forest, Alexander Archipelago.**	**Growing in mossy lawn areas.**	**White flowers**	
1	CPNWH_Mar25 (UAAH9904)[7/17/2012]	Juneau Quad.: Tongass National Forest, Taku Inlet, vicinity of Annex Creek Power Station.	growing in mossy lawn areas.		
	Location uncertain				
2*	**Klinkenberg 2020; Field Museum 2025 (V0358765F) (6/11/1915)**	**Taku Inlet.**	**Sandy terminal moraine.**		

Erioderma sorediatum

Erioderma sorediatum [D.J. Galloway & P.M. Jørg. 1975]

Mouse Ears

Global Rank: **G4G5**

Alaska State Rank: **S2**



photo: (CCBY) Paul Bell-Butler

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy or gaps *Erioderma sorediatum* is known from 11 locations on the TNF (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). These occurrences are located: in the vicinity of Mendenhall Glacier NW of Juneau, western Etolin Island south of Streets Lake, on Kuiu Island in the Tebenkof Bay Wilderness, on Prince of Wales Island southwest of Thorne Bay, in the Alexander Archipelago on south Etolin Island and Heceta Island, on mainland at Amalga trail to Eagle Glacier, on mainland in Misty Fjords National Monument, on Revillagigedo Island on the south side between Rockfish and Fire Coves, in the Misty Fjords Wilderness on DeLong Island, and on Baranof Island S of Sitka at the Yamani Islets (Appendices 1 and 2; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in beach, conifer forests along with *Picea sitchensis* or on alpine mossy soils (CLH 2025). Most occurrences are in old growth beach fringe forest. Two occurrences are in deglaciated habitat, one specifies on “sandy soil” and one is in inland second growth forest. Substrate is *Picea sitchensis* and *Tsuga heterophylla* (CPNWH 2025).

Criteria	*Rank*	*Rationale*
		There are 2 occurrences of this species in southeastern Alaska outside of the Tongass NF (CLH 2025). Across its range, *Erioderma sorediatum* is typically found in semi-open habitats on the coast and in coastal *Picea* forests (McCune and Geiser 2023). In Southeast Alaska, the species tends to co-occur with ericaceous shrubs and conifers (McCune and Geiser 2023). This species may be confused for *Leioderma sorediatum* which is also present nearby (Jørgensen 2000). There are no known subspecies of *Erioderma sorediatum*.
2 Distribution in surrounding geographic area	C	*C* = Wide distribution outside the Tongass National Forest. Global Rank G4, Alaska State Rank S2, British Columbia S2S3 *Erioderma sorediatum* is broadly distributed throughout western North America, central and South America, eastern Africa, the islands of SE Asia and Oceana and eastern coast of Australia (CLH 2025). In North America, *Erioderma sorediatum* is present in British Columbia, Canada, Oaxaca, Mexico, as well as U.S. states Alaska, Washington, Oregon, and California (CLH 2025). Across its range, *Erioderma sorediatum* occurs in coastal and montane habitats at elevations of 10 m to 3800 m (CLH 2025). It is typically found on shrubs including manzanitas, by water in partial shade in old growth forests, often growing directly on moss (CLH 2025). *Erioderma sorediatum* can occur very high in the tree canopy with some reports stating the species was growing epiphytically on a branch 77 m up a *Picea sitchensis* tree in an old growth redwood forest (CLH 2025). *Erioderma sorediatum* reportedly has high light requirements similar to most *Erioderma* species (Maass 1983). On the Tongass NF the soils where this species is found are described as rather acidic, while other reports describe them as sandy soils (CLH 2025). Its range continues northwest in Alaska about 910 km to the Kenai Peninsula Borough (CLH 2025, CPNWH 2025). The occurrences of *Erioderma sorediatum* in the TNF are also close to the observations of this species in coastal forests of British Columbia (CLH 2025).

Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	B = Disperses only through suitable habitat. *Erioderma sorediatum* is a lichen species which grows as an epiphyte on branches or mossy ground (CLH 2025, Jørgensen 2000). Its main dispersal mechanism is by soredia, and this species does not produce sexual spores (Jørgensen 2000). Dispersal distances for clonal propagules like soredia are limited, often falling between 15 to 30 meters from the lichen, and depend on wind direction, wind speed, forest density, and moisture levels (Armstrong 1994, Pasiche-Lisboa et al. 2019, Ronnås et al. 2017). Generally, asexual propagules are distributed with more abundance during periods of increased wind velocity and decreased humidity (Pasiche-Lisboa et al. 2019). Dispersal and establishment of *Erioderma sorediatum* is reported as more rapid than other similar species because soredia enable this species to spread to new areas via vegetative propagules with both fungal and photosynthetic symbionts already present (Jørgensen 2000, Maass 1983).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. One of the occurrences for *Erioderma sorediatum* have population estimates of "one" (occurrence 3), though no other occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Erioderma sorediatum* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	B	B = Decline in habitat quality or quantity, but stable amounts of suitable or potential habitat remain The habitat for the 11 occurrences of *Erioderma sorediatum* on the TNF is beach fringe forest habitat or recently deglaciated forests (CLH 2025). In adjacent locations including Graham Island of B.C., it also occurs in coastal "old forests" alongside *Usnea longissima* (Appendix 1; CLH 2025). These habitats can be grouped under coastal conifer forests or alpine habitats which are common on the Tongass NF (Turner and Mallott 2025).

Criteria	*Rank*	*Rationale*
		Timber harvest has occurred in the recent past at the location for occurrence 6 and is widespread in the vicinity of occurrence 6 on Heceta Island as well as in the vicinity of occurrence 9 on Revillagigedo Island (USFS 2025d). Coastal forests were historically targeted for harvest due to the large trees that grow there and ease of access. This might indicate a negative trend in habitat quality at those sites.
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors Increased frequency and intensity of storms due to climate change (Halofsky et al DRAFT) may contribute to erosion at the beach forest fringe that could result in loss of trees that are habitat for *Erioderma sorediatum*. The impacts of these storms may be exacerbated by increased pest and disease pressure on trees (Halofsky et al. DRAFT). In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit, which will lead to drought stress for sensitive species such as *Erioderma sorediatum* (Turner and Mallott 2025, Wiles and Warren 2025). It is unknown how *Erioderma sorediatum* will respond to warming temperatures and projected summer drought stress projected for the region (Halofsky et al. DRAFT). However, many lichens have peak growth during wet seasons with little to no growth when it is dry (Ellis 2012), so changes in precipitation may affect growth patterns. Recent timber harvest activities have occurred in the vicinity of the alpine summit area at occurrences 6 and 9 (USFS 2025d), and this activity will likely continue on Heceta and Revillagigedo Islands in the future. However, in old growth forest, coastal areas are protected with a 1000 foot no harvest buffer and in young growth forest there is a 200 foot no harvest buffer adjacent to the beach.
8 Life history and demographics	B	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Erioderma sorediatum* is a foliose cyanolichen that grows as an epiphyte on trees and bushes, frequently atop a layer of bryophytes, or on the mossy ground (CLH 2025, Jørgensen 2000, McCune and Geiser 2023). *Erioderma sorediatum* does not have apothecia, the sexual reproduction structures (Jørgensen 2000, McCune and Geiser 2023). Asexual reproduction is through soredia, which are propagules enabling this species to spread to new areas (Jørgensen 2000, Maass 1983).

Criteria	*Rank*	*Rationale*
		The life span of *Erioderma* lichens has not been measured (Jørgensen 2000, Maass 1983). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☒	☐	☐
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Erioderma sorediatum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** The beach fringe old growth forest habitat where this species occurs is protected from timber harvest actions with a 1000' buffer. However, nearby timber harvest activities may still negatively impact habitat through altered hydrology, community composition, and edge effects. Similarly, climate change is likely to alter alpine and coastal forest habitat through expected changes in precipitation patterns and increases in temperature. Coastal forest is particularly vulnerable to projected increases in storm intensity brought on by changing climatic conditions. *Erioderma sorediatum* has high light requirements, so encroachment by invasive species or native woody shrubs into deglaciated habitat may negatively impact habitat conditions.
- **Declining trends:** While population trends are unknown, coastal erosion and the aforementioned expected increases in storm intensity may negatively impact beach fringe forest habitat. Beach fringe habitat is common in the plan area, but it is unknown to what degree the dispersal mechanisms employed by this species will allow for the colonization of suitable habitat outside known occurrences in the case of habitat decline.
- **Restricted ranges:** *Erioderma sorediatum* is not endemic to the plan area. Occurrences on the Tongass NF are not disjunct from nearby

populations, nor are they at the edge of the species greater range.

- **Low population numbers or restricted ecological conditions:** Though exact population data are lacking, there are eleven occurrences in variable forested habitat on the Tongass NF and there exists a small possibility of extirpation of the species from the plan area due to stochastic events. Dispersal for *Erioderma sorediatum* is likely limited because of reproduction by soredia only, but beach fringe forest habitat is abundant and reproduction by soredia allows for simultaneous dispersal of both the fungal and photobiont partners. Additional information is needed to determine whether these factors imply substantial concern for the species.
- **Other factors:** There is not enough available information to identify how additional factors may impact the ability of this species to persist in the plan area. While reproduction by soredia may allow for an intermediate ability to recover from disturbance events, it is unknown whether the dispersal distances achieved by this species are sufficient to counteract existing threats.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (SRP-L16133) [6/10/2021]**	**Mendenhall Glacier area. Along trail on west end of the lake. 15 km NW of Juneau, AK.**			
2*	**CPNWH_Mar25 (OSC) [6/23/2006]**	**[interpreted locality from map: western Etolin Island, about 3.5 km south of Streets Lake]**			
2	CLH 2025 (OSC) [06/23/2006]	FIA Site # 30182 2 280			
3*	**CPNWH_Mar25 (UAAH17140) [8/24/2004]**	**Kuiu Is., Tebenkof Bay Wilderness. Peninsula in small cove of Elena Bay SE of Gap Pt.**	**Beach forest, *Alnus sitchensis, Picea sitchensis, Tsuga heterophylla, Malus, Tsuga heterophylla* twigs.**	**Abundance: 1**	
4*	**CPNWH_Mar25 (WTU) [6/03/2001]**	**Tongass National Forest, Prince of Wales Island east, southwest of Thorne Bay, Salt Chuck north.**	**Corticolous on twig(s) of *Picea sitchensis* at fringe of sheltered beach.**		
4	CLH 2025 (WTU) [06/03/2001]	Tongass National Forest, Prince of Wales Island east, southwest of Thorne Bay, Salt Chuck north.	Corticolous on twig(s) of *Picea sitchensis* at fringe of sheltered beach.		
4	CLH 2025 (BG) [06/03/2001]	Tongass Nat. Forest, Prince of Wales Island E, SW of Thorne Bay, Salt Chuck N	Corticolous on twig(s) of *Picea sitchensis* at fringe of sheltered beach.		
4	CLH 2025 (BG) [06/03/2001]	Tongass Nat. Forest, Prince of Wales Island E, SW of Thorne Bay, Salt Chuck N	Foliicolous on needle of *Picea sitchensis* at fringe of sheltered beach.		
4	CLH 2025 (BG) [06/03/2001]	Tongass Nat. Forest, Prince of Wales Island E, SW of Thorne Bay, Salt Chuck N	Corticolous on twig(s) of *Picea sitchensis* at fringe of sheltered beach.		

4	CLH 2025 (BG) [06/03/2001]	Tongass Nat. Forest, Prince of Wales Island E, SW of Thorne Bay, Salt Chuck N	Corticolous on twigs of *Tsuga heterophylla* at fringe of sheltered beach.		
5*	**CLH 2025 (ALA) [07/13/2006]**	**Alexander Archipelago, south Etolin Island, south end of Burnett Inlet, east side across from north Burnett Island, west of Navy Lake., Tongass National Forest**	**In old growth beach fringe forest**		
6*	**CLH 2025 (ALA) [05/10/2011]**	**Alexander Archipelago, Heceta Island, Tongass National Forest**	**On fallen tsuga heterophylla twig in second growth forest**		
7*	**CLH 2025 (ALA) [08/15/1990]**	**Mainland, Amalga trail to Eagle Glacier, across Boulder Creek., Tongass National Forest**	**sandy soil;.**		
8*	**CLH 2025 (ALA) [07/21/2001]**	**Mainland, Misty Fjords National Monument, Very Inlet., Tongass National Forest**	**Beach fringe forest elevation 3m on picea sitchensis twig**		
9*	**CLH 2025 (ALA) [06/19/2002]**	**Revillagigedo Island, Neets Bay, south side, between Rockfish and Fire Cove., Tongass National Forest**	**Beach fringe forest of picea sitchensis, thuja plicatat and alnus rubra. On tsuga heterophylla twig**		
10*	**CLH 2025 (ALA) [07/19/2001]**	**Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest**	**Beach fringe forest edge of small marine island**		
11*	**CLH 2025 (BG) [09/12/1999]**	**City and Borough of Sitka, Baranof Island SW, 45 km S of Sitka, Yamani Islets, main island NE**	**Corticolous *on Picea sitchensis*, twig; on rock outcrop on beach.**		

Eriophorum viridicarinatum

Eriophorum viridicarinatum [(Engelm.) Fern.]

Thinleaf cottonsedge, Green-keeled cotton-grass

Global Rank: **G5**

Alaska State Rank: **S2S3**



photo: Michael John Oldham

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated. *Eriophorum viridicarinatum* is known from two estimated occurrences on the Tongass National Forest. We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile) CPNWH 2023, ACCS 2023, USDA FS 2023). One occurrence is documented in a karst fen on Chichagof Island near Game Creek (ACCS 2024). The other was found in a "shallow flooded area with [a] rock pit" on southern Mitkof Island (ACCS 2024). This species may be difficult to distinguish from *E. angustifolium,* another cotton-grass which is common on the Tongass.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2S3 Widespread distribution in eastern Canada and the northern United States south to New York, Iowa, Ohio, Michigan, Colorado, and Idaho with thousands of occurrences. As well as patchy distribution from western Canada to Alaska (NatureServe 2024, E-Flora 2024). Range wide habitat is marshes, meadows, bogs, fens, and wet woods from 0–2000 m (E-Flora 2025). In some areas it is considered a calciphile, but it is not a strict calciphile throughout its range, and its preferred habitat and distribution broadens at the northern extent of its range (McPherson 2013). There is one occurrence in Southeast Alaska off Forest Service land near Gustavus in pine woodland (ACCS 2024). The nearest occurrence outside of Southeast Alaska is near Atlin Lake in British Columbia, approximately 125 miles away from the Chichagof occurrence. These occurrences are separated by the Coast Range Mountains, so they could be disjunct, but that area is remote and survey intensity is low.
3 Dispersal capability	B	B = Disperses only through suitable habitat. There is little data at species level, but based on morphology and family level characteristics, this species is likely wind pollinated and has wind dispersed seeds. Seeds may also be dispersed in flowing water. Dispersal ability may be limited by natural barriers such as large, forested areas between isolated populations (E-flora BC 2024, Fertig 2020).
4 Abundance on Tongass NF	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. No population counts are available, but given that there are only two known occurrences of this species on the Tongass NF, it may be rare (CPNWH 2023, ACCS 2023, USDA FS 2023).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. No revisits are recorded for the two known occurrences (USDA FS 2025).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat. Habitat for *Eriophorum viridicarinatum* on the Tongass NF is calcareous and non- calcareous wetlands. This habitat type is abundant, and ecological integrity is high (Turner and Mallot 2025). Orange hawkweed and reed canarygrass are known at the occurrence on Mitkof Island. Reed canarygrass is likely to compete with *Eriophorum viridicarinatum* in wetland habitat.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to range of historical conditions but is being impacted by modern stressors. Wetland habitat is vulnerable to invasion by non-native species like reed canarygrass (*Phalaris arundinaceae*) (Huette et al. 2003). Infestations of reed canarygrass are recorded within 10 miles of both *E. viridicarinatum* records on the TNF (USDA FS 2025). The presence of *Eriophorum viridicarinatum* in a rock pit makes it vulnerable to future quarry activities which could directly impact the occurrence or indirectly impact it through altered hydrology due to rock removal. Increased temperatures and increased evapotranspiration may lead to summer water deficits, which may alter water availability for *Eriophorum viridicarinatum* and if drought conditions are sever could lead to woody encroachment (Halofsky et al 2025). Additionally, logging in adjacent upland forests could contribute to decreased evaporation and increased surface runoff, including excess sediment. Adverse impacts of these hydrological shifts may lead to changes in decomposition and species composition (Rocchio and Crawford 2015).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. This species is a perennial herb with thin rhizomes. Species reproductive rate, competitive ability, response to disturbance, susceptibility to disease, and relationships to predators or symbionts are unknown.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Eriophorum viridicarinatum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Altered precipitation patterns and increased average temperatures due to climate change may decrease available water over summer months and could lead to woody encroachment if drought is severe. Additionally, reed canarygrass is known at one occurrence and is highly invasive in wetland habitat.
- **Declining populations or habitat**: Population trends for the two occurrences on the TNF are unknown. Wetland habitat is widespread and has high ecosystem integrity on the Tongass NF. It is unknown if there are additional habitat requirements that contribute to this species' rarity on the Tongass NF.

- **Restricted range**: This species is widespread in northern North America. The nearest records outside Southeast Alaska are in interior British Columbia approximately 125 miles away and separated by the Coast Mountain Range.
- **Low population numbers**: With only two records on the TNF, the known occurrences of this species are vulnerable to extirpation by stochastic events. However, there is another very common *Eriophorum* species that looks similar so *Eriophorum viridicarinatum* may be underreported.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	TESP_Mar25 (100521P000126Y16)[6/02/2016]			NA	NA
1	ACCS_Mar25 (EO1)[6/02/2016]	Tongass National Forest, Petersburg Ranger District, Mitkof Island, road 6285.	Shallow flooded area within rock pit.		
1	CPNWH_Mar25 (UAAH12608)[6/02/2016]	Tongass National Forest, Petersburg Ranger District, Mitkof Island, road 6285.	Shallow flooded area within rock pit.		
2	ACCS_Mar25 (EO3)[7/15/1994]	Chichagof I., Game Creek	sitka spruce-hemlock forest, open moist to wet graminoid calcareous fen		
2	CPNWH_April2025(ALA)[7/15/1994]	Chichagof I., Game Creek, Sitka Quad, Tongass National Forest.	Sitka spruce-hemlock forest, open moist to wet graminoid calcareous fen.		
	In SE but not on TNF				
3	ACCS_Mar25 (EO5)[7/20/2001]	Gustavus, N of town on Park Road, N side of road just past NPS sign, UTM 454249.99N, 6479088.8W, T 39 S, R 58 E, S 35	pine woodland with predominate forb understory		

Erythranthe lewisii

Erythranthe (Mimulus) *lewisii* [Pursh]

Lewis's monkeyflower

Global Rank: **G5**
Alaska State Rank: **S2**



photo: user rdegeer, iNaturalist

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy OR gaps. There are approximately 22 estimated occurrences of *Erythranthe lewisii* on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The occurrences on the Tongass are near Hyder on the mainland (3), Revillagigedo Island (3), near Stanton/Farragut Lake on the mainland (2), South Admiralty (1), Taku inlet (1), Baranof Island (11), and West Chichagof Island (1). There are no estimated occurrences in southeast Alaska outside of the Tongass NF (CPNWH 2024). Habitat in Alaska consists of wet open riparian areas and woods, often in gravel or cobble streambanks. This species can be found from near sea level to along alpine streams (Hulten 1968, DeLapp 1994, CPNWH 2024).
2 Distribution in	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2 Alberta S3, British Columbia S5

Criteria	*Rank*	*Rationale*
surrounding geographic area		California, Idaho, Nevada, Oregon, Washington, and Utah SNR, Colorado S2, Montana S4, Wyoming S3 This species is common to occasional in appropriate habitats throughout western North America from California to Colorado to Southeast Alaska (Fonda 1974, DeLapp 1994, Titus et al. 1998, NatureServe 2024). The species has two races: the northern form that grows from Tongass NF to southern Oregon and east to the Rocky Mountains, and the southern form that occurs in the California Sierra Nevada Mountains. The clades are partially incompatible and may be sister taxa, though intermediate individuals appear to exist and together the clades form a monophyletic species, *E. lewisii* (Beardsley et al. 2003). The nearest occurrences are in British Columbia approximately 100 km southeast of the Tongass NF occurrences by Hyder. The Tongass NF occurrences are at the northern range edge for the species (CPNWH 2024).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). The species reproduces sexually with many tiny seeds and asexually through rhizomatous growth (Hulten 1968, Angert 2009). Angert (2009) hypothesized for montane Sierra Nevada populations of *Erythranthe lewisii* that as a riparian species, seeds may have a mechanism of primarily unidirectional long-distance dispersal via downstream currents. Studies of co-occurring *Erythranthe* species suggest that wind likely only contributes to very short distance seed dispersal and animals may carry seeds farther away (Waser et al. 1982, Vickery et al. 1986). Recent study of E lewisii found that selfing and clonal reproduction are particularly important at range edges where population densities are lower (Urquhart-Cronish et al 2025). These traits may allow E lewisii to more effectively colonize new areas (Urquhart-Cronish et al 2025).
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. There are 22 known occurrences of *Erythranthe lewisii* on the Tongass NF (ACCS 2023, USDA FS 2023, CPNWH 2024). Two occurrences have documented population sizes of 100 and 90 individuals.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Habitat in Alaska consists of wet open riparian areas and woods, often in gravel or cobble streambanks from sea level to the alpine. Riparian ecosystems in Tongass NF are threatened by climate-change driven threats including increased temperatures, changing hydrological regimes, changes to nutrient availability, and disturbance regimes such windthrow and avalanches (Halofsky et al draft). . At lower elevations, habitat may have been impacted by timber harvest. Riparian habitat is also vulnerable to invasion by exotic species like reed canarygrass (*Phalaris arundinacea*). Japanese knotweed is known near the occurrence at Cliff Lake and splitlip hempnettle (Galeopsis bifida) and reed canarygrass are known near the occurrence on Fish Creek by Hyder. Additionally, it is projected that thousands of kilometers of new streams will be created in the northern portions of the Tongass NF by glacier recession by 2100 (Pitman et al. 2021).
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Riparian plants, especially those growing in and close to the streambed such as *Erythranthe lewisii*, will be more vulnerable to the immediate effects of climate-induced changes in flow. For example, changes in regional hydrology resulting from climate change can increase the incidence of high flows and runoff events, which could result in mechanical injury or death to individual *E. lewisii* plants (Nilsson and Svedmark 2020). Though *E. lewisii* is not limited by saturated soil conditions (Kirkpatrick et al. 2006), longer duration of flooding events and greater depth of flooding reduces seedling survival of most riparian species (Garssen et al. 2015). Invasion of riparian systems by exotic plants is also likely facilitated by changes to flow dynamics (Flanagan et al. 2015, Nilsson and Svedmark 2020). Southeastern Alaska's waterways are among the most vulnerable sites to invasive species. Reed canarygrass is an exotic grass that aggressively invades wetlands and riparian areas in southeastern Alaska, thriving

Criteria	*Rank*	*Rationale*
		in the same saturated but not inundated sites where *E. lewisii* is found. The grass forms thick monospecific mats that choke out other riparian vegetation (Huette et al. 2003) so it may outcompete *E. lewisii* in areas where both species are found. Reed canarygrass is known near one occurrence and Japanese knotweed is known near another occurrence.
8 Life history and demographics	B	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Erythranthe lewisii* is a perennial herb that is self-compatible and primarily bumblebee pollinated (Sutherland & Vickery 1993, Schemske & Bradshaw 1999, Angert & Schemske 2005). It has a stout, erect, simple stem with a branched woody rhizome (Hulten 1968). The northern form has deep magenta-pink flowers with wide, non-reflexed corollas. The corolla throats have a pair of yellow, hairy ridges presumed to be nectar guides for pollinators along with dark, UV-reactive nectar guides (Sutherland & Vickery 1993, Schemske & Bradshaw 1999). Though the species can self-fertilize, it might be vulnerable to the observed widespread declines in bumblebee populations across North America due to the loss of critical pollination services (Cameron et al. 2010, Potts et al. 2010, Thomann et al. 2013). The presence of moss mats appears to essentially eliminate successful seedling establishment (Kirkpatrick et al. 2006). As a species at its northern range margin in southeast Alaska, *E. lewisii* may be less able to adapt to the environmental conditions due to lack of genetic variation or because natural selection is weak compared to homogenization caused by gene flow from more southern populations. Based on studies of Sierra Nevada populations, the species may also be limited by heat stress at lower elevations or in hotter climates (Angert and Schemske 2005, Angert 2009). The Tongass NF occurrences are the far north edge of the range and may be more resilient to temperature increases, while southern populations are negatively impacted.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐

Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Erythranthe lewisii is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: The main threat to this species is climate change (including increased flooding which may scour streams), but it is unknown to what extent *Erythrane lewisii* will be impacted by these changes. Another potential threat is invasive species, which are found at 2 out of 22 known occurrences.
- **Declining trends**: Population trends are unknown. Habitat may be impacted by altered hydrology and invasive species, but glacial recession may create more suitable habitat.
- **Restricted ranges**: *Erythranthe lewisii* is not a narrow endemic nor are Tongass occurrences disjunct from the rest of the species' range, but the Tongass NF is the northern edge of range.
- **Low population numbers or restricted ecological conditions**: There are 22 known occurrences from the southern boundary of TNF and north to Juneau. Extirpation by stochastic events is unlikely but impacts from climate change related changes in hydrology could affect occurrences across the Tongass NF. It is unclear how severe impacts would be. Genetic diversity of Tongass NF populations may be limited due to its reliance on selfing and clonal reproduction at the range edge, which may make it more susceptible to change. Ecological conditions do not appear to be highly restricted as riparian and wet forested habitats are widespread across the Tongass. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors**: It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section. Only the first 15 occurrences are verified.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO0)[8/18/2004]**	**Revillagigedo Island, Alaska. Population is about 0.25 miles northeast of Deer Mountain, just downhill of Deer Mtn.**	**Trail. Plants are growing from cracks in granite in/near ephemeral snowmelt stream.**	**NA**	**NA**
1	TESP_Mar25 (100552P000168)[8/18/2004]				
2*	**ACCS_Mar25 (EO0)[8/08/2000]**	**Revillagigedo Island, Ridge above Mirror Lake**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Licking CrkTS,U62,in running water**		
2	TESP_Mar25 (100552P000133)[8/08/2000]				
3*	**ACCS_Mar25 (EO0)[2/01/1997]**	**Revillagigedo Island, south of Swan Lake, east of Carroll inlet**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Survey docs missing**		
3	TESP_Mar25 (100552P000034)[2/01/1997]				
4*	**ACCS_Mar25 (EO1)[no date]**	**Hyder.**			
5*	**ACCS_Mar25 (EO0)[6/26/1990]**	**Coast Mts., Fish Cr., N of Hyder, 2.4 km W of Hyder**	streamside gravel, with m. guttatus		
5	CPNWH_April2025(ALA)[6/26/1990]	Coast Mts., Fish Cr., N of Hyder, 2.4 km W of Hyder, Ketchikan Quad, Tongass National Forest.	Streamside gravel, with m. guttatus.		
6*	**ACCS_Mar25 (EO3)[no date]**	**Salmon River Valley, ca. 5 miles N near Silver Falls, on bank of Fish Creek.**			
6	ACCS_Mar25 (EO0)[8/05/1993]	Coast Mts., Fish Cr., N of Hyder, trailhead at Mile 4.6 from Hyder intersection	gravelly creek margin		
6	ACCS_Mar25 (EO0)[7/09/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= Rock; Parent Material= Alluvium; Soil Moisture= Moist;		

			Soil Texture= coarse sand; Light Exposure= Full Sun; Comments=		
6	TESP_Mar25 (100552P000301)[7/09/2009]		Regular disturbance by river, maybe two years since last flood, soil is wet.		
6	ACCS_Mar25 (EO7)[no date]	Misty Fiords, Hyder, Fish Creek, trailhead mile 4.6 from main town intersection, follow trail to creek, at confluence of Fish and Slide Creek. Survey site #M93-50.			
6	CPNWH_April2025(ALA)[8/05/1993]	Coast Mts., Fish Cr., N of Hyder, trailhead at Mile 4.6 from Hyder intersection, Ketchikan Quad, Tongass National Forest.	Gravelly creek margin.		
7*	**ACCS_Mar25 (EO0)[8/03/2014]**	**Taku Inlet, Sheep Fork of Carlson Creek.**	**Semi active gravel bars along creek, growing along a creek channel in most fines.**		
7	CPNWH_April2025(ALA)[8/03/2014]	Taku Inlet, Sheep Fork of Carlson Creek, Juneau Quad, Tongass National Forest, Alexander Archipelago.	Semi active gravel bars along creek, growing along a creek channel in most fines with Mimulus guttus, Epilobium spp., Claytonia sibirica, and graminoids.		
8*	**ACCS_Mar25 (EO0)[9/13/1979]**	**Tongass N.F. Baranof Island, 6.5 mi up Big Branch Bay Creek**	**10 m from stream edge. A community of 6 or 8 flowering in association with M. guttatus**		
9*	**ACCS_Mar25 (EO0)[7/29/2013]**	**Baranof Island, Baturin Lake area.**	**Rocky streamside, common along stream.**		
9	CPNWH_April2025(ALA)[7/29/2013]	Baranof Island, Baturin Lake area, Tongass National Forest.	Rocky streamside, common along stream.		
10*	**ACCS_Mar25 (EO0)[7/01/1978] CPNWH_April2025(ALA)**	**Port Alexander Quad, Baranof Island, Rezanof Lake**	**along lakeshore**		
11*	**ACCS_Mar25 (EO0)[8/18/2000]**	**Southeastern Baranof Island at Cliff Lake where it drains into Deep Cove**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Mimulus lewisii next to J. knotweed**		
11	TESP_Mar25 (100531P000023)[8/18/2000]				
11	ACCS_Mar25 (EO2)[no date]	Southeastern Baranof Island at Cliff Lake (which drains into Deep Cove).			
11	ACCS_Mar25 (EO0)[8/18/2000]	E side of island, head of Deep Cove, site of old cannery	tural levee of small stream, growing on gravel and cobbles		

11	CPNWH_April2025(ALA)[8/18/2000]	E side of island, head of Deep Cove, site of old cannery, Port Alexander Quad, Alexander Archipelago, Baranof Island.	tural levee of small stream, growing on gravel and cobbles. Growing with Chamerion latifolia, Mimulus guttatus, Oxyria digy, several saxifrages, and Romanzoffia sitchensis		
12*	ACCS_Mar25 (EO0)[6/23/2004]	Baranof Island, Maksoutof R., Rezanof lake drainage	Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Baranof Is., Maksoutof R., dry side channel, plants at edge of open gravel/cobble bed, 2 plants		
12	TESP_Mar25 (100531P000085)[6/23/2004]				
12	ACCS_Mar25 (EO0)[6/24/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Baranof Is., Maksoutof R. floodplain, uppr. Valley, dry cobbly stream channel, 20 plants		
12	TESP_Mar25 (100531P000086)[6/24/2004]				
12	TESP_Mar25 (100531P000087)[6/24/2004]				
12	ACCS_Mar25 (EO0)[6/24/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Baranof Is., Maksoutof R., uppr. Valley, cobble bar between 2 channels, many forbs, 15 MILE		
12	ACCS_Mar25 (EO0)[6/24/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Baranof Is., Maksoutof R. valley, stone and cobble island between channels, 20 plants		
12	TESP_Mar25 (100531P000088)[6/24/2004]				
12	ACCS_Mar25 (EO0)[6/24/2004]	Alexander Archipelago, Baranof I., Maksoutof R., Rezenof Lake	common on 3Â¿ slope on W aspect, floodplain, cobble pavement between channels		

12	CPNWH_April2025(ALA)[6/24/2004]	Alexander Archipelago, Baranof I., Maksoutof R., Rezenof Lake, Port Alexander Quad, Tongass National Forest.	Common on 3Â¿ slope on W aspect, floodplain, cobble pavement between channels.		
13*	**ACCS_Mar25 (EO6)[no date]**	**Baranof Island, SE part, W of Patterson Bay. Along major inlet stream at W end of Finger Lake.**			
14*	**TESP_Mar25 (100531P000134)[6/15/2005]**	**Baranof Island, Patterson Bay area, Upper Brentwood Lake, valley at west end of lake**			
14	ACCS_Mar25 (EO0)[6/15/2005]	Baranof Island, Patterson Bay area, Upper Brentwood Lake, valley at west end of lake	Floodplain - cobble bars and banks, avalanche zone and snowbed		
15*	**ACCS_Mar25 (EO0)[6/15/2005]**	**Baranof Is., Patterson Bay area, Uppr. Brentwood L., avalanche slope on S. side of lake.**	**Frequently disturbed avalanche slope/snowbed just above lake level.**		
15	TESP_Mar25 (100531P000135)[6/15/2005]				
15	ACCS_Mar25 (EO0)[7/13/1980]	Tongass N.F. Baranof Island, SE part of the Island at Upper Brentwood Lake	W (inlet) end of lake along shore in rocky area		
15	ACCS_Mar25 (EO5)[no date]	SE part of island at Upper Brentwood Lake, W (inlet) end of lake along shore in rocky area.			
16	TESP_Mar25 (100531P000090)[7/02/2004]				
16	ACCS_Mar25 (EO0)[7/02/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Baranof Is., Lake Dia, snowfield, growing among cobbles and gravels, 15 scattered plants		
17	ACCS_Mar25 (EO0)[8/04/2008]	Blue Lake Watershed, along Blue Lake Creek	stable, relict gravel bar ca. 15 ft. from main river channel		
17	CPNWH_April2025(ALA)[8/04/2008]	Blue Lake Watershed, along Blue Lake Creek, Sitka Quad, Alexander Archipelago, Baranof Island.	Stable, relict gravel bar ca. 15 ft. from main river channel.		
18	TESP_Mar25 (100521P000232Y24)[8/14/2024]	Mainland, Near Stanton lake		90	
18	TESP_Mar25 (100521P000230Y24)[8/14/2024]				
18	TESP_Mar25 (100521P000231Y24)[8/14/2024]				
18	ACCS_Mar25 (EO0)[8/07/2013]	Mainland, Stanton Lake, N of Farragut R., E of Sandborn Cal, W ridge above lake to Granit Peak.	Alpine scree, rare.		

18	CPNWH_April2025(ALA)[8/07/2013]	Mainland, Stanton Lake, N of Farragut R., E of Sandborn Cal, W ridge above lake to Granit Peak, Sumdum Quad, Tongass National Forest, Alexander Archipelago.	Alpine scree, rare.		
19	ACCS_Mar25 (EO0)[8/21/1979]	Admirality Is., 3 mi inland from Whitewater Bay	Alpine rock face		
19	ACCS_Mar25 (EO4)[no date]	Three miles inland from Whitewater Bay on rocky alpine face.			
20	TESP_Mar25 (100521P000111Y13)[8/07/2013]	Mainland, west of Farragut Lake		100	
21	TESP_Mar25 (100531P000131)[8/13/2004]	Baranof Is., near Annahootz Mtn., slope below alpine ridge, 1 plant in fractured bedrock			
21	ACCS_Mar25 (EO0)[8/13/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Baranof Is., near Anhootz Mtn., slope below alpine ridge, 1 plant in fractured bedrock		
22	ACCS_Mar25 (EO0)[6/29/2013]	West Chichagof Wilderness.	Gravel bar of small stream.		
22	CPNWH_April2025(ALA)[6/29/2013]	West Chichagof Wilderness, Tongass National Forest.	Gravel bar of small stream, 2 plants.		
	Occurrences not on TNF				
23	ACCS_Mar25 (EO8)[no date]	BRITISH COLUMBIA: -130.042, 56.133) Hyder area, road above Premier Mine, British Columbia, 18.5 miles from Hyder intersection. Survey site #M93-46.			

Festuca saximontana

Festuca saximontanta [Rydb.]

Rocky Mountain Fescue

Global Rank: **G5**

Alaska State Rank: **S4**



photo:ACCS 2014

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce OR isolated. *Festuca saximontana* is known from one estimated occurrence on the Tongass National Forest (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The record is near the west shore of the lake at the face of the Mendenhall Glacier (CPNWH 2025). However, the herbarium label states that it was also found at the flats between glacier and visitor center, which is on the east side of the lake (CPNWH 2025). The population was described to be in an open area with silt flats and glacially scoured rock and mossy areas (CPNWH 2025).
2 Distribution in surrounding geographic area	C	C: Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S4. Taxon ranked by J.R. Fulkerson for this evaluation Broadly ranked as S4 to S5 in Canada except in Nunavut as S3 and Labrador as S1. Not ranked in most U.S. but S2 in Nevada and S1 in Nebraska. In Alaska, *F. saximontana* is found from the North Slope to Eastern Interior and the Wrangell St. Elias region (CPNWH 2025. The species occurs broadly across North America from Alaska eastward to all Canada and Greenland. It occurs

Criteria	*Rank*	*Rationale*
		from the Rocky Mountains west to the Pacific and also in the Great Lakes Region (Natural Resources Conservation Service 2025). The species is also found in Russia Far East (Darbyshire and Pavlickf 2007). In Alaska, *F. saximontana* is found on south facing slopes in steppe habitat, gravel bars, and dry subalpine to alpine tundra (CPNWH 2025). Broadly across its range, *Festuca saximontana* is found in grasslands, open forests, and sand dunes in boreal, montane, and subalpine habitats (Darbyshire and Pavlickf 2007). In British Columbia, habitat for the species is described as mesic to dry meadows, grasslands, rocky slopes and ridges and forest openings in the montane to subalpine zones (Klinkenberg 2020).
3 Dispersal capability	D	D: Insufficient information to draw inferences about criterion. There is no documentation of seed dispersal methods or distances for *Festuca saximontana*. Seeds would fall by gravity in the vicinity of the plant. The seeds do not have wings and would not be greatly dispersed by the wind or find attachment to animal fur (J. Fulkerson pers. obs.).
4 Abundance on Tongass NF	D	D: Insufficient information to draw inferences about criterion. There are no data on the abundance or population number on the Tongass National Forest. The one record does indicate that there is more than one plant in the population as “small compact clumps”.
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Population trends are unknown.
6 Habitat trend on Tongass	D	D: Insufficient information to draw inferences about criterion. There is insufficient data to determine suitable habitat on the Tongass National Forest. On the Tongass NF, the one record for the species occurs in glacial moraine. In other parts of the species’ range, habitat descriptions are variable, and include gravel bars, dry subalpine to alpine tundra, sand dunes, and mesic to dry meadows.

Criteria	*Rank*	*Rationale*
NF		
7 Habitat vulnerability or modification; other threats	D	D: Insufficient information to draw inferences about criterion. The moraine habitat at Mendenhall Glacier may be increasing given the significant recession of the glacier, exposing more habitat. Indeed, glacial moraine is expected to increase on the Tongass National Forest but there is a time lag for a transition to suitable habitat for vegetation due to the lack of soil (Bennetsen et al. 2023). No young growth stands are documented in the area of the population. An occurrence of the non-native *Digitalis purpurea* has been documented within 700 meters of the *Festuca saximontana* population (USDA 2025), whether this non-native has the ability to outcompete *Festuca saximontana* is unknown. *Festuca saximontana* has a tolerance for trampling and heavy foot traffic along trails in alpine settings in Colorado (Benninger-Truax et al 1992).
8 Life history and demographics	C	C: High reproductive rate and not especially susceptible to disease, predation, or competition; OR species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. *Festuca saximontana* species is perennial but there are no data or studies to infer the demography, or reproductive rates. *Festuca saximontana* is a common species used to revegetate mine tailings (Wolter and Naeth 2014). *Festuca saximontana* had a germination rate of 78% and had a high establishment and density under controlled conditions (Wolter and Naeth 2014).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒

Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Festuca saximontana is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** There are no known significant threats to the population. The population is near a trail but the species is known to have a tolerance for trampling and heavy foot traffic in other locations.
- **Declining trends:** Population trends are unknown. Habitat may increase under climate change conditions.
- **Restricted ranges:** Though there is only one record on the Tongass NF, the species is not a narrrow endemic, nor at the edge of its range, and does not appear to be disjunct from the rest of its range.
- **Low population numbers or restricted ecological conditions:** There is one occurrence with unknown population numbers; ecological conditions apparently not highly restricted, though it is unclear why there are not more occurrences of this species in the region. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors:** The species is used in reclamation in dry soil habitats in other regions and has a relatively high germination success rate in controlled settings.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	CPNWH_April2025(ALA)[7/09/1981]	About 10 miles N of Juneau near W shore of lake at the face of Mendenhall Glacier	Open area with silt flats and glacially scoured rock areas. Flats between glacier and visitor center. Small compact clumps in mossy area.	null	null

Fomitopsis officinalis

Fomitopsis (Laricifomes) *officinalis* [(Vill.) Bondartsev & Singer, 1941]

Quinine Conk or Agarikon

Global Rank: **GNR**

Alaska State Rank: **SNR**



photo: WAmushroom CC-BY-SA via Mushroom Observer (2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or gaps.* *Fomitopsis officinalis* is known from 9 locations on the TNF (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). Three locations were downloaded from MyCoPortal but originate from iNaturalist, which obscures these locations based on the species' IUCN endangered status; or Mushroom Observer, which also had a vague location (iNaturalist 2025, Mushroom Observer 2025). However, three locations fall within Forest Service managed lands even when taking the obscured areas from iNaturalist into account, or based on the written description of the locations (Appendix 1 and 2, iNaturalist 2025). These occurrences are located: on Prince of Wales Island south of Whale Passage (occurrence 1), and on the mainland along the Stikine River (occurrence 2) and in a small slough off the main Stikine River (occurrence 3) (Appendices 1 and 2; iNaturalist 2025, MyCoPortal 2025, USFS 2025a). Six additional occurrences were reported from Forest Health Protection (FHP) surveys. The locations of these records are as follows: one occurrence north of Juneau near the outflow of the Herbert river (Occurrence 4); one occurrence in Juneau near the Mendenhall valley on the west slope of Thunder mountain (Occurrence 5); one occurrence north of Petersburg on the eastern Sukois islet (Occurrence 6); one

Criteria	*Rank*	*Rationale*
		occurrence around 500 m east of the Ketchikan Coast Guard Base (Occurrence 7); and one occurrence north of Ketchikan on Connell road (). A group of sites reported around Sitka were not included as there is a mix of ownership here and given the locational uncertainty it is not clear if the sites occur on Forest Service lands (iNaturalist 2025). Within the Tongass NF boundary, this species occurs high in live or dead conifer trees in *Picea sitchensis* forests and riparian areas (Ginns 2017). Habitat on the Tongass NF is old growth Sitka spruce – Western hemlock forest. There are 5 occurrences of this species in southeastern Alaska outside of the Tongass NF (MyCoPortal 2025). Across its range, *Fomitopsis officinalis* is typically found in old growth forests with *Picea sitchensis, Pseudotsuga menziesii*, *Abies* sp., *Pinus* sp., or *Tsuga canadensis*; in Europe with *Larix decidua* or *Larix europaea* (MyCoPortal 2025, Siegel and Schwarz 2024). In Southeast Alaska, the species tends to occur on *Picea sitchensis* or *Tsuga* sp. (iNaturalist 2025, MyCoPortal 2025). This species may be confused for young specimens of *Fomitopsis mounceae* which is dark brown but also present nearby, or *Fomes fomentarius* which grows on birch (iNaturalist 2025, Siegel and Schwarz 2024). There are no subspecies of *Fomitopsis officinalis*.
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank GNR, Alaska State Rank SNR, IUCN Endangered Species (IUCN 2025), British Columbia Rank S2S4 *Fomitopsis officinalis* is broadly distributed throughout North America with scattered observations in Europe and Russia, ranging to eastern Asia in China and Japan (Ginns 2017, iNaturalist 2025, MyCoPortal 2025). In North America, *Fomitopsis officinalis* occurs predominantly in the western United States including Washington, Idaho, Oregon, California and other scattered occurrences; the range extends east to include isolated populations in the interior U.S. in South Dakota and Michigan, and some observations in the Northeast U.S. (Ginns 2017, MyCoPortal 2025). In Canada this species is mostly found in British Columbia, with scattered populations in the provinces Alberta and Saskatchewan (MyCoPortal 2025). Across its range, *Fomitopsis officinalis* occurs in natural forests (not plantations or parks) of *Larix* spp., *Pinus ponderosa,* and *Pseudotsuga menziesii* (Fraiture and Otto 2015, Kałucka and Svetasheva 2019) found creating cylindrical conks high on tree trunks of living trees or on fallen conifers (Ginns 2017). It occurs in mature forests of *Larix* and *Picea* in moist, riparian, and often montane areas at elevations of 120 m to 2743 m (iNaturalist 2025, MyCoPortal 2025). The

Criteria	*Rank*	*Rationale*
		closest populations to the TNF are found on and near Vancouver Island, B.C., Canada growing on dead wood or live conifers in old growth habitats (MyCoPortal 2025). In southeastern Alaska this species is only known from the Tongass NF and adjacent areas; its range continues southeast in Canada 840 km to the Courtenay region of Vancouver Island (MyCoPortal 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Fomitopsis officinalis* is a polypore species which grows on mature live trees or dead wood in old growth forests, and can persist for 60-70 years (Kałucka and Svetasheva 2019). Its main dispersal mechanism is by spores which are dispersed by wind (Ginns 2017).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* None of the occurrences of *Fomitopsis officinalis* have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Fomitopsis officinalis* on the TNF are unknown (USFS 2025a, MyCoPortal 2025).
6 Habitat trend on Tongass NF	A/B	*A/B = Decline in habitat quality or quantity, but a suitable amount of habitat remains.* *Fomitopsis officinalis* occurs in island and riparian mature conifer forest habitats on the TNF (Appendix 1, MyCoPortal 2025). Old growth habitat, especially large tree old growth has been targeted for timber harvest and nearly 1 million acres in Southeast Alaska have been harvested. However, sufficient old growth forest to support this species remains. Timber harvest has occurred in the recent past 164 m northeast of occurrence 1 and timber harvest has occurred across much of north Prince of Wales Island (USFS 2025c).

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* The timber industry in Southeast Alaska has historically pushed for continual harvest of old growth because it provides the highest grade wood. Harvest of old growth timber is likely to continue in the near future. *Fomitopsis officinalis* prefers large, old growth trees which would be targeted for harvest (IUCN 2025, Kałucka and Svetasheva 2019). In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress (Turner and Mallott 2025, Wiles and Warren 2025). Insects and disease as well as increased winter storms may also increase rate of wind throw which could affect this species (Halofsky et al draft).
8 Life history and demographics	B	*B = Low reproductive rate.* *Fomitopsis officinalis* is a perennial necrotroph and a decomposer which produces sporocarps year-round (Ginns 2017, Kałucka and Svetasheva 2019). This species is often growing from trees already suffering from environmental stress (Piętka and Szczepkowski 2004). Specialized asexual reproduction is in the form of sclerids which are disarticulated hyphal cells with thick cell walls in the granular core of the context of the hyphae for this species (Ginns 2017). This species is perennial and basidiocarps can be very long lived, living 60 years or more (Kałucka and Svetasheva 2019).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒

Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

Fomitopsis officinalis is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Timber harvest actions are considered a significant threat to this species. Logging has degraded a large area of productive old growth forest and ongoing old growth harvest will continue to affect habitat in the plan area. Old growth forest the most widely impacted habitat on the Tongass NF. Increasing insect and disease pressure may also impact habitat for this species. Climate change related shifts in temperature and precipitation patterns may further also this habitat in the plan area, potentially increasing insect and disease pressure on the preferred host species for *Fomitopsis officinalis*.
- **Declining trends**: There is not enough information to infer population trends for this species in the plan area. Current trends indicate that productive old growth habitat is stable but vulnerable to ongoing timber harvest activities.
- **Restricted ranges**: The closest confirmed occurrence of this species is south of the plan area on Vancouver Island in British Columbia, though unconfirmed observations have been reported from the Kenai peninsula, AK, and Yukon, CA. The observed density of occurrences do not indicate disjunction. Occurrences in the plan area may represent individuals at the north edge of the species range. Without additional information, it cannot be determined whether or not these high-latitude occurrences dictate concerns related to range restriction.
- **Low population numbers or restricted ecological conditions**: There are nine known occurrences of this species on the Tongass NF; all occurrences lack population data necessary to assess population. There is not enough available information to determine whether or not occurrences of this species require a narrow range of ecological conditions for establishment.
- **Other factors**: This species may take over 50 years to reproduce, potentially impacting persistence of the species

in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**MyCoPortal 2025 (iNaturalist) [09/11/2021]**	**Prince of Wales-Hyder County, US-AK, US**	**found on Old growth Hemlock snag. past prime**		
2*	**MyCoPortal 2025 (iNaturalist) [10/18/2021]**	**Wrangell County, US-AK, US**	**Riparian forest on *Picea sitchensis***		
3*	**MyCoPortal 2025 (iNaturalist) [09/13/2015]**	**Wrangell County, US-AK, US**	**On *Picea sitchensis* in small slough off the main Stikine river**		
4*	**FHP Observation Data [06/09/2022]**	**City and Borough of Juneau, US-AK, US**	**Forest type 305 (Sitka Spruce). On Sitka spruce with broken top, middle to bottom third of crown.**		
5*	**FHP Observation Data [08/05/2023]**	**City and Borough of Juneau, US-AK, US**	**Forest type 301 (Western Hemlock). On limb of Sitka spruce (incorrectly coded as hemlock, reconfirmed PISI by Mulvey)**		
6*	**FHP Observation Data [05/10/2022]**	**Wrangell County, US-AK, US**	**Forest type 305 (Sitka spruce). On ground beneath hemlock with many taller spruce above. Revisit confirmed Sitka spruce host.**		
7*	**FHP Observation Data [04/18/2024]**	**Ketchikan Gateway Borough, US-AK, US**	**Forest type 301 (Western hemlock). On dead Sitka spruce, mortality > 5yrs. 70inch snag.**		
8*	**FHP Observation Data [07/11/2024]**	**Ketchikan Gateway Borough, US-AK, US**	**Forest type 301 (Western hemlock). On Sitka spruce.**		

Gentiana prostrata

photo: Ellyne Geurts (CC0: iNaturalist 2025)



Gentiana prostrata [Haenke]

Pygmy Gentian

Global Rank: **G5**
Alaska State Rank: **SNR**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Gentiana prostrata* is known from one occurrence on the Tongass NF (Appendices 1 and 2; Arctos 2025, CPNWH 2025). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). The one Tongass NF occurrence is based on two specimens collected on Admiralty Island on the north side of the Greens Creek drainage at approximately 2890 to 3060 ft (880 to 930 m) in elevation (Arctos 2025, CPNWH 2025). The habitat is described as a rock outcrop on an alpine ridge with little vegetation; species collected at the same place on the same date are *Draba* sp., *Cystopteris montana*, *Tofieldia coccinea*, *Epilobium hornemannii*, *Dryas integrifolia, Parnassia kotzebuei*, and *Sabulina rubella* (Arctos 2025, SEINet 2025).
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: Not ranked (NatureServe 2025) State Ranks: Canadian provinces and territories: S3 (Vulnerable): Alberta; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present. United States: S1 (Critically Imperiled): California; S2 (Imperiled): Oregon, Wyoming; all others are SNR (not ranked) or not present (NatureServe 2025). *Gentiana prostrata* has a broad distribution in western North America (Pringle 2023). It occurs in the western Canadian provinces and territories of Alberta, British Columbia, the Northwest Territories, and Yukon (Pringle 2023). In the United

Criteria	*Rank*	*Rationale*
		States, it occurs in Alaska, California, Colorado, Idaho, Montana, Oregon, Utah, and Wyoming (Pringle 2023). Reports from other states, such as Nevada and New Mexico (NRCS 2025), are based on a broader circumscription that includes *G. fremontii* (Pringle 2023). As currently circumscribed, the species also occurs in Eurasia; however, genetic evidence suggests the North American and Eurasian plants may warrant treatment as different species (Pringle 2023). There is one occurrence of *Gentiana prostrata* from the Tongass NF (Appendices 1 and 2; Klinkenberg 2020, Arctos 2025, SEINet 2025) and this location is the southernmost Alaskan location for this species (Klinkenberg 2020, SEINet 2025). The nearest Alaskan record is southeast of Juneau at Mt. Roberts off the Tongass NF (Appendix 1; Arctos 2025). There are widely distributed records farther to the northwest in central Alaska (Arctos 2025, CPNWH 2025). To the east, *Gentiana prostrata* is uncommon in northern and eastern British Columbia (Klinkenberg 2020). Throughout its range in North America, *Gentiana prostrata* is found in moist to wet alpine and arctic tundra, meadows, heathland, wet ledges, and lake and stream edges in the upper subalpine and alpine zones at elevations ranging from sea level to approximately 12800 feet (3900 m) (Pringle 2012, Klinkenberg 2020, Pringle 2023). Habitat in adjacent British Columbia is described as moist meadows and seepage sites in upper subalpine and alpine (Klinkenberg 2020).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* As discussed in Criterion 1, the one occurrence of *Gentiana prostrata* on the Tongass NF was observed in rocky alpine habitat at approximately 2890 to 3060 ft (880 to 930 m) in elevation (Arctos 2025, CPNWH 2025). *Gentiana prostrata* is an annual to biennial species that reproduces exclusively from seeds that are housed in dehiscent capsules (Spira and Pollak 1986, Pringle 2023). The seeds are unwinged (and therefore not adapted for wind dispersal), and seed measurements have not been reported (Pringle 2023). Although no information was found on *Gentiana prostrata* seed dispersal, seeds of similar east Asian species of *Gentiana* are dispersed up to 1 meter by raindrops falling into open capsules (Nakanishi 2002). Given the high-elevation alpine habitat preferred by this annual to biennial species, it likely would disperse only through suitable habitat.

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	A	*A = Rare – current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Gentiana prostrata* is known from one estimated occurrence on Admiralty Island (Appendices 1 and 2; Arctos 2025, CPNWH 2025). The observers did not provide any information on population size or abundance. Given the single occurrence, it is likely that this species is rare on the Tongass NF.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The single occurrence of *Gentiana prostrata* on the Tongass NF was observed in both 2004 and 2009, but no information on population size was reported on the specimen labels. As this species is not tracked by the Tongass NF, and no further collections have been made over the past 15 years, the population trend for this one occurrence is unknown (Arctos 2025, CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity.* As explained in Criterion 1, *Gentiana prostrata* is found in rocky alpine habitat on the Tongass NF (Arctos 2025, CPNWH 2025). Alpine habitat on the Tongass NF is currently considered moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). There are no mapped timber projects or non-native weeds in the vicinity of the one occurrence that could have negatively impacted its habitat (USFS 2025b, 2025d).
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc.* Alpine ecosystem integrity is highly vulnerable due to climate change (Turner and Mallot 2025). Through changing environmental factors like increasing temperature and shifting precipitation patterns, climate change may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al DRAFT). Additionally, alpine habitat may be impacted by mining, communication sites and recreation. The known occurrence on the Tongass NF is on the ridge north of the Greens Creek mine where exploratory drilling was proposed; additional exploratory drilling near this location is expected.

Criteria	*Rank*	*Rationale*
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** *Gentiana prostrata* is an annual to biennial herb that grows from a taproot (Pringle 2023). It has a decumbent growth form and produces medium blue to deep blue (sometimes white) flowers during summer (Pringle 2023). Confirmed pollinators and floral visitors of other *Gentiana* species include bees (especially bumblebees, *Bombus* spp.) and flies (CPC 2025). *Gentiana prostrata* reproduces exclusively via seed (Spira and Pollak 1986). Studies on *Gentiana prostrata* in California found high fruit and seed set and a relatively high rate of seed production, even when pollinators were excluded (Spira and Pollak 1986). High seed production rates were attributed to self-pollination capability, low rates of flower predation, and high rates of resource allocation to reproductive structures (Spira and Pollak 1986). No information was found on seed survival or germination rates inside or outside of the planning area. However, studies of another annual gentian (*Gentiana nivalis*) indicate that the persistent and substantial seed bank at its locations in Britain allow the species to recover from sudden population fluctuations (Miller 2009). This species is treated as *Gentiana prostrata* var. *prostrata* in *Flora of North America* (Pringle 2023), but varieties are not recognized in the *Flora of Alaska* project (Ickert-Bond et al. 2019).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Gentiana prostrata is not recommended as a Species of Conservation Concern in accordance with the following:

- **Significant threats:** Significant threats exist for this species in the form of mining and climate change stressors. Additional localized threats may include recreation activities and the maintenance of existing, or creation of additional, communication sites in alpine habitat.
- **Declining trends:** Alpine habitat is considered vulnerable to changing climatic conditions in the near future, but this habitat is currently considered to be moderately stable. There is not enough information to infer trends in population data for this species.
- **Restricted ranges:** *Gentiana prostrata* is not endemic to the plan area, and occurrences on the Tongass NF are not considered disjunct from the nearest populations outside the plan area. This species is common in appropriate habitat to the north and south of the plan area; occurrences on the Tongass NF do not represent individuals at the edge of their range.
- **Low population numbers:** The limited number of occurrences known in the plan area would indicate that this species is vulnerable to extirpation by stochastic events, but the restriction of this small species to relatively remote portions of the plan area may indicate a general lack of focused surveys in appropriate habitat. Growth and establishment of *Gentiana prostrata* is not considered to be restricted to narrow ecological conditions.
- **Other factors:** Studies outside the plan area have highlighted elevated seed production and the likely existence of a long-lasting seed bank in suitable habitat occupied by this species. These reproductive characteristics suggest a persistent and substantial seed bank that may aid the species in tolerance and recovery from disturbance events.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:240556)[8/04/2009]**	**Greens Creek, Juneau Quad, Alexander Archipelago, Admiralty Island.**	**Rock outcrop, 35 degree slope, S aspect. [collected at same place on same date: Draba sp.]**		
1	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:242448)[7/09/2004]	N end of island, ridge just N of Greens Creek mine, Juneau Quad, Alexander Archipelago, Admiralty Island.	Alpine ridge, rock outcrop with little vegetation. [collected at same place on same date: Sabulina rubella, Cystopteris montana, Tofieldia coccinea, Epilobium hornemannii, Dryas integrifolia, Parnassia kotzebuei]		
		Not on Tongass NF			
2*	**SEINet 2025, Arctos 2025 (ALA-UAM:Herb:43899) 8/5/1965**	**Coast Mts., Mt. Roberts, Juneau [trail to Mt. Roberts from Juneau and Mt. Robers peak are outside Tongass NF boundary]**	**Grassy ridge**		

Gentianella propinqua aleutica

Gentianella propinqua aleutica [(Cham. & Schltdl.) J.M. Gillett]

Aleutian Four-parted Gentian

Global Rank: **G5T3**
Alaska State Rank: **S3**

photo: Jason R. Grant (iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is one estimated occurrence on the TNF located approximately 6 miles east of Sitka on Bear Mountain, Baranof Island, adjacent to Silver Bay (Site ID 100531P000036; USDA FS 2025). There is no herbarium record associated with the occurrence. There is one other record in southeastern Alaska on Mount Roberts in the City and Borough of Juneau (ACCS 2025), proximal to Tongass National Forest by 6 km and approximately 90 miles from the known Tongass NF occurrence. The is no habitat data associated with the *Gentianella propinqua* subsp. *aleutica* record on TNF. The Bear Mountain occurrence appears to be at 3,000 ft elevation. The collection from Mount Roberts near Juneau indicates it was found high on the mountain and in the grass (ACCS 2025), and in the Aleutians and Kodiak it is described from "meadows" (Hultén 1968). In addition, there are 11 herbarium records from Yakutat south to Coronation Island that are determined only to species by authoritative experts and are assumed to be the common subspecies (subsp *propinqua*; ALA Arctos Database 2025).

Criteria	*Rank*	*Rationale*
		In the field it may be confused with *Gentianella propinqua* subsp *propinqua*. It is distinguished from the common subspecies by its smaller bluish-white flowers and its broad, reflexed, and less acute calyx lobes but morphology of the two subspecies can be very similar (NatureServe 2025, e-FNA 2025).
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass National Forest. Global Rank: G5 (Secure), State Ranks: Alaska State Rank: S3 The main range is western coast of Gulf of Alaska from Kodiak Island through the Aleutians. Additional sites are known from Kenai Fjords National Park (Carlson & Lipkin 2004), Bering Glacier and near Juneau, in addition to the one TESP field survey record ca. 6 miles east of Sitka from 2003 (B. Krieckhaus). Overall, populations tend to be widely disjunct from one another (NatureServe 2025). The nearest occurrence outside of Southeast Alaska is in the Robinson Mountains approximately 360 miles north of the Baranof occurrence. The taxon is endemic to Alaska (Pringle 2012). There are 36 known occurrences from Alaska, with most records found between Kodiak Island and through the Aleutians (Hultén 1968, ACCS 2025, CPNWH 2025, USDA FS 2025). The Tongass NF occurrence is on the southeastern edge of the range. The habitat of *Gentianella propinqua* subsp. *aleutica* is mountain meadows, or rocky and gravelly substrates (Gillett 1957, Pringle 2012).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. No information is known about the dispersal capability of *Gentianella propinqua* subsp. *aleutica*. It does not, however, have seeds adapted for long-distance dispersal. Its spotty distribution is suggestive of either a more contiguous distribution in the past followed by widespread extirpation, long-distance dispersal, or a taxonomy that is based on a single polymorphic species.

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. No population information was collected at the one known occurrence (USFS 2025). *Gentianella propinqua* subsp. *Aleutica* is difficult to distinguish from subsp *propinqua* and abundance is uncertain.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for the one known occurrence are unknown.
6 Habitat trend on Tongass NF	A	A = Decline in habitat quality or quantity. Based on the latitude and longitude of the record it appears to have been collected in an alpine habitat, which is consistent with the closest collection by Anderson on Mount Roberts near Juneau, "high on the mountain in grass." Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). Climate change may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al 2025). Other comparatively minor, localized, or short duration stressors include mining, communication sites, and recreation.
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors Warming trends may accelerate the loss of precipitation as ice and snow and limit late persisting alpine snowpack (Turner and Mallot 2025). Changes in air temperature, moisture availability, and growing season length is likely to alter plant competition relationships and may allow for encroachment of woody species (Halofsky et al 2025). Additionally, predicted increases in air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for *Gentianella propinqua* subsp. *Aleutica* (Turner and Mallott

Criteria	*Rank*	*Rationale*
		2025, Wiles and Warren 2025). Given that the occurrences on the Tongass NF is at the southern edge of the range of *Gentianella propinqua* subsp. *Aleutica*, it may be particularly sensitive to warming.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. This species is an annual (Gillett 1957, Pringle 2012), but otherwise no information is available regarding population trends or life history. *Gentianella propinqua* subsp. *propinqua* is often found in early successional habitats without canopies and appears to be a poor competitor. This is likely also true of *Gentianella propinqua* subsp. *Aleutica* (pers. obs. Matt Carlson).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☒	☐	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Gentianella propinqua* subsp. *aleutica* within the plan area based upon the following:

- **Significant threats**: Warming trends are likely to alter moisture availability and competitive interactions for *Gentianella propinqua* subsp. *aleutica*. The Tongass NF is the southeastern edge of the range and it is unknown how this species will be impacted by changes in alpine habitat and whether it will be able to move to suitable habitat as current habitat changes.

- **Declining populations or habitat trends**: Population trends for the one known occurrence of *Gentianella propinqua* subsp. *aleutica* on the TNF are unknown. Alpine habitat is declining due to warming, loss of snow and ice and encroachment from woody plants.
- **Restricted range**: *Gentianella propinqua* subsp. *aleutica* is endemic to Alaska, from southeastern Alaska along the Gulf of Alaska to the Aleutians. Occurrences are typically widely disjunct.
- **Low population numbers or restricted ecological conditions:** There is one documented occurrence on the TNF, but targeted surveys would be required to determine the true abundance of this species on the Tongass. Additionally, herbarium vouchers or photos would provide evidence of taxonomic certainty since the other subspecies overlaps in distribution.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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E Flora of North America

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
26	ACCS_Mar25 (EO26)[8/09/2003]	Tongass National Forest, Bear Mountain near Sitka	null	null	null
26	TESP_Mar25 (100531P000047)[8/09/2003]		null	null	null

Geum rossii

Geum rossii [(R. Br.) Ser.]

Ross' Avens

Global Rank: **G5**
Alaska State Rank: **S4**

Photo: Alan Weakley (CC0: iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or Gaps* *Geum rossii* is known from seven estimated occurrences on the Tongass NF (Appendix 1, Arctos 2025, CPNWH 2025, SEINet 2025, USFS 2025a). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). The seven occurrences are all located within an area approximately 1.5 miles wide and 9 miles long on Chichagof Island; occurrences 3, 4 and 6 are in the vicinity of Whitestripe Lake, while occurrences 1, 2, 5, and 7 are in the vicinity of Rust Lake (Appendices 1 and 2; Arctos 2025, CPNWH 2025, SEINet 2025, USFS 2025a). Five of the occurrences are located within the West Chichagof-Yakobi Wilderness, and two are just outside the Wilderness boundary. On the Tongass NF, all occurrences are in open alpine habitat at approximately 1730 to 3000 ft in elevation (527 to 915 meters); most occurrences are on rock outcrops, cliffs, and scree, but one (occurrence 3) has a subpopulation on the shore of Whitestripe Lake (Appendix 1; Arctos 2025, CPNWH 2025, SEINet, USFS 2025a, USGS 2025). Associated species collected at the same time and place include *Primula pumila, Gentianella propinqua, Arnica lessingii, Anemone parviflora,* and *Pedicularis oederi* (Appendix 1; Ickert-Bond et al. 2019, Arctos 2025, SEINet 2025). All the alpine locations where *Geum rossii* has been observed on the Tongass NF are limestone-influenced and this agrees with habitat information for

Criteria	*Rank*	*Rationale*
		alpine locations in British Columbia (Klinkenberg 2020). Occurrence 1 near Pinnacle Peak is underlain by Pinnacle Peak Phyllite substrate, which is a mixture of siliceous phyllite, greenstone, and whitestripe marble (USGS 2025). Habitat data for occurrences 2 and 3 specify that the plants were observed on karst substrate, and other plants collected at occurrence 3 are described as being in karst sinkholes (Arctos 2025, SEINet 2025, USFS 2025a). Habitat data for Occurrences 4, 5, 6 and 7 indicate the plants occurred on limestone or marble substrate (ACCS 2025, USFS 2025a). It should be noted that the three Chichagof Island herbarium specimens cited in Appendix 1 are housed at ALA under the name *Acomastylis rossii* (Arctos 2025); this name is a synonym of *Geum rossii* in the *Flora of Alaska* project (Ickert-Bond et al. 2019).
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: S4 (Apparently Secure) (NatureServe 2025) State Ranks: Canadian provinces and territories: S3 (Vulnerable): British Columbia; all others are S4 (Apparently Secure) or not present. United States: S1 (Critically Imperiled): Idaho; S3 (Vulnerable): Nevada; all others are S5 (Secure), S4 (Apparently Secure), SNR (Not Ranked), or not present (NatureServe 2025). *Geum rossii* occurs in northern and western North America and northeastern Asia (Rohrer 2014). In Canada it occurs in British Columbia, the Northwest Territories, Nunavut, and Yukon (Rohrer 2014, NatureServe 2025, NRCS 2025). In the United States it occurs in Alaska, from Oregon and Washington southeast to Arizona and New Mexico, and north to Montana and Idaho (Rohrer 2014, NatureServe 2025, NRCS 2025). There are seven occurrences of *Geum rossii* on the Tongass NF (Arctos 2025, CPNWH 2025, SEINet 2025, USFS 2025a). The nearest Alaskan records are approximately 300 miles to the northwest in Wrangell-St. Elias National Park (CPNWH 2025, SEINet 2025). *Geum rossii* occurs across much of Alaska (Arctos 2025, CPNWH 2025, USFS 2025a). To the east, the species is rare in northwestern British Columbia (Klinkenberg 2020).

Criteria	*Rank*	*Rationale*
		Throughout its range, *Geum rossii* grows in moist to mesic conditions on rocky slopes, gravelly or peaty soils, or open calcareous substrates in arctic and alpine tundra at altitudes ranging from near sea level to approximately 13,100 feet (4000 m) (Rohrer 2014, Klinkenberg 2020).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* *Geum rossii* produces low numbers of relatively large, short-lived seeds (Chambers 1995). No information on seed dispersal mechanisms or dispersal distance was found for this species. Some *Geum* species are wind dispersed via persistent, elongated and hairy styles, while others are dispersed by adhesion to animals via specialized hooked styles (Sorenson 1986). *Geum rossii* does not have long persistent plumose styles, and so dispersal may be a result of gravity (falling near parent plants) or animals. *Geum rossii* spreads locally via fibrous-rooted rhizomes (Chambers 1991, 1995; Rohrer 2014). High vegetative cover values for this species in Montana are a result of an ability to spread and persist clonally (Chambers 1993, 1995). Vegetative reproduction is not an important factor in long distance dispersal or colonization of new sites, since clonal ramets only reach a diameter of approximately 1 meter (Chambers 1991). However, clonal reproduction due to rhizome fragmentation could be important on unstable scree slopes on the Tongass NF. As detailed in Criterion 1, on the Tongass NF *Geum rossii* has only been observed in one area of Chichagof Island in open alpine habitat on limestone or marble substrate at approximate 1730 to 3000 ft in elevation. It is likely that it would only successfully disperse through suitable open, calcareous, alpine habitat on the Forest.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Geum rossii* is known from seven occurrences on the Tongass NF, all from one alpine region of Chichagof Island (Appendices 1 and 2). These are the only known occurrences of this species in southeast Alaska (Arctos 2025, CPNWH 2025, SEINet 2025). Occurrences 1, 3, and 4 have population estimates with #1 having more than 30 plants, 3 having approximately 1020 plants in two subpopulations (20 by the lakeshore and 1000 on the ridge), and #4 having more than 10 plants.

Criteria	*Rank*	*Rationale*
		Based on the number of occurrences (7), the restricted geographic area where this species occurs on the Forest, and the low number of plants at two out of the three occurrences with population counts, *Geum rossii* is uncommon on the Tongass NF.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow up surveys, population trends for known occurrences of *Geum rossii* on the Tongass NF are unknown (USFS 2025a).
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity* As explained in Criterion 1, *Geum rossii* is found on calcareous substrate in rocky alpine habitat on the Tongass NF (Arctos 2025, CPNWH 2025, SEINet 2025, USFS 2025a, USGS 2025). Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska (Turner and Mallott 2025). There are no mapped timber projects in the vicinity of the seven occurrences that could have negatively impacted their habitat (USFS 2025d). Occurrence 2 is 0.3 mile from mapped locations of the non-native *Taraxacum officinale* which has a large infestation in the Rust Lake watershed (USFS 2025b). However, it is likely that this non-native is absent from the alpine rock outcrop habitat where *Geum rossii* is located.
7 Habitat vulnerability or modification;	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors* Alpine habitat integrity is trending down due to an already evident loss of precipitation as snow and ice and an increase in precipitation in the form of rain; this will affect alpine habitats that are fed by snow melt, which provides a constant source of moisture throughout the summer (Turner and Mallott 2025, Wiles and Warren 2025). As explained in Criterion 1, this species occurs on karst and calcareous substrate on the Tongass NF, and the hydrology of this fast-draining

Criteria	*Rank*	*Rationale*
other threats		substrate may interact differently with rain than snowmelt (Turner and Mallott 2025). Also, an increase in temperature will decrease the snowpack and lengthen the growing season where *Geum rossii* occurs, possibly leading to a change in vegetation (Boggs et al. 2019, Turner and Mallott 2025). Finally, as discussed in Criterion 8, *Geum rossii* requires insect pollinators to produce seeds. Therefore, it is likely that the phenological changes and disruption in pollinator/plant interactions that are predicted to occur with climate change will affect this species (Hülber et al. 2010, Scaven and Rafferty 2013).
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** *Geum rossii* is a long-lived perennial herb that grows from a caudex that branches vegetatively via fibrous-rooted rhizomes, forming clones up to approximately 1m in diameter (Chambers 1991, Rohrer 2014). Inflorescences of one to three yellow flowers are produced in the summer (Rohrer 2014). Floral visitors observed on *Geum rossii* flowers include multiple species of butterflies and confirmed pollinators of other *Geum* species include bees, beetles, and flies (CPC 2025). There is no published information on the reproductive success or demography of *Geum rossii* within the planning unit. The following information is from studies at sites in Montana. *Geum rossii* produces low numbers of relatively large, short-lived seeds that readily germinate (Chambers 1995). Rates of seedling emergence observed in densely vegetated areas are low, while rates of germination and survival observed in disturbed open areas are relatively high (Chambers 1995). *Geum rossii* did not have a large, persistent seedbank, and while its seeds accounted for a very low proportion of total seed rain, the species was a significant component of total vegetation cover (Chambers 1993, 1995). The high cover values are a result of the species' ability to spread and persist clonally (Chambers 1993, 1995). In relative isolation on more open sites, *Geum rossii* exhibited higher rates of vegetative growth, flower production, and seed production (Chambers 1991, 1995). Observed rates were lower at more densely vegetated sites, with the apparent constraint being lower late-season water availability due to competition (Chambers 1991, 1995). Estimated longevity of *Geum rossii* clones in Montana is > 100 years (Chambers (1995).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☒	☐	☐
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Geum rossii is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Projected increases in temperature and shift from precipitation as snow to rain will likely reduce moisture availability during the growing season and may be exacerbated due to the well-drained nature of the calcareous alpine areas preferred by *Geum rossii*. However, this species is likely to be able to disperse locally to more suitable habitat so it is unclear whether these changes could impact population level persistence of this species.
- **Declining trends**: Population trends are unknown. Calcareous alpine habitat is limited on the Tongass NF and is trending towards lower integrity due to increasing temperatures and loss of ice and snow.
- **Restricted ranges**: This species is not a narrow endemic and the range continues north and south of the Tongass NF. The Tongass occurrences may be disjunct due to the island geography of Southeast Alaska. The nearest location to the known Tongass NF occurrences is approximately 300 miles northwest on the mainland.
- **Low population numbers**: All known occurrences on the TNF occur within a small area of Chichagof Island. However, this species may be tolerant of disturbance and can disperse vegetatively and by seeds. Additionally, survey intensity in remote alpine areas is low and there may be additional unknown occurrences of this species.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:142503)[8/05/2004]**	**[0.15 mile east of boundary of West Chichagof-Yakobi Wilderness] Alexander Archipelago, Chichagof I., Pinnacle Peak, SE of Pinnacle Peak, Sitka Quad, Tongass National Forest.**	**Rare on 35 degree slope on NE aspect, fractured bedrock outcrop, cliffs. [Geology: Pinnacle Peak Phyllite.]**	**rare**	
1*	USFS-TESP_Mar25 (100531P000130)[8/05/2004]	[0.15 mile east of boundary of West Chichagof-Yakobi Wilderness] Chichagof Island, Pinnacle Peak	Growing in fractured bedrock and broken rock. [Geology: Pinnacle Peak Phyllite.]	30 plus plants	
2*	**Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:141885)[7/22/2004]**	**Alexander Archipelago, Chichagof Island, Rust Lake, karst ridge N of lake, Sitka Quad, Tongass National Forest.**	**Karst ridge N of lake, SE aspect, tallus and fractured rock. [Geology: whitestripe marble/Pinnacle Peak Phyllite.] [Collected on same date and in same place: Epilobium latifolium]**		
3*	**Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:142479)[7/15/2004]**	**[West Chichagof-Yakobi Wilderness] Alexander Archipelago, Chichagof Island, Whitestripe Lake and Whitestripe Mt., Sitka Quad, Tongass National Forest.**	**Common on 11 degree slope on NE aspect, karst, limestone shoulder slope, scree. [Collected on same date in same place: Primula eximia, Gentianella propinqua, Arnica lessingii, Anemone parviflora, Pedicularis oederi]**	**common**	
3	USFS-TESP_Mar25 (100531P000159)[7/15/2004]	[West Chichagof-Yakobi Wilderness] Chichagof Island, Whitestripe Lake	Ridgeline		
3	USFS-TESP_Mar25 (100531P000094)[7/14/2004]	[West Chichagof-Yakobi Wilderness] Chichagof Island, Whitestripe Lake, lakeshore on beach out from and below ALSI line,	Lakeshore on beach out from and below ALSI line. [Geology: whitestripe marble. Edge of lake/water.]	20+ plants	
3	USFS-TESP_Mar25 (100531P000095)[7/14/2004]	[West Chichagof-Yakobi Wilderness] Chichagof Island, Whitestripe Lake area; talus field below, and on limestone bluff.	Talus field below, and on limestone bluff. [Geology: whitestripe marble. Edge of lake/water.]	1000 + population	
4*	**USFS-TESP_Mar25 (100531P000099)[7/15/2004]**	**[West Chichagof-Yakobi Wilderness] Chichagof Island, Whitestripe Lake area;**	**Shallow rocky soil between limetone outcrops.**	**10+ plants**	

		shallow rocky soil between limetone outcrops.			
5*	**USFS-TESP_Mar25 (100531P000113)[7/21/2004]**	**[On boundary of West Chichagof-Yakobi Wilderness] Chichagof Island, Rust Lake area; limestone shoulder slope; vegetated areas amidst barren limestone**	**Limestone shoulder slope; vegetated areas amidst barren limestone.**		
5	USFS-TESP_Mar25 (100531P000115)[7/21/2004]	[On boundary of West Chichagof-Yakobi Wilderness] Chichagof Island, Rust Lake area; vegetated cracks or ledges on bare limestone ridge to E of lake.	Vegetated cracks or ledges on bare limestone ridge to E of lake.		
6*	**USFS-TESP_Mar25 (100531P000143)[8/11/2005]**	**[West Chichagof-Yakobi Wilderness] Chichagof Island, Whitestripe Lake, "marble" mountain N of lake**	**"Marble" mountain N of lake. [Geology: whitestripe marble.]**		
7*	**USFS-TESP_Mar25 (100531P000158)[7/22/2004]**	**[West Chichagof-Yakobi Wilderness] Chichagof Island, Rust Lake area, limestone ridge**	**Limestone ridge.**		

Glyceria leptostachya

Glyceria leptostachya [Buckley]

Slim-head mannagrass

Global Rank: **G3**
Alaska State Rank: **S3**



Photo: © 2021 Keir Morse (CalPhotos 2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps* *Glyceria leptostachya* is known from 12 estimated occurrences on the Tongass NF. We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). These occurrences are located: at Thomas Bay on the mainland (1 occurrence); on east (1) and central (1) Kupreanof Island; on south Mitkof Island (1); on west (2) and central (1) Wrangell Island; on south Kulu Island (1); on central Etolin Island (1); and southeastern (1) and central (2) Revillagigedo Island (Appendix 1; ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs as an emergent aquatic in freshwater wetland habitats, usually found in marshes, streams, ponds, and lake edges and rarely in streamside meadows; the only associated species mentioned within the Tongass NF boundary is *Alnus rubra* (Appendix 1; ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Just outside of the forest boundary on Prince of Wales Island (in an inholding), this species was collected with *Torreyochloa pallida* var. *pauciflora*, *Deschampsia cespitosa*, and *Gymnocarpium disjunctum* (Vorobik collections made on 8/1/1979 accessed in CPNWH 2025). The habitat data and locations reported within and immediately adjacent to the Tongass NF indicate that this species does not grow in brackish water on the Forest (ANHP ACCS 2025, CPNWH 2025,

Criteria	*Rank*	*Rationale*
		USFS 2025a). Therefore, likely the broad vegetation types where *Glyceria leptostachya* might be found are riparian forest and non-forested wetlands (Turner and Mallott 2024). It is also found in disturbed ditches within urban areas just outside the Tongass NF boundary (ANHP ACCS 2025, CPNWH 2025). Biologists who are familiar with the urban populations have suggested that genetic study of those populations is needed (USFS 2025c). *Glyceria* includes several species that appear to intergrade (Barkworth and Anderton 2021). For example, *G. x occidentalis* may be a hybrid between *G. leptostachya* and *G.fluitans* (Whipple et al 2007). It is worth noting that a microscope is needed to confidently separate *G. leptostachya* from *G. fluitans* , and *G. x occidentalis*, as well as *G. borealis* (Klinkenberg 2020). This problem of hybridization and difficult identification may affect the number of observations within the Tongass NF.
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank G3 (Vulnerable), Alaska State Rank S3 (Vulnerable) (NatureServe 2025) British Columbia S4 (Apparently Secure), Washington, Oregon, and California SNR (No Status Rank) (BCCDC 2025, NatureServe 2025) *Glyceria leptostachya* is mainly distributed along the Pacific slope of North America from southeast Alaska (near Haines) to central California (near the Bay Area) (Barkworth and Anderton 2007, CCH2 2025, CPNWH 2025, NRCS 2025, NYBG 2025). Within its broad distribution, it is found in areas that stay moist in the summer such as wet meadows and a variety of freshwater or brackish wetlands, such as marshes, swamps, bogs, and the edges of lakes, ponds, vernal pools, and streams; it is found both in full sun and in the shade of riparian woodland and forest (Darris 2005a, Klinkenberg 2020, CPNWH 2025). Soils where this species is found are usually waterlogged, acidic, and coarse to fine textured (Darris 2005a). Collections of this species have been made at less than 1500 m in elevation (CPNWH 2025). It is considered uncommon throughout its natural range compared to other *Glyceria* species, and it has been noted that wild populations are often small with the plants widely scattered (Darris 2005a).

Criteria	*Rank*	*Rationale*
3 Dispersal capability	C	*C = Readily disperses across landscapes with few habitat-related limitations* ***Glyceria leptostachya* spreads unisexually via short rhizomes or by rooting at the lower stem nodes as well as sexually via seeds (Darris 2005a, Barkworth and Anderton 2007). It has been observed that plants growing in natural habitat rarely yield much seed, because populations are usually small and plants are widely scattered (Darris 2005a). Information on how far the seeds travel is unavailable, but it is likely that seeds in and around an aquatic habitat can be dispersed via wind, water, and animals. Other *Glyceria* species are known to be used for food by birds and small mammals which could then play a role in dispersal (Darris 2005b, DiTomaso et al. 2013). This species could be dispersed long distances or from island to island by birds. However, its establishment will be limited to suitable habitat.**
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* Within the central and southern Tongass NF, *Glyceria leptostachya* has 12 occurrences distributed on six islands and the mainland (Appendix 1). Of the 12 occurrences, six have population counts, estimated using plant clumps or stem counts. (Appendix 1; ANHP ACCS 2025, USFS 2025a). In general, populations are not large, ranging from 30 to 100 stems and 30 to 60 plants. The total number of counted individuals on the Tongass NF is approximately 370 stems/plants. Based on the number of occurrences and population counts, this species is uncommon within the Tongass NF boundary. However, in the urban areas of Sitka and Wrangell, outside the forest boundary, there are larger populations ranging from 500 to several thousand plants growing in drainage ditches (Appendix 1).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Glyceria leptostachya* on the Tongass NF are unknown.
6	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.*

Criteria	*Rank*	*Rationale*
Habitat trend on Tongass NF		In general, habitat trends at the exact locations where this species is found on the Tongass NF are not known. The broad vegetation types where *Glyceria leptostachya* is likely found on the Tongass NF are riparian forest (usually with *Alnus rubra*), non-forested wetlands, and rarely streamside mesic meadows (Turner and Mallott 2024). Within those broad vegetation types, it has been observed most frequently in freshwater wetland habitats such as marshes, streams, ponds, ditches, and lake edges (Appendix 1; ANHP ACCS 2025, CPNWH 2025, USFS 2025a). The approximately 396,000 acres of Riparian Forest on the Tongass NF are currently considered stable (Turner and Mallott 2024) as are the approximately 213,000 acres of lakes and ponds (Chestnut 2024).
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Both invasive species and climate change are considered threats to wetland habitats on the Tongass NF (Turner and Mallott 2024). The habitats most vulnerable to invasion by non-native species on the Forest include meadows and riparian corridors (Wiles and Warren 2024). In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for wetland species with high soil moisture requirements such as *Glyceria leptostachya* (Turner and Mallott 2024, Wiles and Warren 2024). The only threat currently documented at known occurrences of *Glyceria leptostachya* is invasive species that can survive in or near wetlands (USFS 2025b). Reed canarygrass (*Phalaris arundinacea*), an invader of wetland habitats (APMC 2014), is adjacent to or near to six occurrences (#s 4, 6, and 8-11) (USFS 2025b). Other invasive species that can survive in or near saturated soil found within or near to some locations include creeping buttercup (*Ranunculus repens*) and orange hawkweed (*Hieracium aurantiacum*) (APMC 2014, Turner and Mallott 2024, USFS 2025b).
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** ***Glyceria leptostachya* is a tall, erect, perennial grass with succulent/spongy stems. The erect stems emerge from underground rhizomes at the beginning of the growing season (Darris 2005a, Barkworth and Anderton 2007). If plants are inundated with water, they can produce floating leaves, however longevity may be reduced (Darris 2005a). In Alaska, plants have been collected in flower or fruit June to September (CPNWH 2025). As with all grasses, the flowers lack petals and sepals and instead are**

Criteria	*Rank*	*Rationale*
		borne within bracts in a cluster at the ends of the stems; pollen is moved between plants by wind (Barkworth and Anderton 2007). It has been observed that plants growing in natural habitat rarely yield much seed, because populations are usually small and plants are widely scattered (Darris 2005a). Commercial seed production requires extensive irrigation, poorly drained soils, seasonal wetlands, or shallow water impoundments (Darris 2005a). Seeds ripen in late summer, and lacking strong dormancy, they germinate at a moderate rate in fall or spring (Darris 2005a). Successful seed germination and growth is favored by disturbance and the presence of open mud or prolonged moist soil that is sparsely vegetated (Darris 2005a). This species is successfully persisting in disturbed, anthropogenic habitats (such as drainage ditches) in urban areas like Sitka and Craig outside of the Tongass NF boundary (ANHP ACCS 2025, CPNWH 2025, USFS 2025a).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Glyceria leptostachya is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No specific significant threats are known. *Glyceria leptostachya* is an emergent aquatic in freshwater wetland habitats, usually in marshes, streams, ponds, and lake edges. These habitats may experience impacts from modern stressors like climate change and invasive species, but it is unclear the extent to which these impacts will impact *Glyceria leptostachya*.
- **Declining populations or habitat trends:** No monitoring visits have been made to the known locations, so population trends are unknown. Some locations have the invasive species reed canarygrass mapped nearby, while others do not. Large populations mapped in drainage ditches outside the Forest boundary indicate a high level of tolerance to disturbance.
- **Restricted range:** *Glyceria leptostachya* is thought to be uncommon throughout its natural range compared to other *Glyceria* species with small, widely scattered populations. The Tongass is the northern edge of its' range.

- **Low populations or restricted ecological conditions:** Based on documented occurrences, *Glyceria leptostachya* is uncommon within the Tongass NF boundary. However, there are also large populations mapped in drainage ditches in the towns of Sitka and Wrangell.
- **Other factors:** Genetic and/or microscope work may be needed to understand the hybridization dynamics between this species and other *Glyceria*, as well as if the populations in disturbed areas are closely related to the populations in more remote locations, or if they are recently introduced from elsewhere.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO 1) [7/13/2004]**	**Tongass National Forest, REVILLAGIGEDO ISLAND; ALAVA BAY Misty Fjords National Monument Wilderness/ Tongass NF]**	**PLANTS GROWING NEAR POND OUTFLOW STREAM**		
1	TESP_Mar25 (100552P000163) [7/13/2004]	REVILLAGIGEDO ISLAND; ALAVA BAY; PLANTS GROWING NEAR POND OUTFLOW STREAM [Misty Fjords National Monument Wilderness/ Tongass NF]	PLANTS GROWING NEAR POND OUTFLOW STREAM		
2*	**ACCS_Mar25 (EO 3) [8/9/2000]**	**Tongass National Forest, Licking CrkTS,near U3, riv bank meadow**			
2	TESP_Mar25 (100552P000040) [8/9/2000]	Licking CrkTS,near U3, riv bank meadow	riv bank meadow		
3*	**ACCS_Mar25 (EO 4) [8/11/1995]**	**Tongass National Forest, Upper CarrollTS, distb.wetland, Sect 34**			
3	TESP_Mar25 (100552P000032) [8/11/1995]	Upper CarrollTS, distb.wetland, Sect 34			
3	ACCS_Mar25 (EO 4) [No date]	About four miles north of the lake in wetland pond at lower slope of Upper Carroll Timber Sale.			
3	ACCS_Mar25 (EO 4) [11/30/1994]	Ketchikan C-4 Quad. Wetland off main stream.			
3	CPNWH_Mar25 (UAAH10573) [11/30/1994]	Ketchikan C-4 Quad. Wetland off main stream.	n/a		
4*	**ACCS_Mar25 (EO 9) [6/21/2005]**	**Tongass National Forest, Etolin Is.Old log camp Starfish Cove.**	**Under ALRU2 canopy on shot rock w/old beater cars.**	**30 stems**	
4	TESP_Mar25 (100522P000004) [6/21/2005]	Etolin Is.Old log camp Starfish Cove. Under ALRU2 canopy on shot rock w/old beater cars. 30 stems	Under ALRU2 canopy on shot rock w/old beater cars.	30 stems	
5*	**ACCS_Mar25 (EO 10) [8/1/2010]**	**Tongass National Forest**	**VSubstrate= Water; Light Exposure= Full Sun; Comments=**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
			Plants clumped together near lakeshore and they were the only ones observed. More grasses were clumped (decumbent and submerged) approximately 30 feet offshore and were unavailable for identification.		
5	TESP_Mar25 (100522P000118) [8/1/2010]	Wrangell Island. Plants clumped together near lakeshore.	Within approximately 12 inches of standing water and approximately 5 feet off the lake shoreline. Soil type: 234D, 2W, or in water.	60 plants. Clumped, counted from shoreline. Plants clumped together near lakeshore and they were the only ones observed. More grasses were clumped (decumbent and submerged) approximately 30 feet offshore and were unavailable for identification. No likely direct or indirect effects.	
6*	**ACCS_Mar25 (EO 11) [9/15/2005]**	**Tongass National Forest, Wrangell Is. Forest Rd. 6255, road side.**		**100 stems**	
6	TESP_Mar25 (100522P000003) [9/15/2005]	Wrangell Is. not a rare pl surv; J deMontigny observation/id. Forest Rd. 6255, road side.100 stems	road side.	100 stems	
7*	**ACCS_Mar25 (EO 12) [7/4/2003]**	**Tongass National Forest, Kulu,Tebenkof Wilderness, Petrof Ck. [Tebenkof Bay Wilderness/ Tongass NF]**	**on streambank**		
7	TESP_Mar25 (100521P000002) [7/4/2003]	Kuiu,Tebenkof Wilderness, Petrof Ck. on streambank [Tebenkof Bay Wilderness/ Tongass NF]	Petrof Ck. on streambank		
8*	**ACCS_Mar25 (EO 13)**	**Tongass National Forest, Wrangell Is. Road side, Zimovia Str Rd.**		**100 stems**	
8	TESP_Mar25 (100522P000002)	Wrangell Is. Not a rare pl surv; J. deMontigny observation/id. Road side, Zimovia Str Rd.100 stems	Road side, Zimovia Str Rd.	100 stems	

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
9*	**ACCS_Mar25 (EO 19) [9/15/2005]**	**Tongass National Forest, Mitkof Isl.**		**est. 30 indivduals.**	
9	TESP_Mar25 (100521P000106) [9/15/2005]	Mitkof Isl;not a rare pl survey. GPS location not accurate (from contractor). est. 30 indivdiuals.		est. 30 indivdiuals.	
10*	**ACCS_Mar25 (EO 20) [7/15/2006]**	**Tongass National Forest, Cent Kupreanof EIS, outside footprint below unit 254**	**in shallow water at lake margin.**	**est. 50 stems**	
10	TESP_Mar25 (100521P000102) [7/15/2006]	Cent Kupreanof EIS, outside footprint below unit 254; est. 50 stems in shallow water @lake margin.	in shallow water at lake margin.	est. 50 stems	
11*	**ACCS_Mar25 (EO 22) [7/15/1997]**	**Tongass National Forest, Kupreanof Is. Psg Lake, cabin site [Petersburg Creek-Duncan Salt Chuck Wilderness/Tongass NF]**			
11	TESP_Mar25 (100521P000039) [7/15/1997]	Kupreanof Is. Psg Lake, cabin site [Petersburg Creek-Duncan Salt Chuck Wilderness/Tongass NF]	cabin site		
12*	**ACCS_Mar25 (EO 23) [7/14/2003]**	**Tongass National Forest, Thomas Bay, Pt. Vanderput wetlands on peninsula in H20 beaver area**			
12	TESP_Mar25 (100521P000036) [7/14/2003]	Thomas Bay, Pt. Vanderput wetlands on peninsula in H20 beaver area	Pt. Vanderput wetlands on peninsula in H20 beaver area		
		LOCATIONS OUTSIDE PROJECT BOUNDARY			
13*	**ACCS_Mar25 (EO 7) [8/1/1979]**	**Tongass Nat For.; Prince of Wales Island; 1.4 me SW of Rd 5500, about 2 miles NW of Control Lake Intersection. TRS: T71S R81E S13 [1.4 me is likely a typo and it should be 1/4 mile. This is georeferenced in the right TRS. These coordinates put this collection in a non-forest inholding within the Tongass NF.]**			
13	ACCS_Mar25 (EO 5) [8/1/1979]	Tongas; Prince of Wales I.; 1/4 mile SW of Rd. 5500 about 2 mile NW of Control Lake [coordinates map SW of Control Lake and so either there must be a typo on label and NW should be SW or it was georeferenced wrong]	Along stream in forest.		
13	ACCS_Mar25 (EO 6) [No date]	Prince of Wales Island, .25 mi. SW of Road 5500, about 2 mi. NW of Control Lake intersection.			

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
		[coordinates are incorrect and map due E of Control Lake.]			
13	CPNWH_Mar25 (ORE103278) [8/1/1979]	Tongass Nat For.; Prince of Wales Island; 1.4 me SW of Rd 5500, about 2 miles NW of Control Lake Intersection. TRS: T71S R81E S13 [1.4 me is likely a typo and it should be 1/4 mile]	Along stream in forest.		
14*	**ACCS_Mar25 (EO 2) [6/1/2005]**	**CRAIG QUAD: Prince of Whales Island, Craig, EKJ: Assigned approximate lat/long**	**roadside**		
14	CPNWH_Mar25 (UAAH406) [6/1/2005]	CRAIG QUAD: Prince of Whales Island, Craig	roadside		
15*	**ACCS_Mar25 (EO 8) [8/30/2006]**	**[Prince of Wales Is.] Tongass National Forest, POW Coffman Rd. [Maps in City of Coffman Cove outside of the Tongass National Forest Boundary]**	**pioneer at stream rest site off road shoulder**	**12 indiv.**	
15	TESP_Mar25 (100554P000055) [10/4/2018]	[Maps in City of Coffman Cove outside of the Tongass National Forest Boundary]			
15	TESP_Mar25 (100554P000055) [No date]	POW Coffman Rd; not a rare pl survey. pioneer at stream rest site off road shoulder; 12 indiv. [Maps in City of Coffman Cove outside of the Tongass National Forest Boundary]	pioneer at stream rest site off road shoulder;	12 indiv.	
16*	**ACCS_Mar25 (EO 14) [6/28/1994]**	**Wrangell Island. 9.5 mi. Zimovia HWY. Residential yard, standing in water, disturbed site. [these coordinates appear to be exact and map to a residence along the Zimovia Hwy. Likely EO 14, 15 and 16 are all the same site with coordinates for EOs 15 and 16 inexact on the specimen labels].**	**Associated with Juncus ensifolius and Carex stipata.**	**Less than 50 plants.**	
16	ACCS_Mar25 (EO 15) [No date]	Beach side of Zimovia Highway at mile 9.3. [This maps in the forest upslope of beach residences and not along the hwy. Does not map beach side. Coordinates must be inexact. And mile 9.3 is just 200 m from mile 9.5.]			
16	ACCS_Mar25 (EO 16) [6/28/1994]	Wrangell I., Zimovia Hwy. about 15 km S of Wrangell, Jim Lebo's yard, 9.5 mile on highway [these coordinates map in the ocean and must be inexact]	Residential yard, standing in water, disturbed site . Juncus ensifolius and Carex stipata	less than 50 plants	
16	ACCS_Mar25 (EO 16) [6/28/1994]	About 9.5 miles south of Wrangell along Zimovia Highway. Jim Lebo's yard, about 25 yards from high	Pioneered road bed, abandoned and allowed to grow over. Growing	Fertile.	

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
		tide line up a steep slope. [these coordinates map in the ocean and must be inexact]	in 2-3 inches of standing water on highly disturbed site. With Juncus ensifolius.		
16	ACCS_Mar25 (EO 16) [6/29/1994]	About 9.5 miles south of Wrangell along Zimovia Highway. Jim Lebo's yard, about 25 yards from high tide line up a steep slope.[these coordinates map in the ocean and must be inexact]	Pioneered road bed, abandoned and allowed to grow over. Growing in 2-3 inches of standing water on highly disturbed site. With Juncus ensifolius.	Fertile.	
16	ACCS_Mar25 (EO 16) [6/29/1994]	Wrangell I., Zimovia Hwy. about 15 km S of Wrangell, Jim Lebo's yard, 25 m from high tide line [these coordinates map upslope of highway and must be inexact]	up a steep slope 25 m from high tide line, growing in 5-8 cm of standing water on highly disturbed site; pioneered road bed, abandoned and allowed to grow over . With Juncus ensifolius		
16	CPNWH_Mar25 (ALA18273, WTU332849, WTU332823) [6/29/1994]	About 9.5 miles south of Wrangell along Zimovia Highway. Jim Lebo's yard, about 25 yards from high tide line up a steep slope. [these coordinates map in the ocean and must be inexact]	Pioneered road bed, abandoned and allowed to grow over. Growing in 2-3 inches of standing water on highly disturbed site. Growing with Juncus ensifolius.		
17*	**ACCS_Mar25 (EO 17) [9/12/2005]**	**Tongass National Forest, Wrangell Is. Residential, backyard.**			
17	TESP_Mar25 (100522P000001) [9/12/2005]	Wrangell Is. Tom Heutte observation/id for WRD; not a rare pl survey. Residential, backyard.	Residential, backyard.		
17	ACCS_Mar25 (EO 17) [7/7/1939]	Wrangell	Marsh		
17	ACCS_Mar25 (EO 17) [No date]	Wrangell vicinity.			
18*	**ACCS_Mar25 (EO 18) [8/1/2002]**	**City of Wrangell, north end of Wrangell Island, Airport Loop Road.**	**Wet ditch near airport.**	**More than 500 plants seen. Fertile.**	

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
18	CPNWH, Mar 25 (WTU408496) [8/1/2002]	City of Wrangell, north end of Wrangell Island, Airport Loop Road. Forest Service Alaska Region, TNFS Herbarium, v. 6777.	Wet ditch near airport.	More than 500 plants seen.	
19*	**ACCS_Mar25 (EO 21) [7/15/2003]**	**Tongass National Forest, Mitkof Is. Petersburg Ballfield**			
19	TESP_Mar25 (100521P000037) [7/15/2003]	Mitkof Is. Petersburg Ballfield	Petersburg Ballfield		
19	ACCS_Mar25 (EO 21) [7/15/2003]	Tongass National Forest, Mitkof Is. Hungry Pt Tr., city ditch			
19	TESP_Mar25 (100521P000038) [7/15/2003]	Mitkof Is. Hungry Pt Tr., city ditch [maps to next to Petersburg Ball Fields along Excel St]	city ditch		
20*	**ACCS_Mar25 (EO 24) [7/30/2003]**	**Alexander Archipelago, Baranof I., Sitka, in Sitka, near Verstovia Elementary School playground [maps to Sealing Cove not Verstovia Elementary School Playground]**	**Found in disturbed area along small stream. Area was disturbed to install a city sewer line about 8-10 years ago. Area was partially re-vegetated with non-native shrubs. Associated with Ranuculus repens, Juncus sp., Carex sp., Rumex sp.**		
21*	**ACCS_Mar25 (EO 31) [8/31/2005]**	**Tongass National Forest, Baranof Is., city of Sitka, roadside drainage ditch. [The coordinates for this record map to Chichagof Island in the West Chichagof-Yakobi Wilderness, Tongass NF and must be incorrect.]**			
21	TESP_Mar25 (100531P000151) [8/31/2005]	Baranof Is., city of Sitka, roadside drainage ditch.	roadside drainage ditch.		
22*	**ACCS_Mar25 (EO 25) [9/7/2005]**	**Tongass National Forest, Baranof Is., city of Sitka, roadside drainage ditch, both sides of road.**			
22	TESP_Mar25 (100531P000157) [9/7/2005]	Baranof Is., city of Sitka, roadside drainage ditch, both sides of road.	roadside drainage ditch, both sides of road.		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
22	ACCS_Mar25 (EO 25) [9/7/2005]	Sitka A-4 Quad. Baranof Island, city of Sitka. Price Street. Growing in ditches along both sides of street, recently disturbed industrial zoned area.	Growing with Ranunculus repens, Alnus rubra, Rubus specabilis, Equisetum arvense, Epilobium sp., Taraxacum officinale.	Thousands of plants.	
23*	**ACCS_Mar25 (EO 26) [9/7/2005]**	**Tongass National Forest, Baranof Is., city of Sitka, Sheldon Jackson College campus.**			
23	TESP_Mar25 (100531P000156) [9/7/2005]	Baranof Is., city of Sitka, Sheldon Jackson College campus.	Sheldon Jackson College campus.		
23	ACCS_Mar25 (EO 26) [9/2/2005]	Tongass National Forest, Baranof Is., city of Sitka, Sheldon Jackson College campus.			
23	TESP_Mar25 (100531P000152) [9/2/2005]	Baranof Is., city of Sitka, Sheldon Jackson College campus.	Sheldon Jackson College campus.		
23	ACCS_Mar25 (EO 26) [6/21/1981]	Tongass National Forest, STENS4270 TNFS2107 [Maps to Sheldon Jackson College Campus Museum]			
23	TESP_Mar25 (100531P000182) [6/21/1981]	STENS4270 TNFS2107 [Maps to Sheldon Jackson College Campus Museum]			
24*	**ACCS_Mar25 (EO 27) [8/31/2005]**	**Tongass National Forest, Baranof Is., city of Sitka, drainage ditch in town**			
24	TESP_Mar25 (100531P000150) [8/31/2005]	Baranof Is., city of Sitka, drainage ditch in town	drainage ditch in town		
24	ACCS_Mar25 (EO 27) [8/31/2005]	Sitka A-5 Quad. Baranof Island. City of Sitka, near intersection of Sirstad and Monastery streets.	In drainage ditch. Ranunculus repens, Trifolium sp., Lysichiton americanum, Cerastium beeringianum, Rubus spectabilis, Epilobium sp.	Population of over 500 plants. Vegetative.	
24	ACCS_Mar25 (EO 27) [8/8/2003]	Sitka, near Verstovia ballfield parking area [maps to edge of Swan Lake NE of ballfield]	growing in a disturbed area previously used as an access road . Ranunculus repens, Taraxacum spp., Epilobium spp., Geum		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
			macrophyllum and Trifolium spp.		
25*	**ACCS_Mar25 (EO 28) [9/2/2005]**	**Tongass National Forest, Baranof Is., city of Sitka, roadside drainage ditch. [along Halibut Pt Rd]**			
25	TESP_Mar25 (100531P000153) [9/2/2005]	Baranof Is., city of Sitka, roadside drainage ditch. [along Halibut Pt Rd]	roadside drainage ditch.		
25	ACCS_Mar25 (EO 28) [7/30/2003]	Tongass National Forest, Sitka,in a disturbed area [near Georgeson Loop]			
25	TESP_Mar25 (100531P000055) [7/30/2003]	Sitka,in a disturbed area	in a disturbed area		
25	ACCS_Mar25 (EO 28) [7/30/2003]	Tongass National Forest, Sitka,Disturbed area near ballfield			
25	TESP_Mar25 (100531P000056) [7/30/2003]	Sitka,Disturbed area near ballfield	Disturbed area near ballfield		
25	ACCS_Mar25 (EO 28) [8/8/2003]	Baranof Island. Verstovia ballfield near parking area. DIsturbed area, previously used as access road.	Growing with other 'weedy' species: Ranunculus repens, Epilobium sp., Taxacum sp., Geum macrophyllum.		
26*	**ACCS_Mar25 (EO 29) [9/2/2005]**	**Tongass National Forest, Baranof Is., city of Sitka, roadside drainage ditch.**			
26	TESP_Mar25 (100531P000155) [9/2/2005]	Baranof Is., city of Sitka, roadside drainage ditch.	roadside drainage ditch.		
26	ACCS_Mar25 (EO 29) [9/2/2005]	Sitka A-5 Quad. Baranof Island, city of Sitka.Intersection of Halibut Point Rd. and Ross Street. Ditch on both sides of Ross Street.	Growing with Ranunculus repens, Mimulus guttatus, , Trifolium repen. Rumex sp., Heracleum lanatum, Alnus rubra, Taraxacum officinale.	Many thousand plants.	
27*	**ACCS_Mar25 (EO 30) [9/2/2005]**	**Tongass National Forest, Baranof Is., city of Sitka, old landfill area - new golf course.**			
27	TESP_Mar25 (100531P000154) [9/2/2005]	Baranof Is., city of Sitka, old landfill area - new golf course.	old landfill area - new golf course.		

Gymnomitrion commutatum

Gymnomitrion commutatum [(Limpr.) Schiffn., 1915]

A Liverwort

Global Rank: **G2G4**

Alaska State Rank: **S3**



photo: Mamontov, et al. 2018

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. *Gymnomitrion commutatum* is known from two estimated occurrences on the TNF. We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). These occurrences are located: on central Wrangell Island and at Washington Bay on Kuiu Island (an old collection from 1956; Appendix 1; ACCS 2024, CBH 2025, USFS 2025a). Occurrence 1 was observed in mountain rills (shallow channel cut into soil by the erosive action of flowing surface water). Occurrence 2 was collected in muskeg with *Tsuga heterophylla* trees from a rock crevice (ACCS 2024, CBH 2025). There is one occurrence of this species in southeastern Alaska outside of the Tongass NF in Glacier Bay National Park in an open area with few Sitka spruce, mountain hemlock and shore pine on rock substrate (CBH 2025). Across its range, *Gymnomitrion commutatum* is typically found on rock or soil in cool and moist habitats including tundra, bogs, and mountain ridges (CBH 2025).

Criteria	*Rank*	*Rationale*
		This species may be confused for *Gymnomitrium obtusum* which is also present nearby (CBH 2025). There are no subspecies of *Gymnomitrion commutatum* (Stotler and Crandall-Stotler 2017). Additionally, bryophytes are not typically recorded in botanical surveys, so this species may be more common than documented.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G3, Alaska State Rank S3, British Columbia: S3, Alberta: S1 *Gymnomitrion commutatum* is broadly distributed throughout northern Hemisphere (CBH 2025). There are collections from the North Pacific coastal areas from Japan, Russia, Korea, and the Pacific Northwest of North America. In North America, *Gymnomitrion commutatum* is present in Canada in British Columbia and Alberta, and in the United States in Washington (CBH 2025). Across its range, *Gymnomitrion commutatum* occurs in cool, moist sites like wetlands, tundra, and mountain ridges, at elevations from near sea level to 3000 m (CBH 2025). It is typically found on rock, but there are also reports of it growing on thin or tundra soil (CBH 2025). While the species is found around the globe, known sites are somewhat concentrated in the north Pacific region of North America, Southern Japan, and Europe with few to no collections in regions between these clusters (CBH 2025). In southeastern Alaska this species is known from the Tongass NF and Glacier Bay National Park. The nearest occurrences are to the south in British Columbia approximately 140 miles from the Wrangell Island occurrence.
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. *Gymnomitrion commutatum* is a leafy liverwort with a terrestrial growth habit (Bakalin, et al. 2021). Its main dispersal mechanism is by clonal growth, and probably spores, but reproductive structures are not described in recent literature (Bakalin, et al. 2021).

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. *Gymnomitrion commutatum* is known from 2 occurrences on the Tongass NF (Appendices 1 and 2). None of the occurrences have population estimates or any indication of abundance (Appendix 1; ACCS 2024, USFS 2025).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Gymnomitrion commutatum* on the TNF are unknown (USFS 2025a, ACCS 2024).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat for one occurrence of *Gymnomitrion commutatum* on the TNF is on rock in muskeg, and the other collection is described as growing in mountain rills (CBH 2025). In an adjacent location in Glacier Bay National Park, it also occurs on rock, but within open forest of *Picea sitchensis*, *Tsuga mertensiana*, and *Pinus contorta* (Appendix 1; CBH 2025). These habitats can be grouped under moist forests and wetlands with rock outcrops, which are ecosystems that are very common on the Tongass NF (Turner and Mallott 2025). There may be more specific microhabitat requirements that contribute to this species' rarity in Southeast Alaska. Invasive species that can survive in or near moist forests are not known to occur in or near the coordinates for either Tongass NF occurrence (USFS 2025b). Timber harvest has occurred in the recent past about 1 km to the northwest and southwest from occurrence 2 and is widespread in the vicinity of occurrence 2 on Wrangell Island (USFS 2025c). This might indicate a negative trend in habitat quality at that site.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025). Therefore, the habitat of *Gymnomitrion commutatum* is less likely be impacted by invasive species in the future. Recent timber harvest activities have occurred in the vicinity of the muskeg at occurrence 2 (USFS 2025c), and this activity will likely continue on Wrangell Island in the future. Timber harvest adjacent to wetlands can alter water flows and hydrology. In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for species dependent on humidity and precipitation to maintain hydration like this rock dwelling liverwort (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. The life history of *Gymnomitrion commutatum* is largely unknown. It is a leafy liverwort with a dense mat growth habit (Bakalin, et al. 2021). It produces leafy stems with ecostate leaves that are two lobed (Bakalin, et al. 2021). *Gymnomitrion commutatum* likely produces sporocarps within its TNF range, but they are not described in recent literature (Bakalin et al. 2021). Specialized asexual reproduction is absent for this species (Bakalin, et al. 2021). The life span of *Gymnomitrion* plants has not been reported, but it is a perennial that spreads clonally and likely can persist on its substrate for many years.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Gymnomitrion commutatum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Timber harvest adjacent to muskeg with known occurrence could alter hydrology. Additionally, invasive species may compete with *Gymnomitrion commutatum* in wetland habitat. Increased air temperature and evapotranspiration rate may lead to decreased soil moisture, particularly during the growing season which may lead to drought stress for *Gymnomitrion commutatum*.
- **Declining trends**: Population trends are not known. Wetland habitat is abundant and has high ecosystem integrity, but it is unknown if there are additional microhabitat requirements that may contribute to rarity of *Gymnomitrion commutatum* on the Tongass NF.
- **Restricted ranges**: *Gymnomitrion commutatum* is widespread globally and the range extends north and south of the Tongass NF.
- **Low population numbers**: There are only two documented occurrences of *Gymnomitrion commutatum* on the Tongass NF. However, bryophytes are not typically recorded in botanical surveys, so this species may be more common than documented.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [8/05/1956]**	**Kuiu Island| Washington Bay**	**In mountain rills**		
1	CBH 2025 (F) [08/05/1956]	Kuiu Island| Washington Bay	In mountain rills. Associated taxa: *Siphula ceratites*.		
2*	**ACCSBryo_Oct24 [5/17/2015]**	**Pat Creek, southeast Alaska panhandle, Wrangell Island. Approximately 9 miles SSE of the Borough of Wrangell. Collection area is accessed via road to Middle Ridge.**	**Open west-facing muskeg with saturated slopes surrounding subalpine lake with *Tsuga heterophylla* and *Callitropsis nootkatensis* along margin. partially shaded. Substrate: rock crevice.**		

Hookeria acutifolia

Hookeria acutifolia [Hookeria acutifolia, 1825]

Sharpleaf Hookeria Moss

Global Rank: **G4G5**

Alaska State Rank: **S2**



photo: (CC0) Randal (iNaturalist user rambryum)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Hookeria acutifolia* is known from four estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on northern Wrangell Island (one occurrence) and on Baranof Island near Sitka (three occurrences) (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs on rocks or soil in wetlands and forest (CBH 2025). Occurrence 1 was collected in a forested muskeg on rock and humic soil, Occurrence 2 was collected from dense *Picea Sitchensis – Tsuga heterophylla* forest on a seepy cliff, while Occurrence 3 was collected from soil over a cliff (Appendix 1, CBH 2025). Theses habitats are fairly typical for this species. There is one occurrence of this species in southeastern Alaska outside of the Tongass NF near the Ketchikan airport (CPNWH 2025). This species may be confused for *Hookera lucens* which is also present nearby (CBH 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G4G5, Alaska State Rank S2 British Columbia Provincie Rank S4, Washington State Rank S1 *Hookeria acutifolia* is broadly distributed throughout temperate and tropical forested areas of the world (CBH 2025). There are numerous collections in western North America from southeast Alaska to Washington, mostly near the coast, but with a few records further inland in British Columbia (CBH 2025) *Hookeria acutifolia* is also found in the eastern United States, concentrated in the southern Appalachian Mountains and extending to the Ozarks and the mid-Atlantic region (CBH 2025). The species is also found in southern Mexico, through central America and the Andes to southern Brazil, and the Caribbean islands of Cuba, Jamaica, Hispanola and Puerto Rico (CBH 2025). In south Asia and Oceana there are collections from southern India, through the Indochinese peninsula and the islands of Indonesia, Papua New Guinea and the Philippines, and north through China, Japan and Korea (CBH 2025). There are also numerous collections from Hawaii (CBH 2025). In North America, *Hookeria acutifolia* is present in one Canadian province as well as 19 US states and territories (CBH 2025). Across its range, *Hookeria acutifolia* occurs in moist forests and mountains at elevations from sea level to over 3,000 m (CBJ 2025, FNA 2025). In eastern North America it is almost always reported from rocks, usually described as moist from seepage, waterfall splash, or is otherwise relatively humid. In other parts of the world, the species is also frequently reported as growing on moist soil or hummus, and rarely on tree bases or roots (CBH 2025). Many of the eastern North American collections are reported from sandstone, but other types of geology are also reported, and it is not possible to determine if there is an actual relationship with rock type without more in-depth analysis (CBH 2025). The Tongass is the northern edge of this species range (one record is show further north in British Columbia, but the location description for this record clarifies that the specimen was actually collected to the south on Haida Gwaii) (CBH 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* The main dispersal mechanism of *Hookeria acutifolia* is by spores (FNA 2025).

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Hookeria acutifolia* is known from four occurrences on the Tongass NF. None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Hookeria acutifolia* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The habitat for the four occurrences of *Hookeria acutifolia* on the TNF is peatland or dense forest with a substrate of rock or soil in shady or moist sites (Appendix 1; CBH 2025). Invasive species that can survive in or near rocky areas and wet sites such as *Phalaris arundinacea* and *Phleum pratense* or of open areas like *Trifolium hybridum, Ranunculus repens,* and *Schedonorus arundinacea* are known to occur in or near the coordinates for Occurrences 1, 3, and 4 (USFS 2025b). The effect of these invasive species on habitat quality cannot be addressed without more specific information about the susceptibility of the particular bryophyte substrate to invasion by the particular weeds. Timber harvest has occurred in the recent past within about 100 meters to the west of Occurrence 1, and about 1 km to the east of Occurrence 3 and is widespread on Wrangell Island and parts of Baranof Island (USFS 2025c). This might indicate a negative trend in habitat quality at those sites.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* The vulnerability of forested and non-forested wetlands on the Tongass is thought to be low, while the vulnerability of forest is low to moderate (Tuner and Mallot 2025). However, without more information on the specific habitat preferences and reasons for the limited number of occurrences of this species on the Tongass, conclusions about habitat vulnerability cannot be made. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress species with high atmospheric humidity or substrate moisture requirements such as *Hookera acutifolia* (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Hookeria acutifolia* is largely unknown. It is a pleurocarpous moss with a dense mat growth habit (FNA 2025). It produces leafy stems with simple, entire leaves with no midvein (FNA 2025). *Hookeria acutifolia* produces sporocarps in late fall to spring but there is no information on how frequently this occurs within its TNF range (FNA 2025). Specialized asexual reproduction is absent for this species (FNA 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒

Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Hookeria acutiforia is not proposed as a Species of Conservation Concern based on the following rationale:

- **Significant threats:** Timber harvest and climate change may be threats to this species, but there is not enough information to decide if those threats are significant.
- **Declining trends:** Population trends are unknown. Without more information on specific habitat preferences and reasons for the limited number of occurrences of this species on the Tongass, conclusions about habitat trends cannot be made.
- **Restricted ranges:** The Tongass NF is the northern edge of this species' known range.
- **Low population numbers or restricted ecological conditions:** Four occurrences with unknown population numbers. Ecological conditions as described for this species are apparently broadly available on the Tongass, but it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors:** Bryophyte surveys are limited on the Tongass NF; targeted surveys are required to determine the true distribution of this species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [5/17/2015]**	**Southeast Alaska panhandle, Wrangell Island. Approximately 9 miles SSE of the Borough of Wrangell. Collection area is accessed via road to Middle Ridge.**	**Open west-facing muskeg with saturated slopes surrounding subalpine lake withTsuga heterophylla and Callitropsis nootkatensis along margin. partially shaded. Substrate: humic soil.**		
1	ACCSBryo_Oct24 [3/19/2016]	Southeast Alaska panhandle, Wrangell Island. Approximately 9.5 miles SSE of the Borough of Wrangell, with access via the Middle Ridge Road.	small toeslope muskeg skirted by mostly undisturbed coniferous forest dominated by Pinus contorta, Picea sitchensis, Tsuga heterophylla and Callitropsis nootkatensis. fully shaded, steeply inclined,		
1	ACCSBryo_Oct24 [3/19/2016]	Southeast Alaska panhandle, Wrangell Island. Approximately 9.5 miles SSE of the Borough of Wrangell, with access via the Middle Ridge Road.	small toeslope muskeg skirted by mostly undisturbed coniferous forest dominated by Pinus contorta, Picea sitchensis, Tsuga heterophylla and Callitropsis nootkatensis. fully shaded, steeply inclined. Substrate: rock wall.		
1	CBH 2025 (DAV) [05/17/2015]	Tongass National Forest. Southeast Alaska panhandle, Wrangell Island. Approximately 9 miles SSE of the Borough of Wrangell. Collection area is accessed via road to Middle Ridge. Watershed: Pat Creek. Sitename: West Salamander Ridge Lake	Open west-facing muskeg with saturated slopes surrounding subalpine lake withTsuga heterophylla and Callitropsis nootkatensis along margin. Substrate: partially shaded wet; humic soil.		
2*	**ACCSBryo_Oct24 [5/06/2019]**	**Southeast Alaska Panhandle, Baranof Island. Approximately 8km due east of Sitka, Alaska. Collection locailty a trailside cliff.**	**Non calcareous rock cliff in dens forest dominated by Picea sitchensis, and Tsuga heterophylla. mostly shaded, steeply inclined. Substrate: rock crevice.**		
2	CBH 2025 (DAV) [05/06/2019]	Tongass National Forest. Southeast Alaska Panhandle, Baranof Island. Approximately 8km due east of Sitka, Alaska. Collection locailty a	Non calcareous rock cliff in dens forest dominated by Picea sitchensis, and Tsuga heterophylla. Slope: 90°; Aspect: 10°. Substrate:		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
		trailside cliff. Watershed: Sawmill Creek. Sitename: BeaverTakakia	Mostly shaded seepage steeply inclined; in rock crevice.		
2	iNaturalist [08/23/2022]	East of Sitka			
3*	**ACCSBryo_Oct24 [5/17/2004]**	**Mosquito Cove Trail, Starrigavan Recreation area, Baranof Island, Alexander Achipelago; Co.:Sitka**	**soil over cliff**		
3	CPNWH_Mar25 (UBC) [5/17/2004]	Mosquito Cove Trail, Starrigavan Recreation area, Baranof Island, Alexander Achipelago; Co.:Sitka.	soil over cliff		
3	CBH 2025 (UBC) [05/17/2004]	Mosquito Cove Trail, Starrigavan Recreation area, Baranof Island, Alexander Achipelago; Co.:Sitka	; soil over cliff.		
4*	**iNaturalist 2025 [4/24/2024]**	**Sitka area north of Mount Verstovia**			

Hydnellum mirabile

Hydnellum mirabile (*compactum*) [(Fr.) P. Karst, 1879]

Fuzzy Tooth

Global Rank: **GNR**

Alaska State Rank: **SNR**



photo: stellar_viscera CC-BY-NC via iNaturalist (2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Isolated.* *Hydnellum mirabile* is known from two occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Occurrence 1 is located on Prince of Wales Island northwest of Hollis, south of Granite Mountain, adjacent to Halfmile Creek, and Occurrence 2 is 5 km (3 mi) east of Thorne Lake(Appendix 1; GBIF 2025, iNaturalist 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in old growth forest ecosystems. Occurrence 1 was collected from moss in a mixed conifer forest (iNaturalist 2025). In southeast Alaska there are two additional occurrences of *Hydnellum mirabile*, one on National Park Service land north of Skagway and one on Mitkof Island which may or may not be on Forest Service land (iNaturalist 2025). This species may be confused for older specimens of *Hydnellum caeruleum*, which is also rare on the TNF but has bluish tones when fresh (iNaturalist 2025, Siegel and Schwarz 2024). *Hydnellum mirabile* does not have subspecies in the TNF.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	*B = Widely disjunct taxa for which the main distribution is a significant distance from the Tongass NF.* Global Rank GNR, Alaska SNR, IUCN Vulnerable since 2015 (IUCN 2025, Nitare 2015), Alaska Rare Fungi List (ACCS 2023) The closest occurrences to Southeast Alaska are near Anchorage, AK, 1,175 km to the northwest, and to Mt St. Helens to the southeast (MycoPortal 2025). *Hydnellum mirabile* is narrowly distributed throughout Europe, centralized with many occurrences in Norway and Sweden (MyCoPortal 2025). In North America this species occurs from west coast of Alaska to the Cascades of Washington and Oregon, to Northeast U.S. states including Massachusetts, New Jersey, New York and New Hampshire, and Nova Scotia, Canada (MyCoPortal 2025). Across its range, *Hydnellum mirabile* occurs in conifer forests at elevations of 0 m to about 200 m in Alaska (MyCoPortal 2025). It is typically found in moss on calcareous soil in shady, old-growth forested environments (iNaturalist 2025, MyCoPortal 2025, Nitare 2015). Associated ectomycorrhizal trees are most often *Picea* sp. or *Pinus* sp. (Ryvarden 2024).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Hydnellum mirabile* is a toothed mushroom-forming fungus species which grows in moss on calcareous soil in association with *Picea* and *Pinus* species (MyCoPortal 2025, Ryvarden 2024). Its main dispersal mechanism is by sexual spores dispersed by wind (Ryvarden 2024). Fungal spore dispersal success is species-specific, dependent on spore size and ornamentation, volume of spores produced, environmental factors like wind and other dispersal agents like animals, and availability of suitable habitat and host plants (Golan and Pringle 2017, Peay and Bruns 2014).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* *Hydnellum mirabile* is known from two occurrences on the Tongass NF (Appendix 1). Neither have population estimates or any indication of abundance (Appendix 1; MycoPortal 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends of *Hydnellum mirabile* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* Habitat for *Hydnellum mirabile* on the TNF is old growth mixed conifer forest (iNaturalist 2025, MyCoPortal 2025). *Hydnellum mirabile* requires the ectomycorrhizal plant host of either *Picea* sp. or *Pinus* sp. (Ryvarden 2024). Timber harvest has occurred in the recent past at the location of occurrences 1 and 2 and is widespread to the north, west, and south of occurrence 1, and to the east, west, and south of occurrence 2 on Prince of Wales Island (USFS 2025c). Old growth forest has been impacted by logging in the past but abundant habitat remains and old growth forested habitat has high ecological integrity (Turner and Mallot 2025). Invasive species such as *Cirsium vulgare* (bull thistle) are known to occur in or near the coordinates for occurrence 1 (USFS 2025b). *Cerastium fontanum*, *Hieracium aurantiacum, Phalaris arundinacea, Plantago major, Ranunculus repens,* and *Taraxacum officinale* are known to occur near occurrence 2 (USFS 2025b). The effect of these invasive species on habitat quality cannot be addressed due to the uncertainty of occurrence locations.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Recent timber harvest activities have occurred in the vicinity of the mixed conifer forests at occurrence 1 and 2 (USFS 2025c), and this activity will likely continue on Prince of Wales Island in the future. Habitat change in the form of clear-cutting old-growth trees is listed as the top threat for *Hydnellum mirabile* in Europe (Nitare 2015). In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which could lead to drought stress (Turner and Mallott 2025, Wiles and Warren 2025).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Hydnellum mirabile* is an annual fungus (meaning that it fruits annually), but it may not create mushrooms every year. When it does, it produces a toothed or hydnoid sporocarp with yellow to light or dark brown cap and short or almost absent stipe (Ryvarden 2024). *Hydnellum mirabile* is an ectomycorrhizal species dependent on conifers in *Picea* or *Pinus* genera (iNaturalist 2025, Ryvarden 2024). The species is known to co-occur with *Hemitomes congestum,* an achlorophyllous plant (iNaturalist 2025). The life span of *Hydnellum* fungi has not been measured (Nitare 2015).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	x☐
Declining populations or habitat trends	☐	☐	x☐
Restricted range	X	☐	☐
Low populations or restricted ecological conditions	☐x	☐	☐
Other factors (see conclusion rationale)	☐	☐	☐

Conclusion Rationale

Hydnellum mirabile is not recommended as a species of conservation concern for the following reasons:

- **Significant threats:** Timber harvest in old growth forests impact habitat and may destroy individuals of *Hydnellum mirabile* where it is known to occur on Prince of Wales Island. However, old growth forest habitat across the planning area is relatively abundant and is expected to remain stable, especially in protected areas.
- **Declining trends:** Population trends are unknown. Old growth forest habitat is expected to decline in the areas

where this species occurs on the Tongass National Forest, however, suitable old growth habitat is expected to persist across the planning area.

- **Restricted ranges:** *Hydnellum mirabile* in Southeast Alaska is quite disjunct from other documented occurrences (>1000 km). While rare throughout is range, this species is distributed across the northern hemisphere with species of spruce and pine.
- **Low population numbers or restricted ecological conditions**: There are two known occurrences of *Hydnellum mirabile* on the Tongass NF. Life history and dispersal characteristics are not well described and may contribute to rarity.
- **Other factors:** Specific habitat requirements for this species to persist on the Tongass National Forest are not well known.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☐x	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**GBIF 2025 (iNaturalist) [9/5/2023]**	**Prince of Wales Island, Hollis**			
2*	**iNaturalist 2025 [9/7/2023]**	**Prince of Wales-Hyder County, US-AK, US**			

Hypopterygium flavolimbatum

Hypopterygium flavolimbatum (*fauriei*)
[Müller Hal, 1850]

Faurie's Hypopterygium Moss

Global Rank: **G3G5**

Alaska State Rank: **S1**



photo: (CC0) Randal (iNaturalist user rambryum)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps.* *Hypopterygium flavolimbatum* is known from ten estimated occurrences on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located: on Coronation Island in Egg Harbor and Aats Bay; on Prince of Wales Island in Shipley Bay, southeast of Point Baker, and near Cape pole; on Kosciusko Island southwest of Mt. Francis; on Kuiu Island on northeast shore of Skanax Bay, and northeast of Halleck Harbour; on Etolin Island; and on Shrubby Island in Clarence Strait (Appendices 1 and 2; ACCS 2024, CBH 2025, USFS 2025a). Within the Tongass NF boundary, this species is associated with limestone cliffs and boulders, as well as one muskeg with high conductivity from limestone (Appendix 1). There are three occurrences of this species in southeastern Alaska outside of and adjacent to the Tongass NF (CBH 2025). The range of the species continues south in British Columbia to Haida Gwaii and Vancouver Island (CBH 2025). Bryophytes are not typically recorded in botanical surveys on the Tongass NF so this species may be more common than is documented.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G3G5, Alaska State Rank S1, British Columbia S3S4 *Hypopterygium flavolimbatum* is distributed throughout the northern Pacific Northwest of North America and Southeast Asia including Vietnam, China, Japan, Russia, Papua New Guinea, Philippines, and India (CBH 2025, Kruijer 2002). In North America, *Hypopterygium flavolimbatum* is present in one Canadian province, British Columbia, as well as one U.S. state, Alaska (CBH 2025). The ideal habitat for *Hypopterygium flavolimbatum* is described as humid, evergreen coniferous forest in shady, rocky places (Kruijer 2002). Flora of North American mentions limy humus and limestone (FNA 2025). It is typically found on steep slopes on tree trunk bases or directly on rocks in damp, shaded cliff faces (CBH 2025). In southeastern Alaska this species is predominantly known from the Tongass NF; its range continues southeast in Canada to Vancouver Island (CBH 2025). The Tongass is at the northern edge of this species' known range (CPNWH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Hypopterygium flavolimbatum* is a pleurocarpous, leafy moss with a terrestrial growth habit (FNA 2020). Its main dispersal mechanism is by spores, dispersed from the capsule by wind (Lawton 1971). Dispersal via fragmentation of leaves or branches, and vegetative propagation via gemmae, can also occur for this species (Kruijer 2002). *Hypopterygium flavolimbatum* is reported to perform short-range dispersal via a "step-by-step" method (Kruijer 2002). The occurrences in the Tongass NF should readily disperse via spores or vegetative propagation through close by suitable habitat of limestone and conifer dense forest.

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Hypopterygium flavolimbatum* is known from 10 occurrences on the Tongass NF (Appendices 1 and 2). There is no abundance information for the confirmed occurrences on TNF (CBH 2025, USFS 2025a). Targeted surveys could find more occurrences.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Hypopterygium flavolimbatum* on the TNF are unknown (USFS 2025a, ACCS 2024, CBH 2025).
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity.* The habitat for the 10 occurrences of *Hypopterygium flavolimbatum* on the TNF is limestone cliffs and boulders, as well as one muskeg with high conductivity from limestone (Appendix 1). Limestone habitat is uncommon on the Tongass NF and may be particularly susceptible to changes in precipitation due to the typically fast draining nature of this substrate. Invasive species that can survive in or near coastal forests such as *Dactylis glomerata* (orchard grass), *Phalaris arundinacea* (reed canary grass), and *Ranunculus repens* (creeping buttercup), are known to occur in or near the coordinates for occurrences 1, 6, and 10 (USFS 2025b). Its possible that these species could compete with *Hypopterygium flavolimbatum* in some locations. Timber harvest has occurred in the recent past within 160 m east of occurrence 4 and is widespread in the vicinity of occurrences 7 and 10 on Prince of Wales Island, of occurrence 6 on Etolin Island, and of occurrence 8 on Shrubby Island (USFS 2025c). Occurrence 10, described from 1968, falls within a timber harvest area from 1976, indicating this habitat, described as "heavy forest" in May 1968, may be altered (USFS 2025c, CBH 2025). Timber harvest may have directly impacted Occurrence 10 and could indirectly impact other occurrences by altering light or water availability.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* The habitats most vulnerable to invasion by non-native species on the Tongass NF include riparian corridors, coastal regions, and recreation landscapes (Chestnut and Tucker 2025, Wiles and Warren 2025). Wetland habitat of *Hypopterygium flavolimbatum* may be impacted by invasive species in the future (USFS 2025a). Recent timber harvest activities have occurred in the vicinity of the dense conifer-dominated forests at occurrences 4, 6, 7, and 10 (USFS 2025c), and timber harvest will continue on the Tongass NF. Limestone areas are often targeted for harvest because large trees grow in the less acidic soils. Harvest related activities could directly impact occurrences or indirectly through altered light and water regimes. In addition, increased air temperature and increased evapotranspiration may contribute to growing season water deficit which could lead to drought stress for *Hypopterygium flavolimbatum* (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Hypopterygium flavolimbatum* is a pleurocarpous moss with an erect and leafy growth habit (FNA 2020, Lawton 1971). It produces leafy stems in the shape of fans with semi-costate leaves that are simple to partially serrate (FNA 2020, Kruijer 1960, Lawton 1971). Specialized asexual reproduction is in the form of gemmae for this species, though is reported as rare or occasional only (Kruijer 1960). The life span of *Hypopterygium* plants has not been reported (Kruijer 1960).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☐x
Declining populations or habitat trends	☐	☐	X
Restricted range	☐x	☐	☐
Low populations or restricted ecological conditions	☐	☐	☐x

Other factors (see conclusion rationale)	☐	☐	☐x

Conclusion Rationale

Hypopterygium flavolimbatum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Invasive species or timber harvest could impact occurrences or habitat. Increased temperatures and evapotranspiration and resulting water deficits could also create drought stress. Little is known about the life history of this species to understand how it might specifically be impacted by these threats.
- **Declining trends**: Habitat on the Tongass NF is limestone or limestone influenced rock outcrops, cliffs and wetlands. This habitat type is uncommon but likely fairly stable. Light regimes and hydrology could be indirectly impacted by timber harvest. Road building could also directly affect habitat and introduce invasive species.
- **Restricted ranges**: The occurrences on the Tongass NF are the northern edge of the range.
- **Low population numbers**: There are only ten known occurrences of *Hypopterygium flavolimbatum* on the Tongass NF, so population numbers are potentially low. The species seems to be restricted to limestone habitats on the Tongass NF. However, bryophytes are not typically recorded in botanical surveys, so *Hypopterygium flavolimbatum* may be more common than recorded.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
x☐	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [7/14/2005]**	**Coronation Island: Egg Harbor, Tongass National Forest**	**Limestone cliffs;**		
1	ACCSBryo_Oct24 [7/24/1913]	Egg Harbor, Coronation Island.	On rocks among boulders.		
1	ACCSBryo_Oct24 [7/25/1913]	Egg Harbor Coronation Island, Southeastern Alaska			
1	ACCSBryo_Oct24 [7/26/1913]	Southeast, Egg Harbor, Coronation Island.			
1	CBH 2025 (UBC) [07/14/2005]	Coronation Island: Egg Harbor, Tongass National Forest	Limestone cliffs;.		
1	CBH 2025 (DUKE) [07/24/1913]	Egg Harbor, Coronation Island.	On rocks among boulders.		
1	CBH 2025 (DUKE) [07/24/1913]	Egg Harbor, Coronation Island.	On rocks among boulders.		
1	CBH 2025 (WTU) [07/26/1913]	Southeast, Egg Harbor, Coronation Island.	On humus. Substrate: terricolous.		
1	CBH 2025 (F) [07/24/1913]	Egg Harbor, Coronation Island	On rocks among boulders.		
1	CBH 2025 (F) [07/25/1913]	Egg Harbor, Coronation Island	Hummus among rocks.		
2*	**ACCSBryo_Oct24 [7/25/1913]**	**Aats Bay, Coronation Island.**			
2	ACCSBryo_Oct24 [7/25/1913]	Aats Bay.			
2	CBH 2025 (DUKE) [07/25/1913]	Aats Bay.			
2	CBH 2025 (WTU) [07/25/1913]	Aats Bay, Coronation Island.			

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
3*	**ACCSBryo_Oct24 [7/25/1918]**	**Prince of Wales Id., Shipley Bay.**			
4*	**ACCSBryo_Oct24 [5/27/1968]**	**Trout Creek Timber Sales Area, abt. 4 mi. S.W. Mt. Francis, Kosciusko Island**	**On soil over exposed face and crevices of limestone boulders on slope in heavy forest**		
4	CBH 2025 (COLO) [05/27/1968]	Trout Creek Timber Sales Area, abt. 4 mi. S.W. Mt. Francis, Kosiusko I	On soil over exposed face and crevices of limestone boulders on slope in heavy forest.	Identification remarks: Determiner assumed to be Collector; Date approximate.	
5*	**ACCSBryo_Oct24 [6/25/1968]**	**NE shore of Saginaw Bay, 3 mi SE of Halleck Harbour, dry limestone bluffs near abandoned cannery, Kuiu I.**	**Up base of cedar tree**		
5	ACCSBryo_Oct24 [6/25/1968]	NE shore of Saginaw Bay, 3 mi SE of Halleck Harbour, dry limestone bluffs near abandoned cannery, Kuiu I.	Humid shaded limestone cliff base		
6*	**ACCSBryo_Oct24 [9/05/2014]**	**Southeast Alaska panhandle, Etolin Island. Approximately 21miles SW of the Borough of Wrangell.**	**Muskeg with scattered *Pinus contorta* and *Tsuga heterophylla* with high conductivity from limestone bedrock. Conductivity 250 mS, pH 8.1 mostly shaded. Substrate: humic soil.**		
6	ACCSBryo_Oct24 [8/03/2017]	Southeast Alaska panhandle, Etolin Island. Approximately 21 miles SW of the Borough of Wrangell.	Muskeg with scattered *Pinus contorta* and *Tsuga heterophylla* with high conductivity from limestone bedrock. Conductivity 250 mS, pH 8.1 fully shaded. Substrate: humic soil.		
7*	**ACCSBryo_Oct24 [5/06/2016]**	**Southeast Alaska panhandle, Prince of Wales Island. Approximately 5.0 miles SE of Point Baker. Access via the Flicker Ridge logging road.**	**Undisturbed *Picea sitchensis/Tsuga heterophylla* dominated forest on steep slopes with exposed limestone gully. mostly shaded. Substrate: forest floor.**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
7	ACCSBryo_Oct24 [5/06/2016]	Southeast Alaska panhandle, Prince of Wales Island. Approximately 5.0 miles SE of Point Baker. Access via the Flicker Ridge logging road.	Undisturbed *Picea sitchensis/Tsuga heterophylla* dominated forest on steep slopes with exposed limestone gully. fully shaded. Substrate: forest floor.		
7	CBH 2025 (DAV) [05/06/2016]	Tongass National Forest. Southeast Alaska panhandle, Prince of Wales Island. Approximately 5.0 miles SE of Point Baker. Access via the Flicker Ridge logging road. Watershed: Flicker Creek, unnamed tributary. Sitename: Flicker Ridge Road	Undisturbed *Picea sitchensis/Tsuga heterophylla* dominated forest on steep slopes with exposed limestone gully. Slope: 20°; Aspect: 40°. Substrate: Mostly shaded moist; on forest floor.		
7	CBH 2025 (DAV) [05/06/2016]	Tongass National Forest. Southeast Alaska panhandle, Prince of Wales Island. Approximately 5.0 miles SE of Point Baker. Access via the Flicker Ridge logging road. Watershed: Flicker Creek, unnamed tributary. Sitename: Flicker Ridge Road	Undisturbed *Picea sitchensis/Tsuga heterophylla* dominated forest on steep slopes with exposed limestone gully. Slope: 20°; Aspect: 40°. Substrate: Fully shaded moist; on forest floor.		
8*	**ACCSBryo_Oct24 [5/11/2019]**	**Southeast Alaska Panhandle, Shrubby Island. Collection area along the base of rocky bluff**	**Forest dominated by *Picea sitchensis* and *Tsuga heterophylla*. mostly shaded, immediate coast. Substrate: rock crevice.**		
8	CBH 2025 (DAV) [05/11/2019]	Tongass National Forest. Southeast Alaska Panhandle, Shrubby Island. Collection area along the base of rocky bluff Watershed: Clarence Strait. Sitename: Shrubby Island	Forest dominated by *Picea sitchensis* and *Tsuga heterophylla.* Substrate: Mostly shaded moist immediate coast; in rock crevice.		
9*	**ACCSBryo_Oct24 [6/27/1968]**	**Small Island near NE shore of Saginaw Bay ca. 3.5 miles SE of Halleck Harbour, opp. Abandoned cannery, Kuiu Island.**	**on earth at base of limestone cliff**		
10*	**iNaturalist 2025 [6/3/2023]**	**Prince of Wales Island-Hyder County; near El Capitan Cave interpretive visitor center**	**growing on or around limestone with cedar**		

Isolepis cernua

Isolepis cernua [(Vahl) Roem & Schult.]

low bullrush, fiber optic grass

Global Rank: **G5**
Alaska State Rank: **S1**



photo: U. Wisconsin

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Population is naturally distributed as isolated patches, with limited opportunity for dispersal among patches. On the Tongass, *Isolepis cernua* is known from a single occurrence on southeastern Prince of Wales Island on an upper beach meadow adjacent to cedar-hemlock forest (CPNWH 2023).This occurrence is the northern edge of the range in North America. The habitat as described on the herbarium specimen is broadly available on the Tongass, but recorded surveys in beach meadow on the southern Tongass are limited. Additionally, due to the cryptic nature of graminoids, these species often have a higher likelihood of being overlooked. It is also possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species. Because of these unknowns, targeted surveys would be required to determine the true distribution of this species on the Tongass.
2 Distribution in surrounding geographic	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G5, Alaska State Rank S1 British Columbia S5, California SNR, Oregon SNR, Washington SNR

Criteria	*Rank*	*Rationale*
area		Nearest locations are approximately 160 kilometers (100 miles) south to Haida Gwaii, then south to Vancouver Island and adjacent mainland British Columbia (CPNWH 2023). The distribution continues south along the Pacific Coast through Washington and Oregon with disjunct populations in Mendocino County, California (CPNWH 2023). It also occurs in temperate South America, Africa, Eurasia, Australia, and New Zealand (Smith 2002). The occurrence on the TNF is the northern-most population documented in North America. Habitat in British Columbia is described as marshes, tidal flats, and beaches in the lowland zone (Douglas et al 2001).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information about the dispersal capability specific to this taxon. *Isolepis cernua* is the most distantly spread species in the genus *Isolepis*, growing in a wide range of habitats in temperate Africa, Australia, Europe, North America, and South America (Muasya and Simpson 2002) suggesting widespread dispersal has occurred in the distant past.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion The number of plants at the one location is unknown. Because of the factors listed in Criteria 1, targeted surveys would be required to determine the true abundance of this species on the Tongass.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The site has not been revisited since the plant was collected in 1993, and the population trend is unknown
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The habitat description for the one known occurrence on the TNF is upper beach meadow adjacent to cedar-hemlock forest. The habitat as described is not uncommon on the TNF.

Criteria	*Rank*	*Rationale*
		Habitat in British Columbia is described as marshes, tidal flats, and beaches in the lowland zone (Douglas et al 2001). Range-wide habitat is described as: wet, freshwater to brackish places on beaches, dunes, marine bluffs, sandy areas, mostly coastal; 0–800 m (Smith 2002). Tidal wetlands on the Tongass are thought to have moderate integrity
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Tidal wetlands on the Tongass are thought to have moderate ecological integrity and high vulnerability (Turner and Mallott 2024). Climate change is the main stressor for tidal wetlands. Stream and ocean temperatures are driven by air temperature, which is projected to increase annually and seasonally across Southeast Alaska (Halofsky et al. DRAFT). Changes to stream flow, flow seasonality, or existing flow patterns would alter tidal wetlands. Increased storm frequency or intensity resulting from higher sea water temperature could increase wave action and produce storm surges which can erode tidal wetlands and beaches faster than sediment deposition rates can replenish them (Turner and Mallott 2024). Some change in sea level may occur as a result of isostatic rebound and sea level rise, but is projected to be limited on the southern end of the Tongass NF where this species occurs (Halofsky et al 2025). Other potential stressors to tidal wetlands include timber harvest, dams, urban development, transboundary mines, and invasive species (Turner and Mallott 2024). There are large infestations of invasive plants in some tidal wetlands, including brass buttons (Cotula coronopifolia) in intertidal areas around Petersburg. Some invasive species that haven't yet been recorded on the Tongass National Forest could gain a foothold, especially as the climate warms (Turner and Mallott 2024). The invasive grass reed canarygrass (*Phalaris arundinacea*) is moderately tolerant of saline soils and may have the potential to invade coastally influenced openings such as beach meadows and upper tidal marshes. Threats specific to the one location where this species has been found on the Tongass are unknown.

Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. Little is known about the life history and demographics of *Isolepis cernua*. It is an annual or short-lived perennial tufted graminoid in the *Cyperaceae* family (Muasya & Simpson 2002).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Isolepis cernua is not recommended as a Species of Conservation Concern. There is insufficient information to determine if there is a substantial concern about the species' capability to persist in the plan area over the long term. The following evidence was considered in the conclusion not to recommend *Isolepis cernua* as a Species of Conservation Concern on the Tongass NF:

- **Significant threats**: Threats specific to the one documented location are unknown. General threats to tidal wetland and beach meadow habitat include invasive species, recreation, oil spills, change in sea level and earthquake-induced slides or tsunamis.
- **Declining populations or habitat trends**: Population trends for the one documented location are unknown. Tidal wetlands on the Tongass are thought to have moderate ecological integrity and high vulnerability. Coastal habitats on the southern end of the Tongass NF may be susceptible to erosion.
- **Restricted range**: The occurrence of *Isolepis cernua* on the TNF is at the northern most edge of its range. The nearest occurence to the south is approximately 100 miles (160 kilometers) away.
- **Low populations or restricted ecological conditions**: There is one known occurrence of *Isolepis cernua* on the TNF. The habitat as described for that location is broadly available on the Tongass, so it is unclear why there aren't more records for this species. One

contributing reason could be that recorded surveys in beach meadow on the southern Tongass are limited. Additionally, due to the cryptic nature of graminoids, these species often have a higher likelihood of being overlooked. It is also possible there are specific microhabitat requirements or other ecological constraints for this species on the Tongass that are unknown at this time.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO1)[8/11/1993]	Prince of Wales Island, Moira Sound, head of Aiken Cove, ca. 500 ft. N of mouth of Aiken Creek	upper beach meadow adjacent to cedar-hemlock forest	NA	NA

Juncus articulatus

Juncus articulatus [L.]

Jointleaf rush

Global Rank: **G5**

Alaska State Rank: **S1S2**



photo: Christian Fischer

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or gaps* *Juncus articulatus* is known from six estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The occurrences are on Petersburg, Craig, and Ketchikan-Misty Ranger Districts. Locations are as follows: 1) Ella Lake, 2) Kupreanof Island West Tonka Road, 3) Kupreanof Island southeast of Kake, 4) Cleveland Peninsula east of Bugge Lake, 5) Kupreanof Island north of Kushneahin Lake, and 6) Prince of Wales Island near Cholmondeley Sound (USDA 2023, ANHP ACCS 2023; CPNWH 2023). Occurrences are scattered and geographically isolated. Habitat of known occurrences on the Tongass NF include: mudflat of creek delta, sphagnum mat at lake margin, gravel pit, and wet moss bog. Three additional occurrences not on TNF land are known in southeast Alaska: two at the Mendenhall Valley in Juneau and one near the Petersburg airport on Mitkof Island. Habitat for these occurrences is wet ditches next to roads.
2 Distribution in surrounding	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank S1S2 *Juncus articulatus* is widespread throughout the Pacific Northwest outside of Alaska. Herbarium records indicate the closest population is adjacent to the Tongass National Forest near Stewart, B.C. with additional occurrences on Graham

Criteria	*Rank*	*Rationale*
geographic area		Island and Vancouver Island (CPNWH 2023). Occurrences are also found in south and east-central British Columbia. *Juncus articulatus* is widespread through Washington and Oregon, east to Idaho and northwest Montana.
3 Dispersal capability	C	*C = Readily disperses across landscapes with few habitat-related limitations.* As an obligate wetland species growing near lake and stream margins, *Juncus articulatus* is dispersed primarily by water. A study conducted in Northern Germany documented a high percentage of *Juncus articulatus* seed caught on sedimentation mats on the banks of a seasonally flooded river system (Vogt et al. 2004). Animal dispersal has also been documented in Belgium where *Juncus articulatus* was one of the most abundant species germinated from horse and cattle dung samples (Cosyns et al. 2005). It is likely animal dispersal occurs elsewhere in its range. Reports indicate seeds remain viable in the seed bank for at least 13 years which may allow it to colonize sites following flood disturbance (Geoffrey et al. 2007).
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* One occurrence of *Juncus articulatus* has a population estimate of 75 individuals. Population numbers for the other occurrences are unknown.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends are unknown.
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* Across its range, habitat for Juncus articulatus is described as wet ground in ditches, lake and stream margins, and a variety of other habitats. Habitat of known occurrences on the Tongass NF include: mudflat of creek delta, sphagnum mat at lake margin, gravel pit, and wet moss bog. On the Tongass NF, wetlands have high ecosystem integrity with low vulnerability to stressors (Turner and Mallot 2025).

Criteria	*Rank*	*Rationale*
		The three occurrences in southeast Alaska not on the Tongass NF are all in disturbed areas – wet ditches near roads. Thus, *Juncus articulatus* appears to have a broad habitat amplitude in southeast Alaska and some tolerance of disturbance.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors* Climate change will likely alter temperature and precipitaion patterns which will affect the water table, especially in summer (Turner and Mallot 2025). Declining water table depth in wetlands may allow for tree encroachment but this process appears to be slow. Some freshwater bodies in Alaska have shrunk due to decreased precipitation and increase temperature driven evapotranspiration (Halofsky et al DRAFT). It is unlikely climate change would reduce overall quantity of habitat for this species however it could result in population declines or local extirpations of *Juncus articulatus*. One occurrence of *Juncus articulatus* is within a disturbed gravel pit. It is not known if the gravel pit is currently active or historic, or when *Juncus articulatus* first colonized this area. Therefore, it is unknown if anthropogenic activities have impacted or will continue to impact this population.
8 Life history and demographics	C	*C = High reproductive rate and not especially susceptible to disease, predation, or competition; OR species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.* Juncus articulatus is a perennial graminoid in the Juncaceae (rush) family that reproduces sexually by seed and asexually by short rhizomes. Studies from a seasonal wetland in Australia showed *Juncus articulatus* has a long-lived seedbank adapted to fluctuations in soil moisture (Geoffrey et al. 1996; Geoffrey et al. 2007). *Juncus articulatus* allocates a greater proportion of resources to seed production versus tiller production in flooded habitats which allows it to act as a colonizer when favorable conditions return (Geoffrey et al. 2007). However, *Juncus articulatus* is considered introduced to Australia therefore it is unclear if these reproductive strategies are similar in its native range. *Juncus articulatus* seed from the Australian wetland continued to germinate 13 years after the sediment samples were first collected. It can be assumed that seed longevity is similar in its native range, but conditions that allow for germination are likely to differ considerably.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Juncus articulatus is not recommended as a Species of Conservation Concern. There is insufficient information to determine if there is a substantial concern about the species' capability to persist in the plan area over the long term.

- **Significant threats**: Climate change may impact the water table in wetland habitat during the summer. However, several of the *Juncus articulatus* occurrences are in disturbed habitats, indicating that this species' habitat amplitude is broad and thus it will likely be able to adapt to anticipated changes.
- **Declining populations or habitat trends**: Population trends are unknown. One occurrence has census data but has not been revisited. Because this species is able to grow in a wide variety of wetlands, including both disturbed and pristine habitats, the availability for suitable habitat for this species on the Tongass NF is likely stable.
- **Restricted range**: *Juncus articulatus* is widespread outside of Alaska. Within the TNF, It occurs from Prince of Wales, Revillagigedo and Kupreanof Islands, as well as the mainland. It also occurs adjacent to the TNF in Stewart British Columbia. There are very, sparse scattered records further inland and north of the Tongass NF, but occurrences on the Tongass NF may represent a northern range edge for the main range of the species.
- **Low populations or restricted ecological conditions:** With nine scattered occurrences across the region, population numbers are likely not low enough for the species to be vulnerable to extirpation to stochastic events. Ecological conditions do not appear to be highly restricted.
- **Other factors**: The seed bank is long-lived and the species has been found to be easily dispersed in other areas of its range.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.

☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO3)[8/09/1993]**	**Alexander Archipelago, Prince of Wales Island, Trollers Cove, between Island Point and cove, NE side of small rrow lake**	**on Sphagnum mat at lake margin**	**NA**	**NA**
2*	**ACCS_Mar25 (EO2)[7/14/1993]**	**Ella Lake, lower lake meadow on NE shore**	**On mudflat of creek delta next to wet meadow**		
2	CPNWH_April2025(ALA)[7/14/1993]	Ella Lake, lower lake meadow on NE shore, Ketchikan Quad.	On mudflat of creek delta next to wet meadow.		
3*	**ACCS_Mar25 (EO7)[7/23/2022]**	**Southeast Alaska, Tongass National Forest: Cleveland Peninsula, Helm Bay. South side of bay, on side ridge east of Bugge Lake. Plot 22020.**	**Mid-slope elevation wet moss bog with sphagnum moss and dwarf shore pine. Specimen was found in approximately 4 inches of water on the edges of a small patch of open water. South-east aspect.**		
3	CPNWH_Mar25 (UAAH16726)[7/22/2022]	Southeast Alaska, Tongass tiol Forest: Cleveland Peninsula, Helm Bay. South side of bay, on side ridge east of Bugge Lake. Plot 22020.	Mid-slope elevation wet moss bog with sphagnum moss and dwarf shore pine. Specimen was found in approximately 4 inches of water on the edges of a small patch of open water. South-east aspect.		
4*	**TESP_Mar25 (100521P000120Y16)[7/13/2016]**	**S. Kupreanof Volcanics**	**Full sun**	**75**	
5*	**ACCS_Mar25 (EO5)[7/30/2011]**	**Kupreanof Island, West Tonka Road.**	**Plants growing in ditch along an old revegetating gravel pit.**		
6*	**ACCS_Mar25 (EO6)[7/27/2012]**	**Kupreanof Island, southeast of Kale.**	**In revegetating gravel pit.**		
	Occurrences in SE but not on TNF				
7	ACCS_Mar25 (EO4)[7/28/2011]	Mitkof Island, Sandy beach, near airport.	Wet ditch along road		
8	ACCS_Mar25 (EO11)[9/17/2023]	Medium gradient wet ditch next to back loop road.	Mixed Herbs.		
9	ACCS_Mar25 (EO12)[9/15/2023]	Juneau, Disturbed powerline right of way next to Back Loop road, extensive sedge meadow.	Subarctic Lowland Sedge Wet Meadow.		

Juncus covillei var. obtusatus

Juncus covillei var. *obtusatus* [C.L. Hitchcock]

Coville's rush

Global Rank: **G4G5**
Alaska State Rank: **S1**



photo: USDA NRCS PLANTS Database

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Isolated or rare. One occurrence is known to the TNF, mapped as three locations less than 100 meters apart. This occurrence is located on the shore of Sitkoh Lake on Chichagof Island and was documented with herbarium specimens collected in 2006 and 2007. The habitat is described as "lake shore, sands and gravels" or "sandy beach" (CPNWH 2023).
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G4G5, Alaska State Rank S1 British Columbia Province Rank SNR; SNR in CA, ID, OR, WA. This species is common in western Washington & Oregon, southwestern British Columbia, and forested areas of western Idaho. The TNF occurrence is widely disjunct from its main distribution, and over 482 kilometers (300 miles) north of the next nearest herbarium record (near Prince Rupert, Canada) Occurs in wet areas along lakes, streams, and rivers in montane areas (FNA 2020).

Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). There is no information about the dispersal capability specific to this species, however other Juncus sp. are dispersed by wind, animals, and possibly also by water (Richards and Clapham 1941, Michalski 2007). Wind is listed as the primary disperser for Juncus arcticus (Hauser 2005).
4 Abundance on Tongass NF	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. There is one known occurrence of *Juncus covillei* var. *obtusatus* on the TNF. The number of plants at this location is unknown, but an herbarium record associated with the population says that it is "common" at that location (CPNWH 2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for the known occurrence of *Juncus covillei var. obtusatus* on the TNF are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Range-wide habitat is described as: wet areas along lakes, streams, and rivers (FNA 2020). The habitat at the occurrence on the Tongass NF is also lake edge. The habitat as described is common the Tongass NF and relatively stable. Because only one occurrence has been documented on the TNF, yet this habitat type is common here, it is possible that there are specific microhabitat requirements or other ecological constraints that may contribute to the rarity of this species.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. This species occurs in wet areas and may be sensitive to changes in water dynamics. Summers are projected to become drier, while fall and winter become wetter. Additionally, less precipitation will fall as snow that stores and releases water through the summer. Projected increased temperatures are also likely to increase evapotranspiration, which may affect available water for this species (Shanley et al. 2015, Halofsky et al 2025). While climate change may not reduce overall quantity of habitat, flooding and drought could result in population declines or local extirpations. Wetland and riparian habitats are also vulnerable to invasion by non-native species like reed canarygrass (*Phalaris arundinacea*) (Huette et al. 2003). Reed canarygrass was mapped 64 meters up the beach at the Sitkoh Lake occurrence in 2012, suggesting that invasive species may present a current threat to this occurrence.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. Little is known about the life history and demographics of *Juncus covillei* var. *obtusatus*. *Juncus covillei* var. *obtusatus* is a rhizomatous perennial (MNHP 2012).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒

Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Juncus covillei var. *obtusatus* is not recommended as a Species of Conservation Concern based upon the following rationale:

- **Significant threats**: The wetland invasive species reed canarygrass presents a threat to the single known occurrence of *Juncus covillei* var. *obtusatus* within the plan area. Increasing temperatures and evapotranspiration could lead to summer water deficits and drought stress for this species.
- **Declining populations or habitat trends**: There is no information on population trends for the single known occurrence within the plan area. Lake and stream side habitat is abundant. Habitat may be impacted by changes in precipitation and temperatures, but the tolerance of this plant to changes is unknown and a large amount of habitat will remain.
- **Restricted range**: The TNF population at the northern end of the range of *Juncus covillei* var. o*btusatus* and is disjunct from the nearest known record approximately 480 kilometers to the south.
- **Low populations or restricted ecological conditions**: There is one known occurrence near the Forest Service Cabin at Sitkoh Lake on Chichagof Island. Due to the cryptic nature of graminoids, these species often have a higher likelihood of being overlooked. It is also possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species. Because of these unknowns, targeted surveys would be required to determine the true distribution of this species on the Tongass.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	TESP_Mar25 (100531P000166)[8/07/2006]			NA	NA
1	ACCS_Mar25 (EO0)[8/07/2006]	Alexander Archipelago, Chichagof Island, Sitkoh Bay, Sitkoh Lake	lake shore sands		
1	ACCS_Mar25 (EO0)[8/07/2006]	Alexander Archipelago, Chichagof Island, Sitkoh Bay, Sitkoh Lake, East Forest Service cabin	sandy beach		
1	ACCS_Mar25 (EO0)[8/10/2007]	Alexander Archipelago, Chichagof Island, Sitkoh Bay, Sitkoh Lake, near East Forest Service cabin	lake shore, sands and gravels		
1	CPNWH_Mar25 (WTU414078)[8/10/2007]	Sitka Quad.: Chichagof Island, Alexander Archipelago, Sitkoh Lake, near East Cabin.	Lake shore, sands and gravels	common	
1	CPNWH_April2025(ALA)[8/07/2006]	Alexander Archipelago, Chichagof I., Sitkoh Bay, Sitkoh Lake, East Forest Service cabin, Sitka Quad, Tongass tiol Forest.	Sandy beach.		

Lactuca biennis

Lactuca biennis (Moench) Fernald

Tall Blue Lettuce

Global Rank: **G5**
Alaska State Rank: **S2S3**

Photo: Lauren McLaurin (CC-BY: iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps* *Lactuca biennis* is known from seven estimated occurrences on the Tongass NF (Appendices 1 and 2). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The seven occurrences are located on Admiralty Island (3 occurrences), Swan Island (1 occurrence), and the Chilkat Peninsula (3 occurrences) (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). All seven Tongass NF occurrences were observed in beach habitat, with four in beach meadow, one in upper beach, and one on an elevated beach berm (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Few native plant associates were recorded at the Tongass NF occurrences, but *Leymus mollis* was present at occurrences 4 and 6 (Arctos 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: S2S3 (NatureServe 2025) State Ranks: Canadian provinces and territories: S1 (Critically Imperiled): Labrador, Yukon; S3 (Vulnerable): Alberta, Saskatchewan; all others are S4 (Apparently Secure), S5 (Secure), or not present. United States: S1 (Critically Imperiled): Utah, Wyoming; S2 (Imperiled): Alaska; S2S3 (Vulnerable): North Carolina; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present (NatureServe 2025). *Lactuca biennis* has a broad distribution in North America (Strother 2006). It occurs in all the Canadian provinces and territories except for Northwest Territories and Nunavut (Strother 2006). In the United States, it occurs in Alaska and across the northern United States from Washington to Maine, extending south to northern California and New Mexico, and Tennessee and North Carolina (Strother 2006). Besides the Tongass NF occurrences, there are seven other occurrences of *Lactuca biennis* in southeast Alaska, with one on Strawberry Island, one on Tongass Island, and the rest on the Chilkat Peninsula (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). To the northwest, *Lactuca biennis* is scarce in Alaska, only being found on Kodiak Island (Arctos 2025, CPNWH 2025, SEINet 2025). To the east, *Lactuca biennis* is common in most areas of British Columbia (Klinkenberg 2020). Two of the occurrences outside the Forest boundary near Haines were not in beach habitat with the following habitats recorded: "disturbed, weedy road ditch in mesic soil on closed *Populus balsamifera-Alnus sinuata* floodplain terrace with *Trifolium hybridum*, *Castilleja* hybrid species, *Taraxacum officinale*, *Equisetum arvense*, and *Salix* sp." and "in meadow and on moderately disturbed areas adjacent to airstrip" (Appendix 1; ANHP ACCS 2025). At the floodplain occurrence, the observer noted that *Lactuca biennis* could be mistaken as a non-native weed and mistakenly sprayed with herbicide (ANHP ACCS 2025). Throughout its range in North America, *Lactuca biennis* is found in coniferous forest, woodlands, shrublands, swamps, waste areas, along streams and riverbanks, on cliffs, in moist ditches, and along roadsides ranging from near sea level to

Criteria	*Rank*	*Rationale*
		approximately 6000 feet (1830 m) (Strother 2006, Keil and Stebbins 2012, Klinkenberg 2020, CCH2 2025, CPNWH 2025, OregonFlora 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* *Lactuca biennis* reproduces sexually, producing small, light, 4-5 mm, one-seeded, indehiscent dried fruits (achenes or cypselae) with crowns of 4–6 mm long, fine bristles; the seeds are dispersed within the fruits (Strother 2006). While no literature was found on *Lactuca biennis* dispersal, it is likely wind-dispersed as in other *Lactuca* species (Boorman and Fuller 1984, Chadha and Florentine 2021). Although the distance that *Lactuca biennis* fruits can disperse from the parent plant is not yet known, 99.8% of the fruits of the similar sand dune-inhabiting species *Lactuca virosa* fall within a radius of 7 m (Boorman and Fuller 1984). It does not reproduce vegetatively. In southeast Alaska, *Lactuca biennis* has been documented along the coast in upper beach and beach meadow habitat, as well as in weedy roadside ditches within floodplain habitat (ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). It likely only disperses if seed germinates in suitable habitat.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* Five of the seven Tongass NF occurrences of *Lactuca biennis* have population counts, with the number of plants ranging from seven to 50 and four of the occurrences have 12 or fewer plants (Appendix 1; USFS 2025a). Based on the number of occurrences and the total number of individuals observed, this species is uncommon within the Tongass NF boundary.
5 Population trend on	D	*D = Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Lactuca biennis* on the TNF are unknown due to lack of repeat population counts of the occurrences (USFS 2025a). Although occurrence 5 was visited once in 2006 and then again in 2016, the

Criteria	*Rank*	*Rationale*
Tongass NF		population was not censused during the second visit (Appendix 1; USFS 2025a). Therefore, although the population persisted for 10 years, the population trend is unknown.
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity.* Alterations in sea level change due to isostatic rebound has already occurred and may lead to succession of upper beach meadows on the northern end of the forest (Halofsky et al 2025). Four of the Tongass NF occurrences (#s 1, 3, 5, and 7) are located within or very close to mapped weed infestations, with occurrences 3 and 5 discovered during a weed survey/treatment (USFS 2025a): the coordinates for occurrence 1 are 88 feet from mapped field mustard (*Brassica rapa*); occurrence 3 was found growing amongst perennial sow thistle (*Sonchus arvensis*); occurrence 5 is located 80 feet from yellow toadflax (*Linaria vulgaris*); and occurrence 7 is located within mapped black bindweed (*Polygonum convolvulus*). At one occurrence, the observer noted that *Lactuca biennis* could be mistaken as a non-native weed and mistakenly sprayed with herbicide (ANHP ACCS 2025).
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc.* Climate change and competition from non-native weeds may impact the habitat of *Lactuca biennis* in the future. The coastal habitat of southeastern Alaska is vulnerable to modification and loss due to future predictions of sea level change, as well as changes in temperature and precipitation. Along the northern coast of the Tongass NF, sea levels are projected to fall as much as 5.9 feet by 2108 as a result of rapid isostatic rebound. However, the southern coast may see sea levels rise as much as 0.7 feet in the same period (Halofsky et al 2025). Additionally, projections suggest an increase in average temperatures and precipitation over southeast Alaska (USDA FS 2023, Boggs et al. 2019). As a result, the coast may see more frequent and intense storm surges which could lead to a higher chance of modification as sand is moved further upland, or loss occurs by means of erosion (Carter 1991).

Criteria	*Rank*	*Rationale*
		These changes will likely alter current beach meadow habitat, and it is unknown whether plants can respond to these changes and disperse into newly created suitable habitat. Beach habitat in some locations may also be threatened by human development and recreational use, including off-road vehicles (Boggs et al. 2019, USDA FS 2014). Additionally, upper beach meadows are vulnerable to infestation by invasive species. Invasive plants can establish and spread in these meadows, and several species are readily dispersed by air or carried by tidewater to other beaches (Turner and Mallott 2024). The natural disturbance regime, sandy soil, and high light environment contribute to the invasibility of this habitat (Spellman and Swenson 2012).
8 Life history and demographics	D	**D = Insufficient information to draw inferences about the criterion** *Lactuca biennis* is an annual or biennial herb that grows from a taproot (Strother 2006). No published information on the reproductive success or demography of *Lactuca biennis* was found, either inside or outside of the planning unit. From July to October *Lactuca biennis* produces many-flowered inflorescences with bluish, whitish, or sometimes yellowish corollas (Strother 2006). Confirmed pollinators of this species include bees in the genus *Bombus* (Montana Natural Heritage Program 2025). Many *Lactuca* taxa are capable of self-pollination (Mejías 1994, Chadha and Florentine 2021) and *L. biennis* is likely also self-fertile. *Lactuca biennis* produces 4–5 mm long cypselae (fruits) that have a crown of 4–6 mm long pappus bristles (Strother 2006). Several occurrences in Southeast Alaska off the Tongass NF occur in disturbed areas. Additionally, Latuca biennis coocurs with invasive species on the Tongass NF. This suggests that the species may have some tolerance to disturbance.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☒	☐	☐
Restricted range	☐	☒	☐

Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Latuca biennis is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Invasive species are known near or at four of the seven occurrences on the forest. Beach meadows are also vulnerable to impacts from recreation and changing sea level.
- **Declining trends**: Population trends are not known. Beach meadow habitat is vulnerable to erosion from storms and succession as a result of isostatic rebound and falling sea level.
- **Restricted ranges**: Latuca biennis has a broad distribution in North America. Due to the island geography of Southeast Alaska, it is difficult to assess if the Tongass NF occurrences are disjunct. However, several occurrences are known around Skagway and Haines, approximately 30 miles north of the nearest Tongass NF occurrence.
- **Low population numbers**: There are only seven known occurrences of Latuca biennis on the Tongass NF, but ecological conditions are not obviously restricted. On the Tongass NF, Latuca biennis is known from Admiralty Island and the Chilkat Peninsula. Additionally, it is known from remote private land near Ketchikan. Its wide geographic distribution suggests it may be more widespread than documented. Alternatively, it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species. Some occurrences of Latuca biennis in Southeast Alaska are in disturbed areas or grow alongside invasive plants, suggesting the species may be tolerant to some disturbance.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ANHP ACCS_Mar25 (EO5)[8/10/2011]**	**[Kootznoowoo Wilderness] Swan Cove, Admiralty Island.**			
1	USFS-TESP_Mar25 (100534P000021); USFS 2025b [8/10/2011]	[Kootznoowoo Wilderness] Swan Cove, Admiralty Island.	On old elevated beach berm, next to stream at back edge of bay. Coordinates are 88 feet from mapped Brassica rapa.	7 plants, 2 tall individuals (~6'), 6 smaller, scattered among upper beach meadow herbs	
2*	**ANHP ACCS_Mar25 (EO6)[8/01/2005]**	**CHILKAT PEN., HOWARD BAY,NEAR SIHE4 SITE**	**IN UPPER EDGE OF BEACH MEADOW**		
2	USFS-TESP_Mar25 (100533P000064)[8/01/2005]	CHILKAT PEN., HOWARD BAY,NEAR SIHE4 SITE	IN UPPER EDGE OF BEACH MEADOW		
2	ANHP ACCS_Mar25 (EO6)[7/01/2001]	[Chilkat Peninsula]		need to send to UAF for determination.	
2	USFS-TESP_Mar25 (100533P000020)[7/01/2001]	[Chilkat Peninsula]			
2	USFS-TESP_Mar25 (100533P000978Y12)[7/24/2012]	N. end Howard Bay, Meadow and large berm		12 plants	
2	ANHP ACCS_Mar25 (EO14)[7/31/2001]	Lynn Canal, Chilkat Peninsula, Howard Bay, T41S, R63E, NW1/4 of section 23	beach meadows, narrow belt between new forest (tombolo) and intertidal		
3*	**ANHP ACCS_Mar25 (EO7)[6/21/2006]**	**N Admiralty Island, BARLOW COVE, UPPER BEACH BENCH**	**INCIDENTAL FIND DURING SOCHUS ARVENSIS2 PULL**	**50 stems**	
3	USFS-TESP_Mar25 (100533P000068)[6/21/2006]	N Admiralty Island, BARLOW COVE, UPPER BEACH BENCH	UPPER BEACH BENCH, INCIDENTAL FIND DURING SOAR2 PULL [Sonchus arvensis weed removal]	50 stems	

3	USFS-TESP_Mar25 (100535P000129Y17)[7/18/2017]		Plants are located in beach meadow mixed with field sowthistle infestation.	Incidental find.	
3	USFS-TESP_Mar25 (100535P000130Y17)[7/18/2017]		Plants located in beach meadow with infestation of field sowthistle.	Incidental find.	
4*	**ANHP ACCS_Mar25 (EO8)[8/12/2010]**				
4	USFS-TESP_Mar25 (100533P000923)[8/12/2010]	Cordwood Creek cove, northwest Admiralty Island	on raised beach bench above Leymus mollis zone, north of stream outlet	8 plants	
5*	**ANHP ACCS_Mar25 (EO10)[8/02/2006]**	**[Chilkat Peninsula] E SIDE CHILKAT PEN, N OF Endicott R. ON UPPER BEACH @OLD LOG RD**	**ON UPPER BEACH @OLD LOG RD**	**INCIDENTAL FIND WEED SURVEY, 8 stems**	
5	USFS-TESP_Mar25 (100533P000067)[no date]	[Chilkat Peninsula] Lynn Canal, Endicott R mouth, old road. E SIDE CHILKAT PEN, N OF Endicott R., ON UPPER BEACH @OLD LOG RD, INCIDENTAL FIND WEED SURVEY	Gravelly beach berm at the outlet of a little creek. ON UPPER BEACH @OLD LOG RD, INCIDENTAL FIND WEED SURVEY. At north end of a yellow toadflax infestation.	Few plants (8 stems)	
5	USFS-TESP_Mar25 (100533P000067)[7/28/2016]	[Chilkat Peninsula] Lynn Canal, Endicott R mouth, old road	Gravelly beach berm at the outlet of a little creek. At north end of a yellow toadflax infestation.	Revisit of population	
6*	**ANHP ACCS_Mar25 (EO11)[8/02/2004]**	**[Chilkat Peninsula] Lynn Canal, Sherman Pt. vicinity**	**rocky upper beach meadow, uncommon, growing with mixed herbs, Leymus mollis**		
6	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:139078)[8/02/2004]	[Chilkat Peninsula] Lynn Canal, Sherman Pt. vicinity, Juneau Quad, Tongass National Forest, Alexander Archipelago.	Rocky upper beach meadow, uncommon, growing with mixed herbs, Leymus mollis. [no other specimens made at this location on this date]		
7*	**USFS-TESP_Mar25 (100534P00067Y16)[7/11/2016]**	**[Kootznoowoo Wilderness] Swan Island**	**Individuals in small isolated patches in beach meadow vegetation. Located near black bindweed infestation.**	**Individuals in small isolated patches**	
		NOT ON TONGASS			
8*	**ANHP ACCS_Mar25 (EO1)[7/18/2005]**	**Tongass Island**	**MISTY WEED INVENTORY, TONGASS ISLAND [on Sealaska land]**	**5 IND. ON BEACH**	

8	USFS-TESP_Mar25 (100552P000231)[7/18/2005]	MISTY WEED INVENTORY, TONGASS ISLAND	MISTY WEED INVENTORY, TONGASS ISLAND [on Sealaska land]	5 IND. ON BEACH	
9*	**ANHP ACCS_Mar25 (EO9)[7/20/2016]**	**Strawberry Island, Glacier Bay National Park & Preserve**	**100 or so feet from high tide line; growing with cow parsnip, raspberry and dense grasses in dry soil surrounded by bog and close proximity to spruce/alder forest.**	**flowering and starting to set seed. 5 IND. ON BEACH**	
9	ANHP ACCS_Mar25 (EO9)[6/27/1905]	Strawberry Island, Glacier Bay National Park & Preserve			
10*	**ANHP ACCS_Mar25 (EO12)[8/13/1925]**	**On gravel beach, Davidson Glacier, Lynn Canal.**	**Sea beaches, on gravel in littoral zone; not common.**	**not common.**	
11*	**ANHP ACCS_Mar25 (EO13)[9/06/2011]**	**Haines, Chilkat State Park, boat ramp area**	**Upper tidal beach meadow, boulder beach/shingle outcrops. Mixed herbaceous meadow, upper beach, above high tide zone, 0 to 5 degree slope, S aspect**		
12*	**ANHP ACCS_Mar25 (EO15)[no date]**	**Haines, SE AK, at the head of Lynn Canal, on Portage Cove.**			
13*	**ANHP ACCS_Mar25 (EO16)[7/21/2000]**	**Haines airport, 6 km WNW of town. Growing in meadow between airstrip and ditch**	**herbaceous vegetation on moderately disturbed areas adjacent to airstrip**	**4 plants seen**	
13	ANHP ACCS_Mar25 (EO16)[7/21/2000]	Haines Airport.	In meadow between airstrip and ditch.	Only 4 plants seen.	
13	ANHP ACCS_Mar25 (EO16)[7/21/2000]	SE end of Haines airport, 6km WNW of the town of Haines, SE AK.	"Disturbed ancient river terrace, open herbaceous vegetation, moist ditches, and tall shrub thickets along airport margin." Generalized description from Parker 2001. Parker, C. 2001. Vascular plant inventory of selected sites in the Waring Mountains		
14*	**ANHP ACCS_Mar25 (EO17)[7/03/2015]**	**Haines: Approx Mi 14.5 Haines Hwy**	**Disturbed roadside ditch in mesic soil on closed Populus balsamifera-Alnus sinuata floodplain terrace. Weedy ditch. Can be easily mistaken as a non-native weed and sprayed with herbicide. Disturbance from roadside. With Trifolium hybridum, Castilleja hybrid species, Populus balsalmifera, Taraxacum officinale, Equisetum arvense, Salix sp.**	**less than 50 individuals, flowering**	

Lagotis glauca

Lagotis glauca [Gaertner, 1770]

Glaucous Weaselsnout

Global Rank: **G5**

Alaska State Rank: **SNR**



photo: (CC-BY-SA) Alpsdake

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Lagotis glauca* is known from one estimated occurrence on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The occurrence is located on Coronation Island (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, the habitat of this species is not well documented other than it occurs on "Needle Peak Summit" (Appendix 1). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025).
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F.* Global Rank G5, Alaska State Rank SNR *Lagotis glauca* is broadly distributed throughout northwestern north America in Alaska, Yukon, the Northwest Territories, and in Asia (FNA 2025). In North America, *Lagotis glauca* is present in northwest Canadian provinces and territories as well as in Alaska (FNA 2025).

Criteria	*Rank*	*Rationale*
		Lagotis glauca occurs in tundra meadows, tussock tundra, scree, and edges of tundra pools at elevations of 0 to 1,800 m (FNA 2025). It is typically found in moist soils (FNA 2025, Pratt and Pratt 1993). At lower latitudes it is likely an alpine species (Li et al. 2014). In southeastern Alaska this species is only known from the Tongass NF; its range continues scattered throughout the state. The nearest coastal Alaska occurrence is over 1100 km (700 mi) away on Raspberry Island. (CPNWH 2025). Additionally, there is an occurrence in the Yukon approximately 690 km (430) miles away (CPNWH 2025). Habitat at these occurrences is described as mountain top and alpine tundra, respectively (CPNWH 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Lagotis glauca* is a perennial herb with short rhizomes (FNA 2025). Dispersal mechanisms are not well described.
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Lagotis glauca* is known from one occurrence on the Tongass NF (Appendix 1). There are no population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Herbarium records for 1959 and 1988 document the plant from Needle Peak (the first record just says “Needle Peak” while the second says “Needle Peak Summit”). Neither record gives any indication of abundance. Tongass botanists visited Needle Peak in July 2025 in an attempt to relocate the species. Search time was limited, but the plant was looked for on the summit of Needle Peak and the meadow just below. *Lagotis glauca* was not located. This may indicate a negative population trend or may be due to the limited search time.
6	A	*A = Decline in habitat quality or quantity*

Criteria	*Rank*	*Rationale*
Habitat trend on Tongass NF		The one occurrence of *Lagotis glauca* on the Tongass NF is recorded from Needle Peak (Appendix 1), which is alpine habitat. Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice and has high vulnerability to stressors (Turner and Mallot 2025).
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors* Climate change may degrade habitat for *Lagotis glauca* as it leads to an upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al. In draft). As an alpine or tundra species, *Lagotis glauca* is likely intolerant of shaded conditions that would result from shrub encroachment. Persistent snowpack also protects low-stature alpine vegetation from severe winter temperatures and wind (Turner and Mallott 2025). Increased exposure to freezing events, as driven by earlier snomelt timing, has been shown to increase bud damage in alpine wildflowers (Inouye 2008). Alpine habitat may also be impacted by mining and communication sites, but these impacts are small in area.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Lagotis glauca* is a perennial herb with short rhizomes (FNA 2025). It produces flowers and fruits with seeds (FNA 2025). It flowers during the early summer and flowers are likely pollinated by insects as it has showy flowers and other species in the genus are insect pollinated (Dar et al. 2012). It diverged from its closest relative (*L. integrifolia*) in the early Pleistocene (Li et al. 2014). The lifespan of *Lagotis* species are not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐

Declining populations or habitat trends	☒	☐	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Lagotis glauca is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Potential threats to *Lagotis glauca* on the Tongass NF include climate change, communication sites, and mining. The one known occurrence is in a wilderness area, so communication sites and mining are not likely to be threats in that location but could be threats to any undiscovered populations that may exist. Specific threats to *Lagotis glauca* from climate change include shading and competition from encroachment of shrubs, and loss of persistent snowpack that protects low-stature alpine vegetation from severe winter temperatures and wind.
- **Declining trends**: A 2025 revisit was unable to relocate the population, but search time was short. Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice and has high vulnerability to stressors.
- **Restricted ranges**: The Tongass NF occurrence is at the southern edge of the species' range and is separated from the next nearest occurrence by over 400 miles.
- **Low population numbers or restricted ecological conditions**: With only one known occurrence in southeast Alaska, the species is vulnerable to extirpation by stochastic events. The habitat for the one occurrence is limestone-influenced alpine. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors**: It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025(ALA) [8/05/1959]**	**Alexander Archipelago, Coronation I., Needle Peak, Craig Quad, Tongass National Forest, Alexander Archipelago.**			
1	CPNWH_April2025(ALA) [7/05/1988]	Alexander Archipelago, Coronation I., Craig Quad, Tongass National Forest, Alexander Archipelago.	Needle Peak summit.		

Leioderma sorediatum

Leioderma sorediatum [D.J. Galloway & P.M. Jørg., 1987]

Treepelt Lichen

Global Rank: **G4**

Alaska State Rank: **S1**



photo: (CC0) Braden J. Judson

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Isolated.* *Leioderma sorediatum* is known from 1 location on the TNF (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). The only occurrence is located in the Misty Fjords Wilderness on DeLong Island at the mouth of Foggy Bay (Appendices 1 and 2; CLH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in coastal forests of *Picea sitchensis* on the southern-most islands (CLH 2025). Occurrence 1 was collected in a forest-beach ecotone from twigs of *Picea sitchensis* (CLH 2025). This habitat is typical for this species. There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CLH 2025). Across its range, *Leioderma sorediatum* is typically found in semi-open coastal thickets on the stems of ericaceous shrubs or epiphytic on bryophyte mats (USDA & BLM 2019). This species may be confused for *Erioderma sorediatum* which is also present nearby, but *Leioderma sorediatum* can be distinguished by its cob-webby hairs (not erect hairs) on upper surface (Jørgensen 2000). There are no known subspecies of *Leioderma sorediatum* in TNF.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	*B = Widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F.* Global Rank G4G5, Alaska State Rank S1, Oregon S1, Washington S1, British Columbia S2S3 *Leioderma sorediatum* is most commonly found in Australasia and is disjunct to the Pacific Northwest, Canada and Hawaii (NatureServe 2025). In North America, *Leioderma sorediatum* is present in British Columbia, Canada as well as U.S. states Alaska, Washington, Oregon, New Mexico (CLH 2025). It is considered rare in North America (NatureServe 2025). Across its range, *Leioderma sorediatum* occurs in conifer forests on islands or near the coast in hypermaritime habitats at elevations of 1 m to 2317 m (CLH 2025, Jørgensen 2000). It is typically found in semi-open or sheltered habitats within a few kilometers of the ocean (CLH 2025, McCune and Geiser 2023). The soils where this species are found are often sandy or sand-dunes (CLH 2025). In southeastern Alaska this species is only known from the Tongass NF; its range continues south in Canada southeast approximately 775 km to Jaques Island of the Pacific Rim National Park (CLH 2025). *Leioderma sorediatum* is known as a Pacific hypermaritime species, with its northern limit in the Tongass National Forest (CLH 2025, Jørgensen 2000).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* *Leioderma sorediatum* is a lichen species which grows as an epiphyte or on mossy soil (CLH 2025, USDA & BLM 2019). Its main dispersal mechanism is by soredia, and *Leioderma sorediatum* species do not produce sexual spores in North American occurrences (Jørgensen 2000). Dispersal distances for clonal propagules like soredia are limited, often falling between 15 to 30 meters from the lichen, and depend on wind direction, wind speed, forest density, and moisture levels (Armstrong 1994, Pasiche-Lisboa et al. 2019, Ronnås et al. 2017). Generally, asexual propagules are distributed with more abundance during periods of increased wind velocity and decreased humidity (Pasiche-Lisboa et al. 2019). Soredia of *Leioderma sorediatum* are likely distributed by wind, gravity, animals, or birds (USDA & BLM 2019).
4 Abundance on Tongass	D	*D = Insufficient information to draw inferences about criterion.* None of the occurrences of *Leioderma sorediatum* have population estimates or any indication of abundance (Appendix 1; CLH 2025, USFS 2025).

Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Leioderma sorediatum* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality* The habitat for the sole occurrence of *Leioderma sorediatum* on the TNF is coastal forest-beach ecotone on twigs of *Picea sitchensis* and *Alnus sinuata* (CLH 2025). In adjacent locations including Vancouver Island, Canada, it also occurs in open sand dunes topped with *Picea sitchensis* and other vegetation (Appendix 1; CLH 2025). These habitats can be grouped under semi-open thickets near the coast and coastal forests that are somewhat common on the Tongass NF (Turner and Mallott 2024). Given that this species thrives in disturbed areas, its coastal forest habitat is likely stable.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for species such as *Leioderma sorediatum* (Turner and Mallott 2025, Wiles and Warren 2025). It is unknown how *Leioderma sorediatum* will respond to warming temperatures and projected summer drought stress projected for the region (Halofsky et al. DRAFT). However, many lichens have peak growth during wet seasons with little to no growth when it is dry (Ellis 2012), so changes in precipitation may affect growth patterns.

Criteria	*Rank*	*Rationale*
		Additionally, large atmospheric river storm events (Halofsky et al DRAFT) may contribute to erosion at the beach forest fringe or windthrow events that could result in loss of trees that are habitat for *Leioderma sorediatum*. The impacts of these storms may be exacerbated by increased pest and disease pressure on trees (Halofsky et al. DRAFT).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion* *Leioderma sorediatum* is a foliose cyanolichen that grows as an epiphyte or on soil (Jørgensen 2000). *Leioderma sorediatum* is not known to sexually reproduce with apothecia, while asexual reproduction is through soredia (Jørgensen 2000). *Leioderma sorediatum* is abundant in disturbed areas, such as roadside and at the edge of young growth forests (Galloway and Jorgensen 1987). The life span of *Leioderma* lichens has not been measured (Jørgensen 2000, McCune and Geiser 2023). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973). No information about reproductive success and survival or mortality of *Leioderma sorediatum* from the TNF is available.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	**x**☐
Declining populations or habitat trends	☐	☐	**x**☐
Restricted range	**x**☐	☐	☐
Low populations or restricted ecological conditions	**x**☐	☐	☐

Other factors (see conclusion rationale)	**x**☐	☐	☐

Conclusion Rationale

Leioderma sorediatum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: The main threat to epiphytic lichens inhabiting coastal forests is climate change. Climate change may increase storm and windthrow events, which could directly impact substrate for this species. However, surveys showing an abundance of *Leioderma sorediatum* in disturbed areas indicate that the species is resilient to disturbance events. Additionally, it is unknown how *Leioderma sorediatum* will respond to summer drought events that are predicted to increase.
- **Declining trends:** Harvest of coastal forests occurred at high levels historically, but the 2016 Tongass Forest Plan introduced protections from logging for old growth forest within 1000 feet of the beach. Coastal forest habitat has likely stabilized and is known to be common across the plan area. Population trends for this species are not known.
- **Restricted ranges**: *Leioderma sorediatum* is not endemic to the area, though the primary distribution of this species occurs in Australasia, where it is known to be common. This species is considered uncommon within the range of the disjunct Pacific Northwest populations. There are approximately 20 occurrences in North America, with the farthest north verified record of *Leioderma sorediatum* occurring on the southern Tongass NF.
- **Low population numbers or restricted ecological conditions:** There is only a single known occurrence on the Tongass NF, though the species is observed in abundance within disturbed habitat (forest edge, roadside, harvest edges) in other areas. The single known occurrence in the plan area is vulnerable to extirpation by stochastic events, but abundance in disturbed sites point to a resilience to disturbance events. The possibility of misidentification for the collocated *Erioderma sorediatum* may also indicate a potential for the species to be overlooked. The available information does not indicate any known restricted ecological conditions necessary for the growth and persistence of this species.
- **Other factors:** *Leioderma sorediatum* does not produce sexual spores in North America and only reproduces clonally, which may limit dispersal to very short distances (15 to 30m).

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X☐	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (ALA) [07/19/2001]**	**Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest**	Beach fringe forest edge of small marine island on Picea sitchensis twig		
1	CLH 2025 (ALA) [07/19/2001]	Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest	Twigs of *Picea sitchensis*.		
1	CLH 2025 (BG) [07/01/2003]	Tongass National Forest, Misty Fiords National Monument, De LongIslands forest-beach ecotone	On *Picea sitchensis* twigs.		

Lepidozia sandvicensis

Lepidozia sandvicensis [Lindenb., 1845]

A Fingerwort

Global Rank: **G3G5**

Alaska State Rank: **SNR**



photo: (CC0) Randal (user rambryum on iNaturalist)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated.* *Lepidozia sandvicensis* is known from five estimated occurrences on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located: on northern San Juan Bautista Island, southwest of Craig (1 EO), on western Baranof Island, just north of Sitka (1 EO), Eastern Baker Island, southwest of Craig (1 EO), on the west side of Dall Island (1 EO), and on western Prince of Wales Island near Klawock (1 EO) (Appendix 1; CBH 2025, USFS 2025a). Within the Tongass NF boundary, this species is reported from damp soil or occasionally rocks in forest or muskeg, however there are no collections from more recently than 1968 (CBH 2025). Occurrence 1, 2 and 5 were collected in muskegs or sphagnum fens in the late 1960s from the ground (CBH 2025). Occurrence 3 and 4 were collected in 1913 from the ground in damp forest (CBH 2025). This habitat is typical for this species. Occurrence 2 is reported from a small, shaded pool, but it is unclear if it was at the edge of the water or submerged, which would be atypical for the species (Appendix 1, CBH 2025) There is one occurrence of this species in southeastern Alaska outside of the Tongass NF in Glacier Bay National Park (CBH 2025).

Criteria	*Rank*	*Rationale*
		Across its range, *Lepidozia sandvicensis* is typically found in moist forest and wetlands (CBH 2025). In Southeast Alaska, the species tends to co-occur with *Sphagnum* (CBH 2025). Bryophytes are not typically recorded in botanical surveys on the Tongass NF, so targeted surveys would be required to determine the true distribution of this species.
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside of the Tongass National Forest.* Global Rank G3G5, Alaska State Rank SNR, British Columbia Province Rank: S3 *Lepidozia sandvicensis* is known only from coastal southeast Alaska and British Columbia and the Hawaiian Islands (CBH 2025, Stotler and Crandall-Stotler 2017). Across its range, *Lepidozia sandvicensis* occurs on damp rocks and soil in forest and bogs and similar wetlands at elevations from sea level m to 1900 m (CBH 2025). In Alaska this species is known from the Tongass NF, Glacier Bay National Park (1 record), and Augustine Island (1 record, lower Cook Inlet).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Lepidozia sandvicensis* is a leafy liverwort with a terrestrial growth habit (CBH 2025). Most liverworts produce spores for dispersal, but descriptions of *Lepidozia sandvicensis* are scarce in the literature and an early description of the species reported reproduction was not seen in Hawaii or Alaska (Evans 1914).
4 Abundance on Tongass NF	B	*B = Uncommon – current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Lepidozia sandvicensis* is known from five occurrences on the Tongass NF (Appendices 1 and 2). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CBH 2025, USFS 2025).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Lepidozia sandvicensis* on the TNF are unknown (USFS 2025a, CBH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for the 5 occurrences of *Lepidozia sandvicensis* on the TNF is on moist rock or soil in muskeg or forest (CBH 2025). In adjacent locations including Glacier Bay National Park and various sites in British Columbia, it occurs in similar habitats (Appendix 1; CBH 2025). These habitats can be grouped under poorly drained forests or wetlands which are very common on the Tongass NF (Turner and Mallott 2025). There has been limited ecological studies of this species, so it is unknown what more specific microclimatic or edaphic conditions make good habitat for *Lepidozia sandvicensis*. Invasive species that can survive in or near poorly drained forests and wetlands such as *Phalaris arundinacea* and *Phleum pretense*, are known to occur within 200 m of the coordinates for occurrence 2 (USFS 2025b). The effect of these invasive species on habitat quality is unknown, but if these species expand into the area where this species occurs, they could impact the habitat through competition for light or substrate. Timber harvest has occurred on Tongass NF land in the recent past about 3000 m to the northeast, and potentially closer on private land from occurrence 2 and is widespread in the vicinity of occurrence 3 on Prince of Wales Island (USFS 2025c). This might indicate a negative trend in habitat quality at those sites.
7 Habitat vulnerability or modification;	D	*D = Insufficient information to draw inferences about criterion*. Invasive species, timber activities, and climate change may impact the habitat of *Lepidozia sandvicensis*. The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025). Therefore, the non-forested wetland habitat of *Lepidozia sandvicensis* may be impacted by invasive species in the future.

Criteria	*Rank*	*Rationale*
other threats		Recent timber harvest activities have occurred in the vicinity of at occurrences 2 and 3 (USFS 2025c), and this activity will likely continue on Baranof and Prince of Wales Islands in the future. Timber harvest can directly impact forested and non-forested wetlands through road building or tree removal and indirectly by altering hydrology and light regimes. In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for *Lepidozia sandvicensis* (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion*. *Lepidozia sandvicensis* has such tiny leaves that it seems leafless (Schofield 2002). *Lepidozia sandvicensis* may produce sporocarps within its TNF range, but they have not been reported (Evans 1914). Specialized asexual reproduction is absent for this species (Evans 1914). The life span of *Lepidozia* plants has not been reported.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☐x
Declining populations or habitat trends	☐	☐	☐x
Restricted range	☐x	☐	☐
Low populations or restricted ecological conditions	☐	☐	☐x

Other factors (see conclusion rationale)	☐	☐	☐

Conclusion Rationale

Lepidozia sandvicensis is not recommended as a Species of Conservation Concern based on the following rationale:

- **Significant threats**: Timber harvest may directly affect habitat by tree removal or road building and indirectly by altering hydrology or light regimes. Invasive species, like reed canarygrass, may also impact wetland habitat or occurrences.
- **Declining trends**: Forested and non-forested wetland is common and has high ecosystem integrity. Due to increased temperatures and evapotranspiration, there may be summer drought periods in the future, which could alter habitat for *Lepidozia sandvicensis*.
- **Restricted ranges**: This species is only known from Alaska, British Columbia and Hawaii. There are two records known north of the Tongass NF and the remaining occurrences are to the south.
- **Low population numbers**: There are five known occurrences of *Lepidozia sandvicensis* on the Tongass NF, on Prince of Wales and outlying islands and on Baranof Island. However, bryophytes are not often recorded in Tongass NF botanical surveys so targeted surveys may be required to determine true distribution and abundance of this species.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☐x	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CBH 2025 (COLO) [05/25/1968]**	**San Juan Bautistia I., S.W. of Craig**	**open muskeg, on broad ridge.**		
1	CPNWH_Mar25 (UBC) [5/25/1968]	San juan bautistia isl. sw of craig.	Open muskeg, on broad ridge.		
1	CBH 2025 (UBC) [05/25/1968]	san juan bautistia isl. sw of craig	open muskeg, on broad ridge.		
2*	**CPNWH_Mar25 (UBC) [7/20/1967]**	**Along harbor mtn. rd., near sitka.**	**Sphagnum fen of about 10 degrees with occ. small mtn. hemlocks & cedars. in shaded, deep (3') pool (3'x 3')**		
3*	**CBH 2025 (YPM) [07/11/1913]**	**Baker Island, Port San Antonio**	**In very damp woods; On soil. ""Substrate=terricolous""**		
3	CPNWH_Mar25 (WTU) [7/11/1913]	Southeastern part, Baker Island, east shore.	Habitat: In very damp woods.		
3	CBH 2025 (WTU) [07/11/1913]	Southeastern part, Baker Island, east shore.	Habitat: In very damp woods. Substrate: On soil. Substrate: terricolous.		
3	CBH 2025 (YPM) [07/01/1913]	Baker Island, St. Augustine Bay	On and over rocks.		
4*	**CBH 2025 (WTU) [07/05/1913]**	**Dall Island, West shore, Augustine Bay.**	**Habitat: In very damp woods. Substrate: On soil. Substrate: terricolous.**		
4	CBH 2025 (WTU) [07/05/1913]	Southeastern park, Dall Island, west shore, Augustine Bay.	Habitat: In very damp woods. Substrate: On soil. Substrate: terricolous.		
4	CBH 2025 (FLAS) [07/05/1913]	Augustine Bay [Dall Island, Tongass National Forest].	Substrate: on very damp soil.		
4	CBH 2025 (YPM) [07/15/1913]	southeast Alaska, Port Augustine Bay	Over trash + rocks.		
4	CBH 2025 (YPM) [07/05/1913]	Dall Island, Augustine Bay	In dense brush; On very wet soil.		
4	CBH 2025 (YPM) [07/05/1913]	Augustine Bay	In very damp woods; On soil.		
4	CBH 2025 (F) [07/05/1913]	Augustine Bay	On very damp soil. Substrate: On very damp soil.		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
4	CBH 2025 (DUKE) [07/05/1913]	Augustine Bay	On very damp soil.		
4	CBH 2025 (LD) [07/05/1913]	Augustine Bay			
5*	**CBH 2025 (UBC) [05/19/1968]**	**n. of lower end of klawak lake, prince of wales isl., alaska. gen. vic. of half mile creek**	**muskeg - partially shaded by cedar.**		

Ligusticum calderi

Ligusticum calderi [Mathias & Constance]

Calder's lovage

Global Rank: **G3G4**
Alaska State Rank: **S2**



photo: Adam Huggins

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy or gaps. There are 11 occurrences of Ligusticum calderi on the Tongass NF on southern Prince of Wales Island (7), Dall Island (1), Heceta Island (1) and Sumez Island (2) (USDA FS 2025, ACCS 2025). The occurrences on the Tongass National Forest (USDA FS 2023) are largely located in subalpine meadow habitat. A few records occur closer to sea level in scrubby muskeg and "windswept rock" habitat. Several occurrences are in limestone substrate but a large cluster of records around Bokan Mountain are not. Substrate is described as muskeg, rounded rock, and shallow soils on notch in limestone cliff (USDA FS 2025). There are two additional records on Dall Island on non-NFS lands.
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G3G4, Alaska State Rank S2 British Columbia Province Rank S5?, Yellow List In the United States, this species is only known from southern Southeast Alaska (NatureServe 2023). In Canada, it is known from 53 documented occurrences on the Queen Charlotte Islands and coastal British Columbia south to northern Vancouver Island (BCCDC 2023, Calder and Taylor 1968). Range wide, habitat for this species ranges broadly, and includes subalpine meadows, muskeg edges, rocky cliffs, open boggy or rocky slopes, and edge of coniferous forests (NatureServe 2023).

Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). Subalpine meadow habitats and limestone karst outcrops, believed to be glacial refugia, are naturally distributed as isolated patches, with limited opportunity for dispersal among patches (Goldstein et al. 2009). Little is known about the dispersal capability of this species. Seeds of the congeneric species *Ligusticum porteri* are not dispersed by animals or wind and are likely to remain close to the parent plant when they are released (Wilson 2007). This suggests limited potential for dispersal of seeds among isolated habitats for *Ligusticum calderi*.
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Uncommon on the Tongass National Forest. The current number of occurrences is large enough that demographic stochasticity is not likely to lead to rapid extinction, but in combination with highly variable environmental factors could pose a threat. Plant count information is not available, but inventoried occurrences total 0.13 hectares (0.33 acres) as mapped (USDA FS 2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. None of the known populations have been revisited since they were initially mapped (USDA FS 2025).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. *Ligusticum calderi* primarily occurs at the edges of subalpine meadows on the Tongass National Forest . Generally, subalpine forest has high ecosystem integrity with low vulnerability to stressors (Turner and Mallot 2025). However, the meadow habitat and more open forest where Ligusticum calderi occurs may be highly vulnerable to climate change and woody encroachment. Lower elevation scrubby muskeg where this species is found on the Tongass NF may also be vulnerable to changes in water balance and woody encroachment.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Given the known concentration of plants in the area north of the Bokan mine, minerals exploration and activities could present a future threat to *Ligusticum calderi* and its suitable habitat. Habitat may be vulnerable to other management, recreation and subsistence activities, however most subalpine habitats are difficult to access. Projected increased temperatures are likely to increase evapotranspiration, which may affect available water within habitat for this species (Halofsky et al draft). Changes to water dynamics can alter plant community composition and competitive dynamics, and may result in encroachment of meadows by trees or shrubs. Increased temperatures can also disrupt plant-animal interactions (pollinators, seed dispersers) when species respond differently to warming conditions (Parmesan 2006, Fricke et al. 2022). Tree encroachment and densification within habitat for *Ligusticum calderi* may change the immediate growing environment for this species, which is currently known to occur at the edges of subalpine muskegs. As little is known about the dispersal ability of this species , it is unknown whether or how rapidly this species could adapt to changes in habitat distribution. If seeds drop close to the parent plant as they do in another *Ligusticum* species (Wilson 2007), the ability to disperse into new habitat may be limited.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. Since this plant is rare throughout its known range, little is known about its life history and demographics .

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Ligusticum calderi* within the plan area based upon the following:

- **Significant threats** – The main threat to this species is climate change driven alteration of water availability and woody encroachment of meadow habitat. Mineral exploration and recreation could also impact habitat or individuals.
- **Declining populations or habitat trends** – Population trends are not known. Subalpine habitat distribution is likely shifting up in elevation and it is unknown if Ligusticum calderi will be able to disperse to new habitat.
- **Restricted range** – In the United States, this species is only known from Southeast Alaska. In Canada, it is known from Queen Charlotte Islands and coastal British Columbia south to northern Vancouver Island. Occurrences on the Tongass National Forest are at the northern extent of the species' range.
- **Low populations or restricted ecological conditions** – *Ligusticum calderi* is uncommon on the Tongass National Forest, with 11 occurrences on Prince of Wales and outer islands. Although potential habitat for this species includes a broad range of conditions, from muskegs near sea level to alpine limestone, most Tongass National Forest occurrences are known to subalpine meadows that may be geographically isolated from each other.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**ACCS_Mar25 (EO0)[8/12/1993]**	**Prince of Wales Island, Gardner Bay, 1 mile W of head of bay**	**windswept plant communities on rounded pavement of exposed rock, runnels of vegetation**	**NA**	**NA**
1	CPNWH_April2025(ALA)[8/12/1993]	Prince of Wales Island, Gardner Bay, 1 mile W of head of bay, Dixon Entrance Quad, Tongass tiol Forest.	Windswept plant communities on rounded pavement of exposed rock, runnels of vegetation.		
2	**ACCS_Mar25 (EO0)[8/12/1993]**	**Prince of Wales Island, Gardner Bay, 1 mile west of head of bay.**	**Windswept plant communities on rounded pavement of rock, runnels of vegetation.**		
2	CPNWH_Mar25 (WTU332820)[8/12/1993]	Prince of Wales Island, Gardner Bay, 1 mile west of head of bay.	Windswept plant communities on rounded pavement of rock, runnels of vegetation.		
2	ACCS_Mar25 (EO0)[8/12/1993]				
2	ACCS_Mar25 (EO3)[no date]	Southeast Prince of Wales Island, Dixon Entrance, Gardner Bay, 1 mile west of the head of the bay.			
3	**ACCS_Mar25 (EO0)[6/15/2010]**	**West Arm Kendrick Bay, Prince of Wales, Southeast of Bokan Mountain**			
3	TESP_Mar25 (100551P000337)[6/15/2010]				
4	**ACCS_Mar25 (EO0)[1/01/1900]**	**Prince of Wales, West of Bokan Mountain**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02EMA01 POPULATION SEEMED TO BE DIM**		
4	TESP_Mar25 (100551P000902)[1/01/1900]				
5	**ACCS_Mar25 (EO0)[7/08/1998]**	**Alexander Archipelago, Prince of Wales I., bowl on W side of Bokan Mtn., near lower lake**	**in flat area**		
5	TESP_Mar25 (100551P000071)[8/17/1996]				

5	ACCS_Mar25 (EO0)[8/17/1996]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Bokan Mtn, W side of lake, 2 pops		
5	ACCS_Mar25 (EO0)[8/14/1996]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Bokan Mtn, W side of lake, two pops		
5	TESP_Mar25 (100551P000070)[8/14/1996]				
5	TESP_Mar25 (100551P000903)[1/01/1900]				
5	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02EMA05 SIGHTING OUTSIDE OF PROPOSE		
5	ACCS_Mar25 (EO0)[6/16/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= MoiraTS, U692-16, 2loc, multiple pops?		
5	TESP_Mar25 (100551P000067)[6/16/1998]				
5	ACCS_Mar25 (EO0)[6/16/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= MoiraTS,U692-16,2 loc, multiplepops?		
5	TESP_Mar25 (100551P000065)[6/16/1998]				
5	ACCS_Mar25 (EO0)[6/16/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= MoiraTS,U692-16, 2loc, multiple pops?		
5	TESP_Mar25 (100551P000059)[6/16/1998]				

5	CPNWH_April2025(ALA)[7/08/1998]	Alexander Archipelago, Prince of Wales I., bowl on W side of Bokan Mtn., near lower lake, Dixon Entrance Quad, Tongass tiol Forest.	In flat area.		
6	**TESP_Mar25 (100551P000096)[7/09/2002]**	**Prince of Wales, Northeast of Bokan Mountain**			
6	ACCS_Mar25 (EO0)[7/09/2002]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= POW, Moira, U20 Rd2170		
7	**ACCS_Mar25 (EO0)[7/08/1998]**	**Dixon Entrance Quad.: Alexander Archipelago, Prince of Wales I., Bokan Mt, W side.**	**Small muskeg, scattered near the edges of the muskeg, Ligusticum calderi.**		
7	CPNWH_Mar25 (UAAH10592)[7/08/1998]	Dixon Entrance Quad.: Alexander Archipelago, Prince of Wales I., Bokan Mt, W side	small muskeg, scattered near the edges of the muskeg, Ligusticum calderi.		
7	ACCS_Mar25 (EO0)[7/08/1998]	Prince of Wales I., Bokan Mt, W side.	Small muskeg, scattered near the edges of the muskeg.		
7	ACCS_Mar25 (EO0)[6/16/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= MoiraTS, U692-16, 2loc, multiplepops?		
7	TESP_Mar25 (100551P000063)[6/16/1998]				
7	TESP_Mar25 (100551P000061)[6/16/1998]				
7	ACCS_Mar25 (EO0)[6/16/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= MoiraTS, U692-16, 2 loc, multiplepops?		
7	TESP_Mar25 (100551P000058)[6/10/1998]				
7	ACCS_Mar25 (EO0)[6/10/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= MoiraTS, U692-014, avoid muskegs		
7	TESP_Mar25 (100551P000901)[1/01/1900]				

7	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02GMH01 MANY FLYING INSECTS NOTED ON		
7	TESP_Mar25 (100551P000904)[1/01/1900]				
7	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02GMH02 POPULATION IS 10 FT OFF ROA		
7	ACCS_Mar25 (EO0)[6/09/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Moira TS, U692-13, So arm LTF		
7	TESP_Mar25 (100551P000056)[6/09/1998]				
7	CPNWH_April2025(ALA)[7/08/1998]	Prince of Wales I., Bokan Mt, W side, Dixon Entrance Quad, Alexander Archipelago.	Small muskeg, scattered near the edges of the muskeg. Ligusticum calderi		
7	CPNWH_April2025(ALA)[7/08/1998]	Prince of Wales I., Bokan Mt, W side, Dixon Entrance Quad, Alexander Archipelago.	Small muskeg, scattered near the edges of the muskeg. Ligusticum calderi		
8	**ACCS_Mar25 (EO0)[6/15/2004]**	**Dall Island**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=**		
8	ACCS_Mar25 (EO0)[7/14/2011]	Rust Lake, adjacent to Rust Creek, Dixon Entrance Quad, Alexander Archipelago, Dall Island	herbaceous meadow		
8	CPNWH_April2025(ALA)[7/14/2011]	Rust Lake, adjacent to Rust Creek, Dixon Entrance Quad, Alexander Archipelago, Dall Island.	Herbaceous meadow, infrequent.		
9	**TESP_Mar25 (100551P000905)[1/01/1900]**	**Sumez Island**			
9	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

			LICA02EMA06 GENERALLY ON SLOPES ABOVE M		
9	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02EMA07		
9	TESP_Mar25 (100551P000906)[1/01/1900]				
9	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02EMA08		
9	TESP_Mar25 (100551P000907)[1/01/1900]				
9	TESP_Mar25 (100551P000908)[1/01/1900]				
9	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02EMA09 A LONG, CONTINUOUS PATCH OCC		
10	**ACCS_Mar25 (EO0)[1/01/1900]**	**Sumez Island**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02EMA11**		
10	TESP_Mar25 (100551P000910)[1/01/1900]				
10	ACCS_Mar25 (EO0)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= LICA02EMA10		
10	TESP_Mar25 (100551P000909)[1/01/1900]				
11	**ACCS_Mar25 (EO0)[7/18/2010]**	**Heceta Island**	**Vegetation= ; Slope = 90; Aspect= 137 ; Substrate= Rock; Parent Material= ; Soil Moisture= Dry; Soil Texture= ; Light Exposure= Partial Shade; Comments=**		

11	TESP_2025 (100554PT00062) [7/18/2010]	Heceta Island, Site 35: NE of Bald Mtn.	Concentrated in vertical notch, on shallow soils between limestone (with limestone cobble intermixed in the soil).	10; Clumped in vertical notch of limestone cliff, within approximatel y 20 sq. ft.	
	Occurrences not on TNF				
12	**ACCS_Mar25 (EO0)[8/17/1990]**	**Dall I., Grace Mtn. vic.**	**Just inside mixed conifer subalpine**		
13	**ACCS_Mar25 (EO1)[no date]**	**Grace Mountain, east-central Dall Island, about 244 m. SSW of peak 2443.**			

Lobaria retigera

Lobaria retigera [(Bory) Trevis., 1869]

Smoker's Lung Lichen

Global Rank: **GNR**

Alaska State Rank: **S2S3**



photo: (CC BY) Aiva Noringseth

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps* *Lobaria retigera* is known from 12 occurrences on the Tongass National Forest (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). These occurrences are located: on mainland at the Andrews Slough and Knig Slough of the Stikine River, on mainland south of Mendenhall Lake, on Suikoi Island near Petersburg, on mainland in the Hyder area, at the Blue River confluence with the Unuk River, and on the Misty Fjords (Appendices 1 and 2; CLH 2025, CPNWH 2025, USFS 2025a). Records indicate it occurs in inactive glacial terrain consisting of rounded mountains, angular mountains, and hills with general parent material (GBIF 2025, Turner and Mallott 2024). Within the Tongass NF boundary, this species occurs in riparian and coastal forest ecosystem type including within the Stikine-LeConte Wilderness and the Misty Fjords National Monument Wilderness. there are three additional occurrences of this species in Southeast Alaska on Kupreanof Island, in Glacier Bay National Park and outside Skagway in Gold Rush National Historic Park. Across its range, *Lobaria retigera* is typically found in old growth forests of *Abies*

Criteria	*Rank*	*Rationale*
		spp., *Picea* sp., *Thuja plicata,* and *Tsuga heterophylla* near rivers and other water bodies, and in boreal and subalpine forest described as very humid (CPNWH 2025, iNaturalist 2025). In Southeast Alaska, the species grows on *Picea sitchensis,* Alnus sp., Populus triocarpa, Salix sp., and rock (CPNWH 2025). This species may be confused for *Lobaria pulmonaria* which is similar in form but is bright green when wet and has soredia or isidia (McCune and Geiser 2023). There are not subspecies of *Lobaria retigera* in TNF.
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank GNR, Alaska State Rank S2 Northwest Territories SNR, and British Columbia S3. *Lobaria retigera* is broadly distributed throughout the globe and can be found on nearly every continent (GBIF 2025), ranging from southeastern Africa, across the Himalayas, southeastern Asia, eastern coastal region of Australia, and Canadian Rockies and west Coast Range of North America (GBIF 2025). *Lobaria retigera* occurs in old growth forests at elevations of 15 to 800 m (CPNWH 2025). It occurs in humid forest environments growing on rocks or trees including *Picea sitchensis, Thuja plicata,* and *Tsuga heterophylla* (CPNWH 2025, NatureServe 2025). Populations in the Tongass are scattered, and occurrences are more numerous moving southward (GBIF 2025). The largest population in North America can be found in Kispiox and Skeena Valleys, B.C., Canada (COSEWIC 2018). The Tongass NF occurrences near Hyder are approximately 50 km from the nearest documented occurrence in the Kispiox Valley (CLH 2025). In Alaska its range continues northwest 600 km to Hinchinbrook Island in Prince William Sound (CPNWH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Lobaria retigera* is a lichen species which grows as an epiphyte on trees and shrubs or is saxicolous growing on rock (CPNWH 2025, COSEWIC 2018). Its main dispersal mechanism is by isidia, asexual propagules, which are thought to be dispersed by wind and animals (COSEWIC 2018). Dispersal distances for clonal propagules are limited, often falling between 15 to 30 meters from the lichen, and depend on wind direction, wind speed, forest density, and moisture levels (Armstrong 1994, COSEWIC 2018, Pasiche-Lisboa et al. 2019, Ronnås et al. 2017). Generally, asexual propagules

Criteria	*Rank*	*Rationale*
		are distributed with more abundance during periods of increased wind velocity and decreased humidity (Pasiche-Lisboa et al. 2019). Dispersal of isidia may be a limiting factor because the species is not known to sexually reproduce (produce apothecia) in North America (COSEWIC 2018). In coastal forests, lack of available substrate due to competition with mosses may also be limiting (COSEWIC 2018).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* There is no abundance information or population estimates for the confirmed occurrences on TNF (USFS 2025a). The total number of individuals on the TNF is approximately 12 lichens (Appendix 1, USFS 2025a).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Lobaria retigera* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity* *Lobaria retigera* occurs in riparian and coastal humid old growth forest ecosystems on the TNF (ECCC 2018, GBIF 2025). In adjacent locations including Skeena Valley, B.C. Canada, it also occurs in montane forests of *Abies* sp., *Picea* sp. and *Tsuga* sp. (CPNWH 2025). Competition to colonize substrata by bryophytes and other epiphytic lichens is a limiting factor to the establishment of *Lobaria retigera* in canopy habitats and contributes to its rarity (COSEWIC 2018). This species is especially vulnerable to desiccation and relies on intact, humid old-growth forest habitats (COSEWIC 2018). Historically, coastal and riparian areas were targeted for timber harvest because of ease of access and the quality of trees that grow there due to alluvial and marine nutrient inputs. Under the 2016 Forest Plan coastal forest is protected with a 1000 foot buffer in old growth forest and a 200 foot buffer in young growth forest and Class I and II streams are protected with a 100 foot buffer.Timber harvest has occurred in the recent past at the coordinates for occurrence 6

Criteria	*Rank*	*Rationale*
		along the Unuk River and is widespread in the vicinity of occurrence 7 on mainland near the Blue River and the border of Canada (USFS 2025d). This might indicate a negative trend in habitat quality at those sites. In adjacent British Columbia, direct and indirect impacts from extensive forest harvest have led to this species being classified as threatened (COSEWIC 2018).
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors* Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for drought-sensitive species with high moisture requirements such as *Lobaria retigera* (COSEWIC 2018, Turner and Mallott 2025, Wiles and Warren 2025). *Lobaria retigera* is highly sensitive to changes in microclimate and thus is likely to be negatively impacted by climate change (COSEWIC 2018). Timber harvest is likely to continue to impact habitat for *Lobaria retigera* and it is reported to be highly sensitive to edge effects of timber harvest with a high mortality rate shown in a long-term study in Canada (Stevenson and Coxson 2008). Remaining populations in old growth coastal forest are likely to be protected within the 1000 foot beach buffer required by the 2016 Tongass Forest Plan. The 100 foot riparian buffer required by the 2016 Tongass Forest Plan appears insufficient to protect this species given its sensitivity to disturbance. *Lobaria retigera* responds to natural or anthropogenic disturbances such as logging by increased mortality rates, loss of biomass, reduced growth rates, and diminished migration from loss of suitable habitat (Stevenson and Coxson 2008). This species is also especially sensitive to acid deposition from air pollution (USFS 2025e).
8 Life history and demographics	A	*A = Life history characteristics that suggest populations may not recover rapidly from disturbance events or other demographic risk factors are of concern.* *Lobaria retigera* is a foliose cyanolichen that grows as an epiphyte and on rocks and trees (COSEWIC 2018). *Lobaria retigera* does not sexually reproduce with apothecia and thus does not produce long distance dispersal propagules (COSEWIC 2018). Asexual reproduction is through isidia which are hypothesized to be dispersed by rain and animals (

Criteria	*Rank*	*Rationale*
		COSEWIC 2018). *Lobaria retigera* only associates with cyanobacterial photobionts which have higher water requirements than green algae (Stevenson and Coxson 2008). The generation time of *Lobaria retigera* lichens has been estimated to range from 15 to 30 years (COSEWIC 2018).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	**X**☐	☐	☐
Declining populations or habitat trends	☐	☐	**X**☐
Restricted range	☐	**X**☐	☐
Low populations or restricted ecological conditions	☐	☐	**X**☐
Other factors (see conclusion rationale)	☐	☐	**X**☐

Conclusion Rationale

Lobaria retigera is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: *Lobaria retigera* grows in old growth coastal and riparian forests. It is highly sensitive to changes in microclimate, so direct and indirect effects from logging may negatively impact the species. Additionally, due to its sensitivity to changes in microclimate, *Lobaria retigera* is particularly poorly adapted to drought conditions that may become more common as a result of the expected changes in climatic conditions.
- **Declining trends:** Population trends are unknown. Coastal and riparian old growth forest has been extensively impacted by timber harvest. In Canada, *Lobaria retigera* was designated as threatened, largely due to historical and ongoing harvest of old growth forest. Timber harvest is expected to continue across much of the plan area, though the riparian and coastal corridors where this species is found

are granted protections from timber harvest activities through buffers required by the 2016 Forest Plan. Additionally, uncertainty remains regarding the impact on suitable habitat without additional information on the microclimate conditions required by *Lobaria retigera*.

- **Restricted ranges:** On the Tongass NF, *Lobaria retigera* is not known to be a narrow endemic, and populations in the plan area are not considered disjunct. Occurrences on the Tongass NF are not at the edge of the species' greater range.
- **Low population numbers or restricted ecological conditions :** The number and distribution of occurrences across the plan area indicate that this species unlikely to be extirpated by stochastic events, but potential negative impacts remain in the form of continued timber harvest. There is not enough available information to make inferences on any possible restrictions to suitable ecological conditions for this species.
- **Other factors:** This species does not produce apothecia, limiting dispersal to asexual propagules that are typically limited to short-range, local dispersal. However, our understanding of dispersal ability for this species may require further study, as the Tongass occurrences are relatively close (50km to closest known occurrence, unknown occurrences may be closer) to a large population in the Kispiox and Skeena Valleys, B.C. Canada.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☐**X**	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (ALA) [07/27/1989]**	**Mainland, Stikine River, Andrews Slough, between forks and moose hunting trees on clear water., Tongass National Forest**	**Picea sitchensis, Tsuga heterophylla, Oplopanax horridum, Circaea alpina.**		
1	CLH 2025 (ALA) [07/27/1989]	Mainland, Stikine River, Andrews Slough, between forks and moose hunting trees on clear water., Tongass National Forest	Growing in Picea sitchensis. Picea sitchensis, Alnus sinuata, Vaccinium sp., Carex sitchensis.		
2*	**CLH 2025 (WTU) [08/29/1989]**	**Mendenhall Campground.**			
3*	**CLH 2025 (IDS) [06/10/1994]**	**Tongass National Forest, Suikoi Island, Frederick Sound, near Petersburg**	**facing south at edge of forest. Substrate: at base of Picea sitchensis.**		
4*	**CLH 2025 (ALA) [10/14/2004]**	**Mainland, Stikine River, Knig Slough, north side approx. 2 miles upriver from Little Dry Island and approx.. 100m from riverbank., Tongass National Forest**	**Growing on Alnus sp. Picea sitchensis, Tsuga heterophylla, Alnus sinuata.**		
5*	**CLH 2025 (ALA) [08/13/1991]**	**Unuk River, 1 mile south of Canadian border, in Boundary Lake drainage on NW shore., Tongass National Forest**	**Growing on Picea sitchensis.**		
6*	**CLH 2025 (ALA) [08/11/1991]**	**Misty Fjords, Unuk River, gravel bar., Tongass National Forest**	**Growing on Picea sitchensis. Picea sitchensis, Populus trichodes, Alnus sinuata, Oplopanax horridum,**		

			Rubus pedatus, Circaea alpina, Streptopus sp.		
7*	**CLH 2025 (ALA) [08/10/1991]**	**Blue River confluence with Unuk River. Lower lava flow., Tongass National Forest**	**Growing on Picea sitchensis. Single Picea sitchensis in a grassy meadow.**		
8*	**CLH 2025 (ALA) [07/08/2009]**	**Mainland, Hyder, south side of Salmon River on hillside above main road going north out of Hyder., Tongass National Forest**	**Growing on Salix species. Cornus stolonifera, Alnus sp., Populus sp., Salix sp.**		
9*	**CLH 2025 (ALA) [08/09/1989]**	**Mainland, Stikine River, between AK State Fish and Game cabins south of Shakes Slough., Tongass National Forest**	**Growing on Alnus rubra. ; Alnus rubra, Salix sp., Picea sitchensis.**		
10*	**CLH 2025 (ALA) [05/08/2005]**	**Mainland, south of LeConte Bay, Mallard Slough near Forest Service Cabin, Tongass National Forest**	**Growing on Picea sitchensis. Picea sitchensis.**		
11*	**CLH 2025 (ALA) [07/07/2009]**	**Mainland, Hyder area, Titan Mtn. Recreation Trail., Tongass National Forest**	**Growing on downed Populus triocarpa. Populus trichocarpa.**		
12*	**CLH 2025 (MIN) [07/01/1960]**	**Juneau, Mendenhall Glacier**			
13*	CLH 2025 (ALA) [04/20/2003]	Alexander Archipelago, Kupreanof Island, Wrangell Narrows south of Petersburg Creek about 1 mile., Tongass National Forest	Growing on old beach log and rock. Picea sitchensis, Oplopanax horridum, Malus fusca.		
14	**CLH 2025 (ASU) [08/07/1976]**	**Glacier Bay National Monument, near main lodge**	**spruce forest. Substrate: Picea sitchensis.**		
15	**CLH 2025 (NY) [08/23/2003]**	**NNW of Skagway, NNE of Dyea, E of Taiya River, Klondike Gold Rush Nat. Historical Park, along**	**On rock wall.**		

		Chilkoot Trail, near the trailhead.			

Lobelia dortmanna

Lobelia dortmanna L.

water lobelia

Global Rank: **G4G5**
Alaska State Rank: **S1S2**


photo: Sue Trull

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated. Lobelia dortmanna is known from eight estimated occurrences on the southern TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The eight occurrences are grouped at Ella Lake, Duke Island and Gravina Island (Bostwick Lake) where it occurs in shallow water and lakeshore shallows. Habitat is freshwater lake shallows with sandy substrate. Occurrences are naturally isolated in disparate lakes, with limited opportunity for dispersal among patches.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4G5, Alaska State Rank S1S2 Alberta and Manitoba S1; British Columbia, Island of Newfoundland, New Brunswick, Nova Scotia, and Ontario S5; Labrador S4; Northwest Territories, and Prince Edward Island S2; Saskatchewan S3. Nearest locations outside the TNF are approximately 160 kilometers (100 miles) south on Banks Island and Haida Gwaii (CPNWH 2023). The distribution continues south to Oregon and to the east coast (CPNWH 2023). The southern Tongass appears to be the northwest edge of the plant's range in North America (USDA 2023).
3 Dispersal	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).

Criteria	*Rank*	*Rationale*
capability		The role of dispersal capability of whole plants is uncertain. Many appear to be washed up on the shores of lakes, but the survival rates are likely low (Farmer 1989). Seed dispersal may be either by disintegration of the capsules in water or by their slow liberation from pores near the top of the capsule. Seeds will float for a short time and then sink (Farmer 1989).
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Four of the nine known occurrences of *Lobelia dortmanna* in the TNF have recorded number of plants as 200, 400, more than a 1000, and more than a million individuals.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The sites with known number of plants have not been visited since 1993, 2004, 2005 and 2008; therefore population trends are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Range-wide habitat is described as: shallow water at the margins of lakes and ponds (NatureServe 2023) and lowland sandy or gravelly lake and pond margins (Flora of the Pacific Northwest). These habitat types are widespread on the TNF and are considered to have high ecological integrity and low vulnerability (Turner and Mallot 2024).
7 Habitat vulnerability or modification;	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. *Lobelia dortmanna* is a slow growing perennial herb that is associated with nutrient-poor lakes. It is associated with wet areas and may be sensitive to changes in water dynamics.

Criteria	*Rank*	*Rationale*
other threats		Freshwater lake margins are vulnerable to invasion by the non-native plant reed canarygrass (*Phalaris arundinacea*), although no occurrences are currently documented in the vicinity of known *Lobelia dortmanna* occurrences (Huette et al. 2003, USDA FS 2023). This species can form dense monocultures that would occupy and alter lake and pond margin habitat. Both the presence of this species and herbicide treatments used to control it are potential threats to *Lobelia dortmanna*. In addition, lakeshore habitats may experience changes due to the changes in lake volume and timing of inputs to lakes (EcoAdapt 2014). Increased temperatures and evapotranspiration along with a shift from snow to rain dominated precipitation is likely to impact lake water levels during summer, particularly at the southern end of the forest (Turner and Mallot 2024). Some freshwater bodies in Alaska have shrunk due to decreased precipitation and increase temperature driven evapotranspiration (Halofsky et al 2024).
8 Life history and demographics	B	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors known. *Lobelia dortmanna* is a small and slow growing plant and as a result is a poor competitor *(Gaudet and Keddy 1988,* Nielsen & Sand-Jensen 1991*).* It thrives in oligotrophic lakes where larger and faster growing aquatic plants are limited by nutrient and carbon availability (Nielson et al. 2023). Lobelia dortmanna thrives in lakes with low carbon dioxide concentrations because it can take up carbon dioxide through the roots for photosynthesis, which allows for higher photosynthetic rates than plants that rely on diffusion of carbon dioxide into the stomata on the leaves (Wium-Anderson 1971). In Europe, a dramatic decline in occurrences of *L. dortmanna* has been attributed to eutrophication of lakes and resulting increased competition (Nielsen et al. 2023). Lobelia dortmanna may be used as an indicator species in lakes due to its sensitivity to eutrophication (Nielson et al 2023).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒

Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Lobelia dortmanna* within the plan area based upon the following:

- **Significant threats** – Invasive species such as reed canarygrass constitute a threat to lakeshore habitats on the TNF, however reed canarygrass is not currently known to occur adjacent to known *Lobelia dortmanna* occurrences. Habitat changes to lakeshore habitat (e.g. changes in volume and timing of inputs, lake drying) may occur as a result of climate change. This species is very sensitive to eutrophication but eutrophication is unlikely to occur in Tongass NF lakes because atmospheric deposition rates are low and there are few sources of nutrient run off.
- **Declining populations or habitat trends** – Population and habitat trends on the TNF are unknown. Lakeshore and pond edge habitat is abundant on the TNF.
- **Restricted range** – The occurrences on the TNF are disjunct by approximately 160 kilometers from the nearest occurrences on Haida Gwaii. The southern Tongass appears to be the northwest edge of the plant's range in North America (USDA 2023).
- **Low populations or restricted ecological conditions** – There are eight records of this species concentrated on the southeast part of the TNF. Where recorded, population numbers for four of the populations were large. The occurrences were all in a handful of lakes – Ella Lake, Bostwick Lake, and a couple of ponds on Duke Island. This makes Lobelia dortmanna somewhat vulnerable to stochastic events because changes in water quality or nutrient status of any of these lakes could lead to rapid lake-wide extinction. Potential habitat across the range of this taxon has been described as sandy or gravelly margins of oligotrophic, lowland lakes and ponds. These habitats are not restricted on the TNF.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**TESP_Mar25 (100552P000228)[7/29/2005]**	**Alexander Archipelago, Duke I.**			
1	ACCS_Mar25 (EO0)[7/29/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= DUKE ISLAND, 400 IND. ALONG NORTHERN LAKESHORE		
1	ACCS_Mar25 (EO0)[7/26/2005]	Alexander Archipelago, Duke I.	Plants growing in hard sand bottom at margin of freshwater lake. Domint shallow freshwater plant in this and one nearby lake. Forming more or less continuous mat of rosettes around perimeter of lake.		
1	CPNWH_Mar25 (WTU385053)[7/26/2005]	Duke Island.			
1	CPNWH_April2025(ALA)[7/26/2005]	Alexander Archipelago, Duke I., Prince Rupert Quad, Tongass National Forest.	Growing in hard sand at margin of freshwater lake, flowering stems emergent from 10-50 cm water, forming more or less continuous mat of rosettes around perimeter of lake, is the dominant shallow freshwater plant in this and one nearby lake.		
2	**ACCS_Mar25 (EO0)[7/26/2005]**		**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= DUKE ISLAND, >1000 IND. DOMITING SHALLOWS OF WESTERN LAKESHORE**		
2	TESP_Mar25 (100552P000221)[7/26/2005]				

3	**TESP_Mar25 (100552P000167)[7/18/2004]**	**Bostwick LAke, Gravina Island**			
3	ACCS_Mar25 (EO0)[7/18/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GRAVI IS; BOSTWICK LK; 200 IND. EMERGENT FROM 50CM WATER AND HARD SAND BOTTOM; NE SHORE.no survey		
4	**ACCS_Mar25 (EO0)[8/05/2008]**	**Ella Lake**	**Vegetation= ; Slope = ; Aspect= ; Substrate= Water; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=**		
4	TESP_Mar25 (100552P000008)[8/05/2008]				
5	**ACCS_Mar25 (EO0)[8/09/2005]**	**Ella Lake**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= MISTY WEED INVENTORY, REVILLAGIGEDO ISLAND, ELLA LAKE, >1,000,000 IND. DOMINT ALONG MILES OF SHORE**		
5	TESP_Mar25 (100552P000233)[8/09/2005]				
6	**ACCS_Mar25 (EO0)[7/13/1993]**	**Ella Lake, Ella rrows cabin lakeshore**	**Freshwater lake shallows with sandy substrate**		
6	CPNWH_April2025(ALA)[7/13/1993]	Ella Lake, Ella rrows cabin lakeshore, Ketchikan Quad.	Freshwater lake shallows with sandy substrate.		
7	**ACCS_Mar25 (EO1)[no date]**	**Ella Lake rrows cabin (M6), Revillagigedo Island, lake shoreline, growing in shallow water. Survey site #M93-30.**			
8	**ACCS_Mar25 (EO2)[no date]**	**Misty Fiords, Revillagigedo Island, Ella Creek Trail, in shallows of creek.**			

Lonicera involucrata

photo: https://www.inaturalist.org/people/duskyhead 2020



Lonicera involucrata Banks ex Spreng.

Four-line Honeysuckle

Global Rank: G5

Alaska State Rank: S3

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B: Patchy or gaps *Lonicera involucrata* is known from 14 estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are documented on Kosciusko Island, Warren Island, San Fernando Island, Fripo Island, Foggy Bay, Portland Canal, and Dall Island. Most of the occurrences are on the south end of the Tongass National Forest. One occurrence possibly occurs on the Tongass National Forest, but the general locality of 'Hollis' is too imprecise to be certain. Regionally, there are nine additional occurrences in Southeast Alaska not on Tongass National Forest Lands. The habitat association of *Lonicera involucrata* is moist shaded forests, specifically Sitka spruce and the coastal Spruce-Hemlock forest. All but two of the occurrences, for which there are habitat data, are found on beaches, forest edges that transition to beaches, or in beach meadows. One occurrence is found in the alpine karst habitat.
2 Distribution in surrounding geographic area	C	C: Wide distribution outside the Tongass National Forest. Global Rank: G5, Alaska State Rank S3 Across most of the range, the species is S5 or Not Ranked. The species is listed as S3 in Manitoba and S1 in Wisconsin (NatureServe 2025).

Criteria	Rank	Rationale
		Lonicera involucrata occurs from Alaska and eastward in all of the southern Canadian provinces (NRCS 2025). The species is found in western Cordillera to northern Mexico (BCCDC. 2025). The species also occurs in Michigan and Wisconsin (NRCS 2025). *Lonicera involucrata* is common from central British Columbia southward. In Alaska, *Lonicera involucrata* is primarily found in southern Southeast Alaska, with several disjunct occurrences on the Chugach National Forest and in Anchorage (ACCS 2025). The Alaska occurrences outside of Southeast Alaska are found in closed moist forest setting and beach meadows. In British Columbia, *Lonicera involucrata* occurs in lower elevation and primarily found in moist forests (BCCDC. 2025). In the rest of its range, it is found from the lowlands to subalpine, forest edges, and in moist woodlands (Hitchcock and Cronquist 2018).
3 Dispersal capability	C	C: Readily disperses across landscapes with few habitat-related limitations. *Lonicera involucrata* produces fleshy berries that are consumed by birds, which disperse its seeds (Burns 2004). Island remoteness and isolation was not a determinant factor of seed dispersal rate, suggesting long distance dispersal (Burns 2004).
4 Abundance on Tongass NF	B	B: Uncommon – current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. While this species occurs almost exclusively on beach fringe on the southern end of the Forest, three occurrences have notes of population size of 200 to 500 individuals. One occurrence (EO 5) noted the population to be the dominant plant on the beach fringe and widely scattered. Other occurrences, not on TNF lands, in the region are noted to be scattered, common, and/or widespread (DeLapp 1994).
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. There are no data from the region that indicate population trends directly on the Tongass National Forest. However, two occurrences have had several revisits, indicating persistent population vitality in the region. One population (EO 19) not on the Tongass National Forest, has a repeat visit seven years apart. EO 17 on Annette Island, not on Tongass National Forest managed lands, has had three repeat visits since 1967 and appears to be persistent.
6 Habitat trend on Tongass NF	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Impacts to the karst alpine are suggested to be low and stable in the long-term (Boggs et al. 2019). In the future, shoreline changes are expected to affect low slope habitats (Halofskey at al. 2024) and not upper beach fringes or meadows where *L. involucrata* is found.

Criteria	*Rank*	*Rationale*
		Coastal forested habitats were historically targeted for timber harvest due to ease of access, but these areas are now protected from harvest by a beach buffer. Beach fringe forest habitat is widespread on the Tongass NF, yet this species is confined to the southern end of the Forest. It is possible there are specific habitat requirements or other factors (e.g. dispersal competitive exclusion) that are limiting this species' range.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors Six occurrences are found in the Misty Fjords National Monument Wilderness and one occurrence in the Warren Island Wilderness. One occurrence (EO 33) is mapped within 250 meters of a young growth forest. One occurrence (EO 31) occurs <100 meters to several highly invasive plant species such as *Ranunculus repens, Phalaris arundinacea, Circium arvense, and Leucanthemum vulgare* (USDA 2025). There would be direct competition from these invasive species and potential non-target herbicide application.
8 Life history and demographics	D	D: Insufficient information to draw inferences about criterion. *Lonicera involucrata* is a perennial shrub (Hitchcock and Cronquist 2018). In neighboring British Columbia, *L. involucrata* had higher seed germination rates (7% germination rate) and survivorship to adulthood on larger islands (Burns 2004). Both seedling and sapling survivorship was approximately 80% to 90%, regardless of island size (Burns 2004). *Lonicera involucrata* serves as the principal host for the introduced butterfly, *Euphydryas gillettii* (Ravikanthachari et al. 2024). Herbivory by this species leads to reduced plant size across populations. However, the butterfly does not occur in Alaska (BONA 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☒	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Significant threats

There are no significant stressors or negative impacts from climate change anticipated for occurrences of this species on the Tongass National Forest.

Declining trends

There are no specific trend data of the species, however regional populations appear to be stable since they have been revisited multiple times.

Restricted ranges

Beyond apparently disjunct populations in southcentral Alaska, the southern Tongass NF occurrences are a northern range edge for the species. *Lonicera involucrata* has a wide distribution in North America.

Low population numbers or restricted ecological conditions

Populations appear to be robust for those with data. It is unclear what ecological factors are restricting the species to the southern end of the Forest.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the **Literature Cited** section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
2	ACCS_Mar25 (EO2)[8/21/2010]	Nichols Bay, furthest sound island at "beachbeacon"	Slope = 60	Null	Null
2	TESP_Mar25 (100551P000195)[8/21/2010]	Nichols Bay, furthest sound island at "beachbeacon"	Very edge of timbe along the shoreline.	Null	Null
20	ACCS_Mar25 (EO20)[6/12/1966]	Alexander Archipelago, Hollis, Prince of Wales I.	Null	Null	Null
22	ACCS_Mar25 (EO22)[9/12/2011]	Warren Island, Warren Cove	Null	Null	Null
21	ACCS_Mar25 (EO21)[6/27/1994]	San Fernando I., Fern Point	forest understory, growing to 1-2 m tall	Null	Null
8	ACCS_Mar25 (EO8)[7/17/1993]	Dall Island, Gold Harbor, head of harbor	beach fringe on carbonate substrate	Null	Null
9	ACCS_Mar25 (EO9)[7/27/1992]	Dall I., Grace Mtn. vic., Rose Karst area N of Grace Mtn.	alpine karst landscape	Null	Null
7	ACCS_Mar25 (EO7)[8/26/2010]	Long Island, Nina Cove	Null	Null	Null
16	ACCS_Mar25 (EO16)[6/07/1964]	Fripo I., NW of Duke I.	Null	Null	Null
11	ACCS_Mar25 (EO13)[no date]	Misty Fiords, Foggy Bay, Kirk Point, island off southern point. Survey site #M93-18	Null	Null	Null
11	ACCS_Mar25 (EO11)[no date]	Misty Fiords, Foggy Bay, Kirk Point, largest and western- most of Delong Island group, beach on east side, middle of beach. Survey site #M93-19.			Null
11	ACCS_Mar25 (EO11)[7/07/1993]	Foggy Bay, Delong I.	In tall shrub margin above beach, next to closed Sitka spruce forest		Null
11	ACCS_Mar25 (EO12)[7/07/1993]	Foggy Bay, eagle nest island	Upper beach meadow among rocks at forest edge		Null
12	ACCS_Mar25 (EO15)[no date]	Misty Fiords, Foggy Bay, Upper Very Inlet. Survey site #M93-13.			Null
12	ACCS_Mar25 (EO12)[9/06/1993]	Head of Very Inlet	Head of cove at edge of forest in upper beach meadow		Null
4	ACCS_Mar25 (EO4)[7/19/2005]	TINGBERG ISLAND	Comments= MISTY WEED INVENTORY, WIDELY SCATTERED AT BEACH FRINGE	200 IND.	Null

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
5	ACCS_Mar25 (EO5)[7/18/2005]	TONGASS ISLAND	Comments= MISTY WEED INVENTORY, ALONG BEACH FRINGE WIDELY SCATTERED	200 IND.	Null
5	ACCS_Mar25 (EO5)[7/18/2005]	Alexander Archipelago, Tongass I.	Sitka spruce-marine ecotone, dominant beach fringe plant on this and adjacent islands		Null
3	ACCS_Mar25 (EO3)[7/19/2005]	KANAGUNUT ISLAND	Comments= MISTY WEED INVENTORY, WIDELY SCATTERED AT BEACH FRINGE	500 IND.	Null
10	ACCS_Mar25 (EO10)[6/27/1939]	Hidden Inlet, Portland Canal			Null
10	ACCS_Mar25 (EO10)[6/27/1939]	Hidden Inlet, Portland Canal			Null
5	TESP_Mar25 (100552P000209)[7/18/2005]	Alexander Archipelago, Tongass I.			Null
4	TESP_Mar25 (100552P000210)[7/19/2005]	TINGBERG ISLAND			Null
3	TESP_Mar25 (100552P000211)[7/19/2005]	KANAGUNUT ISLAND			Null
22	TESP_Mar25 (100554P000434)[9/12/2011]	Warren Island, Warren Cove	Picea sitchensis dominated forest/seashore edge.		Null
7	TESP_Mar25 (100551P000158)[8/26/2010]	Long Island, Nina Cove	Perched out over the edge of the beach		Null
31	TESP_Mar25 (100554P000490Y12)[6/21/2012]	Kosciusko Island, Fishermans Harbor			Null

Luzula comosa

Luzula comosa E. Mey.

Pacific woodrush

Global Rank: **G4G5**
Alaska State Rank: **S1**



photo: © 2015 Hayley Ross

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated *Luzula comosa* is known from one estimated occurrence on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is on the Yakutat Forelands, in the Situk River area (Fig. 1). One record from 2004, inventoried in Natural Resource Manager, is described as occurring in open forest in a salvage timber unit (USDA FS 2023). An additional herbarium specimen from 2004 is described as growing in a bare soil depression under a wind-thrown tree (ARCTOS 2023). There is one occurrence of this species in southeastern Alaska outside of the Tongass NF. This occurrence was collected in 2000 on Mitkof Island in the town of Petersburg in a roadside ditch (Appendix 1). There are two historical locations confirmed as *Luzula comosa* var. *comosa* that were collected from the shores of Behm Canal, and from Revillagigedo Island (land ownership unknown) in 1892 and 1895 (Zika et al. 2015, OregonFlora 2024). The status of these historical locations is unknown. *Luzula comosa* could be confused with other *Luzula* species, in particular *Luzula multiflora*, which is common on the Tongass. *Luzula comosa* has been considered a subspecies of *Luzula multiflora* (FNA 2025). This species was split into *Luzula comosa* var. *comosa* and *Luzula comosa* var. *laxa* in 2015 (Zika et al. 2015). The closest records from British Columbia were additionally determined to be var. *comosa* (Zika et al. 2015). These varieties,

Criteria	*Rank*	*Rationale*
		however, have not yet been ranked by ANHP or by NatureServe (NatureServe 2023), so we will consider ranks for the species only at this point in time.
2 Distribution in surrounding geographic area	B	B = Widely disjunct taxa for which the main distribution is a significant distance from the TNF. Global Rank G4G5, Alaska State Rank S1 British Columbia Province Rank S5, Yellow List; Alberta SU, Yukon Territory SNR, Wyoming S3, Washington, Idaho, Oregon, California, Colorado SNR *Luzula comosa* is broadly distributed in meadows, open woods and coniferous forest throughout western states and provinces (FNA 2020). This species is, however, restricted within Alaska, with few documented occurrences, and considered critically imperiled, with an Alaska State Rank of S1. The occurrences on the Forest (Yakutat Forelands) mark the northwestern boundary for the known range of this species. These locations are distant from the nearest occurrence in British Columbia by approximately 540 miles. There is an additional herbarium specimen collected just outside of the TNF administrative boundary within the town of Petersburg (private lands), made by Peter Zika in 2000 (GBIF 2023). This occurrence is distant by approximately 250 miles from the closest occurrences in British Columbia, and also distant from the documented TNF occurrences on the Yakutat Forelands by approximately 300 miles (CPNWH 2023).
3 Dispersal capability	B	B = Likely to disperse through suitable habitat *Luzula comosa* is a perennial, short-rhizomed graminoid (FNA 2020) with the ability to spread vegetatively through rhizomes, or by seed through suitable forest and meadow habitat. Seeds of *Luzula comosa* are characterized by a basal aril (Zika et al. 2015) that has in other species of *Luzula* been linked with seed dispersal mediated by ants (Oostermeijer 1989, Handel 1978), though this has not been confirmed for *Luzula comosa*.
4	A	A = Rare – current abundance is low enough that stochastic and other factors could lead to potential imperilment.

Criteria	*Rank*	*Rationale*
Abundance on Tongass NF		There is no abundance information noted for the confirmed occurrence on the TNF (ARCTOS 2023, USDA FS 2023), however, the single location suggests that stochastic factors could imperil its persistence.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for known locations of *Luzula comosa* on the TNF are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Habitat for this species in southeast Alaska appears to be varied: the two records that make up the one TNF occurrence describe habitat as "open forest", and "growing in bare soil depression under wind-thrown tree". The Petersburg record describes habitat as "dry bank, full sun, roadside ditch" (Appendix 1). These habitat descriptions indicate some degree of tolerance of disturbance. Across the species' range, habitat is broadly described as meadows, open woods, and coniferous forest, which are not restricted habitat types on the TNF. Given that this species has only been documented a handful of times on the forest, there may be unknown habitat requirements that contribute to rarity.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. One occurrence was noted as occurring within a salvage unit (USDA FS 2023), suggesting that habitat may be vulnerable to modification by timber harvest activities in the Yakutat Forelands. Although the specific effects of timber harvest to this occurrence were not documented, there is some evidence that *Luzula comosa* is vulnerable to soil displacement (see below). Because potential habitat on the TNF is unclear, there is a lack of information to assess habitat trends across potential habitat.
8	B	B = Life history characteristics suggest populations have an intermediate ability to recover form disturbance events.

Criteria	*Rank*	*Rationale*
Life history and demographics		This species reproduces from seed and is characterized by short rhizomes. A study of the response of California grassland associates to disturbance found that *Luzula comosa* abundance declined in response to experimental soil disturbance (burial and excavation), but was able to recover somewhat nine years later where soil disturbance depth was shallow (Kotanen 2004). This suggests that *Luzula comosa* may be vulnerable to soil-displacing activities associated with timber harvest. Several herbarium specimens across its range describe disturbed habitat such as roadside ditches or disturbed ground (CPNWH 2023).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low population numbers or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☐

Conclusion Rationale

Luzula comosa is not recommended as a Species of Conservation Concern based on the following rationale:

- **Significant threats**: One of the two records from the Yakutat forelands was mapped within a salvage harvest unit. Although this species is sometimes associated with disturbed habitats elsewhere across its range, there is some evidence that the ability of this species to respond to disturbance may vary according to the depth of soil disturbance, which could render occurrences vulnerable to timber harvest activities.
- **Declining populations or habitat trends**: Population trends for Tongass NF occurrences are unknown. Rangewide habitat encompasses a broad range of habitats (meadows, forest, yellow cedar wetlands) that are largely stable on the Tongass NF. It is unknown if there are additional microhabitat requirements that contribute to rarity.
- **Restricted range**: Tongass NF occurrences are disjunct from the main species distribution across the western United States and Canadian provinces. Tongass NF occurrences on the Yakutat Forelands mark the northwestern boundary for the known range of this species.

- **Low population numbers**: There is just one known occurrences on the TNF, both in the Yakutat Forelands, which may render the species vulnerable to local extirpation through stochastic events. Due to the cryptic nature of graminoids, these species often have a higher likelihood of being overlooked. It is also possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species. Because of these unknowns, targeted surveys would be required to determine the true distribution of this species on the Tongass.
- **Other factors**: None

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**ACCS_Mar25 (EO1)[7/06/2004]**	**Yakutat Foreland, Situk R. area**	**growing in bare soil dpression under wind-thrown tree**		
1	ACCS_Mar25 (EO1)[7/06/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Yakutat, Situk R. area, Yak 2 Salvage Sale, Unit 1010, open forest		
1	TESP_Mar25 (100535P000101)[7/06/2004]				
1	CPNWH_April2025(ALA)[7/06/2004]	Yakutat Foreland, Situk R. area, Yakutat Quad.	Growing in bare soil dpression under wind-thrown tree.		
	Occurrences not on Tongass NF				
2	**ACCS_Mar25 (EO2)[7/10/2000]**	**Near corner of Haugen Drive and South Eighth Street, Petersburg; Mitkof Island.**	**Dry bank, full sun, roadside ditch.**		

Lysimachia thyrsiflora

Lysimachia thyrsiflora [L.]

Tufted loosestrife

Global Rank: **G5**

Alaska State Rank: **S4**



photo: Vcancino inaturalist (2023)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Habitat is broadly distributed across the planning area, but gaps exist within this distribution. There are ten known locations on the TNF that are widely dispersed from Yakutat in the north to Misty Fiords in the south (CPNWH 2025, USDA 2025). There is a cluster of six records encompassing four nearby sites in the Yakutat Foreland, associated with shallow lakes, fens, stream margins, and edges of estuarine wetlands at the mouth of the Situk River. There is a record from lower Carlson Creek valley adjacent to Taku Inlet in a wet sedge-alder bog. Two records are known from the mouth of the Stikine River, one at Figure Eight Lake and in a muddy sedge marsh along Andrews Creek on the south side of the Stikine River. While there are two records at Figure Eight Lake, they are close enough to be recognized as one occurrence. One record is from Revillagigedo Island, in tributary of Portage Cove. The distribution of this species in the Tongass National Forest is patchy in a diversity of wetlands and shallow lakes and ponds. However, it does not appear to grow in peatlands. At Figure Eight Lake, the associated habitat is described as marshy-sedge dominated lake margin and open wet tall willow scrub and growing with *Carex* sp., *Viburnum edule*, and *Calamagrostis canadensis* (CPNWH 2025, Duffy 1993). Much more apparently suitable habitat is present throughout TNF that is not occupied by this species, and it has a rare, seemingly random, and patchy distribution. Such patterns are typical of many wetland plants in Alaska, which often have core ranges farther south. Occasional long-distance dispersal events, likely facilitated by waterbirds, bring these species into Alaskan wetlands that lie near the edge of their physiological or ecological tolerance. Once established, however, they rarely form large populations or spread independently. The Yakutat forelands and Stikine are well-known migratory stop-overs of waterbirds (DeGange & Sanger 2003, Warnock et al. 2004, Petersen 2022).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest; Global Rank G5, Alaska State Rank S4 This taxon is ranked in the adjacent territories of Yukon as S2 and in British Columbia it is ranked as S5. It tends not to be ranked in the northern tier states in the core of its range and tends to be ranked as Imperiled (S2) in the states at the southern end of its distribution, such as California, Utah, Colorado, Kansas, Missouri, West Virginia, and Maryland (NatureServe 2025). The range of *Lysimachia thrysiflora* is global (Cholewa 2022, CPNWH 2025, NatureServe 2025), with its main distribution in North America occurring in the northern Prairie states. In 1968 Hultén noted ten collections of the species in Alaska and the CPNWH (2025) shows ten collections, some of which appear to be the same collections as in Hultén (1968). There is an additional collection by B.A. Bennett at the Haines Airport in Southeast Alaska that is approximately 10 km from the TNF. Other collections in Alaska are extremely widely scattered from Attu Island in the Aleutians to the south side of the Brooks Range in Kanuti Wildlife Refuge, and to urban wetlands in Anchorage in southcentral Alaska. The habitat preference of *Lysimachia thrysiflora* is a wide variety of wetlands, including shallow lakes, bogs, swamps, marshes, and wet woodlands (Cholewa 2022).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There are no studies on seed dispersal in *Lysimachia*, although wind, water, and birds have been suggested as potential dispersal vectors (Oh et al. 2008). The three wetland-species, *Lysimachia thyrsiflora*, *L. terrestris*, and *L. vulgaris*, have a spongy outer layer of the seed coat that is dissimilar from the thin seed coat in other *Lysimachia* species; the sponge-like outer layer has been hypothesized to be an ecological adaptation for seed dispersal in moist habitats (Oh et al. 2008). The spongy seeds have a low specific gravity and may facilitate floating over long distances (Howe and Smallwood 1982). The distribution of this species is suggestive of a capacity for long-distance dispersal, and the morphological studies are also suggestive of a capacity for dispersal within wetland complexes and potentially between complexes, but dispersal data is lacking.

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population sizes on the Tongass National Forest are unknown. At the Yakutat forelands Summit Lake site, it is recorded as "uncommon in patches", while the nearby site along the Lost River trail, it is recorded as "common" in a swampy area near the trail (CPNWH 2025). One of the records from Figure Eight Lake on the Stikine refers to the plant as "uncommon" along the lakeshore.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for *Lysimachia thrysiflora* on the TNF are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable habitat. This species is recorded from a wide range of wetland habitat types in TNF. It does not appear to grow in peatlands, which are the most common wetland in the TNF. However, estuaries, shallow lakes, ponds, wet sedge meadows are common throughout the region (Halofsky et al. 2015). When undisturbed, freshwater wetlands on the Tongass NF have historically been very stable ecosystems, exhibiting high ecological integrity (Turner and Mallott 2024). The ecological integrity of tidal wetlands on the Tongass NF is currently only moderate due to the current impacts of climate change (Turner and Mallott 2024). Because landscape position, soil drainage, and hydrology are important drivers for forested and non-forested wetlands, with the level of soil saturation a factor in the species composition of a particular wetland (Turner and Mallott 2024), activities in the immediate vicinity that change hydrology, such as timber projects and road building, could cause a negative habitat trend. The Figure Eight Lakes populations occur within a stand of reed canarygrass (*Phalaris arundinacea*) (USDA Forest Service 2025),), a non-native plant with the ability to invade wetland habitats.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Invasive species, timber activities, and climate change may impact the habitat of *Lysimachia thyrsiflora*. All populations in the TNF are associated with wetlands and waterbodies. Activities that alter the hydrographic regime of these populations could result in local extirpation, but many populations in TNF occur in Wilderness Areas, or in areas with low probabilities of timber harvest, or other development. The response to climate change by wetland plant communities will depend on local conditions with some areas increasing in size and other experience forest encroachment and drying (Halofsky et al. 2015). The Figure Eight Lakes populations occur within a stand of reed canarygrass (*Phalaris arundinacea*) (USDA Forest Service 2025) and may experience extirpation from overcrowding or be affected as a non-target from herbicide control. In general, the habitats that are occupied by this species are vulnerable to invasion by reed canarygrass.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. Unknown life history and demographics in Alaska or elsewhere. Assumed to be a long-lived species based on its rhizomatous behavior (see Cholewa 2022).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Lysimachia thyrsiflora is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** While there are stressors from invasive species, timber activities, and climate change, it is unclear to what extent these factors will impact this species in the future. Activities that alter the hydrographic regime of these populations could result in local extirpation, but many populations occur in Wilderness Areas, or in areas with low probabilities of timber harvest, or other development.
- **Declining trends:** Population trends for *Lysimachia thrysiflora* on the Tongass NF are unknown. Wetland habitats remain largely intact in the region, though activities that modify the local hydrology, as well as invasive plants and climate, may negatively impact populations in the future.
- **Restricted range:** *Lysimachia thrysiflora* has a global range outside of Alaska, and within southeast Alaska it is widely, though uncommonly, distributed from Yakutat to Misty Fiords.
- **Low population numbers or restricted ecological conditions:** There are at least ten occurrences scattered north to south across the Tongass NF, so this species is likely not vulnerable to exirpation by stochastic events. Habitat preferences are apparently not highly restricted.
- **Other factors:** The patchy, uncommon distribution of the species is probably caused by occasional long-distance dispersal events, likely facilitated by waterbirds.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Maianthemum racemosum amplexicaule

Maianthemum racemosum amplexicaule [(Nutt.) LaFrankie]

Feathery false lily of the valley

Global Rank: **G5T5**
Alaska State Rank: **S1**



photo: © 2009 Keir Morse

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Population is naturally distributed as isolated patches, with limited opportunity for dispersal among patches. *Maianthemum racemosum* ssp. *amplexicaule* is known from two estimated occurrences near Hyder and the Salmon River Valley (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). An herbarium record from 1979 descriced habitat as a wooded area on the east bank of the Salmon River. An additional specimen collected in the same area in 1993 described habitat as open Sitka spruce forest on a river bar (CPNWH 2023, ANHP ACCS 2023).
2 Distribution in surrounding geographic area	C	C = Widely distributed outside of the TNF. Global Rank G5T5, Alaska State Rank S1 British Columbia Province Rank S5, Yellow List; Alberta S5, Yukon Territory SNR, Washington, Idaho, Oregon, Montana SNR *Maianthemum racemosum* ssp. *amplexicaule* is broadly distributed throughout western North America (NatureServe 2023), ranging from Alaska south to Texas (FNA 2020). It is common in British Columbia, where it occurs in moist to mesic forests, streambanks, meadows and clearings in the lowland and steppe to subalpine zones (Klinkenberg 2023).

Criteria	*Rank*	*Rationale*
		This species is restricted within Alaska, with few documented occurrences. Other than the TNF specimens, there is just one additional herbarium specimen, collected in central Alaska west of Fairbanks (ARCTOS 2023). Other than the highly disjunct Fairbanks specimen, the Tongass occurrences are on the northeastern edge of this species' range. Occurrences on the TNF, however, are not widely distant from adjacent collections made within British Columbia (CPNWH 2023), with the closest collection approximately 50 kilometers from the Hyder occurrence.
3 Dispersal capability	B	B = Disperses only through suitable habitat. *Maianthemum racemosum* ssp. *amplexicaule* is a perennial, rhizomatous forest herb that produces flowers and fruit in panicles on leafy stems (LaFrankie 1986). While no further information specific to the subspecies was found, factors in the dispersal of *Maianthemum racemosum* are well-described. *Maianthemum racemosum* can reproduce either vegetatively, via rhizomes, or by seed. Rhizomes of *Maianthemum racesmosum* are robust, and can be up to seven inches long (Brundrett and Kendrick 1988), and persist for over 20 years (LaFrankie 1985a). Clonal growth is thought to be the primary means of reproduction for this species (Piper 1989). Flowering stems produce between zero and 250 white flowers in terminal clusters (LaFrankie 1986). However, one study found low rates of fruit set (<10%) in *Maiantheum racemosum* (Piper 1989). Fruits of *Maianthemum racemosum* are eaten and dispersed by birds (Piper 1989). A germination study in Washington found that *Maianthemum racemosum* was able to germinate under a broader range of light conditions than other forest herbs (Piper 1986).
4 Abundance on Tongass NF	A	A = Rare – current abundance is low enough that stochastic and other factors could lead to potential imperilment. There is no abundance information noted for either of the confirmed occurrences on the TNF (ARCTOS 2023, USDA FS 2023), however, the low number of occurrences suggests that stochastic factors could imperil the persistence of the few known occurrences, as there are just two locations confirmed on the TNF.
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Population trends for known occurrences of *Maianthemum racemosum* ssp. *amplexicaule* on the TNF are unknown.

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality Habitat at known occurrences was described as open Sitka spruce forest on a river bar and wooded riverbank. These can be grouped under riparian forest, which has high ecosystem integrity with moderate vulnerability to change (Turner and Mallot 2025). Habitat for this species in adjacent British Columbia is broadly described as moist to mesic forests, streambanks, meadows and clearings in the lowland and steppe to subalpine zones, which are not restricted habitat types on the TNF (Klinkenberg 2023). There may be specific habitat requirements or other ecological constraints that contribute to the rarity of this species on the TNF.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions, but is being impacted by modern stressors. Wetland and riparian vegetation on the TNF may be vulnerable to drying or successional changes with predicted temperature increases (Halofsky et al 2025). In addition, the timing and volume of river flows is predicted to change along with changes to the proportion of precipitation falling as rain, which may riparian vegetation (EcoAdapt 2014). Splitlip hempnettle (galeopsis bifida) and reed canarygrass (phalaris arundinacea) infestations are known in the Salmon River near the occurrences of Maianthemum racemosum (NRIS 2025). Forest wide, riparian habitat is vulnerable to invasion from invasive species because moving water naturally spreads seeds and vegetative parts (Wiles and Warren 2025).
8 Life history and demographics	B	B = Life history characteristics suggest populations have an intermediate ability to recover form disturbance events. While there is little information specific to the subspecies *amplexicaule*, the life history of *Maianthemum racemosum* is well-described. *Maianthemum racemosum* is a rhizomatous perennial herb that produces a terminal cluster of between 0-250 white flowers (LaFrankie 1986, Piper 1989). Visitors to flowers in Washington and Idaho include a broad suite of insect taxa, including flower flies (Syrphidae), bees (Apidae and Halictidae) and various Lepitoptera (Piper 1989). No information about pollinators specific to Alaska populations is known. Piper (1989) has observed low recruitment rates from seed in Massachusetts populations. When plants do establish by seed, several years lapse before the flowering adult phase is attained. Seeds germinate following a period of cold

Criteria	*Rank*	*Rationale*
		stratification, then require an additional period of cold stratification before the first leaves are produced. Leaf and rhizome growth begin the following year. Not until the fourth year are flowering stems produced (LaFrankie 1985b). Although there are no studies of disturbance specific to this species in Alaska or British Columbia, it has been included in several studies of understory response to disturbance elsewhere in its range. Deer have been observed to browse preferentially on this species in Upper Michigan (Kraft et al. 2004). Timber harvest had little effect to the abundance of this species in a disturbed northern hardwood forest (Hughes and Fahey 1991). Several herbarium specimens across its range describe disturbed habitat such as roadsides, transmission line corridors, logged stands, or other disturbed ground (CPNWH 2023). LaFrankie (1985b) noted that because new shoots are pre-formed along the rhizome in the summer months but do not emerge until the following spring, this species may not be able to easily adjust to changes in environmental conditions or to injury to the plant. LaFrankie further notes, however, that although the time lag in shoot development might suggest fidelity to stable conditions, *Maianthemum racemosum* bucks that assumption with its broad ecological amplitude in diverse forest types (LaFrankie 1985b).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low population numbers or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☐

Conclusion Rationale

- **Significant threats**: Reed canarygrass and splitlip hempnettle are known along the Salmon River near where this species is known on the TNF. Additionally, changes in temperature and precipitation patterns are likely to lead to more frequent and intense flooding as well as growing season drought, which may negatively impact riparian vegetation. Information from studies across the range of this species indicate a moderate ability to recover from disturbance.

- **Declining populations or habitat trends**: Population trends are not known. Riparian forest habitat has high ecosystem integrity with moderate vulnerability to stressors.
- **Restricted range**: Other than one highly disjunct specimen west of Fairbanks, the Tongass occurrences are on the far northeastern edge of this species' range. Occurrences on the TNF, however, are not widely distant from adjacent collections made within British Columbia.
- **Low population numbers**: There are just two confirmed occurrences of *Maianthemum racemosum* ssp. *amplexicaule* on the southeast edge of the Tongass NF near Hyder. This suggests a potential risk of imperilment due to stochastic factors. There may be specific habitat requirements or other ecological constraints that contribute to the rarity of this species on the TNF.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**ACCS_Mar25 (EO0)[7/22/1972]**	**Coast Mts., Hyder, E bank Salmon R.**	**wooded area**	**NA**	**NA**
1	ACCS_Mar25 (EO1)[no date]	Hyder, west of town, along east bank of Salmon River in wooded area.			
2	**ACCS_Mar25 (EO0)[8/06/1993]**	**Hyder, N of town, Mile 3.9 from Hyder intersection**	**open sitka spruce forest on river bar**		
2	ACCS_Mar25 (EO2)[no date]	Hyder, Salmon River valley, river bar forest at end of second dike, mile 3.9 from main town intersection. Survey site #M93-52.	wooded area		

Maianthemum stellatum

Maianthemum stellatum [(L.) Link]

Starflower Solomon's-plume

Global Rank: **G5**
Alaska State Rank: **S3**

Photo: Craig Martin (Craig Martin: iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Maianthemum stellatum* is known from one estimated occurrence on the Tongass NF; (Appendix 1; SEINet 2025). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The one occurrence is located at the southeastern tip of the Tongass NF on Kanagunut Island in the Misty Fiords National Monument. Two other occurrences are known from southeast Alaska outside the boundary of the Tongass NF; one is at the Old Sitka Historic Site on Baranof Island, and the other is along the Chilkoot Trail north of Skagway on the mainland (Appendix 1; Arctos 2025, ANHP ACCS 2025, CPNWH 2025, USFS 2025a). The habitats listed on the specimen label of the Kanagunut collection and in the TESP database are Sitka spruce-marine ecotone and beach fringe (near sea level), and the coordinates on the specimen label place the location at the edge of the forest near the upper beach 100 m from the USFS TESP record coordinates from the same date (USFS 2025a); note that the coordinates for this specimen in the Arctos database map in the ocean and should be disregarded (Arctos 2025). Little is known about the habitat of this one Tongass NF occurrence, as no associated species were observed or collected (Arctos 2025, CPNWH 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
		In adjacent British Columbia, this species is described as occurring in moist to mesic (occasionally dry) forests, streambanks, clearings, and meadows (Klinkenberg 2020). On the Tongass, this species looks most similar to the common *Streptopus* (twisted stalk) species, but the terminal rather than axillary inflorescence is distinctive.
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: S2 (Imperiled): Labrador; S3 (Vulnerable): Prince Edward Island; all others are S4 (Apparently Secure), S5 (Secure), Not Ranked (SNR), or not present. United States: S1 (Critically Imperiled): Arkansas, Kentucky, Tennessee, Virginia; S2 (Imperiled): Kansas, Maryland, West Virginia; S3 (Vulnerable): Alaska, Illinois, New Jersey; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present (NatureServe 2025). *Maianthemum stellatum* has a broad distribution in North America (LaFrankie 2002, NRCS 2025). It occurs in all the Canadian provinces and territories except for Nunavut (LaFrankie 2002, NRCS 2025). In the United States, it occurs across most of the conterminous United States except for the southern states from Texas to North Carolina (LaFrankie 2002, NRCS 2025). Beyond the three occurrences in southeast Alaska, *Maianthemum stellatum* is often localized in moist boreal habitats in Alaska, as well as along the Yukon River (Arctos 2025, CPNWH 2025). To the east, *Maianthemum stellatum* is common throughout British Columbia, except the north coast (Klinkenberg 2020). The closest record to the Tongass occurrence is over 100 miles to the northwest near Cranberry Junction in Canada. The three southeast Alaska occurrences are even further from each other, as well as being on separate islands and/or the mainland.

Criteria	*Rank*	*Rationale*
		In North America, *Maianthemum stellatum* is found in mesic woodlands, meadows, swamps, sand dunes, streambanks, and open slopes at elevations ranging from sea level to approximately 10,500 feet (3200 m) (LaFrankie 2002, Klinkenberg 2020, McNeal 2024, OregonFlora 2025). However, based on herbarium collection data, this species has been encountered more frequently in inland mountainous regions than in maritime locations in the northern part of it range (SEINet 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Maianthemum stellatum* reproduces clonally by long, thin rhizomes but also can reproduce by seed (Piper 1989, LaFrankie 1986, 2002). Plants produce a terminal cluster of 6–15 white flowers that, if pollinated, mature into 4–6 mm diameter berries, each with 1–6 seeds; the seeds are dispersed by birds (Piper 1989, LaFrankie 1986, 2002). No information was found on dispersal distances.
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* The one occurrence has a population count of 50 plants (Appendix 1; ACCS 2025, ANHP ACCS 2025, Arctos 2025, USFS 2025a). Therefore, this species is rare on the Forest.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow up surveys, the population trend for the one occurrence of *Maianthemum stellatum* on the Tongass NF is unknown (USFS 2025a).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The habitat of the one occurrence is described as Sitka spruce-marine ecotone and beach fringe (Arctos 2025). Given that the habitat as described is common on the Forest, yet only one occurrence has been documented, more information is needed on specific abiotic and/or biotic factors that may contribute to the rarity of this species here.

Criteria	*Rank*	*Rationale*
		No timber projects or non-native plants are mapped on the same small island or within a mile of the occurrence (USFS 2025b, 2025d).
7 Habitat vulnerability or modification; other threats	D	**D = Insufficient information to draw inferences about the criterion** No local threats are known. Climate change is considered to be the main future stressor of unharvested well-drained forest, poorly-drained forest, and forested (palustrine) wetland on the Tongass NF (Turner and Mallott 2025), but it is unknown how the effects of climate change will affect habitat suitability for this species. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit; winters are predicted to be warmer (with more rain and less snow) and summers drier, which will lead to drought stress for plant species that are found in moist environments (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	D	**D = Insufficient information to draw inferences about the criterion** *Maianthemum stellatum* is a rhizomatous perennial herb that produces a terminal cluster of 6–15 white flowers from mid to late spring (LaFrankie 2002). The flowers are reportedly self-incompatible (Piper 1989). Insects observed visiting *Maianthemum stellatum* flowers in Washington and Idaho include flower flies (Syrphidae), bees (Apidae and Halictidae), and moths and butterflies (Lepidoptera) (Piper 1989). *Maianthemum stellatum* produces berries 4–6 mm in diameter that are green with black stripes when young and red when mature; they have 1–6-seeds (LaFrankie 1986, 2002). At sites in Idaho and Washington, Piper (1989) observed low rates of fruit set and low rates of recruitment via seed. *Maianthemum stellatum* also spreads clonally via rhizomes (Piper 1989). The amount of light reaching plants at different sites had little to no apparent effect on ramet size or reproduction (Piper 1989). When establishing via seed, *Maianthemum stellatum* takes multiple years to reach maturity, with flowering stems produced in the fourth year (LaFrankie 1985).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Maianthemum stellatum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No local threats are known. Climate change may impact habitat generally, but the impact of those changes on habitat suitability for this species is unknown.
- **Declining trends:** Population trends are unknown. The occurrence is in the Misty Fjords National Monument and no timber projects or non-native plants are mapped on the same small island or within a mile of the occurrence.
- **Restricted ranges:** *Maianthemum stellatum* is not a narrow endemic nor is it at the edge of its range on the Tongass NF. Large distances separate the southeast Alaska occurrences from one another and from occurrences in Canada, but this scattered distribution is likely explained by seed dispersal by birds.
- **Low population numbers or restricted ecological conditions:** With only one known occurrence on the Tongass NF consisting of 50 individuals, population numbers are low. The habitat as described is broadly available on the Tongass, so it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.

☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Arctos 2025 (ALA-UAM:Herb:129200) [7/19/2005]**	**Kanagunut Island, Misty Fiords National Monument.**	**At Sitka spruce-marine ecotone.**	**rare in area. One small population found on this and local islands.**	
1	ANHP ACCS_Mar25 (EO1)[7/19/2005]	Alexander Archipelago, Kanagunut I.	Sitka spruce-marine ecotone, rare in area		
1	ANHP ACCS_Mar25 (EO2)[7/19/2005]	MISTY WEED INVENTORY, KANAGUNUT ISLAND	BEACH FRINGE	50 plants	
1	USFS-TESP_Mar25 (100552P000212)[7/19/2005]	MISTY WEED INVENTORY, KANAGUNUT ISLAND	BEACH FRINGE	50 plants	
		NOT ON TONGASS NF			
2*	**ANHP ACCS_Mar25 (EO3)[6/09/2004]**	**Baranof Is., Old Sitka Historic Site,**	**Incidental sighting, grn strip along rd.**	**50 plants**	
2	USFS-TESP_Mar25 (100531P000076)[6/09/2004]	Baranof Is., Old Sitka Historic Site, Incidental sighting, grn strip along rd, 50 plants		50 plants	
2	ANHP ACCS_Mar25 (EO3)[6/09/2004]	Alexander Archipelago, Baranof I., Sitka, Old Sitka State Park	rare on green strip along road		
2	ANHP ACCS_Mar25 (EO3)[6/09/2004]	SITKA QUAD.: Alexander Archipelago, Baranof I., Sitka, Old Sitka State Park.	On green strip along road.	Rare.	
2	ANHP ACCS_Mar25 (EO3)[6/09/2004]	Alexander Archipelago, Baranof Island, Sitka, Old Sitka State Park.	Rare on green strip along road.	Rare.	
2	Arctos 2025, CPNWH 2025 (UAAH10579, ALA-UAM:Herb:142576) [6/9/2004]	SITKA QUAD.: Alexander Archipelago, Baranof I., Sitka, Old Sitka State Park	rare on green strip along road.	Rare.	
3*	**ANHP ACCS_Mar25 (EO4)[6/07/1995]**	**Coast Mts., Skagway, Chilkoot Trail, Canyon City Trail, N of Suspension Bridge [This is georeferenced incorrectly at Skagway but**	**cottonwood stand, alder, willow, high bush cranberry understory, moist ground cover,**		

		even if georeferenced along the Chilkoot Trail on the way to Canyon City and near a suspension bridge, it is not on the Tongass NF]	**growing along trail [no other specimens collected by Rector on this date]**		

Mastigophora woodsii

Mastigophora woodsii [(Hooker) Nees, 1838]

Woods' Whipwort

Global Rank: **G3G5**

Alaska State Rank: **S1**



photo: (CC0) Julia Carr

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Isolated.* *Mastigophora woodsii* is known from one estimated occurrence on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is located in Lost cove of Lisianski Strait in the northwest of Chichagof Island (Appendix 1; ACCS 2024, USFS 2025a). The occurrence was found in humic soil and partial shade in a densely forested muskeg wetland dominated by *Callitropsis nootkatensis* and *Tsuga heterophylla* (ACCS 2024). This habitat is typical for this species. There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CBH 2025). The closest occurrences to southeast Alaska are on Haida Gwaii and mainland British Columbia, Canada (CBH 2025). This species may be confused for species of *Lepicolea*, though this does not occur nearby (CBH 2025). Subspecies of *Mastigophora woodsii* do not occur in TNF (CBH 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside of the Tongass National Forest.* Global Rank G3G5, Alaska State Rank S1, British Columbia S2, IUCN NT in Europe *Mastigophora woodsii* shows a very interrupted distribution in oceanic climates, with populations on Haida Gwaii (BC, Canada), a few collections clustered near Durango, Mexico, and populations in Ireland and northern Scotland including the Faroe Islands (CBH 2025). This species is also reported from Japan, Taiwan, and the Himalayas (Stotler and Crandall-Stotler 2017, Schofield 2002). Habitat for the species in North America is described as "near watercourses, often within spray of cascades or waterfalls in extremely high precipitation regions" (Schofield 2002). Across its range, *Mastigophora woodsii* occurs in oak-pine forests in stream beds, in open humus on "bouldering canyon streamlet" [sic], on glacially scoured, largely barren slopes, or in wet, maritime forests at elevations of 31 m to 2,637 m (CBH 2025). It is typically found on boulders or on humus often near a water source including the ocean, a stream, or a lake (CBH 2025). Some associated species include *Sphagnum* spp., *Racomitrium lanuginosum*, and sedges (CBH 2025). The soils where this species are found are typically wet, moist, and bog-like or "peaty" (CBH 2025). In southeastern Alaska this species is only known from the Tongass NF; its range continues south in British Columbia approximately 329 miles (530 km) to the Goose Cove of Graham Island (CBH 2025). In the western hemisphere, the Tongass NF occurrence is the furthest north known occurrence for the species. Range-wide threats to *Mastigophora woodsii* include agro-industry farming, fire, and competition from graminoids including invasive species (IUCN 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Mastigophora woodsii* is a leafy liverwort with a terrestrial growth habit (Glime and Bisang 2017, Singh, Paul and Saha 2024). Its main dispersal mechanism is by clonal growth through branching or fragmentation (Damsholt 2017, Singh, Paul and Saha 2024). Fertile plants and gemmae are not reported for this species (Glime and Bisang 2017, IUCN 2025), however one report shows an image of a "gynoecial branch" on *Mastigophora woodsii* with no further description

Criteria	*Rank*	*Rationale*
		(Singh, Paul and Saha 2024). More information is needed to determine if *Matisogophora woodsii* can disperse beyond branching and fragmentation.
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* None of the occurrences have population estimates or any indication of abundance (Appendix 1; ACCS 2024, USFS 2025a).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Mastigophora woodsii* on the TNF are unknown (ACCS 2024, USFS 2025a, CBH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for the one occurrence of *Mastigophora woodsii* on the TNF is densely forested muskeg wetland (ACCS 2024). This habitat can be grouped under forested wetlands which are fairly common on the Tongass NF (Turner and Mallott 2025). *Mastigophora woodsii* has been shown to thrive at 33% relative humidity and perish at 15% which would constrain the potential habitats this species can survive in (Clausen 1964). Invasive species are not reported to occur in or near the coordinates for Occurrence 1 (USFS 2025b). Likewise, timber harvest has not occurred in the recent past near the sole occurrence of *Mastigophora woodsii* on Chichagof Island (USFS 2025c). From the information at hand, the densely forested muskeg wetland with the only known occurrence of this species seems stable.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Rank B when no localized threats are documented, but there are general threats and stressors.* Climate change may impact the habitat of *Mastigophora woodsii.* Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for species dependent on humidity and precipitation to maintain hydration, such as *Mastigophora woodsii* (Clausen 1964, Turner and Mallott 2025, Wiles and Warren 2025). Recent timber harvest activities have not occurred in the vicinity of the forested wetland at the known occurrence of *Mastigophora woodsii* (USFS 2025c). Forested muskeg are not likely targets for timber harvest. Acidic muskeg habitat is not likely to be invaded by the non-native plants currently known to exist on the Forest, and no non-native plants are reported in or near the occurrence, therefore invasive plants are likely not a threat to this occurrence.
8 Life history and demographics	B	*B = Low reproductive rate.* The life history of *Mastigophora woodsii* is not well described. It is a leafy liverwort with an erect growth habit (Singh, Paul and Saha 2024). It produces leafy stems with imbricate, lanceolate leaves that are embracing the stem (Singh, Paul and Saha 2024). *Mastigophora woodsii* is not known to reproduce sexually anywhere, including within its TNF range (Glime and Bisang 2017). Specialized asexual reproduction is not reported for this species either (Singh, Paul and Saha 2024), instead reproduction is done through branching and fragmentation (Damsholt 2017). The life span of *Mastigophora* plants has not been reported. *Mastigophora woodsii* has been shown to thrive at 33% relative humidity and perish at 15% (Clausen 1964).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information

Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

Mastigophora woodsii is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Due to known humidity requirements, *Mastigophora woodsii* may be impacted by future changes in patterns of precipitation and evapotranspiration due to climate change, but it is unclear whether this threat is significant. Range-wide threats to *Mastigophora woodsii* include agro-industry farming, fire, and competition from graminoids including invasive species (IUCN 2025).
- **Declining trends:** Population trends are unknown. Habitat trends at the single occurrence are unknown but expected to be stable.
- **Restricted ranges:** The occurrence on the Tongass NF is disjunct from the next known occurrence by over 300 miles and is the furthest north occurrence in the western hemisphere.
- **Low population numbers or restricted ecological conditions:** There is one occurrence in southeastern Alaska. The habitat as described is broadly available on the Tongass NF, but it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors:** Reproduction apparently only occurs through fragmentation, greatly limiting the potential dispersal of the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [7/11/2022]**	**Southeast Alaska Panhandle, NW Chichagof Island.**	**Densely forested muskeg dominated by *Callitropsis nootkatensis* and *Tsuga heterophylla*. Drier portions with *Picea sitchensis*. moist, partially shaded. Substrate: humic soil.**		
1	ACCSBryo_Oct24 [7/11/2022]	Southeast Alaska Panhandle, NW Chichagof Island.	Densely forested muskeg dominated by *Callitropsis nootkatensis and Tsuga heterophylla*. Drier portions with *Picea sitchensis*.		
1	ACCSBryo_Oct24 [7/11/2022]	Southeast Alaska Panhandle, NW Chichagof Island.	Densely forested muskeg dominated by *Callitropsis nootkatensis* and *Tsuga heterophylla.* Drier portions with *Picea sitchensis*.		

Melica subulata

Melica subulata [(Grisb.) Scribn.]

Alaska Oniongrass

Global Rank: **G5**
Alaska State Rank: **S2**

Photo: Alan Weakley (CC0: iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or Gaps* *Melica subulata* is known from 30 estimated occurrences on the Tongass NF (Appendices 1 and 2; Meridian Environmental 2011, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). The 30 occurrences are found on: Baranof Island (1 occurrence), Cone Island (1), Coronation Island (1), Heceta Island (4), Kosciusko Island (7), Kruzof Island (3), Prince of Wales Island (2), Suemez Island (8), Tuxecan Island (2), and Whale Head Island (1) (Appendix 1). Two of the Tongass NF occurrences are located in Wilderness Area with occurrence 1 in the South Baranof Wilderness and occurrence 18 in the Coronation Island Wilderness. An additional five occurrences are found just outside the Tongass NF boundary (Appendix 1). Together, these 35 occurrences make up the majority of Alaskan occurrences (Meridian Environmental 2011, Klinkenberg 2020, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Information recorded by observers and collectors indicates that *Melica subulata* grows in a variety of wet habitats on the Tongass NF including moist forests, edges of streams, alluvial areas, beaches and bays, wetlands, and muskeg (Appendix 1; Meridian Environmental 2011, ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). For locations

Criteria	*Rank*	*Rationale*
		encountered during 2010 surveys for this species, the habitat was summarized as forest edge near coastal beach and inland forest edge near wetlands or streams (Meridian Environmental 2011). *Melica subulata* is often found in occasionally-flooded areas that are a short distance from the edge of forest with intermediate canopy cover (Meridian Environmental 2011). Nine occurrences (#s 16, 17, 19, 21, 22, 23, 25, 26, 27) have habitat data that specify that *Melica subulata* was observed in or map within or in proximity to calcareous habitat (Appendix 1; Meridian Environmental 2011). However, other occurrences (for example # 14 and four documented in 2010) were observed in muskeg (Appendix 1; Meridian Environmental 2011). Therefore, *Melica subulata* is not an obligate calciphile on the Tongass NF. Associated species observed with *Melica subulata* on the Tongass NF include: *Tsuga heterophylla*, *Picea sitchensis*, *Thuja plicata, Alnus rubra*, *Vaccinium* species, *Festuca subulata*, *Heracleum lanatum*, *Rubus spectabilis*, *Ribes bracteosum*, *Bromus sitchensis*, *Athyrium filix-femina*, and/or mosses (Appendix 1; Meridian Environmental 2011, ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a).
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the Tongass NF* Global Rank: G5 (Secure), Alaska State Rank: S2 (Imperiled) (NatureServe 2025) State Ranks: Canadian provinces and territories: S2 (Imperiled): Alberta; S5 (Secure): British Columbia; all others not present. United States: S1 (Critically Imperiled): Colorado, Nevada; S2 (Imperiled): Alaska; S2 (Imperiled): Montana, Wyoming; all others are S4 (Apparently Secure), SNR (Not Ranked), or not present (NatureServe 2025). *Melica subulata* is a perennial rhizomatous herb in the Poaceae with a broad distribution in western North America and Eurasia (Barkworth 2007). In Canada, it only occurs in Alberta and British Columbia (Barkworth 2007, NatureServe 2025, NRCS 2025). In the United States it occurs from Alaska south along the west coast to California, and in the interior states of Colorado, Idaho, Montana, Nevada, South Dakota, and Wyoming (Barkworth 2007, NatureServe 2025, NRCS 2025). There are 30 occurrences of *Melica subulata* from the Tongass NF (Meridian Environmental 2011, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). The nearest Alaskan records are five occurrences that are located on Kosciusko, Long, Tuxecan, and Prince of Wales islands just outside the Tongass National Forest boundary (ANHP-ACCS

Criteria	*Rank*	*Rationale*
		2025, USFS 2025a). The next closest Alaskan record is on Unalaska Island approximately 1200 miles to the west-northwest (Arctos 2025, CPNWH 2025). Southern Alaska is at the northern edge of the species' range and most of the Alaskan records are from the Alexander Archipelago on Tongass National Forest lands (Meridian Environmental 2011, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). The species is common on Vancouver Island and the Queen Charlotte Islands in British Columbia and infrequent elsewhere in the province (Klinkenberg 2020). Throughout its range, *Melica subulata* occurs in moist to dry meadows and forests and is often found in nitrogen rich soils (Barkworth 2007, Klinkenberg 2020). It grows from the lowlands to montane zones at altitudes ranging from near sea level to approximately 7550 feet (2300 m) (Barkworth 2007, Klinkenberg 2020).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* The seeds (within the florets) are thought to be wind-dispersed, but they have no specialized structures to aid in wind dispersal (Brightly et al. 2024). In forested habitat, the average seed dispersal range is estimated at 0.69 ± 0.31 meters, while in meadow habitat it is 4.94 ± 2.44 meters (Brightly et al. 2024). Therefore, the seeds fall fairly close to the parent plant. There is speculation that the seeds of other *Melica* species may be spread short distances by small ground foraging mammals or birds (Smith 2021). Given that this species has dispersed to 10 islands, it may have some long-distance dispersal capability. Whether this species can reproduce clonally by rhizome or corm fragmentation is not documented.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Melica subulata* is known from 30 estimated occurrences on ten islands on the western side of the Tongass NF (Appendices 1 and 2; Meridian Environmental 2011, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Eight occurrences (record #s 1, 2, 3, 13, 14, 15, 16 and 17) have populations counts (Appendix 1). Three have 45 or fewer

Criteria	*Rank*	*Rationale*
		plants, three have between 100 and 150 plants, one (occurrence 3) has 1,000 plants, and one (occurrence 2) has an estimated 10,000 plants (USFS 2025a). Based on the number of occurrences (30) and small size of most of the censused populations, this species is uncommon within the Tongass NF boundary.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Melica subulata* on the Tongass NF are unknown due to lack of repeat population counts of the occurrences (USFS 2025a).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat; relatively unchanged habitat quality.* *Melica subulata* is found in a variety of wet habitats on the Tongass NF including moist forests, edges of streams, alluvial areas, beaches and bays, wetlands, and muskeg (Appendix 1; Meridian Environmental 2011, ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a).These habitats can be grouped under forested and non-forested wetlands, which are freshwater, non-tidal influenced vegetation types with saturated soils (Turner and Mallott 2024). Wetlands are abundant on the Tongass NF and generally have high ecosystem integrity (Turner and Mallot 2025). However, soil saturation, influenced by landscape position, soil drainage, and hydrology drives vegetation composition in wetlands (Turner and Mallott 2024). Activities that impact hydrology could cause a negative habitat trend in adjancent wetlands Of the 30 total occurrences, 21 are within one mile of a mapped historical or recent timber project, and five are within a timber project footprint (USFS 2025d). From aerial imagery, the landscape near these 21 occurrences has been greatly altered with both timber removal and road building. Most of these occurrences that are near or within timber project footprints are on Prince of Wales, Heceta, Koskciusko, Tuxecan, and Suemez islands; none of the occurrences on Baranof, Cone, Coronation, and Whale Head islands are near timber projects (Appendix 1, USFS 2025d). Of the 22 occurrences that are located in a habitat described as a wetland, 14 are within one mile of a mapped historical or recent timber project (Appendix 1; USFS 2025d). Whether timber harvest and associated road building has affected the habitat of *Melica subulata* is not known. This species is known to prefer forest edge habitat and to tolerate a certain

Criteria	*Rank*	*Rationale*
		amount of natural and manmade disturbance (Meridian Environmental 2011, Montana Natural Heritage Program 2025). Occurrences in or near mapped karst forest may be particularly susceptible to impacts from harvest because these forests produce large, high grade trees and 44% of productive old growth forests on karst lands have been logged since 1954 (Boggs et al. 2019). This can lead to long-term declines in soil depth and fertility in this habitat (Boggs et al. 2019). In addition, nine of the occurrences are located within one mile of mapped non-native plants, with most within 1000 feet (Appendix 1; USFS 2025b). Non-native weeds that have been mapped (mostly along roads) in the vicinity of the occurrences include *Phalaris arundinacea*, *Arrhenatherum elatius*, *Phleum pratense*, *Plantago major*, *Taraxacum officinale*, *Trifolium repens*, *Leucanthemum vulgare, Crepis tectorum*, *Poa pratensis*, *Poa annua*, *Medicago lupulina*, *Cerastium fontanum*, *Hieracium aurantiacum*, *Ranunculus repens*, and *Mycelis muralis*.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Invasive species, timber activities, and climate change may impact the habitat of *Melica subulata*. As mentioned in Criterion 6, invasive species are known to be present in the vicinity of nine occurrences of *Melica subulata* on the Tongass NF (USFS 2025b). For example, the population coordinates for occurrence 27 along a creek on Prince of Wales Island are within 170 ft of mapped polygons of reed canary grass (*Phalaris arundinacea*) and other weeds (ANHP-ACCS 2025, USFS 2025b), and occurrence 4 on Kruzof Island was observed growing adjacent to reed canary grass (USFS 2025a). The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut 2024, Wiles and Warren 2024), and reed canary grass has the ability to invade wetland habitats (APMC 2024). Therefore, at some locations invasive species may outcompete *Melica subulata* in the future. In addition, timber harvest activities have occurred adjacent to or in the vicinity of *Melica subulata* (USFS 2025d). If this activity continues to occur in the future, especially in karst forest habitat, this could impact soil drainage, soil

Criteria	*Rank*	*Rationale*
		saturation, and hydrology in habitat for *Melica subulata* and could alter species composition (Boggs et al. 2019, Turner and Mallott 2024). Additionally increased air temperature and evapotranspiration may lead to growing season water deficit which could cause drought stress for *Melica subulata* (Turner and Mallott 2024, Wiles and Warren 2024). Although it is expected that wetland ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2024).
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** *Melica subulata* is a perennial grass with culms (stems) 55 to 125 cm tall; the culms are tufted and attached to a short rhizome (Boyle 1941, Barkworth 2007). As in several other *Melica* species, the stems have an onion-like corm at the base (Boyle 1941, Barkworth 2007), which may function as a starch storage organ or to protect the resting buds at or near the soil surface (Khodaverdi et al. 2023). In either case, the corms represent an adaptation to harsh winter conditions (Khodaverdi et al. 2023). *Melica* species are also generally tolerant of cold temperatures (Khodaverdi et al. 2023). All grasses have highly reduced flowers (florets) that lack petals or other showy parts; they are predominantly wind-pollinated, representing an adaptation to provide reproductive assurance when pollinators are scarce (Davis et al. 2004, Friedman and Barrett 2009). Similar to most other grasses in subfamily Pooideae, all *Melica* species tested to date are

Criteria	*Rank*	*Rationale*
		long-day flowering, meaning that they flower faster in photoperiods with greater than 12 hours of light per day (Fjellheim et al., 2022). The inflorescence of *Melica subulata* is a narrow panicle with each branch consisting of 1 to 5 spikelets; each spikelet is made up of two sterile bracts at the base and 2 to 5 bisexual florets (Boyle 1941, Barkworth 2007). At maturity, the axis of the spikelet separates above the basal bracts and between the florets; each individual floret is therefore a unit of seed dispersal (Boyle 1941, Barkworth 2007). The florets are thought to be wind-dispersed, but they have no specialized structures to aid in wind dispersal (Brightly et al. 2024). For *Melica subulata* in forested habitat, the average seed dispersal range is estimated at 0.69 ± 0.31 meters, while in meadow habitat it is 4.94 ± 2.44 meters (Brightly et al. 2024). The longevity of individual *Melica subulata* plants has not been studied, but a demographic monitoring study on the central Great Plains (Kansas, USA), has shown that perennial grasses generally follow a Type III survivorship curve, meaning that individuals have a very high chance of mortality in the seedling stage but a much lower mortality rate for those few individuals surviving to reproductive age (Lauenroth and Adler 2008). *Melica subulata* is reportedly tolerant of habitat disturbances associated with roads, trails, and forestry prescriptions (Montana Natural Heritage Program 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

- **Significant threats**: Melica subulata and its habitat may be directly impacted by timer harvest, road building and/or invasive species, which are all occur near several known occurrences of this species. In addition, timber harvest and

road building may alter hydrology and indirectly impact wetland habitat for this species.

- **Declining trends**: Population trends are not known. Wetland habitat has relatively high ecosystem integrity. Increased temperatures and evapotranspiration may lead to growing season water deficit, which could alter wetland hydrology and vegetation composition.
- **Restricted ranges**: The occurrences on the Tongass NF are near the northern edge of the range for this species, but it is otherwise widespread in North America.
- **Low population numbers**: There are 30 known occurrences of this species on the Tongass NF, on 10 different islands on the western edge of the Forest. *Melica subulata* may be tolerant of some disturbance.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Personal Communications

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ANHP-ACCS_Mar25 (EO17)[7/18/2009]**	**Sandy Bay, N arm, trail to Lake Maksoutoff waterfall**	**mixed forest of Picea sitchensis and Alnus rubra, infrequent [From analysis layers: 130 ft from pacific tidal marsh, 700 ft from cano wetland, not near timber project, 80 ft from mapped weeds Arrhenatherum elatius, Phleum pratense, not near mapped timber projects. Presence of Alnus indicates near waterway.]**		
1	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:245364)[7/18/2009]	Sandy Bay, N arm, trail to Lake Maksoutoff waterfall, Port Alexander Quad, Alexander Archipelago, Baranof Island. South Baranof Wilderness.	Mixed forest of Picea sitchensis and Alnus rubra, infrequent.		
1	ANHP-ACCS_Mar25 (EO29)[7/25/2012]	Baranof Island, Sandy Bay, near hatchery site.	Open forest, old road bed.		
1	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:24667)[7/25/2012]	Baranof Island, Sandy Bay, near hatchery site, Port Alexander Quad.	Open forest, old road bed, common.		
1	USFS-TESP_Mar25 (100531P00203Y12)[7/25/2012]	Concentrated along the old hatchery road		150 plants, concentrated along the old hatchery road	
2*	**ANHP-ACCS_Mar25 (EO16)[7/02/2008]**	**[Maps to Kruzof Island]**	**This species was first noted near stream just in from beach, then large numbers seen in bottom of small canyon. [From analysis layers: located in mapped Callitropsis nootkatensis wetland. Not near mapped timber projects or weeds.]**	**Large numbers**	
2	ANHP-ACCS_Mar25 (EO16)[7/02/2008]	[Maps to Kruzof Island]			
2	USFS-TESP_Mar25 (100531PG00001)[7/02/2008]	[Maps to Kruzof Island]		10000 plants	

2	ANHP-ACCS_Mar25 (EO16)[7/02/2008]	Sitka Quad: Kruzof Island, Alexander Archipelago, Port Mary.	open forest		
2	CPNWH_Mar25 (UAAH9954)[7/02/2008]	Sitka Quad.: Kruzof Island, Alexander Archipelago, Port Mary.	open forest, N aspect, 5 degree slope.	Common	
2	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:240533)[7/02/2008]	Port Mary, Sitka Quad, Alexander Archipelago, Kruzof Island.	Open forest, N aspect, 5 degree slope.		
3*	**ANHP-ACCS_Mar25 (EO18)[7/20/2011]**	**[Maps to East Kruzof Island.]**	**[From analysis layers: 200 ft from Pacific tidal marsh, 400 feet from mapped Callitropsis nootkatensis wetland, not near mapped timber projects or weeds]**		
3	ANHP-ACCS_Mar25 (EO18)[7/20/2009]	[Maps to East Kruzof Island.]			
3	USFS-TESP_Mar25 (100531P00198)[7/20/2011]	[Maps to East Kruzof Island.]	Population found along small stream in somewhat open forest	1000 plants	
4*	**USFS-TESP_Mar25 (100531P00206Y13)[6/27/2013]**	**[Maps to Kruzof Island N of other occurrence]**	**Roadside and shaded by red alder. Some Phalaris arundinacea associated with population. [Analysis layer information: 80 ft from mapped Callitropsis nootkatensis wetland, located within mapped 1972 timber project, and 500 ft from mapped Poa annua, Ranunculus repens] [Presence of Alder indicates near a waterway]**		
5*	**ANHP-ACCS_Mar25 (EO7)[6/29/1994]**	**Craig Quad: Siketi Sound, Cone Island, N side of island.**	**Sitka spruce-hemlock forest on slope, alder slide zone with forest [Analysis layers indicate not within or near ecosystem of conservation concern, mapped timber projects, or mapped weeds] [presence of Alder indicates near waterway]**		
5	Arctos 2025 (UAM:Herb:11816); CPNWH_Mar25 (UAAH10549)[6/29/1994]	CRAIG QUAD.: Siketi Sound, Cone Island, N side of island	sitka spruce-hemlock forest on slope, alder slide zone with forest.		
6*	**ANHP-ACCS_Mar25 (EO10)[7/23/2002]**	**Suemez Island, SCRATCHINGS,RDLINE U61**	**[From analysis layers: 0.1 mile from mapped Callitropsis nootkatensis wetland on two sides, 0.1 mile from two mapped timber projects from 1994 and 1995, no weeds]**		

6	USFS-TESP_Mar25 (100551P000088)[7/23/2002]	Suemez Island, SCRATCHINGS,RDLINE U61			
7	**ANHP-ACCS_Mar25 (EO11)[7/25/2002]**	**Suemez Island, SCRATCHNGS,RDLINE U25,27,28,30,**	**[From analysis layers: 200 ft from mapped Calitropsisl nootkatensis wetland, no mapped timber projects, no mapped weeds]**		
7	USFS-TESP_Mar25 (100551P000089)[7/25/2002]	Suemez Island, SCRATCHNGS,RDLINE U25,27,28,30,			
8*	**ANHP-ACCS_Mar25 (EO12)[7/30/2002]**	**Suemez Island, SCRATCHINGS,RDLINE N OF U63**	**[From analysis layers: not near an ecosystem of conservation concern, 0.12 mile from mapped 1986 timber project, 0.25 mile from mapped 1995 and 2009 timber projects, 0.18 mile from mapped Phalaris arundinacea, Poa annua, Plantago major, Poa pratensis, Cerastium fontanum, Medicago lupulina, Trifolium repens]**		
8	USFS-TESP_Mar25 (100551P000090)[7/30/2002]	Suemez Island, SCRATCHINGS,RDLINE N OF U63			
9*	**ANHP-ACCS_Mar25 (EO13)[8/02/2002]**	**Suemez Island, SCRATCHINGS,RDLINE U12**	**[From analysis layers: not near an ecosystem of conservation concern, located within mapped 1986 timber project, 0.45 mile from mapped Mycelis muralis, Phalaris arundinacea, Poa annua, Plantago major, Cerastium fontanum]**		
9	USFS-TESP_Mar25 (100551P000091)[8/02/2002]	Suemez Island, SCRATCHINGS,RDLINE U12			
10*	**ANHP-ACCS_Mar25 (EO14)[8/06/2002]**	**Suemez Island, SCRATCHINGS,RDLINE U82 TO U80**	**[From analysis layers: located on edge of mapped Callitropsis nootkatensis wetland, 0.9 mile from mapped 1995 timber project, no mapped weeds]**		
10	USFS-TESP_Mar25 (100551P000092)[8/05/2002]	Suemez Island, SCRATCHINGS,RDLINE U82 TO U80			
11*	**USFS-TESP_Mar25 (100551P000093)[8/06/2002]**	**Suemez Island, SCRATCHINGS,RDLINE TO U46**	**[From analysis layers: located within mapped Callitropsis nootkatensis wetland, 0.6 mile from mapped 1995 timber project, no mapped weeds]**		
11	ANHP-ACCS_Mar25 (EO15)[8/15/2002]	Suemez Island, SCRATCHINGS,RDLINE TO U46			
12*	**USFS-TESP_Mar25 (100551P000095)[8/15/2002]**	**Suemez Island, SCRATCHINGS, RDLINE U92-U96**	**[From analysis layers: not located in a mapped ecosystem of conservation concern, 0.75 mile from mapped 1995 timber project, no mapped weeds]**		

12	ANHP-ACCS_Mar25 (EO14)[8/05/2002]	Suemez Island, SCRATCHINGS, RDLINE U92-U96			
13*	**USFS-TESP_Mar25 (100554P000459Y 12)[8/06/2012]**	**[maps to Halibut Harbor on Kosciusko Island]**	**Found in partial shade in fine sand of wet alluvial fan of small creek outflow adjacent to shoreline beach. Area is open to one side and forested on other with thick alders blocking ocean view from the plant location. [From analysis layers: located on edge of mapped pacific tidal marsh, 0.13 mile from numerous mapped timber projects from 1950s, no mapped weeds.**	**100 plants. Healthy, fairly dense population of 50 square feet.**	
14*	**USFS-TESP_Mar25 (100554P000473Y 12)[8/04/2012]**	**[maps to Kosciusko Island]**	**Along stream edged with THPL/TSHE (Thuja plicata, Tsuga heterophylla) and VAAL/VAOV (Vaccinium alaskaense, Vaccinium ovatum) running through muskeg. Growing in wet muck and silty clay in partial shade. [From analysis layers: located in mapped Callitropsis nootkatensis wetland, 0.28 mi from mapped 1965 timber project, not near mapped weeds.}**	**5 plants, sparse and scattered within cluster of another grass type.**	
15*	**USFS-TESP_Mar25 (100554P000477Y 12)[8/07/2012]**	**[maps to Kosciusko Island]**	**Found on the edge of the water and at the head of the bay in blowdown spruce/cedar/hemlock. [From analysis layers: located on edge of mapped pacific tidal marsh, 450 ft from mapped 1955 timber project and a bit further from 1976 project. 1000 ft from mapped weeds: Plantago major, Leucanthemum vulgare, Crepis tectorum, Phalaris arundinacea, Taraxacum officinalis, Poa pratensis.}**	**10 plants**	
16*	**USFS-TESP_Mar25 (100554P000485Y 12)[6/21/2012]**	**[maps to Kosciusko Island]**	**The MESU was growing along the edges of a stream, just downstream from the resurgence and several sinkholes in the area. There is likely a high calcareous influence at the site. [From analysis layers: Not located within mapped ecosystem of conservation concern. 700 ft from several mapped 1976 timber projects. 175 ft from mapped weed Hieracium aurantiacum.]**	**45 plants**	
17*	**USFS-TESP_Mar25 (100554P000457Y 12)[8/04/2012]**	**[maps to Kosciusko Island] This EO is connected to survey number 100554S000447Y12**	**In Spruce-Cedar-Hemlock Forest Shrub swamp. MESUS found along a small stream edged with red cedar/western hemlock and a sea of Vaccinium spp. Growing in partial shade in moist loam to muck. [From analysis layers: Not located in an ecosystem of conservation concern. Located within mapped 1955 and 1968 timber projects. 0.2 and 0.38 mi from mapped weeds: Hieracium aurantiacum, Taraxacum officinale. 800 ft from many more: Leucanthemum vulgare, Cerastium vulgare, Trifolium repens, Plantago major, Phalaris arundinacea.]**	**5 plants, scattered.**	
17	USFS-TESP_Mar25 (100554P000497Y1 2)[8/03/2012]	[maps to Kosciusko Island]		50 plants	

17	USFS-TESP_Mar25 (100554P000498Y12)[8/03/2012]	[maps to Kosciusko Island]		30 plants	
17	USFS-TESP_Mar25 (100554P000499Y12)[8/03/2012]	[maps to Kosciusko Island]	Growing along streambanks along a tributary for Survey Creek. Many resurgences and caves, has a high calcareous influence throughout the channel.	50 plants	
18*	**ANHP-ACCS_Mar25 (EO5)[7/29/1960]**	**Alexander Archipelago, Coronation Island, Egg Harbor. Coronation Island Wilderness.**	**small opening in woods [From analysis layers: Not located in mapped ecosystem of conservation concern, not near timber projects or weeds]**		
18	Arctos 2025(ALA-UAM:Herb:48666)[7/29/1960]	Alexander Archipelago, Coronation Island, Egg Harbor	small opening in woods		
19*	**Arctos 2025 (UAM:Herb:11710); CPNWH 2025 (WTU408525)[7/12/1994]**	**Craig Quad. Heceta Island, Port Alice, road system between Port Alice and Bald Mountain.**	**Sitka spruce-hemlock-cedar forest on limestone, wet open bog. [From analysis layers: located 1200 ft from Callitropsis nootkatensis wetland.Located in mapped 1985 timber project. No mapped weeds.]**		
19	ANHP-ACCS_Mar25 (EO8)[7/12/1994]	Craig Quad. Heceta Island, Port Alice, road system between Port Alice and Bald Mountain.	Sitka spruce-hemlock-cedar forest on limestone, wet open bog.		
20*	**ANHP-ACCS_Mar25 (EO9)[6/20/1996]**	**Tuxecan Island.**	**Streambank. [From analysis layers: located in mapped Callitropsis nootkatensis wetland. 500 ft from mapped 1986 timber project. No mapped weeds.]**		
20	CPNWH 2025 (WTU408526) [7/20/1996]	Tuxecan Island. T70S R79E S36 NW 1/4 SE 1/4 [This township and range NE corner is on Tuxekan Island near Section 36]	Streambank.		
21*	**ANHP-ACCS_Mar25 (EO19)[7/09/2010]**	**[Maps to whale head island. This is likely Meridian Environmental (2011) survey 100554S00262 and EO 100554P000221 at Whale Head Island]**	**Slope = 30; Aspect= 120 ; Substrate= Soil; Soil Moisture= Moist; Light Exposure= Partial Shade; Second subpopulation has NW aspect, in small embayment immediately to the north. [From analysis layers: Located within mapped Karst Tsuga heterophylla Picea sitchensis Plant Association. 20 ft from mapped pacific tidal marsh. Not near mapped timber projects or weeds.]**		
22*	**ANHP-ACCS_Mar25 (EO20)[7/09/2010]**	**[maps to Halibut Harbor on Kosciusko Island. This is likely Meridian Environmental (2011) survey 100554S00266 and EO 100554P000223 at Halibut Harbor]**	**Halibut Harbor. Slope = 1; Aspect= 76 ; Substrate= Soil; Parent Material= Alluvium; Light Exposure= Full Shade. [From analysis layers: Located 150 ft from mapped Pacific Tidal marsh, 500 ft from mapped Karst Tsuga heterophylla Picea sitchensis Plant Association. 0.25 mile from several mapped 1977 timber projects which abutt 1958 timber projects. No mapped weeds.]**		

23*	**ANHP-ACCS_Mar25 (EO21)[7/11/2010]**	**[maps to Marsh Creek, East Heceta Island. This is likely Meridian Environmental (2011) survey 100554S00238 and EO 100554P000224 at East Heceta Beaver Ponds.]**	**East Heceta Beaver Ponds. Most of population along edge of large sedge fen. One small group of plants (5-6) at NE edge. Slope = 10; Aspect= 290 ; Substrate= Soil; Soil Moisture= Moist; Soil Texture= loam; Light Exposure= Partial Shade. [From analysis layers: Located in mapped Karst Tsuga heterophylla Picea sitchensis Plant Association. 200 ft from and surrounded by mapped 1972 timber project. No mapped weeds.]**		
24*	**ANHP-ACCS_Mar25 (EO22)[7/11/2010]**	**[maps to Dead Tree Point, Heceta Island. This is likely Meridian Environmental (2011) survey 100554S00245 and EO 100554P000228 at Beach South of Dead Tree Point]**	**Aspect= 322 ; Substrate= Soil; Soil Moisture= Moist; Soil Texture= loam; Light Exposure= Partial Shade. [From analysis layers: Located 90 ft from mapped Pacific Tidal Marsh. Located within mapped 1974 timber project. No mapped weeds.]**		
25*	**ANHP-ACCS_Mar25 (EO23)[7/11/2010]**	**[maps to next peninsula south of Dead Tree Point, north of White Cliff, Heceta Island. This is likely Meridian Environmental (2011) survey 100554S00244 and EO 100554P000230 at Beach North of White Cliff.]**	**Slope = 3; Aspect= 134 ; Substrate= Soil; Light Exposure= Partial Shade. [From analysis layers: Located 80 ft from mapped Pacific Tidal Marsh. 400 feet from mapped Karst Tsuga heterophylla Picea sitchensis Plant Association. 800 ft from mapped 1920 timber project. No mapped weeds]**		
26*	**ANHP-ACCS_Mar25 (EO24)[7/12/2010]**	**[maps to Trout Creek outlet, Kosciusko Island] Six subpopulations: two along beach, one at GPS point above, another to north at 56.0525 [This is likely Meridian Environmental (2011) survey 100554S00220 and EO 100554P000234 at Trout Creek Beach]**	**[maps to Trout Creek outlet]. Slope = 5; Aspect= 290 ; Substrate= Gravel; Parent Material= Alluvium; Soil Moisture= Moist; Light Exposure= Partial Shade; [From analysis layers: located in mapped Pacific Tidal Marsh and Karst Tsuga heterophylla Picea sitchensis Plant Association. 0.8 mile from two mapped 1982 timber projects. No mapped weeds.]**	**Six subpopulations: two along beach, one at GPS point above, another to north at 56.0525**	
27*	**ANHP-ACCS_Mar25 (EO25)[7/14/2010]**	**[maps to Prince of Wales Island, along North Prince of Wales Road at south end of Sarkar Lake, likely a Meridian Environmental (2011) survey. Possibly survey 100554S00253 and EO 100554P000238 at Clam Creek.]**	**[Clam Creek?] Slope = 4; Aspect= 92 ; Substrate= Soil; Parent Material= Alluvium; Light Exposure= Full Sun. [From analysis layers: located in mapped Karst Tsuga heterophylla Picea sitchensis Plant Association. 100 ft from mapped 1982 timber project footprint. 170 ft from large polygon of mapped weeds: Plantago major, Phleum pratense, Phalaris arundinacea, Trifolium repens, and a bit further away in the 1982 timber footprint, there are more polygons with same weeds plus Taraxacum officinale.}**		
28*	**ANHP-ACCS_Mar25**	**[maps to Prince of Wales Island east of Sarkar Lake. This is**	**Slope = 3; Aspect= 130 ; Substrate= Soil; Soil Moisture= Wet; Light Exposure= Partial Shade. [From analysis layers:**		

	(EO26)[7/16/2010]	**likely Meridian Environmental (2011) survey 100554S00226 and EO 100554P000246 at Wetlands East of Sarkar]**	**located in mapped Callitropsis nootkatensis wetland. 0.3 mile from mapped 1977 timber project, and a bit further from 1990 and 1999 projects. 0.5 mile from mapped weeds: Phalaris arundinacea and Trifolium repens, and there are over 30 polygons of these plants and other weeds to the south of occurrence in timber footprints.}**		
29*	**ANHP-ACCS_Mar25 (EO6)[7/23/1979]**	**Alexander Archipelago, Suemez I., Cape Felix, cove just W of southernmost point between Cape Felix and Arena Cove**	**behind beach under Picea sitchensis, panicle nodding. [From analysis layer: located 250 feet from mapped pacific tidal marsh. Not near mapped timber projects or weeds.]**		
29	Arctos 2025(ALA-UAM:Herb:48665)[7/29/1960]	Alexander Archipelago, Suemez Island, Cape Felix, cove just W of southernmost point between Cape Felix and Arena Cove, Craig Quad, Tongass National Forest.	behind beach under Picea sitchensis, panicle nodding		
30*	**ANHP-ACCS_Mar25 (EO9)[7/23/1979]**	**[maps to southwest Tuxecan Island, south side of Karheen Lakes. This is likely Meridian Environmental (2011) survey 100554S00229 and EO 100554P000263 at Southwest Tuxecan Island]**	**Substrate= Soil; Parent Material= Alluvium; Soil Moisture= Moist; Soil Texture= loam; Light Exposure= Partial Shade. [From analysis layers: located in mapped Callitropsis nutkatensis wetland. 0.25 mile from mapped 1989 timber project as well as privately owned timberland. No mapped weeds nearby.]**		
		Not On Tongass			
31*	**USFS-TESP_Mar25 (100554P000469Y12)[6/22/2012]**	**[Maps to tributary of Survey Creek on Kosciusko Island]**	**Scattered in patches along the banks of Survey Creek.**	**45 plants**	
32*	**USFS-TESP_Mar25 (100554P000444Y12)[8/04/2012]**	**[Maps to Kosciusko Island]Take the mainline 1500000 from Edna Bay and take a right on 1522000 [or go in from the 1520000] and take the first right on to 1522100. Find plant west of the road.**	**Found on a small shelf eroding into an open upwelling spring below a grassy meadow area adjacent to an old logging road.**	**3 plants**	
33*	**ANHP-ACCS_Mar25 (EO2)[no date]**	**Howkan village site vicinity, on northwest coast of Long Island.**			
34*	**ANHP-ACCS_Mar25 (EO27)[7/19/2010]**	**[maps to northwest Tuxekan Island. This is likely Meridian Environmental (2011) survey 100554S00257 and EO**	**Vegetation= ; Slope = 2; Aspect= 310 ; Substrate= Soil; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=**		

		100554P000266 at Northwest Tuxecan Fen]			
35*	**ANHP-ACCS_Mar25 (EO28)[7/13/2011]**	**Prince of Wales Island.**	**Open forest, near small stream.**		

Micranthes nelsoniana var. carlottae

Micranthes nelsoniana var. *carlottae* [(Calder & Savile) Gornall & H. Ohba]

Dotted or heartleaf saxifrage

Global Rank: **G5T3**
Alaska State Rank: **S2**



photo: Klinkenberg 2023

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. *Micranthes nelsoniana var. carlottae* is known from four estimated occurrences on the Tongass National Forest (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The habitat for all of these occurrences is alpine. There is an additional occurrence not on TNF land on Chichagof Island. In addition, a plant intermediate between var. *carlottae* and var. *porsildiana* is known from Taku Inlet, Sheep Fork of Carlson Creek (ARCTOS 2023). Additional information about the taxonomy of this subspecies is found in Brouillet and Gornall (2007), and Calder and Savile (1960), and Hultén (1973). While there are few herbarium specimens recorded as *var. carlottae*, there are many more (approximately 35 on CPNWH in March 2025) specimens of *M. nelsoniana* not identified to variety, as well as many (approximately 24 on CPNWH in March 2025) identified to *var. porsildiana*. Flora of British Columbia mentions that the varieties intergrade. More information is needed to determine the true distribution of *var. carlottae* on the Tongass.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass NF Global Rank G5T3, Alaska State Rank S2 British Columbia Province Rank S4, Yellow List; Yukon Territory SU *Micranthes nelsoniana var. carlottae* is known mostly from Haida Gwaii and adjacent coastal British Columbia (Flora of North America). There are four additional herbarium records from elsewhere in Alaska. Two are within the Togiak National Wildlife Refuge, and one is between Cape Yakataga and Cape Suckling (CPNWH 2023). In Canada, 28 occurrences are known to British Columbia throughout Haida Gwaii (Queen Charlotte Islands), adjacent British Columbia (Brouillet and Elvander 2009), and northern alpine British Columbia (BCCDC 2021). Habitat includes open alpine, alpine heath, subalpine meadows rocky streamsides, gravel bars, rocky areas, crevices in rock cliffs, talus/scree slopes (BCCDC 2023).
3 Dispersal capability	B	B = Disperses only through suitable habitat Although there is no information specific to the dispersal capability of *Micranthes nelsoniana* var. *carlottae*, species in the genus *Saxifraga* (sensu Webb and Gornall 1989, which includes *Micranthes*) are dispersed by wind or water, including water from melting snow (Webb and Gornall 1989 in Fukuda et al. 2023). This suggests that *Micranthes nelsoniana* var. *carlottae* may disperse through suitable habitat such as streambanks or talus slopes through either wind or water, including snowmelt.
4 Abundance on Tongass NF	D	D: Insufficient information to draw inferences about criterion. *Micranthes nelsoniana* var. *carlottae* is known from four occurrences on the Tongass National Forest. The number of individuals in each population is unknown, but two herbarium labels state that the species was “common”, and another says “frequent”. Additionally, there are approximately 35 herbarium records of *Micranthes nelsoniana* that are not identified to variety, so the true abundance of this species on the Tongass NF is unknown.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information about population trends on the Tongass National Forest.
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity* Habitat as described on herbarium labels for Tongass National Forest specimens includes alpine and subalpine meadows, banks of streamlets, and talus slopes. Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors. Additionally, more localized threats to alpine habitat include mining, communication sites, and recreation (Turner and Mallott 2025).
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc* Alpine ecosystem integrity is highly vulnerable due to climate change (Turner and Mallot 2025). Increased temperatures and a shift from snow to rain may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al DRAFT). Projected increased temperatures are likely to increase evapotranspiration, which may affect available water within habitat for this species (Shanley et al. 2015, Bennetsen et al. 2023). Changes to water dynamics can alter plant community composition and competitive dynamics, and may result in encroachment by trees or shrubs. Increased temperatures can also disrupt plant-animal interactions (pollinators, seed dispersers) when species respond differently to warming conditions (Parmesan 2006, Fricke et al. 2022). Tree encroachment and densification within habitat for *Micrantes nelsoniana* var. *carlottae* may change the immediate growing environment for this species where it occurs in transitional zones between subalpine and forested landscapes. Conversely, the increase in alpine habitat as glaciers recede (Bennestsen et al. 2023, Shanley et al. 2015) could expand

Criteria	*Rank*	*Rationale*
		potential habitat for this taxon. As little is known about the dispersal ability of this species, it is unknown whether or how rapidly this species could adapt to changes in habitat distribution.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. There is no available information about this plant's life history or demographics.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

- **Significant threats**: Alpine ecosystem integrity is highly vulnerable due to climate change. Increased temperatures and a shift from snow to rain may lead to woody encroachment in alpine habitat and fragmentation and loss of alpine plant communities
- **Declining trends**: Population trends are unknown. Alpine habitat is highly vulnerable to stressors
- **Restricted ranges**: *Micranthes nelsoniana var. carlottae* is known only from British Columbia, Yukon and Alaska.
- **Low population numbers**: There are four confirmed occurrences of *Micranthes nelsoniana var. carlottae* on the Tongass NF. However, there are many more (approximately 35 on CPNWH) specimens of *M. nelsoniana* not identified to variety, as well as many (approximately 24 on CPNWH in March 2025) identified to *var. porsildiana*. Flora of British Columbia mentions that the varieties intergrade. More information is needed to determine the true distribution of *var. carlottae* on the Tongass.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	CPNWH_Nov25 [9/2/1971]	Salmon Mountain, 4 miles north of Whales Pass, Prince of Wales Island	Elevation: 2500 ft. Moist crevices; conglomerate substrate		
2	ALA_Nov25 [7/29/2013]	Mainland, south of Bradfield Canal, Cleveland Peninsula, east of Hoya Creek, west of Anan Creek, Bradfield Canal Quad, Tongass National Forest	Elevation: 891 m. small alpine lake surrounded by limestone, alpine meadow at lake margin, common	common	
3	ALA_Nov25 [8/7/2013]	Mainland, Stanton Lake, N of Farragut R, E of Sandborn Canal, W ridge above lake to Granit Peak, Sumdum Quad, Tongass National Forest	Elevation: 1020 m. alpine, common	Common	
4	ACCS_Mar25 [8/3/1982]	Alexander Archipelago, Etolin I.	Alpine; frequent along streamlet	frequent	
	In SE but not on TNF				
	ACCS_Mar25 [8/31/81]	Southeast; Chichagof Island; Icy Strait area; Gallagher Creek Drainage	Aspect: northwest; slope: 70 percent. Talus slope; in small soil pockets	Locally common	

Micranthes tolmiei

Micranthes tolmiei [(Torr. & A. Gray) Brouillet & Gornall]

Tolmie's saxifrage

Global Rank: **G5**

Alaska State Rank: **S2S3**

photo: Virginia Skilton, E-Flora BC



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B1	B = Habitat exists primarily as patches, some of which are small or isolated to the degree that species interactions are limited by movements between patches. *Micranthes tolmiei* is known from 24 estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). the occurrences are scattered north to south on the Forest, in alpine areas of the inner islands and mainland, including: - Mainland near Juneau (2 occurrences - Powerline ridge near Sheep Creek and Blackerby Ridge) - Mainland near Stanton Lake - Sherman peak, Kupreanof Island - Thunder Mountain, mainland east of Petersburg - Etolin Island alpine (two occurrences approximately 4 miles apart) - Mainland south of Bradfield Canal - Mt Head, mainland above Unuk River - Revillagigedo Island alpine (two occurrences approximately 11 miles apart)

Criteria	*Rank*	*Rationale*
		- Misty Fjords mainland (four occurrences approximately 3-8 miles apart) *Micranthes tolmiei* is an alpine species generally found on moist, sandy to rocky, sparsely vegetated sites or associated with *Phyllodoce-Cassiope* heath, often on ridges or outcrops (ANHP ACCS 2023, CPNWH 2024. It typically occupies areas where snowmelt occurs late in the season (Ingersoll 1991, ANHP ACCS 2023)
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2S3 British Columbia: S5 California: SNR, Idaho: SNR, Montana: S3S4, Nevada: SNR, Oregon: SNR, Washington: SNR The range of *Micranthes tolmiei* extends from southeast Alaska south to California, Nevada, Idaho, and Montana (Klinkenburg 2020, NatureServe 2024). It is more common close to the Pacific Ocean and becomes rarer in the intermountain west (Sparh et al. 1991, Klinkenburg 2020). In the Rocky Mountains it is restricted to Idaho and an adjacent portion of western Montana (Stubbs et al. 2018a). It occupies similar subalpine and alpine habitats with poorly developed, chronically disturbed soils throughout its range including talus, rock faces, moss mats at seeps, snow bed sites, glacial silt, and scree slopes, often on northerly slopes (Beamish 1961, Douglas 1972, Lesher 1984, Evans & Fonda 1990, Ingersoll 1991). *M. tolmiei* is an early seral species that can be found on areas of glacial retreat around 20-30 years after the ground is exposed (Jumpponen et al. 1998). It is common to abundant in appropriate habitat (Douglas 1972, Lesher 1984, Ingersoll 1991).
3 Dispersal capability	B	B = Disperses only through suitable habitat. *Micranthes tolmiei* relies primarily on wind dispersal (Jumpponen et al. 1999). The small seeds may also be dispersed considerable distances by runoff from snowmelt across mostly bare late snowmelt sites and deposited in microsites reached by few other seeds (Ingersoll 1991). In both dispersal mechanisms, seeds are often deposited in protected microsites like small depressions and concave surfaces where wind and surface water velocities are lower. These sites may also provide greater moisture and prevent seed desiccation in sparsely vegetated areas where there is intense

Criteria	*Rank*	*Rationale*
		radiation (Jumpponen et al. 1999). *Micranthes tolmiei* can reproduce asexually by branching and rooting at the nodes, creeping to form large mats (Beamish 1961).
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Exact population estimates are not available for *Micranthes tolmiei* on the Tongass NF. Some occurrences note that the plant was common or frequently observed in the area. An occurrence near Juneau notes that the population was approximately 1,000-2,500 plants, with 40% vegetative and 60% flowering (ANHP ACCS 2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for documented occurrences are unknown.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. *Micranthes tolmiei* is an alpine species that typically occurs where snowmelt occurs late in the season. Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). While habitat for this species is changing, *Micranthes tolmiei* may be able to take advantage of new sites exposed by retreating glaciers. Species restricted to alpine and montane environments near the upper elevational limits are more susceptible to habitat loss than those found at lower elevations, because as climate envelopes get pushed towards the summits they will be left with less habitable area. In particular, *Micranthes tolmiei* is often found in habitat with late persisting snowpack, which may recede with climate change. *Micranthes tolmiei* is projected to lose almost 75% of its overall habitat due to

Criteria	*Rank*	*Rationale*
		climate change by 2080 (Stubbs et al. 2018b). However, it is capable of colonizing new sites exposed by receding glaciers and starts establishing 20-30 years after deglaciation (Jumpponen et al. 1998). The loss of ice cover is likely to create some new habitat for the species. Several occurrence records are from alpine cirques, bowl-shaped depressions left by retreating glaciers (ANHP ACCS 2023, CPNWH 2024).
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors. Climate change, recreation, and mining are the main expected threats to this species. In western alpine areas, consistent snowpack reductions have encouraged the colonization of meadows and treeless areas by trees like *Abies lasiocarpa* and *Tsuga mertensiana* (Boggs et al. 2009, Dial et al. 2016). Often species experience local extirpations because they cannot persist when trees become dominant (Ford and HilleRisLambers 2020). *Micranthes tolmiei* is adapted to open areas and cover by woody plants negatively affects presence (Jumpponen et al. 1998). As a species that is found in moist areas with extremely late snowmelt (Douglas 1972, Evans and Fonda 1990, Ingersoll 1991), it is also possible that decreased snowpack will have negative impacts due to increased water stress. However, no relationship between earlier snow disappearance and *M. tolmiei* survival has been established. This may be because as a life-history adaptation to survive in harsh environments alpine plants tend to conserve resources rather than rapidly allocate them to biomass, leading to slow or more complex responses to climate change (Ford and HilleRisLambers 2020). Alpine communities supporting *M. tolmiei* may also be threatened by mining operations and recreation in certain areas. A trail leads to Blackerby Ridge, where one occurrence is known near Juneau. An unofficial but established trail goes through the Crystal Mountain occurrence on Mitkof Island. Alpine herb communities are rapidly lost through human disturbance like trampling and could take decades to centuries to recover due to short growing seasons, low primary productivity, and low rates of seedling establishment (Ingersoll 1991). The other known occurrence by Juneau is near a powerline where notes indicate ground disturbance due to transmission line burial. Additionally, the occurrences in the Misty Fjords are near exploration mining for the Quartz Hill mine. The species may also be sensitive to the effects of chemical pollutants (Belsky 1982).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	B	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Micranthes tolmiei* is a perennial herb with stems 3-8 cm tall growing from slender, woody-stem bases, with numerous leaves that can persist for years. It has one to four white flowers per stem (Klinkenburg 2020). It is unique in being the only *Micranthes* with succulent leaves (Stubbs et al. 2018a). The species appears to be self-compatible, though may be visited by flies as its most common pollinator (Ingersoll 1991). It often grows with other vascular plants and mosses, but also occurs alone in extremely moist microsites with late snowmelt around July-August (Douglas 1972, Evans & Fonda 1990, Ingersoll 1991). Because it has a shallow root system, it may rely on near-surface water and its phenology slowed on sites with early snow release. Though it produces abundant seeds and has a significant presence in the seedbank, low rates of seedling emergence and establishment in these environments suggest very high rates of pre- or early post-germination mortality (Ingersoll 1991). Recruitment probability appears to increase with increasing coarse substrate cover >1 mm in diameter (Jumpponen et al. 1999). Previously there was a recognized *Micranthes tolmiei var. ledifolia*, distinguishing the disjunct populations in the Sierra Nevada. Recent works do not recognize any intraspecific entities, though phylogenetic structure suggests that further evaluation may be warranted (Stubbs et al. 2018a).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒

Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Micranthes tolmiei is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Climate change, recreation, and mining activity are all potential threats, but how significant these threats will be for *Micranthes tolmiei* is unknown. Climate change may alter snowpack and competition with other species. Rangewide, *Micranthes tolmiei* is projected to lose almost 75% of its overall habitat due to climate change by 2080. However, the loss of ice cover is likely to create some new habitat for the species. The species can colonize new sites exposed by receding glaciers and starts establishing 20-30 years after deglaciation. Several occurrences may be disturbed by recreation, powerlines, or mining activity.
- **Declining trends:** Population trends are unknown. Climate change may alter habitat negatively as other plants encroach or positively as glaciers melt.
- **Restricted range:** *Micranthes tolmiei* is at the northern edge of its range in southeast Alaska. Its range appears to be continuous with its range in British Columbia and extends south into California.
- **Low population numbers or restricted ecological conditions:** There are twenty-four occurrences on the forest scattered north to south. A couple records note that the species is common, and one estimates 1000-2500 plants at the location. Thus, population numbers are not low enough to be vulnerable to extirpation by stochastic events. This species' habitat preference of alpine areas with late-lying snowpack is somewhat uncommon on the Forest.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO10)[6/29/1993]	Quartz Hill area, alpine cirque in valley E of Boca de Quadr	Wet rocks on slope of alpine ridge with Cassiope, Luetkea, Fauria, and Lycopodium spp	NA	NA
1	CPNWH_April2025(ALA)[6/29/1993]	Quartz Hill area, alpine cirque in valley E of Boca de Quadr, Ketchikan Quad.	Wet rocks on slope of alpine ridge with Cassiope, Luetkea, Fauria, and Lycopodium spp.		
2	ACCS_Mar25 (EO9)[6/27/1993]	Quartz Hill area, alpine ridge E of Boca de Quadra	Sparsely vegetated exposed gravel and sandy soils, with occasiol individuals of Cassiope and Phyllodoce		
2	CPNWH_April2025(ALA)[6/27/1993]	Quartz Hill area, alpine ridge E of Boca de Quadra, Ketchikan Quad.	Sparsely vegetated exposed gravel and sandy soils, with occasiol individuals of Cassiope and Phyllodoce.		
3	ACCS_Mar25 (EO3)[6/01/1943]	Ketchikan	alpine		
4	ACCS_Mar25 (EO7)[6/27/1993]	Quartz Hill area, higher area of alpine ridge E of mine	Exposed Cassiope heath in gravel soil, with Phyllodoce, Saxifraga spp., and Carex spp		
4	CPNWH_April2025(ALA)[6/27/1993]	Quartz Hill area, higher area of alpine ridge E of mine, Ketchikan Quad.	Exposed Cassiope heath in gravel soil, with Phyllodoce, Saxifraga spp., and Carex spp.		
5	ACCS_Mar25 (EO8)[6/27/1993]	Quartz Hill area, cirque N of mine	Phyllodoce - Cassiope heath, with Cladi, Saxifraga nelsonia, and Stereocaulon		
5	CPNWH_April2025(ALA)[6/27/1993]	Quartz Hill area, cirque N of mine, Ketchikan Quad.	Phyllodoce - Cassiope heath, with Cladi, Saxifraga nelsonia, and Stereocaulon.		
6	ACCS_Mar25 (EO11)[8/01/1993]	Revillagigedo Island, Marble Creek headwaters, alpine ridges above creek	talus		

6	CPNWH_April2025(ALA)[8/01/1993]	Revillagigedo Island, Marble Creek headwaters, alpine ridges above creek, Ketchikan Quad, Misty Fjords tiol Monument.	Talus.		
7	ACCS_Mar25 (EO5)[8/08/1979]	Revilagigado Island; about 0.25 miles south of Lake 2499.	rocky areas on summit		
7	CPNWH_April2025(ALA)[8/08/1979]	Alexander Archipelago, Revillagigedo I., ridge S of Lake 2499, 4 km SW of lake, Ketchikan Quad.	Rocky areas on summit.		
8	ACCS_Mar25 (EO15)[no date]	Mt. Head			
9	TESP_Mar25 (100522P000050)[8/19/2004]				
9	ACCS_Mar25 (EO12)[8/19/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= S.Etolin Is.alpine lake, Air Quality plots, Saxifraga tolmiei, many pops in scree, floatplane from W		
10	ACCS_Mar25 (EO6)[8/04/1982]	Alexander Archipelago, Etolin I.	Alpine habitat. Frequent on dry,		
10	CPNWH_April2025(ALA)[8/04/1982]	Alexander Archipelago, Etolin I., Petersburg Quad, Alexander Archipelago.	Alpine habitat. Frequent on dry,.		
11	TESP_Mar25 (100521P000223Y23)[8/21/2023]				
11	TESP_Mar25 (100521P000224Y23)[8/21/2023]				
11	TESP_Mar25 (100521P000221Y23)[8/21/2023]				
11	TESP_Mar25 (100521P000222Y23)[8/21/2023]				
12	TESP_Mar25 (100521P000225Y23)[8/21/2023]		Wet, mossy rocks		
13	TESP_Mar25 (100522P000221Y23)[7/07/2023]				
14	ACCS_Mar25 (EO13)[8/25/2004]	Coast Mts., Thunder Mtn., Thunder Mtn. area, S of summit approx 200m	scattered individuals and clumps in small wet areas in alpine with sparse vascular vegetation, with liverwort mats, E aspect, 20Â¿ slope		
14	CPNWH_April2025(ALA)[8/25/2004]	Coast Mts., Thunder Mtn., Thunder Mtn. area, S of summit approx 200m, Petersburg Quad, Tongass tiol Forest.	Scattered individuals and clumps in small wet areas in alpine with sparse vascular vegetation, with liverwort mats, E aspect, 20Â¿ slope.		

15	ACCS_Mar25 (EO4)[8/20/1957]	Alexander Archipelago, Sherman Peak, Kupreanof I.	snow flush		
15	CPNWH_April2025(ALA)[8/20/1957]	Alexander Archipelago, Sherman Peak, Kupreanof I., Petersburg Quad, Tongass tiol Forest.	Snow flush.		
16	TESP_Mar25 (100521P000219Y23)[7/05/2023]				
16	TESP_Mar25 (100521P000220Y23)[7/05/2023]				
17	TESP_Mar25 (100521P000228Y24)[8/14/2024]				
17	TESP_Mar25 (100521P000229Y24)[8/14/2024]				
17	CPNWH_April2025(ALA)[8/08/2013]	Mainland, Stanton Lake, N of Farragut R., E of Sandborn Cal, Sumdum Quad, Tongass tiol Forest, Alexander Archipelago.	Deglaciated cirque above lake, on soil between boulders, common.		
18	ACCS_Mar25 (EO16)[no date]	Windham Bay			
19	ACCS_Mar25 (EO14)[8/23/2013]	Powerline Ridge. South of Juneau, AK, and approximately 1.2 miles SE of Sheep Mountain.	present in areas where late snowmelt was likely, in talus seeps, and in an area where fine sediments had accumulated due to ground disturbance related to transmission line burial saturated wet		
19	TESP_Mar25 (100533P001038Y13)[8/22/2013]		scattered stems in alpine dwarf shrub tundra; most abundant in moist deposits of fine sediment, and rooted in protected microhabitats in rocky bluff		
19	CPNWH_April2025(ALA)[8/23/2013]	Ridge NNE of upper Sheep Cr. valley, vic. of powerline above Camp 6, Juneau Quad, Tongass tiol Forest, Alexander Archipelago.	In wet fine talus at base of alpine outcrop, growing with Leutkea pectita, Carex circita, and Micranthes ferruginea, scattered.		
20	ACCS_Mar25 (EO1)[9/13/1925]	Mt. Roberts, Juneau	rocky alpine		
21	ACCS_Mar25 (EO2)[8/11/1940]	Coast Mts., Juneau	wet rocky alpine		
22	ACCS_Mar25 (EO2)[9/01/1940]	Granite Creek Basin, Juneau	wet		
22	ACCS_Mar25 (EO2)[8/11/1940]	Juneau	wet rocky alpine		
23	CPNWH_April2025(ALA)[7/29/2013]	Mainland, south of Bradfield Cal, Cleveland Peninsula, east of Hoya Creek, west of An Creek, Bradfield Cal Quad, Tongass tiol Forest.	Small alpins lake surrounded by limestone, limestone rock outcrop at lake margin, common.		

24	CPNWH_April2025(ALA)[7/13/2018]	Juneau, Blackerby Ridge, near GLORIA low site, Juneau Quad, Alexander Archipelago.	Moist area with many rivulets, few plants.		

Mielichhoferia elongata

Mielichhoferia elongata [(Hoppe & Hornschuch) Nees & Hornschuch, 1831]

Mielichhofer's Copper Moss

Global Rank: **GNR**

Alaska State Rank: **S2**



photo: CC by C. Halpin

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated.* *Mielichhoferia elongata* is known from three estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located: on Wrangell Island southeast of Wrangell, on the mainland northeast of LeConte Bay near the glacier terminus, and on the mainland northeast of Wrangell and northwest of Shakes Lake (Appendices 1 and 2; CBH 2025, USFS 2025a). Two of the occurrences were found on solid granite bedrock recently exposed by glacier recession and one in an abandoned quarry of metamorphic rock (ACCS 2024). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF. Mielichhoferia elongata grows in dense, compact turfs with a whitish or sometimes bluish color that makes this species easily recognizable (CBH 2025). Similar species that *Mielichhoferia elongata* may be confused for include *Pohlia* sp. and *Mielichhoferia mielichhoferiana* which is also present on the TNF (British Bryological Society 2020, CBH 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside of the Tongass National Forest.* Global Rank GNR, Alaska State Rank S2, Oregon S1, British Columbia S3?, IUCN Vulnerable in Europe *Mielichhoferia elongata* is broadly distributed throughout North America and Europe, with scattered occurrences in Africa and Asia (CBH 2025). In North America, *Mielichhoferia elongata* is present in Canadian provinces and territories British Columbia, Ontario, Quebec, and Newfoundland and Labrador, as well as U.S. states Alaska, Oregon, California, Montana, Colorado, Michigan, and Maine (CBH 2025). Across its range, *Mielichhoferia elongata* occurs in cool, humid sites which are often alpine or tundra at elevations of 0 m to 4,180 m (CBH 2025, British Bryological Society 2020). Alternatively, this species is also found on boulders in woodlands in filtered light (CBH 2025). It is typically found in shaded rock crevices on acidic rocks, sometimes described from the north slope (British Bryological Society 2020, CBH 2025). *Mielichhoferia elongata* is one of the copper mosses because it often grows on mineral enriched substrates, although not always with copper (CBH 2025). Like other copper mosses, *M. elongata* has a broad and highly disjunctive geographic range but is nowhere common. In North America, the species is most frequent in the Rocky Mountains of Colorado, where it occurs on mine tailings, especially around the towns of Ouray and Silverton in San Juan County (FNA 2020). In southeastern Alaska this species is only known from the Tongass NF; its range continues northwest in Alaska approximately 1,200 km to the Denali National Park (ACCS 2024, CBH 2025). The closest occurrence to the Tongass occurrences is approximately 100 miles east in British Columbia (CBH 2025). The Coast Mountain range separates the Tongass NF occurrences from this occurrence, and given the limited dispersal ability of Mielichhoferia elongata, the Tongass NF occurrences may be disjunct.
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Mielichhoferia elongata* is an acrocarpous, leafy moss with a terrestrial growth habit (British Bryological Society 2020). Its main dispersal mechanism is by clonal growth, fragmentation and, more rarely, spores (British Bryological Society 2020). Spore-bearing capsules are reported as rare, with most patches of *Mielichhoferia elongata* consisting of a single sex (British Bryological Society 2020, FNA 2020).

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	A	*A = Rare.* None of the three occurrences of *Mielichhoferia elongata* in TNF have population estimates or any indication of abundance (Appendix 1; CBH 2025, ACCS 2024). However, with only three populations isolated from each other by glaciers and ocean bays, stochastic factors could lead to potential imperilment (ACCS 2024).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Mielichhoferia elongata* on the TNF are unknown (USFS 2025a, ACCS 2024).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Two of the occurrences of *Mielichhoferia elongata* are on recently deglaciated granite, and one was found on metamorphic rock in an abandoned quarry (ACCS 2024). *Mielichhoferia elongata* often grows on mineral-rich substrates which could limit potential habitats for this species (FNA 2020). The occurrence in the quarry has *Phalaris arundinacea* (reed canary grass) mapped nearby, but the extent to which this invasive plant would impact the habitat of a rock-dwelling moss is unknown (USFS 2025b). Habitat for this species is not well defined on the Tongass NF. The three documented locations are all relatively young substrates. However, bryophytes are not typically included in botanical surveys so the extent of this species on the Tongass NF is not known.
7 Habitat vulnerability or modification;	D	*D = Insufficient information to draw inferences about criterion.* The habitat niche for *Mielichhoferia elongata* on the Tongass is not well defined. The species is known to often occur on mineral-rich substrates, but the abundance, distribution, and threats to locations that would be appropriate habitat for this species on the Tongass is unclear.Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for moisture-dependent species such as *Mielichhoferia elongata* (Turner and Mallott 2025, Wiles and Warren 2025).

Criteria	*Rank*	*Rationale*
other threats		
8 Life history and demographics	A	*A = life history characteristics that suggest populations may not recover rapidly from disturbance events or other demographic risk factors are of concern.* *Mielichhoferia elongata* is an acrocarpous moss that grows in dense, compact turfs (British Bryological Society 2020, FNA 2020). *Mielichhoferia elongata* produces sporocarps seldom in general, and the frequency is unknown within the Tongass NF (British Bryological Society 2020, FNA 2020). Specialized asexual reproduction is absent for this species (FNA 2020). *Mielichhoferia elongata* is reported to carry out vegetative propagation "through detached tufts and fragmentation of the fragile stems" (British Bryological Society 2020). Sexual reproduction via sporophyte production of *Mielichhoferia elongata* is reported to be sporadic, with some populations forming sporophytes abundantly in some years, while others rarely do (Shaw 2000). Even when both male and female gametophytes are present in the same population, sexual reproduction is limited by both the frequency and the proximity of the two sexes (Haig 2016, Shaw 2000).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range		☐	☒
Low populations or restricted ecological conditions	☒	☐	☐

Other factors (see conclusion rationale)	☒	☐	☒

Conclusion Rationale

Mielichhoferia elongata is not recommended as a Species of Conservation Concern based upon the rationale below:

- **Significant threats**: The habitat niche for this species is not well described on the Tongass NF. Invasive species could be a threat at one known occurrence, but unclear if invasives would compete in preferred habitat for Mielichhoferia elongata. Localized threats are not known at the other two occurrences.
- **Declining trends**: Habitat for this species is not well defined on the Tongass NF, so it is difficult to discen trends. The three documented locations are all on relatively young substrates. Additionally, bryophytes are not typically included in botanical surveys so the extent of this species on the Tongass NF is not known.
- **Low population numbers**: Mielichhoferia elongata is known from three occurrences on the central Tongass NF mainland and Wrangell Island.
- **Other factors**: Dispersal may be limited due to potential low production of sporophytes and lack of specialized asexual propagules

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [1/31/2016]**	**Southeast Alaska panhandle, Wrangell Island. Approximately 13 miles SSE of the Borough of Wrangell.**	**Abandoned quarry with compacted gravelly soils derived from crushed metamorphic rock. Surrounding forest young second growth *Picea sitchensis, Pinus contorta* and *Alnus rubra*. fully exposed, steeply inclined. Substrate: silt.**		
2*	**ACCSBryo_Oct24 [6/21/2020]**	**Southeast Alaska Panhandle mainland. Collection area at the southeast end of LeConte Bay, within 250 meters of the current glacier terminus.**	**Solid granitic bedrock slopes recently vacated by glacier.**		
3*	**ACCSBryo_Oct24 [9/30/2017]**	**Tongass National Forest. Southeast Alaska panhandle mainland. Approximately 24.5 miles due NNE of the Borough of Wrangell. Watershed: Stikine River, Shakes Lake. Sitename: Shakes Lake NW**	**Fully exposed and largely nonvegetated lateral moraine recently exposed by glacier recession. Slope: 40°; Aspect: 45°; mostly shaded moist steeply inclined; mineral soil**		
3	CBH 2025 (DAV) [09/30/2017]	Tongass National Forest. Southeast Alaska panhandle mainland. Approximately 24.5 miles due NNE of the Borough of Wrangell. Watershed: Stikine River, Shakes Lake. Sitename: Shakes Lake NW	N facing cliff. Fully exposed and largely nonvegetated lateral moraine recently exposed by glacier recession. Slope: 40°; Aspect: 45°. Substrate: Mostly shaded moist steeply inclined; on mineral soil.		

Monotropa uniflora

Monotropa uniflora [L.]

Ghost-pipe

Global Rank: **G5**
Alaska State Rank: **S1**



photo: © 2016 Keir Morse

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce OR isolated. There is one estimated occurrence for *Monotropa uniflora* on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The observation was made in 1998 by Phyllis Woolwine on Gravina Island (USDA FS 2023). No photo or herbarium specimen is associated with the occurrence. No additional habitat information was provided for this record (USDA FS 2023). There is one other occurrence in southeast Alaska that may or may not have been on the Tongass NF, a 1939 record by J.P. Anderson in the vicinity of Hyder (Appendix 1). This species could be confused with *Monotropa hypopitys*, which is occasional on the Tongass. *Monotropa uniflora* is white and has solitary flowers while *M. hypopitys* is yellowish to orange or reddish with flowers in racemes, or rarely solitary (FNA).
2 Distribution in surrounding	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S1 British Columbia Province Rank S5, Yellow List; Alberta S3, Yukon Territory SNR, Washington, Idaho, Oregon SNR, Montana S4.

Criteria	*Rank*	*Rationale*
geographic area		*Monotropa uniflora* is a wide-ranging and globally common species that occurs in Central, South, and North America and eastern Asia (NatureServe 2023). Across its range, this species occurs in a wide variety of coniferous, deciduous, or mixed forests that vary from moist to dry at elevations ranging from sea level to 3,000 meters (FNA 2020). In British Columbia it is associated with mesic to moist forests in the lowland and montane zones (Klinkenberg 2020). Although common in much of its range (forested regions of Oregon and Washington, northern Idaho, and northwest Montana), there are only three records of this species for Alaska. The southeastern Alaska occurrences appear to be the northwestern edge of this species' range, with the occurrence on Gravina Island roughly 201 kilometers (125 miles) from the closest herbarium record in British Columbia. and about 60 miles from the nearest iNaturalist observation (iNaturalist accessed 10/29/2025). There is just one other record for the species in Alaska, over 600 miles to the north near Cordova (CPNWH 2025). Across its range threats are largely unknown but wild collection may be a threat, as this species is increasingly found in online markets as an alternative medicine (NatureServe 2023).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). As a mycoheterotroph, *Monotropa uniflora* is reliant upon mycorrhizal fungi for successful germination and growth. In British Columbia, this species is associated with fungi in the Russulaceae family (Young et al. 2002), a family that is well-distributed across southeastern Alaska (USDA FS 2013). *Monotropa uniflora* produces a large number of small, winged seeds that disperse by wind (Olson 1980, Klooster and Culley 2009).
4 Abundance on Tongass NF	A	A = Rare -current abundance is low enough that stochastic and other factors could lead to potential imperilment. There is no abundance information noted for the one known occurrence on the Tongass NF (USDA FS 2023).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for *Monotropa uniflora* on the Tongass NF are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Habitat for this species is broadly described as moist to dry, coniferous and mixed-deciduous forests from sea level to 3,000 meters (FNA). Forest in general is not a restricted habitat type on the Tongass National Forest. Studies from across the range of this species have defined several more specific habitat attributes associated with occurrences of this species. These include high canopy cover, abundance of coarse woody debris, and rich humus (Moola and Vasseur 2004, Kremsater et al. 2003) and an association with mature stands in British Columbia (Ryan et al. 2009). Mature conifer forests with these attributes are widespread on the Tongass NF. They have experienced habitat declines due to timber harvest, but a large amount remains. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contributes to the rarity of this species on the Forest.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. There are currently no mapped invasive species, timber activities, roads, or trails within at least one mile of the one known occurrence on the TNF, but timber harvest, road building, climate change, and invasive species could potentially impact the habitat of this species in the future. *Monotropa uniflora* has documented sensitivity to disturbance associated with some logging treatments. A study from Quebec found that 20 years post-treatment, the frequency of *Monotropis uniflora* was lower in group-selection cuts that had also been scarified through harrowing following timber harvest, but did not differ significantly among control, single-tree selection, or group selection without scarification treatments (Jaeger et al. 2002). Additional research from that experiment found that *Monotropa uniflora* occurred less frequently in planted stands than it did in naturally regenerating stands follow timber harvest (Aubin et al. 2014). A study from Nova Scotia found that *Monotropa uniflora*

Criteria	*Rank*	*Rationale*
		was restricted to late seral stands and associated with greater canopy cover and abundance of coarse woody debris than other understory species (Moola and Vasseur 2004). In British Columbia, *Monotropa uniflora* was associated with downed wood or rich humus (Kremsater et al. 2003) or mature stands (Ryan et al. 2009). The alteration of soil and litter layer from timber harvesting can negatively impact the mycorrhizal fungi by reduced abundance and regeneration ability, even after decades after disturbance (Hartmann et al. 2012). Additional indirect effects of timber harvest activities include the abrupt change in solar radiation and hydrologic regimes due to the removal of the canopy or other ground disturbing activities near the plants. The effects of a changing climate on the forest ecosystems of southeast Alaska are under investigation. General threats include increased predation by insects due to increases in pest outbreaks under warmer conditions; increased competition of exotic species; changes in flowering times and synchronicity with pollinators; and decrease or absence of fungal symbionts due to increased soil temperature and moisture regimes (Fulkerson et al. 2017).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Monotropa uniflora* lacks chlorophyll (and therefore a means to conduct photosynthesis) and relies upon fungal networks that allow it to receive carbon compounds from neighboring trees for nutrition (Young et al. 2002). Across its range *Monotropa uniflora* has been associated with fungi in the Russulaceae family, as well as *Boletus* species, *Armillaria mellea,* and other fungal clades (Young et al. 2002). A study, however, found that *Monotropa uniflora* was exclusively associated with fungi in the Russulaceae family in Central British Columbia (Young et al. 2002). This family of fungi is well-represented and distributed broadly in southeastern Alaska (USDA FS 2013). Flowers of *Monotropa uniflora* are herkogamous (anthers and stigmas spatially separated), a trait that is associated with reduced self-pollination and dependence upon cross-pollination. A study in the eastern United States found that *Monotropa uniflora* was visited primarily by bumblebees (*Bombus* spp.), which also functioned as the primary pollen dispersal agents (Klooster and Culley 2009). Vibrations produced by bumblebees are necessary to facilitate the release of pollen via slits in the anthers (Klooster and Culley 2009). This study additionally found that reproductive effort (e.g. reproductive stem and flower production) was highly variable from year to year (Klooster and Culley 2009).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒

Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Monotropa uniflora is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** The most likely threats to this species and its habitat are impacts from timber harvest. However, there are currently no mapped invasive species, timber activities, roads, or trails within at least one mile of the one known occurrence on the TNF.
- **Declining trends:** Population trends are unknown. Substantial timber harvest and road construction has occurred in the past on the TNF within the general range of this species, however current trends in habitat quantity and quality are likely stable.
- **Restricted range:** The single occurrence on the Tongass NF is at the northwestern edge of this species' range.
- **Low populations or restricted ecological conditions:** There is no abundance information noted for the one occurrence, but given that it is a single occurrence, the species may be vulnerable to extirpation by stochastic factors on the Tongass NF. Ecological conditions do not appear to be highly restricted, but it is possible there are specific habitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species on the Tongass NF.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO3) [3/01/1998]**	**Tongass National Forest**		**NA**	**NA**
1	TESP_Mar25 (100552P000097) [3/01/1998]				
	Unclear if the following occurrence was on TNF or not				
2	ACCS_Mar25 (EO1) [7/01/1939]	Hyder	woods		

Montia chamissoi

Montia chamissoi [(Ledeb. ex Spreng.) Greene, 1891]

Chamisso's montia

Global Rank: **G5**

Alaska State Rank: **SNR**



photo: CC0 Gabriel Campbell

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Montia chamissoi* is known from three estimated occurences on the Tongass National Forest (Fig. 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located: 1) about 50 km (30 miles) southeast of Juneau on the south side of Port Snettisham; 2) about 80 km (50 miles) west of Juneau on Chichagof Island on Pinta Cove; and 3) about 50 km (30 miles) south of Sitka on Baranof Island near Gut Bay (Appendices 1 and 2; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in upper beach meadows (Occurrence 1 and 2) and shorelines of ponds (Occurrence 3) (Appendix 1). At occurrence 1, it is scattered along the edge of and under beach logs with a substrate that is gravelly and topped with rotting *Fucus* and other deposited algae and vegetation (Appendix 1). At Occurrence 3, it is along the shore of a large pond with a rocky and muddy substrate (Appendix 1). The upper beach meadow habitat is atypical for this species, but the pond shoreline habitat is typical of the species (FNA 2025). There is one occurrence of this species in southeastern Alaska outside of the Tongass NF near Haines (Arctos 2025). An additional occurrence is recorded near Yakutat, but location data is lacking and the record cannot be determined to occur in the plan area with any certainty (Arctos 2025).

Criteria	*Rank*	*Rationale*
		Across its range, *Montia chamissoi* is typically found in wetlands, riverbanks, and streamsides. This species is considered synonymous with *Claytonia chamissoi* and *Crunocallis chamissoi* (FNA 2025).
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank SNR, British Columbia S3, Minnesota S1, Pennsylvania S1, Wyoming S3 (NatureServe 2025) *Montia chamissoi* is broadly distributed throughout western North America (FNA 2025). It is ranked S3 and is rare in coastal BC (Klinkenberg 2020). Across its range, *Montia chamissoi* occurs in wetlands, riverbanks, and streamsides at elevations of 500 m to 3,700 m (FNA 2025). The soils where this species is found are typically wet (FNA 2025). This species range continues north in Alaska to the Paxon area and east to the Alaska Peninsula National Wildlife Refuge; the nearest specimen outside of SE Alaska is from the mouth of Tashalich River about 490 km (304 mi) from the nearest Tongass NF site (Occurrence 2), and about 234 km (145 mi) from the occurrence near Yakutat (CPNWH 2025, Klinkenberg 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Montia chamissoi* is a perennial herb with a rhizomatous and stoloniferous growth habit (FNA 2025). Its main dispersal mechanism is by clonal rhizomatous and stolon growth and by seed (FNA 2025). Seed dispersal mechanisms are not well documented for this species.
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Montia chamissoi* is known from 3 occurrences on the Tongass NF (Appendices 1 and 2). There is some abundance information for the confirmed occurrences on TNF, namely there were 30 counted in 2014 at Occurrence 1. Also, plants at Occurrence 2 were described as “rare” (Appendix 1).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Montia chamissoi* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The habitat for the three occurrences of *Montia chamissoi* on the TNF is upper beach meadows and shorelines of ponds (Appendix 1). These habitats can be also grouped under meadows which are described as coastal beaches, dunes, sand spits, and the outer edge of river deltas that are very rare on the Tongass NF (Turner and Mallott 2025). Invasive species that can survive in or near meadows, such as common dandelion (*Taraxacum officinale*) and reed canary grass (*Phalaris arunidacea*), are known to occur in or near the coordinates for occurrence 2 (USFS 2025b). Timber harvest has not occurred in the recent past in the vicinity of any occurrences (USFS 2025c). Without follow-up visits to the meadows at all occurrences, there is not enough information to decide if the habitat has declined.
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc.* Invasive species, timber activities, and climate change may impact the habitat of *Montia chamissoi*. The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025). Therefore, the habitat of *Montia chamissoi* may be impacted by invasive species in the future. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for wetland species with high soil moisture requirements such as *Montia chamissoi* (Turner and Mallott 2025, Wiles and Warren 2025).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Montia chamissoi* is a perennial herb with a rhizomatous and stoloniferous growth habit (FNA 2025). It flowers from May to August (FNA 2025). Plants are pollinated by bees and flies (UWBM 2025). The life span of *Montia* species is not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	**X**☐	☐	☐
Declining populations or habitat trends	☐	☐	**X**☐
Restricted range	☐	**X** ☐	☐
Low populations or restricted ecological conditions	☐	☐	**X** ☐
Other factors (see conclusion rationale)	☐	☐	**X** ☐

Conclusion Rationale

Montia chamissoi is not recommended as a Species of Conservation Concern in accordance with the following:

- **Significant threats:** The upper beach meadows, stream banks, and wetlands this species is known to occupy are threatened by the encroachment of invasive species and by alterations to temperature and precipitation patterns associated with expected changes in climatic conditions.
- **Declining trends:** There is not enough available information to establish trends in known populations or occupied habitat for *Montia chamissoi*.
- **Restricted ranges:** This species is not endemic to the plan area or Alaska. Occurrences on the Tongass NF are not

disjunct from the nearest populations outside the plan area and do not exist at the edge of the species' greater range.

- **Low population numbers or restricted ecological conditions:** The few known occurrences in the plan area may be vulnerable to extirpation by stochastic events. However, continuity of occurrences to the north and south of the plan area, as well as the abundance of suitable habitat on the Tongass NF, indicate the possibility that this species has been overlooked in past surveys. Persistence of this species is not known to require a narrow range of ecological conditions, and additional information would be required to definitively assess population numbers in the plan area.
- **Other factors:** There is not enough available information to determine whether or not additional factors may exist that impact the ability of *Montia chamissoi* to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X☐	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**TESP_Mar25 (100533P001034Y13) [6/24/2013]**	**South side of Port Snettisham about 1.8 miles SW of Sentinel Point**	**Upper beach/forest ecotone, in seepy area, scattered along the edge of and under beach logs. Substrate gravelly and topped with rotting Fucus and other deposited algae and vegetation. Plants creeping by stolons, clustered.**	**30 counted. 1% cover. No flowers, just tightly closed buds.**	
2*	**CPNWH_April2025 (ALA) [6/25/2012]**	**Pinta Cove, Juneau Quad, Alexander Archipelago, Chichagof Island.**	**Upper beach, meadow, rare.**	**rare**	
3*	**CPNWH_April2025 (ALA) [6/17/2010]**	**South Baranof Wilderness, Gut Bay, Port Alexander Quad, Alexander Archipelago, Baranof Island.**	**Rocky and mud shore of large pond.**		
Occurrences with deficient information					
4	**UAM:Herb:50915 [1952]**	**Alaska, Yakutat Quad Yakutat Foreland, Yakutat**		**Syn. Claytonia chamissoi**	
5	**LD Accsn#1364374 [No Date]**	**Alaska**		**Syn. Crunocallis chamissoi**	
6	**UAM:Herb:27427 [7/2/1946]**	**Haines, Skagway Quad**		**Syn. Claytonia chamissoi**	

Myriophyllum farwellii

Myriophyllum farwellii Morong

Farwell's watermilfoil

Global Rank: **G5**

Alaska State Rank: **S1**



photo: Peter Dziuk

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce OR isolated. *Myriophyllum farwellii* is known from one estimated occurrence on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The occurrence is at Lake Eva on Baranof Island, where it is described as locally common and growing in the shallow lake bottom (USDA FS 2023, ANHP ACCS 2023, CPNWH 2023). Surveys for submerged aquatic plants on the Tongass are limited, so the species may be more widespread than is currently known.
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G5, Alaska State Rank S1 British Columbia Province Rank S4, Yellow List *Myriophyllum farwellii* ranges from Nova Scotia and Quebec south to New York, and west to Minnesota, also occurring in Alaska and British Columbia. Its global range includes Mexico, Central America, South America, Eurasia, north and northwestern Africa, Indian Ocean Islands, Pacific Islands, and Australia (FNA 2020). It is infrequent and scattered

Criteria	*Rank*	*Rationale*
		throughout southern British Columbia, where it occurs in lakes, ponds and slough bottoms in the lowland and lower montane zones (Klinkenberg 2023). Most occurrences in British Columbia are known from Vancouver Island or the southern mainland; sites more than 500 miles from the TNF occurrences. Additional Alaska locations are known from Kenai Peninsula and to lakes east of Fairbanks, also more than 500 miles from the occurrence on Baranof Island. Across its range, the habitat for *Myriophyllum farwellii* is oligotropic to mesotrophic, often highly tannic waters, lakes, ponds, and marshes (FNA 2020).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). Like many *Myriophyllum* species, *Myriophyllum farwellii* produces tiny flowers underwater that yield small (1.5-2.5 millimeter) fruit clusters and also has the potential to reproduce through vegetative propagules (FNA 2020). Other congeneric species of *Myriophyllum*, such as invasive European milfoil (*Myriophyllum spicatum*), have been documented to spread primarily through asexual fragmentation. As fragments of leafy stems break or are dislodged from lake sediments, they may be carried away from the source plant to re-establish elsewhere in suitable habitat (Madsen et al. 1988) via wind, waterfowl, and watercraft (Buchan and Padilla 2000). Unlike other *Myriophyllum* species, *Myriophyllum farwellii* does not have rhizomes, limiting its ability to spread vegetatively through lateral stem growth (FNA 2020). *Myriophyllum farwellii* does, however, produce buds called turions, which allow plants to overwinter and are an important means of vegetative reproduction (FNA 2020, Weber and Nooden 1974, Aiken 1981). No information was found on whether *Myriophyllum farwellii* disperses primarily through seed or through vegetative propagules.
4 Abundance on Tongass NF	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. There is one occurrence known to the TNF. The species was noted as common at the site, and a population estimate of 10,000 was given (ANHP ACCS 2023, USDA FS 2023). The restriction of this species to a single lake system, however, suggests that stochastic factors have the potential to imperil its persistence on the TNF.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for the known occurrence of *Myriophyllum farwellii* on the TNF are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. *Myriophyllum farwellii* is an aquatic plant that lives in oligotrophic to mesotrophic, often highly tannic waters, lakes, ponds, and marshes (FNA 2020). Lakes on the Tongass National Forest are overall in pristine condition. The majority of data suggest that no considerable sources of pollution are affecting the health and integrity of this ecosystem (Chestnut and Tucker 2025). No invasive plants or timber harvest are mapped within two miles of the occurrence. There is a Forest Service cabin at the lake accessible by a 25-minute float plane flight from Sitka, and a trail along the southern side of the lake. Approximately 2000 guided hikers from small and mid-size cruise ships visited the trail in 2002 (Van Dyke 2003). Historically, large lakes accessible by floatplane from surrounding communities were stocked with native and non-native lake species including brown trout, rainbow trout and grayling. Many of these stocking efforts have not persisted to the present day due to lake conditions or competition with native species (Chesnut and Tucker 2025).
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. As with many other resources, lake conditions are likely to change with projected changes in temperature and hydrologic regime (Chestnut and Tucker 2025). Climate change may result in higher water temperatures or changes to the volume and timing of inputs to lakes (EcoAdapt 2014). How these changes might affect habitat suitability for *Myriophyllum farwellii* is unknown. Aquatic invasive plants such as *Myriophyllum spicatum* could potentially be transported to Lake Eva by float plane in the future.

Criteria	*Rank*	*Rationale*
		Under the 2016 Forest Plan, lakes are protected by a 100' no-cut commercial harvest buffer.
8 Life history and demographics	B	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. The ability of *Myriophyllum farwellii* to reproduce both sexually and asexually via fragmentation or turions (Aiken 1981) suggests an intermediate ability to recover from disturbance.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Myriophyllum farwellii is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No significant threats are known. Lake conditions are likely to change with projected changes in temperature and hydrologic regime, but how these changes might affect habitat suitability for *Myriophyllum farwellii* is unknown.
- **Declining trends:** Population trends are unknown. Overall, lakes on the Tongass NF are thought to be in pristine condition, and no localized negative habitat trend is known or suspected.

- **Restricted ranges:** The occurrence of *Myriophyllum farwellii* on the TNF is separated by more than 500 miles from other occurrences in Alaska and British Columbia, so the population may be disjunct. However, the species may be dispersed by waterfowl, which could account for its scattered distribution.
- **Low population numbers or restricted ecological conditions:** There is one known occurrence with an estimated population of 10,000 individuals. Surveys for submerged aquatic plants on the Tongass are limited, so the species may be more widespread than is currently known. Ecological conditions do not appear to be restricted. The habitat as described is broadly available, but it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of the species on the Tongass NF.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO2)[9/09/2010]**	**Sitka Quad.: Baranof Island, Alexander Archipelago, Lake Eva.**	**Shallow lake bottom, common.**	**common**	
1	CPNWH_Mar25 (WTU407590)[10/19/2010]	Baranof Island, Alexander Archipelago, Lake Eva.	Shallow lake bottom.		
1	CPNWH_Mar25 (UAAH10594)[9/09/2010]	Sitka Quad.: Baranof Island, Alexander Archipelago, Lake Eva.	Shallow lake bottom, common.		
1	ACCS_Mar25 (EO2)[7/08/2010]				
1	TESP_Mar25 (100531P00190)[7/08/2010]		Shallow water at edges of lake - plants oriented horizontally on lake bottom, typically over organic sediments	10000 (estimate). Population concentrated at North end of lake but probably occurs in shallows all along the W side of lake.	
1	CPNWH_April2025(ALA)[9/09/2010]	Lake Eva, Sitka Quad, Alexander Archipelago, Baranof Island.	Shallow lake bottom, common.		

Niebla cephalota

Niebla cephalota [(Tuck.) Rundel & Bowler]

Powdery sea-fog lichen

Global Rank: **G4**
Alaska State Rank: **S1**

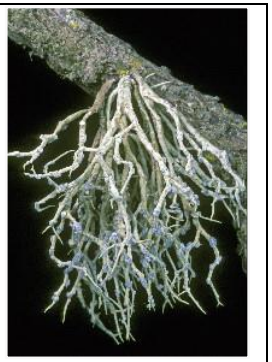


photo: Steve Sharnoff

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated. *Niebla cephalota* is known from one estimated occurrence on the Tongass NF, on DeLong Island, at the mouth of Foggy Bay, in the Misty Fjords National Monument Wilderness (Appendix 1, Spribille et al. 2023, CPNWH 2023). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The specimen was collected from a twig of *Picea sitchensis* in beach fringe forest habitat at the edge of the small marine island.
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G4, Alaska State Rank S1 British Columbia Province Rank S2, Red List, Oregon S2, Washington S2 *Niebla cephalota* is endemic to the North American Pacific Coast. It occurs only on exposed coastal trees and sometimes on rocks from the Washington oceanic shores to Baja California. *Niebla cephalota* is always found very close to the ocean and is considered rare in the Pacific Northwest (McCune and Geiser 2009), as evidenced by its Red List ranking in British Columbia, and S2 rankings in several states. There are no additional occurrences known to Alaska, and the closest occurrences on Vancouver Island are more than 644 kilometers (400 miles) from the location on the Tongass NF (Consortium of Lichen Herbaria 2023).

Criteria	*Rank*	*Rationale*
		In the Pacific Northwest, the primary habitats for *Niebla cephalota* are Sitka spruce and shore pine stands on marine terraces and dunes in regions of moderate winter temperatures and rainfall on the immediate coast (Glavich et al. 2005a). All nineteen occurrences of *Niebla cephalota* in a study along the Oregon, Washington and California coasts were within the marine fog belt, very close to sea level and to the shoreline. In comparison to the study area as a whole, sites supporting *Niebla cephalota* had comparatively more fog, but fewer rainy days per year, lower mean annual precipitation, warmer winter temperatures, and higher dew point temperatures (Glavich et al. 2005b).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). The microscopic size of the reproductive propagules should enable them to be carried long distances by wind, animals, or birds. Birds in particular are thought to enhance arrival rates of rare oceanic species like *Niebla cephalota* by dispersing lichen propagules along coastal migratory routes of the Pacific Northwest (McCune *et al.* 1997 in Geiser 2019). However, as this species is restricted to the fog belt of coastal areas, propagules would need to disperse into suitable habitat to persist. Asexual reproduction occurs through laterally positioned, bluish-gray soredia (McCune and Geiser 2009) whose microscopic size lends itself to dispersal by wind, animals, or birds. Apothecia (spore-producing structures) have not been documented.
4 Abundance on Tongass NF	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. There is just one occurrence known to the Tongass NF. *Niebla cephalota* was found on a single tree, despite searches of other potential habitat on the island (Dillman 2023). Because this species was epiphytic on a Sitka spruce tree, it is highly vulnerable to stochastic factors that could imperil its persistence on the TNF, e.g. the mortality of the host tree.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for the known occurrence of *Niebla cephalota* on the TNF are unknown.

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	A/B	A/B = *There has been a decline in habitat quality and quantity, but stable amounts of suitable or potential habitat remain* This species grows in the forest fringe directly adjacent to the coast. Coastal forested habitats were historically targeted for timber harvest due to ease of access, but these areas are protected from harvest by a beach buffer. Beach and Estuary Fringe Standards and Guidelines under the 2016 Forest Plan maintains an approximately 1,000-foot-wide beach fringe of mostly unmodified forest on Tongass NF lands.
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. Because the primary habitat of this lichen is the coastal fog belt, and because fog significantly concentrates pollutants, especially acidic forms of SOx and NOx to which lichens are most sensitive, the potential vulnerability of *Niebla cephalota* to air-quality deterioration is a reasonable concern (Geiser 2019). While there were no lichen air quality samples taken at or near the known location, monitoring at southern Prince of Wales Island found elevated sulfur levels in specimens of the lichen *Alectoria sarmentosa*. Sulfur may be deposited from natural sources in marine spray, however it may also be generated by marine vessels, as fossil fuel combustion releases nitrogen and sulfur emissions (Dillman et al. 2007). It is unknown how much nitrogen or sulfur deposition is acceptable before detrimental effects would occur in lichen communities on the TNF (Dillman et al. 2007). It is anticipated, however, that marine traffic is likely to increase with the trends of increased cruise ship tourism in southeastern Alaska (Southeast Alaska 2023). Climate change that contributes to changes in coastal fog patterns and an increase in rain could affect the vigor of this species, possibly resulting in a more restricted distribution or contributing to local extirpation (Geiser 2019). A primary source of *Picea sitchensis* mortality is blow-down from storms and other localized high wind events. Climate models for the next half-century predict increased storm intensity and frequency, suggesting that this threat will only grow with time (Dillman et al. 2017). Higher wind speeds and larger storm swells are likely to lead to increased windthrow related disturbance events, which presents a threat to the known occurrence of this taxon, as all occur on the immediate coast (Dillman et al. 2017). Another potential indirect threat to the *Niebla cephalota* population is an increasing risk of the primary host tree, *Picea sitchensis*, to insect pests. Spruce beetle (*Dendroctonus rufipennis*) damage in southeastern Alaska appears to be limited in extent: near Prince of Wales Island, in the Stikine River drainage, and near Haines (Dillman et al. 2017). Increasing

Criteria	*Rank*	*Rationale*
		temperatures may allow for more widespread outbreaks on the Tongass NF. As the population is known from a single tree, damage or mortality of host trees from spruce aphids or spruce beetles may pose a threat to the *Niebla cephalota* population, where the loss of this single tree could result in population extirpation. The white pine weevil (*Pissodes strobi*) can also impact Sitka spruce, but is currently limited to warmer latitudes of the Pacific Northwest; however, climate warming may facilitate a northward expansion of its range. Additionally, the spruce aphid (*Elatobium abietinum*) is limited primarily by winter temperatures in the region and is likely to become more problematic with increasing frequency of mild winters (Dillman et al. 2017).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Niebla cephalota* is a fruticose lichen in the family Ramalinaceae, order Lecanorales, class Ascomycetes (Geisler 2019). It grows with a tufted to drooping pale greenish, often black-spotted fruticose thallus. This species is primarily epiphytic on trees but sometimes occurs on rock substrates (McCune and Geiser 1997), and its persistence is therefore tied to the persistence of its host tree. *Niebla cephalota* is described as slow-growing (NatureServe 2023).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Ricasolia amplissama ssp. sheiyi is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats** – Any changes to coastal fog patterns or increases in rain could affect the vigor of this species. In addition, climate change-related increases in threats to host trees represent a substantial threat to the known location and potential habitat for this species. Predicted increases in marine traffic (commercial shipping, tourism) also represent a threat to this species, as fog can concentrate nitrogen and sulfur compounds present in the air.
- **Declining populations or habitat trends** – Population trends for *Niebla cephalota* on the TNF are unknown. Coastal forested habitat is likely stable, but disturbance events that affect individual trees (beach erosion, wind throw, insect infection) are likely to increase with climate change. Since Niebla cephalota is known from a single tree on the Tongass NF, it is unclear if it is able to disperse if host trees are lost.
- **Restricted range** – The single known occurrence on the TNF is the only occurrence in Alaska and is over 400 miles (644 kilometers) from the closest occurrences on Vancouver Island. Although this species is distributed along the length of the Pacific Coast from Alaska south to Baja California, it is rare across much of its range and considered critically imperiled in Alaska. The species is more common in warmer climates to the south and the occurrence on the Tongass NF is the furthest north occurrence known.
- **Low populations or restricted ecological conditions** – On the TNF, *Niebla cephalota* is known to a single location where it is epiphytic on a single tree of *Picea sitchensis*. This renders the population highly vulnerable should the host tree succumb to stochastic events such as windthrow, insects, or disease.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025(ALA)[7/19/2001]**	**Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest.**	**Beach fringe forest edge of small marine island on Picea sitchensis bole**		
1	CPNWH_April2025(ALA)[7/19/2001]	Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest.	Beach fringe forest edge of small marine island on large Picea sitchensis bole		
1	CPNWH_April2025(ALA)[7/19/2001]	Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest.	Beach fringe forest edge of small marine island; Picea sitchensis twig		

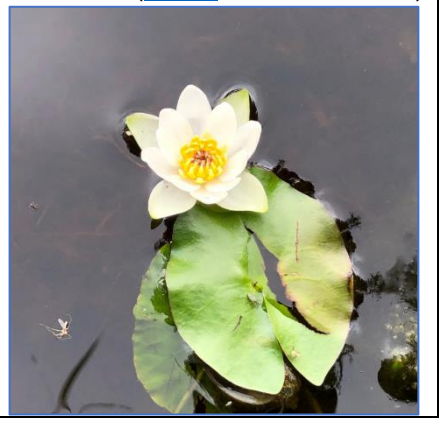
Nymphaea tetragona

Nymphaea tetragona [Georgi]

Pygmy Water-lily

Global Rank: **G5**
Alaska State Rank: **S3**

Photo: Jason Grant (CC-BY: iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Nymphaea tetragona* is an aquatic plant known from two estimated occurrences on the Tongass NF (Appendix 1; Arctos 2025, iNaturalist 2025). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The two occurrences are located on Admiralty Island and on Revillagigedo Island (DeLapp 1994, Arctos 2025, iNaturalist 2025, Rudis 2025 pers. comm., SEINet 2025). Both occurrences are located in Wilderness Areas, with the one on Admiralty Island in the Kootznoowoo Wilderness and the other in the Misty Fjords National Monument Wilderness. These are the only known occurrences of *Nymphaea tetragona* in southeast Alaska (Arctos 2025, CPNWH 2025, iNaturalist 2025, SEINet 2025). Both Tongass NF occurrences were observed in bodies of freshwater (Appendix 1). The occurrence on Revillagigedo Island at Princess Bay Lake was collected with *Potamogeton alpinus*, *Potamogeton natans*, *Sparganium angustifolium*, *Utricularia intermedia*, and *Utricularia minor* (DeLapp 1994, Arctos 2025, SEINet 2025). The occurrence on Admiralty Island was observed with *Nuphar polysepala* (iNaturalist 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: S1 (Critically Imperiled): Yukon; S2 (Imperiled): Alberta, Manitoba, Saskatchewan; S3 (Vulnerable): British Columbia; SNR (Not Ranked): Northwest Territories; not present in any other provinces or territories. United States: SH (Possibly Extirpated): Idaho, Washington; S3 (Vulnerable): Alaska; not present in any other states (NatureServe 2025). *Nymphaea tetragona* occurs in Eurasia and in northwestern North America (Wiersema and Hellquist 1997, POWO 2025). It is rare across most of its North American range (Wiersema 1996). In Canada, it occurs in the provinces and territories of Alberta, British Columbia, Manitoba, Northwest Territories, Saskatchewan, and Yukon (Wiersema and Hellquist 1997, NRCS 2025). In the United States, it occurs in Alaska and was collected once from Washington (Wiersema and Hellquist 1997, NRCS 2025). While NatureServe (2025) and USDA Plants (NRCS 2025) include Idaho and Montana in the species' range, Wiersema (1996) and Wiersema and Hellquist (1997) treat records from these states as the very similar *N. leibergii*, with which *N. tetragona* was formerly considered conspecific. There are two occurrences of *Nymphaea tetragona* from the Tongass NF (Arctos 2025, CPNWH 2025, iNaturalist 2025). The nearest Alaskan records are approximately 400 miles to the northwest along the Chitina River (Arctos 2025, CPNWH 2025). Of all the states and provinces where *Nymphaea tetragona* occurs in North America, it is the most common in Alaska where there are scattered records from the central and southwestern parts of the state (Wiersema 1996, Arctos 2025, CPNWH 2025). To the east, *Nymphaea tetragona* is rare in coastal, central, and northwestern British Columbia (Wiersema 1996, Klinkenberg 2020, CPNWH 2025). The nearest record to the Tongass occurrences is 270 miles south down the British Columbia coast on Spider Island (Klinkenberg 2020). *Nymphaea tetragona* is an aquatic emergent perennial found in ponds, lakes, or slow-moving streams from the lowland to montane zones at elevations ranging from sea level to approximately 3940 feet (1200 m) (Wiersema and Hellquist 1997, Klinkenberg 2020). No information was found reporting water quality or pH values at occupied sites.

Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	*B = Disperses only through suitable habitat* While some *Nymphaea* species reproduce vegetatively by lateral rhizomes or stolons, *Nymphaea tetragona* is believed to mainly reproduce and disperse by seed (Wiersema 1988). The seeds of *Nymphaea* species have bladder-like arils that cause them to float, and once the arils rupture the seeds sink (Heslop-Harrison 1955). Dispersal via floating seeds is limited to bodies of water or watersheds within which the species already occurs. Overland dispersal to new bodies of water (or recolonization) is likely the result of transport by waterbirds (Wiersema 1988). Compared to other *Nymphaea* taxa, *Nymphaea tetragona* has relatively large seeds and produces relatively few per fruit (Wiersema 1988). Despite these potential disadvantages to dispersal, *N. tetragona* has the broadest range of any *Nymphaea* species (Wiersema 1988). Since *Nyphaea tetragona* is not found throughout all the varied aquatic habitats on the Tongass NF, successful dispersal and colonization or recolonization may be limited by specific aquatic habitat requirements or other unknown factors.
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Nymphaea tetragona* is known from only two occurrences on the Tongass NF; neither occurrence has a population count (Appendix 1; Arctos 2025, CPNWH 2025, iNaturalist 2025). Based on the small number of occurrences, this species is rare on the Forest.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow up surveys, the population trends for the occurrences of *Nymphaea tetragona* on the Tongass NF are unknown (Arctos 2025, CPNWH 2025, iNaturalist 2025, USFS 2025a).
6 Habitat trend on Tongass	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* Both occurrences are in freshwater lakes; based on aerial imagery the lakes are not fed by glacier melt and are likely fed by snowmelt as well as rain. One occurrence is in Princess Bay Lake, and the other is likely at the junction of Lake Alexander and Beaver Lake (Appendix 1; DeLapp 1994, Arctos 2025, iNaturalist 2025, Rudis 2025 pers. comm.). Lakes on

Criteria	*Rank*	*Rationale*
NF		the Tongass NF are overall in pristine condition (Chestnut and Tucker 2025). In addition, the occurrences are within Wilderness Area and are not near mapped timber projects nor non-native weeds (USFS 2025b, 2025d). Therefore, the current habitat of *Nymphaea tetragona* appears to be stable. A report by the Alaska Department of Environmental Conservation (ADEC) in 2017 showed that lakes sampled on NFS lands did not exceed state water quality standards in any parameter. Even so, signatures of industrialization are evident in lake sediments, where atmospherically deposited mercury levels are higher than background levels (Lepak et al, 2020), and site-specific problems related to roads and mining do occur (Chesnut and Tucker 2025).
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Lake conditions may change with projected changes in temperature and hydrologic regime (Chestnut and Tucker 2025). Climate change is predicted to lead to increased air temperature and growing season water deficit; winters are predicted to be warmer (with more rain and less snow) and summers drier (Turner and Mallott 2025, Wiles and Warren 2025). How this may impact habitat suitability for *Nymphaea tetragona* is unclear. Under the 2016 Forest Plan, lakes are protected by a 100' no-cut commercial harvest buffer. The function of the lakeside riparian buffer, like streams, is to minimizes excess sedimentation input and allow for allochthonous inputs to lakes including large wood as cover, and leaf litter/insects to support biological production (Chesnut and Tucker 2025).
8 Life history and demographics	D	**D = Insufficient information to draw inferences about the criterion** *Nymphaea tetragona* is an aquatic perennial herb in the water-lily family (Nymphaeaceae) (Wiersema and Hellquist 1997). It grows from erect rhizomes embedded in the substrate at the bottom of ponds, lakes, and slow-flowing streams (Wiersma and Hellquist 1997). Floating white flowers, 3–7.5 cm in diameter, are produced in the summer; the flowers open during the day and close at night (Wiersma and Hellquist 1997). Most *Nymphaea* species require pollinators to deliver pollen to the stigmatic surface, because within a flower, the stigma is only receptive the day before the stamens release pollen (Wiersema 1988); there is no information on whether *Nymphaea tetragona* requires pollination. No information was found on pollinators of *Nymphaea tetragona*, but other *Nymphaea* species are pollinated by a range of

Criteria	*Rank*	*Rationale*
		insect taxa (Heslop-Harrison 1955, Wiersema 1988). While some members of the genus reproduce vegetatively by lateral rhizomes or stolons, *N. tetragona* is thought to only reproduce sexually by seed production (Wiersema 1988).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Nymphaea tetragona is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No significant threats to habitat are known. Lakes on the Tongass NF are overall in pristine condition and under the 2016 Forest Plan are protected by a 100' no-cut commercial harvest buffer.
- **Declining trends:** Habitat may be impacted by projected changes in climate, but the degree to which this will affect habitat suitability for *Nymphaea tetragona* is unclear. Population trends are unknown.
- **Restricted ranges:** The next nearest records to the Tongass NF occurrences are over 250 miles to the south in British Columbia. The species is likely dispersed by birds, meaning that long-range dispersal is possible and thus Tongass NF populations are likely not genetically isolated. While records are highly scattered, the range of the species continues to the north, east, and south.
- **Low population numbers or restricted ecological conditions:** Two occurrences are known on the Tongass NF. While lakes and ponds are common across the Forest, it is unclear if there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of the species.
- **Other factors:** It is unknown whether other factors may exist that could impact the persistence of this species in

the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**DeLapp 1994; Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:10176)[7/17/1993]**	**Revillagigedo Island. Princess Bay lake, E side of bay, E of banding cabin, Ketchikan Quad.**	**Princess Bay Lake. [Collected on same date in same place/habitat: Potamogeton alpinus, Potamogeton natans, Sparganium angustifolium, Utricularia intermedia, Utricularia minor]**		
2*	**iNaturalist (https://www.inaturalist.org/observations/88966531) [7/19/2021]**	**Admiralty Island. Admiralty Island National Monument. [Junction of Lake Alexander and Beaver Lake.]**	**In fresh water adjacent at the junction of two lakes, growing next to an extensive Nuphar bed [Nuphar polysepala]**		

Oxytropis campestris

Oxytropis campestris [L., 1802]

yellow locoweed

Global Rank: **G5**

Alaska State Rank: **SNR**



photo: (CC BY-NC) Odenwaelder

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps.* *Oxytropis campestris* is known from 16 estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). These occurrences are located on the Yakutat Foreland (Occurrences 1 through 4), South of Virginia Lake (Occurrence 5), southeast of Juneau (Occurrence 6), northeast of Juneau (Occurrence 10), Chichagof Island (Occurrences 7, 12, and 15), Dall Island (Occurrence 8), Revillagigedo Island (Occurrence 9), northern Prince of Wales Island (Occurrence 11), Baranof Island (Occurrences 12 and 14), and Lynn Canal (Occurrence 16) (Appendix 1, CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in disturbed areas (Occurrences 1, 3, 7, 13, and 15), sand dunes (Occurrences 2 and 4), open alpine areas (Occurrences 5, 6, 8, 9, 10, 11, and 16), and rocky areas and ridges (Occurrences 12, 14, and 15). It tends to co-occur with soils that are gravelly, dry, and composed of limestone (Appendix 1). There are one or two occurrences of this species in southeastern Alaska outside of the Tongass NF in the Juneau area (one site from 1891 could be within Tongass NF but the reported location is vague) (CPNWH 2025).

Criteria	*Rank*	*Rationale*
		This species may be confused for other *Oxytropis* species or other Fabaceae species such as *Astragalus* which are also present nearby (iNaturalist 2025). Subspecies of *Oxytropis campestris* in TNF include *Oxytropis campestris* var. *jordalii* (CPNWH 2025).
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank SNR *Oxytropis campestris* is broadly distributed throughout North America and Eurasia (FNA 2025). In North America, *Oxytropis campestris* is present in all Canadian provinces and territories as well as most northern states in the USA (FNA 2025). Across its range, *Oxytropis campestris* occurs in forest openings at rocky balds from sea-level to the alpine (FNA 2025). It is typically found in rocky and gravelly soils composed of limestone and in open areas (Appendix 1; FNA 2025). In British Columbia it is found in dry to mesic sandy, gravelly, or rocky sites, including river bars, terraces, rock outcrops, grassy slopes, meadows, clearings, roadsides, alpine tundra and heath, and open forests in the steppe, montane, subalpine and alpine zones (Klinkenberg 2020). Outside of the Tongass NF, the range of this species continues throughout much of Alaska and British Columbia (CPNWH 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Oxytropis campestris* is a perennial herb with a cespitose growth habit (OregonFlora 2025). Its main dispersal mechanism is likely by seeds, similar to many plants in Fabaceae (Baskin and Baskin 2012). Seed dispersal is not well documented for this species.
4 Abundance on Tongass	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Oxytropis campestris* is known from 16 occurrences on the Tongass NF (Appendix 1). Three occurrences note the species as common (Occurrences 5, 7, and 12) rare (Occurrence 14) (Appendix 1; CPNWH 2025).

Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Oxytropis campestris* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for the 16 occurrences of *Oxytropis campestris* on the Tongass NF are varied, including a range of elevations and some locations with high disturbance. It tends to co-occur with soils that are gravelly, dry, and composed of limestone (Appendix 1). Because of the range of habitats occupied, and the apparent tolerance of disturbance, it is assumed that habitat trends for this species on the Tongass NF are stable. Invasive species are documented within 1 km of Occurrence 4 (*Lupinus polyphyllus*) (USFS 2025b). Timber harvest has not occurred in the recent past within 1 km from any occurrence on the Tongass NF (USFS 2025c).
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Climate change is expected to be a main stressor across habitats in the future. However, the ecological amplitude of *Oxytropis campestris* is apparently high, and direct impacts of climate change on this species are unknown. Species occurring in alpine ecosystems are considered highly vulnerable to impacts of reduced snowpack, subalpine species encroachment, altered interactions with pollinators, and rising temperatures as a result of climate change (Inouye 2020, Halofsky et al. 2025). It is uncertain how community composition of alpine ecosystems will shift with variance in site specific conditions as topographic heterogeneity may offer a buffer to alpine habitat loss (Halofsky et al. 2025, Seastedt and Oldfather 2021).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Oxytropis campestris* is a perennial herb with a cespitose growth habit (OregonFlora 2025). It produces flowers and fruits with seeds. Flowers are likely pollinated by insects, similar to other species of *Oxytropis* (CPC 2025). Spontaneous self-pollination is also possible within the *Oxytropis* genus (Kozurahova 2016). Seeds have physical dormancy and require scarification for germination (Baskin and Baskin 2012). The species is used in roadside revegetation projects in other parts of Alaska, indicating that plants are easy to grow from seed and tolerant of high disturbance conditions (Alaska Plant Materials Center 2008).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	☐	X	☐
Low populations or restricted ecological conditions	☐	☐	X
Other factors (see conclusion rationale)	X	☐	☐

Conclusion Rationale

Oxytropis campestris is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Significant threats are unclear. Invasive plants may compete with the species in some locations. Habitat may be impacted by projected changes in climate, particularly alpine habitat, but whether this will affect

habitat suitability for *Oxytropis campestris* is unclear.

- **Declining trends:** Population and habitat trends are unknown. The species has an apparently broad ecological amplitude indicating a tolerance for potential changes in habitat.
- **Restricted ranges:** While records are scattered, the range of the species continues to the north, east, and south.
- **Low population numbers or restricted ecological conditions:** *Oxytropis campestris* is known on the Tongass NF from sixteen scattered occurrences in a range of mostly dry, sandy, gravelly, or calcareous habitats. A preference for drier conditions may be restricting its abundance on the Tongass NF. It is unclear if there are other specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the uncommonness of the species.
- **Other factors:** The species is used in roadside revegetation projects elsewhere in the state, indicating plants are easy to grow from seed and tolerant of disturbance conditions

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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[USFS] USDA Forest Service. 2025c. Region 10 Young Growth Forest dataset.

Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025(ALA) [6/22/1991]**	**Yakutat Foreland, Harlequin Lake - Dangerous River area, Yakutat Quad.**	**Gravel airstrip.**		
2*	**CPNWH_April2025(ALA) [6/22/1991]**	**Yakutat Foreland, Situk R. estuary, Yakutat Quad.**	**Stabilized sand dunes NW of river mouth.**		
3*	**CPNWH_April2025(ALA) [7/18/1980]**	**Yakutat Foreland, Dangerous R. Airstrip near Harlequin Lake, Yakutat Quad, Tongass National Forest.**	**Open areas with scattered willow.**		
4*	**CPNWH_April2025(ALA) [6/30/1977]**	**Yakutat Foreland, between Lost and Situk R. mouths, Yakutat Quad.**	**Coastal sand dunes, in dry sand.**		
5*	**CPNWH_April2025(ALA) [7/30/2013]**	**Mainland, S of Virginia Lake, NE of Madan Bay, Petersburg Quad, Tongass National Forest.**	**Top of ridgeline of limestone mountain, dry limestone gravels in alpine, common.**	**Common**	
5	CPNWH_April2025(ALA) [9/10/2013]	Mainland, S of Virginia Lake, NE of Madan Bay, Petersburg Quad, Tongass National Forest.	Top of ridgeline of limestone mountain, dry limestone gravels in alpine, common.	Common	
6*	**CPNWH_Mar25 (WTU282661) [7/8/1981]**	**Mainland. About 1 mile southeast of Juneau along Mount Roberts Trail.**	**Above treeline in grassy, rocky alpine tundra. just above cross, among rocks.**	**Flowers.**	
7*	**CPNWH_April2025(ALA) [7/17/2013]**	**Chichagof Island, Freshwater Bay area, Tongass National Forest.**	**Sparsely vegetated limestone pavement, common.**	**Common**	
8*	**CPNWH_April2025(ALA) [8/15/1990]**	**Alexander Archipelago, Dall, I., Thunder Mtn., Craig Quad, Alexander Archipelago.**	**Exposed herbaceous-low grass alpine.**		
9*	**CPNWH_April2025(ALA) [8/08/1979]**	**Alexander Archipelago, Revillagigedo I., ridge S of Lake 2499, 2 km SW of lake, Ketchikan Quad.**	**Rocky areas of summit of peak.**		
10*	**CPNWH_April2025(ALA) [7/27/1952]**	**Coast Mts., Juneau Icefield, Death Valley, slope N of Death Valley, Juneau Quad, Tongass National Forest, Alexander Archipelago.**	**Rich heath community on s slope.**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
11*	CPNWH_Mar25 (UAAH12827) [7/03/2018]	Prince of Wales Island, north end, Perue Peak, karst alpine.	On humus between karst stones, forb and graminoid dominant location.		
12*	CPNWH_April2025(ALA) [6/28/2009]	Rust Lake, E of small unnamed lake, Sitka Quad, Alexander Archipelago, Chichagof Island.	Limestone ridge,crack in bedrock, common.	Common	
13*	CPNWH_April2025(ALA) [8/04/2008]	Blue Lake Watershed, E shore of lake and along Blue Lake Creek, Sitka Quad, Alexander Archipelago, Baranof Island.	Upper gravel bar of creek above brush field.		
14*	CPNWH_April2025(ALA) [8/10/2004]	Alexander Archipelago, Baranof I., Glacier Lake, ridgeline E of lake, Sitka Quad, Tongass National Forest.	Rare on W aspect, exposed ridgeline.	rare	
15*	CPNWH_April2025(ALA) [7/15/2004]	Alexander Archipelago, Chichagof I., Whitestripe Lake and[X]Whitestripe Mt., Sitka Quad, Tongass National Forest.	10 degree slope on S aspect, limestone cobble pavement and karst.		
16*	CPNWH_April2025(ALA) [9/02/1988]	Lynn Canal, ridge N of Dayebas Cr., T29S,R60E,S32, Skagway Quad, Tongass National Forest.	Alpine ridge with low, windswept tundra.		

Packera pauciflora

Packera pauciflora [(Pursh) Á. Löve & D. Löve]

Few-flower Ragwort

Global Rank: **G5**
Alaska State Rank: **SNR**

Photo: Kallum McDonald (CC0, iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Packera pauciflora* is known from one occurrence on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). The one occurrence is in the very northwest part of the Forest in the Situk River area of the Yakutat Forelands (Arctos 2025, CPNWH 2025). The occurrence was observed at two places approximately 0.75 km apart along Forest Service Road 10 (also known as the Alsek Road or Dangerous River Road) (Arctos 2025, CPNWH 2025). Parts of the occurrence have been observed in 1991, 2004, and 2014, and the habitat where the plants were observed was described as wet graminoid [sphagnum] bog meadow with tall willows, roadside meadow, and roadside gravel (Arctos 2025, CPNWH 2025). Associated species collected or observed at the same time, place, and habitat include *Salix* sp., *Cardamine pratensis*, *Hippuris vulgaris*, *Carex microglochin*, *Geum calthifolium*, *Pedicularis oederi*, *Erythranthe guttata*, and *Botrychium lanceolatum*. (Appendix 1; Arctos 2025, CPNWH 2025). In addition to the Forest occurrence near Yakutat, *Packera pauciflora* also occurs in southeast Alaska near Glacier Bay National Park in the vicinity of Gustavus (Appendix 1; Klinkenberg 2020, Arctos 2025). The flower heads of *Packera pauciflora* usually just contain disk flowers and do not have ray flowers (Trock 2006, Klinkenberg 2020). This is also true of *Packera indecora*, with which it overlaps in distribution, and the two species can be difficult to distinguish (Bain and Whitton 1994, Trock 2006). In his *Flora of Alaska*, Hulten (1968) only recognized

Criteria	*Rank*	*Rationale*
		Packera pauciflora, placing *Packera indecora* in synonymy. In floras and taxonomic treatments that recognize both species, *Packera pauciflora* is differentiated from *Packera indecora* in having smaller stature (usually 1.5-4 dm vs 3-8 dm), relatively thick and turgid basal leaves (vs. thin and flaccid), fewer flower heads (usually 1–6 vs 8–20), peduncles with blue or reddish bractlets (vs. peduncles usually without bractlets), deep red bracts (phyllaries) around the heads (or the phyllaries green with deep red to purple tips) (vs. phyllaries green with blue tips), and deep yellow to red-orange corollas (vs yellow corollas) (Bain and Whitton 1994, Trock 2006). Based on specimen collections, both species occur in southeast Alaska near Gustavus (Klinkenberg 2020, Arctos 2025). There are two documented occurrences of Packera indecora on the Tongass NF, both near Yakutat (CPNWH 2025, Arctos 2025, USFS 2025).
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: Not ranked (NatureServe 2025) State Ranks: Canadian provinces and territories: SH (Possibly Extirpated): Saskatchewan; S1 (Critically Imperiled): Ontario; S2 (Imperiled): Newfoundland; S3 (Vulnerable): Alberta, Northwest Territories, Quebec; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present. United States: S2 (Imperiled): Wyoming; all others, including Alaska, are SNR (not ranked) or not present in that state (NatureServe 2025). *Packera pauciflora* is perennial herb in the Asteraceae that is found in western and northeastern North America (Trock 2006). It occurs in the western Canadian provinces and territories of Alberta, British Columbia, Northwest Territories, and Yukon, and in eastern Canada in Newfoundland & Labrador, Ontario, and Quebec (Trock 2006). In the United States, it is reported from Alaska, California, Colorado, Idaho, Michigan, Minnesota, Montana, Nevada, Washington, and Wyoming (Trock 2006, NatureServe 2025, NRCS 2025). Its occurrence in some of these states is uncertain; its reported presence in Oregon (NatureServe 2025) appears to be based on a specimen that still requires verification (CPNWH 2025), so the taxon is not included by Oregon Flora (2025). The single *Packera pauciflora* occurrence from the Tongass NF is approximately 10 miles (16 km) east-northeast of Yakutat (CPNWH 2025). The nearest Alaskan records are approximately 150 miles (240 km) to the southeast near Gustavus, and 165 miles (265 km) northwest near McCarthy (Arctos 2025, CPNWH 2025). Further northwest, records

Criteria	*Rank*	*Rationale*
		are scattered through southern and central Alaska (Arctos 2025, CPNWH 2025). To the east, *Packera pauciflora* is widespread in British Columbia (Klinkenberg 2020, CPNWH 2025). Throughout its range in North America, *Packera pauciflora* is found in damp meadows and woodlands ranging from sea level to 10,830 feet (3300 m). In the west, it tends to be in the subalpine and alpine zones, but it commonly occurs at lower elevations in the east. (Trock 2006, Trock 2012, Klinkenberg 2020).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* On the Tongass NF, *Packera pauciflora* is found in wet meadow/sphagnum bog habitat as well as in roadside gravel (Appendix 1). The small (1-1.5 mm) one-seeded, indehiscent fruits (achenes or cypselae) have a delicate, white pappus that is attached at one end (Trock 2006) which may aid in wind-dispersal. However, in *Packera*, the pappus readily falls off the fruit (Trock 2006), which may lead the fruit to fall near the parent plant and be dispersed by water or animals. In some *Packera* species, the fruits remain in the head until the inflorescence stems are broken during winter storms (Searcy 2023). Therefore, the distance that the fruit can disperse from the parent plant is unknown. Once the fruit is dispersed, it would only be successful in suitable habitat.
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Packera pauciflora* is known from only one occurrence in the northwest part of the Tongass NF (Appendix 1). Parts of the occurrence were observed in 1991, 2004, and 2014; in 2014, the collector observed that the plant was rare where found in a roadside meadow (Appendix 1; Arctos 2025, CPNWH 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* This species was observed at the same general location three times over a period of approximately 25 years between 1991 and 2014, indicating that this occurrence is somewhat stable. However, as no population census was taken during any visit, the population trend of this occurrence is unknown.

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality* The single occurrence of *Packera pauciflora* on the Tongass NF was observed in wet meadow/sphagnum bog habitat as well as in roadside gravel (Arctos 2025, CPNWH 2025). Wet meadow and bog habitat on the Tongass NF are grouped under the vegetation category non-forested wetlands (or palustrine wetlands), which is a freshwater, non-tidal influenced vegetation type with saturated soil (Turner and Mallott 2024). Wetlands generally have high ecosystem integrity and low vulnerability to stressors. However, landscape position, soil drainage, and hydrology are important drivers for wetland species composition (Turner and Mallott 2024). Activities in the immediate vicinity of this species that change hydrology could cause a negative habitat trend. One end of the single known occurrence is approximately 1 mile west of a timber project from 2004 (USFS 2025d). Additionally, Forest Service Road 10 has numerous mapped non-native plants in the vicinity of *Packera pauciflora*, including *Phalaris arundinacea* (reed canary grass), *Poa pratensis* (Kentucky bluegrass), and *Trifolium repens* (white clover). (USFS 2025b). The westernmost part of the *Packera pauciflora* occurrence is 0.3 mile southeast of mapped reed canarygrass, a non-native weeds that can invade wet meadows and riparian areas (APMC 2024, USFS 2025b).
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Invasive species, timber activities, and climate change may impact the habitat of *Packera pauciflora*. As mentioned in Criterion 6, invasive species are known to be present in the vicinity of *Packera pauciflora* along Forest Service Road 10 (USFS 2025b). The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut 2024, Wiles and Warren 2024). There is a possibility that invasive species could outcompete *Packera pauciflora* in the future. In addition, timber harvest activities are likely to occur in the future and can impact soil drainage, soil saturation, and hydrology of wet meadows and bogs, which could alter habitat conditions for *Packera pauciflora* (Turner and Mallott 2024). Additionally, increased air temperature and evapotranspiration may lead to decreased soil moisture, particularly during the growing season, which could lead to drought stress for *Packera pauciflora* (Turner and Mallott 2024, Wiles and

Criteria	*Rank*	*Rationale*
		Warren 2024). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2024).
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** *Packera pauciflora* is a perennial herb that grows each season from a fibrous-rooted, erect to horizontal, weakly spreading underground stem (a caudex) (Trock 2006). The one to three above-ground, erect stems usually grow to 40 cm tall (sometimes 50 cm tall) and terminate in an inflorescence that usually has one to six heads (Bain and Whitton 1994, Trock 2006, Klinkeberg 2020). Each head can have 60 to more than 80 narrow bisexual disk flowers in the center (Trock 2006). The heads usually lack ray flowers (Bain and Golden 2005, Trock 2006, Klinkeberg 2020). The disk flowers are self-fertile although they are capable of outcrossing (Bain and Golden 2005). While no species-specific pollination information was found, confirmed pollinators of other *Packera* taxa include bees, butterflies, moths, and flies (CPC 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

- **Significant threats**: Reed canarygrass is known along the road near the one documented occurrence of Packera pauciflora. Additionally, timber harvest has occurred in the vicinity of the known occurrence and may impact the hydrology in nearby wetland habitat.
- **Declining trends**: Population trends for *Packera pauciflora* on the Tongass NF are not known. Wetland habitat generally has high ecosystem integrity and low vulnerability to stressors. However, increased air temperature and evapotranspiration may lead to decreased soil moisture, particularly during the growing season, which could lead to changes in vegetation composition and/or drought stress for *Packera pauciflora*.
- **Restricted ranges**: *Packera pauciflora* is widespread in North America.
- **Low population numbers**: There is one known occurrence of *Packera pauciflora* on the Tongass NF near Yakutat. This species requires careful consideration to distinguish from other *Packera* species and targeted surveys could reveal that it is more common than documented. It is also possible that dispersal limitations may limit *Packera pauciflora* to the northern end of the forest.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025, Arctos 2025 (ALA-UAM:Herb:253126) [7/05/2014]**	**Yakutat, Situk River, Yakutat Quad.**	**Roadside meadow.**	**Rare**	
1	CPNWH_April2025, Arctos 2025 (ALA-UAM:Herb:141879) [7/10/2004]	Yakutat Forelands, Situk R. area, Yakutat Quad, Tongass National Forest.	Road bank gravels with mixed plants. [Collected on same day at same place: Botrychium lanceolatum]		
1	CPNWH_April2025, Arctos 2025 (ALA-UAM:Herb:4071) [6/25/1991]	Yakutat Foreland, Vic. Mile 9 - 10 Alsek Road, Yakutat Quad.	Wet graminoid [sphagnum] bog-meadow with tall willow overstory. [Collected on same day at same place in same habitat: Cardamine pratensis, Hippuris vulgaris, Carex microglochin, Geum calthifolium, Pedicularis oederi, Erythranthe guttata}		
2	Arctos 2025 (ALA-UAM:Herb:146629) [7/20/2001]	E of Gustavus airport, Wilson Road approaching Rink Road, UTM 459155.32N, 6477344.1W, Juneau Quad, Glacier Bay National Park and Preserve, Alexander Archipelago	Pine woodland with predominant forb understory, with Pinus contorta, Carex, Antennaria pulcherrimma.	**Outside the Tongass NF**	

Packera paupercula

Packera paupercula [(Michx.) Á. Löve & D. Löve]

Balsam Ragwort

Global Rank: **G5**
Alaska State Rank: **SNR**

Photo: Kallum McDonald (iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Rare or isolated* *Packera paupercula* is known from five occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile). The five occurrences are located within an area of approximately 1.25 x 2 miles on the southwest edge of the Chilkat Peninsula, southeast of Excursion Inlet (Arctos 2025, CPNWH 2025, USFS 2025a). All five occurrences are along logging roads in disturbed roadside gravel with sparse vegetation (Arctos 2025, CPNWH 2025, USFS 2025a). At occurrence 5, one associated species, *Erigeron acris* subsp. *kamtschaticus*, was collected at the same time, place, and habitat; no other associated species were observed or collected at any of the other Tongass NF locations (Arctos 2025). Two other occurrences of *Packera paupercula* are located in southeast Alaska outside the Tongass NF (Appendix 1; Arctos 2025, CPNWH 2025). One is near Gustavus to the northwest of the five Forest occurrences (Arctos 2025). Label data for this specimen indicate the habitat is bog peatland and associated species include *Pinus contorta*, *Picea sitchensis*, *Vaccineum uliginosum*, *Empetrum nigrum*, *Equisetum variegatum*, and moss species. The other occurrence is located far to the south on Prince of Wales Island in a calcareous fen; the only associated species collected or observed was *Erigeron peregrinus* (CPNWH 2025). *Packera paupercula* is known to occur in well-drained, often sandy soils that can range from acidic to neutral to alkaline, with some populations found in calcareous habitats (Mahoney 2000).

Criteria	*Rank*	*Rationale*
		Ecologically and morphologically, *Packera paupercula* is the most variable species of the genus in North America, and some "phases" have been treated as separate species, subspecies, varieties, forms, and races (Trock 2006, Mahoney and Kowal 2008). Floristic treatments that cover Alaska and nearby Canada do not recognize the infraspecific taxa that have been proposed for this species (Trock 2006, Ickert-Bond et al. 2019, Klinkeberg 2020, and NRCS 2025).
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: Not ranked (NatureServe 2025) State Ranks: Canadian provinces and territories: S3 (Vulnerable): Labrador; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present. United States: S1 (Critically Imperiled): Connecticut, Georgia, Mississippi; S2 (Imperiled): New Hampshire, West Virginia; S3 (Vulnerable): Colorado, Maryland, New York, Ohio; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present (NatureServe 2025). *Packera paupercula* is a perennial herb in the Asteraceae with a broad distribution in North America (Trock 2006). It occurs in all the Canadian provinces and territories (Trock 2006). In the United States, it is reported from Alaska and all the other states bordering Canada from Oregon east to Maine, south in the Rocky Mountain states to Colorado Utah, and New Mexico and in the southeast to the Gulf Coast states of Alabama, Georgia, and Florida (Trock 2006, NRCS 2025). There are scattered records farther to the northwest in central Alaska (Arctos 2025, CPNWH 2025). To the east, *Packera paupercula* is widespread in British Columbia (Klinkenberg 2020, CPNWH 2025). Throughout its range in North America, *Packera paupercula* is found in wet meadows, stream edges, rocky outcrops, and woodlands from lowlands to montane zones at elevations ranging from sea level to approximately 9845 feet (3000 m) (Trock 2006, Klinkenberg 2020). Mahoney (2000) found that the soils of eastern *Packera paupercula* populations tend to be sandy and well drained with low clay content and of neutral to acidic pH, but western populations often occur on calcareous soils. In Illinois, this species is often found in locations that have undergone some degree of disturbance (Hilty 2020).

Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	*B = Disperses only through suitable habitat* The small (1-2 mm) one-seeded, indehiscent fruits (achenes or cypselae) of *Packera paupercula* have a delicate, white pappus that is attached at one end (Trock 2006) which may aid in wind-dispersal. However, in *Packera*, the pappus readily falls off the fruit (Trock 2006), which may lead the fruit to fall near the parent plant and be dispersed by water or animals. In some *Packera* species, the fruits remain in the head until the inflorescence stems are broken during winter storms (Searcy 2023). In addition, this species has been known to be able to produce clonal plants from the short rhizomes and stolons that grow from the underground stem (Hilty 2020). The distance that the fruits or clones can disperse from the parent plant is unknown. Once the fruit is dispersed, it would only be successful in suitable habitat. On and near the Tongass NF, *Packera pauciflora* is found in roadside gravel within *Callitropsis nootkatensis* wetland, in and adjacent to bog peatland, and in a calcareous fen (Appendix 1). The five Forest occurrences are located within an area of approximately 1.25 x 2 miles on the southwest edge of the Chilkat Peninsula. Suitable wetland habitat (and roadside gravel within that habitat) is abundant on the Tongass NF, and it is unknown why it is only recorded in one restricted part of the Forest. Limited dispersal activity could contribute to this species limited known distribution on the Tongass NF.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* There are five documented occurrences of *Packera paupercula* on the Tongass NF, all within an area of approximately 1.25 x 2 miles on the southwest edge of the Chilkat Peninsula (Appendices 1 and 2). All five occurrences have population counts from 2011 when the occurrences were first documented (Appendix 1; USFS 2025a). Estimated population sizes range from 10 to 600 plants, with a total of approximately 1,300 individuals observed over all populations; the majority of individuals (900) were seedlings to immature plants (USFS 2025a). Based on the number of occurrences (5), the limited area where the species is found on the Forest, and the total number of individuals observed, this species is uncommon within the Tongass NF boundary.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Packera paupercula* on the TNF are unknown due to lack of repeat visits to these occurrences (CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality* The five Tongass NF occurrences of *Packera paupercula* are located in one restricted area of the Forest and were observed in roadside gravel along timber roads within *Callitropsis nootkatensis* wetland and adjacent to bog habitat (Appendix 1; Arctos 2025, CPNWH 2025). *Callitropsis nootkatensis* wetland and bog habitat on the Tongass NF are grouped in forested and non-forested wetlands (or palustrine wetlands), which is a freshwater, non-tidal influenced vegetation type with saturated soil (Turner and Mallott 2024). Wetlands on the Tongass NF have high ecosystem integrity and low vulnerability to stressors (Turner and Mallot 2025). However, landscape position, soil drainage, and hydrology influence vegetation composition in wetlands (Turner and Mallott 2024). Therefore, activities in the immediate vicinity that change hydrology could cause a negative habitat trend. All five occurrences are along roads in the vicinity of timber projects that were completed between 1990 and 1992; from aerial imagery, it appears that this area was much changed at that time (USFS 2025d). Part of occurrence 5 is within 300 feet of a timber project, occurrence 4 is within 250 feet, occurrence 3 is within 850 ft, occurrence 2 is within 50 feet, and occurrence 1 is within 350 feet (USFS 2025d). This activity likely included the building of logging roads. However, given that this species was observed in roadside gravel on the Tongass NF, it is difficult to know if this species has been impacted by changes in hydrology. In other parts of its range, this species is found in well drained, sandy soils, and may be tolerant to some disturbance, so it is unclear if road construction was detrimental for this species. In addition, based on aerial imagery, the region where it was found has abundant bogs and wet meadows that could provide suitable habitat. Few non-native plants have been mapped near the Tongass NF occurrences (USFS 2025b). Only *Leucanthemum vulgare* has been mapped along the logging road 1000 ft northwest of occurrence 5; this weed was mapped on the same date that *Packera paupercula* was observed in 2011 (USFS 2025b).

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Timber activities, and climate change may impact the habitat of *Packera paupercula*. Timber harvest is likely to continue and the Tongass NF and may impact soil drainage, soil saturation, and hydrology of adjacent wetland habitat (Turner and Mallott 2024). Additionally, increased air temperature and evapotranspiration may lead to decreased soil moisture, particularly during the growing season, which could lead to drought stress for *Packera paupercula* or increased competition from woody species (Turner and Mallott 2024, Wiles and Warren 2024). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2024).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Packera paupercula* is a perennial herb that grows each season from short rhizomes (weakly branched, ascending to erect) with fibrous roots and occasionally some small stolons (Trock 2006, Klinkeberg 2020). The one to several above-ground, erect stems usually grow no more than 45 cm tall (sometimes to 70 cm tall) and terminate in an inflorescence that usually has one to ten heads (Trock 2006, Klinkeberg 2020). Each head can have 50-65 narrow, bisexual, yellow disk flowers in the center (Trock 2006). At the periphery of the heads, yellow ray flowers are usually present (Trock 2006, Klinkeberg 2020). Most *Packera* species are obligate outbreeders, which means that the pollen produced by a plant cannot be used to produce seed on that same plant (Bain and Whitton 1994). Bees in the genus *Osmia* are known to pollinate *Packera paupercula* in eastern Ontario (Catling 2015). The nectar and pollen of the flowers are also known to attract cuckoo bees (*Nomada spp.*), Halictid bees, Andrenid bees, Syrphid flies, small butterflies and skippers, and miscellaneous beetles (Hilty 2020, CPC 2025). In Illinois, this species is often found in locations that have undergone some degree of disturbance (Hilty 2020); disturbance could aid in creating clonal plants from the parent plant.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information

Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

- **Significant threats**: Timber harvest may impact habitat for this species, directly or indirectly. Additionally, invasive species could compete with *Packera paupercula*, particularly in roadside locations. However, this species may be somewhat disturbance tolerant.
- **Declining trends**: Population trends of *Packera paupercula* are unknown. Wetland habitat has high ecosystem integrity with low vulnerability to stressors. However, increased air temperature and evapotranspiration may lead to decreased soil moisture, particularly during the growing season, which could lead to drought stress for *Packera paupercula* or increased competition from woody species.
- **Restricted ranges**: *Packera paupercula* is widespread in North America.
- **Low population numbers or restricted ecological conditions**: On the Tongass NF, *Packera paupercula* is only known from five occurrences on the mainland on the Chilkat Peninsula that are all in close proximity. Wetland habitat for this species is widespread and it may be somewhat tolerant of disturbance. Dispersal ability may limit the distribution of this species on the Tongass NF. Additionally, Packera species can be difficult to identify and the Chilkat Peninsula has low survey intensity, so targeted surveys may be required to determine the abundance of this species on the Tongass NF.
- **Other factors**: No other factors are known to affect the species.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.

☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**USFS-TESP_Mar25 (100533P000950)[7/14/2011]**	**Site name: Couverden logging Road**	**Gravelly dirt roadside with sparse vegetation.**	**185 plants (approximately). Scattered in 12m x 1m strip on one side of dirt road.**	
2*	**USFS-TESP_Mar25 (100533P000951)[7/14/2011]**	**Site name: Couverden logging Road**	**open gravelly dirt road side with sparse vegetation.**	**60 plants (approximately). 5 in flower. Approximately 50 young plants.**	
2	USFS-TESP_Mar25 (100533P000952)[7/14/2011]	Site name: Couverden logging Road	Open gravelly dirt roadside with sparse vegetation.	550 plants. 20m x 1m. Both sides of the road. 4 adults and 230 young plants on one side, 15 adults and 300 young plants on other side.	
3*	**USFS-TESP_Mar25 (100533P000953)[7/14/2011]**	**Site name: Couverden logging Road**	**open, gravelly dirt roadside with sparse vegetation.**	**60 plants (approximately). 10 with flowers, ~50 seedlings scattered in 8m x 1 m strip in road apron.**	
4*	**USFS-TESP_Mar25 (100533P000954)[7/14/2011]**	**Site name: Couverden logging Road**	**open gravelly edge of dirt road**	**10 plants**	
5*	**USFS-TESP_Mar25 (100533P000955)[7/14/2011]**	**Site name: Couverden logging Road**		**10 plants (approximately). Phenology not recorded, but at least some must have been flowering or would not likely have been noticed**	
5	USFS-TESP_Mar25 (100533P000958)[7/15/2011]	Site name: Couverden logging Road	open gravelly edge of dirt road	100 plants (approximately)	
5	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:245418)[7/15/2011]	Icy Strait, Chilkat Peninsula, SW edge of peninsula, ca. 10.8 miles SE of Excursion Inlet, Juneau Quad, Tongass National Forest, Alexander Archipelago.	Open roadside gravels along dirt logging road, patchy. [Collected at same time: Erigeron acris subsp. kamtschaticus]	patchy	
5	USFS-TESP_Mar25 (100533P00056)[7/15/2011]	Site name: Couverden logging Road	open gravelly apron of dirt road.	350 plants (approximately). S side of road: 10 adults, 20 young plants. N side of road ~100 adults, 2-300 young plants.	

		Close to but not on Tongass NF			
6*	**Klinkeberg 2020, Arctos 2025, (ALA-UAM:Herb:132435) [7/15/2011]**	**Gustavus, N of town on Park Road, T39S, R59E, Sec 35/26 line**	**Bog-peatland, associated with Pinus contorta, Vaccineum uliginosum, Empetrum nigrum, Equisetum variegatum, Picea sitchensis, and moss.**		
7*	**CPNWH 2025 (UAAH18411) [6/26/2018]**	**Prince of Wales Island, Soda Creek, adjacent to road.**	**Calcareous fen. [Collected at same place: Erigeron peregrinus]**		

Packera subnuda var. moresbiensis

Packera subnuda var. *moresbiensis* [(Calder & Roy L. Taylor) Trock]

Queen Charlotte Groundsel

Global Rank: **G5T3T4**
Alaska State Rank: **S3**

Photos: A. Hyde (top) J. Bindernagel (bottom) CC-BY-NC (iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or Gaps* *Packera subnuda* var. *moresbiensis* is known from 28 estimated occurrences on the Tongass NF (Appendices 1 and 2; Meridian Environmental 2011, 2014, ANHP ACCS 2025, CPNWH 2025, USFS 2025a). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). The 28 occurrences are confined to the southwestern part of the Tongass NF (Appendix 2), and they make up the majority of the approximately 33 Alaskan occurrences of this variety (Klinkenberg 2020, ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Other than this distribution in the southwestern corner of southeast Alaska, this variety does not occur elsewhere in Alaska, and record 27 on Kosciusko Island is the northernmost known location of this variety (Appendix 1; Klinkenberg 2020, ANHP ACCS 2025, CPNWH 2025). The Tongass NF occurrences are located on: Prince of Wales Island (20 occurrences), Coronation Island (2), Dall Island (2), Heceta Island (2), Kosciusko Island (1), and Baker Island (1). Two occurrences are located in Wilderness Area, both on Coronation Island in the Coronation Island Wilderness (Appendix 1).

Criteria	*Rank*	*Rationale*
		Information recorded by observers and collectors indicates that *Packera subnuda* var. *moresbiensis* grows in a variety of habitats on the Tongass NF including: alpine limestone talus, alpine talus meadow, dwarf shrub alpine meadow, alpine heath, moist subalpine meadow, alpine rocky cushion plant meadow on carbonate, wet meadow, densely vegetated lakeshore in sandy substrate, beaver pond with karst stream inflow, wetland, swale, fen, bog, sphagnum dam between shallow muskeg ponds, calcareous soils by beach, disturbed roadside in gravel with native vegetation, road edge, and road bed (Appendix 1; Meridian Environmental 2011, 2014, ANHP-ACCS 2025, CPNWH 2025, USFS 2025a). Associated species observed or collected with *Packera subnuda* var. *moresbiensis* on the Tongass NF include: (in alpine talus meadow) *Trisetum cernuum*, *Cerastium beeringianum*, *Saxifraga adscendens*, *Erigeron humilis*, *Toefieldia coccinea*, and *Epilobium anagallidifolium*; (in alpine heath with drainages) *Chamaenerion latifolium*, *Diphasiastrum sitchense*; (in alpine cushion plant meadow on carbonate) *Artemisia arctica*, *Salix reticulata*, *Carex macrochaeta*, and sedges; (in karst influenced fen) *Carex flava*, *Nephrophyllidium crista-galli*, *Deschampsia cespitosa*, *Carex sitchensis*, and *Caltha biflora*; (in karst influenced beaver pond) *Deschampsia cespitosa* and sedges; (in muskeg) *Pinus contorta*, *Vaccinium caespitosum*, *Carex livida*, *C. sitchensis*, *Sanguisorba menziesii*, and *Drosera rotundifolia*; and (in wet meadow) *Trichophorum cespitosum*, *Dodecatheon* sp., *Rubus arcticus*, *Pinguicula vulgaris*, *Carex viridula*, *Eriophorum angustifolium*, *Lysimachia europaea*, *Menyanthes trifoliata*, *Lysichiton americanus*, and *Botrypus virginianum* (Appendix 1; Meridian Environmental 2011, 2014, ANHP-ACCS 2025, CPNWH 2025, USFS 2025a). In addition, at the one beach location, *Sisyrinchium littorale* was also collected (Arctos 2025). Record #s 2 and 10 map in Karst Alpine Herbaceous Meadow and Heath, an ecosystem of conservation concern which is uncommon on the Tongass NF (Boggs et al. 2019, ACCS 2025). *Packera subnuda* var. *moresbiensis* is one of two varieties of *Packera subnuda*, with the other being *P. subnuda* var. *subnuda* (Trock 2006, Klinkenberg 2020). Both varieties are present in northwest North America, but only var. *moresbiensis* is present in Alaska (Ickert-Bond et al. 2019, Klinkenberg 2020, CPNWH 2025). Variety *moresbiensis* differs from var. *subnuda* mainly in characteristics of the bracts around the heads (the phyllaries); those of var. *moresbiensis* usually have hairs and are red to purplish in color while those of var. *subnuda* are hairless and green (sometimes red-tipped) (Trock 2006).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside of the TNF* Global Rank: G5T3T4 (rounded to G5T3, Vulnerable), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: S4 (Apparently Secure): British Columbia. United States: S3 (Vulnerable): Alaska (NatureServe 2025). *Packera subnuda* var. *moresbiensis* is a perennial herb in the Asteraceae with a narrow distribution limited to islands in southeastern Alaska and western British Columbia (Trock 2006). It occurs from Coronation Island and Prince of Wales Island south to Vancouver Island (Klinkenberg 2020, CPNWH 2025, NatureServe 2025). There are 28 occurrences of *Packera subnuda* var. *moresbiensis* on the Tongass NF (Appendices 1 and 2; Meridian Environmental 2011, 2014, ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Most of the Alaskan records are on Tongass NF lands, with the nearest records on Prince of Wales Island just outside of NF boundaries (Arctos 2025, CPNWH 2025). In British Columbia, *Packera subnuda* var. *moresbiensis* only occurs on Haida Gwaii Island, Banks Island, and extreme northern Vancouver Island (Klinkenberg 2020, CPNWH 2025). *Packera subnuda* var. *moresbiensis* is found in moist to wet sites in meadows, peat bogs, stream and lake sides, and mossy slopes at elevations ranging from sea level to approximately 2950 feet (900 m) (Trock 2006, BCCDC 2025, Klinkenberg 2020). A number of herbarium collections mention boggy habitat and one collection mentions “carbonate tufa,” and the plant is often associated with calcareous substrate (BCCDC 2025, CPNWH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* This variety is endemic to the islands of southernmost Alaska (known from Prince of Wales, Coronation, Dall, Heceta, Kosciusko, and Baker islands), as well as the offshore islands of British Columbia south to northern Vancouver Island. It is found in a wide variety of habitats including alpine limestone talus, alpine talus meadow, dwarf shrub alpine meadow, moist alpine heath, moist subalpine meadow, alpine rocky cushion plant meadow on carbonate, wet meadow, densely vegetated lakeshore in sandy substrate, beaver pond with karst stream inflow, wetland, swale, fen, bog, sphagnum dam

Criteria	*Rank*	*Rationale*
		between shallow muskeg ponds, calcareous soils by beach, disturbed roadside in gravel with native vegetation, road edge, and road bed from sea level to nearly 1000 m (Appendix 1; Meridian Environmental 2011, 2014, ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Although this variety is found in a wide variety of (usually wet) habitats and elevations, its restricted geographic distribution may indicate that it requires a particular climate or that some other factor is limiting its distribution (BCCDC 2025). The small (1.5-2.5) one-seeded, indehiscent fruits (achenes or cypselae) of *Packera subnuda* var. *moresbiensis* have a delicate, white pappus that is attached at one end (Trock 2006) which may aid in wind-dispersal. However, in *Packera*, the pappus readily falls off the fruit (Trock 2006), which may lead the fruit to fall near the parent plant and be dispersed by water or animals. In some *Packera* species, the fruits remain in the head until the inflorescence stems are broken during winter storms (Searcy 2023). In addition, as is seen in other *Packera*, this species may be able to produce clonal plants from the short rhizomes that grow from the underground stem (Hilty 2020). The distance that the fruits or clones can disperse from the parent plant is unknown (BCCDC 2025). Once the fruit is dispersed, it would only be successful in suitable habitat and climate.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Packera subnuda* var. *moresbiensis* is known from 28 estimated occurrences on six islands in the southwest part of the Tongass NF (Appendices 1 and 2; Meridian Environmental 2011, 2014, ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Six occurrences (record #s 5, 6, 13, 23, 26, and 28) have populations counts, with most having fewer than 100 plants (Appendix 1); only one occurrence (# 6) from south of Control Lake along Big Salt Road has a larger population (300 plants in several subpopulations) (ANHP ACCS 2025, CPNWH 2025, USFS 2025a). Two other occurrences have qualitative comments about abundance (record #s 7 and 25) with one indicating the plants are "scattered" and the other that the plants are "frequent." Based on the number of occurrences (28), the limited geographical area where the species is found on the Forest, and the total number of individuals observed, this species is uncommon within the Tongass NF boundary.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Packera subnuda* var. *moresbiensis* on the Tongass NF are unknown due to lack of repeat population counts of the occurrences (Arctos 2025, CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* This variety is found in a wide variety of habitats discussed in Criterion 1. Record #s 2 and 10 map in Karst Alpine Herbaceous Meadow and Heath, an ecosystem of conservation concern which is uncommon on the Tongass NF (Boggs et al. 2019, ACCS 2025). Nineteen of the occurrences are located in a swale, wet meadow, lakeshore, pond, fen, bog, or wetland. These habitats on the Tongass NF are grouped under the vegetation category forested and non-forested wetlands (or palustrine wetlands), which is a freshwater, non-tidal influenced vegetation type with saturated soil that is very common on the Forest (Turner and Mallott 2024). When undisturbed, freshwater wetlands on the Tongass NF have historically been very stable ecosystems, with some persisting for thousands of years (Turner and Mallott 2024). However, landscape position, soil drainage, and hydrology are important drivers for non-forested wetlands with the level of soil saturation a factor in the species composition of a particular wetland (Turner and Mallott 2024). This would indicate that activities in the immediate vicinity that change hydrology could cause a negative habitat trend. Of the 28 total occurrences, 21 are within one mile of a mapped historical or recent timber project, and 11 are within or adjacent to a timber project footprint (USFS 2025d). The landscape near these 21 occurrences has been greatly altered with both timber removal and road building. Most of these occurrences that are near or within timber project footprints are on Prince of Wales Island (Appendix 1); none of the five occurrences on Coronation, Baker, and Dall islands are near timber project footprints (USFS 2025d). Of the 19 occurrences that are located in a habitat described as a wetland or located within mapped *Callitropsis nootkatensis* wetland, 16 are within one mile of a mapped historical or recent timber project with seven occurrences mapping within or directly adjacent to the footprint of a timber project (Appendix 1; USFS 2025d). In addition, 17 of the occurrences are located within one mile of mapped non-native plants, with most within 1000 feet (Appendix 1; USFS 2025b). Non-native weeds that have been mapped (mostly along roads) in the vicinity of the

Criteria	*Rank*	*Rationale*
		occurrences include *Phalaris arundinacea*, *Deschampsia elongata*, *Phleum pratense*, *Plantago major*, *Taraxacum officinale*, *Trifolium repens*, *Sonchus asper*, *Leucanthemum vulgare, Hypochaeris radicata*, *Melilotus officinalis*, *Lolium perenne*, *Medicago lupulina*, *Cerastium fontanum*, *Hieracium aurantiacum*, and *Hieracium caespitosum*.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Invasive species, timber activities, and climate change may impact the habitat of *Packera subnuda* var. *moresbiensis*. As mentioned in Criterion 6, invasive species are known to be present in the vicinity of 17 occurrences of *Packera subnuda* var. *moresbiensis* on the Tongass NF (USFS 2025b). For example, the population coordinates for record 6 at a fen on Prince of Wales Island are within and adjacent to mapped polygons of reed canary grass (*Phalaris arundinacea*) and bull thistle (*Cirsium vulgare*) (ANHP-ACCS 2025, CPNWH 2025, USFS 2025a, USFS 2025b), and reed canary grass has the ability to invade wetland habitats (APMC 2024). The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut 2024, Wiles and Warren 2024), and 19 of the occurrences of *Packera subnuda* var. *moresbiensis* are located in habitats that are classified as palustrine wetlands. Therefore, there is a possibility that invasive species could outcompete *Packera subnuda* var. *moresbiensis* in the future. In addition, timber harvest activities have occurred adjacent to or in the vicinity of *Packera subnuda* var. *moresbiensis* (USFS 2025d). If this activity continues to occur in the future, this could impact soil drainage, soil saturation, and hydrology of the 19 wetland occurrences of *Packera subnuda* var. *moresbiensis*; this in turn could affect species composition (Turner and Mallott 2024). *Packera subnuda* var. *moresbiensis* is known to occur in a variety of wetland habitats (Trock 2006, Klinkenberg 2020, BCCDC 2025). Climate change is considered to be the main future stressor of palustrine wetlands on the Tongass NF (Turner and Mallott 2024). Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for wetland species such as *Packera subnuda* var. *moresbiensis* (Turner and Mallott 2024, Wiles and Warren 2024). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2024).

Criteria	*Rank*	*Rationale*
		Packera subnuda var. *moresbiensis* also occurs in alpine habitats on the Tongass NF (Appendix 1). Record #s 1, 2, 7, 10 and 22 all occur in alpine habitats such as alpine meadow, alpine heath, and alpine dwarf shrub (Appendix 1), and record #s 2 and 10 map in Karst Alpine Herbaceous Meadow and Heath, an ecosystem of conservation concern which is uncommon on the Tongass NF (Boggs et al. 2019, ACCS 2025). Climate change is considered to be the main future stressor of alpine areas on the Tongass NF (Boggs et al. 2019, Turner and Mallott 2024). The loss of snow and ice in alpine habitats in southeast Alaska is already evident, and the rate of loss of alpine habitat is likely to increase in the future (Turner and Mallott 2024); these changes will likely affect the alpine habitat of *Packera subnuda* var. *moresbiensis*. Without modern stressors, such as invasive species, timber harvest, and climate change, the palustrine wetlands on the Tongass NF would be considered relatively stable and the alpine regions moderately stable (Chestnut 2024, Turner and Mallott 2024).
8 Life history and demographics	C	**C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known** *Packera subnuda* var. *moresbiensis* is a perennial herb that grows each season from a fibrous-rooted, stout, woody stem base (a caudex) or short rhizome (Trock 2006, Klinkenberg 2020). The one to three above-ground, erect stems grow to 35 cm tall and terminate in an inflorescence that has just one to three heads of flowers (Trock 2006, Klinkenberg 2020). Each head can have 40 to 55 yellow, narrow, bisexual disk flowers in the center and approximately 13 yellow ray flowers around the edge of the head (Trock 2006). Most *Packera* species are obligate outbreeders, which means that the pollen produced by a plant cannot be used to produce seed on that same plant (Bain and Whitton 1994). While no species-specific pollination information was found, confirmed pollinators of other *Packera* taxa include bees, butterflies, moths, and flies (CPC 2025). The small (1.5-2.5 mm) one-seeded, indehiscent fruits (achenes or cypselae) have a delicate, white pappus that is attached at one end (Trock 2006) which may aid in wind-dispersal. However, in *Packera*, the pappus readily falls off the fruit (Trock 2006), which may lead the fruit to fall near the parent plant and be dispersed by water or animals. In some *Packera* species, the fruits remain in the head until the inflorescence stems are broken during winter storms (Searcy 2023). In addition, as is seen in other *Packera*, this species may be able to produce clonal plants from the short rhizomes that grow from the underground stem (Hilty 2020).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

- Significant threats
    a. Stressors on and off the plan area to populations and habitat (7) yes timber, invasives
    b. Includes climate change (7) yes
- Declining trends
    a. Declining trends in population (3,5) insufficient information
    b. Declining trends in habitat (6,7) relatively unchanged but modern impacts ongoing
- Restricted ranges
    a. Narrow endemics (2) yes
    b. Disjunct populations (2) no
    c. Species at edge of range (2) yes
- Low population numbers (vulnerable to extirpation by stochastic events) (3,4) or restricted ecological conditions (1,3,8) apparent restriction to POW/South TNF
- Other factors: taxonomy, diversity, and important ecological function of the species, where any of these factors are of importance in determining the likelihood of long-term persistence of the species in the plan area (Any of the eight criteria can be used)] no

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☒	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**ANHP-ACCS_Mar25 (EO1)[7/19/1993]**	**Dall Island, Gold Harbor, "Rose Karst" area E of harbor, knob between Grace Mountain and Twin Peaks**	**SE-facing alpine limestone talus**		
1	CPNWH_April 2025(ALA-UAM:Herb:10614) [7/19/1993]	Dall Island, Gold Harbor, "Rose Karst" area E of harbor, knob between Grace Mountain and Twin Peaks, Dixon Entrance Quad, Tongass National Forest. [georeferenced incorrectly]	SE-facing alpine limestone talus.		
2	**ANHP-ACCS_Mar25 (EO3)[8/15/1990]**	**Alexander Archipelago, Dall Island, Thunder Mtn. [georeferenced incorrectly down east slope at 1000 feet]**	**Sparsely vegetated limestone rock runnel [maps in Picea sitchensis/Calamagrostis nutkaensis Plant Association]**		
2	CPNWH_April 2025(ALA-UAM:Herb:22505) [8/15/1990]	Alexander Archipelago, Dall Island, Thunder Mtn., Craig Quad, Alexander Archipelago. [georeferenced incorrectly down east slope at 1000 feet]	Sparsely vegetated limestone rock runnel.		
2	ANHP-ACCS_Mar25 (EO4)[8/15/1990]	Alexander Archipelago, Dall Island, Thunder Mtn. [georeferenced incorrectly down east slope at 1000 feet]	Low-growing herb-dwarf shrub alpine; Open alpine habitat on limestone; substrate of exposed rock fragments reticulated with areas of low-growing herbs, dwarf shrub alpine meadow		
2	CPNWH_April 2025(ALA-UAM:Herb:22504) [8/15/1990]	Alexander Archipelago, Dall Island, Thunder Mtn., Craig Quad, Alexander Archipelago. [georeferenced incorrectly down east slope at 1000 feet]	Low-growing herb-dwarf shrub alpine.		
2	ANHP-ACCS_Mar25 (EO4)[no date]	Dall Island, Thunder Mountain, W side of northern peak.			

2	ANHP-ACCS_Mar25 (EO4)[no date]	Dall Island, Thunder Mountain, NW side of northern peak.			
3	**ANHP-ACCS_Mar25 (EO5)[6/30/1994]**	**Baker Island, Fortaleza Bay, subalpine bench and cirque lake NW of bay**	**very wet meadow slope, open woodland, scattered**		
4	**ANHP-ACCS_Mar25 (EO6)[6/10/1997]**	**[Prince of Wales Island] Cholmondeley Timber Sale, U616-12, sml lk 3/8 mi Mon [Maps to Prince of Wales Island south of Monie Lake]**	**[Maps in Callitropsis nootkatensis wetland]**		
4	USFS-TESP_Mar25 (100551P000007)[6/10/1997]	[Prince of Wales Island] CholmondeleyTS,U616-12,sml lk 3/8 mi Mon			
4	USFS-TESP_Mar25 (100551P000007)[6/10/1997]	[Prince of Wales Island] CholmondeleyTS,U616-12,sml lk 3/8 mi Mon			
5	**ANHP-ACCS_Mar25 (EO8)[6/26/2009]**		**Slope = 20; Aspect= S; Light Exposure= Full Sun;**		**This occurre;nce is 600 to 800 feet from 2005 and 2016 mapped timber projects.**
5	USFS-TESP_Mar25 (100554P000064)[6/26/2009]	[Prince of Wales Island] NW shore of Angel Lake	Lakeshore, fairly sandy substrate	7 plants. Dense herb layer, could have been more vegetative plants that would have been difficult to see.	
6	**ANHP-ACCS_Mar25 (EO9)[6/23/2009]**	**[Prince of Wales Island] near Big Salt Road.**	**Slope = 10; Aspect= SE; Substrate= Moss; Parent Material= Gravel; Soil Moisture= Moist; Light Exposure= Full Sun;**		**This occurrence is within 700 ft of 1991 timber project and 900 feet of 2017 timber project. Weeds are along road adjacent to fen that Packera is in. Within and adjacent to (within 120 ft) of mapped polygons of Cirsium vulgare and Phalaris arundinacea.**

6	USFS-TESP_Mar25 (100554P000100)[6/23/2009]	PAMO18 Roadside	Roadside, disturbed site, mostly native	100 plants. 5 percent cover. Roadside population.	
6	ANHP-ACCS_Mar25 (EO9)[6/23/2009]		Slope = 10; Aspect= SE; Substrate= Water; Parent Material= Muck; Soil Moisture= Wet; Light Exposure= Full Sun;		
6	USFS-TESP_Mar25 (100554P000101)[6/23/2009]		Wetland fen	200 plants. 5 percent cover.	
6	ANHP-ACCS_Mar25 (EO9)[7/07/2009]	[Prince of Wales Island] near Big Salt Road, about 2.05 km S of Control Lake Junction, about 60 m S of road	growing on large fen, occasional		
6	CPNWH_April 2025(ALA-UAM:Herb:242458) [7/07/2009]	Near Big Salt Road, about 2.05 km S of Control Lake Junction, about 60 m S of road, Craig Quad, Alexander Archipelago, Prince of Wales Island.	Growing on large fen, occasional.		
6	CPNWH_Mar25 (WTU384711)[7/07/2009]	Craig Quad: Prince of Wales Island, Alexander Archipelago, near Big Salt Road, about 2.05 kilometers south of Control Lake Junction, about 60 meters south of road.			
6	CPNWH_April 2025(ALA-UAM:Herb:255783) [7/04/2011]	[Prince of Wales Island] Control Lake, Craig Quad, Tongass National Forest, Alexander Archipelago. [maps south of Control Lake, along Big Salt Road]	Fen-bog interface, common in this microsite.		
7	**ANHP-ACCS_Mar25 (EO10)[7/01/1972]**	**Prince of Wales Island, Klawock Mountains, south ridge of main massif, 18 miles ne of Craig. [uncertain where Klawock Mtns are but the air miles to this place is more or less correct, but georeferenced on steep southern slope rather than on a ridge] [georeferencing based on western**	**[Aerial imagery of top of ridge shows many drainages and wetlands] [Location is in mapped Callitropsis nootkatensis wetland if use Justin's coordinates, and not in that wetland if use 55.690817, -132.960513]**	**Growing scattered throughout vegetation.**	

		extension of southern ridge is 55.690817, -132.960513]			
7	Arctos 2025, CPNWH_Mar25 (OSC141145) [7/31/1972]	Prince of Wales Island, Klawock Mountains, south ridge of main massif, 18 miles ne of Craig.	Alpine heath vegetation; small ridge radiating westernly off of main south ridge. [Also collected in same habitat on same day: Chamaenerion latifolium, Diphasiastrum sitchense]		
8	**ANHP-ACCS_Mar25 (EO11)[7/19/1999]**	**[Prince of Wales Island] Rio Roberts RNA pop,Rd. 20, trlhead**	**[Location is within mapped Callitropsis nootkatensis wetland – aerial imagery looks like sphagnum bog near timber road]**		**Location is within one mile of mapped 1990 timber project and within 1500 ft of mapped weeds along forest road, including Plantago major, Phalaris arundinaceae, Taraxicum officinale.**
8	USFS-TESP_Mar25 (100554P000047)[7/19/1999]	Rio Roberts RNA pop,Rd. 20, trlhead			
8	ANHP-ACCS_Mar25 (EO11)[no date]	At the Rio Roberts River where it crosses #20 road there is a trail head. The population is located on both sides of the trail.			
9	**ANHP-ACCS_Mar25 (EO13); Meridian Environmental 2011[no date]**	**[Prince of Wales Island] North Thorne Timber Unit, Take road 3015 road to the curve in the road shown on the map and on air photo #L30N 690-37. At the bend take a compass reading of 70 degrees.**	**[Location maps within 100 feet of Callitropsis nootkatensis wetland]**		**Within boundary of 2020 Timber project. But in geolocate, is on the edge of it in forest. Within 800 feet of weeds along road that include Phalaris arundinacea, Hieracium aurantiacum and Trifolium repens.**
10	**ANHP-ACCS_Mar25 (EO14)[7/23/1993]**	**Heceta Island, Bald Mountain, westernmost peak**	**alpine talus meadow**		**Location is within 650 ft of mapped timber project.**
10	ANHP-ACCS_Mar25 (EO14)[no date]	Heceta Island, Bald Mountain, western most peak. Survey site #R93-11.			
10	ANHP-ACCS_Mar25	[Maps to top of Bald Mountain. This is Site 34 on Bald Mountain of the	Slope = 30; Aspect= 250 ; Substrate= Soil; Soil Moisture= Moist; Light Exposure= Full Sun;	Plants may continue farther downslope -	

	(EO14)[7/18/2010]	2011 Meridian Environmental Rare Plant Survey.]	Comments= Plants may continue farther downslope - only top of slope and summit ridge were surveyed. [Meridian Environmental report says the two Bald Mountain populations were observed in rocky cushion-plant meadow habitat in the alpine zone, on carbonate rock substrate. Associated species included Artemisia norvegica, Salix reticulata, Carex macrochaeta, and several other sedge species.]	only top of slope and summit ridge were surveyed.	
10	ANHP-ACCS_Mar25 (EO17); Meridian Environmental 2011 [7/18/2010]	[maps to ridge extending NE from Bald Mtn peak. 900 m from EOs 14 and 15. This is site 35 from the Meridian Environmental 2011 Rare Plant Survey Report.]	Slope = 1; Aspect= 176 ; Substrate= Soil; Soil Moisture= Dry; Light Exposure= Full Sun; [Meridian Environmental report says the two Bald Mountain populations were observed in rocky cushion-plant meadow habitat in the alpine zone, on carbonate rock substrate. Associated species included Artemisia norvegica, Salix reticulata, Carex macrochaeta, and several other sedge species.]		
10	Arctos 2025, CPNWH_April 2025(ALA-UAM:Herb:8774) [7/23/1993]	Heceta Island, Bald Mountain, westernmost peak, Craig Quad, Tongass National Forest, Alexander Archipelago. [georeferenced incorrectly on steep slopes on south side of mountain down at 1200 feet)	Alpine talus meadow. [Collected in same habitat and place on same date: Trisetum cernuum, Cerastium beeringianum, Saxifraga adscendens, Erigeron humulis, Toefieldia coccinea, and Epilobium anagallidifolium]		
10	CPNWH_April 2025(ALA-UAM:Herb:8749) [7/23/1993]	Heceta Island, Bald Mountain, westernmost peak, Craig Quad, Tongass National Forest, Alexander Archipelago. [georeferenced incorrectly on steep slopes on south side of mountain down at 1200 feet)	Alpine talus meadow.		
10	ANHP-ACCS_Mar25 (EO15)[7/13/1994]	Heceta Island, Bald Mountain, NW-facing slopes of mountain	moist subalpine meadow slopes, among rocks		
10	CPNWH_April 2025(ALA-UAM:Herb:11739) [7/13/1994]	Heceta Island, Bald Mountain, NW-facing slopes of mountain, Craig Quad, Tongass National Forest, Alexander Archipelago. [georeferenced incorrectly on steep slopes on south side of mountain down at 1200 feet)	Moist subalpine meadow slopes, among rocks.		
11	**ANHP-ACCS_Mar25**	**[Prince of Wales Island] No.ThorneTS,U579-520,Rd3015,drop lower h [Notes**	**[Location maps in Callitropisis nootkatensis wetland. Aerial imagery looks like open wetlands within forest.]**		**Adjacent to (50 ft from) 2017 timber project. 1000**

	(EO16)[10/01/1999]	**say "north Thorne Timber Sale, US79-520, Road 3015 and then trail off] [maps east of Forest Road 3015, N of Thorne River, 500 m from EO 18]**			**ft from road with weeds like Taraxacum officinalis.**
11	USFS-TESP_Mar25 (100554P000038)[10/01/1999]	No.ThorneTS,U579-520,Rd3015,drop lower h			
11	ANHP-ACCS_Mar25 (EO18)[no date]	North Thorne Timber Unit, Take road 3015 road to the curve in the road shown on the map and on air photo #L30N 690-37. At the bend take a compass reading of 115 degrees. Walk this direction There are a number of large trees circling a muskeg.			
11	ANHP-ACCS_Mar25 (EO18)[7/21/1999]	No.ThorneTS,U579-520,Rd3015			
11	USFS-TESP_Mar25 (100554P000037)[7/21/1999]	No.ThorneTS,U579-520,Rd3015			
12	**ANHP-ACCS_Mar25 (EO19)[6/07/2005]**	**P.O.W. [Prince of Wales Island] Staney Creek area, road 2050300, growing at edge of road [maps along forest road 2050-310, west of Staney Creek]**	**Growing at edge of road [location maps within Callitropsis nootkatensis wetland.]**		**Location is surrounded by mapped timber projects from 1967, 1968, 1969, 1974, 1978, and 1994. 0.1 mile from projects from 1978 and 1994. Highly disturbed area. Along FS road 2050-310 which has numerous mapped weeds. Adjacent to Cerastium fontanum and 0.1 mile from Phalaris arundinacea. Nearby is Deschampsia elongata and Leucanthemum vulgare.**

12	USFS-TESP_Mar25 (100554P000099)[6/07/2005]	P.O.W. Staney Creek area, road 2050300, growing at edge of road			
13	**ANHP-ACCS_Mar25 (EO20); Meridian Environmental 2011 [7/11/2010]**	**[maps to Heceta Island near Marsh Lake. May be the Meridian Environmental 2011 location "East Heceta Beaver Ponds"]**	**Slope = 2; Aspect= 260 ; Substrate= Soil; Light Exposure= Full Sun; [in aerial imagery this location looks like it is in a pond along a creek that is part of the Marsh Lake drainage] [If this is the "East Heceta Beaver Ponds" Meridian Environmental site, the plants were found in a Deschampsia cespitosa and sedge-dominated wetland just below the point where a karst stream resurges from a forested side slope into a beaver pond complex.] [Location is within 150 feet of mapped Callitropsis nootkatensis wetland – aerial imagery looks like it is boggy soil along a creek that feeds the lake.]**	**[If this is the "East Heceta Beaver Ponds" Meridian Environmental site, 70 plants were observed]**	**Location is within 400 feet and surrounded on three sides by extensive mapped 1972 timber projects.**
14	**ANHP-ACCS_Mar25 (EO21); Meridian Environmental 2011 [7/16/2010]**	**[Prince of Wales Island, maps east of North Prince of Wales Road on ridge above and to the west of Logjam Creek. This is likely the Meridian Environmental rare plant survey "Logjam Ridge/Windgate Cave" location.]**	**Slope = 1; Aspect= 175 ; Light Exposure= Full Sun; [If this is the Meridian Environmental "Logjam Ridge" location, the population was located in a fen near the point of a karst stream inflow. The site is located at elevation 1,250 feet; dominant plants in the fen included Carex flava, Fauria crista-galli, Deschampsia cespitosa, Carex sitchensis, and Caltha biflora. [Location is 100 ft from mapped Callitropsis nootkatensis wetland]**		**Location is 0.4 mile from mapped 1969 timber project. Locatin is 1 mile from mapped weeds (Trifolium repens, Plantago major) along N Prince of Wales Road (N Island Road).**
15	**ANHP-ACCS_Mar25 (EO22)[no date]**	**[Prince of Wales Island] North Thorne Timber Unit. Take road 3015. On photo #L29N 990-173. There are two visible landforms from this road. The population is east of a large hill.South of the hill is a muskeg which is where the population can be found.**	**muskeg [Location is within mapped Callitropsis nootkatensis wetland.]**		**Location is surrounded by mapped timber projects from 1975, 1976, 1977, 1988, 1998 and it is 0.4 mile from Phalaris arundinacea with along FS Road 3015.**
16	**ANHP-ACCS_Mar25 (EO23)[7/26/1999]**	**North Thorne Timber Sale. U580-413, Rd3015, avoid muskeg [maps near Forest Road 3015, Prince of Wales Island]**	**Avoid muskeg. [Location is directly adjacent to mapped Callitropsis nootkatensis wetland.]**		**Location in wetland is surrounded by mapped timber projects from 1976, 1980 and 1998 and within 0.2 mile of projects from 1976 and 1980. It is also 0.5 mile from Phalaris**

					arundinacea along FS Road 3015.
16	USFS-TESP_Mar25 (100554P000035)[7/26/1999]	No.ThorneTS,U580-413,Rd3015,avoid muskeg [maps near Forest Road 3015, Prince of Wales Island]			
17	**ANHP-ACCS_Mar25 (EO24)[6/04/2005]**	**Prince of Wales Island, Staley Cr. area, ca. 1.5 miles NE of Silver Salmon Falls**	**[Location is is within 300 ft of Callitropsis nootkatensis wetland.]**		**This location was highly disturbed in 1960s. It is surrounded by mapped timber projects from 1976 and 1969 and maps within a timber project from 1969. Numerous invasive plants are mapped along FS Road 2050-200. the location is within 200 feet of Plantago major.**
17	ANHP-ACCS_Mar25 (EO24)[6/04/2005]	Prince of Wales Island, Staney Creek Timber Sale, wetland to north of Unit 588-452	Wetland to north of Unit 588-452		
17	USFS-TESP_Mar25 (100554P000097)[6/04/2005]	P.O.W. Staney Creek TS., wetland to north of Unit 588-452			
17	USFS-TESP_Mar25 (100554P000097)[6/04/2005]	P.O.W. Staney Creek TS., wetland to north of Unit 588-452			
17	CPNWH_April 2025(ALA-UAM:Herb:134659) [6/04/2005]	Prince of Wales Island, Staley Cr. area, ca. 1.5 miles NE of Silver Salmon Falls, Craig Quad, Tongass National Forest, Alexander Archipelago.			
18	**ANHP-ACCS_Mar25 (EO25)[7/27/2000]**	**[Prince of Wales Island] Logjam Timber Sale, U577-41, Rd 2052, in swale [Maps along forest road 2052 west of Logjam Creek]**	**In swale. [Location is within 200 ft of mapped Callitropsis nootkatensis wetland.]**		**Location is within footprint of 1989 mapped timber project and within 800 ft of 2011 timber project. Maps along FS Road 2052. Numerous**

					nonnative weeds are mapped along this road. Within 400 feet of Trifolium repens.
18	USFS-TESP_Mar25 (100554P000034)[7/27/2000]	[Prince of Wales Island] Logjam TS, U577-41, Rd 2052,in swale W o[Maps along forest road 2052 west of Logjam Creek]			
19	**ANHP-ACCS_Mar25 (EO26)[7/20/1999]**	**[Prince of Wales Island] Staney Creek Pop, Rd. 20, Prince of Wales Island [Maps along North Prince of Wales Road]**	**[Location is within 350 ft of Callitropsis nootkatensis wetland.]**		**Location is along N Prince of Wales Rd in an area that was highly disturbed in 1970s. It is within the footprint of 1970 timber project and adjacent to mapped Phalaris arundinacea.**
19	USFS-TESP_Mar25 (100554P000031)[7/20/1999]	[Prince of Wales Island] Staney Creek Pop, Rd. 20, Prince of Wales Island [Maps along North Prince of Wales Road]			
20	**ANHP-ACCS_Mar25 (EO27)[no date]**	**[Prince of Wales Island] Staley Creek mile 66. Take road 20 (N Prince of Wales Rd) past Control Creek Junction and the Stanley Creek Cabin junction. Look for mile post 66. Heading away from Thorne Bay the population is on the left side of the road 100m before the mile marker in a wet clear cut. The p**	**[Location is within mapped Callitropsis nootkatensis wetland.]**		**Location is 0.7 mile from mapped 2012 timber project. It is further away from, but surrounded by, others from the 1990s. It is 0.9 mile from invasive weeds along N Prince of Wales Rd. These include Cerastium fontanum, Phalaris arundinacea, Trifolium repens.**
21	**ANHP-ACCS_Mar25 (EO28)[6/05/2005]**	**Prince of Wales Island. Staney Creek Timber Sale. Wetland to east of Unit 571-434**	**Wetland to east of Unit 571-434 [Location is directly adjacent to Calliptropsis nootkatensis wetland.]**		**Location is in an area that was highly disturbed in the 1980s. It is within 500 feet of a mapped timber project from 1988 and within 1000 ft of another on N side from 1982. It is also adjacent to a number of mapped weeds. Within 200 ft of Phalaris**

					arundinacea, Medicago lupulina, and Hieracium caespitosum along timber road and Melilotus officinalis along N Prince of Wales Rd and Coffman Cove Rd. Also close by Hypericum perforatum, Trifolium repens, and Leucanthemum vulgare. These were mapped in 2012.
21	USFS-TESP_Mar25 (100554P000098)[6/05/2005]	P.O.W. Staney Creek TS., wetland to east of Unit 571-434			
21	ANHP-ACCS_Mar25 (EO28)[6/05/2005]	Craig D-4 Quad. Prince of Wales Island. About 3 miles east of the mouth of Naukati Bay, near intersection of forest roads 20 and 23.	Wet meadow. With Trichophorum cespitosum, Dodecatheon sp., Rubus arcticus, Pinguicula vulgaris, Carex viridula, Eriophorum angustifolium, Trientalis europaea, Menyanthes trifoliata, Lysichiton americanum, Botrychium virginianum.		
21	CPNWH_Mar25 (WTU385057)[6/05/2005]	Craig D-4 Quad. Prince of Wales Island. About 3 miles east of the mouth of Naukati Bay, near intersection of forest roads 20 and 23.	Wet meadow; Associated plants: Trichophorum cespitosum, Dodecatheon sp., Rubus arcticus, Pinguicula vulgaris, Carex viridula, Eriophorum angustifolium, Trientalis europaea, Menyanthes trifoliata, Lysichiton americanum, Botrychium virginianum.		
22	**ANHP-ACCS_Mar25 (EO29)[7/30/1960]**	**Alexander Archipelago, Coronation Island, Needle Peak [Coronation Island Wilderness]**	**alpine**		
22	ANHP-ACCS_Mar25 (EO29)[8/06/1960]	Alexander Archipelago, Coronation Island, Needle Peak	open middle slopes		
22	CPNWH_April 2025(ALA-UAM:Herb:41860) [7/30/1960]	Alexander Archipelago, Coronation Island, Needle Peak, Craig Quad, Tongass National Forest, Alexander Archipelago.	Alpine.		
22	CPNWH_April 2025(ALA-	Alexander Archipelago, Coronation Island, Needle Peak, Craig Quad,	Open middle slopes.		

	UAM:Herb:41861) [8/06/1960]	Tongass National Forest, Alexander Archipelago.			
22	ANHP-ACCS_Mar25 (EO30)[no date]	Middle slopes of Needle Peak, Coronation Island. [not georeferenced correctly. Biotics data with no information about date, elevation or source. Placed with EO29.]			
23	**ANHP-ACCS_Mar25 (EO31)[8/29/2006]**	**Prince of Wales Island. Coffman Rd**	**[Location is on the edge of mapped Callitropsis nootkatensis wetland.]**	**not a rare pl survey. est. 20 individuals senescing off of wet mit site.**	**The location is in an area that has been highly altered by timber projects - dense presence. It is on the edge of a mapped timber project from 1983 and within 0.25 mile of timber projects from 1979 and 1985. It is also within a mapped polygon of Lolium perenne, 0.16 mile from Melilotus officinalis, and near Leucanthemum vulgare, Hypochaeris radicata, Ranunculus repens, Pheum pratense. Lots of mapped weeds along Coffman Cove Road.**
23	USFS-TESP_Mar25 (100554P000054)[8/29/2006]	Prince of Wales Island. Coffman Rd;		not a rare pl survey. est. 20 individuals senescing off of wet mit site.	
24	**ANHP-ACCS_Mar25 (EO32)[no date]**	**[Prince of Wales Island] Coffman Cove Road, the population extends on both sides of the road. The highest density is on the east side of the road.**	**[Location is within 0.25 mile of Callitropsis nootkatensis wetland].**	**the population extends on both sides of the road. The highest density is on the east side of the road.**	**The location is surrounded by mapped timber projects in this area from the 1970s and 1980s. The location is inside the polygon of a mapped 1987 timber project and on the border of a 2019 timber project. It is also within 200 ft of mapped Phalaris arundinacea and Plantago**

					major that are located along FS Road 30. Also close by are Taraxacum officinale, Plantago major.
24	ANHP-ACCS_Mar25 (EO32)[7/15/1999]	Coffman Cove Rd.,Luck Lk alt, Rd3030,Dom			
24	USFS-TESP_Mar25 (100554P000023)[7/15/1999]	Coffman Cove Rd.,Luck Lk alt, Rd3030,Dom			
25	**ANHP-ACCS_Mar25 (EO33)[7/16/1988]**	**Alexander Archipelago, Coronation Island, Egg Harbor Beach [Coronation Island Wilderness]**	**Egg Harbor beach**		
25	ANHP-ACCS_Mar25 (EO33)[7/15/2005]	Egg Harbor entrance, near Nation Point, E side of bay	landslide zone, exposed calcareous soils, E-facing 10 degree slope, frequent	Frequent	
25	Arctos 2025, CPNWH_April 2025(ALA-UAM:Herb:22503) [7/16/1988]	Alexander Archipelago, Coronation Island, Egg Harbor Beach, Craig Quad, Tongass National Forest. [not georeferenced correctly. Not at Egg Harbor Beach].	Egg Harbor beach. [Collected in same location, habitat, date: Sisyrinchium litorale]		
26	**ANHP-ACCS_Mar25 (EO35)[7/14/2013]**	**[Prince of Wales Island] N end of island, E of Mt. Calder.**	**Low sphagnum dam between shallow ponds. [The location is within 0.25 mile of mapped Callitropsis nootkatensis wetland.]**	**Rare.**	**The location is 0.8 mile E and NE of mapped timber projects from 1992 along Prince of Wales Rd. It is also 1 mile E of mapped Phalaris arundinacea which is all along Prince of Wales Road.**
26	CPNWH_April 2025(ALA-UAM:Herb:25068 4) [7/14/2013]	N end of island, E of Mt. Calder, Petersburg Quad, Alexander Archipelago, Prince of Wales Island.	Low sphagnum dam between shallow ponds, rare.	rare	
26	USFS-TESP_Mar25 (100554P0005	Survey 519, Sarheen Cove vicinity -- east of road [Meridian	On low dam between shallow muskeg ponds. [Meridian Environmental report says: At this location, two small subpopulations of Queen	35 plants. 2 percent cover. Patchy distribution within	

	25Y13)[7/14/2013]	Environmental 2014 Rare Plant Survey site 519]	Charlotte butterweed were present in bog habitat, on a low dam between muskeg ponds. Species associated: included Pinus contorta, Vaccinium caespitosum, Carex livida, C. sitchensis, Sanguisorba menziesii, and Drosera rotundifolia.	population; subpopulation w/a counted 5 individuals [Meridian Environmental report: two small subpopulations]	
27	**ANHP-ACCS_Mar25 (EO36)[9/03/2007]**	**Kosciusko Island, Mt. Francis area**	**road bed**		**Location is within 0.25 mile of a mapped 1983 timber project. It is also 0.4 air miles from Phalaris arundinacea which is along the same forest road.**
27	CPNWH_April 2025(ALA-UAM:Herb:156197) [9/03/2007]	Mt. Francis area, Petersburg Quad, Alexander Archipelago, Kosciusko Island.	Road bed.		
28	**USFS-TESP_Mar25 (100554P000512Y13); Meridian Environmental 2014 [7/09/2013]**	**[Prince of Wales Island] Survey 522, south of Neck Lake [maps west of Prince of Wales Road at side of body of water northeast of Camp Taylor site] {This is Meridian Environmental 2014 Rare Plant Survey Site 522 S of Neck Lake]**	**Right at mixed conifer edge adjacent to swale. [In Meridian Environmental 2014 report is says that several subpopulations were found along the southern shore of a small lake. The plants were located in part shade in fen and muskeg wetlands at the edge of mixed conifer habitat. Species associated: included Pinus contorta, Vaccinium caespitosum, Carex livida, C. sitchensis, Sanguisorba menziesii, and Drosera rotundifolia.] [Location is within 500 feet of mapped Callitropsis nootkatensis wetland.]**	**63 plants found. 3 percent cover. Five subpopulations found, with an estimate of 30 individuals, 5 individuals, 25 individuals, 1 individual and 2 individuals**	**Location is 0.25 mile from a mapped 1982 timber project. Others to the north and northwest are from 1970 and 1980. Invasives: Trifolium repens, Phalaris arundinacea, Plantago major, Sonchus asper, Leucanthemum vulgare have been introduced along Prince of Wales Road and FS Road 2075. The locations are within 0.3 mile from the occurrence both to the north and south.**

Papaver radicatum alaskanum

Papaver radicatum alaskanum [(Hultén) J.P. Anderson]

Arctic Poppy

Global Rank: **G5T4**
Alaska State Rank: **S3**

Photo: Lilly Setters (CC-BY-NC: iNaturalist 2025)



Species Assessment

Criteria	*Rank*	*Rationale*
1-8	NA	*NA = Not Confirmed on the Tongass National Forest* One occurrence of *Papaver radicatum* subsp. *Alaskanum* was documented in 2008 above Blue Lake on Baranof Island. The occurrence noted "only a single plant found." Botanists attempted to relocate this species and were unsuccessful. The area where this plant was found has many observations on iNaturalist, but no record of this species. Thus, its continued persistence on the Tongass NF is uncertain. This species may still occur further up the drainage, but this needs to be confirmed to consider it as a Species of Conservation Concern. The occurrence was on Baranof Island along the creek that feeds Blue Lake at approximately 500 ft (150 m) in elevation (Arctos 2025). The habitat is described as gravel bars in the creek, and species collected at the same place on the same date are *Carex scirpoidea* and *Carex anthoxanthea* (Arctos 2025, SEINet 2025). The substrate underlying the habitat is of volcanic and sedimentary origin (USGS 2025). In the Flora of Alaska provisional checklist, the accepted name for this taxon is *Papaver alaskanum* (Ickert-Bond et al. 2019). It is also known by the name *Oreomecon alaskana* (POWO 2025). It should be noted that there are several occurrences of *Papaver* on Baranof and Chichagof islands in the Tongass NF that remain only identified to genus (CPNWH 2025, USFS 2025a).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Papaver radicatum alaskanum is not recommended as a Species of Conservation Concern because it is not confirmed to occur on the Tongass National Forest.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Arctos 2025, CPNWH_April2025 (ALA-UAM:Herb:192143)[6/25/2008]**	**Blue Lake Watershed, E shore of lake, Sitka Quad, Alexander Archipelago, Baranof Island. [maps to creek east of Blue Lake flowing west into the Lake, not on shore of lake]**	**On small gravel bar. [Collected at same place on same date on creek gravel bars: Carex scirpoidea, Carex anthoxanthea]**	**Only a single plant found.**	

Parmotrema arnoldii

Parmotrema arnoldii [(Du Rietz) Hale, 1974]

Powdered ruffle lichen

Global Rank: **G3G5**

Alaska State Rank: **S2S3**



photo: (CCBY) Harry Podschwit

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy.* *Parmotrema arnoldii* is known from at least 11 estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are all on the southern half of the Forest in beach fringe forest growing on mostly *Picea sitchensis* and *Tsuga heterophylla* but also on *Thuja plicata* and *Acer glabrum*. (Appendix 1; CPNWH 2025, USFS 2025a). Eleven occurrences are found in the Consortium of Lichen Herbaria (listed in Appendix 1) as well as several more in the Region 10 rare lichen database. There are two additional occurrences of this species in southeastern Alaska outside of the Tongass NF (CLH 2025). This species may be confused for *Parmotrema crinitum* which is also a rare species present nearby (CLH 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside of the Tongass National Forest.* Global Rank G4, Alaska State Rank S2S3, British Columbia S5 *Parmotrema arnoldii* is broadly distributed throughout North America with scattered occurrences ranging from northern South America, across Europe, eastern Africa, and across several islands in the Indian and Pacific Oceans (CLH 2025). In North America, *Parmotrema arnoldii* is present in the southern portions of Canadian provinces and territories British Columbia, Ontario, and New Brunswick, as well as 23 US states, most predominantly found in the Pacific west coast, near the Great Lakes, and southern Appalachia (CLH 2025). *Parmotrema arnoldii* occurrences on the Tongass are the northern edge of its North American range (CLH 2025). Outside of southeastern Alaska, the closest records are on the British Columbia mainland and on Haida Gwaii (CLH 2025). Across its range, *Parmotrema arnoldii* occurs in mountainous forests and rocky summits, on conifers at the edge of the beach, in grasslands and pastures with oak or redwood groves, or seepy [sic] valley bottoms at elevations of 0 m to 3935 m (CLH 2025). It is typically found on branches or in litterfall of both hardwood and conifers, sometimes among mosses on rock (CLH 2025). Sometimes descriptions say this species is growing exposed to the ocean or on exposed rock outcrops (CLH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Parmotrema arnoldii* is a lichen species which grows as an epiphyte (CLH 2025, McCune and Geiser 2023). Its main dispersal mechanisms are by soredia, conidia, and rarely ascospores (CLH 2025). Dispersal of ascospores may achieve long distances, >5 km, comparable to lichens that depend on clonal reproduction (Ronnås et al. 2017). However, there is limited information on the dispersal capabilities of *Parmotrema arnoldii* as it pertains to environmental conditions within the Tongass. Asexual propagules such as soredia, can be dispersed by wind or gravity. Dispersal of asexual propagules is dependent on wind direction and speed, and distance is likely within the tens of meters (Armstrong 1994, Ronnås et al. 2017). Lichen soredia can be dispersed vertically and horizontally within and between tree canopies, enabling effective short distance dispersal (Armstrong 1994).

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* Several specimens indicate that the species was common in the area (FIA abundance code 3, common, 10-40 individuals on the plot).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* No population trend monitoring has occurred for this species on the Tongass NF.
6 Habitat trend on Tongass NF	A/B	*A/B = There has been a decline in habitat quality and quantity, but stable amounts of suitable or potential habitat remain* The habitat for the eleven occurrences of *Parmotrema arnoldii* on the Tongass NF is beach fringe forest (Appendix 1). Past harvesting practices on the Tongass National Forest did target the beach fringe forests to where this taxon is restricted, therefore it is likely that some habitat was impacted by past timber harvest. Historical timber harvest activities occurred in the vicinity of the beach fringe forest at occurrences 5 and 8 (USFS 2025c). Beach and Estuary Fringe Standards and Guidelines under the 2016 Forest Plan maintains an approximately 1,000-foot-wide beach fringe of mostly unmodified forest on Tongass NF lands. Invasive species that can survive in or near coastal and island forests, such as *Sorbus aucuparia* (European mountain ash) are known to occur in or near the coordinates for occurrence 6 (USFS 2025b). The effect of this invasive species on habitat quality for *Parmotrema arnoldii* is unknown.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Climate change is predicted to lead to increased beach erosion and storms that could impact trees that this lichen grows on. A primary source of *Picea sitchensis* mortality is blow-down from storms and other localized high wind events. Climate models for the next half-century predict increased storm intensity and frequency, suggesting that this threat will only grow with time (Dillman et al. 2017). Higher wind speeds and larger storm swells are likely to lead to increased windthrow related disturbance events, which presents a threat to the known occurrence of this taxon, as all occur on the immediate coast (Dillman et al. 2017). The species does not appear to be dispersal limited, so may be able to disperse to new suitable habitat as the beach fringe shifts. Beach fringe habitat could potentially be impacted by the invasive tall shrub/tree *Sorbus aucuparia* in the future, but the extent to which this species will impact habitat suitability for *Parmotrema arnoldii* is unknown. Decline in air quality would affect this species. *Parmotrema arnoldii* is reported to be sensitive to sulfur acidity, and to be eutrophic in regards to nitrogen, which means only tolerant of low to moderate N fertilization (USFS 2025d). It is anticipated that marine traffic is likely to increase with the trends of increased cruise ship tourism in southeastern Alaska (Southeast Alaska 2023).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Parmotrema arnoldii* is a foliose green algal lichen that grows as an epiphyte among mosses (CLH 2025, Jablonska et al. 2009). *Parmotrema arnoldii* rarely sexually reproduces with apothecia and more often reproduces asexually through soredia and pycnidia (CLH 2025). *Parmotrema* lichens in temperate environments which exhibit a reproductive strategy producing both asexual and sexual spores may have an advantage over only using one reproductive strategy in such unpredictable environments, as compared to *Parmotrema* lichens in tropical environments (Lawrey 1980). The life span of *Parmotrema* lichens has not been reported (Jablonska et al. 2009). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	X	☐	☐
Low populations or restricted ecological conditions	☐	☐	X
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

Parmotrema arnoldii is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Potential threats to the species include climate change-related increases in threats to host trees, predicted increases in marine traffic (commercial shipping, tourism), and beach fringe timber harvest on non-FS lands. Whether these threats are significant to the persistence of the species on the planning area is unknown.
- **Declining trends:** Population trends are unknown. Coastal forested habitat is likely stable, but disturbance events that affect individual trees (beach erosion, wind throw, insect infection) are likely to increase with climate change. *Parmotrema arnoldii* does not have any obvious limitations to dispersal, so may be able to disperse to new suitable habitat as beach fringe conditions shift.
- **Restricted range:** The Tongass is the northern edge of this species' range.
- **Low population numbers or restricted ecological conditions:** The habitat for *Parmotrema arnoldii* is beach fringe forest, which is a fairly widespread habitat type on the Tongass, though the species has only been found on the southern half of the Forest. Several occurrences in addition to population counts indicating that the species can be common where found point to population numbers for this species not being especially low.

- **Other factors:** It is unknown whether other factors may exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (IDS) [05/28/1994]**	**Tongass National Forest, Blake Channel, on small island north of Blake Island**	**on marble cliffs above high tide line. Substrate: on maple trees. Associated taxa: *Acer glabrum, Cornus stolinifera, Fritillaria* sp., grasses and mosses.**		
2*	**CLH 2025 (ALA) [07/13/1990]**	**Dog Island, Dog Cove, beach edge east side., Tongass National Forest**	**Growing on Thuja plicata bole at beach edge**		
3*	**CLH 2025 (ALA) [07/21/2001]**	**Mainland, Misty Fjords NM, Very Inlet., Tongass National Forest**	**Growing on exposed *Picea sitchensis* branch. Beach fringe forest of *Picea sitchensis, Alnus rubra, Thuja plicata, Tsuga heterophylla.* Uplifted beach with *Vaccinium* sp.**		
3	CLH 2025 (ALA) [07/21/2001]	Mainland, Misty Fjords NM, Very Inlet., Tongass National Forest	on *Tsuga heterophylla* twig. *Tsuga heterophylla, Picea sitchensis, Vaccinium* sp., *Oplopanax horridum*.		
4*	**CLH 2025 (ALA) [07/01/2003]**	**Kuiu Island, Chatham Straits, north of Gedney Harbor, south of Swaine Point and Tebenkof Bay., Tongass National Forest**	**Beach fringe forest of Picea sitchensis, Alnus sitchensis, Tsuga heterophylla. Uplifted beach with Calamagrostis nutkatensis, Vaccinium sp. Growing on Picea sitchensis**		
5*	**CLH 2025 (ALA) [07/04/1991]**	**Kupreanof Island, Kah Sheets Bay, Kah Sheets Island., Tongass National Forest**	**Growing on Picea sitchensis branch. Assoc plants: Picea sitchensis, Oplopanax horridum, Malus fusca**		
6*	**CLH 2025 (ALA) [03/25/2003]**	**Sukoi Island, eastern most of the small archipelago in Frederick Sound., Tongass National Forest**	**southern exposure beach fringe; branch of Tsuga heterophylla**		
7*	**CLH 2025 (ALA) [07/19/2001]**	**Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest**	**beach fringe forest edge of small marine island. Picea sitchensis bole**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
8*	**CLH 2025 (ALA) [07/28/2003]**	**Gravina Island, Dall Bay., Tongass National Forest**	**beach fringe forest of Thuja plicata, Picea sitchensis, Tsuga heterophylla, Alnus rubra, Malus fusca**		
9*	**CLH 2025 (ALA) [07/02/2003]**	**Windfall Island, Chatham Straits, south Tebenkof Bay, south shore of island., Tongass National Forest**	Beach fringe forest of Picea sitchensis, Malus fusca, Tsuga heterophylla. Rocky head with Calamagrostis nutkatensis, Vaccinium sp. Growing on Picea sitchensis branch		
9	CLH 2025 (ALA) [07/02/2003]	Windfall Island, Chatham Straits, south Tebenkof Bay, south shore of island., Tongass National Forest	Beach fringe forest of Picea sitchensis, Malus fusca, Tsuga heterophylla. Rocky head with Calamagrostis nutkatensis, Vaccinium sp. Growing on Picea sitchensis branch		
10*	**CLH 2025 (ALA) [08/12/2003]**	**Coronation Island Wilderness, Egg Harbor, head of bay., Tongass National Forest**	**Branch of Picea sitchensis Beach fringe forest of *Picea sitchensis, Alnus rubra, Tsuga heterophylla.***		
11*	**CLH 2025 (ALA) [08/07/2003]**	**Misty Fjords Wilderness, Kanagunut Island, SW side of island at narrow isthmus., Tongass National Forest**	**Beach fringe forest of *Thuja plicata, Picea sitchensis, Alnus rubra, Malus fusca.***		

Parmotrema crinitum

Parmotrema crinitum [(Ach.) M. Choisy, 1952]

Salted Ruffle Lichen

Global Rank: **G5**

Alaska State Rank: **S2**



photo: (CC0) Peter de Lange

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*B = Patchy.* *Parmotrema crinitum* is known from 3 occurrences on the Tongass NF (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). These occurrences are located: on the south shore of Kah Sheets Island and in the mouth of Foggy Bay on DeLong Island in the Misty Fjords Wilderness, and on the south side of Gravina Island (Appendices 1 and 2; CLH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in uplifted beach forests associated with either *Picea sitchensis* or *Tsuga heterophylla*. Occurrence 1 was collected in beach fringe forest growing on *Picea sitchensis* branch, occurrence 2 in beach fringe forest on Tsuga heterophylla branch and occurrence 3 in forest on Tsuga heterophylla (CLH 2025). This habitat is typical for this species. Across its range, *Parmotrema crinitum* is typically found in coastal areas, maritime salt marshes, swamp mixed-hardwood forests, or mangroves (CLH 2025). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF. This species may be confused for *Parmotrema arnoldii* which is a rare species that is also present nearby (CLH 2025). There are no subspecies of *Parmotrema crinitum* in TNF.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside of the Tongass National Forest.* Global Rank G5, Alaska State Rank S2, British Columbia S3, Least Concern (IUCN 2025) *Parmotrema crinitum* is broadly distributed throughout North and South America, Europe, southeastern Africa, and scattered islands in the west Pacific Ocean including the east coast of Australia (CLH 2025). In North America, *Parmotrema crinitum* is present in the southern areas of five Canadian provinces and territories including British Columbia, Ontario, Quebec, New Brunswick, and Nova Scotia as well as many US states ranging from observations along the west coast which are disjunct from the eastern states with observations occurring in the south, Atlantic states, and northern Midwest states in addition to scattered observations in the Rockies, Hawaii, and Mexico (CLH 2025). The Tongass NF serves as the northern extent of its range in North America (CLH 2025). The closest occurrences to TNF are to the south on Haida Gwaii in British Columbia, Canada (CLH 2025). *Parmotrema crinitum* is typically a sub-tropical or temperate species but is known from northern regions in areas with high humidity (Stelate et al. 2022). Across its range, *Parmotrema crinitum* occurs in mangroves, along the coasts, with mixed hardwoods at elevations of 0 m to 3,700 m (CLH 2025). It is typically found on trees along beach or roadside with open to shaded light exposure, this species can sometimes be found growing directly on rocks (British Columbia, Canada; CLH 2025). The rocks where this species is found are sometimes basalt (reported from Australia; CLH 2025). The trees which this species grows on are described on a spectrum from "wind swept" to "sheltered forest edge" (CLH 2025). *Parmotrema crinitum* is reported to be most abundant in fairly open forests and on fences, boulders or trees by parking and picnic areas (McCune and Geiser 2023).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Parmotrema crinitum* is a lichen species which grows as an epiphyte, sometimes reported growing on soil or rocks (CLH 2025, McCune and Geiser 2023). Its main dispersal mechanism is by asexual propagules, isidia (McCune and Geiser 2023, Stelate et al. 2022). The isidia of *Parmotrema crinitum* are described to persist in a coralloid morphology and are not reported to break down into coarse soredia as they do in similar species (Kantvilas 2023). There is limited information on the dispersal capabilities of *Parmotrema crinitum* as it pertains to environmental conditions within the Tongass. Asexual propagules such as isidia, can be dispersed by wind or gravity. Dispersal of

Criteria	*Rank*	*Rationale*
		asexual propagules is dependent on wind direction and speed, and distance is likely within the tens of meters (Armstrong 1994, Ronnås et al. 2017).
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Parmotrema crinitum* is known from 3 occurrences on the Tongass NF (Appendices 1 and 2). All occurrences had abundance ranked as 3 on the FIA scale, indicating there were at least 10 thalli but less than 50% of available substrate was covered (Appendix 1; CLH 2025, USFS 2025a).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Parmotrema crinitum* on the TNF are unknown (USFS 2025a, CLH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for the 3 occurrences of *Parmotrema crinitum* on the TNF is uplifted beach fringe or coastal forests associated with *Picea sitchensis* and *Tsuga heterophylla* (CLH 2025). In adjacent locations including on Queen Charlotte Island, it also occurs on rocky shores with *Tsuga heterophylla* (Appendix 1; CLH 2025). These habitats can be grouped under coastal forests. Coastal forest was historically targeted for timber harvest due to ease of access. However, this ecosystem is now protected from timber harvest with a 1000 foot buffer in old growth. Remaining old growth coastal forest likely has high ecosystem integrity with low vulnerability to stressors (Turner and Mallott 2025).
7 Habitat vulnerability or	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.*

Criteria	*Rank*	*Rationale*
modification; other threats		Recent timber harvest activities have occurred in the vicinity of the *Picea sitchensis* forests at occurrence 3 (USFS 2025c), and this activity will likely continue on Gravina Islands in the future. This is the only occurrence where the record does not indicate it is in the beach forest fringe, so it may be susceptible to direct or indirect effects from harvest. The occurrences in the beach fringe may be susceptible to beach erosion and storms that could impact trees that this lichen grows on. In addition, climate change is predicted to lead to increased air temperature, increased evapotranspiration, and growing season water deficit which will lead to drought stress for humidity-dependent species (Turner and Mallot 2025, Wiles and Warren 2025). *Parmotrema crinitum* requires high humidity environments (Stelate et al. 2022). However, it is difficult to predict how climate change would affect humidity and whether Parmotrema crinitum would be impacted. Threats specific to *Parmotrema crinitum* are reported to include primarily habitat loss and human disturbance (Scheidegger et al. 1995). In addition, *Parmotrema crinitum* is reported to be sensitive to sulfur acidity, and to be oligotrophic in regards to nitrogen, which means it is only tolerant to low N deposition (USFS 2025d).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Parmotrema crinitum* is a foliose green algal lichen that grows as an epiphyte and sometimes on rock (McCune and Geiser 2023). *Parmotrema crinitum* is not known to sexually reproduce with apothecia, while asexual reproduction is through coralloid branched, apically ciliate isidia (CLH 2025, Stelate et al. 2022). No information about reproductive success and survival or mortality of *Parmotrema crinitum* from the TNF is available. The life span of *Parmotrema* lichens has not been reported (Scheidegger et al. 1995, Stelate et al. 2022). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	**X**

Declining populations or habitat trends	☐	☐	**X**
Restricted range	☐	**X**	☐
Low populations or restricted ecological conditions	**X**	☐	☐
Other factors (see conclusion rationale)	☐	☐	**X**

Conclusion Rationale

Parmotrema crinitum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Timber harvest actions pose a threat to *Parmotrema crinitum* only when the species or its habitat occur outside of the beach fringe. Old growth forest within 1000 feet of the coast and young growth forest within 200 feet of the coast is protected from harvest under the 2016 Forest Plan, and two of the three known occurrences on the Tongass NF occupy beach fringe habitat.
- **Declining trends**: Population trends are not known. Climate change may alter moisture availability or humidity and could alter growth rates or this species ability to persist. However, this species is widespread globally, suggesting a tolerance for a wide range of climatic conditions.
- **Restricted ranges**: This species is not endemic to Alaska or the plan area and is broadly distributed globally. The Tongass NF occurrences are the northern edge of the species' range in North America. Expected increases in temperature in the region may expand suitable habitat farther north, but there is insufficient information to assess the ability of this species to disperse northward and colonize new available habitat.
- **Low population numbers or restricted ecological conditions**: There are only three occurrences on the Tongass National Forest, leaving the species vulnerable to extirpation from the plan area through stochastic events. Two occurrences are in beach fringe forest where coastal erosion could affect substrate trees. Little is known about life history and dispersal characteristics, so it is unknown if this species would be able to acclimate to changing climate or disperse to more suitable habitat.
- **Other factors**: There is not enough information to determine whether or not other factors exist that may impact the ability of this species to persist in the plane area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (ALA) [07/31/2003]**	**Misty Fjords Wilderness, Kah Sheets Island, Boca De Quadra, south shore, small island off the coast., Tongass National Forest**	**Growing on *Picea sitchensis* branch. Beach fringe forest of *Picea sitchensis, Alnus rubra, Tsuga heterophylla*. Uplifted beach with *Vaccinium* sp.**	**Abundance = 3 (more than 10 thalli but growing on less than 50% of substrate)**	
2*	**CLH 2025 (ALA) [07/19/2001]**	**Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest**	**Growing on *Tsuga heterophylla* branch. Beach fringe forest of *Picea sitchensis, Alnus rubra, Thuja plicata, Tsuga heterophylla.* Uplifted beach with *Vaccinium* sp.**	**Abundance = 3**	
3*	**CLH 2025 (ALA) [07/28/2003]**	**Gravina Island, Dall Head, east side., Tongass National Forest**	**growing on Tsuga heterophylla; *Picea sitchensis,* Tsuga heterophylla forest; Exposed site. 5% Alnus sitchensis cover. Associated plants are Galtheria shallon**	**Abundance = 3**	

Parnassia kotzebuei

Parnassia kotzebuei [Chamisso ex Sprengel, 1824]

Kotzebue's Grass-of-Parnassus

Global Rank: **G5**

Alaska State Rank: **SNR**



photo: (CC BY) Jack Bindernagel

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps.* *Parnassia kotzebuei* is known from 10 estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Chichagof Island (Occurrences 1, 9, and 10), Yakutat Foreland (Occurrence 2 and 3), Mendenhall Glacier north of Juneau (Occurrence 4, 5, and 7), northern Admiralty Island (Occurrence 8), and Glory Lake (Occurrence 6) (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in disturbed areas (Occurrence 1 and 3), gravel beaches and shorelines (Occurrence 2, 5, and 6), glacially scoured granite (Occurrence 4), an alpine ridge rock outcrop (Occurrence 8), and talus below a ridgeline (Occurrence 7). These habitats are typical for this species. There are two other occurrences of this species in southeastern Alaska outside of the Tongass NF near Juneau (iNaturalist as of March 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank SNR *Parnassia kotzebuei* is broadly distributed throughout boreal North America and Siberia (GBIF 2025), ranging from along the edge of the Arctic Circle in coastal Nunavut and the Northwest Territories to the southern reaches of the Rocky Mountain Range, and from southern Greenland to the coastline of the East Siberian Sea (FNA 2020, GBIF 2025, NatureServe 2025). Across its range, the habitat for *Parnassia kotzebuei* is described as moist or seasonally dry shores, stream banks, riverbanks, meadows, tundra, seepage areas, talus, snowbeds, wet calcareous rocky places, and open conifer forests at elevations from 0 m to 3,800 m. (FNA 2025). Its range continues throughout Alaska (CPNWH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Parnassia kotzebuei* is a perennial herb with a cespitose growth habit (FNA 2025). Its main dispersal mechanism is by seeds (FNA 2025). Seeds are likely dispersed by wind and gravity (SID 2025).
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Parnassia kotzebuei* is known from 10 occurrences on the Tongass NF (Appendix 1). The occurrence near Sitka (Occurrence 7) states that the species was “rare”, but none of the other occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends of *Parnassia kotzebuei* on the TNF are unknown (USFS 2025a, CPNWH 2025). The species has been seen at Occurrence 4 several times from 1993 to 2025, and at Occurrence 7 several times from 2004 to 2025, but no

Criteria	*Rank*	*Rationale*
		population data is available apart from a comment at Occurrence 7 which noted plants were rare in 2004 (CPNWH 2025, iNaturalist 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitats for the 10 occurrences of *Parnassia kotzebuei* on the TNF are varied: roadside gravel, gravel beach, disturbed dirt bank, glacially scoured granite, small pond on young moraine, occasionally flooded shore, alpine ridge, and talus (Appendix 1). *Taraxacum officinale,* an invasive species that can survive in or near meadows, is located within 1 km of Occurrence 3, Occurrence 4, and Occurrence 10 (USFS 2025b). *Phalaris arundinacea* has been documented about 1.4 km away from Occurrence 3 (USFS 2025b). No other occurrences have documented invasive species within 2 km (USFS 2025b). Timber harvest has occurred in the recent past east and west from Occurrence 1 on Chichagof Island (USFS 2025c). This might indicate a negative trend in habitat quality at this site. Because habitat for this species on the Tongass is varied, including low and high elevation, beaches, alpine, as well as disturbed sites, there is likely stable amounts of suitable or potential habitat on the Tongass for this species. However, there have not been follow-up visits to the known occurrences, so the habitat trend at those locations is unknown.
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows and riparian corridors (Chestnut and Tucker 2025, Wiles and Warren 2025). Therefore, the habitat of *Parnassia kotzebuei* may be impacted by invasive species in the future. Recent timber harvest activities have occurred in the vicinity of Occurrence 1 (USFS 2025c), and this activity will likely continue on Chichagof Island in the future. *Parnassia kotzebuei* is mostly found in non-forested habitats, so timber harvest is unlikely to directly impact its habitat. However, timber harvest could have indirect impacts on the species (i.e. road building or changes in hydrology).

Criteria	*Rank*	*Rationale*
		Parnassia kotzebuei may be impacted where it grows in riparian areas by climate-driven changes to hydrology of the region with more precipitation and reduced snowpack. Changes are expected to impact nutrient cycling in aquatic and terrestrial habitats (Halofsky et al. 2025). Emerging trends project a decrease or insignificant change in mean wind velocity, but an increase in thunderstorms and severe cyclones by the end of the century (Redilla et.al 2019). Wind is an ecological agent of seed recruitment, gene flow, and plant distribution, and plays a notable part in the limitation or expansion of trees into alpine habitats (Johnson et. at. 2017, Kambo and Danby 2018). It is largely unknown how climate induced changes to windthrow regimes may impact seed dispersal for this species in the Tongass.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Parnassia kotzebuei* is a perennial herb with a cespitose growth habit (FNA 2025). It produces solitary, bisexual flowers and capsule fruits (FNA 2025). It flowers from June to August (FNA 2025, GBIF 2025). Flowers are pollinated by insects (CPC 2025). Plants are primarily outcrossing (CPC 2025). Mature fruits are produced from August to October (GBIF 2025). Seeds are likely orthodox (SID 2025). Germination requirements of this species are unknown but may exhibit non-dormancy as indicated by congeners of similar regional distribution (Baskin and Baskin 2014, SID 2025). The life span of *Parnassia* species is not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Parnassia kotzebuei is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No potential threats are known to be significant. Because habitat for this species on the Tongass is varied, including some occurrences in disturbed habitats (roadside gravel, disturbed dirt bank), some tolerance for disturbance and change is indicated.
- **Declining trends:** Population trends are unknown. Habitat may be declining, but it is unclear the extent to which this may affect habitat suitability for *Parnassia kotzebuei*
- **Restricted ranges:** The species is not a narrow endemic, populations on the Tongass NF are not known to be disjunct, nor is the species at the edge of its range.
- **Low population numbers or restricted ecological conditions:** Ten occurrences scattered on the northern half of the Tongass NF in a variety of habitats indicate that population numbers are likely high enough for the species to not be vulnerable to extirpation by stochastic events. Ecological conditions do not appear to be highly restricted. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the uncommonness of this species.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**TESP_Mar25 (100532P000073) [6/28/2006]**	**Chichagof Is., Two Creeks Small TS, roadside gravels**	**roadside gravels**		
2*	**CPNWH_April2025 (ALA) [6/22/1991]**	**Yakutat Foreland, Harlequin Lake - Dangerous River area, Yakutat Quad.**	**Gravel beach, growing in shallow moss layer.**		
3*	**CPNWH_Mar25 (WTU282230) [7/18/1980]**	**Yakutat. About 30 miles southeast of town, via Forest Service Highway 10, on south side of Dangerous River bridge.**	**Disturbed dirt bank at the dead end of the bridge, with a wide variety of non-weedy herbs.**	**Flowers.**	
3	CPNWH_April2025 (ALA) [7/18/1980]	Yakutat Foreland, Dangerous R. Bridge, 48 km SE of Yakutat, S side of river, Yakutat Quad, Tongass National Forest.	Disturbed dirt bank with wide variety of.		
4*	**CPNWH_Mar25 (WTU333402) [7/06/1993]**	**Mendenhall Glacier Recreation Area circa 9 miles northwest of Juneau, Photo Point, circa 1/8 mile north of Visitor's Center.**	**Glacially scoured granite.**	**Flowers & Fruits.**	
4	CPNWH_April2025 (ALA) [7/06/1993]	Mendenhall Glacier Recreation Area, Photo Point, ca. 1/8 mile N of Visitor's Center, Juneau Quad, Tongass National Forest, Alexander Archipelago.	Glacially scoured granite.		
4	iNaturalist 2025 [7/13/2020]	Juneau, Alaska, United States			
4	iNaturalist 2025 [6/12/2021]	Juneau, AK, USA			
4	iNaturalist 2025 [6/19/2022]	Nugget Falls, Nugget Creek, Juneau, AK 99801, USA			
4	iNaturalist 2025 [6/18/2023]	Juneau County, US-AK, US			
4	iNaturalist 2025 [7/1/2023]	Nugget Falls Trail, Juneau, AK, US			
4	iNaturalist 2025 [6/17/2025]	Juneau, AK 99801, USA			
5*	**CPNWH_April2025(ALA) [5/21/1961]**	**Coast Mts., Mendenhall Gl. (incl. visitor center), Juneau Quad, Tongass National Forest, Alexander Archipelago.**	**Wet area and small pond on young moraine.**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
5	iNaturalist 2025 [6/25/2019]	Juneau, AK, USA			
6*	**CPNWH_Mar25 (UAAH12569) [7/18/2017]**	**Tongass National Forest, Petersburg Ranger District, mainland, Glory Lake**	**Occasionally flooded shore of island, moss carpet**		
7*	**CPNWH_April2025(ALA) [7/13/2004]**	**Alexander Archipelago, Baranof I., Sitka, Bear Mtn., Sitka Quad, Tongass National Forest.**	**on 5 degree slope on W aspect, talus below ridgeline.**	**Rare**	
7	iNaturalist 2025 [8/18/2012]	Sitka County, US-AK, US			
7	iNaturalist 2025 [9/6/2008]	Sitka, AK, USA			
7	iNaturalist 2025 [9/15/2019]	Sitka County, US-AK, US			
7	iNaturalist 2025 [9/12/2020]	Sitka County, US-AK, US			
7	iNaturalist 2025 [6/18/2020]	Sitka, AK, USA			
7	iNaturalist 2025 [8/2/2021]	Baranof Island, Sitka, AK 99835, USA			
7	iNaturalist 2025 [8/2/2021]	Sitka County, US-AK, US			
7	iNaturalist 2025 [8/29/2025]	Sitka County, US-AK, US			
7	iNaturalist 2025 [8/29/2025]	Sitka County, US-AK, US			
7	iNaturalist 2025 [8/29/2025]	Sitka County, US-AK, US			
8*	**CPNWH_April2025(ALA) [7/09/2004]**	**N end of island, ridge just N of the Greens Creek mine, Juneau Quad, Alexander Archipelago, Admiralty Island.**	**Alpine ridge, rock outcrop with little vegetation.**		
9*	**iNaturalist 2025 [7/15/2023]**	**Hoonah-Angoon, AK, USA**	**approximate location.**		
10*	**iNaturalist 2025 [6/27/2009]**	**Sitka, AK, USA**			

Physciella chloantha

Physciella chloantha [(Ach.) Essl., 1986]

Cryptic Rosette Lichen

Global Rank: **G5?**

Alaska State Rank: **S2**



photo: (CCBY) Michel Langeveld

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated *Physciella chloantha* is known from three occurrences on the Tongass NF (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). These occurrences are located: on the mainland in the Very Inlet of the Misty Fjords National Monument, on DeLong Island at the mouth of Foggy Bay, and on Mitkof Island north of Ideal Cove across from LeConte Bay (Appendices 1 and 2; CLH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in beach fringe forests. All occurrences were collected from *Picea sitchensis* branches or twigs in the beach forest fringe ecotone (CLH 2025). In southeastern Alaska this species is only known from the Tongass NF; its range continues southeast in British Columbia approximately 620 km to some scattered occurrences in and south of Wells Gray Provincial Park (CLH 2025, iNaturalist 2025). Across its range, *Physciella chloantha* is typically found growing on bark or rock in mature forests of coniferous or deciduous trees, or sometimes bogs (CLH 2025).

Criteria	*Rank*	*Rationale*
		This species may be confused for species in the genus *Phaeophyscia* or the species *Physciella melanchra* which are both present nearby in B.C., Canada (Esslinger 1986, iNaturalist 2025). There are no subspecies of *Physciella chloantha* in TNF.
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside of the Tongass National Forest.* Global Rank G5?, Alaska State Rank S2, British Columbia S3 *Physciella chloantha* is broadly and densely distributed throughout North America, ranging from west coast to east coast, and scattered occurrences are found in South America, Europe, Asia, and Africa (CLH 2025). In North America, *Physciella chloantha* is present in Canadian provinces and territories British Columbia, Manitoba, Ontario, Quebec, New Brunswick as well as most U.S. states (CLH 2025). Across its range, *Physciella chloantha* occurs in coniferous upland forests, riparian forests, and sometimes dry ridgetops with thin soil on rock outcrops at elevations of 0 m to 3383 m (CLH 2025, CPNWH 2025). It is typically found in association with fir, maple, juniper, oak, pine, poplar, Douglas fir, and willow (CLH 2025). The soils where this species are found are typically fertile or xeric, and the rocks are calciferous or sometimes limestone (CLH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Physciella chloantha* is a lichen species which grows as an epiphyte, or sometimes on rocks (CLH 2025). Its main dispersal mechanisms are by soredia and pycnidia, and this species rarely disperses by ascospores (CLH 2025). One of the defining features of *Physciella chloantha* is this species' ellipsoid conidia produced in pycnidia (Esslinger 1986). There is limited information on the dispersal capabilities of *Physciella chloantha* as it pertains to environmental conditions within the Tongass NF. Asexual propagules such as soredia can be dispersed by wind or gravity. Dispersal of asexual propagules, including soredia and pycnidia, is dependent on wind direction and speed, and distance is likely within the tens of meters (Armstrong 1994, Ronnås et al. 2017). Lichen soredia can be dispersed vertically and horizontally within and between tree canopies, enabling effective short distance dispersal (Armstrong 1994).

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Two of the occurrences of *Physciella chloantha* in TNF were given FIA abundance ranks of 3, indicating there were more than 10 individuals present, but less than 50% of available habitat was occupied (Appendix 1; CLH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Physciella chloantha* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	A/B	*A/B = Decline in habitat quantity, but stable amounts of suitable or potential habitat, relatively unchanged habitat quality* The habitat for the three occurrences of *Physciella chloantha* on the TNF is old growth beach fringe forests (CLH 2025). In adjacent locations including interior British Columbia, it also occurs on limestone cliffs in humid Douglas fir forests (Appendix 1; CLH 2025). Historically, coastal forest was targeted for harvest due to ease of access and quality of trees. However, the 2016 Forest Plan protects old growth forest within 1000 feet of the beach and young growth forest within 200 feet of the beach from harvest. Climate change may alter storm frequency and intensity, which may contribute to beach erosion and windthrow events that impact substrate for this species (Halofsky et al draft). Stable amounts of old growth coastal forest habitat remain (Turner and Mallot 2025)
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors* Climate change may alter storm frequency and intensity, which may contribute to beach erosion and windthrow events that impact substrate for this species (Halofsky et al draft). In addition, climate change is predicted to lead to increased air temperature, increased evapotranspiration, and growing season water deficit which could lead to drought stress for *Physciella chloantha* (Turner and Mallott 2025, Wiles and Warren 2025). It is unclear how this epiphytic species will be impacted by changes in moisture availability and temperature.

Criteria	*Rank*	*Rationale*
		Ongoing timber harvest may also impact habitat for this species, but direct impacts to the beach buffer are likely to be restricted due to Forest Plan guidelines. Threats specific to *Physciella chloantha* include pollution; this species is reported as a mesotroph – preferring a moderate nitrogen nutrient regime - and sensitive to sulfur acidity (USFS 2025d).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Physciella chloantha* is a foliose green algal lichen that grows as an epiphyte (CLH 2025). *Physciella chloantha* rarely sexually reproduces with apothecia (McCune and Geiser 2023). Asexual reproduction is through soredia fragmentation and pycnidia (Esslinger 1986, McCune and Geiser 2023). The life span of *Physciella* lichens has not been measured (Esslinger 1986). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	**X**
Declining populations or habitat trends	☐	☐	**X**
Restricted range	☐	**X**	☐
Low populations or restricted ecological conditions	**X**	☐	☐
Other factors (see conclusion rationale)	☐	☐	**X**

Conclusion Rationale

Physciella chloantha is not recommended as a Species of Conservation Concern in accordance with the following rationale:

- **Significant threats**: Climate change is the main threat to this species, though it is unclear how this epiphytic species will be affected by changes in temperature and moisture availability. Timber harvest or road building in the beach fringe could affect this species, but direct impacts are unlikely as they are restricted under Forest Plan guidelines. Localized impacts from decreases in air quality are possible, but more information is needed to fully assess the magnitude of this threat.
- **Declining trends**: Population trends are not known. Habitat is likely stable but may be impacted by altered conditions associated with changing climate, including increased storm frequency and intensity, as well as the erosion of beach habitat.
- **Restricted ranges**: This species is not endemic to the region and is widespread globally. The Tongass NF occurrences are the northern edge of the species' range, indicating decreasing habitat suitability at more northern latitudes. Expected increases in temperature may expand the range of this species northward, but without more information, the ability of *Physciella chloantha* to readily disperse into newly available habitat is unknown.
- **Low population numbers or restricted ecological conditions**: There are three known occurrences on the Tongass NF, indicating some vulnerability to extirpation from the plan area through stochastic events. Little is known about life history to determine whether this species will acclimate or disperse effectively under changing climate.
- **Other factors**: There is not enough information to determine additional factors that may impact the ability of this species to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (ALA) [07/21/2001]**	**Mainland, Misty Fjords NM, Very Inlet., Tongass National Forest**	***On picea sitchensis twigs at forest/beach ecotone, exposed***		
2*	**CLH 2025 (ALA) [07/19/2001]**	**Misty Fjords Wilderness, DeLong Island, mouth of Foggy Bay., Tongass National Forest**	**Growing on *Picea sitchensis* branch. Beach fringe forest of *Picea sitchensis, Alnus sitchensis, Alnus rubra*. Uplifted beach with *Oplopanax horridum, Vaccinium* sp.**	**FIA = 3 (More than 10 individuals but less than 50% or substrate is occupied)**	
3*	**CLH 2025 (ALA) [08/18/2003]**	**Mitkof Island, north of Ideal Cove, across from LeConte Bay, Tongass National Forest**	**Picea sitchensis twig, old growth beach forest ecotone**	**FIA = 3 (More than 10 individuals but less than 50% or substrate is occupied)**	

Physocarpus capitatus

Physocarpus capitatus [(Pursh) Kuntze]

Pacific ninebark

Global Rank: **G5**

Alaska State Rank: **S2**

photo: G.D. Carr, WTU Image Collection



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy OR gaps *Physocarpus capitatus* is known from approximately 30 estimated occurrences on the Tongass NF. We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). There are four occurrences at the north end of Prince of Wales island, with additional records around Cape Pole/Edna Bay on Kosciusko Island, Orr Island, and around Sarkar Lake and Naukati Bay. One occurrence is on Kuiu Island directly west of Point Baker, another on central Dall Island, and three on the north side of Moira sound on South Prince of Wales (ANHP ACCS 2023, USDA FS 2023, CPNWH 2024). There is a research-grade iNaturalist report from southern Annette Island. The species is found on moist soil and streambanks on lower mountain slopes near the coast (Vierick and Little 1972). Habitats include beaches, beach forests, riparian areas, stream margins, lake edges and shorelines, edges of roads, and small islands. It may be found growing under alder, *Tsuga heterophylla, Thuja plicata* and *Picea sitchensis* (USDA FS 2023, ANHP ACCS 2023, CPNWH 2024).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	B = Widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G5 Alaska State Rank S2 *Physocarpus capitatus* is distributed from the Tongass NF south through western North America to central and southern California. The nearest occurrences in the CPNWH database are in southwestern British Columbia near Bella Coola and north central British Columbia near Liard River, both approximately 300 miles distant from the nearest *P. capitatus* in the Tongass NF (CPNWH 2024). It is primarily found west of the Sierra Nevada, Cascade, and British Columbia Coast Ranges. There is also a disjunct population in northern Idaho (Vierick & Little 1972, Topik & Hemstrom 1982, Monsan & Shaw 1983, USDA CRNS 2007). It is found in similar habitats across its range, at low elevations on very moist to wet, nitrogen-rich sites such as streams sides, swamps, lake margins, and semi-open to open forests (Topik & Hemstrom 1982, Ceska & Skagel 1989, Fuchs et al. 2000, Sarr & Hibbs 2007). In coastal British Columbia *P. capitatus* is characteristic of alluvial floodplain forests (Ceska & Skagel 1989). It is common to occasional in appropriate habitats through its range, with thousands of occurrences (NatureServe 2024).
3 Dispersal capability	B	B = Disperses only through suitable habitat There is little information regarding the dispersal of *Physocarpus capitatus*. Generally, members of the family Rosaceae rely heavily on animals for seed dispersal (Kalkman 1993). The species produces small, non-fleshy fruit with four seeds (USDA NRCS 2007). In nursery settings, it is propagated mainly by seed. Seed viability ranges from <50% to ~100%. In wild settings it likely spreads slowly by seed or by root sprouting (USDA CRNS 2007). Congener *Physocarpus malvaceus* readily resprouts after disturbance from adventitious buds and deep-rooted rhizomes (Keane 1984). Populations of *P. capitatus* on the Tongass NF are often separated by significant bodies of water (USDA FS 2023, ANHP ACCS 2023, CPNWH 2024).
4 Abundance on Tongass	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Between CPNWH, USDA FS, and ANHP ACCS data there are roughly 30 occurrences on the Tongass NF. Plant counts range between 1 and 100 individual plants. The species is probably uncommon and local, rare at its northern limit on

Criteria	*Rank*	*Rationale*
NF		the Tongass NF (Vierick & Little 1972). *Physocarpus capitatus* might be overlooked or under mapped on Prince of Wales Island (V. Cancino, A. Lund 2024, pers. comm.) but is not common on the rest of the forest (K. LaBounty 2024, pers. comm.).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Habitat for this species on the Tongass NF includes beaches, beach forests, riparian areas, stream margins, lake edges and shorelines, edges of roads, and small islands. While Northern Prince of Wales Island, where there are the most occurrences of *Physocarpus capitatus*, has experienced substantially more logging than the other biogeographical provinces of Southeast Alaska, many of the habitats where this species occurs are protected with buffers under the 2016 Forest Plan. Also, with some occurrences in disturbed areas, the species shows some tolerance of disturbance. Riparian forests on the Tongass NF are thought to have high ecosystem integrity (Turner and Mallot 2025). However, riparian ecosystems such as streamsides and lakeshores in Tongass NF are threatened by climate-change driven threats including increased temperatures, changing hydrological regimes, and changes to nutrient availability in addition to non-climate stressors such as timber harvest, transportation corridors, insects and stem decay, and beavers (EcoAdapt 2014). The timing and frequency of large rain events and rain on snow events that contribute to flooding will be altered under future climate scenarios, and peak flows and floods can scour riparian areas, erode stream channels, undercut riparian trees, and alter plant community composition (Halofsky et al 2024). Riparian ecosystems are also vulnerable to exotic species like reed canarygrass (*Phalaris arundinaceae*), which is one of the most invasive plants in the region (Huette et al. 2003).

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Climate change and invasive species may impact the habitats of *Physocarpus capitatus* in the future. Riparian plants, especially those growing close to the streambed and lakeshores such as *P. capitatus*, will be more vulnerable to the immediate effects of climate-induced changes in flow and erosion rates. For example, changes in regional hydrology resulting from climate change can increase the incidence of high flows and runoff events that could result in mechanical injury or death to individuals of *P. capitatus* (Nilsson & Svedmark 2020). Longer duration of flooding events and greater depth of flooding can limit gas exchange and photosynthesis, leading to decreased fitness or death, and reduce seedling survival of most riparian species (Garssen et al. 2015). Invasion of riparian systems by exotic plants is also likely facilitated by changes to flow dynamics (Flanagan et al. 2015, Nilsson & Svedmark 2020). Southeastern Alaska's waterways are among the most vulnerable sites to invasive species. Reed canarygrass is an exotic grass that aggressively invades wetlands and riparian areas in southeastern Alaska. The grass forms thick monospecific mats that choke out other riparian vegetation (Huette et al. 2003). *P. capitatus* presence has been found to be strongly negatively correlated with the reed canarygrass gradient (Fierke & Kauffman 2006).
8 Life history and demographics	C	C = Species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. *Physocarpus capitatus* is a spreading to erect deciduous shrub growing up to 5 meters tall. It has bark that peels and sheds in long strips exposing the inner bark, giving it the common name "ninebark". It has clusters of small white flowers that give rise to small fruits sheathed in bell-shaped bracts (Vierick & Little 1972, USDA 2007). It apparently has low palatability when browsed by herbivores or bears and has few known pests or diseases (USDA CRNS 2007). *Physocarpus* is visited by a variety of pollinators (Wheeler & Hoebeke 1985). *P. capitatus* has a low drought tolerance, though it is occasionally found on drier sites (USDA CRNS 2007).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Physocarpus capitatus is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Invasive species and climate change are potential threats across many habitats on the Tongass NF, including for habitat for *Physocarpus capitatus* but it is unclear how significant they are to the persistence of this species.
- **Declining populations or habitat**: Population trends are unknown. Habitat is being impacted by modern stressors but it is unclear to what extent they will affect habitat suitability for *Physocarpus capitatus*.
- **Restricted range**: While this species is widespread and fairly common on the West coast of North America, populations on the Tongass are at the northern extent of their range, and may be disjunct from the rest of the species' range.
- **Low population numbers or restricted ecological conditions**: With approximately 30 estimated occurrences, as well as reports that the species' may be underreported, it is unlikely that population numbers are low enough for the species' to be vulnerable to extirpation by stochastic events on the Tongass NF. *Physocarpus capitatus* occupies a variety of edge habitats on the southern Tongass NF.
- **Other factors**: It apparently has low palatability when browsed by herbivores or bears and has few known pests or diseases.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.

X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO1)[8/23/1947]	Waterfall, Dall Id.		NA	NA
2	ACCS_Mar25 (EO2)[6/01/1951]	Prince of Wales Is.			
2	ACCS_Mar25 (EO2)[8/11/1993]	Prince of Wales Island, Moira Sound, N Arm, S shore of outlet of Miller Lake	NE-facing limestone exposure		
3	ACCS_Mar25 (EO3)[8/11/1993]	Craig Quad.: Prince of Wales Island, Moira Sound, North Arm,south shore of outlet of Miller Lake.	Northeast-facing limestone exposure.		
3	CPNWH_Mar25 (WTU332846)[8/11/1993]	Craig Quad.: Prince of Wales Island, Moira Sound, North Arm,south shore of outlet of Miller Lake.	Northeast-facing limestone exposure.		
4	TESP_Mar25 (100554P00580)[5/23/2018]		In class 3/4 riparian, overstory domint alder		
5	ACCS_Mar25 (EO4)[7/20/1978]	Alexander Archipelago, Tuxekan I.	on beach		
6	TESP_Mar25 (100554P00584)[6/12/2018]		Boat landing/ rocky shoreline Historic and ongoing disturbance (blasting, grading, vehicle, and foot traffic)		
7	TESP_Mar25 (100554P00566)[6/20/2016]				
8	TESP_Mar25 (100554P00565)[8/13/2016]				
9	ACCS_Mar25 (EO5)[no date]	Tuxekan Island on beach near trail leading to USFS stand density plots.			
10	TESP_Mar25 (100554P00568)[6/23/2016]				
11	ACCS_Mar25 (EO6)[7/20/2015]	S side of the head of a small cove on the W side of Tuxecan Island, which is W of Prince of Wales Island.	Beach forest ecotone.		
11	CPNWH_Mar25 (UAAH10528)[7/20/2015]	S side of the head of a small cove on the W side of Tuxecan Island, which is W of Prince of Wales Island.	Beach forest ecotone, growing under Tsuga heterophylla, Thuja plicata and Picea sitchensis.		
11	TESP_Mar25 (100554P00556)[8/26/2015]				

12	TESP_Mar25 (100554P00564)[8/25/2016]				
13	TESP_Mar25 (100554P000464Y12)[6/23/2012]				
14	TESP_Mar25 (100554P00569)[9/06/2016]				
13	TESP_Mar25 (100554P000465Y12)[6/23/2012]				
15	TESP_Mar25 (100554P00600FY19)[6/25/2019]		Wet sedge meadow		
16	ACCS_Mar25 (EO7)[6/27/2018]	Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.	Hemlock forest, lake edge, organic soil, full shade.		
16	CPNWH_Mar25 (UAAH15321)[6/27/2018]	Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.	Hemlock forest, lake edge, organic soil, full shade.		
16	TESP_Mar25 (100554P00608)[6/17/2021]		Along lake margin in Sitka spruce and red cedar forest. Associated species are Luzula parviflora, Lysichiton americanus, Menziesia ferruginea, Thalictrum occidentale, Vaccinium ovalifolium, Gymnocarpium dryopteris, Rubus parviflorus, Athyrium filix-femi, and Ranunculus orthorhynchus.		
13	TESP_Mar25 (100554P000468Y12)[6/23/2012]				
13	TESP_Mar25 (100554P000542Y14)[7/31/2014]				
17	TESP_Mar25 (100554P00559)[6/22/2016]				
17	TESP_Mar25 (100554P00563)[6/22/2016]				
18	TESP_Mar25 (100554P000470Y12)[8/07/2012]		Shoreline beach with bedrock bordering forest of spruce/cedar/hemlock		
19	ACCS_Mar25 (EO7)[7/08/2009]	N part of island, Sarkar Lake boat launch area	growing at edge of forest		
17	TESP_Mar25 (100554P00562)[6/22/2016]				
20	ACCS_Mar25 (EO7)[7/15/1979]	Alexander Archipelago, Sarkar Lake, Prince of Wales I.	edge of small i.		
21	TESP_Mar25 (100554P00557)[6/14/2016]		Forest edge habitat at margin of ROW		
21	TESP_Mar25 (100554P000642)[9/09/2024]				
22	TESP_Mar25 (100554P000506Y12)[6/22/2012]		Edges of the streambanks/forest along Survey Creek.		

23	ACCS_Mar25 (EO9)[7/19/1972]	Alexander Archipelago, Charley Cr., Ed Bay, Kosciusko I.	cutover		
24	TESP_Mar25 (100554P000539Y14)[7/30/2014]				
25	ACCS_Mar25 (EO10)[no date]	Kosciusko Island along Charley Creek, near the falls.			
26	ACCS_Mar25 (EO11)[8/27/1947]	Shakan Bay			
27	TESP_Mar25 (100554P000611Y20)[9/01/2020]		Roadside and parking area on peninsula for boat ramp, mostly gravel and invasives.		
27	TESP_Mar25 (100554P000610Y20)[9/01/2020]		Roadside/campsite area/ trail leading to public use dock and FS barge		
27	ACCS_Mar25 (EO12)[5/31/2005]	N end of island, N side of Dry Pass, 2.5 km SSW of El Capitan Peak	beach fring forest overhanging S-facing beach		
27	TESP_Mar25 (100554P000612Y20)[8/25/2020]		Roadside ditches		
27	TESP_Mar25 (100554P000609Y20)[9/01/2020]		Roadside/pullout leading toward old logging road.		
28	TESP_Mar25 (100554P00602FY19)[6/20/2019]				
29	TESP_Mar25 (100554P00589)[6/27/2018]		Along creek on both sides and along western side of the lake (did not look aroud the whole lake).		
29	ACCS_Mar25 (EO14)[6/26/2019]	Prince of Wales Island, Red Creek, Red Bay area.	Stream side habitat. Assoc. species: Carex mertensii, Tsuga heterophylla, Thuja plicata		
29	CPNWH_Mar25 (UAAH15083)[6/26/2019]	Prince of Wales Island, Red Creek, Red Bay area.	Stream side habitat. Assoc. species: Carex mertensii, Tsuga heterophylla, Thuja plicata		
29	CPNWH_Mar25 (UAAH15084)[6/26/2019]	Prince of Wales Island, Red Creek, Red Bay area.	Stream side habitat. Assoc. species: Carex mertensii, Tsuga heterophylla, Thuja plicata		
30	ACCS_Mar25 (EO13)[7/28/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Kuiu Is. Reed Bay, Middle Cove beach		
30	TESP_Mar25 (100521P000028)[7/28/1998]				

2	CPNWH_April2025(ALA)[8/11/1993]	Prince of Wales Island, Moira Sound, N Arm, S shore of outlet of Miller Lake, Craig Quad, Tongass tiol Forest, Alexander Archipelago.	NE-facing limestone exposure.		
19	CPNWH_April2025(ALA)[7/08/2009]	N part of island, Sarkar Lake boat launch area, Craig Quad, Alexander Archipelago, Prince of Wales Island.	Growing at edge of forest.		
20	CPNWH_April2025(ALA)[7/15/1979]	Alexander Archipelago, Sarkar Lake, Prince of Wales I., Craig Quad, Tongass tiol Forest, Alexander Archipelago.	Edge of small i.		

Pilophorus cereolus

Pilophorus cereolus [(Ach.) Th. Fr., 1875]

Powdered matchstick lichen

Global Rank: **G3G4**

Alaska State Rank: **S2**



photo: (CCBY) Matt Muir

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy.* *Pilophorus cereolus* is known from 5 occurrences on the Tongass NF (Fig. 1). We define an estimated occurrence as a grouping of populations that are separated by less than 1 km (0.62 mile) (NatureServe 2025). These occurrences are located: in Nichols Bay on the south coast of Prince of Wales Island, on the northwest coast of Kuiu Island in Washington Bay, in Windham Bay south of Spruce creek on the mainland, in Augustine Bay on the west side of Dall Island, and on the southeast side of Prince of Wales Island in Deep Cove (Appendices 1 and 2; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in rocks along the shore or in the forest. Occurrences in the TNF were collected in seaside rock ecosystems and in the forest from schist rocks, among moss (CLH 2025). In southeastern Alaska this species is known from the Tongass NF and its range continues northwest in Alaska approximately 430 km to Kakutat Bay, near Skagway (248 km), and further north to Evans Island (860 km; CLH 2025).

Criteria	*Rank*	*Rationale*
		Across its range, *Pilophorus cereolus* is typically found in rocky areas that are exposed to sunlight in mixed deciduous and conifer forests (CLH 2025). In Southeast Alaska, the species tends to co-occur with slate schist rocks, large boulders of granite, forest of *Alnus* sp., and mosses including *Brachythecium asperrimum* (CLH 2025). This species may be confused superficially for *Cladonia* sp which is also present nearby (CLH 2025). Subspecies of *Pilophorus cereolus* are not reported to occur in TNF (CLH 2025). This is the only Pilophorus species reported in Southeast Alaska with sorediate stalks.
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside of the Tongass National Forest.* Global Rank G3G4, Alaska State Rank S2, British Columbia S3S4 *Pilophorus cereolus* is broadly distributed throughout North America and Europe, with high densities in the Pacific Northwest and in Fennoscandinavia (CLH 2025). In North America, *Pilophorus cereolus* is present in Canadian provinces and territories British Columbia, Quebec, New Brunswick, and Newfoundland and Labrador, as well as U.S. states Alaska, Washington, Oregon, California, Minnesota, Tennessee, New York, and Maine (CLH 2025). There are at least 6 occurrences of this species in southeastern Alaska outside of the Tongass NF (CLH 2025). Outside of Alaska, the closest occurrences are in British Columbia both on the mainland and on Queen Charlotte Islands (CLH 2025). There is a high density of occurrences in western Washington state (CLH 2025). Across its range, *Pilophorus cereolus* occurs in montane tundra, on alpine cliffs, or coastal mixed forests at elevations of 0 m to 2,300 m (CLH 2025). It is typically found among *Abies* sp., *Alnus* sp., *Picea* sp., *Pinus* sp., *Pseudotsuga* sp., and *Thuja* sp., occurring on rocks including shale, sandstone, basalt, siliceous, and granite boulders (CLH 2025). The soils where this species are found are not typically described (CLH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Pilophorus cereolus* is a lichen species which grows on rocks (CLH 2025, McCune and Geiser 2023). Its main dispersal mechanism is by soredia, and its secondary dispersal is through ascospores (McCune and Geiser 2023). There is limited information on the dispersal capabilities of *Pilophorus cereolus* as it pertains to environmental conditions within the Tongass. Asexual propagules such as soredia, can be dispersed by wind or gravity. Dispersal of

Criteria	*Rank*	*Rationale*
		asexual propagules, including soredia, is dependent on wind direction and speed, and distance is likely within the tens of meters (Armstrong 1994, Ronnås et al. 2017). Dispersal of ascospores may achieve long distances, >5 km, comparable to lichens that depend on clonal reproduction (Ronnås et al. 2017).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* None of the occurrences of *Pilophorus cereolus* in TNF have population estimates or any indication of abundance (Appendix 1; CLH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Pilophorus cereolus* on the TNF are unknown (USFS 2025a, CLH 2025). All occurrences on the Tongass NF were documented in the 1900s-1960s with no more recent occurrences or follow up visits.
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Habitat is only explicitly recorded for two of the occurrences and is described as granite seashore rock and in forest on mica-schist rock. All of the records are relatively old before GPS technology was invented so habitat cannot be inferred from coordinates. Thus, it is difficult to characterize habitat for this species, although it likely grows on rock in habitat where sufficient sunlight reaches the ground. Invasive species that can survive in or near coastal forests, such as *Poa pratensis* (Kentucky bluegrass), are known to occur near the coordinates for occurrence 2 (USFS 2025b). The effect of these invasive species on habitat quality cannot be addressed due to the high uncertainty of occurrence location. Timber harvest has occurred in the recent past within 600 m north from occurrence 1 and is widespread to the east of occurrence 2 on Kuiu Island (USFS 2025c). This might indicate a negative trend in habitat quality at those sites.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* Habitat for this species may be found in a range of ecosystems where rocky substrate is found. It is difficult to generalize threats to habitat but broadly habitat with rocky substrate for this species is likely to be abundant. It is unknown whether more specific habitat requirements contribute to the rarity of this species on the Tongass NF. Coastal occurrences may be vulnerable to changes in sea level as well as increased storm frequency and intensity. In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for species with high moisture requirements such as *Pilophorus cereolus* (Turner and Mallott 2025, Wiles and Warren 2025). The impacts to saxicolous species like *Pilophorus cerolus*, which presumably have some tolerance to drought conditions given the inability of rock substrate to store water, are unknown.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Pilophorus cereolus* is a crustose cyano-lichen with sorediate stalks that grows on rock (McCune and Geiser 2023). *Pilophorus cereolus* rarely sexually reproduces with apothecia, while asexual reproduction is through soredia (McCune and Geiser 2023). The life span of *Pilophorus* lichens has not been reported to be measured. The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	**X**
Declining populations or habitat trends	☐	☐	**X**
Restricted range	☐	**X**	☐
Low populations or restricted ecological conditions	☐	☐	**X**

Other factors (see conclusion rationale)	☐	☐	**X**

Conclusion Rationale

Pilophorus cereolus is not recommended as a Species of Conservation Concern according to the following rationale:

- **Significant threats**: More information is required to determine whether significant threats exist for this species. Timber harvest, invasive species, or climate change may threaten *Pilophorus cereolus*, but it is difficult to describe potential impacts because records are old (pre 1970 and GPS) and several lack habitat information.
- **Declining trends**: Population trends are unknown. Potentially trending downward because this species was documented five times from 1905-1955 and has not been documented since. Habitat on the Tongass is described for only two occurrences: 1) on granite seashore rocks and 2) in the forest. Substrate: mica-schist rock. Habitat as described is widespread and stable on the Tongass NF, but additional habitat requirements may exist that are not currently understood. Coastal occurrences may be vulnerable to changes in sea level as well as increased storm frequency and intensity.
- **Restricted ranges**: This species is broadly distributed, and occurrences in the plan area do not exist at the edge of the species' range.
- **Low population numbers or restricted ecological conditions**: Only five occurrences are known on the Tongass NF, indicating a possible vulnerability to extirpation by stochastic events. Life history characteristics that may impact reproduction and dispersal are unknown, and it is likely that restricted ecological conditions exist that have yet to be described. More information is required in order to make valid assessments.
- **Other factors**: There is not enough information to evaluate whether any additional factors exist that may impact the ability of this species to persist on the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.

X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (CINC) [06/01/1913]**	**Nichols Bay. Prince of Wales Island**			
1	CLH 2025 (WTU) [06/08/1913]	Southeast, Nichols Bay.			
2*	**CLH 2025 (WTU) [08/28/1955]**	**Washington Bay, Kuiu Island.**	**On seashore granite rock. Substrate: saxicolous.**		
2	CLH 2025 (WTU) [06/27/1955]	Washington Bay, Kuiu Island.	On granite seashore rock.		
2	CLH 2025 (WTU) [08/28/1955]	Washington Bay, Kuiu Island.	On granite seashore rock in moss.		
2	CLH 2025 (WTU) [09/05/1947]	Washington Bay, Kuiu Island.	On granite rocks on seashore.		
3*	**CLH 2025 (WS) [10/11/1905]**	**Windham Bay. Mainland in Chuck River Wilderness**	**On jutting rocks.**		
4*	**CLH 2025 (WTU) [07/06/1913]**	**Southeast, Augustine Bay, Dall Island**			
5*	**CLH 2025 (ILL) [06/22/1939]**	**Deep Cove, Prince of Wales Island.**	**in the forest. Substrate: mica-schist rock. Associated taxa: *Brachythecium asperrimum*.**		

Platanthera ephemerantha

Platanthera ephemerantha [R.M. Bateman]

Whiteflower rein orchid

Global Rank: **G3**
Alaska State Rank: **S2**



photo: Wikipedia

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy or gaps There are 36 known locations of *Platanthera ephemerantha* on the Tongass National Forest on Prince of Wales Kosciusko, Kuiu, Revillagigedo, and Etolin Islands. (USDA FS 2023, ANHP ACCS 2023). This species has been found along the edge of the forest and muskeg, just inside the protected timbered edge or under scrub cedar or pine in the muskegs. It is generally found along the edges of muskegs with a fair *Rubus chamaemorus* component. It has also been found in somewhat open, lower productivity timbered stands, as well as along the edges of trails and roads. In addition, there are three unverified occurrences of *Platanthera unalascensis* that may in fact be *Platanthera ephemerantha*. *Platanthera ephemerantha* was formerly included with *Platanthera unalascensis*, but described as a new species in 1990 (Morgan and Ackerman 1990).This species was formerly known as *Piperia candida* but in 2009 was revised to *Platanthera ephemerantha* following a molecular analysis of the *Platanthera* clade (Bateman 2009). Although this analysis was not specific to Alaska or the Pacific Northwest, the Alaska Natural Heritage Program has decided to adopt this name for occurrences in Alaska (J. Fulkerson, personal communication, 2023). On the Tongass, several original documentations of *Platanthera ephemerantha* were previously identified as *Platanthera unalascensis*. Several specimens from the Tongass have been sent to orchid expert Robert Lauri, and he has verified all of them as *Platanthera ephemerantha*. On Prince of Wales Island, all occurrences that have been revisited and found during flowering periods have been determined to be *Platanthera ephemerantha* and not *unalascensis*.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G3, Alaska State Rank S2 British Columbia Province Rank S3, Blue List; California S3, Oregon S3?, Washington SNR An additional Alaska occurrence is located in the community of Thorne Bay, in a small patch of timber between the school parking lot and the main road. Distribution is limited outside of the Tongass National Forest. The species is known to British Columbia, Washington, Oregon, and south to central California (NatureServe 2023, CNPS 2023, Klinkenberg 2023). Occurrences on the Tongass NF are separated from occurrences at Glacier Bay National Park by approximately 200 kilometers, and from occurrences on Vancouver Island, British Columbia by approximately 800 kilometers.
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Platanthera ephemerantha* typically has many flowers per plant (up to 100), and very small seeds. Given the size of the seeds, they are likely wind dispersed, with high dispersal capability. Plants within the *Platanthera* genus lack an endosperm, which is why the seeds can be so small and light. However, the lack of endosperm means that the seed requires a mycorrhizal interaction for establishment, which can greatly limit the success at a site (Goldstein et al. 2009).
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. On the Tongass National Forest, populations known in natural habitats are generally small, with few individuals (USDA FS 2023). The populations with larger numbers (over 100 plants) tend to occur along the road corridors and right-of-ways. Over 1,000 total individuals are estimated on the Tongass National Forest (USDA FS 2023). However, approximately 60% of the known populations on the Tongass have less than 10 plants (USDA FS 2023).
5 Population trend on	D	D = Insufficient information to draw inferences about criterion. Monitoring plots within five *Platanthera ephemerantha* occurrences on the Tongass were visited annually between 2011 and 2015 as a part of the Tongass Rare Plant Monitoring project (USDA FS 2015, USDA FS 2019). The average density expressed as number of individuals per 500 m^2 plot was measured at 61 individuals per plot in 2011, 10 individuals per

Criteria	*Rank*	*Rationale*
Tongass NF		plot in 2013, 14 per plot in 2014, and 5 per plot in 2015. One plot may have been impacted by roadwork, and dropped from 226 individuals in 2011 to 12 plants in 2013. Monitoring results for this study should be viewed with caution considering the high variance in counts among plots, short duration of the monitoring period, and the narrow focus of sample sites across the plant's range in the planning area. In addition, this species seems to begin dying back earlier in the season that most flowering plants. The leaves generally die-back before the flowering stems do, by later in the season, some vegetative plants that were out in May might not be visible in August. This timing seems also to depend upon spring and summer weather. Dormancy periods and die-back may result in inconsistent counts from year to year. A more precise assessment of population trends would require a longer timeframe and a better understanding of dormancy periods.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Substantial timber harvest and road construction has occurred in the past within the general range of this species on the Tongass National Forest. Roughly half of known occurrences were found during surveys for a large timber sale, at the edges of muskegs or edges of units planned for timber harvest. Timber harvest has likely resulted in some fragmentation into smaller and more isolated parcels, however large amounts of suitable habitat remain. Microbial communities at timber harvest sites with soil compaction and organic matter removal in northern British Columbia were significantly altered, even fifteen years after the timber harvest (Hartmann et al. 2015). Areas where mycorrhizal networks have been damaged from soil disturbances are not likely to provide habitat for *Platanthera* species (Nawrocki et al. 2017). Occurrences have been found in the rights-of-way of forest roads and on road cut banks. It is not known if they are remnants that have survived the disturbance, or if they have colonized the areas due to modification of habitat. Occurrences that are within muskeg habitat, under patches of scrub, are less likely to be impacted by timber harvest activities. There is a large amount of muskeg suitable habitat available on the Tongass National Forest that is considered stable, with relatively unchanged habitat quality. A recent analysis of muskeg habitat on Prince of Wales Island found that transitional areas between open habitat, woodland scrub, and treed habitats have become increasingly treed

Criteria	*Rank*	*Rationale*
		between 2000-2020; however, it is unknown whether these shifts are outside of the historic range of variation. (Bennetsen et al. 2023).
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. Known suitable habitat for *Platanthera ephemerantha* is vulnerable to timber harvest, road building, and road maintenance. The majority of the known populations are within the central portion of Prince of Wales Island. Many occurrences are well within the muskegs, under patches of scrub, generally less than waist high, would not be impacted by commercial timber sales. Timber and muskeg edges, however, may be vulnerable to timber management activities. In addition, populations along the roadside can be vulnerable to management and maintenance of those roads, recreational and subsistence use, and competition from invasive species. Some impacts to existing populations along the roads have already been observed within one of the few monitoring plots established on the Tongass (see population trend above). However, these roadside populations that have likely been impacted by brushing, ditching and other road maintenance generally have a higher number of individuals than the natural setting locations. Global climate change may be the most pervasive threat to future long-term persistence of rare orchids worldwide (Swarts and Dixon 2009). Predicted climate changes for southeast Alaska include higher summer and winter temperatures, increased length of growing seasons and frost-free days, increased precipitation with more falling as rain rather than snow, increased evapotranspiration rates, and increased storm intensities (Haufler et al. 2010). The Conservation Assessment for *Platanthera unalascensis,* which is similar in range and habitat type to *Platanthera ephemerantha*, concludes that given the trends of increased temperature and precipitation and the overall climatic stability of the region, the vulnerability of *Platanthera ephemerantha* to climate change is likely low. Climate change at mid-century will likely result in increased habitat availability within the Alaska Region (Nawrocki et al. 2017). The long-term effects of these changes on habitat for this species, its pollinators, and its mycorrhizal symbiont, however, are uncertain.

Criteria	*Rank*	*Rationale*
8 Life history and demographics	B	B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. *Platanthera ephemerantha* is a difficult species to identify during surveys; it can require separating the scrub timber to find the plants. In many circumstances, this species can be easily overlooked, and since the plants do not flower annually, identification can be difficult. It may be confused with a more common *Platanthera* species when only single leaves are visible. In addition, this plant is known to have dormancy periods, where no above ground growth would be visible during a survey. In addition, even though the chances for dispersal seem high for *Platanthera*, with many flowers and very small seeds, the required mycorrhizal interactions necessary for successful establishment make suitable habitat more limited than what is readily identifiable as muskeg edge and low productivity timber. Populations do seem to have some ability to recover from disturbance events, given their ability to inhabit the road right-of-way and trail edges.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

Platanthera ephemerantha is not recommended as a Species of Conservation Concern. The balance of the following evidence was considered in the conclusion not to recommend *Platanthera ephemerantha* as a Species of Conservation Concern on the Tongass National Forest:

- **Significant threats** – This species is not considered highly vulnerable to climate change impacts. However, roadside habitat is vulnerable to infestation by invasive species, and habitat of lower productivity timber stands and muskeg edges may be vulnerable to timber management activities.
- **Declining populations or habitat trends** – Abundant, relatively stable habitat trends. While there is a history of commercial timber production on Prince of Wales Island, many occurrences are located within muskeg habitat not suitable for commercial timber harvest. While there is some indication that tree encroachment and densification is occurring within transitional areas between open habitat, woodland scrub, and treed habitats around muskegs, there is not enough scientific evidence to document whether this outside of the historic range of variability. Half of occurrences are associated with mapped yellow cedar wetlands, considered an ecosystem of conservation concern due to the decline of Alaska yellow cedar.
- **Restricted range** –Distribution outside of the Tongass National Forest to British Columbia, the Pacific Northwest and south to Central California. Tongass NF locations are disjunct by approximately 200 kilometers from a location at Glacier Bay, and by approximately 800 kilometers from occurrences on Vancouver Island, British Columbia.
- **Low populations or restricted ecological conditions** – *Platanthera ephemerantha* is rare on the Tongass National Forest. There are 36 known occurrences, and while many host a large number of individuals, almost all occurrences are located in the central portion of Prince of Wales Island. Prior to 2011, these occurrences were considered *Platanthera unalascensis*. There are three additional occurrences currently described as *Platanthera unalascensis* with high likelihood of being instead *Platanthera ephemerantha*. While general habitat conditions are widespread, limited distribution of orchids may be due at least in part from the rarity or required soil conditions of their mycorrhizal symbiont.
- **Other factors**: While suitable habitat is stable and common, this species produces naked seeds with limited dispersal ability and are dependent on the presence of a mycorrhizal symbiont for germination.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	TESP_Mar25 (100551S999999Y13)[5/17/2013]	TESP_Mar25 (100551S999999Y13)[5/17/2013]		NA	NA
2	ACCS_Mar25 (EO7)[7/31/2019]	ACCS_Mar25 (EO7)[7/31/2019]	Wet hummus,		
3	TESP_Mar25 (100551P000421)[6/30/2011]	TESP_Mar25 (100551P000421)[6/30/2011]	1 individual growing at the base of a high-volume THPL in a small THPL grove adjacent to the trail to the 12-mile cabin (about 5' off trail).		
4	ACCS_Mar25 (EO8)[8/10/2011]	ACCS_Mar25 (EO8)[8/10/2011]			
4	TESP_Mar25 (100552P000309)[8/10/2011]	TESP_Mar25 (100552P000309)[8/10/2011]	Open, THPL-TSHE/Vacc spp. raised forested inclusion within an extensive complex of string Sphagnum spp. bogs (muskegs).		
5	TESP_Mar25 (100552P000310)[8/10/2011]	TESP_Mar25 (100552P000310)[8/10/2011]	On mossy mound on edge of roadside. There is a thin strip of TSHE/Vacc forest between the roadside and a muskeg. The side is not high quality habitat. The general area is influenced by carbotes. The road base is carbote in origin.		
6	TESP_Mar25 (100554P000425)[9/07/2011]	TESP_Mar25 (100554P000425)[9/07/2011]	PIUN growing on road edge (rock substrate) in full sunlight		
7	TESP_Mar25 (100554P000432)[no date]	TESP_Mar25 (100554P000432)[no date]			
7	TESP_Mar25 (100554P000432)[8/29/2018]	TESP_Mar25 (100554P000432)[8/29/2018]			
8	TESP_Mar25 (100554P000276)[6/22/2011]	TESP_Mar25 (100554P000276)[6/22/2011]	Muskeg margin domited by CUNO and TSME. PLOR4 close by.		
9	TESP_Mar25 (100554P000178)[6/16/2010]	TESP_Mar25 (100554P000178)[6/16/2010]	short THPL/TSHE forest on lake edge 25' in from water. Light from water reflection also increasing area brightness		
10	TESP_Mar25 (100554P000193)[8/30/2018]	TESP_Mar25 (100554P000193)[8/30/2018]			
10	TESP_Mar25 (100554P000193)[no date]	TESP_Mar25 (100554P000193)[no date]			
11	ACCS_Mar25 (EO11)[7/25/2011]	ACCS_Mar25 (EO11)[7/25/2011]			

11	TESP_Mar25 (100554P000271)[no date]	TESP_Mar25 (100554P000271)[no date]	Plants growing on small knoll surrounded by road and parking lot. Knoll is vegetated with some small young-growth THPL, PISI, ALRU, ALSI. PIUN3 has very poor vigor and is growing among HIAU and dandelion on the exposed banks.		
11	TESP_Mar25 (100554P000271)[8/30/2018]	TESP_Mar25 (100554P000271)[8/30/2018]	Plants growing on small knoll surrounded by road and parking lot. Knoll is vegetated with some small young-growth THPL, PISI, ALRU, ALSI. PIUN3 has very poor vigor and is growing among HIAU and dandelion on the exposed banks.		
10	TESP_Mar25 (100554P000106)[8/09/2021]	TESP_Mar25 (100554P000106)[8/09/2021]	Alder forest along road prism.		
10	TESP_Mar25 (100554P000106)[no date]	TESP_Mar25 (100554P000106)[no date]	Most plants are along the edges of the existing road ROWs and road prism. North of the pavement, individual plants begin at edge of timber/brush line just outside of the ROW.		
10	TESP_Mar25 (100554P000106)[no date]	TESP_Mar25 (100554P000106)[no date]	Most plants are along the edges of the existing road ROWs and road prism. North of the pavement, individual plants begin at edge of timber/brush line just outside of the ROW.		
10	TESP_Mar25 (100554P000106)[no date]	TESP_Mar25 (100554P000106)[no date]	Most plants are along the edges of the existing road ROWs and road prism. North of the pavement, individual plants begin at edge of timber/brush line just outside of the ROW.		
10	TESP_Mar25 (100554P00590)[8/30/2018]	TESP_Mar25 (100554P00590)[8/30/2018]	Roadside		
12	TESP_Mar25 (100554P000320)[6/08/2010]	TESP_Mar25 (100554P000320)[6/08/2010]	wet mossy meadow/bog edges in THPL/TSHE		
13	TESP_Mar25 (100554P000489Y12)[8/16/2012]	TESP_Mar25 (100554P000489Y12)[8/16/2012]	Roadside mixed with PICO and PISI saplings. A wetland meadow on either side of the raised road where plants are found on a gravel isthmus.		
13	TESP_Mar25 (100554P000488Y12)[6/21/2012]	TESP_Mar25 (100554P000488Y12)[6/21/2012]	Wetland area near Ball's Lake under saplings on the edge of a trail.		
13	TESP_Mar25 (100554P000164)[7/25/2010]	TESP_Mar25 (100554P000164)[7/25/2010]	The plants were found along roadside through muskeg. Most were on the uphill face of the bench cut - established after road contruction.		

14	TESP_Mar25 (100554P000315)[6/19/2010]	TESP_Mar25 (100554P000315)[6/19/2010]	THPL/TSHE forest just upslope from muskeg boundary		
15	TESP_Mar25 (100554P000547Y14)[9/25/2014]	TESP_Mar25 (100554P000547Y14)[9/25/2014]			
16	TESP_Mar25 (100554P000548Y14)[8/11/2014]	TESP_Mar25 (100554P000548Y14)[8/11/2014]			
17	TESP_Mar25 (100554P000105)[8/11/2009]	TESP_Mar25 (100554P000105)[8/11/2009]	At the edge of low volume cedar scrub and a muskeg system, just beneath the cedars in somewhat brush-free patches		
18	TESP_Mar25 (100554P000344)[5/26/2010]	TESP_Mar25 (100554P000344)[5/26/2010]	found along deer trail		
18	TESP_Mar25 (100554P000349)[5/26/2010]	TESP_Mar25 (100554P000349)[5/26/2010]			
19	TESP_Mar25 (100554P000143)[7/29/2010]	TESP_Mar25 (100554P000143)[7/29/2010]	Small tree-islands with plenty of sidelight - more so than the tree-islands with PLOR4		
20	TESP_Mar25 (100554P000284)[7/08/2011]	TESP_Mar25 (100554P000284)[7/08/2011]	Typical CUNO muskeg margins with TSME		
20	TESP_Mar25 (100554P000285)[7/08/2011]	TESP_Mar25 (100554P000285)[7/08/2011]	Growing along muskeg margin in CUNO & TSME		
20	TESP_Mar25 (100554P000145)[8/03/2010]	TESP_Mar25 (100554P000145)[8/03/2010]			
21	TESP_Mar25 (100554P000478Y12)[8/07/2012]	TESP_Mar25 (100554P000478Y12)[8/07/2012]	North edge of open muskeg in THPL and TSHE cluster. All sides allow side lighting to come in.		
22	TESP_Mar25 (100554P000343)[5/27/2010]	TESP_Mar25 (100554P000343)[5/27/2010]			
23	TESP_Mar25 (100554P000356)[6/20/2010]	TESP_Mar25 (100554P000356)[6/20/2010]	At the very edge of the scrub timber from the muskeg.		
22	TESP_Mar25 (100554P000289)[9/05/2018]	TESP_Mar25 (100554P000289)[9/05/2018]	Plants growing on cut bank of the main 3030 road north of Luck Lake on the west side of the road. Full sunlight, growing among small THPL/PISI, BLSP, ATFI.		
22	TESP_Mar25 (100554P000289)[no date]	TESP_Mar25 (100554P000289)[no date]	Plants growing on cut bank of the main 3030 road north of Luck Lake on the west side of the road. Full sunlight, growing among small THPL/PISI, BLSP, ATFI.		
22	ACCS_Mar25 (EO10)[7/25/2011]	ACCS_Mar25 (EO10)[7/25/2011]			
22	ACCS_Mar25 (EO10)[7/25/2011]	ACCS_Mar25 (EO10)[7/25/2011]			
22	TESP_Mar25 (100554P000288)[9/05/2018]	TESP_Mar25 (100554P000288)[9/05/2018]	In road prism at pullout at landing in clearcut.		
22	TESP_Mar25 (100554P000288)[no date]	TESP_Mar25 (100554P000288)[no date]	In road prism at pullout at landing in clearcut.		
23	TESP_Mar25 (100554P000494Y12)[6/23/2012]	TESP_Mar25 (100554P000494Y12)[6/23/2012]	Just below a western red cedar on the edge of a stream, just at a beaver dam.		

22	TESP_Mar25 (100554P000290)[7/11/2011]	TESP_Mar25 (100554P000290)[7/11/2011]	In PICO-CUNO/muskeg margin.		
24	TESP_Mar25 (100554P000480Y12)[8/05/2012]	TESP_Mar25 (100554P000480Y12)[8/05/2012]			
25	TESP_Mar25 (100554P000332)[6/17/2010]	TESP_Mar25 (100554P000332)[6/17/2010]	Within first edge of timber from muskeg at the base of a yellow cedar		
25	TESP_Mar25 (100554P000333)[6/17/2010]	TESP_Mar25 (100554P000333)[6/17/2010]	Red cedar and western hemlock forest		
26	ACCS_Mar25 (EO5)[7/14/2013]	ACCS_Mar25 (EO5)[7/14/2013]	Brushed roadcut, rare		
26	TESP_Mar25 (100554P000526Y13)[7/14/2013]	TESP_Mar25 (100554P000526Y13)[7/14/2013]	Disturbed, brushed vegetation on road cut adjacent to 20 Road.		
27	TESP_Mar25 (100554P000524Y13)[7/14/2013]	TESP_Mar25 (100554P000524Y13)[7/14/2013]	Single plant located in MXD CON 50 feet from edge of muskeg on gentle slope towards stream which is located about 250 feet away.		
28	ACCS_Mar25 (EO9)[7/26/2011]	ACCS_Mar25 (EO9)[7/26/2011]			
28	TESP_Mar25 (100522P000092)[7/26/2011]	TESP_Mar25 (100522P000092)[7/26/2011]	Open, Cupressus nootkatensis-Pinus contorta contorta/Vaccinium spp. raised, forested inclusion within an extensive complex of string Sphagnum bogs (muskegs).		
29	TESP_Mar25 (100554P000107)[7/08/2009]	TESP_Mar25 (100554P000107)[7/08/2009]			
29	ACCS_Mar25 (EO4)[7/09/2013]	ACCS_Mar25 (EO4)[7/09/2013]	Roadcut with loose soil and gravel, rare		
29	TESP_Mar25 (100554P000458Y12)[7/19/2012]	TESP_Mar25 (100554P000458Y12)[7/19/2012]	Located on a peninsula surrounded by Neck Lake and the road isthmus on the other side. Within twenty feet of the lakeshore in Hemlock/Cedar forest with dense shrub undergrowth.		
29	TESP_Mar25 (100554P000515Y13)[7/09/2013]	TESP_Mar25 (100554P000515Y13)[7/09/2013]	Growing in brushed vegetation along road cut.		
30	TESP_Mar25 (100554P000558Y14)[8/18/2014]	TESP_Mar25 (100554P000558Y14)[8/18/2014]			
31	TESP_Mar25 (100554P000559Y14)[8/24/2015]	TESP_Mar25 (100554P000559Y14)[8/24/2015]			
32	ACCS_Mar25 (EO1)[7/08/2013]	ACCS_Mar25 (EO1)[7/08/2013]	Opening in forest.		
33	ACCS_Mar25 (EO6)[8/10/2011]	ACCS_Mar25 (EO6)[8/10/2011]	Forested wetland on Pinus contorta, along creek that empties into lake on E side of lake, approx. 20 ft from lake edge		
33	ACCS_Mar25 (EO6)[8/09/2011]	ACCS_Mar25 (EO6)[8/09/2011]			
33	TESP_Mar25 (10052300001)[8/10/2011]	TESP_Mar25 (10052300001)[8/10/2011]			

34	ACCS_Mar25 (EO2)[7/22/2008]	ACCS_Mar25 (EO2)[7/22/2008]	Growing at trail edge, rare		
35	ACCS_Mar25 (EO1)[7/08/2015]	ACCS_Mar25 (EO1)[7/08/2015]			
36	ACCS_Mar25 (EO3)[8/11/2001]	ACCS_Mar25 (EO3)[8/11/2001]	NW-facing limestone cliffs, dryas dwarf shrubs		
26	CPNWH_April2025(ALA)[7/14/2013]	CPNWH_April2025(ALA)[7/14/2013]	Brushed roadcut, rare.		
29	CPNWH_April2025(ALA)[7/09/2013]	CPNWH_April2025(ALA)[7/09/2013]	Roadcut with loose soil and gravel, rare.		
33	CPNWH_April2025(ALA)[8/10/2011]	CPNWH_April2025(ALA)[8/10/2011]	Forested wetland of Pinus contorta, along creek that empties into lake on E side of lake, approx. 20 ft from lake edge, growing wtih Blechum spicant, Fauria crista-gallii, Parssis fimbriata, Cornus cadensis, Alnus viridis, Lysichiton americanum.		
34	CPNWH_April2025(ALA)[7/22/2008]		Growing at trail edge.		

Platanthera orbiculata

Platanthera orbiculata [(Pursh.) Lindl.]

Lesser round-leaved orchid

Global Rank: **G5**

Alaska State Rank: **S3S4**



photo: Alison Northup

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or gaps* *Platanthera orbiculata* occurs in scattered patches across the southern third of southeast Alaska. There are approximately 129 estimated occurrences known on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The largest occurrences are concentrated in east-central Prince of Wales Island near Thorne Bay. The higher concentration of known occurrences near Thorne Bay may reflect a higher survey intensity in this area in response to timber projects. Other concentrations are on western Revillagigedo Island, Gravina Island, southern Etolin Island, and western Wrangell Island. There are a few occurrences on the mainland on Cleveland Penninsula. The northern limit of known occurrences on the Tongass is a single occurrence on northern Zarembo Island. The species also occurs on Duke Island, Kosciusko Island, and San Fernando Island (USDA FS 2025). Habitat for the species on the Tongass NF is generally low elevation old-growth forest.
2 Distribution in surrounding	C	*C = Wide distribution outside the Tongass National Forest.Global Rank G5, Alaska State Rank S3S4* *British Columbia Province Rank: S5, Yellow List; Ranked in four additional provinces, and seventeen additional states.* *Platanthera orbiculata* has a wide range in North America, occurring across the northern areas of North America from Newfoundland to Alaska, and south to Tennessee and South Carolina. While it has a wide range, it is considered uncommon or rare throughout most of its range (Fulkerson et al. 2017). The closest occurrences to the Tongass NF

Criteria	*Rank*	*Rationale*
geographic area		occurrences are just to the south on Dundas Island in British Columbia (CPNWH 2025, Fulkerson et al. 2017), and the species' distribution on the Tongass NF appears to be continuous with the rest of the species' range. While the species' range does extend further north in inland Canada, in southeast Alaska it has not been found north of Zarembo Island.
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Platanthera orbiculata* produces an abundance of tiny seeds which are thought to be dispersed by wind, or perhaps across long distances by animals (Lesher and Henderson 1998, Fulkerson et al. 2017). While seeds are numerous and likely easily dispersed, they require an association with a specific mycorrhizal fungus to germinate and grow.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* A total of approximately 5,000 individuals were documented during the most recent visits to each of the inventoried locations on the Tongass NF (USDA FS 2023a). Population estimates for this species must be evaluated with caution because plant counts vary widely from year to year in some occurrences (USDA FS 2023b). This is likely due to dormancy. Dormancy has been observed in other orchids such as *Cypripedium montanum* and *Platanthera hookeri* (Vance 2007, Reddoch and Reddoch 2007 in Fulkerson et al. 2017).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Several occurrences documented in NRM have revisit measures (USDA 2023). Some of these show declining numbers, while others are stable or increasing. Dormancy and variation in search effort may contribute to interannual variation in plant counts, so it is difficult to assess trends based on revisit data. Additionally, some occurrences were harvested and showed large declines in plant counts (Fulkerson et al 2017), but if undisturbed occurrences are stable the forest wide population is likely also stable. Monitoring at seven, largely undisturbed sites occurred in 2022 and 2023 and populations were stable over the two years that plants were counted. Continued monitoring at these sites will help to determine whether populations are stable over the long term. The table below shows individual plant counts at the seven sites on Prince of Wales Island

<table>
<tr><th>Criteria</th><th>Rank</th><th>Rationale</th></tr>
<tr><td></td><td></td><td>(NThorne354, BT160, BT181), Revillagigedo Island (Lunch Creek), Gravina Island, and Wrangell Island (Thoms, Turn Island).
<table>
<tr><th>Site</th><th>2022</th><th>2023</th></tr>
<tr><td>NThorne354</td><td>30</td><td>36</td></tr>
<tr><td>BT160</td><td>15</td><td>19</td></tr>
<tr><td>BT181</td><td>30</td><td>52</td></tr>
<tr><td>Lunch Creek</td><td>20</td><td>22</td></tr>
<tr><td>Gravina</td><td>15</td><td>15</td></tr>
<tr><td>Thoms</td><td>25</td><td>20</td></tr>
<tr><td>Turn Island</td><td>20</td><td>30</td></tr>
</table></td></tr>
<tr><td>6

Habitat trend on Tongass NF</td><td>A/B</td><td>A = Decline in habitat quality or quantity/B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.

Habitat for the known occurrences of Platanthera orbiculata is usually old growth forest (93.5% of occurrences known in 2017) and low elevations (below 152 meters). It is moderately associated with wetland habitat and forested wetlands within old growth forest (60% and 51%, respectively) (Fulkerson et al. 2017). Based on geospatial information and field notes, the general habitat and micro-habitat characteristics for P. orbiculata in Alaska include slopes between 15% and 75%, high bryophyte cover, a red cedar component, low forb cover, forest edges or near gaps in otherwise shady forests, proximity to open water or boggy areas, metasedimentary geology (non-carbonate), mesic soils, and a deep organic duff layer. Individuals are frequently found on decaying logs, stumps, or at the bases of old trees. The variability of Platanthera orbiculata habitat descriptions indicates that this orchid can persist in a range of microhabitats within old growth forest environments (Fulkerson et al. 2017).

Old growth forest on the Tongass NF has high ecological integrity with moderate vulnerability to stressors (Turner and Mallot 2025). Timber harvest has resulted in some fragmentation into smaller and more isolated parcels; however large amounts of suitable habitat remain. Many occurrences are within wilderness areas and so would not be affected by timber harvest. Several occurrences have also been documented in older young growth forest, indicating some ability of</td></tr>
</table>

Criteria	*Rank*	*Rationale*
		the species to survive and/or repopulate forest that has been cut. However, the overall size, extent, and persistence of these populations is unknown.
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. Primary threats to this plant and its habitat on the Tongass NF include timber harvest, road building, recreation site users, and climate change (Fulkerson et al. 2017). Potential impacts from timber harvest include direct damage to or burying of plants, as well as soil disturbance and compaction (Fulkerson et al. 2017). The alteration of soil and litter layer from timber harvesting has also been shown to negatively impact the mycorrhizal fungi by reducing abundance and regeneration ability, an effect that can last decades after disturbance (Fulkerson et al. 2017). Additional indirect effects of timber harvest activities include the abrupt change in solar radiation and hydrologic regimes due to the removal of the canopy. The microhabitat of *Platanthera orbiculata* is primarily defined by shady moist soils. Removal of the canopy increases light intensity and temperature, significantly altering microhabitat. A study in Washington found that a population of 95 individuals declined to just a few individuals following timber harvest activity (Lesher and Henderson 1998). This species has been observed in young growth timber stands on Revillagigado Island. The long-term impacts of timber harvest activities on *Platanthera orbiculata* are not known with any certainty. Road construction could result in negative impacts to *Platanthera orbiculata* individuals and habitat, including the mycorrhizal fungi they depend on (Fulkerson et al. 2017). The southern half of the Tongass NF is expected to see both temperature and precipitation increases in the future. How these changes will affect *Platanthera orbiculata* and its associated mycorrhizal species is unknown. Specific potential threats from these changes include increased predation by insects due to increases in pest outbreaks under warmer conditions; increased competition of exotic species; changes in flowering times and synchronicity with pollinators; and decrease or absence of fungal symbionts due to increased soil temperature and moisture regimes (Fulkerson et al. 2017, Argue 2012). Insect and deer-mediated seed predation and herbivory occur in *Platanthera orbiculata* and the impact can be significant. When *Platanthera orbiculata* experienced greater than 25% leaf area damage, the individual died the

Criteria	*Rank*	*Rationale*
		following year (Cleavitt et al 2016). Individuals that experienced between 15 to 25% leaf damage reverted into an earlier demographic stage. Lower levels (<15%) of leaf damage did not appear to alter the demographic stage of *P. orbiculata* (Cleavitt et al 2016). Slug and fungal infections were the primary agents of leaf damage observed by Cleavitt et al. (2016). Grouse have been observed to dig up and remove the plant entirely and there is evidence of deer exhibiting the same behavior in the Tongass (USDA FS 2023). With 53% of the populations on the Tongass National Forest having less than ten individuals, removal of a single individual could have a significant to the population with losing genetic variance (Fulkerson et al. 2017). There is no information on invasive plants interacting with *Platanthera orbiculata*. The shady habitat may not be suitable for many invasive plants, however a removal of overstory and disturbance of the soil would create favorable conditions for invasive plants to infest *Platanthera orbiculata* habitat. Non-native species are more common on the road system within the Tongass National Forest. Of the *Platanthera orbiculata* populations in Alaska, 63% of them have a non-native plant species occurrence within the EO (ACCS 2015, Fulkerson et al. 2017). Some occurrences of this species are located in or near recreation areas, including along nature trails. These plants could potentially be vulnerable to collection or trampling by recreationists. Recreation-related impacts have been anecdotally observed as minor. The occurrences at the Turn Island beach campsite and the Rio Roberts trail site did not seem to be adversely affected by recreation activities at those sites (USDA FS 2023b).
8 Life history and demographics	A	A = Low reproductive rate and high mortality (such as: susceptible to disease, predation, or competition); OR life history characteristics that suggest populations may not recover rapidly from disturbance events or other demographic risk factors are of concern. Terrestrial orchids require an association with a fungus for seed germination and plant establishment. These mycorrhizal associations are essential for successful development and competition of orchids in their natural environments (Currah et al. 1990). This species produces an abundance of tiny seeds which are generally thought to be dispersed by wind (Lesher and Henderson 1998). A high mortality rate is commonly observed in *Platanthera* seedlings (Zettler et al. 2005). Specifically, in *Platanthera orbiculata*, on the rare chance germination is successful, on average less than 3% of seeds develop into leaf-bearing seedlings (Smreciu and Currah 1989 in Fulkerson et al. 2017). Experiments on the inoculation of several *Platanthera*

Criteria	*Rank*	*Rationale*
		species demonstrated that *P. orbiculata* had one of the poorest germination success rates and was only inoculated by one fungus species (Smreciu and Currah 1989). Little is currently known about the pollinators of this species in Alaska and the Pacific Northwest (Lesher and Henderson 1998), but the complex flower structure indicates a high degree of pollinator specificity. Pollinator-limited seed production has been reported for several species of *Platanthera* (Catling and Catling 1991). The rarity of this species across its range may be at least partially due to the rarity of its pollinators. Pollinators of the genus *Platanthera* in other regions of North America are nocturnal moths (Reddoch and Reddoch 1993). A subfamily of noctuid moths is known from southeast Alaska (Dillman 2008). The tuberous root system is regenerated annually, and this requires considerable energy which presumably is fueled by the carbohydrates produced by the single pair of leaves and contributed by the mycorrhizal fungus. Browsing or fungal infestation of leaves, or other loss of photosynthetic tissue, may impact the development of the underground structures and may result in decreased viability or vigor of the individual (Lesher and Henderson 1998). The dormancy period of this orchid is a potential threat. Plants may be present but dormant, and escape detection during field surveys in a particular year. If that habitat is then cleared for management activities, damage or loss of those individuals could result (Fulkerson et al. 2017).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

Platanthera orbiculata is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats** – The main threat to this species is timber harvest and road construction in old-growth forest. Some populations are in Wilderness Areas and thus protected from timber harvest, and plants are sometimes in found in mature young growth. Climate change, recreation site users, and herbivory may also be threats.
- **Declining populations or habitat trends** – Population monitoring at some occurrences is ongoing, however there is currently not enough information to determine forest-wide population trends. Substantial timber harvest and road construction has occurred in the habitat of this species, but current trends in habitat quantity and quality are stable.
- **Restricted range** – The nearest occurrences to the Tongass NF occurrences are to the south in British Columbia approximately 35 miles away, and the species' distribution on the Tongass NF appears to be continuous with the rest of the species' range. While the species' range extends further to the north in Canada, the central Tongass NF is the northern edge of the species' range along the coast.
- **Low populations or restricted ecological conditions** – Occurrences on the southern half of the Tongass NF are widespread and numerous, though they often have low numbers of individuals. Ecological conditions are not particularly restricted.
- **Other factors** - The low germination rate and high mortality rate of seeds of this species suggest that its distribution may also be limited by mycorrhizal communities or pollinator availability. Dormancy could cause populations or individuals to be missed in surveys.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. **Only the first 15 occurrences are verified**. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	A		In a small patch of cedar and pine surrounding the area. One of few areas that was thick with small diameter cedar, and no salal in the understory.		NA
1	ACCS_Mar25 (EO1)[8/23/2010]		Vegetation= ; Slope = 40; Aspect= SW; Substrate= Duff; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
2*	ACCS_Mar25 (EO2)[8/18/2010]		Vegetation= ; Slope = 20; Aspect= S; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
2	TESP_Mar25 (100551P000336)[8/18/2010]		Approx 60 year old young growth, PISI, TSHE, and THPL, likely heavy to the THPL before harvest.	35	
3*	TESP_Mar25 (100551P000069)[7/08/1998]		Bokan Mountain Lake, Upper, in bowl onBMt		
3	ACCS_Mar25 (EO3)[7/08/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= BokanMountain Lake, Upper, in bowl onBMt		
4*	TESP_Mar25 (100551P000912)[7/14/2021]	Southern Prince of Wales, Moira Sound	Red cedar forest with small diameter western hemlock. Associated species are Huperzia sp., Blechnum spicant, Menziesia ferruginea, Gaultheria shallon, Maianthemum dilatatum, and Streptopus sp. In dense litter at the base of a rock outcrop cliff and near a small open wet grassy area.	1	
5*	ACCS_Mar25 (EO5)[6/10/1997]	Prince of Wales, Chalmondeley Sound	Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= ChasiTS,LancasterBay,USFSShore cabin,n		
5	TESP_Mar25 (100551P000032)[6/10/1997]				
6*	**ACCS_Mar25 (EO6)[no date]**	**Bostwick Inlet. Gravina Island. In forest eastside of**			

		Bostwick Inlet, one population in middle of forest and the other on the edge of stream.			
6	TESP_Mar25 (100552P000092)[7/29/1998]		GravinaTS,Camp4Crk,Up,BlankPt,Sside ofCr		
6	ACCS_Mar25 (EO6)[7/29/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,Camp4Crk,Up,BlankPt,Sside ofCr		
6	ACCS_Mar25 (EO6)[7/29/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS, U7640,Silver Fir Bowl		
6	TESP_Mar25 (100552P000091)[7/29/1998]				
6	ACCS_Mar25 (EO6)[7/28/1998]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,.25mi SE Spot Mtn		
6	TESP_Mar25 (100552P000089)[7/28/1998]				
7*	**TESP_Mar25 (100552P000090)[8/09/1999]**	**Gravina Island**			
7	ACCS_Mar25 (EO6)[8/09/1999]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,U7640,EBostwickInlet,2 pops		
8*	**TESP_Mar25 (100551P000022)[7/18/1996]**	**Prince of Wales, Chasina Point**	**ChasinaTS,U363,Rd2160, 1 stem**	**1**	
8	ACCS_Mar25 (EO9)[7/18/1996]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= ChasiTS,U363,Rd2160, 1 stem		
8	ACCS_Mar25 (EO9)[no date]	Chasi Point, 1/2 mile E of Salmon VABM			
9*	**ACCS_Mar25 (EO11)[no date]**	**Gravi Island, Dall ridge. Plant found growing in 780 PA adjacent to muskeg just north of helicopter pickup.**			
9	ACCS_Mar25 (EO6)[no date]				
9	ACCS_Mar25 (EO11)[7/14/1999]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,U25&29,adjacent to muskeg		
9	TESP_Mar25 (100552P000088)[7/14/1999]	Gravina Island	GravinaTS,U25&29,adjacent to muskeg		

9	TESP_Mar25 (100552P000269)[8/15/2006]		Gravina EIS,nr unit 39, 4 plnts,2 flr, side slope head of botwick inlset west side thpl, chno, tshe		
9	ACCS_Mar25 (EO11)[8/15/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Gravi EIS,nr unit 39, 4 plnts,2 flr, side slope head of botwick inlset west side thpl, chno, tshe		
9	ACCS_Mar25 (EO6)[no date]				
9	ACCS_Mar25 (EO11)[8/01/2008]		Vegetation= ; Slope = ; Aspect= ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
10*	**ACCS_Mar25 (EO6)[4/01/1999]**	**Gravi Island, Found in muskeg in Gravi Timber Sale.**	**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,U20,edge of unit**		
10	TESP_Mar25 (100552P000086)[4/01/1999]	Gravi island. Follow unit roadline in from the north into 760 forest about 200ft from unit edge boundary on photo #298-11. Other location SE of this at unit edge boundary.	GravinaTS,U20,edge of unit		
11*	**ACCS_Mar25 (EO6)[7/08/1999]**		**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,U18, two locations**		
11	TESP_Mar25 (100552P000085)[7/08/1999]				
11	ACCS_Mar25 (EO11)[no date]				
11	ACCS_Mar25 (EO11)[no date]				
11	ACCS_Mar25 (EO6)[6/13/2008]				
11	ACCS_Mar25 (EO6)[6/13/2008]		Vegetation= ; Slope = 10; Aspect= 360 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Knob above scrubby shore pine. Typical plor site		
11	TESP_Mar25 (100552PT00003)[8/06/2022]				
12*	**TESP_Mar25 (100552P000300)[6/26/2009]**	**East side of Dall Ridge on Gravi Island. West side of stream bank growing under huge Sitka spruce trees just south of the junction of all streams in the area.**			
12	ACCS_Mar25 (EO11)[6/26/2009]	Gravi Island, Gravi Timber Sale. Large cresent shaped muskeg	Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= NO		

		just east of this location. From pink and black flag, enter forest on 228 degree for 300ft.	DATA BEYOND SPECIES AND LOCATION, FIELD NOTES GOT SCRAMBLED		
12	ACCS_Mar25 (EO11)[6/26/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	TESP_Mar25 (100552P000299)[6/26/2009]		In moderate to high volume stand in bottom land, meandering streams	27	
12	ACCS_Mar25 (EO6)[6/13/2008]		Vegetation= ; Slope = 10; Aspect= 360 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	ACCS_Mar25 (EO11)[6/26/2009]		Vegetation= ; Slope = 15; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	TESP_Mar25 (100552P000298)[6/26/2009]			2	
12	ACCS_Mar25 (EO11)[7/06/1999]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,U11, on the road		
12	TESP_Mar25 (100552P000084)[7/06/1999]		GravinaTS,U11, on the road		
12	TESP_Mar25 (100552P000303)[7/14/2009]			30	
12	ACCS_Mar25 (EO11)[7/14/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Boundary of population is flagged with white flagging tape.		
12	TESP_Mar25 (100552P000305)[7/14/2009]	Gravina	Typical habitat, high vol THPL stand with sparse forb layer.	8	
12	TESP_Mar25 (100552P000304)[7/14/2009]	Gravina	Typical habitat, TSHE with THPL component	2	
12	ACCS_Mar25 (EO11)[7/31/2008]		Vegetation= ; Slope = ; Aspect= ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	ACCS_Mar25 (EO11)[7/14/2009]				
12	TESP_Mar25 (100552P000313)[7/14/2009]		Edge of clearcut	2	
12	ACCS_Mar25 (EO11)[7/31/2008]				
12	TESP_Mar25 (100552P000291)[6/18/2009]	Central Gravina Unit 15	Typical. Very sparse forbs under 24-36" dbh THPL	20	
12	ACCS_Mar25 (EO11)[6/18/2009]		Vegetation= ; Slope = 10; Aspect= W; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

12	ACCS_Mar25 (EO11)[7/31/2008]				
12	ACCS_Mar25 (EO11)[7/31/2008]		Vegetation= ; Slope = 40; Aspect= E; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	TESP_Mar25 (100552P000083)[6/25/1999]	GravinaTS,along stream			
12	ACCS_Mar25 (EO11)[6/25/1999]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,along stream		
12	ACCS_Mar25 (EO11)[7/31/2008]				
12	TESP_Mar25 (100552P000142)[7/14/2000]	Gravina Is.House Mt. U13. 3 plants		3	
12	ACCS_Mar25 (EO11)[7/14/2000]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Gravi Is.House Mt. U13. 3 plants		
12	ACCS_Mar25 (EO11)[7/31/2008]		Vegetation= ; Slope = 10; Aspect= NE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	TESP_Mar25 (100552P000292)[6/18/2009]		Low volume THPL, blowdown	1	
12	ACCS_Mar25 (EO11)[6/18/2009]		Vegetation= ; Slope = 10; Aspect= W; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	TESP_Mar25 (100552P000293)[6/18/2009]		Young 18-24" dbh THPL stand, island of moderate volume THPL in CHNO/PICO scrub.	128	
12	TESP_Mar25 (100552000295)[6/18/2009]		At base of big THPL in landslide stand dom by ALRU.	1	
12	ACCS_Mar25 (EO11)[6/18/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
12	TESP_Mar25 (100552P000082)[8/09/1999]				
12	ACCS_Mar25 (EO11)[8/09/1999]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviIsl,U7640,inforest near LTF		
13*	**ACCS_Mar25 (EO11)[7/21/1998]**		**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= GraviTS,U7610,avoid site disturbance**		
13	TESP_Mar25 (100552P000067)[7/21/1998]	Gravina		1	

14*	**ACCS_Mar25 (EO11)[7/25/2008]**		**Vegetation= ; Slope = ; Aspect= ; Substrate= Moss; Parent Material= ; Soil Moisture= Wet; Soil Texture= ; Light Exposure= Full Shade; Comments=**		
14	TESP_Mar25 (100552P000404Y17)[6/27/2017]		large red cedar with duff layer, Hylocomium and Rhytidodelphus present; some forbs	2	
14	ACCS_Mar25 (EO11)[7/25/2008]		Vegetation= ; Slope = 10; Aspect= E; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Full Shade; Comments=		
14	TESP_Mar25 (100552PT00015)[6/28/2017]	Gravina, Vallenar Creek. near unit 130	Boggy forest just outside bog, MEFE heavily browsed for find in 2008; in 2017 plants were found in open understory TSHE-THPL stand in hylocomium splendens and rhytidiadelphous	2	
14	ACCS_Mar25 (EO11)[6/22/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= In second growth		
14	TESP_Mar25 (100552P000297)[6/22/2009]	Gravina Island	In second growth	1	
14	ACCS_Mar25 (EO11)[7/24/2008]				
14	ACCS_Mar25 (EO11)[6/22/2009]		Vegetation= ; Slope = 20; Aspect= W; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Full Shade; Comments=		
14	TESP_Mar25 (100552P000295)[6/22/2009]	Gravina Island	Overstocked young growth dom by PISI	1	
15*	**TESP_Mar25 (100552P000274)[8/24/2006]**	**Revillagigedo Island, Thorne arm**			
15	ACCS_Mar25 (EO37)[8/24/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Sealevel mine,incid find by Willoughby,one plant,no flr, old camp, ten ft frm shore nr bouy	1	
16	TESP_Mar25 (100552P000408)[8/11/2018]	Revillagigedo Island, forest between Carroll and Thorne Arm		3	
17	ACCS_Mar25 (EO38)[8/14/2008]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revisit of KMD00272. Could not relocate the two plants I found in 2006		
17	TESP_Mar25 (100552P000272)[no date]				
17	TESP_Mar25 (100552P000272)[7/25/2022]				
17	ACCS_Mar25 (EO38)[8/18/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

			Revilla, two plnts,no flr,nr begining perseverance lake tr betw trail and ccc campground		
18	TESP_Mar25 (100552P000405)[6/27/2018]				
18	TESP_Mar25 (100552P000406)[8/12/2018]				
18	TESP_Mar25 (100552P000407)[8/12/2018]				
19	ACCS_Mar25 (EO39)[7/29/1997]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= SealevelTS,Rd10&spur Rd to Unit10		
19	TESP_Mar25 (100552P000048)[7/14/2019]		Mixed Conifer, steep slope above stream		
19	TESP_Mar25 (100552P000048)[no date]				
20	TESP_Mar25 (100552P000315Y12)[6/21/2012]				
21	TESP_Mar25 (100552P000004)[7/17/2008]		Typical plor habitat. Large THPL transitioning to boggy scrub		
21	ACCS_Mar25 (EO40)[7/17/2008]				
21	ACCS_Mar25 (EO40)[7/17/2008]				
21	ACCS_Mar25 (EO40)[7/19/2008]				
21	ACCS_Mar25 (EO40)[7/19/2008]				
21	TESP_Mar25 (100552P000638Y22)[8/02/2022]				
21	ACCS_Mar25 (EO40)[7/27/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Settlers Cove State Pk, 14 plnts,no flr,semi open dtand dom by tshe and thpl,		
21	TESP_Mar25 (100552P000267)[7/27/2006]				
21	ACCS_Mar25 (EO40)[7/17/2008]				
21	ACCS_Mar25 (EO40)[7/17/2008]				
21	ACCS_Mar25 (EO40)[7/17/2008]				
21	TESP_Mar25 (100552P000006)[no date]				
21	ACCS_Mar25 (EO40)[7/17/2008]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Relocated plant I found in 2006 and three more.		

21	TESP_Mar25 (100552P000006)[7/25/2022]				
21	ACCS_Mar25 (EO40)[7/27/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Settlers Cove St Pk, one plnt, no flr,lunch creek loop trail near seawater		
21	TESP_Mar25 (100552P000268)[7/27/2006]				
22	ACCS_Mar25 (EO41)[6/29/2011]		Vegetation= ; Slope = 12; Aspect= 160 ; Substrate= Moss; Parent Material= ; Soil Moisture= Dry; Soil Texture= ; Light Exposure= Partial Shade; Comments= There are discrepcies in GIS layers depicting ownership. Some of the subpopulations may or ma		
22	TESP_Mar25 (100552P000308)[6/29/2011]		TSHE-THPL/Vacc spp. Forest Plant Association. Subpopulations located in old-growth, large diamter THPL/Vacc forest comprised of undulating mounds. Old THPL on top of mound & PLOR4 growing along slope. THPL/Vacc forest is within larger Plant Associationlsited above. Habitat covers do not usually differentiate pure stands of old-growth THPL.		
23	ACCS_Mar25 (EO42)[9/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,near lower wolf lake, top of small knob, 3 plnts,no flr,		
23	TESP_Mar25 (100552P000285)[9/06/2006]				
23	ACCS_Mar25 (EO42)[9/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Wolf Lake Tr,9 plnts,20% flr,semi open thpl tshe, boggy, plor on high spots		
23	TESP_Mar25 (100552P000284)[9/06/2006]				
23	TESP_Mar25 (100552P000283)[9/06/2006]				
23	ACCS_Mar25 (EO42)[9/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Wolf lk tr,36 plnts,10% flr, big thpl,tshe younger, lyam low spots, some gramnoids,nr lake		
23	ACCS_Mar25 (EO42)[9/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,one plnt on decaying log,in old clearcut sim to kmd00277, tshe, pisi, wolf lake trailhead		

23	TESP_Mar25 (100552P000281)[9/06/2006]				
23	ACCS_Mar25 (EO42)[9/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,21 plnts, 20 % flr, Wolf Lake Tr,open THPL and TSHE,300 m fm trailhead,past edge of muskeg		
23	TESP_Mar25 (100552P000282)[9/06/2006]				
24	TESP_Mar25 (100554P000639)[6/18/2024]				
25	TESP_Mar25 (100554P000149)[8/11/2010]		The PIUN3 growing the Anderson draige generally occurred in the forest muskeg interface where the canopy cover was less than 50%, and where there was less than 60% shrub cover.		
25	ACCS_Mar25 (EO43)[8/11/2010]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= PIUN3 found in 4 location through the survey: PIUN-KARTAb, 4 veg, 377Â¿, N55 34.555' / W132 43.781' PIUN-KARTAc,		
25	TESP_Mar25 (100554P000151)[8/11/2010]		PLOR4 scattered throughout survey area in patches of 10-30+, in patchy, brushy THPL/TSHE stands. Average vigor - many starting to decline. PLOR4 occurered on tops of small knolls, typicall in vicinity of deer trails.		
25	ACCS_Mar25 (EO43)[8/11/2010]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= PLOR4 was found throught the survey area, but the vast majority were clustered around the following points:		

			PLOR		
26	ACCS_Mar25 (EO44)[8/12/2010]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= EO includes 4 waypoints: PLOR-KTRAILb: 1 flower PLOR-KTOR: 1 veg / 1 flower		
26	TESP_Mar25 (100554P000172)[8/12/2010]		PLOR found in THPL/TSHE stands. One plant (PLOR-KTRAILb) found adjacent to Karta River hiking trail (~5' off trail). Several small populations found in brushy forest surrounded by muskeg		
26	TESP_Mar25 (100554P000637Y22)[5/14/2022]				
26	ACCS_Mar25 (EO44)[8/12/2010]				
27	TESP_Mar25 (100554P000173)[8/12/2010]		PLOR in TSHE/THPL forest ~50' from Salmon Lake. Good amount of sidelight from the lake, but canopy directly overhead is ~60%. Plants found about 1/4 mi. east of Salmon Lake cabin on Karta Lake Trail.		
27	ACCS_Mar25 (EO44)[8/10/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= POW, Not a rare pl survey. Piggyback Creek, Sarkar. Duff layer under TSHE and PISI. 8 stems		
27	TESP_Mar25 (100554P000051)[8/10/2005]				
27	ACCS_Mar25 (EO44)[8/10/2010]		Vegetation= ; Slope = 10; Aspect= 360 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
27	TESP_Mar25 (100554P000155)[8/10/2010]				
28	ACCS_Mar25 (EO46)[9/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,nr Loring, one plnt,no flr,open stand large thpl, tshe scattered and small		
28	ACCS_Mar25 (EO46)[9/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla nr Loring, 16 plnts,20% flr,many young thpl 12 to 14 inch dbh prob clearcut and or fire		
28	ACCS_Mar25 (EO46)[9/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla nr Loring, 6 plnts,50% flr,old growth, few lrg thpl, young tshe, semi open, few vaov		
28	TESP_Mar25 (100552P000278)[9/05/2006]				

28	ACCS_Mar25 (EO46)[9/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,nr Loring,one plnt, no flr, second growth tshe approx 100 y.o.		
28	ACCS_Mar25 (EO46)[9/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,nr Loring,43 plnts,40% flr,100 yo cannery site, even aged tshe, few pisi,thpl stumps only		
28	TESP_Mar25 (100552P000276)[9/05/2006]				
28	ACCS_Mar25 (EO46)[9/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,nr Loring, 5 plnts,no flr,80-100 y.o. clearcut, even aged tshe, some pisi		
28	TESP_Mar25 (100552P000277)[9/05/2006]				
29	ACCS_Mar25 (EO47)[8/12/2010]				
29	TESP_Mar25 (100554P000174)[8/12/2010]		PLants found grouped near the base of THPL in a patchy THPL/TSHE stand ~200' from a muskeg		
30	TESP_Mar25 (100554P000161)[8/18/2010]		Second growth THPL/PSHE 2Â¿ from foot trail and 10Â¿ from skid road, 30Â¿ from river.		
30	ACCS_Mar25 (EO48)[8/18/2010]		Vegetation= ; Slope = 7; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
31	ACCS_Mar25 (EO49)[7/09/2010]				
31	TESP_Mar25 (100554P000303)[7/09/2010]		1 flowering individual found at the base of a THPL about 6' from a deer trail. Forest is open and patchy/shrubby, bordered by a muskeg		
32	TESP_Mar25 (100554P000308)[7/01/2010]		on hill between two THPL in a mixed THPL/TSHE forest with muskeg above and below the grove		
32	ACCS_Mar25 (EO49)[7/01/2010]		Vegetation= ; Slope = 15; Aspect= ESE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
32	ACCS_Mar25 (EO51)[7/29/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; FRANCIS COVE TS; U37; 21 INDIVIDUALS IN OPEN HEMLOCK/CEDAR STAND		
32	TESP_Mar25 (100552P000174)[7/29/2004]				
33	ACCS_Mar25 (EO49)[6/12/2009]		Vegetation= ; Slope = 10; Aspect= W; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

33	TESP_Mar25 (100554P000058)[6/12/2009]		5-8 MBF/acre small diameter yellow cedar and western hemlock, just inside timbered edge from muskeg		
33	TESP_Mar25 (100552P000175)[7/29/2004]				
33	ACCS_Mar25 (EO51)[7/29/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; FRANCIS COVE TS; U37; 11 IND. UNDER LARGE RED CEDARS		
34	ACCS_Mar25 (EO49)[5/12/2010]				
34	TESP_Mar25 (100554P000353)[8/31/2021]		Densely vegetated clear cut.		
34	TESP_Mar25 (100554P000353)[no date]		Individual PLOR4 found on level bank ~10' from stream at base of TSHE & THPL		
34	TESP_Mar25 (100554P000352)[5/12/2010]		Individuals found on a bench with 0% slope at the base of a large cedar. Surrounding slope is 20%. Growing amongst juvenile LYAM		
34	ACCS_Mar25 (EO49)[5/12/2010]				
34	TESP_Mar25 (100554P000350)[5/12/2010]		Individual found on small bench below a large cedar on western slope of a ridge in NW corner of the stand. Surrounding slope ~15%		
34	ACCS_Mar25 (EO49)[5/12/2010]				
34	TESP_Mar25 (100554P000351)[5/12/2010]		Individual found at base of a large cedar on top of a ridge		
34	ACCS_Mar25 (EO49)[5/12/2010]				
35	ACCS_Mar25 (EO49)[6/23/2011]				
35	TESP_Mar25 (100554P000277)[6/23/2011]		PLOR growing adjacent to deer trails, not more than 20' from a stream. Very mossy/duffy site.		
36	ACCS_Mar25 (EO49)[6/26/2009]		Vegetation= ; Slope = ; Aspect= NE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= 2 patchest 50 feet apart, 1 with 5 plants, the other 2, all appear vigorous		
36	TESP_Mar25 (100554P000061)[6/26/2009]		Very low volume cedar, 3-5 mbf/ac		
36	ACCS_Mar25 (EO49)[6/26/2009]		Vegetation= ; Slope = 5; Aspect= NE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
36	TESP_Mar25 (100554P000059)[6/26/2009]		Muskeg between existing road and low volume timbered edge, two plants within 3 feet of eachother		
36	TESP_Mar25 (100554P000060)[6/26/2009]		8 mbf/ac, cedar with scattered hemlock and spruce, at edge of road ROW, and old landing		

36	ACCS_Mar25 (EO49)[6/26/2009]		Vegetation= ; Slope = 15; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
36	TESP_Mar25 (100554P000441Y12)[5/24/2012]		Growing on hummock beneath TSHE and one sg. Plants growing out of debris in rotting bark fallen from sg. 10 meters from road in pine/cedar/hemlock forest and a few individuals growing out of deer pellet pile.		
36	TESP_Mar25 (100554P000063)[6/26/2009]				
36	ACCS_Mar25 (EO49)[6/26/2009]		Vegetation= ; Slope = 5; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
36	TESP_Mar25 (100554P000435)[5/17/2011]		Plants found in THPL domited forest with some shrub component and mostly duff floor In 2021 the one plant was found in western hemlock and red cedar forest; in dense moss with Cornus cadensis and under Vaccinium ovalifolium and V. parvifolium.		
37	ACCS_Mar25 (EO49)[5/17/2011]				
37	TESP_Mar25 (100554P000146)[6/12/2009]		Second-growth, primarily spruce and hemlock, probably around 50 years old. Was likely heavy to cedar before harvest.		
37	ACCS_Mar25 (EO58)[6/12/2009]		Vegetation= ; Slope = ; Aspect= A; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
38	ACCS_Mar25 (EO49)[6/26/2009]		Vegetation= ; Slope = 20; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
38	TESP_Mar25 (100554P000062)[6/26/2009]				
39	TESP_Mar25 (100554P000112)[8/17/2009]				
39	ACCS_Mar25 (EO49)[8/17/2009]		Vegetation= ; Slope = 30; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
39	ACCS_Mar25 (EO49)[8/17/2009]		Vegetation= ; Slope = 15; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= ; Comments=		

39	TESP_Mar25 (100554P000113)[8/17/2009]				
39	TESP_Mar25 (100554P000115)[8/17/2009]		40 feet from boundary of the Beavertail Timber Sale.		
39	ACCS_Mar25 (EO49)[8/17/2009]		Vegetation= ; Slope = 10; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
39	TESP_Mar25 (100554P000114)[8/17/2009]				
39	ACCS_Mar25 (EO49)[8/17/2009]		Vegetation= ; Slope = 40; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
39	ACCS_Mar25 (EO49)[6/22/2011]				
39	TESP_Mar25 (100554P000275)[6/22/2011]		Stream-side old-growth forest domited by PISI, THPL, TSHE. Forest is high volume, duffy and open.		
39	ACCS_Mar25 (EO49)[6/16/2010]		Vegetation= ; Slope = 12; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
39	TESP_Mar25 (100554P000312)[6/16/2010]		THPL/TSHE forest on slope below young-growth clearing and above roadside 3013150. Lower 1/3 of unit 83, some outside of unit in probable free use cut zone, open wet area amongst slash		
39	ACCS_Mar25 (EO63)[6/08/2010]		Vegetation= ; Slope = 10; Aspect= NE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
39	TESP_Mar25 (100554P000317)[6/08/2010]		patch of THPL surrounded by wet fen		
39	ACCS_Mar25 (EO49)[6/17/2009]		Vegetation= ; Slope = 20; Aspect= NE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
39	TESP_Mar25 (100554P000111)[6/17/2009]				
39	ACCS_Mar25 (EO58)[7/08/1997]		few individuals in localized colony, growing on mossy forest floor, under closed canopy forest of Picea sitchensis and Tsuga heterophylly, substrate flat, well-drained		
39	ACCS_Mar25 (EO49)[6/22/2011]				
39	TESP_Mar25 (100554P000273)[6/22/2011]		PLOR found in patchy, low/medium volume THPL/TSHE/CUNO stands along muskeg edges.		
39	TESP_Mar25 (100554P000313)[6/09/2010]				
39	ACCS_Mar25 (EO63)[6/09/2010]		Vegetation= ; Slope = 20; Aspect= 315 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

39	TESP_Mar25 (100554P000400)[8/12/2011]		In open TSHE/PISI second-growth adjacent to road (100' west), and small stream (100' NE)		
39	ACCS_Mar25 (EO49)[8/12/2011]		Vegetation= ; Slope = 10; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
39	ACCS_Mar25 (EO49)[6/15/2010]		Vegetation= ; Slope = 10; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
40	TESP_Mar25 (100554P000179)[6/15/2010]		right on edge of clearcut in TSHE/THPL wet seepage/meadow		
40	ACCS_Mar25 (EO49)[6/22/2011]				
40	TESP_Mar25 (100554P000274)[6/22/2011]		4 individuals (1 in bud) were found in TSHE/PISI/ALRU young-growth on a level, rocky floodplain adjacent to a small creek. These had heavy slug browse. Others found in TSHE/THPL adjacent to muskeg.		
40	ACCS_Mar25 (EO63)[6/09/2010]		Vegetation= ; Slope = 10; Aspect= 270 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
40	TESP_Mar25 (100554P000314)[6/09/2010]		Found within fens on cedar/ hemlock islands about 20-80' across. At edge of wed meadow under hemlock/cedar.		
40	ACCS_Mar25 (EO63)[6/08/2010]		Vegetation= ; Slope = 30; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= EO includes waypoints PLOR52 and PLOR52-2		
40	TESP_Mar25 (100554P000318)[6/08/2010]		THPL/TSHE forest		
40	TESP_Mar25 (100554P000176)[6/16/2010]		TSHE/PISI on hill above clearcut and main road out of Thorne Bay in unit 92 on side trail off deer trail		
40	ACCS_Mar25 (EO49)[6/16/2010]		Vegetation= ; Slope = 25; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
40	ACCS_Mar25 (EO49)[6/15/2010]		Vegetation= ; Slope = 25; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
40	TESP_Mar25 (100554P000177)[6/15/2010]		found on peninsula of THPL/TSHE with lake on one side and meadow surrounding the rest, possibly within lake buffer?		
41	TESP_Mar25 (100554P000299)[8/12/2011]		Plants found in young-growth adjacent to the Thorne River estuary in faily open-canopy TSHE grove		
41	ACCS_Mar25 (EO49)[8/12/2011]		Vegetation= ; Slope = 10; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
41	TESP_Mar25 (100554P000436)[10/04/2011]				
41	ACCS_Mar25 (EO49)[10/04/2011]				

42	ACCS_Mar25 (EO49)[8/11/2010]	Alexander Archipelago, Thorne Bay, Prince of Wales I., ca. 17 km E of Thorne Bay at Rio Roberts, ca. 0.4 km N of the road on the W bank of Rio Roberts, T71S, R82E, S24, SW1/4	Vegetation= ; Slope = 5; Aspect= 180 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
43	TESP_Mar25 (100554P000166)[8/11/2010]		Dense cedar/ hemlock stand 30' feet from main paved road		
43	TESP_Mar25 (100554P000110)[8/30/2018]		PLOR4 sightings were concentrated in low to moderate volume timber, with a fair cedar component.		
43	TESP_Mar25 (100554P000110)[no date]		PLOR4 sightings were concentrated in low to moderate volume timber, with a fair cedar component.		
43	ACCS_Mar25 (EO49)[6/09/2009]		Vegetation= ; Slope = 20; Aspect= A; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
44	TESP_Mar25 (100554P000447Y12)[7/12/2012]		Hemlock/Sitka spruce forest with minimal understory of VAAL, VAOV, and MEFE. Many down, rotting logs and punky stumps.		
44	TESP_Mar25 (100554P000160)[8/20/2010]		PISI/TSHE young-growth stand, found along seepages with some VAOV and DREX		
44	ACCS_Mar25 (EO49)[8/20/2010]		Vegetation= ; Slope = 45; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
44	TESP_Mar25 (100552P000121)[7/02/2002]				
44	ACCS_Mar25 (EO77)[7/02/2002]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Margaret Fish Pass Trail, 1/4 mile in le		
44	ACCS_Mar25 (EO78)[7/23/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; FRANCIS COVE TS; U10; 1 IND. GROWING UNDER LARGE RED CEDAR		
44	TESP_Mar25 (100552P000173)[7/23/2004]				
44	TESP_Mar25 (100554P000194)[no date]				
45	TESP_Mar25 (100554P000194)[7/08/2020]				
46	ACCS_Mar25 (EO49)[7/21/2010]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments= Individual clumps:		

			PLOR-RR1, 17veg/2bud, 349', N55 41.642'/ W132 46.600' PLOR-RR2, 1veg, 372',		
46	TESP_Mar25 (100554P000279)[6/30/2011]		Plants found in young-growth unit (PISI/TSHE) south of Thorne Bay (adjacent to the bay). Unit is about 50 years old. Area had been surveyed previously and plants were found near this survey.		
47	ACCS_Mar25 (EO49)[6/30/2011]		Vegetation= ; Slope = 20; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
47	TESP_Mar25 (100554P000167)[8/11/2010]		Found beneath 2 sgs and stunted cedar/hemlock forest with open canopy on three sides		
47	ACCS_Mar25 (EO49)[8/11/2010]				
48	TESP_Mar25 (100554P000402)[8/06/2011]		In Thuja plicata, Callitropsis nootkatensis, Tsuga mertensia mature forest.		
48	ACCS_Mar25 (EO49)[8/06/2011]		Vegetation= ; Slope = 1; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
48	ACCS_Mar25 (EO49)[8/11/2010]		Vegetation= ; Slope = 3; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
48	TESP_Mar25 (100554P000171)[8/11/2010]		Forest edge between muskeg edges		
48	TESP_Mar25 (100552P000415)[6/07/2023]				
48	ACCS_Mar25 (EO49)[7/18/2001]	Thorne Bay Rd., ca. 20 km W of Thorne Bay, just S of Rio Roberts Bridge and ca. 75 m E of road near river bank	open Thuja plicata - Tsuga heterophylla forest with mossy forest floor		
48	ACCS_Mar25 (EO49)[7/20/2015]	Prince of Wales Island, about 20 km W of Thorne Bay along the road, just N Rio Roberts bridge crossing. About 40			

		meters W of the Highway, just below the Rio Roberts Trail.			
48	CPNWH_Mar25 (UAAH10526)[7/20/2015]	Prince of Wales Island, about 20 km W of Thorne Bay along the road, just N Rio Roberts bridge crossing. About 40 meters W of the Highway, just below the Rio Roberts Trail.	Under a closed canopy of Tsuga heterophylla.		
48	TESP_Mar25 (100554P000272)[7/19/2011]		On ridgetop in mature TSHE-THPL forest.		
48	ACCS_Mar25 (EO84)[7/19/2011]		Vegetation= ; Slope = 2; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
48	ACCS_Mar25 (EO49)[5/25/1996]	25 Miles from USFS Ranger District 20, south side of Rio Roberts River, metal tag at base of large helmock, site 50' from river near open Veratrum and Rubus spectabilis meadow.	Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= RioRoberts1,Rd20,So.RRRiver nr meadow		
48	TESP_Mar25 (100554P000046)[5/25/1996]				
48	TESP_Mar25 (100554P000319)[6/08/2010]		wet mossy meadow/bog edges. THPL/TSHE forests with some PICO		
48	ACCS_Mar25 (EO63)[6/08/2010]	Thorne Bay Rd., ca. 20 km W of Thorne Bay, just S of Rio Roberts Bridge and ca. 75 m E of road near river bank, Craig Quad, Alexander Archipelago, Prince of Wales Island.	Vegetation= ; Slope = 10; Aspect= NNE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
48	ACCS_Mar25 (EO63)[6/19/2009]		Vegetation= ; Slope = 20; Aspect= S; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
49	TESP_Mar25 (100554P000133)[6/19/2009]				
50	TESP_Mar25 (100554P000316)[6/24/2021]		mixed conifer stand bordering muskeg		
50	TESP_Mar25 (100554P000316)[no date]		mixed conifer stand bordering muskeg		
51	ACCS_Mar25 (EO49)[8/11/2010]		Vegetation= ; Slope = 10; Aspect= 180 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
51	TESP_Mar25 (100554P000168)[8/11/2010]		Cedar/ Hemlock forest betwen muskegs		

51	TESP_Mar25 (100554P000311)[6/25/2022]				
51	ACCS_Mar25 (EO49)[7/08/2010]		Vegetation= ; Slope = 10; Aspect= A; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
52	TESP_Mar25 (100554P000311)[no date]		the PLOR was spread over a knoll just above the Thorne River estuary. The young-growth TSHE/PISI canopy was dense and there was little other vegetation where the PLOR was found		
52	TESP_Mar25 (100554P000311)[no date]				
53	TESP_Mar25 (100554P000311)[no date]		The PLOR was spread over a knoll just above the Thorne River estuary. The young-growth TSHE/PISI canopy was dense and there was little other vegetation where the PLOR was found		
53	ACCS_Mar25 (EO89)[7/16/2010]		Vegetation= ; Slope = 5; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
53	TESP_Mar25 (100554P000196)[no date]		Base of THPL in cedar/hemlock forest with pondlike muskeg on three sides of grove		
53	TESP_Mar25 (100554P000196)[8/26/2021]		Base of cut red cedar stump, at the edge of a clear cut and muskeg.		
53	TESP_Mar25 (100552P000414)[6/07/2023]				
53	ACCS_Mar25 (EO49)[no date]				
53	TESP_Mar25 (100554P000633Y22)[8/09/2022]		OPEN FOREST FLOOR, SURROUNDED BY CEDAR, HEMLOCK, AND SPRUCE. GROWING ON TOP OF MOSS, HYSP70. NO STREAM NEARBY BUT SOME WET AREAS WE OBSERVED CLOSEBY.		
53	TESP_Mar25 (100554P000170)[8/11/2010]		Yellow cedar/ W Hemlock knolls between more steep forest and open scrubby canopy muskeg		
53	ACCS_Mar25 (EO49)[8/11/2010]		Vegetation= ; Slope = 1; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
53	ACCS_Mar25 (EO49)[7/23/2010]		Vegetation= ; Slope = 9; Aspect= W; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= EO includes many waypoints: PLOR-SMH1 through PLOR-SMH12		

			and PLOR-Thorne through PLOR-thorne23 and PLOR-Main		
53	TESP_Mar25 (100554P000190)[no date]		a mosaic of muskeg with mixed THPL/TSHE/PISI borders and groves throughout area surveyed		
53	TESP_Mar25 (100554P000190)[8/30/2018]		a mosaic of muskeg with mixed THPL/TSHE/PISI borders and groves throughout area surveyed		
53	TESP_Mar25 (100554P000300)[7/14/2010]				
54	ACCS_Mar25 (EO49)[7/14/2010]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= EO includes several waypoints: PLOR-N120: 11 veg PLOR-120: 3 veg		

			PLOR-120a: 6 veg PLOR-120b: 13 veg		
54	ACCS_Mar25 (EO49)[8/06/2011]		Vegetation= ; Slope = 7; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
54	TESP_Mar25 (100554P000401)[8/06/2011]		In mature Tsuga heterophylla forest.		
54	TESP_Mar25 (100554P000192)[8/15/2022]		At base of cedar in cedar/hemlock forest Brushy, swamped openings on three sides of grove 100 feet from grassy seep (PLOR-175C		
54	TESP_Mar25 (100554P000192)[no date]		At base of cedar in cedar/hemlock forest Brushy, swamped openings on three sides of grove 100 feet from grassy seep (PLOR-175C		
54	ACCS_Mar25 (EO89)[7/16/2010]		Vegetation= ; Slope = 5; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	TESP_Mar25 (100554P000198)[8/03/2010]		Found in cedar/hemlock forest above creek meadow near side seepage		
55	ACCS_Mar25 (EO49)[8/03/2010]		Vegetation= ; Slope = 8; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	ACCS_Mar25 (EO63)[6/30/2009]		Vegetation= ; Slope = 5; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	TESP_Mar25 (100554P000119)[6/30/2009]				
55	TESP_Mar25 (100554P000619Y22)[6/27/2022]		Spruce/Hemlock domint forest, harvested 40-50 years ago		

55	ACCS_Mar25 (EO97)[7/20/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; SW NEETS TS, U7; LARGE POPULATION (400-1000 IND) CENTERED ALONG RIDGELINE		
55	TESP_Mar25 (100552P000170)[7/20/2004]				
55	ACCS_Mar25 (EO63)[6/30/2009]		Vegetation= ; Slope = 15; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	TESP_Mar25 (100554P000120)[6/30/2009]				
55	ACCS_Mar25 (EO49)[7/14/2010]				
55	TESP_Mar25 (100554P000301)[7/14/2010]		growing amongst moss near the base of a tree near a pond		
55	TESP_Mar25 (100554P000169)[8/11/2010]		PLR6 is 15' from pond on meadow edge PLR7near base of yellow cedar in cedar stand 50' from edge PLR5 Cedar/ hemlock knoll at meadow edge near canopy opening and deer trail		
55	ACCS_Mar25 (EO49)[8/11/2010]		Vegetation= ; Slope = 5; Aspect= NE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	TESP_Mar25 (100554P00609)[6/30/2021]		Sitka spruce and western hemlock forest; growing in filtered light mostly with litter and some moss. Associated species are Moneses uniflora, Dryopteris expansa, and Vaccinium ovalifolium.		
55	ACCS_Mar25 (EO49)[7/14/2010]				
55	TESP_Mar25 (100554P000302)[7/14/2010]		at the base of THPL between a cut area and a pond		

55	TESP_Mar25 (100554P000326)[7/02/2010]		Near opening in canopy between cedar/ hemlock trees on a drier sopt in muskeg forest.		
55	ACCS_Mar25 (EO49)[7/02/2010]		Vegetation= ; Slope = 5; Aspect= 180 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	ACCS_Mar25 (EO49)[6/30/2009]		Vegetation= ; Slope = 5; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	TESP_Mar25 (100554P000116)[6/30/2009]				
55	TESP_Mar25 (100554P00615)[8/17/2021]		Young growth understory, filtered light, surrounded by moss, some ferns (shield fern, lady fern and oak fern). Sparse understory associates such as Cornus cadensis, Vaccinium ovalifolium, Menziesia ferruginea, etc.; often growing through debris and plant refuse. One plant found on a steep slope, the other two in highly disturbed areas close to a major roadway. Surrounded mostly by Tsuga heterophylla, Picea sitchensis, and some Thuja plicata. Generally found at the base of large trees or a large stump.		
55	TESP_Mar25 (100554P00611)[7/30/2021]		Young growth understory, filtered light, surrounded by moss, some ferns, and a few other low growing plants (Cornus cadensis, Menziesia ferruginea, Athyrium filix-femi, Dryopteris expansa, Gymnocarpium dryopteris). Growing through debris and plant refuse. Never on a steep slope, though shallow slope growth occurs. Surrounded mostly by Thuja plicata, Picea sitchensis, and some Tsuga heterophylla.		
55	TESP_Mar25 (100554P000620Y22)[6/28/2022]		Growing with Hylocomium splendends on open forest floor near ferns and about 50 feet from creek. Open canopy above		
55	TESP_Mar25 (100552P000171)[7/20/2004]				
55	ACCS_Mar25 (EO97)[7/20/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; SW NEETS TS, U7; SINGLE INDIVIDUAL UNDER CEDAR AT EDGE OF MUSKEG		
55	TESP_Mar25 (100554P000197)[8/03/2010]		Cedar cluster; brishy area with numerous dead standing timber at muskeg edge; mixed in with Platanthera chorisia.		
55	ACCS_Mar25 (EO49)[8/03/2010]				
55	TESP_Mar25 (100554P000117)[6/30/2009]				
55	ACCS_Mar25 (EO49)[6/30/2009]		Vegetation= ; Slope = 5; Aspect= NNW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	TESP_Mar25 (100554P000118)[6/30/2009]				

55	ACCS_Mar25 (EO49)[6/30/2009]		Vegetation= ; Slope = 10; Aspect= W; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
55	ACCS_Mar25 (EO49)[5/11/2010]				
55	TESP_Mar25 (100554P000354)[no date]		knoll above muskeg, heavy to redcedar, found in more shaded spots near base of cedar		
56	TESP_Mar25 (100554P000354)[8/15/2022]		knoll above muskeg, heavy to redcedar, found in more shaded spots near base of cedar		
56	TESP_Mar25 (100554P000199)[5/19/2022]		Mixed cedar/ hemlock forest between open brush areas below top of hill.		
56	ACCS_Mar25 (EO104)[no date]				
57	TESP_Mar25 (100554P000622ZY22)[7/05/2022]		Spruce-Hemlock-Cedar Foresst with many streams and creeks throughout unit; unit has been previously harvested		
57	ACCS_Mar25 (EO97)[9/03/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; SW NEETS TS, ROAD TO U6; SINGLE, SENESCENT INDIVIDUAL IN ROAD ROUTE		
57	TESP_Mar25 (100552P000176)[9/03/2004]				
57	TESP_Mar25 (100554P000199)[no date]		Mixed cedar/ hemlock forest between open brush areas below top of hill.		
57	ACCS_Mar25 (EO49)[7/14/2010]		Vegetation= ; Slope = 15; Aspect= 180 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000623Y22)[7/06/2022]		19 plants: growing on second growth in the valley, next to stump near spruce tree in a wet area covered with H. splendens and P. schreberi. Single occurrences both growing on a steep slope in previous harvests with H. splendens and P. schreberi		
57	ACCS_Mar25 (EO97)[8/17/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS,nr unit S07, 2 plnts, 1 flr, edge of closed canopy thpl near beaver pond		
57	TESP_Mar25 (100552P000270)[8/17/2006]				
57	ACCS_Mar25 (EO49)[5/26/1996]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= RioRobertsR2,U544-101,Rd2050100		
57	TESP_Mar25 (100554P000042)[5/26/1996]				

57	ACCS_Mar25 (EO49)[7/20/2010]		Vegetation= ; Slope = 5; Aspect= NW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000185)[7/20/2010]		Found at the base of cedars at the top of a hill		
57	ACCS_Mar25 (EO49)[7/20/2011]				
57	TESP_Mar25 (100554P000292)[7/20/2011]		Most plants were found in open THPL forest with brushy understory.		
57	TESP_Mar25 (100552P000251)[7/18/2006]				
57	ACCS_Mar25 (EO97)[7/18/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, 1 plnt in flr, Traitors EIS, SW of Brushy Point,open canopy, boggy, thpl		
57	ACCS_Mar25 (EO49)[8/25/2010]		Vegetation= ; Slope = 10; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= EO includes 2 waypoints: PLOR-CTHROATe: 1 veg/ el. 230' PLOR-CTHROATf: 2 veg/ el. 283'		
57	TESP_Mar25 (100554P000156)[8/25/2010]		PLOR found on deer trail in THPL/TSHE grove, a few hundred feet north of Cutthroat Creek		
57	TESP_Mar25 (100554P000322)[6/14/2010]		found in cedar/hemlock forest long open muskeg, on or near deer trails, and the base of cedar trees.		
57	TESP_Mar25 (100552P000248)[7/18/2006]				
57	ACCS_Mar25 (EO97)[7/18/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

			Revilla,Traitors EIS,2 plts,no flr, not in a harvest unit, open std thpl tshe, loc closed in vicin		
57	ACCS_Mar25 (EO49)[6/20/2010]		Vegetation= ; Slope = 10; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000325)[6/20/2010]				
57	ACCS_Mar25 (EO49)[6/14/2010]		Vegetation= ; Slope = 12; Aspect= 45 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	ACCS_Mar25 (EO49)[7/20/2010]		Vegetation= ; Slope = 5; Aspect= W; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000184)[7/20/2010]		Cedar/Hemlock mixed forest near small seepage filled with LYAM, that allows for side lighting to enter		
57	TESP_Mar25 (100552P000249)[7/18/2006]				
57	ACCS_Mar25 (EO97)[7/18/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,not thpl overstory,4 plts,no flr, tshe and vaov in mid layer, plor on hummocks,		
57	TESP_Mar25 (100554P000621Y22)[6/29/2022]		growing on duff, open forests floor. predomonitly hemlocks, about 120 feet from stream		
57	TESP_Mar25 (100552P000250)[7/18/2006]				
57	ACCS_Mar25 (EO97)[7/18/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS, SW Bushy Cove,1 plnt,no flrs,thpl sgs, pisi and tshe less than 8 inch dbh		
57	TESP_Mar25 (100554P000187)[7/20/2010]		Cedar/hemlock forest downhill from a clearcut; also near muskeg		
57	ACCS_Mar25 (EO49)[7/20/2010]		Vegetation= ; Slope = 8; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	ACCS_Mar25 (EO49)[6/20/2010]		Vegetation= ; Slope = 10; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000324)[6/20/2010]				
57	ACCS_Mar25 (EO49)[8/25/2010]		Vegetation= ; Slope = 15; Aspect= NW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= EO includes 3 waypoints:		

			PLOR-CTHROATb: 7 veg/ 1 bud/ el. 248' PLOR-CTHROATc: 2 veg/ el. 247' PLOR-CTH		
57	TESP_Mar25 (100554P000153)[8/25/2010]		PLOR found in patchy THPL/TSHE grove on deer trails, near edges of a lake/seepy streams		
57	TESP_Mar25 (100554P000188)[7/20/2010]		Spruce/hemlock stand with no cedar at the top of a hill		
57	ACCS_Mar25 (EO49)[7/20/2010]		Vegetation= ; Slope = 8; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	ACCS_Mar25 (EO97)[7/18/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,nr unit S04, one plnt, no flr,open stand thpl tshe, thpl nearby but does not dom stand		
57	TESP_Mar25 (100552P000247)[7/18/2006]				
57	ACCS_Mar25 (EO49)[7/13/2010]				
57	TESP_Mar25 (100554P000175)[7/13/2010]		at base of THPL, approx. 100' from a rock pit, in young-growth TSHE/PISI forest		
57	TESP_Mar25 (100554P000321)[6/14/2010]		on edge of streamside with a grassy opening; found in cedar/hemlock forest.		

57	ACCS_Mar25 (EO49)[6/14/2010]		Vegetation= ; Slope = 5; Aspect= 225 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000152)[8/25/2010]		THPL/TSHE groves on edges of muskegs, one clump near a river. All plants found on or adjacent to deer trails		
57	ACCS_Mar25 (EO49)[8/25/2010]		Vegetation= ; Slope = 10; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= EO includes 3 waypoints: PLOR-CTHROATa: 4 veg/ el. 257' PLOR-CTHROATg: 28 veg/ 1 flower/ el. 244' PLOR		
57	TESP_Mar25 (100554P000608Y20)[7/08/2020]		On top/side of two separate moss-covered logs extending downslope on forest floor.		
57	TESP_Mar25 (100554P000182)[8/25/2010]		All clumps were found in the muskeg edge above the lower lake outflow area in cedar/ hemlock/ spruce mixed forests with multiple rotting stumps and course woody debris.		
57	ACCS_Mar25 (EO49)[8/25/2010]		Vegetation= ; Slope = 5; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Includes data from the points:		

			PLORc:lk1, PLORc:lk2 , PLOR2CUTLK2, PLOR3C:lk2 PLOR4C:lk2		
57	ACCS_Mar25 (EO49)[7/20/2010]		Vegetation= ; Slope = 10; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000189)[7/20/2010]		Cedar/hemlock grove surrounded by muskeg that allows side lighting to enter		
57	TESP_Mar25 (100554P000323)[6/20/2010]				
57	ACCS_Mar25 (EO49)[6/20/2010]		Vegetation= ; Slope = 10; Aspect= N; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000310)[no date]		Hemlock forest above road and meadow area.		
57	ACCS_Mar25 (EO49)[6/17/2010]		Vegetation= ; Slope = 17; Aspect= 180 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000310)[no date]				
57	TESP_Mar25 (100554P000122)[6/03/2009]				
57	ACCS_Mar25 (EO49)[6/03/2009]		Vegetation= ; Slope = 20; Aspect= W; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000310)[6/15/2022]		Predomintly TSHE with some THPL throughout, on a bench above/adjacent to a stream. Open understory, with VAOV and VAAL prdomintly.		
57	ACCS_Mar25 (EO49)[6/03/2009]		Vegetation= ; Slope = 20; Aspect= SW; Substrate= Moss; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
57	TESP_Mar25 (100554P000121)[6/03/2009]				
57	TESP_Mar25 (100552P000246)[7/06/2006]				
57	ACCS_Mar25 (EO97)[7/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS,nr rd 8060540 18 plnts,50% flr, mostly closed mod well drained thpl tshe		

57	ACCS_Mar25 (EO49)[6/17/2010]		Vegetation= ; Slope = 10; Aspect= 225 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000305)[6/17/2010]		Soggy area near open meadow along seepage filled with skunk cabbage (LYAM3).		
57	TESP_Mar25 (100554P000341)[6/17/2010]		Base of cedar in cedar/hemlock forest		
57	ACCS_Mar25 (EO49)[6/17/2010]		Vegetation= ; Slope = 12; Aspect= S; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000126)[6/27/2009]				
57	ACCS_Mar25 (EO49)[6/27/2009]		Vegetation= ; Slope = ; Aspect= FL; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000508Y13)[7/25/2013]				
57	TESP_Mar25 (100554P000304)[6/17/2010]		Spruce/hemlock forest near large gap on one side.		
57	ACCS_Mar25 (EO49)[6/17/2010]		Vegetation= ; Slope = 25; Aspect= 270 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
57	TESP_Mar25 (100554P000509Y13)[8/14/2012]				
57	ACCS_Mar25 (EO49)[6/27/2009]		Vegetation= ; Slope = 10; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
57	TESP_Mar25 (100554P000125)[6/27/2009]				
57	TESP_Mar25 (100554P000306)[no date]		Large gap to the SW creating side lighting Found in Cedar/Hemlock forest		
57	TESP_Mar25 (100554P000306)[7/10/2021]		Large gap to the SW creating side lighting Found in Cedar/Hemlock forest		
58	ACCS_Mar25 (EO4)[6/26/2008]				
59	ACCS_Mar25 (EO11)[8/01/2008]		Vegetation= ; Slope = 40; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

60	ACCS_Mar25 (EO32)[7/07/1963]	Alexander Archipelago, Revillagigedo I., Ketchikan			
61	ACCS_Mar25 (EO32)[8/31/2006]	Private land	Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Ketchikan,above 3rd ave bypass, 5 plnt,2 flr, thpl tshe stand blowdown lyam nearby typical plor site.		
61	TESP_Mar25 (100552P000275)[8/31/2006]		Ketchikan,above 3rd ave bypass, 5 plnt,2 flr, thpl tshe stand blowdown lyam nearby typical plor site.		
62	TESP_Mar25 (100554P000355)[6/17/2010]		Found at cedar and hemlock bases with large amounts of dead standing and fallen wood in the area		
62	ACCS_Mar25 (EO49)[6/17/2010]		Vegetation= ; Slope = 12; Aspect= S; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
63	TESP_Mar25 (100552P000172)[7/22/2004]				
63	ACCS_Mar25 (EO97)[7/22/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; SW NEETS TS, U3; 14 IND. DISPERSED UNDER OPEN THPL ON S-FACING RIDGELINE		
63	ACCS_Mar25 (EO49)[6/27/2009]		Vegetation= ; Slope = 5; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
63	TESP_Mar25 (100554P000127)[6/27/2009]				
64	TESP_Mar25 (100554P000128)[6/27/2009]		At very edge of muskeg		
64	ACCS_Mar25 (EO49)[6/27/2009]		Vegetation= ; Slope = ; Aspect= FL; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
64	TESP_Mar25 (100552P000245)[7/06/2006]				
64	ACCS_Mar25 (EO97)[7/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS, nr rd 8060500, unit S03, 11 stems,25% flr,blocky with crevices, limestone?		
65	ACCS_Mar25 (EO49)[6/27/2009]		Vegetation= ; Slope = 5; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
65	TESP_Mar25 (100554P000124)[6/27/2009]				
66	TESP_Mar25 (100552P000244)[7/06/2006]				
66	ACCS_Mar25 (EO132)[7/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		

			Revilla,Traitors EIS, rd 8060583, two plts,no flr,one 20 m above rd, one 20 m below,thpl chno vaov		
66	ACCS_Mar25 (EO49)[6/27/2009]		Vegetation= ; Slope = 10; Aspect= NE; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
67	TESP_Mar25 (100554P000123)[6/27/2009]	Approx 1 mile from confluence of Rio Roberts and Thorne River. Just beyond the site - a large sedge meadow on north side of Rio Roberts.	Patch of moderate volume red cedar with very low volume cedar/scrub surrounding.		
68	TESP_Mar25 (100554P000634Y22)[8/22/2022]		Spruce and hemlock domited, growing on rotting log, near the road on a mild slope		
68	TESP_Mar25 (100554P000627Y22)[7/20/2022]		GROWING ON STEEP SLOPES ON DUFF AND ROTTING WOOD. SPRUCE AND HEMLOCK DOMINT. STREAMS 50 - 100 FEET AWAY. ONE PLANT WAS ON OPEN FOREST FLOOR WITH NOT A LOT OF VEGETATION NEARYBY WHILE THE OTHER PLANT WAS A LOT MORE CROWDED BY VEGETATION BUT NOT BEING SHADED OUT		
69	ACCS_Mar25 (EO49)[8/25/2010]		Vegetation= ; Slope = 18; Aspect= 180 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= This contains data from the point PLORc:lk1.		
69	TESP_Mar25 (100554P000183)[8/25/2010]		Cedar/ hemlock forest on penninsula near lower end of the lake foound 10' feet from lake edge.		
69	TESP_Mar25 (100554P000136)[8/17/2009]		At edge ofl ow volume cedar scrub and a muskeg		
69	ACCS_Mar25 (EO49)[8/17/2009]		Vegetation= ; Slope = 5; Aspect= N; Substrate= Moss; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
69	TESP_Mar25 (100554P000137)[no date]				
69	ACCS_Mar25 (EO49)[8/17/2009]		Vegetation= ; Slope = 5; Aspect= E; Substrate= Moss; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
70	TESP_Mar25 (100554P000137)[8/09/2021]				
71	TESP_Mar25 (100552P000252)[7/19/2006]				
71	ACCS_Mar25 (EO97)[7/19/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,nr rd 8060500, 1 plnt, no flr,tshe,isol pockets thpl, no lyam, well drained		

72	ACCS_Mar25 (EO49)[7/20/2011]		Vegetation= ; Slope = 10; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= ; Comments=		
73	TESP_Mar25 (100554P000291)[7/20/2011]				
73	ACCS_Mar25 (EO97)[7/19/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS,26 plnts, 10% flr, thpl, tshe, lyam, plor on hummocks above boggy soils		
74	TESP_Mar25 (100552P000254)[7/19/2006]				
74	ACCS_Mar25 (EO97)[7/19/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS,nr rd 8060525,13 plnts,30% flr, thpl, tshe, lyam, hummocks above boggy soils		
75	TESP_Mar25 (100552P000253)[7/19/2006]				
76	ACCS_Mar25 (EO97)[8/17/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS, nr rd 8060525, closed canopy, boggy tshe and thpl		
77	TESP_Mar25 (100552P000271)[8/17/2006]				
77	TESP_Mar25 (100554P00610)[6/29/2021]		Thuja plicata/Tsuga heterophylla forest. Small T. heterophylla interspersed with occasiol, larger T. plicata. Some growing near water tracks running down the slope, others near a soil pit; all plants were near the base of large T. plicata. Associated species are Gymnocarpium dryopteris, Maianthemum dilatatum, Menziesia ferruginea, Lysichiton americanus, Blechnum spicant, Cornus cadensis, Vaccinium ovalifolium, Streptopus amplexifolius, and Thelypteris phegopteris.		
78	TESP_Mar25 (100554P000626Y22)[7/19/2022]		Growing on duff next to spruce and under slash. Mostly spruce, some hemlock. No running streams nearby buyt some wet, muddy areas about 100 feet away. open forest floor on a bit of a slope.		
78	TESP_Mar25 (100554P000624Y22)[7/11/2022]		Young growth previously harvested area. Lots of downed trees around. Primarily spruce and hemlock present about 30 feet from stream and 30 feet from old logging road. disturbed area.		
78	ACCS_Mar25 (EO135)[5/26/2010]				
78	TESP_Mar25 (100554P000345)[5/26/2010]		PLOR found at edge of muskeg in cedar forest		

78	ACCS_Mar25 (EO136)[8/05/2010]		Vegetation= ; Slope = 7; Aspect= 295 ; Substrate= Soil; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments= White spider on one of the flowers.		
78	TESP_Mar25 (100552P000307)[8/05/2010]		Dense second-growth Western hemlock forest within the beach-forest fringe. Soil appears to be well-draining. Site receives afternoon sun. Micorsite is depression between two TSHE trees with little (<1%) herbaceous cover or shrub cover. Abundance of duff and mycelium in soil. Ground cover domited by bryophytes.		
78	TESP_Mar25 (100552P000188)[5/24/2005]				
78	ACCS_Mar25 (EO137)[5/24/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= TRAITORS COVE EIS. REVILLAGIGEDO ISLAND. INCIDENTAL SIGHTING, NO SURV#. 1 IND.		
78	ACCS_Mar25 (EO97)[6/22/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO IS; NEETS BAY; STAND 73603124; 2 IND. IN TSHE-THPL FOREST, Sheila Spores, no survey		
78	TESP_Mar25 (100552P000179)[6/22/2004]				
78	TESP_Mar25 (100554P000348)[5/26/2010]				
78	ACCS_Mar25 (EO135)[5/26/2010]		Vegetation= ; Slope = 30; Aspect= A; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
78	TESP_Mar25 (100552P000241)[7/05/2006]				
78	ACCS_Mar25 (EO137)[7/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,sw neets, 3 plnts, 2 in flr,fairly open, mod well drained, thse thpl		
78	ACCS_Mar25 (EO135)[7/29/2010]				
78	TESP_Mar25 (100554P000144)[7/29/2010]		Plants growing from moss covered downed logs 10-20' from lake shore, with steep dense stand uphill to the east		
78	TESP_Mar25 (100554P000635Y22)[7/27/2022]				
78	TESP_Mar25 (100554P000201)[8/10/2023]		Scattered under trees in muskeg		
78	TESP_Mar25 (100554P000347)[8/30/2018]				

78	TESP_Mar25 (100554P000347)[no date]				
78	ACCS_Mar25 (EO135)[5/26/2010]		Vegetation= ; Slope = 10; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
78	ACCS_Mar25 (EO143)[8/23/2011]				
78	TESP_Mar25 (100554P000408)[8/23/2011]		About 50' from lake, patchy stand of THPL-TSHE.		
78	TESP_Mar25 (100554P000631Y22)[7/12/2022]		NEAR SPRUCE AND HEMLOCK ON FLAT PART OF SLOPE GROWING ON DUFF, SURROUNDED BY FERNS WITHIN PREVIOUS HARVEST WITH A LOT OF SLASH NEARBY AND FELLED TREES		
78	ACCS_Mar25 (EO135)[5/26/2010]		Vegetation= ; Slope = 40; Aspect= E; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
79	TESP_Mar25 (100554P000346)[5/26/2010]				
80	TESP_Mar25 (100554P000445Y12)[no date]		Woody debris and windfall along a brushy stream. PLOR4 found beneath all these layers in a domint cedar/hemlock forest.		
80	TESP_Mar25 (100554P000445Y12)[8/30/2018]		Woody debris and windfall along a brushy stream. PLOR4 found beneath all these layers in a domint cedar/hemlock forest.		
81	ACCS_Mar25 (EO137)[7/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS, nr unit R02,nr rd 8060210,4 plnts,2 inflr,fairly open, well drained thpl tshe		
81	TESP_Mar25 (100552P000242)[7/05/2006]				
81	TESP_Mar25 (100554P000406)[8/23/2011]		In patchy TSHE-CANO adjacent to muskeg and small streams.		
81	ACCS_Mar25 (EO143)[8/23/2011]				
81	TESP_Mar25 (100554P000142)[no date]				
81	ACCS_Mar25 (EO135)[7/28/2010]		Vegetation= ; Slope = 5; Aspect= 180 ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
81	TESP_Mar25 (100554P000142)[8/14/2022]				
81	TESP_Mar25 (100554P000625Y22)[7/13/2022]		Northern polygon; spruce-hemlock forest, 25 feet from stream, growing on woody debris near spruce-hemlock trees and stumps in previously harvested area. blow down and logs present, near previously harvested stumps		

			southern polygon: Hemlock-Spruce domint, in the valley of the slope to the east. water pooling at the bottome of the creek about 20 feet away, growing in woody debris of previous harvest near downed trees and stumps		
81	TESP_Mar25 (10054P000636Y22)[7/21/2022]				
81	ACCS_Mar25 (EO137)[7/25/2002]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= RockfishTS,behind old log camp 8 plants		
81	TESP_Mar25 (100552P000123)[7/25/2002]				
81	ACCS_Mar25 (EO137)[6/29/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla is. 50 plants scattered throughout Unit R01 of Traitors Cove, with Stensvold		
81	TESP_Mar25 (100552P000287)[6/29/2006]				
81	TESP_Mar25 (100552P000169)[6/17/2004]				
81	ACCS_Mar25 (EO137)[6/17/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; ROCKFISH TS, U7; >170 IND. UNDER THPL/CHNO AT EDGE OF 95 CUT		
81	TESP_Mar25 (100554P000628Y22)[7/21/2022]		SPRUCE AND HEMLOCK DOMITED, SOME POPULATIONS HAD CEDAR NEARBY. ALL GROWING ON THE OPEN FOREST FLOOR ON DUFF AND ROTTING WOOD. SOME PLANTS HAD FERNS AROUND THEM AND OTHERS HAD VIRTUALLY NO VEGETATION AROUND THEM. STREAMS WERE ALWAYS WITHIN 30-50 FEET AWAY FROM THE POPULATIONS		
81	TESP_Mar25 (100552P000255)[7/20/2006]				
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,Unit R07, 30 plnts,10% flr,thpl, tshe no lyam, steep, well drained		
81	ACCS_Mar25 (EO137)[7/05/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,traitors EIS,not in harvest unit,nr rd 8060000, 4 plts,50%flr,opn mod well drained thpl tshe		
81	TESP_Mar25 (100552P000243)[7/05/2006]				

81	TESP_Mar25 (100552P000256)[7/20/2006]				
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS, Unit R07, 4 stems, no flr,thpl,tshe, vaov, no lyam		
81	TESP_Mar25 (100552P000257)[7/20/2006]				
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,nr unit R07,12 plts, 50% flr,thpl,tshe,tsme,vaov,no lyam		
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,nr unit R07, 8 plnts, 20% flr,thpl,tshe, no lyam		
81	TESP_Mar25 (100552P000258)[7/20/2006]				
81	TESP_Mar25 (100552P000259)[7/20/2006]				
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS,nr unit R07, 2 plnts, 50% flr, thpl, tshe, open, with gash, no lyam or vaov		
81	TESP_Mar25 (100554P00612)[8/05/2021]		Young growth understory on steep slopes, growth was not very dense, and there wasnâ€™t much understory growing among any of the found PLOR4. Primarily moss and some ferns (Athyrium filix-femi Dryopteris expansa), though still sparse. The plants were all growing through litter or woody debris. Most growing by an existing larger tree, or the stump of an old growth stump. Domint trees were Tsuga heterophylla and Picea sitchensis, with some Thuja plicata. Soil is loose, undeveloped, and not very stable.		
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS,nr unit R07, 19 plnts, 25% flr,thpl pisi tshe vaov, no lyam		
81	TESP_Mar25 (100552P000260)[7/20/2006]				
81	TESP_Mar25 (100552P000266)[7/20/2006]				
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS, unit R07, 41 plts, 70% flr,thpl tshe pisi, no lyam		

81	TESP_Mar25 (100552P000261)[7/20/2006]				
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,nr unit S07, 7 plnts,20% flr,tshe thpl vaov, no lyam		
81	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,nr unit R07, 20 plnts, 40% flr,thpl tshe vaov,no lyam		
81	TESP_Mar25 (100552P000265)[7/20/2006]				
81	TESP_Mar25 (100552P000264)[7/20/2006]				
82	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,nr unit R07, 5 plnts, 40% flr,thpl tshe vaov, no lyam		
82	TESP_Mar25 (100552P000263)[7/20/2006]				
83	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla,Traitors EIS,near R07		
84	TESP_Mar25 (100554P000629Y22)[7/25/2022]		OPEN FOREST FLOOR GROWING ON DUFF AND STICKS. NOT A LOT OF VEG SURROUNDING. NEAR SPRUCE AND HEMLOCK. ABOUT 50 FT FROM STREAM. ONE PLANT WAS CLOSE TO A CEDAR		
84	TESP_Mar25 (100552P000262)[7/20/2006]				
84	ACCS_Mar25 (EO137)[7/20/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Revilla, Traitors EIS,nr unit R07,31 plnts,40% flr,thpl dom overstory, tshe mid, vaov,		
85	TESP_Mar25 (100554P000286)[7/08/2011]		six plants are growing in a clump of CUNO at the edge of a muskeg while five are growing under THPL in the forest.		
85	ACCS_Mar25 (EO150)[7/08/2011]		Vegetation= ; Slope = 2; Aspect= W; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
86	TESP_Mar25 (100554P00616)[8/25/2021]		Young growth understory, filtered light, surrounded by moss, some ferns (Gymnocarpium dryopteris, Dryopteris expansa) and Tiarella trifoliata. Surrounded mostly by Tsuga heterophylla, Picea sitchensis, and some Thuja plicata. Found on a slight slope. All trees fairly young or small in size.		

87	TESP_Mar25 (100554P000632Y22)[8/03/2022]		SPRUCE-HEMLOCK FOREST, 50 FEET FROM STREAM, GROWING ON WOODY DEBRIS NEAR SPRUCE AND HEMLOCK TREES AND STUMPS, IN PREVIOUSLY HARVESTED AREA, VERY STEEP SLOPE		
87	TESP_Mar25 (100554P00583)[8/01/2018]		Sedge meadow east of Staney 38 polygon, near to road. Crab apple, lady fern, skunk cabbage, small flower bullrush, false azalea, spruce and hemlock.		
88	TESP_Mar25 (100554P000287)[7/08/2011]		Large volume THPL domited forest with TSHE and moderate shrub cover. Area with moderate amount of blowdown		
89	ACCS_Mar25 (EO150)[7/08/2011]		Vegetation= ; Slope = 5; Aspect= S; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
89	ACCS_Mar25 (EO152)[8/03/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND, NEETS BAY, 3 IND. AMID SECOND-GROWTH TSHE		
90	TESP_Mar25 (100552P000232)[8/03/2005]				
90	TESP_Mar25 (100552P000401Y12)[7/11/2012]		Open understory of mature, individual PISI, THPL, TSHE alon shoreline with 2nd growth TSHE, ALRU. Site is adjacent to forested wetland with LYAM, RUSP. A trail runs through the site, used by game and people.		
91	TESP_Mar25 (100554P000536Y13)[5/26/2013]				
92	TESP_Mar25 (100554P00570)[7/31/2017]		Shore pine and yellow cedar overstory. hemlock, pine, yellow cedar mid canopy. NECR2-LYAM3 ground cover 25% canopy coverage		
93	ACCS_Mar25 (EO153)[6/15/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLA IS; STAND 73202004; 6 IND. IN 20 YR OLD REGEN (1 IND.ON MOSSY STUMP) S. Spores, no survey		
94	TESP_Mar25 (100552P000178)[6/15/2004]				
94	TESP_Mar25 (100554P000203)[7/08/2023]				
94	ACCS_Mar25 (EO153)[7/12/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= KLAM EIS, U10, REVILLAGIGEDO ISLAND, 32 IND. SCATTERED		
94	TESP_Mar25 (100552P000198)[7/12/2005]				
94	ACCS_Mar25 (EO153)[8/19/2004]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= REVILLAGIGEDO ISLAND; SHRIMP TS, U7(1?); 1 IND. IN MIXED CONIFER FOREST, Jill Reeck, no survey		

94	TESP_Mar25 (100552P000177)[8/19/2004]				
94	ACCS_Mar25 (EO153)[7/14/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= KLAM EIS, U5, REVILLAGIGEDO ISLAND, 35 IND. WIDELY SCATTERED		
94	TESP_Mar25 (100552P000197)[7/14/2005]				
94	ACCS_Mar25 (EO153)[7/12/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= KLAM EIS, U10, REVILLAGIGEDO ISLAND, 48 IND. WIDELY DISTRIBUTED		
94	TESP_Mar25 (100552P000195)[7/12/2005]				
95	TESP_Mar25 (100552P000196)[7/13/2005]				
96	ACCS_Mar25 (EO153)[7/13/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= KLAM EIS, U1, REVILLAGIGEDO ISLAND, 3 IND. ON OPEN SLOPE ABOVE LAKE		
96	ACCS_Mar25 (EO153)[7/11/2005]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= KLAM EIS, U10, REVILLAGIGEDO ISLAND, 80 IND. WIDELY SCATTERED.		
96	TESP_Mar25 (100552P000194)[7/11/2005]				
96	TESP_Mar25 (100554P000032)[8/14/1996]				
97	ACCS_Mar25 (EO156)[8/14/1996]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= TuxecanEIS,U406,Rd1470,Send of lakeERd14		
97	ACCS_Mar25 (EO156)[no date]				
98	ACCS_Mar25 (EO158)[7/31/2007]	TUXEKAN ISLAND SECTIONS 34 AND 4. POPULATION AT SOUTH END OF LAKE EAST OF RD 1470. BEAVER DAM AREA. PLANTS ON ISLAND IN BEAVER DAM AREA.	Vegetation= ; Slope = 50; Aspect= 220 ; Substrate= Moss; Parent Material= ; Soil Moisture= Wet; Soil Texture= ; Light Exposure= Full Shade; Comments=		
99	ACCS_Mar25 (EO159)[5/27/2011]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Full Shade; Comments=		
100	TESP_Mar25 (100554P000420)[5/27/2011]		In Thuja grove along fish-bearing stream. High volume Thuja stand.		

100	ACCS_Mar25 (EO160)[8/24/2011]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= One plant was found incidentally. A limited survey was done to find additiol plants, and none were found.		
101	TESP_Mar25 (100554P000431)[8/24/2011]				
101	TESP_Mar25 (100554P000416)[5/31/2011]		Individual in unit 44 was in a fairly open, seepy forest (though the PLOR4 was growing a bit elevated from the wet areas) between a TSHE and THPL. Individual in unit 52 was in more brushy, lower volume forest on a subtle slope, at the base of a smaller diameter (about 14" TSHE. Both individuals has >70% overstory cover and were adjacent to VAOV.		
102	ACCS_Mar25 (EO159)[5/31/2011]		Vegetation= ; Slope = 10; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
102	TESP_Mar25 (100554P000442)[5/31/2011]		In low quality spruce/hemlock forest with >70% over story		
102	TESP_Mar25 (100522P000212Y16)[9/14/2016]				
103	ACCS_Mar25 (EO162)[8/12/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
104	TESP_Mar25 (100522P000099)[8/12/2009]				
104	TESP_Mar25 (100554P00603FY19)[6/10/2019]				
105	TESP_Mar25 (100554P000293)[7/26/2011]		1 plant at the base of TSHE with CUNO and THPL close by (~5-10'), found where open canopy, brushy forest transitions to closed canopy		
106	ACCS_Mar25 (EO163)[7/26/2011]		Vegetation= ; Slope = 10; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
106	TESP_Mar25 (100522P000102)[8/12/2009]				
107	ACCS_Mar25 (EO162)[8/12/2009]				
107	TESP_Mar25 (100522P000016)[7/26/2006]				
107	ACCS_Mar25 (EO162)[7/26/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= S. Etolin Wilderness; not a rare pl survey. J Smith located approx. 20 indivs at old village site.		

107	ACCS_Mar25 (EO162)[8/12/2009]				
107	TESP_Mar25 (100522P000095)[8/12/2009]				
107	TESP_Mar25 (100522P000091)[8/12/2009]				
107	ACCS_Mar25 (EO162)[8/12/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Starting to find sites with Malus and PLOR4 co-located.		
107	ACCS_Mar25 (EO162)[8/12/2009]				
108	TESP_Mar25 (100522P000096)[8/12/2009]				
108	TESP_Mar25 (100522P000090)[8/12/2009]				
109	ACCS_Mar25 (EO162)[8/12/2009]				
109	TESP_Mar25 (100522P000089)[8/12/2009]				
109	ACCS_Mar25 (EO162)[8/12/2009]				
109	TESP_Mar25 (100522P000088)[8/12/2009]				
109	ACCS_Mar25 (EO162)[8/12/2009]				
109	ACCS_Mar25 (EO167)[8/11/2009]				
110	TESP_Mar25 (100522P000081)[8/11/2009]				
110	ACCS_Mar25 (EO167)[8/11/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Open undersotry, few forbs, late stem exclusion prob 1940s		
110	TESP_Mar25 (100522P000080)[8/11/2009]				
110	TESP_Mar25 (100522000100)[8/12/2009]		Young growth stand dom by TSHE with legacy old THPL		
110	ACCS_Mar25 (EO162)[8/12/2009]				
110	ACCS_Mar25 (EO167)[8/11/2009]				
110	TESP_Mar25 (100522P000083)[8/11/2009]				
110	ACCS_Mar25 (EO167)[8/11/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Just inside beach fringe under young THPL		

110	TESP_Mar25 (100522P000082)[8/11/2009]				
110	TESP_Mar25 (100522P000084)[8/11/2009]				
111	ACCS_Mar25 (EO167)[8/11/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= some confusion on exact location from GPS. May be located 75 meters to southwest.		
111	TESP_Mar25 (100522P000086)[8/11/2009]				
112	ACCS_Mar25 (EO162)[8/11/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Boundaries of population not determined. Population could go well inland from here as suitable habitat exists over		
112	ACCS_Mar25 (EO162)[8/11/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Extent of population not known. Scattered clumps of 1-35 individuals throughout surveyed area.		
112	TESP_Mar25 (100522P000087)[8/11/2009]				
112	ACCS_Mar25 (EO169)[8/11/2009]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Forgot to record number of plants found, not a large number.		
113	TESP_Mar25 (100522P000085)[8/11/2009]				
113	ACCS_Mar25 (EO162)[8/13/2009]				
114	TESP_Mar25 (100522P000101)[8/13/2009]				
114	ACCS_Mar25 (EO171)[6/11/2009]				
115	TESP_Mar25 (100554P000131)[6/11/2009]				
115	TESP_Mar25 (100554P000294)[7/28/2011]		PLOR found in 40-year-old closed canopy TSHE/PISI young-growth		
116	ACCS_Mar25 (EO171)[7/28/2011]		Vegetation= ; Slope = 10; Aspect= SW; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
116	TESP_Mar25 (100554P000295)[7/28/2011]		PLOR found in THPL/CUNO/TSHE groves adjacent to muskeg and/or patchy forest		
116	ACCS_Mar25 (EO171)[7/28/2011]				

116	TESP_Mar25 (100554P000334)[5/19/2010]		growing on road prism for a road built to access an even-aged harvest from mid-1950s. Stand is currently PISI domited with minor TSHE component, and was likely similar historically		
116	ACCS_Mar25 (EO173)[5/19/2010]		Vegetation= ; Slope = ; Aspect= ; Substrate= Gravel; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
116	TESP_Mar25 (100554P000296)[7/28/2011]		PLOR found in closed-canopy THPL grove adjacent to muskeg. Several waypoints were taken to mark the extent of the population. Plants were found above and below a small (~15-20') rock knob		
116	ACCS_Mar25 (EO171)[7/28/2011]				
116	ACCS_Mar25 (EO171)[5/26/2010]		Vegetation= ; Slope = ; Aspect= A; Substrate= Moss; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
116	TESP_Mar25 (100554P000138)[5/26/2010]		Almost 30 plants were growing within second-growth right of way. The majority of the plants were just within the cedar fringe of the muskeg.		
116	TESP_Mar25 (100554P000328)[6/30/2010]				
116	ACCS_Mar25 (EO175)[6/30/2010]				
116	ACCS_Mar25 (EO171)[7/11/2011]		Vegetation= ; Slope = 30; Aspect= A; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
117	TESP_Mar25 (100554P000281)[no date]		Plants found pretty much exclusively in high volume old growth THPL groves with little to no understory. Mostly flat sites with some sidelighting or thinner canopy (60-70%).		
117	TESP_Mar25 (100554P000281)[no date]		Plants found pretty much exclusively in high volume old growth THPL groves with little to no understory. Mostly flat sites with some sidelighting or thinner canopy (60-70%).		
118	TESP_Mar25 (100554P000281)[7/26/2022]		Plants found pretty much exclusively in high volume old growth THPL groves with little to no understory. Mostly flat sites with some sidelighting or thinner canopy (60-70%).		
118	ACCS_Mar25 (EO162)[1/01/1900]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= S Etolin Isl Wilderness, McHenry Inlet; Karisa Garner sighting.		
119	TESP_Mar25 (100522P000017)[1/01/1900]				
119	ACCS_Mar25 (EO177)[7/19/1982]		Hemlock-spruce forest with sparse		
120	ACCS_Mar25 (EO178)[no date]	Alexander Archipelago, Frosty Bay, 13 km S of mouth of Bradfield Cal			

120	ACCS_Mar25 (EO179)[8/05/2006]	Alexander Archipelago, Frosty Bay, 13 km S of mouth of Bradfield Cal, Bradfield Cal Quad.	Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Etolin Is.vy TS W of Burnett In. S of rd 51401, 9 stems, one flowering, open forest along ck		
121	TESP_Mar25 (100522P000070)[8/05/2006]	Frosty Bay, Cleveland Peninsula, south of Wrangell, Southeast Alaska.			
122	TESP_Mar25 (100522P000069)[8/06/2006]				
122	ACCS_Mar25 (EO179)[8/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Etolin Is.vy TS W of Burnett Inlet, S of Rd 51401, 10 stems, 2 flowering, in forest along stream		
122	ACCS_Mar25 (EO179)[8/06/2006]		Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Etolin Is. vy TS Unit T67, Rd 6540, beaver dam area, 10 stems, 5 flowering.		
122	TESP_Mar25 (100522P000071)[8/06/2006]				
123	TESP_Mar25 (100522P000093)[no date]		TSHE-THPL/Vacci forest on steep site slope.		
123	TESP_Mar25 (100522P000093)[no date]		TSHE-THPL/Vacci forest on steep site slope.		
124	TESP_Mar25 (100522P000093)[7/14/2022]		TSHE-THPL/Vacci forest on steep site slope.		
124	TESP_Mar25 (100522P000110)[7/04/2010]		Western hemlock-domited canopy with scattered Western red cedar in canopy and sub-canopy. Understory is boggy with pit and mound microtopography. Dense skunk cabbage in low areas, Vaccinium spp./Clintonia uniflora on mounds. Soil type: 291B, 234B, 2SW		
124	ACCS_Mar25 (EO181)[7/04/2010]		Vegetation= ; Slope = 8; Aspect= 220 ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= Specimen found in bog-like setting 30 feet from muskeg/fen.		
125	ACCS_Mar25 (EO162)[7/03/2010]		Vegetation= ; Slope = 2; Aspect= 250 ; Substrate= Duff; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= Plants often associated with moss-covered red cedar buttresses, logs, and at the bases of decidou		
125	TESP_Mar25 (100522P000109)[7/03/2010]		Western hemlock-Western red cedar old growth with Alnus rubra along edge of beach opening. Shrub layer domited by Vaccinium spp. shrubs and open. Ground layer mostly litter and duff with scattered forbs and mosses. Soil type: 234B, 291B, 2SW		

126	TESP_Mar25 (100522P000103)[6/18/2010]		Mature Cedar/Hemlock. Open forest floor with thick moss cover and scattered Vaccinium spp. and low shrubs. Between many stream channels. Soil type: 232B		
126	ACCS_Mar25 (EO181)[6/18/2010]		Vegetation= ; Slope = 18; Aspect= 240 ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= Just downslope of proposed logging road and within proposed timber harvest unit.		
126	TESP_Mar25 (100522P000106)[6/20/2010]		Deep litter/duff/moss. Slope in a shallow ravine on the northeast facing side. Soil type: 223D		
126	ACCS_Mar25 (EO181)[6/20/2010]		Vegetation= ; Slope = 119; Aspect= 54 ; Substrate= Duff; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= It is likely that this plant occurs in Harvest Unit 701 and neighboring harvest units making thi		
126	TESP_Mar25 (100522P000130Y12)[6/20/2012]		Mixed conifer on steep side slope with relatively open understory. Ground cover domited by mosses.		
126	TESP_Mar25 (100522TES090001)[7/07/2022]		Western hemlock-Western red cedar open canopy forest domited by Vaccinium spp. and Menziesia ferruginea. Ground layer domited by mosses, skunk cabbage, Streptopus roseus and Cornus cadensis. Soil type: 291B		
126	ACCS_Mar25 (EO162)[7/03/2010]		Vegetation= ; Slope = 18; Aspect= 200 ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= Small plants, no additiol individuals found downslope to shore. Vegetative plants are difficul		
126	TESP_Mar25 (100522TES090001)[no date]		Western hemlock-Western red cedar open canopy forest domited by Vaccinium spp. and Menziesia ferruginea. Ground layer domited by mosses, skunk cabbage, Streptopus roseus and Cornus cadensis. Soil type: 291B		
126	ACCS_Mar25 (EO162)[12/04/2009]		Vegetation= ; Slope = 2; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
126	ACCS_Mar25 (EO162)[6/19/2010]		Vegetation= ; Slope = 3; Aspect= 210 ; Substrate= Duff; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= May be same population as Turn Island Campsite. Near campground and evidence of camping (trash,		
126	TESP_Mar25 (100522P000105)[6/19/2010]		Mature open forest (Western hemlock-Western red cedar). Very close to shoreline and near stream channel. Soil type: 234B, 236B, 2SW		
126	ACCS_Mar25 (EO181)[6/21/2010]		Vegetation= ; Slope = 22; Aspect= 190 ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= Located on a proposed logging road along a flowing creek in thick moss, Population disperses som		
126	TESP_Mar25 (100522P000107)[6/21/2010]		Streamside, thick mass groundcover bottom of draige. Western hemlock-Western red cedar in overstory. Soil type: 232B		

126	ACCS_Mar25 (EO181)[6/19/2010]		Vegetation= ; Slope = 100; Aspect= 300 ; Substrate= Duff; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= Site to steep to safely traverse further downslope. However, suitable habitat exists downslope		
127	TESP_Mar25 (100522P000104)[6/19/2010]		Steep west facing slope. Open mature Western hemlock-Western red cedar forest with litter/moss as domint groundcover. VAPA scattered, and low shrub. Soil type: 223B, 216D, 264		
127	ACCS_Mar25 (EO185)[7/02/2010]		Vegetation= ; Slope = 30; Aspect= 180 ; Substrate= Moss; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= Partial Shade; Comments= Located along creek side. Small occurrence for species.		
127	TESP_Mar25 (100522P000108)[no date]		Open tall canopy of Alnus rubra, Western hemlock, Western red cedar, with dense Vaccinium spp. understory and ground layer of mosses, Rubus, Coptis, Pyrola, Clintonia, Linea, and sparse Carex spp. Soil type: 232B		
128	TESP_Mar25 (100522P000108)[7/14/2022]		Open tall canopy of Alnus rubra, Western hemlock, Western red cedar, with dense Vaccinium spp. understory and ground layer of mosses, Rubus, Coptis, Pyrola, Clintonia, Linea, and sparse Carex spp. Soil type: 232B		
128	TESP_Mar25 (100522P000131)[7/27/2023]		Under hemlock spruce canopy on edge of forest/stream that leads down to beach		
128	CPNWH_April2025(ALA)[7/18/2001]		Open Thuja plicata - Tsuga heterophylla forest with mossy forest floor.		
129	CPNWH_April2025(ALA)[7/19/1982]		Hemlock-spruce forest with sparse.		

Polygonum minimum

Polygonum minimum [S. Watson]

Little mountain knotweed

Global Rank: **G5**

Alaska State Rank: **S1**



photo: © 2005 Keir Morse

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce OR isolated. *Polygonum minimum* is known from three estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Two of the occurrences are at Glory Lake and Upper Glory Lake on the mainland in locations 3.2 kilometers apart. One was located on a lateral moraine, above the lake edge, and the other on a high gradient alluvial fan of sandy gravel at the moraine toe slope (CPNWH 2023, USDA FS 2023). The other occurrence was on rocky lateral moraine at the face of Shakes Glacier in the Stikine-LeConte Wilderness (Duffy 2003, USDA FS 2023, ANHP ACCS 2023, CPNWH 2023). Surveyors noted that the Glory Lake occurrence was located in very disturbed habitat, on steep slides that roll into the water, and that plants were actively eroding off the steep gravel slopes. Surveyors noted that the Upper Glory Lake occurrence showed evidence of nearby landslide movement (USDA FS 2023). There is one other record in southeast Alaska. It is from 1951 with the location recorded as "13 miles N of Haines" (Appendix 1).

Criteria	*Rank*	*Rationale*
		Glacial moraine habitat is not frequently surveyed on the Tongass NF so the species may be under recorded for that reason (USDA FS 2023).
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G5, Alaska State Rank S1 British Columbia Province Rank S5, Yellow List; Montana S4, Washington, Oregon SNR. *Polygonum minimum* occurs in alpine to subalpine sites, in open or semi-barren soil across western North America (FNA 2020). In British Columbia this species is known to moist vernal sites to dry rocky slopes and forest openings in the lowland to alpine zones (Klinkenberg 2023). Although widespread across its range, occurrences on the TNF are distant from occurrences in British Columbia by over 482 kilometers (300 miles), and the southeast Alaska occurrences represent the northern edge of the range (CPNWH 2023).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). *Polygonum minimum* is a small annual species that disperses via seed held in achenes (FNA 2020). A study from the western Cascades in Oregon found seed production rates that averaged 10,000 seeds per square meter (Hickman 1977). This study additionally found that a larger proportion of *P. minimum* seeds succeeded in establishing plants relative to other annual *Polygonum* species that occur in alpine environments. Seeds of *Polygonum minimum* were found in gravels of third and fifth order streams in the western Cascades, suggesting that achenes may be dispersed via water (Harmon and Franklin 1995). This species was found in a variety of primary successional habitats, including pumice plains following the eruption of Mount Saint Helens (Titus et al. 1998).
4 Abundance on Tongass	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. The Glory Lake and Upper Glory Lake occurrences numbered three and 20 plants respectively in 2017 (USDA FS 2023). There is no abundance information noted for the Shakes Glacier occurrence (ARCTOS 2023).

Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Population trends for occurrences of *Polygonum minimum* on the TNF are unknown.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Glacial moraine habitat is abundant on the TNF and may be increasing with glacial retreat (Bennetsen et al. 2023). Glacial retreat at Shakes Glacier is a well-documented process (Hutten 2018). The occurrence at Glory Lake was noted as occurring in disturbed habitat on a steep slide (USDA FS 2023), reflective of the inherently dynamic nature of glacial moraine habitat.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Climate change may result in changes to the distribution of glacial moraine habitat. It is anticipated that glaciers will recede and snowpack decrease (Bennetsen et al. 2023), which has the potential to expose additional glacial moraine habitat. How these changes will affect habitat suitability for *Polygonum minimum* is unknown. However, the species appears to be resilient to disturbance and a colonizer of primary successional habitats so it is likely that *Polygonum minimum* will be resilient to these changes.
8 Life history and demographic	C	C = High reproductive rate and not especially susceptible to disease, predation, or competition; OR species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known. *Polygonum minimum* is an annual species that persists in habitats where available moisture in any given year is highly unpredictable (Hickman 1977). This species self-pollinates and is not reliant upon pollinators to set seed (Hickman 1977).

Criteria	*Rank*	*Rationale*
s		In the western Cascades, this species occupies a niche where water availability is not dependable enough for other species (Hickman 1977). That *Polygonum minimum* has been documented as occurring in primary successional habitats on Mount Saint Helens (Titus et al. 1998) suggest that it has a high ability to recover from disturbance events.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Polygonum minimum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No significant threats are known. While the habitat this species occupies on the Tongass NF has experienced disturbance due to erosion, the species appears to be resilient to such changes and is known to occupy primary successional habitat elsewhere.
- **Declining trends:** Population trends are unknown. Glacial moraine habitat is predicted to increase as glaciers recede.
- **Restricted ranges:** Occurrences on the Tongass NF may be disjunct (approximately 300 mi or 482 km from the next nearest records) and are at the northern edge of the species' known range.
- **Low population numbers or restricted ecological conditions:** Population numbers may be low, with two of the three documented occurrences with just 3 and 20 plants. However, glacial moraine habitat is not frequently surveyed on the Tongass NF so the species may be under recorded for that reason. Ecological conditions do not appear to be highly restricted.
- **Other factors:** *Polygonum minimum* self-pollinates and is not reliant upon pollinators to set seed. *Polygonum minimum* has been documented as occurring in primary successional habitats on Mount Saint Helens, suggesting it has a high ability to recover from disturbance events.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO1)[7/30/1993]**	**Shakes Glacier**	**rocky lateral moraine**	**NA**	**NA**
1	ACCS_Mar25 (EO1)[no date]	Stikine River, Shakes Glacier, lateral moraine at face of glacier. Note: 1993 glacier face has receeded approximately 2 miles from position indicated on topographic map. Survey site #R93-23.			
1	CPNWH_April2025(ALA)[7/30/1993]	Shakes Glacier, Petersburg Quad, Tongass National Forest.	Rocky lateral moraine.		
2*	**ACCS_Mar25 (EO0)[7/19/2017]**	**Mainland, Glory Lake, north of Farragut Lake.**	**Gravels on lateral moraine above lake edge.**		
2	CPNWH_Mar25 (UAAH12834)[7/19/2017]	Mainland, Glory Lake, north of Farragut Lake.	Gravels on lateral moraine above lake edge.		
2	TESP_Mar25 (100521P000135Y17)[7/17/2017]				
3*	**TESP_Mar25 (100521P000136Y17)[7/19/2017]**				
3	ACCS_Mar25 (EO3)[7/19/2017]	Tongass National Forest, Petersburg Ranger District, mainland, Glory Valley upper lake	Sandy gravel area S facing slope at lake, along high gradient alluvail fan.		
3	CPNWH_Mar25 (UAAH12566)[7/19/2017]	Tongass National Forest, Petersburg Ranger District, mainland, Glory Valley upper lake	Sandy gravel area S facing slope at lake, along high gradient alluvail fan.		
4	ACCS_Mar25 (EO2)[8/01/1951]	13 miles N of Haines	**Occurrences in SE AK not on TNF**		

*Polyozellus purpureoniger**

Polyozellus purpureoniger [Spirin & I. Saar, 2018]

Blue chanterelle

Global Rank: **SNR**

Alaska State Rank: **SNR**



photo: Kate Mohatt

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy.* **Polyozellus multiplex* was recently identified as a complex containing four new species: *P. atrolazulinus*, *P. mariae*, *P. marymargaretae*, and *P. purpureoniger* (Voitk et al. 2017). The range of *Polyozellus multiplex* is now considered restricted to eastern North America, and occurrences in Southeast Alaska once attributed to *P. multiplex* are now accepted as belonging to either *P. atrolazulinus* or *P. purpureoniger*. These species cannot be differentiated without analysis of spore morphology or genetics, and occurrences of both species are likely underreported in the region. Therefore, this evaluation looks at *Polyozellus spp.* as a whole in southeast Alaska. *Polyozellus* is known from 54 observations in southeast Alaska on iNaturalist (accessed 4 March 2025), as well as at least seven herbarium collections (MycoPortal 2025). The observations are scattered across the region. Across its range, *Polyozellus spp.* are typically found in mature conifer forests (MyCoPortal 2025). In Southeast Alaska, the genus tends to co-occur with lignin-rich duff and sometimes with *Vaccinium* sp. (MyCoPortal 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	D	*D = Insufficient information to draw inferences about criterion.* Global Rank GNR, Alaska State Rank SNR In North America, *Polyozellus purpureoniger* is only confirmed by DNA to be found in US states Washington and Alaska (MyCoPortal 2025). The *Polyozellus* complex as a whole however has a much wider range, and many records are not currently identified to species. Across their range, *Polyozellus spp.* occur in mature, mixed conifer forests at varying elevations which are not reported (MyCoPortal 2025) but may range from 15 m – 1150 m (elevation range estimated by using elevations of McKinley Lake Trail in Chugach National Forest and Easy Pass trailhead in North Cascades National Park). The mushroom is typically found in clusters on the ground in forests with species of *Abies, Pseudotsuga, Thuja* and *Tsuga* (MyCoPortal 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Polyozellus purpureoniger* is a mushroom-forming fungus species (MyCoPortal 2025, Voitk et al. 2017). Its main dispersal mechanism is by sexual spores which are dispersed by wind (Voitk et al. 2017). Fungal spore dispersal success is species-specific, dependent on spore size and ornamentation, volume of spores produced, environmental factors like wind and other dispersal agents like animals, and availability of suitable habitat and host plants (Golan and Pringle 2017, Peay and Bruns 2014).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion* None of the occurrences of *Polyozellus spp.* on the TNF have population estimates or any indication of abundance (MyCoPortal 2025, iNaturalist 2025).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends of *Polyozellus spp.* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality* The habitat for records of *Polyozellus spp.* on the TNF is in hemlock and spruce forests (CPNWH 2025, MyCoPortal 2025). These habitats can be grouped under old growth conifer forests which are common on the Tongass NF (Turner and Mallott 2025). Timber harvest has occurred in the vicinity of many of the records, but a suitable amount of habitat likely remains.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modifications is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors* Host tree removal from timber activities and climate change may impact the habitat of *Polyozellus spp.* Timber harvest has occurred in the vicinity of many of the records, and this activity will likely continue in the future. As an ectomycorrhizal fungal species, survival of *Polyozellus spp.* is dependent on living tree hosts (Voitk et al. 2017). However, given the scattered distribution of records, it is likely that many populations will remain in areas that will not experience timber harvest (Wilderness areas, for example). Climate change is predicted to cause many changes in southeast Alaska forests, some of which may impact survival of *Polyozellus spp.* (for example, increased insect outbreaks that affect host trees).
8 Life history and demographic	D	*D = Insufficient information to draw inferences about criterion.* *Polyozellus purpureoniger* is a mycorrhizal species which is a mutualist with species of *Abies, Picea,* and *Pinus* and can produce sporocarps annually from the end of August to the beginning of October (Voitk et al. 2017).

Criteria	*Rank*	*Rationale*
s		The life span of *Polyozellus* fungi has not been measured, but one report observed the close relative *Polyozellus multiplex* to fruit in the same site for 7 of the last 10 years (Voitk et al. 2017). No information about reproductive success and survival or mortality of *Polyozellus purpureoniger* from the TNF is available.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	☐	☐	X
Low populations or restricted ecological conditions	☐	☐	X
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

Polyozellus purpureoniger is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Timber harvest and climate change are potential threats. The species is ectomycorrhizal so any impacts to host trees (like timber harvest or increased insect outbreaks due to climate change) will affect survival of the fungus. However, the *Polyozellus spp.* are well-distributed across the planning area so will likely persist even in the face of localized impacts.
- **Declining trends:** Population trends are unknown. Habitat has seen some declines due to past timber harvest, but a suitable amount of habitat remains.
- **Restricted ranges:** The range of the species is difficult to determine given recent taxonomic changes.
- **Low population numbers or restricted ecological conditions:** Many records for *Polyozellus spp.* are scattered across southeast Alaska (50+ iNaturalist observations as well as seven herbarium collections), indicating that that the blue chanterelles as a group are not vulnerable to extirpation by stochastic events. Ecological conditions do not appear to be highly restricted. Because the many records are not able to be determined to species however, it is difficult to know whether *P. purpureoniger* in particular has

low populations or restricted ecological conditions.

- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Polystichum setigerum

Polystichum setigerum [(C. Presl) C. Presl, 1836]

Alaska sword fern

Global Rank: **G3**

Alaska State Rank: **S3**



Photo: CC0 from iNaturalist

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps.* *Polystichum setigerum* is known from 51 occurrences on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are scattered across much of the forest (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in spruce and hemlock forests, old growth, stream banks, thickets, cliffs and in disturbed areas (blowdown and logged areas) (Appendix 1). There are an additional five occurrences of this species in southeastern Alaska outside of the Tongass NF, on Dall Island at Grace Mountain, southeast of Ketchikan, near Yakutat, in Glacier Bay National Park, and on southern Mitkof Island (ANHP ACCS 2025). *Polystichum setigerum* is thought to be of hybrid origin, the result of a cross between *P. munitum* and *P. braunii* (FNA 2025). It could be confused with other *Polystichum* which are also present in southeast Alaska, in particular *Polystichum braunii and P. andersonii*.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F.* Global Rank G3, Alaska State Rank S3, British Columbia Rank S3 *Polystichum setigerum* is narrowly distributed in Alaska and British Columbia (FNA 2025). Southeast Alaska is the core of the species range; its range extends down the southern coast of British Columbia to the vicinity of Vancouver, and north to southcentral Alaska, with a western disjunct on Attu Island at the western tip of the Aleutian Islands (FNA 2025, Klinkenberg 2025). Habitat across the species' range is lowland coastal forests at elevations of 0 to 250 m (FNA 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Polystichum setigerum* is a perennial fern with a cespitose growth habit (FNA 2025). Plants rely on spore dispersal as it lacks a rhizomatous growth habit. Spore dispersal mechanisms for this species are not well documented.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Polystichum setigerum* is known from 51 occurrences on the Tongass NF (Appendix 1). Approximately a third of the occurrences have abundance information, with population counts ranging from 1 to 25 individuals or "genets" (Appendix 1). There are approximately 70 documented individuals across all occurrences.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends of occurrences of *Polystichum setigerum* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for *Polystichum setigerum* on the TNF is lowland coastal forests.

Criteria	*Rank*	*Rationale*
Habitat trend on Tongass NF		Timber harvest has occurred in the recent past within 1 km of Occurrence 3, 29, 31, and several others (USFS 2025c). Non-native plants that occur near some occurrences include *Phalaris arundinacea* (Occurrence 32, 34, 42. 43 and 52), *Poa pratensis* (Occurrence 1), and *Cerastium fontanum* (Occurrence 31) (USFS 2025b). While some habitat decline has likely occurred due to timber harvest and the introduction of non-native plants, a suitable amount of potential habitat remains.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Invasive species, timber activities, and climate change may impact the habitat of *Polystichum setigerum* in the future. Recent timber harvest activities have occurred in the vicinity of the Occurrence 3, 29, 31, and several others (USFS 2025c), and this activity will likely continue in the future. However, due to the scattered distribution of the species and high number of occurrences, many occurrences will likely remain unaffected by timber harvest. Most invasive plants that are currently present on the forest are adapted to high light conditions, thus the shady, forested habitats where *Polystichum setigerum* is found are not currently thought to be at high risk for invasion by non-native plants.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Polystichum setigerum* is a perennial fern with a cespitose growth habit (FNA 2025). It produces spores (FNA 2025). It is a hexaploid derivative hybrid between *P. munitum* and *P. braunii* (FNA 2025). The life span of *Polystichum* species is not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒

Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Polystichum setigerum is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** No significant threats are known. Timber harvest, invasive plants, and climate change may all impact the species in the future but are not likely to imperil the species' ability to persist on the Forest.
- **Declining trends:** Population trends are unknown. Habitat has experienced declines due to timber harvest, but a suitable amount remains.
- **Restricted ranges:** *Polystichum setigerum* is a somewhat narrow endemic whose range is centered on southeast Alaska.
- **Low population numbers or restricted ecological conditions:** With 51 known occurrences scattered across the Tongass NF, population numbers are unlikely to be low. Ecological conditions appear to be abundant on the Forest.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO14) [8/25/1956]**	**Washington Bay, Kuiu Island.**	**In spruce and hemlock forest.**		
1	ACCS_Mar25 (EO15) [8/10/1955]	Washington Bay, Kuiu Island.	In shady ravine in alder woods.		
1	ACCS_Mar25 (EO14) [8/15/1947]	Washington Bay, Kuiu Island.	Shady spruce forest.		
1	ACCS_Mar25 (EO15) [8/20/1947]	Washington Bay, Kuiu Island.	Rock crevice in stream bank.		
1	ACCS_Mar25 (EO15) [8/20/1947]	Washington Bay, Kuiu Island.	In devil climb thicket.		
1	ACCS_Mar25 (EO15) [8/05/1951]	Washington Bay. Kuiu Island.	In deep canyon growing in shade.		
1	CPNWH_Mar25 (WTU293245) [8/20/1947]	Washington Bay, Kuiu Island.	Rock crevice in stream bank.		
1	CPNWH_Mar25 (WTU293244) [8/15/1947]	Washington Bay, Kuiu Island.	Shady spruce forest.		
1	CPNWH_Mar25 (WTU118037) [8/20/1947]	Washington Bay, Kuiu Island.	In devil climb thicket.		
2*	**ACCS_Mar25 (EO17) [9/03/2024]**	**Baranof Island, Sitka, AK, US**			
2	ACCS_Mar25 (EO17) [5/13/1980]	Alexander Archipelago, Mt. Verstovia, Baranof I. 4 km E of Sitka	growing in a rocky gully on the lower parts of the mountain in a blowdown area, are last year's fronds		
2	ACCS_Mar25 (EO17) [10/12/2023]	Sitka, AK 99835, USA			
2	ACCS_Mar25 (EO17) [10/12/2023]	Sitka, AK 99835, USA			
2	ACCS_Mar25 (EO17) [5/16/2021]	Sitka County, US-AK, US			
2	ACCS_Mar25 (EO17) [11/10/2023]	Baranof Island, Sitka, AK, US			
2	ACCS_Mar25 (EO17) [8/15/2017]	Sitka County, US-AK, US			
2	ACCS_Mar25 (EO17) [5/02/2021]	Sitka, AK, USA			
2	ACCS_Mar25 (EO17) [5/02/2021]	Sitka, AK, USA			

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
2	ACCS_Mar25 (EO17) [6/24/2015]	Sitka, AK, USA			
2	ACCS_Mar25 (EO17) [10/30/2021]	Sitka County, US-AK, US			
2	ACCS_Mar25 (EO17) [7/15/2022]	Sitka County, US-AK, US			
2	ACCS_Mar25 (EO17) [7/13/2020]	Sitka, Alaska, United States			
2	ACCS_Mar25 (EO17) [7/13/2018]	Sitka County, US-AK, US			
2	ACCS_Mar25 (EO17) [6/15/2018]	Sitka County, US-AK, US			
2	ACCS_Mar25 (EO17) [5/16/2021]	Sitka, AK, USA			
2	ACCS_Mar25 (EO17) [6/02/2017]	Sitka, Alaska, United States			
2	ACCS_Mar25 (EO17) [12/28/2018]	Sitka County, US-AK, US			
2	ACCS_Mar25 (EO17) [5/17/2020]	Sitka County, US-AK, US			
2	CPNWH_April2025(ALA) [5/13/1980]	Alexander Archipelago, Mt. Verstovia,[X]Baranof I. 4 km E of Sitka, Sitka Quad, Tongass National Forest.	Growing in a rocky gully on the lower parts of the mountain in a blowdown area, are last year's fronds.		
3*	**ACCS_Mar25 (EO16) [1/08/2024]**	**Sitka, AK 99835, USA**			
3	ACCS_Mar25 (EO16) [11/27/2020]	Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [12/06/2020]	Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [12/23/2020]	Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [8/25/2019]	1000 Lake St, Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [12/08/2020]	Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [1/30/2024]	Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [12/07/2020]	Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [1/18/1981]	Alexander Archipelago, Baranof I., Sitka, about 1/3 mile up the Indian R. trail	open forest about 100 ft. from the river		
3	ACCS_Mar25 (EO16) [10/09/2020]	Sitka County, US-AK, US			
3	ACCS_Mar25 (EO16) [4/26/2020]	Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [12/30/2020]	Sitka, AK 99835, USA			

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
3	ACCS_Mar25 (EO16) [5/13/2021]	Sitka, AK, USA			
3	ACCS_Mar25 (EO16) [12/24/2020]	Kaasdaa Heen Cr / Indian River Rd, Sitka, AK 99835, USA			
3	ACCS_Mar25 (EO16) [8/10/2020]	Sitka National Historical Park, Sitka, Alaska, United States			
3	ACCS_Mar25 (EO16) [1/15/2021]	Sitka National Historical Park, Sitka, AK, US			
3	ACCS_Mar25 (EO16) [4/05/2020]	Sitka, AK, USA			
3	ACCS_Mar25 (EO16) [8/03/2019]	Sitka, AK, USA			
3	ACCS_Mar25 (EO16) [4/15/2004]	W side of island, Sitka National Historical Park, trail edbe between trail and Indian River	growing on vegetated rip-rap under western hemlock canopy, river-forest ecotone, only known plant of this species in the park		
3	ACCS_Mar25 (EO16) [6/25/2020]	Sitka, AK, USA			
3	ACCS_Mar25 (EO16) [9/12/2019]	Sitka, AK, USA			
3	ACCS_Mar25 (EO16) [8/14/2019]	Sitka, AK, USA			
4*	**ACCS_Mar25 (EO10) [no date]**	**Prince of Wales Island, Flicker Ridge, forest service road 2087. Survey site #R93-10.**			
5*	**ACCS_Mar25 (EO9) [7/22/1993]**	**Prince of Wales Island, Flicker Ridge**	**logged rocky slope**		
5	CPNWH_April2025(ALA) [7/22/1993]	Prince of Wales Island, Flicker Ridge, Petersburg Quad, Tongass National Forest.	Logged rocky slope.		
6*	**ACCS_Mar25 (EO11) [8/16/1981]**	**Tongass National Forest Baranof Island, southeast part, northeast side of Port Armstrong, about 300 feet west of old whale station.**	**Grassy upper beach meadow, about 20 feet east of P. Munitum.**		
7*	**ACCS_Mar25 (EO12) [7/24/2012]**	**Baranof Island, Big Branch Bay, mid bay, big lobe to E.**	**Forest, common.**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
7	CPNWH_April2025(ALA) [7/24/2012]	Baranof Island, Big Branch Bay, mid bay, big lobe to E, Port Alexander Quad.	Forest, common.		
8*	**ACCS_Mar25 (EO13) [6/01/1945]**	**Sergief Island, Stikine River mouth, 10 miles N of Wrangell**	**conifer forest, near small stream**		
9*	**ACCS_Mar25 (EO19) [9/11/2016]**	**Sitka County, US-AK, US**			
9	ACCS_Mar25 (EO19) [12/24/2020]	Sitka County, US-AK, US			
9	ACCS_Mar25 (EO19) [7/08/2006]	Sitka, AK, USA			
9	ACCS_Mar25 (EO19) [7/09/1994]	Alexander Archipelago, Baranov I., Indian R. valley, NE of Sitka, trail to Indian River Falls.	Sitka spruce-hemlock forest understory.		
9	ACCS_Mar25 (EO19) [7/15/2023]	Sitka County, US-AK, US			
9	ACCS_Mar25 (EO19) [5/13/1980]	Alaska, southeast. Baranof Island (West side). Mount Verstovia about 2 miles E of Sitka.	Growing in a rocky gully on the lower parts of the mountain in a blowdown area.		
9	ACCS_Mar25 (EO19) [5/03/2020]	Sitka County, US-AK, US			
9	ACCS_Mar25 (EO19) [7/11/2019]	Sitka, AK, USA			
9	ACCS_Mar25 (EO19) [6/13/2003]	Sitka, AK, USA			
10*	**ACCS_Mar25 (EO20) [6/28/2005]**	**Sitka C-7 Quad. Chichagof Island, Black River.**	**Riverbank about a quarter mile upriver from estuary.**		
10	ACCS_Mar25 (EO20) [6/28/2005]	Alexander Archipelago, Black R. (vic. Mouth), Chichagof I., ca. 0.25 mile upriver from estuary	river bank, growing with Streptopus amplexifolius, Osmorhiza sp., Trisetum spicatum, Tiarella trifoliata, Arnica latifolia, Viola sp., Rubus specatabilis, Alnus sinuata		
10	CPNWH_Mar25 (WTU408362) [6/28/2005]	Sitka C-7 Quad. Chichagof Island, Black River.	Riverbank about a quarter mile upriver from estuary. Associated plants: Streptopus amplexifolia, Osmorhiza sp., Trisetum spicatum, Tiarella trifoliate, Arnica latifolia, Viola sp., Rubus specatabilis, Alnus sinuate.		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
11*	**ACCS_Mar25 (EO21) [8/25/1979]**	**Tongass National Forest, Yakobi Island, northeast coast, small bay just west of Mite Island.**	**Just above tide line.**		
11	ACCS_Mar25 (EO21) [8/25/1979]	Alexander Archipelago, NE Yakobi I. opposite Mite I., small bay just W of Mite I., just above high tide line	woods just above high tide		
11	ACCS_Mar25 (EO21) [8/25/1979]	Alexander Archipelago, NE Yakobi I. opposite Mite I., small bay just W of Mite I., just above high tide line	woods just above high tide		
12*	**ACCS_Mar25 (EO22) [7/24/1967]**	**Coast Mts., Mendenhall Gl. (incl. visitor center), E of old powerhouse**	**common on rocky outcropping with willow, alder, spruce, mosses and Athyrium**		
13*	**ACCS_Mar25 (EO23) [7/16/1991]**	**Yakutat Foreland, Yakutat area, 0.3 km W of head of Russell Fjord, 59¿36'18"N, 139¿22'13"W, T27S, R36E, S8, NW1/4, NW1/4**	**western hemlock-Sitka spruce forest, growing on a steep grassy slope under the canopy**		
13	CPNWH_Mar25 (WTU332864) [7/16/1991]	Yakutat Area, 15 miles east of the town about 1/5 mile west of the head of Russell Fjord.	Western hemlock-Sitka spruce forest, growing on a steep grassy slope under the canopy.		
13	CPNWH_Mar25 (UAAH10732) [7/16/1991]	Yakatat area. About 15 miles E of the town about 1/5 mile west of the head of Russell Fjord. NW NW 1/4 Sec 8, T.27 S., R. 36 E. CRM.	Western hemlock-Sitka spruce forest, growing on a steep grassy slope under the canopy.	Spores.	
13	CPNWH_April2025(ALA) [7/16/1991]	Yakutat Foreland, Yakutat area, 0.3 km W of head of Russell Fjord, 59¿36'18"N, 139¿22'13"W, T27S, R36E, S8, NW1/4, NW1/4, Yakutat Quad.	Western hemlock-Sitka spruce forest, growing on a steep grassy slope under the canopy.		
14*	**ACCS_Mar25 (EO24) [7/16/1991]**	**Yakatat area. About 15 miles E of the town about 1/5 mile west of the head of Russell Fjord. NW NW 1/4 Sec 8, T.27 S., R. 36 E. CRM.**	**Western hemlock-Sitka spruce forest, growing on a steep grassy slope under the canopy.**		
15*	**ACCS_Mar25 (EO28) [7/03/1996]**	**N. Fork Thorne River. Stream side.**	**Coniferous forest.**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
15	CPNWH_Mar25 (UAAH9992) [7/03/1996]	N. Fork Thorne River. Stream side.	Coniferous forest.		
16*	**ACCS_Mar25 (EO29) [7/19/1975]**	**Yakutat, N. of Situk Lake**	**Along rocky streamin Picea forest**		
16	CPNWH_April2025(ALA) [7/19/1975]	Yakutat, N. of Situk Lake.	Along rocky stream in Picea forest.		
17*	**ACCS_Mar25 (EO3) [8/11/1993]**	**Prince of Wales Island, Moira Sound, head of Aiken Cove, ca. 500 ft. N of mouth of Aiken Creek**	**cedar-hemlock forest, bank of dry side channel of cobbles**		
18*	**ACCS_Mar25 (EO30) [6/05/1984]**	**Western Chichagof Island, Doolth Mt. T48S R57E S36 At Bart portal**	**In Hemlock-Spruce forest. Rocky area and cliffs in forest.**	**locally common**	
18	CPNWH_April2025(ALA) [6/05/1984]	Western Chichagof Island, Doolth Mountain T48S R57E S36, Sitka Quad, Alexander Archipelago, Chichagof Island.	In Hemlock-Spruce forest. Rocky are and cliffs in forest. Growing with moss and other ferns. Locally common.		
19*	**ACCS_Mar25 (EO32) [5/13/2017]**	**Sitka, AK, USA**			
20*	**ACCS_Mar25 (EO33) [10/31/2021]**	**Sitka, AK 99835, USA**			
21*	**ACCS_Mar25 (EO34) [8/16/2024]**	**Sitka County, US-AK, US**			
21	ACCS_Mar25 (EO34) [8/16/2024]	Sitka County, US-AK, US			
22*	**ACCS_Mar25 (EO35) [7/30/2012]**	**Sitka, AK, USA**			
23*	**ACCS_Mar25 (EO36) [9/01/2023]**	**Mendenhall Glacier, Juneau, AK, USA**			
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			
23	ACCS_Mar25 (EO36) [9/01/2023]	Mendenhall Glacier, Juneau, AK, USA			
23	ACCS_Mar25 (EO36) [9/29/2021]	Juneau, AK 99801, USA			
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
23	ACCS_Mar25 (EO36) [9/01/2023]	Juneau, AK, USA			
24*	**ACCS_Mar25 (EO37) [4/23/2024]**	**Lemon Creek Trail, Juneau, AK, US**			
25*	**ACCS_Mar25 (EO38) [8/21/1980]**	**About 28 miles N of Juneau. About 4 miles up the Eagle Glacier trail., Mt. St. Elias Quad, Tongass National Forest.**	**Growing in the forest near the trail.**		
25	CPNWH_April2025(ALA) [8/21/1980]	About 28 miles N of Juneau. About 4 miles up the Eagle Glacier trail., Mt. St. Elias Quad, Tongass National Forest.	Growing in the forest near the trail.		
26*	**ACCS_Mar25 (EO4) [7/19/2001]**	**Helm Bay, Cleveland Peninsula.**	**Mountain slope in coniferous woods.**		
27*	**ACCS_Mar25 (EO40) [6/09/2023]**	**Craig, AK 99921, USA**			
28*	**TESP_Mar25 (100521P000143Y20) [6/25/2020]**			**3 Genets counted. 1% cover.**	
28	ACCS_Mar25 (EO41) [6/24/2020]	Tongass National Forest: Mitkof Island, Woodpecker Cove	at stream edge within V-notches, forested Western hemlock/Vaccinium		
28	CPNWH_Mar25 (UAAH16209) [6/24/2020]	Tongass National Forest: Mitkof Island, Woodpecker Cove¶	at stream edge within V-notches, forested Western hemlock/Vaccinium¶		
29*	**TESP_Mar25 (100522P000215Y20) [7/17/2020]**			**2 Genets counted.**	
29	ACCS_Mar25 (EO42) [7/17/2020]	Tongass National Forest: Zarembo Island, Beach Road	side of boulder along stream in alluvial fan		
29	CPNWH_Mar25 (UAAH16208) [7/17/2020]	Tongass National Forest: Zarembo Island, Beach Road	side of boulder along stream in alluvial fan		
30*	**ACCS_Mar25 (EO43) [6/05/2024]**	**Mitkof Island, Petersburg, AK, US**			
31*	**ACCS_Mar25 (EO44) [8/01/2024]**	**Mitkof Island, Petersburg, AK, US**			
32*	**ACCS_Mar25 (EO45) [7/07/2018]**	**Tongass National Forest. Mitkof Island, Three Lakes Loop Road.**	**V notch with unstable side slope**		
32	CPNWH_Mar25 (UAAH15053) [7/01/2019]	Tongass National Forest. Mitkof Island, Three Lakes Loop Road.	V notch with unstable side slope.		
32	TESP_Mar25 (100521P000133Y19) [6/28/2019]			3 Genets counted. 1% cover.	

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
33*	**ACCS_Mar25 (EO46) [2/17/2024]**	**Petersburg, AK 99833, USA**			
34*	**ACCS_Mar25 (EO47) [7/31/2024]**	**Mitkof Island, Petersburg, AK, US**			
35*	**ACCS_Mar25 (EO48) [6/11/2022]**	**North Tongass Hwy / Across from Wards Cove Cannery, Alaska 99901, USA**			
36*	**ACCS_Mar25 (EO49) [8/12/2022]**	**Ketchikan Gateway County, US-AK, US**			
37*	**TESP_Mar25 (100552P000402Y12) [7/11/2012]**		**Relatively open understory forested wetland of LYAM/RUSP/ATFI, with regenerating TSHE (6-8 inch dbh) and ALRU (8-10 inch dbh) forest to the east, west, and north; and with shoreline fringe of mature trees to the south.**	**3 Genets counted. 1% cover. Three plants found within 0.5 acre area of forested wetland adjacent to small stream. Wetland dominated by LYAM, RUSP, ATFI. No additional plants observed within Survey Site 9.**	
37	ACCS_Mar25 (EO5) [7/11/2012]	Revillagigedo Island, Shrimp Bay, E of Chin Point, SW shore of bay.	Old growth forest along shoreline.	Uncommon.	
37	CPNWH_April2025(ALA) [7/11/2012]	Revillagigedo Island, Shrimp Bay, E of Chin Point, SW shore of bay, Ketchikan Quad, Tongass National Forest.	Old growth forest along shoreline, uncommon.		
38*	**ACCS_Mar25 (EO7) [no date]**	**On the Mountain by Yes Bay.**			
38	ACCS_Mar25 (EO7) [no date]	On the Mountain by Yes Bay.	In open coniferous woods.		
39*	**ACCS_Mar25 (EO8) [8/05/1993]**	**Coast Mts., Fish Cr., N of Hyder, trailhead at Mile 4.6 from Hyder intersection**	**cliff at creek margin**		
39	ACCS_Mar25 (EO8) [no date]	Misty Fiords, Hyder, Fish Creek, trailhead mile 4.6 from main town			

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
		intersection, follow trail to creek, at confluence of Fish and Slide Creek. Survey site #M93-50.			
39	CPNWH_April2025(ALA) [8/05/1993]	Coast Mts., Fish Cr., N of Hyder, trailhead at Mile 4.6 from Hyder intersection, Ketchikan Quad, Tongass National Forest.	Cliff at creek margin.		
40*	**ACCS_Mar25 (EO6) [6/01/1988]**	**Alexander Archipelago, Coronation I.**	**Needle Peak summit. NE-facing**		
40	CPNWH_April2025(ALA) [6/01/1988]	Alexander Archipelago, Coronation I., Craig Quad, Tongass National Forest, Alexander Archipelago.	Needle Peak summit. NE-facing.		
41*	**TESP_Mar25 (100521P000127Y16) [7/06/2017]**		**Slope position: BS. Substrate: Rock.**	**5 Genets counted.**	
42*	**TESP_Mar25 (100521P000134Y19) [8/20/2019]**			**5 Genets counted. 1% cover. along wet sideslope, full shade**	
43*	**TESP_Mar25 (100521P000137Y17) [8/01/2017]**			**3 Genets counted. 1% cover.**	
44*	**TESP_Mar25 (100521P000138Y17) [7/31/2017]**			**2 Genets counted. 1% cover.**	
45*	**TESP_Mar25 (100521P000142Y20) [6/24/2020]**			**3 Genets counted. 1% cover.**	
46*	**TESP_Mar25 (100522P000201Y12) [7/08/2012]**		**Streambank of high energy creek. Growing in shallow duff pocket in rocks, about 12" above current water line (~200' below road).**	**1 Genets counted. 1% cover. Only one plant found.**	
47*	**TESP_Mar25 (100522P000206Y12) [7/12/2012]**		**At lower end of slide chute tucked in on downslope side of boulder.**	**25 Genets counted. 1% cover. Isolated as well as forming fern glen. Likely more abundant but time not available**	

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
				for thorough search.	
48*	**TESP_Mar25 (100552P000405Y17) [6/27/2017]**		**Substrate: Rock**	**3 Genets counted. 1% cover. single pl at unit backline, 2 pl on side of V-notch**	
49*	**TESP_Mar25 (100552P000422Y22) [5/13/2022]**			**2 Genets counted. 0.5% cover. signle plants on colluvium below cliff face. 99% moss and liberwort ground cover**	
50*	**TESP_Mar25 (100552P000423Y22) [8/03/2022]**			**9 Genets counted. 0.5% cover. locally commin in creek at the head of hte lake as well as along the north-facing slope. scattered as groups of 1-3 plants**	
51*	**ACCS_Mar25 (EO39) [8/29/2023]**	**Prince of Wales-Hyder Census Area, AK, USA**			
51	ACCS_Mar25 (EO39) [8/31/2023]	Prince of Wales-Hyder Census Area, AK, USA			

Pseudocyphellaria perpetua

Pseudocyphellaria perpetua (*hawaiiensis*) [McCune & Miądl., 2002]

Gilded specklebelly lichen

Global Rank: **G5**

Alaska State Rank: **S2S3**



photo: (CCBY) Kevin Faccenda

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Isolated.* *Pseudocyphellaria perpetua* is known from one estimated occurrence on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The one occurrence is located in the Mendenhall glacier trail along the west end of the lake, 15 km northwest of Juneau (Appendix 1; CLH 2025, USFS 2025a). Occurrence 1 was collected adjacent to the Mendenhall Lake in the riparian area from an undocumented substrate (CLH 2025). This habitat is fairly atypical for this species, as it is usually found in mature forests. There are two occurrences of this species in southeastern Alaska outside of the Tongass NF (CLH 2025). This species may be confused for *Pseudocyphellaria crocata* which is also present nearby (CLH 2025, Miadlikowska et al. 2002). There are no subspecies of *Pseudocyphellaria perpetua* on the Tongass NF. This species was found to be synonymous with *Pseudocyphellaria hawaiiensis* in 2014 (Moncada et al. 2014).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside the Tongass National Forest or widely disjunct taxa for which the main distribution is a significant distance from the Tongass National Forest.* Global Rank G5, Alaska State Rank S2S3, Washington S1, Oregon S3, British Columbia S1 In North America, *Pseudocyphellaria perpetua* is present in four Canadian provinces and territories including British Columbia, New Brunswick, Nova Scotia, and Newfoundland and Labrador, as well as U.S. states Alaska, Washington, Oregon, California, Tennessee, North Carolina, and Maine (CLH 2025). It is also known from far east Russia (NatureServe 2025). Across its range, *Pseudocyphellaria perpetua* occurs in coastal, old growth or mature forests at elevations of 2 m to 2,100 m (CLH 2025, Miadlikowska et al. 2002). It is typically found as litterfall on branches in mesic forests of *Picea sitchensis*, *Pseudotsuga menziesii*, *Quercus* sp., and *Tsuga heterophylla* near a lake or near the coast (CLH 2025). The soils where this species are found are typically moist and adjacent to floodplains or wetlands (CLH 2025). In southeastern Alaska this species is known from one occurrence on the Tongass NF, as well as one occurrence near Haines and one near Skagway; the next nearest occurrences are approximately 745 miles to the northwest in Lake Clark National Park and Preserve in Alaska and approximately 745 miles to the southeast in Pacific Rim National Park in British Columbia (CLH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Pseudocyphellaria perpetua* is a lichen species which grows as an epiphyte (Miadlikowska et al. 2002). Its main dispersal mechanism is by asexual soredia (Miadlikowska et al. 2002), though some reports indicate this species also produces spores via apothecia (as *Pseudocyphellaria hawaiiensis*; Moncada et al. 2014). Dispersal distances for clonal propagules are limited, often falling between 15 to 30 meters from the lichen, and depend on wind direction, wind speed, forest density, and moisture levels (Armstrong 1994, Pasiche-Lisboa et al. 2019, Ronnås et al. 2017). Generally, asexual propagules are distributed with more abundance during periods of increased wind velocity and decreased humidity (Pasiche-Lisboa et al. 2019). For *Pseudocyphellaria perpetua* specifically, soredia, which contain fungal hyphae and cyanobacterial cells, are heavy and somewhat dispersal-limited (USDA & BLM 2020). This species is reported to grow in the upper to mid-canopy of *Picea sitchensis* forests and is most frequently encountered on fallen branches (Miadlikowska et al. 2002).

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The one occurrence of *Pseudocyphellaria perpetua* on TNF does not have population estimates or any indication of abundance (Appendix 1; CLH 2025, USFS 2025a).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends are unknown.
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The habitat for the only occurrence of *Pseudocyphellaria perpetua* on the TNF is adjacent to Mendenhall Lake alongside the trail to Mendenhall glacier near some human-built environments (CLH 2025). In adjacent locations to the north including in Klondike Gold Rush National Historical Park, it also occurs on rock wall or corticolous on trunks of *Betula* sp. near Chilkat State Park (Appendix 1; CLH 2025). These habitats can be grouped under mixed mature forests which are near the coast that is common on the Tongass NF (Turner and Mallott 2025). Most reports indicate that *Pseudocyphellaria perpetua* is closely associated with old-growth *Picea sitchensis* habitats (Miadlikowska et al. 2002, Moncada et al. 2014). Timber harvest has not occurred in the recent past in the vicinity of Occurrence 1 (USFS 2025d). However, this occurrence is found in between campgrounds and Mendenhall Glacier visitor center with recurring human foot traffic. Without follow-up visits to the riparian forest area at the one occurrence, there is not enough information to decide if the habitat has declined.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Timber harvest, human activities, climate change, and air pollution may impact the habitat of *Pseudocyphellaria perpetua*. Recent timber harvest activities have not occurred in the vicinity of Mendenhall Lake at Occurrence 1 (USFS 2025d), though this environment is surrounded by human recreation activity which will likely continue and could expand in the future. Air pollution is also a potential threat (NatureServe 2025). Future changes in temperature and precipitation patterns (climate change) are expected throughout the region (Halofsky 2025) but to what extent these changes will affect habitat suitability for *Pseudocyphellaria perpetua* is unknown.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Pseudocyphellaria perpetua* is described to some extent (Miadlikowska et al. 2002, Moncada et al. 2014). *Pseudocyphellaria perpetua* is a foliose cyanolichen that grows corticolous as an epiphyte on hardwood and conifer trees (Miadlikowska et al. 2002). This species is reported to sexually reproduce with apothecia (Moncada et al. 2014), and abundant asexual reproduction is through soredia held in yellow soralia along the margin (Miadlikowska et al. 2002). The life span of *Pseudocyphellaria* lichens has been measured for very few species, and generation time for the closely related species *Pseudocyphellaria crocata* ranges from 9–13 years (Larsson and Gauslaa 2011). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	X	☐	☐
Low populations or restricted ecological conditions	☐	☐	X
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

Pseudocyphellaria perpetua is not recommended as a Species of Conservation Concern for the following reasons:

Significant threats: Timber harvest, human activities, climate change, and air pollution may be threats to this species, but there is not enough information to determine if those threats are significant.

Declining trends: Population trends are unknown. Habitat trends at the one occurrence on the Tongass NF are unknown; habitat trends forest-wide have likely experienced impacts (i.e. past timber harvest in beach fringe) but are likely currently stable.

Restricted ranges: This one occurrence known on the Tongass NF, and three total in southeast Alaska. The next closest occurrences to southeast Alaska are approximately 750 miles away, so the southeast Alaska occurrences may be disjunct.

Low population numbers or restricted ecological conditions: One occurrence on the Tongass NF is known, with unknown population numbers. Habitat does not appear to be highly restricted, but it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.

Other factors: It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (SRP) [07/19/2015]**	**Mendenhall glacier area trail along west end of the lake, 15 km Northwest of Juneau**			
Occurrences in SE AK but not on the Tongass NF					
2	**CLH [2003-8-23]**	**United States, Alaska, NNW of Skagway, NNE of Dyea, E of Taiya River, Klondike Gold Rush National Historical Park, along Chilkoot Trail, near the trailhead**	**On rock wall**		
3	**CLH [2003-8-27]**	**United States, Alaska, Haines Borough, SE of Haines, Chilkat Peninsula, along and W of the main road to Chilkat State Park, at Mount Riley Trail trailhead**	**Corticolous on trunks of Betula**		

Pseudocyphellaria rainierensis

photo: (CC0) Stephen Sharnoff



Pseudocyphellaria rainierensis [Imshaug, 1950]

Oldgrowth specklebelly lichen

Global Rank: **G3**

Alaska State Rank: **S2S3**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps* *Pseudocyphellaria rainierensis* is known from at least* 12 estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). All occurrences were found in beach fringe forest growing on *Picea sitchensis, Tsuga heterophylla, Alnus viridis* ssp *sinuata, Alnus rubra, Rhododendron menziesii or Malus* sp. (CLH 2025). There are two occurrences of this species in southeastern Alaska outside of the Tongass NF (CLH 2025). Across its range, *Pseudocyphellaria rainierensis* is typically found in old growth forests of *Abies amabilis, Pseudotsuga menziesii, Thuja plicata,* and *Tsuga heterophylla* and riparian areas (CLH 2025). This species may be confused for *Pseudocyphellaria perpetua or P. mallota* which are also present nearby (CLH 2025). There are no subspecies of *Pseudocyphellaria rainierensis* on the TNF. *The 12 estimated occurrences in Appendix 1 are records from herbaria. The TNF database for lichen biomonitoring includes 44 records for the species, some of which may overlap with the 12 estimated occurrences in Appendix 1. Taking these records into account, there are likely approximately 30 occurrences scattered across the Forest, mostly south of Sitka.

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G3, Alaska State Rank S2S3 British Columbia S2S3, Washington S3, and Oregon S3. *Pseudocyphellaria rainierensis* is endemic to the Pacific Northwest of North America (NatureServe 2025, GBIF 2025), along the Coastal and Cascade ranges from southeast Alaska, through coastal British Columbia to northern Oregon (NatureServe 2025). Across its range, it is found in old growth forests at elevations of 0 m to 980 m (CLH 2025, NatureServe 2025). It occurs on sheltered or semi-exposed limbs or trunks of *Abies amabilis, Alnus* spp.*, Picea sitchensis, and Tsuga heterophylla* in moist, old growth forests, riparian zones, beach forest fringes, toe-slopes, and nutrient micro-sites on *Abies amabilis* in the dripline of neighboring *Callitropsis nootkatensis* (Beese et al. 2015, CLH 2025, NatureServe 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Pseudocyphellaria rainierensis* is an epiphytic lichen species (NatureServe 2025). Its main dispersal mechanism is by isidia and lobules (NatureServe 2025). Dispersal is limited by the distances that the heavier clonal propagules travel with passive assistance from wind, and influence from moisture conditions and forest stand dynamics (NatureServe 2025, Pasiche-Lisboa et al. 2019). Asexual propagules are likely distributed with more abundance during periods of increased wind velocity and decreased humidity (Pasiche-Lisboa et al. 2019, Ronnås et al. 2017). The limited distance of clonal propagules, habitat specificity, and scattered distribution contribute to the rarity of this species (Beese et al 2015, NatureServe 2025, Sillett 1994).
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Pseudocyphellaria rainierensis* is known from at least 12 occurrences on the Tongass NF (Appendix 1). Many of the records from lichen biomonitoring plots have an Abundance Rank of 3 (>10 individuals on the plot).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends are unknown.
6 Habitat trend on Tongass NF	A/B	*A: Decline in habitat quality or quantity/B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality* The habitat of *Pseudocyphellaria rainierensis* on the TNF is beach fringe forest. It is one of the lichen species most strongly restricted to old-growth forests (McCune and Geiser 2023). Historically, coastal forest was targeted for timber harvest because it was easy to access. Many coastal areas have been harvested, but a large amount of old growth beach fringe habitat remains, and the 2016 Forest Plan requires a beach buffer for harvest activity in old growth forest. Natural alteration of habitat at the beach fringe occurs as a result of wind and storm surges.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Rank B when no localized threats are documented, but there are general threats and stressors.* Threats include unscheduled tree cutting in beach fringe for free-use and recreation, air pollution impacts in popular marine anchorages, insect outbreaks that damage host trees, changes in shoreline structure due to wind events, and changes in sea level due to isostatic rebound or tectonic events. Climate change driven increased storm frequency and intensity may accelerate coastal erosion and windthrow of substrate trees (Halofsky et al draft). Higher wind speeds and larger storm swells are likely to lead to increased windthrow related disturbance events. Recent timber harvest activities have occurred in the vicinity of the forested wetlands at occurrences 3 and 11 (USFS 2025d), and this activity will continue on the Tongass NF. The species could be directly impacted by harvest in young growth habitat and indirectly impacted by harvest adjacent to the beach buffers. *Pseudocyphellaria rainierensis* responds negatively to disturbances such as fire and logging due to loss of suitable habitat and propagule sources (NatureServe 2025, Sillett 1994). However, this species shows some resilience to edge effects and can colonize younger

Criteria	*Rank*	*Rationale*
		forests from older source sites (Beese et al. 2015, Sillett and McCune 1998). Establishment success of new thalli is also determined by the environmental context of the source site (Sillett 1994). The greater similarity there is between source and recruitment sites, the greater the establishment success (Sillett 1994). It is unknown how *Pseudocyphellaria rainierensis* will respond to warming temperatures and projected summer drought stress projected for the region (Halofsky et al. DRAFT). However, many lichens have peak growth during wet seasons with little to no growth when it is dry (Ellis 2012), so changes in precipitation may affect growth patterns. Additionally, large atmospheric river storm events (Halofsky et al DRAFT) may contribute to erosion at the beach forest fringe that could result in loss of trees that are habitat for *Pseudocyphellaria rainierensis*. The impacts of these storms may be exacerbated by increased pest and disease pressure on trees (Halofsky et al. DRAFT). This species is also especially sensitive to acid deposition from air pollution and is an oligotroph, which categorizes it as more abundant under nitrogen deposition regimes below 4.2 kg N/ha/yr (USFS 2025e). Increased air pollution is not expected but localized emissions from boat or vehicle traffic could impact individuals.
8 Life history and demographics	B	*B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known.* *Pseudocyphellaria rainierensis* is a foliose green algal and cyano-lichen that grows as an epiphyte (NatureServe 2025, Sharrett et al. 2025). *Pseudocyphellaria rainierensis* rarely sexually reproduces with apothecia (Sillett and Goward 1998). Asexual reproduction is through isidia and lobules (NatureServe 2025, Sharrett et al. 2025). This species has higher initial growth rates on moss mats, but has better establishment success on bare bark after a year (Sillett and McCune 1998). This species grows relatively slowly with an average growth rate of 5.7+- 0.92% annually in Western Oregon (Sillett 1994). The life span of *Pseudocyphellaria* lichens is not known (Sharrett et al. 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information

Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	X	☐	☐
Low populations or restricted ecological conditions	☐	X	☐
Other factors (see conclusion rationale)	X	☐	☐

Conclusion Rationale

Pseudocyphellaria rainierensis is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Threats include unscheduled tree cutting in beach fringe for free-use and recreation, air pollution impacts in popular marine anchorages, insect outbreaks that damage host trees, changes in shoreline structure due to wind events, and changes in sea level due to isostatic reboun. Higher wind speeds and larger storm swells may lead to increased windthrow related disturbance events. How significant these threats are to the persistence of *Pseudocyphellaria rainierensis* is unknown.
- **Declining trends**: Population trends are not known. Past harvesting practices did target the beach fringe forests where this taxon, so some habitat was likely impacted in the past. Sea level changes and increased storm events may degrade beach fringe habitat through erosion and loss of trees.
- **Restricted ranges**: *Pseudocyphellaria rainierensis* is only known from Oregon to Southeast Alaska, and the Tongass NF is the north edge of the species' range.
- **Low population numbers or restricted ecological conditions**: While population numbers are unknown, there are likely at least 30 occurrences scattered across the Tongass NF, many of which had at least 10 individuals at the plot. Habitat for *Pseudocyphellaria rainierensis* is mostly old-growth beach fringe, which is not a highly restricted habitat type on the Tongass NF.
- **Other factors**: The growth rate of *Pseudocyphellaria rainierensis* has been measured and is slow, so the species would likely be slow to recover from disturbance. It mainly disperses by isidia and lobules (sexual reproduction is rare) so dispersal distances are likely limited.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH 2025 (SRP) [08/02/1992]**	**Tongass National Forest /Stikine Area; Sukoi Islands, Frederick Sound, Petersburg D-3**	**on beach with southern aspect; Assoc. Plants: *Picea sitchensis, Gramineae, Hieracium sp., Oplopanax horridum, Alnus sp., Tsuga heterophylla, Malus fusca, Maianthemum dilatatum*.**		
1	CPNWH 2025 (ALA) [03/19/2003]	Alexander Archipelago, Sukoi Island, eastern most of the small archipelago in Frederick Sound, southern exposure beach fringe., Tongass National Forest	Growing on *Menziesia ferruginea* branch. Beach fringe forest of *Picea sitchensis, Alnus rubra, Thuja plicata, Tsuga heterophylla*. Uplifted beach with *Vaccinium* sp.		
2*	**CPNWH 2025 (SRP) [07/17/2004]**	**Southeastern Alaska, Tongass National Forest, Kuiu Island, S. Kuiu Wilderness, Affleck Pt. on west side of Affleck Canal, at rocky point of peninsula between Bear Harbor and Affleck Canal. Quad Port Alex A-1.**	**S exposure. at exposed forest-marine ecotone, on old *Alnus rubra bole*. Also found with *Lobaria amplissima*.**		
3*	**CPNWH 2025 (ALA) [05/20/2003]**	**Mitkof Island, Sumner Straits, Blind Slough south, west side., Tongass National Forest**	**Growing on *Picea sitchensis* twig. Beach fringe forest of *Picea sitchensis, Alnus rubra*. Uplifted beach with *Vaccinium* sp., *Maianthemum* sp.**		
4*	**CPNWH 2025 (ALA) [07/13/2006]**	**Alexander Archipelago, south Etolin Island, south end of Burnett Inlet, east side across from north Burnett Island, west of Navy Lake., Tongass National Forest**	**Growing on *Picea sitchensis* twig. Beach fringe forest of *Picea sitchensis, Alnus rubra, Tsuga heterophylla*. Uplifted beach with *Vaccinium* sp.**		

5*	**CPNWH 2025 (ALA) [07/28/2003]**	**Gravina Island, Dall Head, east side., Tongass National Forest**	**Growing on *Alnus viridis* ssp *sinuata* twig. Beach fringe forest of *Picea sitchensis*, *Alnus rubra, Malus fusca, Tsuga heterophylla*. Uplifted beach with *Vaccinium* sp.**		
6*	**CPNWH 2025 (ALA) [08/09/1999]**	**Gravina Island, east side of Bostwick Inlet, beach fringe forest., Tongass National Forest**	**Growing on *Tsuga heterophylla* twig. Beach fringe forest of *Picea sitchensis, Thuja plicata, Alnus rubra.* Uplifted beach with *Vaccinium* sp.**		
7*	**CPNWH 2025 (BG) [09/12/1999]**	**City and Borough of Sitka, Baranof Island SW, 45 km S of Sitka, Yamani Islets, main island NE**	**Corticolous on shaded *Alnus sinuata.***		
7	CPNWH 2025 (BG) [09/12/1999]	City and Borough of Sitka, Baranof Island SW, 45 km S of Sitka, Yamani Islets, main island NE	Corticolous *on Picea sitchensis*, trunk; near upper edge of beach.		
7	CPNWH 2025 (BG) [09/12/1999]	City and Borough of Sitka, Branof Island SW, 45 km S of Sitka, Yamani Islets, main island E	Corticolous on *Picea sitchensis*, trunk of small tree.		
8*	**CPNWH 2025 (BG) [08/18/2003]**	**Mitkof Island, E side, NE of Hill Lake**	**Corticolous on *Alnus sitchensis* at upper edge of beach.**		
9*	**CPNWH 2025 (BG) [08/11/2003]**	**Coronation Island, Windy Bay, N side**	**Corticolous trunk of *Tsuga heterophylla* at upper edge of beach.**		
10*	**CPNWH 2025 (OSC) [06/23/2006]**	**FIA Site # 30182 2 280**			
11*	**CPNWH 2025 (ALA) [06/02/2005]**	**Alexander Archipelago, north Prince of Wales Island, Memorial Beach, Sumner Straits., Tongass National Forest**	**Growing on *Tsuga heterophylla* twig. Beach fringe forest of *Picea sitchensis, Alnus rubra, Malus fusca, Tsuga heterophylla.* Uplifted beach with *Vaccinium* sp.**		
12*	**CPNWH 2025 (ALA) [06/30/2003]**	**Kuiu Island, Tebenkof Bay, Explorer Basin, west side., Tongass National Forest**	**Growing on *Malus* bole. Beach fringe forest of *Picea sitchensis, Tsuga heterophylla, Thuja plicata*.**		

			Rocky head with *Vaccinium* sp., *Lysichitum americanum*.		

Ramalina obtusata

Ramalina obtusata [(Arnold) Bitter 1901]

Hooded Ribbon Lichen

Global Rank: **G5**
Alaska State Rank: **S1**

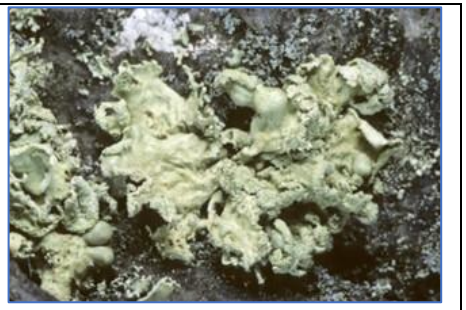


photo: Stephen Sharnoff (CC0)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Ramalina obtusata* is known from one occurrence on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is located on rocks by the eastern edge of Lake McDonald, southwest of Bald Mountain (Appendix 1; CPNWH 2025, Dillman et al. 2012, USFS 2025a). Occurrence 1 was collected in a mixed conifer deciduous poorly drained forest from a rock on the edge of the lake (Dillman et al. 2012). The occurrence is described from a shaded rock outcrop with high humidity, acidic geology and a stable environment (Dillman pers. comm., 2025). This habitat is typical for this species. A similar species, *Ramalina pollinaria*, is found in other parts of SE Alaska outside of TNF and in nearby British Columbia; though these species can be differentiated because *R. obtusata* has cup-like terminal soralia (Bowler 1974).
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank S1 Yukon and Northwest Territories SNR, British Columbia S4, Alberta, Saskatchewan, and Manitoba S3. There are several occurrences of this species in Southcentral Alaska on the Kenai Peninsula in spruce alder or paper birch, aspen, black cottonwood forest. (CLH 2025, CPNWH 2025). Additionally, there is an occurrence near the Southeast Alaska border in pine, aspen, and alder forest on the lower Stikine River in British Columbia. (CLH 2025).

Criteria	*Rank*	*Rationale*
		Across its range, *Ramalina obtusata* is typically found in forests of mixed conifer and deciduous species such as a spruce and alder forests (CLH 2025). Associated vascular species include *Picea sitchensis, Thuja plicata, Alnus rubra* and lichen species *Dermatocarpon miniatum* (CLH 2025). *Ramalina obtusata* is broadly distributed throughout the northern hemisphere (GBIF 2025), ranging from North America primarily along the Rocky and Appalachian Mountains, and across most mountain ranges of Europe as far south as the Caucasus and as far east as the Ural Mountains (GBIF 2025). It occurs in montane mixed coniferous forest in riparian areas at elevations of 0 m to 2200 m (CPNH 2025, GBIF 2025). Populations of *Ramalina obtusata* are scattered and widespread across North America; this species is present in British Columbia, Yukon, Alberta, Northwest, Saskatchewan Canadian provinces and territories and others farther east, as well as many US states such as Oregon, Idaho, Montana, South Dakota, Wisconsin and Michigan (CLH 2025). It is typically found on *Picea* spp., *Betula* spp., *Pinus* spp., and *Populus* spp., cliff faces, or siliciferous rock, and is often in partial shade, and sometimes near waterfalls (CLH 2025, CPNH 2025, GBIF 2025, Walker and Pystina 2005). In southeastern Alaska this species is known from one location on the Tongass NF; its range continues northwest in Alaska about 730 miles northwest to the Kenai Peninsula (CLH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Ramalina obtusata* is a lichen species which grows on rocks or tree bark (CLH 2025). Its main dispersal mechanism is by fragmentation of soredia (CLH 2025, McCune and Geiser 2023). Asexual propagules such as soredia, can be dispersed by wind or gravity. Dispersal of asexual propagules is dependent on wind direction and speed, and distance is likely within the tens of meters (Armstrong 1994, Ronnås et al. 2017). Lichen soredia can be dispersed vertically and horizontally within and between tree canopies, enabling effective short distance dispersal (Armstrong 1994).
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* There is no abundance information or population estimate for the one confirmed occurrence on TNF (Dillman et al. 2012).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Ramalina obtusata* on the TNF are unknown (Dillman et al. 2012, iNaturalist 2025, USFS 2025a).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for the one occurrence of *Ramalina obtusata* on the TNF is poorly drained forest habitat at low elevation (less than 100 ft) (Dillman et al. 2012). In adjacent locations including British Columbia, Canada, it also occurs in Pine/Aspen/Alder forest, or *Tsuga, Populus, Betula,* and *Picea* growing along talus slope, or spruce & lodge pole pine forest (Appendix 1; CLH 2025). These habitats can be grouped as poorly drained forest which often has saturated soils and are common on the Tongass NF (Turner and Mallott 2024). Past disturbances in this habitat have occurred primarily as a result of road construction (USDA 2016a) and past timber harvest. (Turner and Mallot 2024). However, trees in poorly drained habitat are typically marginal for harvest. This habitat is abundant and relatively stable.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* There is no information about threats specific to *Ramalina obtusata* at the one known location on the TNF (Dillman et al. 2012). It is unknown how *Ramalina obtusata* will respond to warming temperatures and projected summer drought stress projected for the region (Halofsky et al. 2024). However, many lichens have peak growth during wet seasons with little to no growth when it is dry (Ellis 2012), so changes in precipitation may affect growth patterns. Recent timber harvest activities have occurred in the vicinity of the poorly drained forest ecosystem at the occurrence near Lake McDonad (USFS 2025d), and this activity may continue in the future. This species may prefer humid, shady habitat and timber harvest could directly affect it if substrate was harvested or indirectly impact it through changes in canopy cover and light regimes. However, poorly drained forest does not typically produce large trees that are targeted for harvest and a large amount of forested area would remain intact.

Criteria	*Rank*	*Rationale*
		This species has intermediate sensitivity to acid deposition from air pollution (USFS 2025e, Walker and Pystina 2005). Increased air pollution is not expected at this location on the Tongass NF, but localized emissions from boat or vehicle traffic could impact individuals.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Ramalina obtusata* is a fruticose green-algal lichen that grows as an epiphyte or lithophyte (CLH 2025, McCune and Geiser 2023). *Ramalina obtusata* is not known to sexually reproduce with apothecia, in fact this is a defining characteristic of this species (CLH 2025, Mariraj et al. 2021). Asexual reproduction is through fragmentation of soredia (CLH 2025). The thallus of *Ramalina obtusata* is small, generally less than 3 cm long, and is partially hollow and sometimes transparent; the soredia are most often found beneath hooded lobe tips and are often cup- or lip-shaped (McCune and Geiser 2023). The life span and growth rates of *Ramalina* lichens have not been measured (CLH 2025, McCune and Geiser 2023, Walker and Pystina 2005).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Ramalina obtusata is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** There are no known localized threats to the one occurrence. Generalized threats include climate change, but it is unknown how the species will respond to increased temperatures, changes in precipitation patterns, and summer water deficits.
- **Declining trends:** Population trends for *Ramalina obtusata* are unknown. Habitat preferences are apparently broad and relatively stable.
- **Restricted ranges:** *Ramalina obtusata* is not a narrow endemic, populations are not disjunct, and the Tongass NF is not at the edge of the species range.
- **Low population numbers or restricted ecological conditions:** There is a single known occurrence on Tongass NF, so it may be vulnerable to stochastic events. The habitat as described is common on the Tongass NF, but it is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Personal communication

Notes from Karen Dillman about *Ramalina obtusata* observation on TNF via USFS ecologist Eric Rizzo via email May 2025.

Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**Dillman et al. 2012 [2000]**	**Alexander Archipelago, Cleveland Peninsula, Lake McDonald**	**on rock at lake edge**		

Ramalina subleptocarpha

photo: (CC0) Stephen Sharnoff



Ramalina subleptocarpha [Rundel & Bowler, 1976]

Slit-rimmed *Ramalina* lichen

Global Rank: **G4**

Alaska State Rank: **S2S3**

Species Assessment

Criteria	***Rank***	***Rationale***
1 Distribution on Tongass NF	A	*A = Scarce or isolated.* *Ramalina subleptocarpha* is known from two estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Occurrence 1 is located on the east side of Mitkof Island, northeast of Hill Lake, and northwest of Ideal Cove; Occurrence 2 is on Five Finger southern Island (Appendix 1; CLH 2025, iNaturalist 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in *Picea sitchensis* forest along the coast. Occurrence 1 was collected in shoreline forest habitat from twigs of *Picea sitchensis* (CLH 2025). Occurrence 2 "on spruce" (iNaturalist 2025). This habitat is typical for this species. There are no other occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025). There is a site in British Columbia on Haida Gwaii about 400 km (250 mi) south of Occurrence 1 (CLH 2025). Across its range, *Ramalina subleptocarpha* is typically found in coastal or exposed forest ecosystems of *Picea glauca, P. sitchensis,* and *Thuja plicata*, sometimes with *Alnus rubra* or *Malus* sp. (CLH 2025).

Criteria	Rank	Rationale
		This species may be confused for *Ramalina farinacea* which is also present and fairly abundant nearby but has narrower lobes and a different branching pattern (CLH 2025, McCune and Geiser 2023). There are no subspecies of *Ramalina subleptocarpha*.
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G3G5, Alaska State Rank S2S3, British Columbia S3S4, Idaho S3. *Ramalina subleptocarpha* is narrowly distributed east to west along the Pacific coastline and Rockies of North America but does range north to south along the coast from British Columbia to Baja California in Mexico and in the Puget Sound-Willamette trough (GBIF 2025, NatureServe 2025). In North America, *Ramalina subleptocarpha* is present in British Columbia as well as five US states: Alaska, Washington, Oregon, California, and Idaho (CLH 2025, NatureServe 2025). Across its range, *Ramalina subleptocarpha* occurs in riparian and coastal hardwood forests at elevations of 3 to 1500 m (GBIF 2025, NatureServe 2025). It is typically found on bark and wood substrate in maritime conditions or seasonally wet areas (McCune and Geiser 2023, Rundel and Bowler 1976). The nearest concentrated populations outside of TNF are southeast in the Puget trough in northwest Washington, the Willamette trough in Oregon, and near the Rockies in Idaho (CLH 2025). From the Tongass NF, its range continues northwest in Alaska 1,170 km to Alaska Maritime National Wildlife Refuge on the coast of Kodiak Island (CLH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat.* *Ramalina subleptocarpha* is a lichen species which grows as an epiphyte (McCune and Yang 2024). Its main dispersal mechanism is by soredia*;* apothecia are not seen (McCune and Geiser 2023, McCune and Yang 2024). Dispersal is dependent on wind direction and speed, and distance is likely within the 10s of meters (Armstrong 1994, Ronnås et al. 2017). Dispersal distances for clonal propagules are limited, often falling between 15 to 30 meters from the lichen, and depend on wind direction, wind speed, forest density, and moisture levels (Armstrong 1994, ECCC 2018, Pasiche-Lisboa

Criteria	Rank	Rationale
		et al. 2019, Ronnås et al. 2017). Generally, asexual propagules are distributed with more abundance during periods of increased wind velocity and decreased humidity (Pasiche-Lisboa et al. 2019).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* *Ramalina subleptocarpha* is known from two occurrences on the Tongass NF (Appendix 1). Neither occurrence has population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends are unknown.
6 Habitat trend on Tongass NF	A/B	*A/B = There has been a decline in habitat quality or quantity, but stable amounts of suitable or potential habitat remain.* The habitat for *Ramalina subleptocarpha* on the TNF is beach fringe forest (Appendix 1, CLH 2025, iNaturalist 2025). Historically, coastal areas were targeted for timber harvest because of ease of access and the quality of trees that grow there due to marine nutrient inputs. Under the 2016 Forest Plan coastal forest is protected from timber harvest with a 1000 foot buffer in old growth forest and a 200 foot buffer in young growth forest.
7 Habitat vulnerability or modification;	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* The beach fringe may be susceptible to increased beach erosion and storms that may impact trees that this lichen grows on. Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for humidity-dependent

Criteria	Rank	Rationale
other threats		species such as *Ramalina subleptocarpha* (Turner and Mallott 2025, Wiles and Warren 2025). However, it is difficult to predict how climate change will affect humidity and whether *Ramalina subleptocarpha* would be impacted.
8 Life history and demographics	B	*B = Low reproductive rate; or life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known.* *Ramalina subleptocarpha* is a fruticose green algal lichen that grows as an epiphyte (McCune and Yang 2024). *Ramalina subleptocarpha* rarely sexually reproduces with apothecia and never with perithecia; asexual reproduction is through soredia (CLH 2025, McCune and Yang 2024). The life span of *Ramalina* lichens has been measured for very few species; the lifespan of the congeneric *R. fraxinea* has been found to range from 20–30 years or longer (Yahr et al. 2024). The growth rate of an individual lichen is dependent on access to moisture in the environment and other climatic factors like light and temperature; most lichens grow very slowly and, if given the resources, can have a lifespan of up to hundreds of years (Beschel 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	☐	☐	X
Low populations or restricted ecological conditions	X	☐	☐
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

- **Significant threats**: Projected increases in temperature and altered precipitation patterns may impact the ability of this species to persist because it has high humidity requirements. However, interactions between species biology and future water availability and humidity are not well known.
- **Declining trends**: Population trends are not known. Historically coastal forest habitat was targeted for timber harvest but habitat is currently protected with a 1,000-foot buffer for timber sales and is relatively stable. Increased storm frequency or intensity could impact host trees. It is unknown whether *Ramalina Subleptocarpha* would be able to disperse following loss of host trees.
- **Restricted ranges**: The occurrences on the Tongass NF are approximately 250 miles from the closest known occurrence on Haida Gwaii.
- **Low population numbers or restricted ecological conditions:** With just two known occurrences, it may be vulnerable to exirpation by stochastic events, such as storm events that cause mortality of host trees. Known habitat is beach fringe forest, which is not a highly restricted habitat type on the Tongass NF. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors**: It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH 2025 (BG) [08/18/2003]**	**Mitkof Island, the E side, NE of Hill Lake, small point**	**Corticolous on dry twig(s) of *Picea sitchensis* at upper edge of beach and on tip of point.**		
2*	**iNaturalist 2025 [6/1/2023]**	**Five Finger southern Island**	**under Eagle nest on spruce**		

Ranunculus orthorhynchus var. orthorhynchus

Ranunculus orthorhynchus var. *orthorhynchus* [Hook.]

Straight-beak buttercup

Global Rank: **G5T5**
Alaska State Rank: **S3**



Photo: Gerald D. Carr (CC-BY-NC: iNaturalist 2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or Gaps* *Ranunculus orthorhynchus* var. *orthorhynchus* is known from 14 estimated occurrences on the Tongass NF (Appendix 1; Meridian Environmental 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The 14 occurrences are found in the southwestern part of the Tongass NF on Prince of Wales Island (9 occurrences), Heceta Island (1), Kuiu Island (1), Tuxecan Island (1), Tah Island (1), and San Fernando Island (1). Two occurrences are located in Wilderness Areas: Occurrence 6 on Prince of Wales Island and Occurrence 12 on Tah Island, both in the South Prince of Wales Wilderness (Appendix 1). An additional nine non-Forest occurrences of *Ranunculus orthorhynchus* var. *orthorhynchus* are located in southeast Alaska, with three on the mainland near Juneau, Yes Bay, and Anan Bay, and the rest occurring on the following islands: Prince of Wales (2 occurrences), Baranof (1), Gravina Island (1), Long Island (1), and Revillagigedo Island (1) (Appendix 1). Therefore, although the Forest occurrences are found in the southwestern part of the Tongass NF, this variety has been observed off Forest lands to the east on the mainland. These 23 southeast Alaska occurrences account for all but one of

Criteria	*Rank*	*Rationale*
		the known Alaskan occurrences of this variety and are at the northernmost extent of the North American range (Klinkenberg 2020, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Information recorded by observers and collectors indicates that *Ranunculus orthorhynchus* var. *orthorhynchus* grows in a variety of wetland habitats on the Tongass NF including lake shore, streamside, wet meadow, wet muck, beaver wetland, bay, and upper beach from sea level to approximately 100 meters in elevation (Appendix 1; Meridian Environmental 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Associated species observed or collected with *Ranunculus orthorhynchus* var. *orthorhynchus* on the Tongass NF include: *Tsuga heterophylla*, *Picea sitchensis*, *Salix scouleriana*, *Physocarpus capitatus*, *Ribes lacustre*, *Rubus stellatus*, *Rubus chamaemorus*, *Gaultheria shallon*, *Heracleum lanatum*, *Aquilegia formosa*, *Thalictrum occidentale*, *Polemonium acutiflorum*, *Ranunculus pacificus*, *Lysichiton americanum*, *Platanthera stricta*, *Elymus hirsutus*, *Bromus sitchensis*, *Podagrostis aequivalvis*, *Carex livida*, *Carex sitchensis*, and *Carex utriculata* (Appendix 1; Meridian Environmental 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). *Ranunculus orthorhynchus* var. *orthorhynchus* is the only variety of this species recognized by the Flora of Alaska project (Ickert-Bond et al. 2019). Some of the Alaskan herbarium specimens are still identified as *Ranunculus orthorhynchus* var. *alaschensis* or var. *hallii* which are considered synonyms of var. *orthorhynchus* in Alaska (Ickert-Bond et al. 2019).
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass NF* Global Rank: G5T5 (Secure), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: S5 (Secure): British Columbia; not present in any other provinces or territories. United States: S3 (Vulnerable): Alaska; all others are SNR (not ranked) or not present (NatureServe 2025). *Ranunculus orthorhynchus* var. *orthorhynchus* occurs in western North America from Alaska south to California (Whittemore 1997, Whittemore 2012, NatureServe 2025). It is also reported from the interior states of Colorado, Idaho, Montana, Nevada, and Utah (NRCS 2025).

Criteria	*Rank*	*Rationale*
		To the north, there is just one additional Alaskan occurrence at Prince William Sound, and to the east and south, the variety is common in coastal British Columbia and rare inland (Klinkenberg 2020). Across its range, *Ranunculus orthorhynchus* var. *orthorhynchus* is found in meadows, thickets, marshy areas, and along streambanks at elevations ranging from near sea level to approximately 7220 feet (2200 m) (Whittemore 1997, Whittemore 2012, Klinkenberg 2020).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Ranunculus orthorhynchus* var. *orthorhynchus* likely only reproduces via seed (Benson 1948, Whittemore 1997). The pollination system in *Ranunculus* is not specialized, and the flowers are visited by many kinds of insects (Steinbach and Gottsberger 1994, Kipling and Warren 2014). Efficiency of sexual reproduction is generally high in *Ranunculus* species lacking a means of reproducing clonally (Sarukhán 1974, Kocot et al. 2022). Demographic monitoring studies of other *Ranunculus* species lacking clonal reproduction indicate that their populations are generally stable or expanding in spite of turnover of individuals through mortality and recruitment (Sarukhán and Harper 1973, Cursach et al. 2013, Thoen et al. 2024). The fruits of *Ranunculus* are one seeded, dry achenes, with many achenes produced per flower, and the achene is dispersed with the seed inside (Whittemore 1997). Dispersal in other species of *Ranunculus* is via rainwater and water movement (Salisbury 1931, Noel et al. 2006), although it is also likely that animals and birds disperse this variety.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Ranunculus orthorhynchus* var. *orthorhynchus* is known from 14 estimated occurrences on six islands in the southwest part of the Tongass NF (Appendix 1). Only Occurrence 2 from Prince of Wales Island has a population count (15 plants). Two other occurrences have a qualitative estimate, indicating that the plants are "rare." Given the number of occurrences (14) and the few plants seen at three of the occurrences, it is likely that this variety is uncommon on the Tongass NF.
5 Population trend on	D	*D = Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Ranunculus orthorhynchus* var. *orthorhynchus* on the Tongass NF are unknown due to lack of repeat population counts of the occurrences (Arctos 2025, CPNWH 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
Tongass NF		
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity* *Ranunculus orthorhynchus* var. *orthorhynchus* is found in a wide variety of wetland habitats on the Tongass NF including lake shore, streamside, wet meadow, wet muck, beaver wetland, bay, and upper beach from sea level to approximately 100 meters in elevation (Appendix 1; Meridian Environmental 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). The habitat descriptions and locations near or within both freshwater wetlands and mapped Pacific Tidal Marsh (Boggs et al 2019) indicate that this variety tolerates both freshwater and brackish water. Freshwater habitats on the Tongass NF are grouped under the vegetation category forested and non-forested wetlands (or palustrine wetlands), which is a freshwater, non-tidal influenced vegetation type with saturated soil that is very common on the Forest (Turner and Mallott 2024). In contrast wetlands influenced by tides and the presence of brackish and saltwater are grouped under the category tidal wetlands (Turner and Mallott 2024). When undisturbed, freshwater wetlands on the Tongass NF have historically been very stable ecosystems, exhibiting high ecological integrity (Turner and Mallott 2024). The ecological integrity of tidal wetlands on the Tongass NF is currently only moderate due to the current impacts of climate change (Turner and Mallott 2024). Because landscape position, soil drainage, and hydrology are important drivers for forested and non-forested wetlands, with the level of soil saturation a factor in the species composition of a particular wetland (Turner and Mallott 2024), activities in the immediate vicinity that change hydrology, such as timber projects and road building, could cause a negative habitat trend. Of the 14 Tongass NF occurrences, seven are within one mile of a mapped historical or recent timber project (Appendix 1; USFS 2025d). The landscape near these seven occurrences has been greatly altered with both timber removal and road building. In addition, six of the occurrences are located within one mile of mapped non-native plants, with most within 1000 feet (Appendix 1; USFS 2025b). Non-native weeds that have been mapped (mostly along roads) in the vicinity of the

Criteria	*Rank*	*Rationale*
		occurrences include *Phalaris arundinacea*, *Cirsium vulgare, Poa palustris, Phleum pratense, Poa pratensis, Plantago major, Cerastium fontanum, Trifolium repens, Trifolium hybridum,* and *Taraxacum officinale*. The proximity of historical and recent timber harvest and non-native invasive species to occurrences of *Ranunculus orthorhynchus* var. *orthorhynchus* on the Tongass NF, as well as the current effects of climate change on tidal wetlands, indicates a negative trend in habitat.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Invasive species, timber activities, and climate change may impact the habitat of *Ranunculus orthorhynchus* var. *orthorhynchus*. Invasive species are known to be present in the vicinity of six occurrences of *Ranunculus orthorhynchus* var. *orthorhynchus* on the Tongass NF (Appendix 1; USFS 2025b). In every case, the weeds mapped close to the occurrence include reed canary grass (*Phalaris arundinacea*), a non-native plant with the ability to invade wetland habitats (APMC 2024). Therefore, there is a possibility that invasive species could outcompete *Ranunculus orthorhynchus* var. *orthorhynchus* in the future. In addition, timber harvest activities have occurred adjacent to or in the vicinity of *Ranunculus orthorhynchus* var. *orthorhynchus* (Appendix 1; USFS 2025d). If this activity continues to occur in the future, this could impact soil drainage, soil saturation, and hydrology of the palustrine wetland occurrences of *Ranunculus orthorhynchus* var. *orthorhynchus*; this in turn could affect species composition (Turner and Mallott 2024). Finally, climate change is considered to be the main future stressor of palustrine wetlands and tidal wetlands on the Tongass NF (Turner and Mallott 2024). Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for palustrine wetland species such as *Ranunculus orthorhynchus* var. *orthorhynchus* (Turner and Mallott 2024, Wiles and Warren 2024). Although it is expected that these ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2024). Similarly, the main future stressor for tidal wetlands is climate change, which is predicted to increase air and ocean temperatures, increase or intensify storm frequency, and cause sea level rise (Turner and Mallot 2024).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Ranunculus orthorhynchus* var. *orthorhynchus* is a perennial herb with decumbent to nearly erect stems 15 to 70 cm high (Benson 1948, Whittemore 1997). There is no published information on the reproductive success or demography of *Ranunculus orthorhynchus* var. *orthorhynchus*, either inside or outside of the planning unit. Given that its stems do not produce roots at the above-ground nodes and its subterranean roots generally do not form thickened storage organs (Benson 1948, Whittemore 1997), *Ranunculus orthorhynchus* var. *orthorhynchus* seemingly reproduces exclusively through seed production rather than vegetatively. The flowers are yellow (sometimes red on the undersurface) and appear in spring to early summer (April to July; Benson 1948, Whittemore 1997). The pollination system in *Ranunculus* is not specialized, and the flowers are visited by many kinds of insects (Steinbach and Gottsberger 1994, Kipling and Warren 2014). Efficiency of sexual reproduction is generally high in *Ranunculus* species lacking a means of reproducing clonally (Sarukhán 1974, Kocot et al. 2022). Demographic monitoring studies of other *Ranunculus* species lacking clonal reproduction indicate that their populations are generally stable or expanding in spite of turnover of individuals through mortality and recruitment (Sarukhán and Harper 1973, Cursach et al. 2013, Thoen et al. 2024).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☒	☐	☐
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Straight-beak buttercup (*Ranunculus orthorhynchus* var. *orthorhynchus*) is not recommended as a Species of Conservation Concern based upon the rationale below:

- **Significant threats:** While there are stressors from invasive species, timber activities, and climate change, these stressors have not yet been identified as leading to a reduction of occurrences of the species within the plan area.
- **Declining trends:** No population trend information is available. The proximity of historical and recent timber harvest and non-native

invasive species to occurrences of *Ranunculus orthorhynchus* var. *orthorhynchus* on the Tongass NF, as well as the current effects of climate change on tidal wetlands, indicates a negative trend in habitat.

- **Restricted ranges:** *Ranunculus orthorhynchus* var. *orthorhynchus* may be at the northern extent of its range on the southern half of the Tongass NF, though there is one historic collection near Juneau and on in southcentral Alaska.
- **Low population numbers or restricted ecological conditions:** With twenty-three occurrences in southeast Alaska, this species is likely uncommon in the region, but population numbers are likely not low enough for the taxon to be vulnerable to extirpation by stochastic events. *Ranunculus orthorhynchus* var. *orthorhynchus* is found in a wide variety of wetland habitats on the Tongass NF.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ANHP ACCS_Mar25 (EO13)[6/27/2018]**	**Prince of Wales-Outside Ketchikan**	**Hemlock forest, lake edge, organic soil, full shade**		**Southern subpopulation 0.03 mile from 1982 timber project. 0.06 mile from weeds: Plantago major, Ranunculus repens, Phleum pratense, Phalaris arundinacea, Poa annua, Taraxacum officinale, Cerastium fontanum, Trifolium repens.**
1	CPNWH_Mar25 (UAAH15318)[6/27/2018]	Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.	Hemlock forest, lake edge, organic soil, full shade. [Collected on same day, in same place and habitat: Ranunculus pacificus, Thalictrum occidentale, Elymus hirsutus, Physocarpus capitatus, Bromus sitchensis]		
1	ANHP ACCS_Mar25 (EO13)[6/25/1996]	[Prince of Wales Island]TuxecanEIS, Sarkar Lk, 20660Rd, lakeshore	lakeshore		
1	USFS-TESP_Mar25 (100554P000012)[6/25/1996]	[Prince of Wales Island]TuxecanEIS, Sarkar Lk, 20660Rd, lakeshore			
2*	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:250710)[7/13/2013]**	**Prince of Wales Island, N end of island, Red Bay, SW end of bay, Petersburg Quad, Alexander Archipelago.**	**Small windthrow gap in old growth forest, uncommon. [no other plants collected with this collection]**	**uncommon**	
2	Meridian Environment 2014; USFS-TESP_Mar25 (100554P000523Y13)[7/13/2013]	[Prince of Wales Island] Survey 507, Red Bay	Plants located in small opening (wind disturbance) in wet muck. Limestone rocks upslope roughly 300 feet away. [From Meridian Environmental (2014): western hemlock and mixed conifer forest, beaver-influenced riparian and	15 plants	0.08 mile from timber project from 1984 and 0.5 mile from multiple weeds: Phalaris arundinacea, Trifolium repens, Trifolium hybridum, Pheum pratense, Taraxacum officinale, Plantago major.

			wetland habitat, and estuary with Heracleum lanatum, Lysichiton americanum, Tsuga heterophylla, and Picea sitchensis]. 0.1 mile from mappedd Callitropsis nootkatensis wetland and 0.15 mile from mapped Pacific tidal marsh.		
3*	**ANHP ACCS_Mar25 (EO21)[7/12/1999]**	**[Prince of Wales Island] Coffman Cove Rd,Hatchery Cutoff, 30-30**		**rare**	
3	USFS-TESP_Mar25 (100554P000010)[7/12/1999]	[Prince of Wales Island] Coffman Cove Rd,Hatchery Cutoff, 30-30	On border of both mapped Pacific Tidal Marsh and mapped Callitropsis nutkatensis wetland.		0.1 mile from 1977 timber projects. 0.08 mile from numerous weeds: Cirsium vulgare, Poa palustris, Plantago major, Phalaris arundinacea, Phleum pratense, Poa pratensis, Trifolium repens.
4*	**ANHP ACCS_Mar25 (EO19)[6/09/1998]**	**[Prince of Wales Island, South Arm of Moira Sound] MoiraTS, So Arm LTF,U692-13**		**avoid pop?**	
4	USFS-TESP_Mar25 (100551P000057)[6/09/1998]	[Prince of Wales Island, South Arm of Moira Sound] MoiraTS, So Arm LTF,U692-13	Located within mapped Pacific Tidal Marsh and 0.04 mile from mapped Callitropsis nutkatensis wetland.		
5*	**ANHP ACCS_Mar25 (EO18)[6/18/1997]**	**[Prince of Wales Island] Cholmondeley TS, U675-030, Rd2170, Sunny Cove**	**Sunny Cove**		
5	USFS-TESP_Mar25 (100551P000026)[6/18/1997]	[Prince of Wales Island] Cholmondeley TS, U675-030, Rd2170, Sunny Cove	Sunny Cove . Located 0.03 mile from mapped Pacific Tidal Marsh and 0.06 mile from mapped Callitropsis nootkatensis wetland.		
6*	**ANHP ACCS_Mar25 (EO17)[8/13/1996]**	**[Prince of Wales Island] South Prince of Wales Wilderness, Hunter Bay, on beach**	**Hunter Bay,on beach**		
6	USFS-TESP_Mar25 (100551P000074)[8/13/1996]	[Prince of Wales Island] South Prince of Wales Wilderness, Hunter Bay, on beach	Located on border of mapped Pacific Tidal Marsh and 0.07 mile from mapped Callitropsis nootkatensis wetland.		
7*	**ANHP ACCS_Mar25**	**[Prince of Wales Island] Tuxecan EIS,**	**Streamside [Maps to Gutchi Creek near jct of North Prince of**		

	(EO14)[8/07/1996]	**jct.20&30rds,W of rd, streamside [Maps to Gutchi Creek near jct of North Prince of Wales Rd and Coffman Cove Road]**	**Wales Rd and Coffman Cove Road]**		
7	USFS-TESP_Mar25 (100554P000027)[8/07/1996]	[Prince of Wales Island] Tuxecan EIS, jct.20&30rds,W of rd, streamside [Maps to Gutchi Creek near jct of North Prince of Wales Rd and Coffman Cove Road]	Streamside [Maps to Gutchi Creek near jct of North Prince of Wales Rd and Coffman Cove Road]. Located on border of mapped Callitropsis nutkatensis wetland.		0.17 mile from 1982 timber project. 0.06 mile from Phalaris arundinacea and other weeds slightly farther away.
8*	**ANHP ACCS_Mar25 (EO10)[8/11/1993]**	**Prince of Wales Island, Moira Sound, N Arm, S shore of outlet of Miller Lake, Tongass National Forest**	**NE-facing limestone exposure**		
8	Arctos 2025, CPNWH_April2025 (ALA9690-UAM:Herb:9690)[8/11/1993]	Prince of Wales Island, Moira Sound, N Arm, S shore of outlet of Miller Lake, Tongass National Forest	NE-facing limestone exposure. [Collected on same date, in same place and habitat: Aster subspicatus, Ribes lacustre, Polypodium vulgare, Physocarpus capitatus, Asplenium viridus). Located close to mappedPacific Tidal Marsh and Callitropsis nootkatensis wetland.		
9*	**ANHP ACCS_Mar25 (EO8)[6/23/1979]**	**Prince of Wales Island. Edge of Balls Lake .**	**Wet meadow. [Collected on same date in same location and habitat: Carex livida, Rubus stellatus, Rubus chamaemorus, Plantago macrocarpa]. Located 0.1 mile from mapped Callitropsis nutkatensis wetland.**		**0.5 mile from 1989 and 2017 timber projects. 0.05 mile from numerous mapped weeds: Cirsium vulgare, Plantago major, Cerastium fontanum, Trifolium repens, Phalaris arundinacea, Taraxacum officinale.**
10*	**ANHP ACCS_Mar25 (EO22)[6/29/2016]**	**Kuiu Island, northeast head of Security Bay, Tongass National Forest, Petersburg Ranger District.**	**Upper beach, just above logs; sandy substrate.**		
10	CPNWH_Mar25 (UAAH12567)[6/29/2016]	Kuiu Island, northeast head of Security Bay, Tongass National Forest, Petersburg Ranger District.	Upper beach, just above logs; sandy substrate. Located adjacent to Callitropsis nootkatensis wetland.		0.15 mile from 1942 timber project, and 0.25 mile from numerous projects from 1970s , and 0.5 mile from numerous projects from 1970s and 1980s.
11*	**ANHP ACCS_Mar25**	**[Tuxecan Island] Tuxecan Isl EIS, TargetSurvey, NichinCove**	**Cove . Located on border of mapped Callitropsis nootkatensis**		**0.25 mile from 1974, 1986, 2008 timber projects. 0.25 mile from Phalaris arundinacea.**

	(EO15)[8/13/1996]		**wetland and 0.1 mile from mapped Pacific Tidal Marsh.**		
11	USFS-TESP_Mar25 (100554P000030)[8/13/1996]	[Tuxecan Island] Tuxecan Isl EIS, TargetSurvey, NichinCove			
12*	**ANHP ACCS_Mar25 (EO16)[8/13/1996]**	**Tah Island, South Prince of Wales Wilderness, on shoreline**	**On shoreline**		
12	USFS-TESP_Mar25 (100551P000076)[8/13/1996]	Tah Island, South Prince of Wales Wilderness, on shoreline	Located 0.2 mile from mapped pacific tidal marsh and 0.05 mile from mapped Callitropsis nootkatensis wetland.		
13*	**Arctos 2025 (ALA11718-UAM:Herb:11718); ANHP ACCS_Mar25 (EO12)[7/12/1994]**	**Heceta Island, Port Alice, road system between Port Alice and Bald Mtn. Tongass National Forest.**	**meadow, grown-over beaver pond. [Collected on same date in same place and habitat: Carex sitchensis, Carex utriculata, Platanthera stricta, Podagrostis aequivalvis, Polemonium acutiflorum]**	**rare**	
14*	**Arctos 2025 (ALA11627-UAM:Herb:11627);ANHP ACCS_Mar25 (EO11)[6/27/1994]**	**San Fernando Island, Fern Point, Tongass National Forest**	**forest-beach margin, moist herbaceous sites [collected on same date in same location and habitat: Salix scouleriana, Trisetum cernuum, Gaultheria shallon, Vicia gigantea, Elymus hirsutus, Aquilegia formosa]. Located on border of mapped Pacific Tidal Marsh.**		
		NOT ON TONGASS NF			
15*	**ANHP ACCS_Mar25 (EO20)[6/22/1999]**	**[Prince of Wales Island] Coffman CoveRd,Rd23/30,N.edge,rare**		**rare**	
15	USFS-TESP_Mar25 (100554P000001)[6/22/1999]	[Prince of Wales Island] Coffman CoveRd,Rd23/30,N.edge,rare			
16*	**ANHP ACCS_Mar25 (EO5)[7/31/1936]**	**[Prince of Wales Island] Craig**	**Roadside**		

17*	**ANHP ACCS_Mar25 (EO6)[6/02/1939]**	**Gravina island, Ketchican**	**Open grounds**		
18*	**ANHP ACCS_Mar25 (EO4)[6/01/1944]**	**[Revillagigedo Island] Ketchican**			
18	ANHP ACCS_Mar25 (EO4)[8/01/1927]	[Revillagigedo Island] Ketchican	roadside		
19*	**ANHP ACCS_Mar25 (EO1)[no date]**	**Shores of Yes Bay. [likely near Yes Bay Lodge. Shores on the bay are not within the Tongass NF footprint]**			
20*	**ANHP ACCS_Mar25 (EO2)[6/27/1915]**	**Mainland, Anan Creek.**	**Edge of forest at high tide.**		
20	ANHP ACCS_Mar25 (EO2)[7/28/1993]	Tongass National Forest Anan Bay, W end Bradfield Canal. [Note: verbatim locality just says Anan Bay, W end Bradfield Canal. It does not say Tongass NF, and habitat is marsh in brackish lagoon, likely Anan Lagoon].	marsh in brackish lagoon		
20	CPNWH_April2025 (ALA)[7/28/1993]	Anan Bay, W end Bradfield Canal, Bradfield Canal Quad, Tongass National Forest. [Note: verbatim locality just says Anan Bay, W end Bradfield Canal. It does not say Tongass NF, and habitat is marsh in brackish lagoon, likely Anan Lagoon].	Marsh in brackish lagoon.		
20	Klinkenberg, 2020 [7/2/1894]	Bradfield Inlet (vague location, unable to georeference, placed with Anan Bay specimens)			

21*	**ANHP ACCS_Mar25 (EO7)[6/10/1973]**	**Tongass National Forest, Coast Mts., Juneau, Road to A-J (Alaska-Juneau) Mine.**	**Damp, rocky soil at**		
22*	**ANHP ACCS_Mar25 (EO3)[8/16/1924]**	**[Baranof Island] Sitka**	**Wetland**		
23*	**Klinkenberg, 2020 [6/20/1897]**	**[Long Island], Howkan**	**Abundant along shore out in clearings**		

Ranunculus pacificus

Ranunculus pacificus [(Hultén) L.D. Benson]

Pacific buttercup

Global Rank: **G3**
Alaska State Rank: **S3**

Photo: © 2025 WTU Herbarium (used with permission)



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy or Gaps* *Ranunculus pacificus* is an Alaskan endemic (Whittemore 1997, NatureServe 2025, NRCS 2025) that is known from 25 estimated occurrences on the Tongass NF (Appendix 1; Meridian Environmental 2011, 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The 25 occurrences are found on the Yakutat Foreland (4 occurrences), and on the following islands: Prince of Wales (9 occurrences), Kupreanof (2), Kuiu (2), Chichagof (2), Tuxecan (1), Kosciusko (1), Lemesurier (1), Noyes (1), Farm (1), and Coronation (1) (Appendix 1). Occurrence 23 on Noyes Island is the southernmost known occurrence of this Alaskan endemic (Arctos 2025, CPNWH 2025, SEINet 2025). Five of the Tongass NF occurrences are located in Wilderness Area: Occurrence 2 in the Russell Fjord Wilderness in the Yakutat Foreland, Occurrence 14 in the Petersburg Creek-Duncan Salt Chuck Wilderness on Kupreanof Island, Occurrence 22 in the Pleasant/Lemusurier/Inian Islands Wilderness on Lemesurier Island, Occurrence 24 in the Stikine-LeConte Wilderness on Farm Island, and Occurrence 25 in the Coronation Island Wilderness on Coronation Island (Appendix 1).

Criteria	*Rank*	*Rationale*
		An additional eight non-Forest occurrences of *Ranunculus pacificus* are located in southeast Alaska, with four on the mainland (Yakutat Foreland, Chilkat Peninsula, Glacier Bay, Juneau) and three on the following islands: Revillagigedo, Baranof, Wrangell; the eighth non-Forest occurrence has a very vague label location that refers to both the mainland and Shipley Bay and could not be georeferenced (Appendix 1). Information recorded by observers and collectors indicates that on the Tongass NF, *Ranunculus pacificus* grows in riparian, lakeshore and upper beach meadow or beach forest fringe habitat from sea level to approximately 100 meters in elevation (Appendix 1; Meridian Environmental 2011, 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Beach habitat substrates include sand, pebbles and gravel. In riparian habitat the species is found in wet meadows along streams and adjacent to lakes in organic soils, rocky areas, and on gravel bars. Survey reports that address this species on Kosciusko, Prince of Wales, and Tuxecan islands (mainly in fresh-water habitats) indicate that *Ranunculus pacificus* is often located just above the zone of semi-frequent flooding, at the upper elevation of forb-rich vegetation, but usually outside the shade of shrubs and forest, suggesting the species is restricted by light and water requirements (Meridian Environmental 2011, 2014). Occurrences on the Tongass NF are found on volcanic, granitic, limestone, and other substrates (Appendix 1; USGS 2025); approximately 15 could be carbonate influenced, while 10 are likely not carbonate influenced (Appendix 1; USGS 2025). Associated species observed or collected with *Ranunculus pacificus* on the Tongass NF include: *Tsuga heterophylla*, *Picea sitchensis*, *Alnus sitchensis*, *Acer* sp., *Viburnum edule*, *Physocarpus capitatus*, *Rubus parviflorus*, *Rubus spectabilis*, *Heracleum lanatum*, *Ligusticum scothicum*, *Lathyrus japonicus*, *Aquilegia formosa*, *Thalictrum occidentale*, *Potentilla anserina*, *Athryrium filix-femina*, *Pteridium aquilinum*, *Deschampsia cespitosa*, *Leymus mollis*, *Juncus ensifolius*, *Scirpus microcarpus, Carex sitchensis*, and *Carex flava* (Appendix 1; Meridian Environmental 2011, 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a).
2 Distribution in surrounding	B	*B = Limited distribution outside the TNF* Global Rank: G3 (Vulnerable), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks:

Criteria	*Rank*	*Rationale*
geographic area		United States: S3 (Vulnerable): Alaska; not present in any other states or in any Canadian provinces or territories (NatureServe 2025). *Ranunculus pacificus* is a perennial herb in the Ranunculaceae and is endemic to Alaska (Welsh 1974, Whittemore 1997, NatureServe 2025, NRCS 2025). The 33 (25 on the Tongass NF, 8 off the Forest) southeast Alaska estimated occurrences account for a majority of the known Alaskan occurrences of *Ranunculus pacificus* which occurs in coastal southeastern, south-central, and southwestern Alaska, and in the Alaska Peninsula (ANHP-ACCS 2025, Arctos 2025, CPNWH 2025, SEINet 2025). *Ranunculus pacificus* grows in moist sites near the coast in meadows and along streams at elevations ranging from sea level to approximately 25 feet (8 m) (Welsh 1974, Whittemore 1997, Arctos 2025, CPNWH 2025). However, on the Tongass NF, elevations of 100 m have been recorded (Appendix 1).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Ranunculus pacificus* grows riparian, lakeshore and beach habitat across the Tongass NF (Appendix 1; Meridian Environmental 2011, 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). *Ranunculus pacificus* is a perennial herb that lacks the type of underground stems and roots that would allow for vegetative (clonal reproduction), and likely only reproduces via seed production (Benson 1948, Whittemore 1997). The fruits of *Ranunculus* are one seeded, dry achenes with many achenes produced per flower, and the achene is dispersed with the seed inside (Whittemore 1997). Dispersal in other species of wet habitat *Ranunculus* is via rainwater and water movement (Salisbury 1931, Noel et al. 2006), although animals and birds may also disperse this species.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Ranunculus pacificus* is known from 25 estimated occurrences across the Tongass NF (Appendix 1; Meridian Environmental 2011, 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Six occurrences have populations counts: Occurrence #6 has 50 plants, #16 has 30, #7 has 20, #21 has 10, #14 has 7, and #8 has 4. In addition, three

Criteria	*Rank*	*Rationale*
		occurrences (#s 2, 18, and 22) have the qualitative observation that the plants are "common" with no indication of actual numbers of plants (Appendix 1).
5 Population trend on Tongass NF	D	*D: Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Ranunculus pacificus* on the Tongass NF are unknown due to lack of repeat population counts of the occurrences (ANHP ACCS 025, Arctos 2025, CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	A/B	*A/B = Decline in habitat quality or quantity, but a stable amount of suitable or potential habitat remains.* *Ranunculus pacificus* grows in riparian, lakeshore and beach habitat across the Tongass NF (Appendix 1; Meridian Environmental 2011, 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). Riparian and lakeshore habitat types are relatively common on the Tongass NF and have high ecological integrity (Turner and Mallott 2024). Beach meadow habitat is relatively rare on the Tongass NF and may have been impacted by sea level changes, timber harvest, or recreation; however, ecological integrity is considered to be high (Turner and Mallott 2024). Historic timber harvest and road building may have destroyed habitat, altered hydrology or introduced invasive species that degrade habitat. Of the 25 Tongass NF occurrences, 12 are within one mile of a mapped historical or recent timber project (Appendix 1; USFS 2025d). In addition, 11 of the occurrences are located within 0.5 miles of mapped non-native plants, with most within 1000 feet (Appendix 1; USFS 2025b). Non-native plants that have been mapped (mostly along roads) in the vicinity of the occurrences include *Phalaris arundinacea*, *Poa palustris, Poa annua, Poa pratensis, Phleum pratense, Agrostis gigantea, Dactylus glomerata, Melilotus officinale, Lupinus polyphyllus, Leucanthemum vulgare, Plantago major, Cerastium fontanum, Trifolium repens, Ranunculus repens, Hypericum perforatum,* and *Taraxacum officinale. Phalaris arundinacea* (reed canarygrass) in particular is a highly invasive grass with the ability to invade habitats where *Ranunculus pacificus* grows and is likely to be able to outcompete that species.

Criteria	*Rank*	*Rationale*
		The proximity of historical and recent timber harvest and non-native invasive species to occurrences of *Ranunculus pacificus* on the Tongass NF, as well as the current effects of climate change on riparian and beach meadow habitat, indicates a negative trend in habitat.
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variation, and/or habitat is impacted by modern stressors* Invasive species are known to be present in the vicinity of 11 occurrences of *Ranunculus pacificus* on the Tongass NF (Appendix 1; USFS 2025b). Eight of those occurrences are near reed canary grass (*Phalaris arundinacea*), three are near creeping buttercup (*Ranunculus repens*), and one is near bigleaf lupine (*Lupinus polyphyllus*); all three species are non-native plants with the ability to invade wetland habitats (APMC 2024). Reed canarygrass has been shown to negatively impact water quality, riparian processes, and community composition (Wiles and Warren 2024). These impacts are predicted to increase with warmer air and water temperatures due to climate change (Wiles and Warren 2024). In addition, the habitats most vulnerable to invasion include estuaries, upper beach meadows, and riparian corridors (all *Ranunculus pacificus* habitats), while the many nearby roads act as a conduit for the movement of invasive species (Wiles and Warren 2024). Therefore, there is a possibility that invasive species could negatively impact *Ranunculus pacificus* in the future. In addition, timber harvest activities have occurred adjacent to or in the vicinity of *Ranunculus pacificus* (Appendix 1; USFS 2025d). If this activity continues to occur in the future, this could impact soil drainage, soil saturation, and hydrology of the palustrine wetland occurrences of *Ranunculus pacificus*; this in turn could affect species composition (Turner and Mallott 2024). Riparian and lakeshore habitat is likely to be altered by increased frequency and magnitude of large rain events and rain on snow events that contribute to flooding (Halofsky et al. In draft). Peak flows and floods can scour riparian areas, erode stream channels, undercut riparian trees and alter plant community composition (Halofsky et al. In draft). Additionally, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for species such as *Ranunculus pacificus* (Turner and Mallott 2024, Wiles and Warren 2024). Although it is expected that riparian and lakeshore ecosystems will persist, there is uncertainty regarding changes in species composition (Turner and Mallott 2024).

Criteria	*Rank*	*Rationale*
		Similarly, the main future stressor for beach meadow habitat is climate change, which is predicted to increase air and ocean temperatures, increase storm frequency, and change sea level due to isostatic rebound (Turner and Mallot 2024).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Ranunculus pacificus* is a perennial herb with nearly erect to reclining stems 30 to 50 cm high (Benson 1948, Whittemore 1997). There is evidently no published information on the reproductive success or demography of *Ranunculus pacificus*, either inside or outside of the planning unit. However, a need for monitoring of all occurrences has been identified to determine plant abundance and population trends (NatureServe 2025). Given that its stems do not produce roots at the above-ground nodes and its subterranean roots do not form thickened storage organs (Benson 1948, Whittemore 1997), *Ranunculus pacificus* seemingly reproduces exclusively through seed production rather than vegetatively. The flowers are yellow (sometimes tinged with purple on the undersurface) and appear in the summer (July; Benson 1948, Whittemore 1997). The pollination system in *Ranunculus* is generally not specialized, and the flowers are visited by many kinds of insects (Steinbach and Gottsberger 1994, Kipling and Warren 2014). Efficiency of sexual reproduction is generally high in *Ranunculus* species lacking a means of reproducing clonally (Sarukhán 1974, Kocot et al. 2022). Demographic monitoring studies of other *Ranunculus* species lacking clonal reproduction indicate that their populations are generally stable or expanding in spite of turnover of individuals through mortality and recruitment (Sarukhán and Harper 1973, Cursach et al. 2013, Thoen et al. 2024).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☒	☐	☐

Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Pacific Buttercup (*Ranunculus pacificus*) is not recommended as a Species of Conservation Concern based upon the rationale below:

- **Significant threats:** The habitats occupied by *Ranunculus pacificus* are especially vulnerable to invasive species, in particular reed canarygrass. Invasive species including reed canarygrass are already known to be present at nearly half of the occurrences. Effects of climate change on this species' habitat may also impact populations, including increased flooding, increased storm frequency, changes in sea level, and changes in soil moisture.
- **Declining trends:** The proximity of invasive plants to occurrences of *Ranunculus pacificus* indicates a negative trend in habitat. Additionally, historic timber harvest and road building has likely destroyed habitat and altered hydrology. Population trends are unknown. Monitoring is recommended to establish population trends.
- **Restricted ranges:** The species is only known from southern Alaska.
- **Low population numbers or restricted ecological conditions:** Twenty-five scattered occurrences with a range of population counts indicates that the species is uncommon across the Forest but likely not vulnerable to extirpation by stochastic events. The species occurs in a range of habitats that are not particularly restricted across the Forest, including riparian, lakeshore and upper beach meadow. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the uncommonness of this species.
- **Other factors:** The species potentially responds well to disturbance given that it grows in somewhat naturally disturbance-prone ecosystems, but it is unclear how the species will respond to future conditions.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ANHP ACCS_Mar25 (EO12)Herbarium (ALA4482)[8/11/1991]**	**Yakutat Foreland, Situk R. estuary**	**Meadow [Geology indicates not limestone]**		
1	Arctos 2025, CPNWH_April2025 (ALA4482-UAM:Herb:4482)[8/11/1991]	Yakutat Foreland, Situk R. estuary, Yakutat Quad.	Meadow.		
1	ANHP ACCS_Mar25 (EO12)Herbarium (ALA3854)[6/24/1991]	Yakutat Foreland, Situk R. estuary	Herbaceous vegetation on back beach; sandy substrate		
1	Arctos 2025, CPNWH_April2025 (ALA3854-UAM:Herb:3854)[6/24/1991]	Yakutat Foreland, Situk R. estuary, Yakutat Quad.	Herbaceous vegetation on back beach; sandy substrate.		
1	ANHP ACCS_Mar25 (EO2); Arctos 2025 (ALA28207-UAM:Herb:28206) [7/18/1953]	Yakutat Foreland, Yakutat	Near Situk River		
2*	**ANHP ACCS_Mar25 (EO33) Herbarium**	**[Yakutat Foreland] Russell Fjord Wilderness, Situk Lake, bear guide permit cabin at north end of lake.**	**In fen along lake shore [Geology indicates not limestone]**	**common.**	

	(ALA251588)[6/20/2013]				
2	CPNWH_April2025 (ALA251588-UAM:Herb:251588)[6/20/2013]	[Yakutat Foreland] Russell Fjord Wilderness, Situk Lake, bear guide permit cabin at north end of lake, Tongass National Forest.	In fen along lake shore	common.	
3*	**ANHP ACCS_Mar25 (EO28); Herbarium (ALA251097) [7/25/1995]**	**Yakutat [Foreland], 5.5 km directly S of town on Cannon Beach Road, forest side of Tawah Creek Bridge.**	**Adjacent to stream, common in disturbed area. [Geology indicates not limestone]**		**100 feet from mapped Lupinus polyphyllus.**
3	CPNWH_April2025 (ALA251097-UAM:Herb:251097)[7/25/1995]	Yakutat [Foreland], 5.5 km directly S of town on Cannon Beach Road, forest side of Tawah Creek Bridge, Yakutat Quad.	Adjacent to stream, common in disturbed area.		
4*	**ANHP ACCS_Mar25 (EO29); Arctos 2025 (ALAALA251108-UAM:Herb:251108)[7/25/1995]**	**Yakutat [Foreland], road between Summit and Aka Lakes, between lakes, extending S from Aka Lake. [This is georeferenced by the herbarium just off (on the border of) Tongass NF lands, but could very likely be on Tongass land. It used to be Forest land, but some was taken out. Counting this as a Tongass NF record]**	**Meadow. [Geology indicates not limestone]**		
5*	**ANHP ACCS_Mar25 (EO23); Herbarium (UAAH15317, UAAH 15414)[6/27/2018]**	**Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.**	**Hemlock forest, lake edge, organic soil, full shade [geology indicates limestone]**		**200 ft from 1982 timber project, and 200 ft from multiple weeds located in timber project footprint and along North Prince of Wales Road: Plantago major, Ranunculus repens, Phleum pratense, Phalaris arundinacea, Poa annua, Taraxacum officinale, Cerastium fontanum, Trifolium repens**
5	CPNWH_Mar25 (UAAH15317)[6/27/2018]	Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.	Hemlock forest, lake edge, organic soil, full shade.		

5	CPNWH_Mar25 (UAAH15414)[6/27/2018]	Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.	Hemlock forest, lake edge, organic soil, full shade.		
5	ANHP ACCS_Mar25 (EO23); Federal Database (USFS100554PT00040); Meridian Environmental 2011 [7/14/2010]	[Prince of Wales Island] [Meridian Environmental (2011) survey at Sarkar Lake. In report, it says the plants were along the lakeshore and along the creek. Note that this observation is only georeferenced at the southern boat ramp, not near the creek (at the northern end), and the creek populations would be a separate occurrence that is the same as occurrence 13]	Slope = 2; Aspect= 360 ; Substrate= Soil; Soil Moisture= Moist; Soil Texture= loam; Light Exposure= Partial Shade. [Lakeshore, along creek]		
6*	**USFS-TESP_Mar25 (100554P000518Y13); Meridian Environmental (2014) [7/10/2013]**	**[Prince of Wales Island] N of Salmon Lk. Meridian Environmental (2014) 512 Wetland-Muskeg Wetland, wet meadow 75.**	**Alder/Neck Muskeg and wet meadow N of Salmon Lk. Scattered along wet meadow on edge of streambank; meadow is choked wtih vegetation and partially flooded. Sitka sedge and other plants extend 20+ feet from water, but all RAPA individuals found within 10 feet of water. On rock and wet loam in full sun. 5% slope. [Geology indicates turbidite but near limestone]**	**Individuals are scattered throughout the streambank area, within about 50 feet of where the first plant was found. Additional non-flowering plants may be present but are difficult to see when not in flower. 50 plants.**	**1 mile from 1986 timber project**
7*	**USFS-TESP_Mar25 (100554P000516Y13); Meridian Environmental (2014) [7/09/2013]**	**[Prince of Wales Island] Meridian Environmental (2014) Alder/Neck Site 525 Wetland-Muskeg Roaside, lakeshore 200, Neck Lake East Causeway**	**Population located in quarry spall at base of road fill adjacent and slightly upslope of lake shore. Disturbed roadside, quarry spall at base of causeway fill. Moist soil in full sun. 15% slope. [200 ft from mapped Callitropsis nootkatensis wetland. Geology indicates turbidite and volcanics]**	**Majority of plants in seed or dispersed; 4 in flower. 20 plants.**	**300 feet from numerous mapped weeds: Phalaris arundinacea, Taraxacum officinale, Plantago major, Leucanthemum vulgare which are along the causeway road.**
7	ANHP ACCS_Mar25 (EO34) Herbarium	Prince of Wales Island. N end of island, Neck Lake, E side of lake.	Causeway rock next to shallow mud	Uncommon.	

	(ALA250689) [7/09/2013]				
7	Arctos 2025, CPNWH_April2025 (ALAALA250689-UAM:Herb:250689) [7/09/2013]	Prince of Wales Island. N end of island, Neck Lake, E side of lake, Petersburg Quad, Alexander Archipelago.	Causeway rock next to shallow mud	Uncommon.	
8*	**USFS-TESP_Mar25 (100554P000511Y13); Meridian Environmental (2014) [7/09/2013]**	**[Prince of Wales Island] Meridian Environmental (2014) Neck Lake Inlet Site # 525, lakeshore 200, 100554S000516Y13**	**Wet meadow along lakeshore, with dense cover of herbs and grass. All RAPA samples were within 10 feet of the lake. On moist alluvium, silt, in full sun. [Geology indicates limestone]**	**Two individuals found in bloom. Two more found vegetative only. More may be present but are buried in thick vegetation and are difficult to find when out of flower. 4 plants.**	**Surrounded by 1981 timber projects which are about 1500 ft away. Also 1500 ft away from numerous weeds: Phalaris arundinacea, Trifolium repens, Taraxacum officinale, Leucanthemum vulgare, Phleum pratense which are located in timber project footprints.**
9*	**ANHP ACCS_Mar25 (EO24)Federal Database (USFS100554PT00043); Meridian Environmental (2011) [7/15/2010]**	**[Prince of Wales Island, N of Staney Creek just E of outlet to Tuxecan Passage] Meridian Environmental (2011) Staney Creek Uplifted Beach 57 site 100554S00256.**	**Slope = 1; Aspect= 200 ; Substrate= Soil; Soil Moisture= Moist; Light Exposure= Full Sun. Along tributary of Staney Creek. [Geology indicates not on limestone]**		**Within mapped 1971 timber project footprint. 300 ft from numerous mapped weeds which are in the timber footprints and along adjacent road: Phalaris arundinacea, Plantago major, Taraxacum officinale, Dactylis glomerata, Trifolium repens.**
10*	**ANHP ACCS_Mar25 (EO25) Federal Database (USFS100554PT00045); Meridian Environmental (2011) [7/15/2010]**	**[Prince of Wales Island, NE of Kaukati Bay, shore of lake on south side of North Prince of Wales Road (road 20)]. Meridian Environmental (2011) Boyd Lake 55 site 100554S00254.**	**Substrate= Soil; Soil Moisture= Moist; Soil Texture= loam; Light Exposure= Partial Shade [Geology: maps on limestone]**		**100 ft from 1986 timber project. 200 ft from numerous mapped weeds: Trifolium repens, Poa palustris, Phalaris arundinacea, Taraxacum officinale, Poa pratensis, Agrostis gigantea, Plantago major, Phleum pratense which are along North Prince of Wales Road (FS 20).**
11*	**ANHP ACCS_Mar25 (EO21) Federal Database (USFS100554PT00016); Meridian Environmental**	**[Prince of Wales Island, northern end of Salmon Bay Lake] Meridian Environmental (2011) Salmon Bay Lake 15 100554S00214**	**Substrate= Soil; Parent Material= Lacustrine Sediments; Soil Moisture= Moist; Light Exposure= Partial Shade; [Geology indicates turbidite but near limestone]**	**Most plants in one dense area (where GPS point was taken) but a few scattered**	**0.5 mile from numerous timber projects from the 1970s through 1990s**

	(2011)[7/06/2010]				
12*	**ANHP ACCS_Mar25 (EO20)Federal Database (USFS100554PT00011); Meridian Environmental (2011) [6/29/2010]**	**[Prince of Wales Island, E side of Cavern Lake] Meridian Environmental (2011) Cavern Lake 17 100554S00216**	**Slope = 2; Aspect= 294 ; Light Exposure= Full Sun [Lakeside. Geology indicates limestone]**		**Located within footprint of 1966 timber projects which must have been on edge of lake? or lake is artificial. Location 200 feet from numerous mapped weeds: Phalaris arundinacea, Taraxacum officinale, Trifolium repens, Hypericum perforatum, Ranunculus repens which are along adjacent FS Road.**
13*	**ANHP ACCS_Mar25 (EO8) Herbarium (ALA19036)[7/14/1979]**	**Prince of Wales Island, Sarkar Lake, E side of creek from lake north of Sarkar Lake to Sarkar Lake**	**Lakeside and creek. [Located 500 ft from mapped Callitropsis nootkatensis wetland. Geology: maps on turbidite but limestone is upslope on west side of Sakar Lake]**		
13	Arctos 2025, CPNWH_April2025 (ALA19036-UAM:Herb:19036)[7/14/1979]	Prince of Wales Island, Sarkar Lake, E side of creek from lake north of Sarkar Lake to Sarkar Lake, Craig Quad, Tongass National Forest, Alexander Archipelago.			
14*	**USFS-TESP_Mar25 (100521P000128Y17)[6/13/2017]**	**[Kupreanof Island, Petersburg Creek-Duncan Salt Chuck Wilderness] Petersburg Lake South**	**Growing in openings without Heracleum lanatum. Lacustrine substrate, moist soil, full sun, 1 percent slope. [Located in mapped Callitropsis nootkatensis wetland. Geology indicates silica-rich sedimentary mixed with granite]**	**7 plants**	**800 ft from mapped Phalaris arundinacea and Ranunculus repens which are on the lake edge.**
15*	**ANHP ACCS_Mar25 (EO3) Herbarium (ALA42511)[6/25/1959]**	**Kupreanof Island, Alexander Archipelago**	**muskeg [geology indicates granite and volcanics]**		
15	CPNWH_April2025 (ALA42511-UAM:Herb:42511)[6/25/1959]	Kupreanof Island, Alexander Archipelago, Petersburg Quad	Muskeg.		
15	Arctos 2025 (UAM:Herb:42511) [6/25/1959]	Kupreanof Island [no exact location]			

16*	**USFS-TESP_Mar25 (100521P000115Y15)[7/15/2015]**	**[Kuiu Island. Maps on shore of Threemile Arm inlet]**	**Mesic graminoid herbaceous vegetation. Within beach log berm at top of beach, on moist gravel in full sun. [Located in mapped Pacific Tidal Marsh. Geology indicates volcanics]**	**30 plants**	**300 feet from several 1965 timber projects. 0.6 mile from mapped Phalaris arundinacea.**
17*	**ANHP ACCS_Mar25 (EO35) Observation https://www.inaturalist.org/observations/170599107[no date]**	**[Kuiu Island, NE point on peninsula near Fossil Bluffs] Prince of Wales-Hyder County**	**[Geology does not indicate limestone, mixture of volcanics]**		**0.4 mile from several 1965 timber projects.**
18*	**ANHP ACCS_Mar25 (EO32)Herbarium (ALA248654)[6/25/2012]**	**[Chichagof Island] Pinta Cove.**	**Upper beach, meadow [geology indicates karheen formation, perhaps limestone]**	**common.**	
18	Arctos 2025, CPNWH_April2025 (ALA248654-UAM:Herb:248654)[6/25/2012]	Chichagof Island. Pinta Cove, Juneau Quad, Alexander Archipelago	Upper beach, meadow	common.	
19*	**ANHP ACCS_Mar25 (EO15); Arctos 2025 (ALA142400-UAM:Herb:1424000) [6/18/2003]**	**Chichagof Island, False Bay, False Beach, north of where the FS road intersects the beach**	**scattered individuals along upper beach area near large calcareous cliffs, growing with Alnus sitchensis, Picea sitchensis, Leymus mollis, Heracleum lanatum, Aquilegia formosa and Acer sp., E aspect, 5% slope [Geology indicates turbidite]**		**0.5 mile from Schedonorus arundinaceus and Plantago major along FS road 8530. 0.5 mile downslope from 1989 timber projects. Likely did not affect the habitat.**
20*	**ANHP ACCS_Mar25 (EO26) Federal Database (USFS100554PT00069); Meridian Environmental (2011) [7/19/2010]**	**[Tuxecan Island, SE end of Karheen Lakes] Meridian Environmental (2011) Southwest Tuxecan Island 30 100554S00229**	**Substrate= Soil; Parent Material= Alluvium; Soil Moisture= Moist; Soil Texture= loam; Light Exposure= Full Sun [Geology: limestone]**		**500 ft from 2012 Timber Project and private land that likely has more that are not mapped in the layer.**
21*	**ANHP ACCS_Mar25 (EO22)Federal**	**[Kosciusko Island, outlet of Trout Creek at Sumner Strait] Meridian**	**Vegetation= ; Slope = 10; Aspect= 220 ; Substrate= Gravel; Parent Material= Alluvium; Soil Moisture= Moist; Soil**	**10 plants**	**0.8 mile downslope from 1982 timber projects. Likely did not affect the habitat.**

	Database (USFS100554PT00039); Meridian Environmental (2011) [7/12/2010]	**Environmental (2011) Trout Creek Beach 21 100554S00220**	**Texture= sand; Light Exposure= Partial Shade; Comments= Only RAPA found on beach or along tidal portions of Trout Creek and associated meadow. [Meridian Environmental (2011) text: Ten plants were found on and below a low bank at the transition from forested habitat to open, sandy/gravelly saltwater beach, associated with Lathyrus maritimus, Heracleum lanatum, Potentilla anserina, Carex macrochaeta, Rubus parviflorus and Rubus spectabilis.] [Geology indicates limestone]**		
22*	**ANHP ACCS_Mar25 (EO14)Herbarium (ALA90236)[6/23/1999]**	**[Pleasant/Lemusurier/Inian Islands Wilderness] Lemesurier Island, cove on N side of island**	**inside edge of uplifted beach ridge, just E of where stream breaks through gravel berm, upper beach meadow with tall shrubs. [geology is gordey and makepeace formation which is complicated and could have some limestone as well as quartz, etc]**	**common.**	
22	Arctos 2025, CPNWH_April2025 (ALA90236-UAM:Herb:90236)[6/23/1999]	[Pleasant/Lemusurier/Inian Islands Wilderness] Lemesurier Island, cove on N side of island, Mt. Fairweather Quad.	Inside edge of uplifted beach ridge, just E of where stream breaks through gravel berm, upper beach meadow with tall shrubs	common.	
22	ANHP ACCS_Mar25 (EO14)Herbarium (WTU384493, V190943)[6/23/1999]	Lemesurier Island, Cove on north side of the Island. Inside edge of uplifted beach ridge. Just east of where the stream breaks through the wave-formed berm of gravel.	inside edge of uplifted beach ridge, just E of where stream breaks through gravel berm,, just above high tide line; upper beach meadow with tall shrubs.		
22	CPNWH_Mar25 (WTU384493)[6/23/1999]	[Pleasant/Lemusurier/Inian Islands Wilderness] Lemesurier Island, Cove on north side of the Island. Inside edge of uplifted beach ridge. Just east of where the stream breaks through the wave-formed berm of gravel.	inside edge of uplifted beach ridge, just E of where stream breaks through gravel berm,, just above high tide line; upper beach meadow with tall shrubs.		

23*	**ANHP ACCS_Mar25 (EO13); Arctos 2025 (ALA11639-UAM:Herb:11639) [6/28/1994]**	**Noyes Island, Point San Francisco, E shore of island**	**forest-beach margin, narrow meadow zone on pebble beach [Geology indicates limestone]**		
24*	**ANHP ACCS_Mar25 (EO9)Herbarium (ALA19037)[7/08 /1980]**	**[Stikine-LeConte Wilderness] Farm Island, vic. Stikine River mouth**	**dry meadow [Geology indicates granite]**		**Only weed in vicinity is Melilotus officinalis.**
24	Arctos 2025, CPNWH_April2025 (ALA-UAM:Herb:19037)[7/08/1980]	[Stikine-LeConte Wilderness] Farm Island, vic. Stikine River mouth, Petersburg Quad, Tongass National Forest.	Dry meadow.		
25*	**ANHP ACCS_Mar25 (EO5); Arctos 2025 (ALA41917-UAM:Herb:41917) [7/06/1964]**	**[Coronation Island Wilderness] Coronation Island, Egg Harbor, head of harbor, Alexander Archipelago**	**beach strip, immed. above high tide mark [geology indicates limestone]**		
		NOT ON TONGASS NF			
26*	**ANHP ACCS_Mar25 (EO27)Observati on [8/07/2012]**	**[Revillagigedo Island] Swan Lake. Lost Creek.**	**Plants growing in wet moss on top of large, 40 foot long downed, mossy log at edge of riparian area. Plants may also be growing in soil of stabilized gravel bar nearby.**		
26	ANHP ACCS_Mar25 (EO27)Herbarium (WTU389590)[8/0 7/2012]	[Revillagigedo Island] Lost Creek, Swan Lake, northeast of Ketchikan.	Plants growing on large wet mossy log, adjacent a creek.		
27*	**ANHP ACCS_Mar25 (EO2); Arctos 2025 (ALA28206-UAM:Herb:28207) [7/30/1953]**	**Yakutat Foreland, Yakutat, near Situk River**	**Grassy area along road**		
28*	**ANHP ACCS_Mar25**	**Baranof Island, Alexander Archipelago, Sitka**	**Moist, gravelly-sandy beach**		

	(EO7) Herbarium (ALA28208); Arctos 2025 (ALA28208-UAM:Herb:28208)[7/08/1975]				
28	ANHP ACCS_Mar25 (EO7) Herbarium (WCW7161)[6/09/1974]	Baranof Island. Sheldon Jackson College campus. Indian River drainage system.	Modified spruce-hemlock forest. Common in open places and in lawns.		
29*	**ANHP ACCS_Mar25 (EO31) Herbarium (UAAH10074, WTU 407576, ALA 250929-UAM:Herb:250929)[6/29/1999]**	**Mainland, S end of Chilkat Peninsula, Couverden Island, NW tip of island. Juneau Quad**	**Upper beach meadow.**		
30*	**ANHP ACCS_Mar25 (EO30)Herbarium (UAAH9926, ALA 250945)[6/28/1999]**	**Mainland, Glacier Bay, SE of Sturgess I., Sandy Cove, N shore, Tombolo between NW shore of cove and small island. Mt. Fairweather Quad.**	**Upper beach gravels.**		
31*	**SEINet 2025 (RSA0120205) [7/22/1959]**	**Mainland, Taku Lodge, Taku River, Juneau City**			
32*	**SEINet 2025 (ASC00019139) [6/23/1969]**	**Wrangell**			
33*	**SEINet (ASC00019050) [8/27/1969]**	**Shipley Bay, Alaska; mainland, 45 mi. north of Petersburg [label indicates this was collected on the mainland 45 mi N of Petersburg. Perhaps label is indicating several locations at once. Can't georeference such a vague location.]**			

Ricasolia amplissima sheiyi

Ricasolia amplissima sheiyi [Derr & Dillman]

Global Rank: **GNR**

Alaska State Rank: **S1S3**



Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps* *Ricasolia amplissima ssp. sheiyi* is known from 38 estimated occurrences on the Tongass NF. We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Occurrences on the Tongass NF are known from Prince of Wales Island (4), Kosciusko Island (3), Coronation Island (4), Warren Island (1), Misty Fjords National Monument (2), Rookery Island, off Zarembo Island (1), Kuiu and small surrounding islands (9), Etolin Island and nearby Eagle Island (2), Stikine River Delta (1), Kupreanof and nearby Sukoi Islets (3), Baranof Island and small nearby islands (5), and Kruzof Island (3). This taxon has not been found on Hoonah, Admiralty, Juneau or Yakutat Ranger Districts, but is known from all other districts. One occurrence is known near Yakutat on non-NFS land. This lichen prefers beaches with exposure to open ocean and fog and is only known as an epiphyte on tree trunks and branches of the forest-beach ecotone. Often the sites are small marine islands and exposed peninsulas (Dillman et al. 2017). Beach fringe habitat exists broadly across the planning area, but there are considerable gaps in the distribution of occurrences of this lichen. Botanical surveys on the Tongass NF have included this lichen since 2009. This taxon was first reported in the literature from Baranof Island (Tønsberg and Goward 2001) and first confirmed in Alaska by Chiska Derr, Tongass ecologist in the early 1990's on a small island in Frederick Sound, but the record was never published.

Criteria	*Rank*	*Rationale*
		Ricasolia amplissima ssp. sheiyi has rounded, overlapping lopes that have the appearance of dried puddles of wax dripped from a candle held overhead (Cornejo et al 2017). Recent molecular work has moved this lichen to the genus *Ricasolia* from *Lobaria*. (Moncada et al. 2013).
2 Distribution in surrounding geographic area	A	*A = Only within the boundaries of the Tongass National Forest (local or regional endemics).* Global Rank GNR, Alaska State Rank S1S3 The global status of this taxon has not yet been determined by NatureServe or IUCN (NatureServe 2023). Although the species *Ricosalia amplissima* occurs in Europe (Purvis et al. 1992), the Alaskan lineage is described separately as subspecies *sheiyi* (Cornejo et al. 2017). The current known range of *Ricasolia amplissima ssp. sheiyi* is restricted to southeast Alaska, though there is a single occurrence of the green algal morph in British Columbia (iNaturalist 2025). British Columbia considers all dendriscocaulids such as this taxon of conservation priority. The British Columbia populations of *Ricasolia amplissima* are largely the cyanomorphs (described in Section 8). There may be an additional occurrence of the green algal morph of *Ricasolia amplissima* in California, but the identification of this sample is dubious (Dillman et al. 2017).
3 Dispersal capability	A	*A = Very limited dispersal ability* Dispersal for *Ricasolia amplissima* subsp. *sheiyi*. is likely very limited. Asexual means of reproduction (isidia and soredia) appear to be absent (Tønsberg & Goward 2001). Spore-producing structures (apothecia) have been identified in a small fraction of *Ricasolia amplissima* subsp. *sheiyi* populations (only Warren Cove and Windfall Island populations). Of the few populations that produce apothecia, all that have been dissected were sterile (i.e., no spores were visible) (Dillman et al. 2017). Propagules, if present, may travel with invertebrates, wind, or birds.

Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* This lichen is characterized by very small, scattered populations on the Tongass NF. Populations are typically restricted to just one or a few trees (Dillman et al. 2017). The 32 known occurrences contain between them an estimated 300-400 individual thalli. Many of the Tongass National Forest locations contain one tree with one lichen thallus, while others have several to many trees with abundant thalli covering the bole and branches. Only one population (Warren Island) is relatively large; here patches of *R. amplissima* subsp. *sheiyi* occupy 21 to 25 Sitka spruce trees, nearly every large Sitka spruce within a 200 meter stretch along the cove (Dillman et al. 2017).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Monitoring for this lichen is not comprehensive enough to infer population trends. Similar abundances have been noted at several locations (Warren Cove, Head of Egg Harbor) over the course of repeat visits. At other occurrences, impacts to substrates may have resulted in local extirpation. At Nation Point, the lichen was found on a branch broken out of a tree, and at Craig Cemetery Island, the lichen occurred on a dead Sitka spruce bole that eventually washed out to sea (Dillman et al. 2017). The generally small populations may be subject to local extirpation. However, other populations appear to be relatively stable over the short-term. Because of the lack of consistent monitoring of more populations, it is difficult to infer whether population numbers (or number of host trees) are changing and whether the range of *Ricasolia amplissima* subsp. *sheiyi* has expanded or contracted over time (Dillman et al. 2017).
6 Habitat trend on Tongass NF	A/B	*A = Decline in habitat quality or quantity/B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality* *Ricasolia amplissima* ssp. *sheiyi* is only known as an epiphyte on tree trunks and branches of the forest-beach ecotone (Dillman et al. 2017). In Alaska, populations are often exposed to large bodies of marine water, such as ocean entrances to bays and inlets (Dillman 2004). At some sites, the trees where *Ricasolia amplissima* ssp. *sheiyi* is found are out in the

Criteria	*Rank*	*Rationale*
		open, away from the rest of the forest edge. The lichen is absent from early seral habitats and responds poorly to large-scale disturbance, but it appears to benefit from disturbances that decrease non-substrate density. Past harvesting practices on the Tongass National Forest did target the beach fringe forests to where this taxon is restricted, therefore it is possible that some habitat was impacted by past timber harvest (Dillman et al. 2017). Populations are mainly in wilderness areas which are considered protected and relatively stable. Natural alteration of habitat at the beach fringe occurs as a result of wind and storm surges. One population at Coronation Island is threatened due to the unraveling of the beach fringe due to roots being undermined by erosion, and then the trees blow over. This could occur in many of the locations as the exposed beach fringes are susceptible to blowdown.
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc* Threats to *Ricasolia amplissima* subsp. *sheiyi* include unscheduled tree cutting in beach fringe for free-use and recreation, air pollution impacts in popular marine anchorages, insect outbreaks that damage host trees, changes in shoreline structure due to wind events, and changes in sea level due to isostatic rebound or tectonic events. Climate change driven increased storm frequency and intensity may accelerate coastal erosion and windthrow of substrate trees (Halofsky et al draft). Higher wind speeds and larger storm swells are likely to lead to increased windthrow related disturbance events, which presents a threat to all known occurrences of this taxon, as all occur on the immediate coast (Dillman et al. 2017). Logging within beach fringe habitats has the potential to impact habitat for *Ricasolia amplissima* ssp. *sheyi*, however these impacts are expected to be minimal because areas where this would occur would be characterized by closed canopy stand conditions and younger trees, which is not the preferred habitat for this taxon (Dillman et al. 2017). Construction of access roads or log transfer facilities associated with logging activities may, however, pose a threat to this species (Dillman et al. 2017). Air pollution in several wilderness sites is also a concern to this species, where levels of nitrogen and sulfur are above thresholds established for lichens on the Tongass NF (Dillman et al. 2007). The nitrogen and sulfur concentrations are possibly due to the emissions from marine vessels in the area. Several locations are traditionally used as anchorages for fishing vessels and other private boats. It is unknown how much nitrogen or sulfur deposition is acceptable before

Criteria	*Rank*	*Rationale*
		detrimental effects occur in lichen communities on the Tongass NF (referred to as critical loads; see Nilsson and Grennfelt, 1988). Cyanolichens such as *R. amplissima* are considered more susceptible to air pollution damage than lichens with only a green algae photobiont. At particular risk are the Warren Cove and Coronation Island Egg Harbor occurrences, which are known to inhabit areas with elevated levels of nitrogen and sulfur. No air quality measurements have been taken at other *Ricasolia amplissima* ssp. *sheiyi* sites (Dillman et al. 2015). Recreational wood harvesting (unscheduled cutting) and other anthropogenic disturbances represent a threat to *Ricasolia amplissima* subsp. *sheiyi* populations. Since whole populations of this lichen are most restricted to a single tree, cutting of just one tree could result in extirpation of a local population. However, the probability of such events is quite low given the rarity of *Ricasolia amplissima* subsp. *sheiyi*, the large amount of beach-fringe habitat, and the small number of people harvesting trees in the region (Dillman et al. 2017). Recreation-related threats are not limited to unscheduled cutting. At the Narrow Point population, an old tent platform is nailed to both trees that host *Ricasolia amplissima* subsp. *sheiyi*. The Sukoi Islands, Canon Beach, Explorer Basin, and Windfall Island occurrences are near popular recreation areas, and the Southeast Kruzof Island occurrence is within 1 km of the Mt. Edgecumbe trailhead. Due to elevated levels of human traffic (or as human use increases due to greater access to remote locations), these populations may be at increased risk of disturbance. Herbivory by gastropods has been documented on *Ricasolia amplissima* subsp. *amplissima* in Norway and has been found to play a role in the distribution and spatial patterns of epiphytic lichens in gastropod-rich environments (Asplun et al., 2009). Whether gastropod grazing occurs in Alaskan populations has not been systematically investigated (though circumstantial evidence suggests it may be occurring). Known occurrences of herbivory-related damage include the Warren Cove and the Explorer Basin population (Dillman et al. 2017). Spruce beetle damage in southeastern Alaska appears to be limited in extent: near Prince of Wales Island, in the Stikine River drainage, and near Haines (USFS FHP & ADNR, 2000, Graham pers. comm.). As more than half of known populations are known only from single trees, damage or mortality of host trees from spruce aphids or spruce beetles could result in extirpation of the occurrence (Dillman et al. 2017). In addition to the insect pests mentioned above, a primary source of *Picea sitchensis* mortality is blow-down from storms and other localized high wind events. At the Craig Cemetery Island occurrence (non NFS land), one host tree has already fallen into the ocean; given the lichen's affinity for open, exposed sites, it seems likely that other host trees could meet a similar fate. The beach at Egg Harbor, Coronation Island, is unraveling at the head of the bay due to tidal surges,

Criteria	*Rank*	*Rationale*
		producing windthrow and threatening *Ricasolia amplissima* subsp. *sheiyi* population. Climate models for the next half-century predict increased storm intensity and frequency, suggesting that this threat will only grow with time (Dillman et al. 2017). Higher wind speeds and larger storm swells are likely to lead to increased windthrow related disturbance events, which presents a threat to all known occurrences of this taxon, as all occur on the immediate coast (Dillman et al. 2017). Another potential indirect threat to *Ricasolia amplissima* subsp. *sheiyi* populations to changing climates is an increasing risk of the primary host tree, *Picea sitchensis*, to insect pests. The white pine weevil (*Pissodes strobi*) that can also impact Sitka spruce, is currently limited to warmer latitudes of the Pacific Northwest (Overhulser et al., 1974); however, climate warming may facilitate a northward expansion of its range. The spruce beetle (*Dendroctonus rufipennis*) is also currently limited in its Alaskan extent, but increased temperatures may allow for more widespread outbreaks on the Tongass National Forest. The largest recent spruce beetle outbreaks in the state, however, are restricted to south central Alaska, outside of the Tongass National Forest (USDA FS 2022). Additionally, the spruce aphid (*Elatobium abietinum*) is limited primarily by winter temperatures in the region and is likely to become more problematic with increasing frequency of mild winters (Graham pers. comm.).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion* This taxon is perennial, with a fungal partner that reproduces via spores. The photobiont partners in the genus *Lobaria* are *Myrmecia* or *Trebouxia* and the cyanobacterium *Nostoc or Scytonema* (Purvis 1992). The populations on the Tongass are the green algal morph of the taxon, which is large and not cryptic. The cyanomorph (the fungus with a cyanobacterium partner) of this lichen can either be attached to the green algal form (which has never been seen in Alaska), or it can be free-living. This free-living form, called *Dendriscocaulon*, is more cryptic, and the identity of the samples collected can more confidently be determined by molecular techniques. Several other species also make this shrubby form with the cyanobacterium partner, so one is never certain if it is *Ricasolia amplissima* or a *Dendriscosticta* s. stricta. unless it is physically attached (Tønsberg and Goward 2001, McCune and Geiser 2009). The two forms (green algal and cyanobacterium) of *Ricasolia* have not been found growing physically attached to one another in the Alaska collections. The minimum number of individuals or populations of this lichen that is necessary to be considered a viable population is unknown (Dillman et al. 2017).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☒	☐	☐
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☒	☐	☐

Conclusion Rationale

Ricasolia amplissama sheiyi is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Threats to *Ricasolia amplissima* subsp. *sheiyi* include unscheduled tree cutting in beach fringe for free-use and recreation, air pollution impacts in popular marine anchorages, insect outbreaks that damage host trees, changes in shoreline structure due to wind events, and changes in sea level due to isostatic rebound or tectonic events. Higher wind speeds and larger storm swells may lead to increased windthrow related disturbance events. How significant these threats are to the persistence of *Ricasolia amplissima* subsp. s*heiyi* is unknown.
- **Declining populations or habitat trends**: There is some evidence of population decline at specific sites, but overall population trends are unknown. Past harvesting practices did target the beach fringe forests where this taxon, so some habitat was likely impacted in the past. Sea level changes and increased storm events may degrade beach fringe habitat through erosion and loss of trees.

- **Restricted range:** The green algal morph of *Ricasolia amplissima* subsp. *sheiyi* is found almost exclusively in southeast Alaska. There is one additional occurrence known globally, on Vancouver Island in British Columbia. The cyanomorph occurs from Alaska to northern California on the west side of the Cascades.
- **Low population numbers and restricted ecological conditions**: There are 38 estimated occurrences on the Tongass NF, mostly scattered across the central and southern part of the Forest. Most occurrences are very small, restricted to just one or a few trees. Each small, isolated, occurrence is vulnerable to extirpation by stochastic events, but given the large number of scattered occurrences, the species as a whole will likely persist even if some occurrences are lost. However, the minimum number of individuals or populations of this lichen that is necessary to be considered a viable population is unknown. *Ricasolia amplissima* subsp. *sheiyi* grows as an epiphyte on unshaded portions of branches and trunks of trees in the forest-beach ecotone, particularly beaches with exposure to open ocean and fog. While these ecological conditions are very specific, they are not highly restricted on the Forest.
- **Other factors**: Reproductive structures are sparse on *Ricasolia amplissima* subsp. s*heiyi,* so dispersal may be difficult.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (WTU) [9/12/1999]**	**City and Borough of Sitka, Baranof Island southwest, 45 kilometers south of Sitka, Yamani Islets, main island east.**	**Substrate: corticolous.**		**NA**
1	CLH 2025 (BG) [09/12/1999]	City and Borough of Sitka, Baranof Island SW, 45 km S of Sitka, Yamani Islets, main island E	Corticolous on Picea sitchensis, trunk of big tree		NA
1	CLH 2025 (WTU) [09/12/1999]	City and Borough of Sitka, Baranof Island southwest, 45 kilometers south of Sitka, Yamani Islets, main island east.			NA
2*	**CLH 2025 (OSC) [07/13/2005]**	**Warren Island Wilderness, Tongass N.F. N. side of large creek W. of Warren Cove. Old cabin site.**	**Picea sitchensis stand >50 dbh with large decaying stumps showing signs of fire scars at base**		**NA**
2	CLH 2025 (ALA) [07/13/2005]	Alexander Archipelago, Warren Island Wilderness, Warren Cove, north side of large creek that drains the muskeg west of the cove, at an old cabin site., Tongass National Forest	Growing on Populus trichocarpa.; Picea sitchensis.		NA
2	TESP March 2025 (100554P000426) [9/12/2011]	Warren Island Warren Cove		Found on two trees totaling 8"" x 8"" area in about 4' - 9' range above ground on Picea sitchensis trunk. Population likely larger and found on more trees.	NA
3*	**CLH 2025 (BG) [08/11/2003]**	**Coronation Island, Windy Bay, N side**	**Corticolous trunk of Picea sitchensis at upper edge of beach**		**NA**
3	CLH 2025 (BG) [08/12/2003]	Coronation Island, Windy Bay, N side	Corticolous on Tsuga heterophylla near upper edge of beach		NA

3	TESP March 2025 (100554P000452Y12) [6/12/2012]				NA
4*	**CLH 2025 (BG) [08/09/2003]**	**NNE of Petersburg, Frederick Sound, Sukoi Islets, the easternmost island, S part**	**Corticolous on trunk of Picea sitchensis near upper edge of rocky beach**		**NA**
4	CLH 2025 (ALA) [03/19/2003]	Alexander Archipelago, Sukoi Island, eastern most of the small archipelago in Frederick Sound, southern exposure beach fringe., Tongass National Forest	Bole of Picea sitchensis; Beach fringe forest edge of Picea sitchensis, Tsuga heterophylla		NA
4	CLH 2025 (BG) [08/09/2003]	NNE of Petersburg, Frederick Sound, Sukoi Islets, the easternmost island, SE part	Corticolous on trunk of Tsuga heterophylla		NA
4	TESP March 2025 (100521PT00020) [3/18/2003]	Sokoi Islands, east, Frederick Sound		lichen is found scattered in several places on this point on this island, generally facing south. no fertile specimens found	NA
5*	**CLH 2025 (ALA) [07/31/2003]**	**Alexander Archipelago, Misty Fjords Wilderness, Kah Sheets Island, Boca de Quadra, south shore, small island off the mainland coast., Tongass National Forest**	**on fallen branch of Picea sitchensis, old growth beach fringe;**		**NA**
6*	**CLH 2025 (ALA) [07/29/2003]**	**Alexander Archipelago, Misty Fjords Wilderness, DeLong Island at entrance of Foggy Bay, Tongass National Forest**	**on bole of Picea sitchensis, edge of exposed small island forest ; with Calamagrostis nutkatensis and Tsuga heterophylla**		**NA**
7*	**CLH 2025 (PH) [8/26/1891]**	**Prince of Wales Island**			**NA**
8*	**CLH 2025 (BG) [08/12/2003]**	**Coronation Island, Egg Harbour, W side**	**Corticolous on trunk of Picea sitchensis at upper edge of rocky beach**		**NA**
8	TESP March 2025 (100554P000154Y12) [6/14/2012]	Nation Point			NA
9*	**CLH 2025 (ALA) [07/09/2010]**	**Alexander Archipelago, Whale Head Island, west of Prince of Wales Island, Tongass National Forest**	**Growing on Salix sp. bark.;**		**NA**

10*	CLH 2025 (ALA) [06/20/2006]	Alexander Archipelago, south Etolin Island, Rocky Bay, head of Cooney Cove., Tongass National Forest	Growing on Picea sitchensis bole.; Cove inside a group of islets and rocks, near the mouth of a small stream, with Alnus sinuata.		NA
11*	CLH 2025 (ALA) [08/15/2003]	Alexander Archipelago, east side of Kuiu Island, Kell Bay, north shore, Tongass National Forest	on branches of Malus fusca and Alnus; beach fringe forest		NA
12*	CLH 2025 (SRP) [07/17/2004]	Southeastern Alaska, Tongass National Forest, Kuiu Island S Kuiu Wilderness, Affleck Pt. on west side of Affleck Canal, at rocky point of peninsula between Bear Harbor and Affleck Canal. Quad Port Alex A-1.	South exposure, at exposed forest-marine ecotone. On Picea.		NA
13*	CLH 2025 (ALA) [07/17/2004]	Alexander Archipelago, Kuiu Island Wilderness, east side of Kuiu Island, west side of Affleck Canal, inside Bear Harbor, small island at head of harbor*., Tongass National Forest *despite original description, this is towards the mouth of the harbor and approximately 2 miles from occurrence 16 at the head of the harbor	Growing on Picea sitchensis.; Picea sitchensis, Populus trichocarpa, Alnus sinuata, Oplopanax horridum, Rubus pedatus, Circaea alpina, Streptopus sp.		NA
14*	CLH 2025 (ALA) [05/22/2010]	Alexander Archipelago, Rookery Island, Clarence Straits between Zarembo and Prince of Wales Islands., Tongass National Forest	Growing on Picea sitchensis branch.; Picea sitchensis, Alnus sinuata, Vaccinium sp., Carex sitchensis		NA
15*	CLH 2025 (ALA) [07/14/2005]	Alexander Archipelago, Coronation Island, Egg Harbor, east side of bay., Tongass National Forest	Growing on downed Populus trichocarpa.; Populus trichocarpa.		NA
16*	TESP 2025 (100521PT00014) [7/17/2004]	Kuiu Is. Big Bear H, small island at back of harbor	one tree, Picea sitchensis with lichen, beach fringe forest of small island, lots of Unea longissima		
17*	TESP March 2025 (100554P000460Y12) [6/23/2012]	Kosciusko, Lower Survey Creek, West of Survey Cove		Patches of Lobaria scattered on several trees along the very edge of the shorelines. Patches were	NA

				concentrated in areas where the sunlight would reach the bole of the tree, from stump level to around 5 feet.	
18*	**CLH 2025 (ALA) [06/22/2004]**	**Alexander Archipelago, Stikine River Delta, SE Kadin Island., Tongass National Forest**	**Growing on Alnus rubra.; Shrubby habitat with Salix, Alnus rubra, small Picea sitchensis. Soil is gravelly-sandy with good drainage.**		**NA**
18	TESP March 2025 (100522PT00005) [6/22/2004]	Kadin Island, RNA		one thallus on Malus bole	NA
19*	**TESP March 2025 (100531P00202Y12) [7/24/2012]**	**Baranof Is., Big Branch Bay, alluvial fan**		**Large healthy clusters, mostly on spruce boles, some on hemlock. Populations seen on at least a dozen trees, one tree had over 4 sqare feet of LOAM6, in multple patches, from 5 to 12 feet above ground.**	**NA**
20*	**CLH 2025 (ALA) [07/01/2003]**	**Kuiu Island, Tebenkof Bay Wilderness, Chatham Straits, north of Gedney Harbor, south of Swain Point and Tebenkof Bay. Southeast of Pt. Ellis, Tongass National Forest**	**on bole of old Alnus rubra, old growth beach fringe forest;**		**NA**
21*	**CLH 2025 (ALA) [06/30/2003]**	**Kuiu Island, Tebenkof Bay Wilderness, Explorer Basin, west side., Tongass National Forest**	**on bole of Picea sitchensis; Beach fringe forest**		**NA**
22*	**CLH 2025 (ALA) [06/30/2007]**	**Alexander Archipelago, Pt. Ellis on Kuiu Island, Chatham Straits between Rowan Bay and Tebenkof Bays., Tongass National Forest**	**; Tsuga heterophylla, Oplopanax horridum.**		**NA**
23*	**CLH 2025 (ALA) [07/02/2003]**	**Windfall Island, Chatham Straits, south Tebenkof Bay, south shore of island., Tongass National Forest**	**on boles of dead Picea sitchensis falling into the saltwater; at beach fringe of small island**		**NA**
23	CLH 2025 (ALA) [07/02/2003]	Windfall Island, Chatham Straits, south Tebenkof Bay, south shore of island., Tongass National Forest	on bole of Picea sitchensis in full sun; Beach fringe forest		NA

			along rocky grassy headland with Picea sitchensis, Malus fusca, Tsuga heterophylla, Calamagrostis canadensis		
23	CLH 2025 (ALA) [07/01/2007]	Alexander Archipelago, Chatham Straits, south Tebenkof Bay Wilderness, Windfall Island, on south shore, Tongass National Forest	Growing on tree bole. ; Floodplain with Picea sitchensis, Oplopanax horridum, Vaccinium sp.		NA
23	CLH 2025 (ALA) [07/02/2003]	Windfall Island, Chatham Straits, south Tebenkof Bay, south shore of island., Tongass National Forest	on bole of Picea sitchensis in old growth beach fringe forest;		NA
24*	**CLH 2025 (hb. Esslinger) [07/01/2007]**	**Windfall Islands, Chatham Straights.**			**NA**
25*	**TESP March 2025 (100554P000428) [8/9/2011]**	**Kosciusko, Halibut Harbor**	**Spruce along the beach edge**	**2 patches low on a forked spruce, approx 1 sq ft area at 10 to 15ft high on the bole. Possibly additional patches higher on the tree, but unable to get a positive id.**	**NA**
26*	**CLH 2025 (ALA) [04/24/2011]**	**Alexander Archipelago, Baranof Island, approx. 6 miles south of Sitka, Three Entrance Bay, Tongass National Forest**	**Growing on Picea sitchensis.; Picea sitchensis, Oplopanax horridum, Tsuga heterophylla, Vaccinium sp.**		**NA**
27*	**TESP March 2025 (100521P000227Y23) [10/23/2023]**	**Little Duncan Canal, Kupreanof I**		**one small thallus on trunk of one Malus fusca**	**NA**
28*	**TESP March 2025 (100531P00197) [7/21/2011]**	**Kruzof Is., Fred's Creek area**		**One patch found on young spruce tree about 25 feet from forest edge**	**NA**
28	TESP March 2025 (100531P00194) [7/20/2011]	Kruzof Island, Fred's Creek		Single occurance on young spruce tree, about 8 feet off ground and 25 feet from beach fringe.	NA

29*	**TESP March 2025 (100531P00193) [7/18/2011]**	**Kruzof Island, Fred's Creek**		**Single occurance on a western hemlock tree. LOAM was seen about 12 feet above ground and about 35 feet from the beach fringe.**	**NA**
30*	**TESP March 2025 (100554P000269) [6/23/2021]**	**Prince of Wales, eastern side along Sandy Beach road on the coast**		**Found lichen on the south side of the trunks and branches of five spruce trees. The swing is east of the population.**	**NA**
30	TESP March 2025 (100554P000269) [7/7/2011]	LOAM-SB		Generally in good health, some may be affected by air pollution, disease or changing microhabitat. Population covering a few different trees. Several patches totalling 9" x 9" growing only on branches of Picea sitchensis.	NA
31*	**TESP March 2025 (100554P000476Y12) [8/7/2012]**	**Western tip of Kosciusko Island**	**Found on a PISI, in a spruce grove, facing the ocean right on the edge of the shoreline.**	**Two patches-6"" squared patch and a 1/2"" squared patch eight feet up a tree.**	**NA**
32*	**TESP March 2025 (100554P000270) [6/21/2011]**	**Eastern side of Prince of Wales on coast along Sandy Beach road**	**Typical Picea sitchensis-Tsuga heterophylla-Malus fusca ocean-side forest.**	**7 total. On two Picea trunks, about 5 thalli totaling 40 sq. in. on north tree and 2 thalli 10 sq. in. on south tree. Population relatively healthy, not fertile. All thalli on south side of tree.**	**NA**
33*	**TESP March 2025 (100554P000454Y12) [6/11/2012]**	**Coronation Island, Gish Bay, Shoreline**		**Patches of Lobaria on 4 trees at the head of Gish Bay.**	**NA**
34*	**TESP March 2025 (100521P000226Y23) [10/20/2023]**	**Little Duncan Canal, Kupreanof I**		**one patch on trunk of one Malus fusca tree**	**NA**

35*	**TESP March 2025 (100531P00200Y12) [7/24/2012]**	**Baranof Is., Point between Redfish and Big Branch**			**NA**
36*	**TESP March 2025 (100522P000211Y16) [9/14/2016]**	**Eagle Island, South end of Etolin Island**		**8 counted. Unable to see very far up the bole of the tree, hence the estimate for plant count**	**NA**
37*	**TESP March 2025 (100531P00201Y12) [7/24/2012]**	**Baranof Is., Big Branch, right fork**			**NA**
38*	**TESP March 2025 (100531P00205Y13) [6/26/2013]**	**Kruzof Island, Shelikof Beach**			**NA**
38	TESP March 2025 (100531P00188) [7/19/2016]	Kruzof Island, North Beach			NA
38	TESP March 2025 (100531P00188) [5/4/2011]	Kruzof Island, North Beach		Beach fringe to 120 feet into forest, dispersed on PISI and some TSHE, mostly on main stem.	NA
38	TESP March 2025 (100531P00189) [6/22/2011]	Kruzof Island, Cuvacan Cove		Dispersed on PISI trees, also found Pseudocyphellaria rainierensis at W end of beach fringe.	NA
	Occurrrences in SE AK not on TNF				
39	CLH 2025 (ALA) [04/30/2009]	Alexander Archipelago, Graveyard Island, Community of Craig on Prince of Wales Island	Growing on Cornus stolonifera.; Populus trichocarpa, Alnus sinuata, Oplopanax horridum, Circaea alpina.		NA
40	CLH 2025 (ALA) [09/26/2010]	Alexander Archipelago, south Mitkof Island. East of south Blind Slough along beach., Tongass National Forest	Growing on Tsuga heterophylla.; Tsuga heterophylla, Vaccinium sp., Dryopteris austriaca.		NA
41	CLH 2025 (ALA) [08/29/2003]	Alexander Archipelago, south Mitkof Island, end of Mitkof highway, small wedge of forest between road and beach., Tongass National Forest	Growing on Salix sp. ; Shrubby, mixed species vegetation.		NA
42	TESP March 2025 (100521PT00019) [8/29/2003]	South Mitkof Island		one small thallus not fertile from TSHE	NA

43	CLH 2025 (ALA) [07/07/2005]	Mainland, Yakutat forelands, Ocean Cape.	Growing on Alnus sinuata.;		NA

Riccia fluitans

Riccia fluitans [L., 1793]

Floating crystalwort

Global Rank: **GNR**

Alaska State Rank: **S1**



photo: (CC0) Allan Harris

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Riccia fluitans* is known from one estimated occurrence on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is located on the north shore of Twin Lakes , about 17 miles NNE of the Borough of Wrangell (Appendices 1 and 2; CPNWH 2025, USFS 2025a). Occurrence 1 was collected from a lakeshore forest partially submerged in warm water, in partial shade, and on mineral soil (Appendix 1). This habitat is typical for this species. There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025). This species may be confused for *Riccia frostii* which may be present nearby (iNaturalist 2025).
2 Distribution in surrounding geographic	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank GNR, Alaska State Rank S1 *Riccia fluitans* is broadly distributed throughout much of the world, with the highest concentrations of observations in North America, Europe, and Japan (CBH 2025). In North America, *Riccia fluitans* is present in British Columbia,

Criteria	*Rank*	*Rationale*
area		Northwest Territories, Manitoba, Ontario, and Quebec Canadian provinces and territories as well as nearly all the US states] (CBH 2025). Across its range, *Riccia fluitans* occurs in aquatic habitats (CBH 2025, IFAS 2025, Wagner 2024). It is typically found floating within the water column in lakes, ponds, or other shallow bodies of water (Althoff and Zachgo 2020, CBH 2025, IFAS 2025, Wagner 2024). In southeastern Alaska this species is only known from the Tongass NF; it also occurs over 300 miles (500 km) away near Fairbanks (CPNWH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Riccia fluitans* is a thalloid liverwort with an aquatic growth habit that can also grow stranded on muddy drying shores (Althoff and Zachgo 2020, CBH 2025, IFAS 2025, Wagner 2024). Its main dispersal mechanism is likely clonal growth as reproductive structures are rarely observed (IFAS 2025). Given its aquatic habit, it likely disperses by water.
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Riccia fluitans* is known from one occurrence on the Tongass NF (Appendices 1 and 2). The occurrence does not have a population estimate or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Riccia fluitans* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6	A	*A = Decline in habitat quality or quantity.*

Criteria	*Rank*	*Rationale*
Habitat trend on Tongass NF		The habitat for the one occurrence of *Riccia fluitans* on the TNF is lakeshore forest partially submerged in warm water (Appendix 1). This habitat can be grouped under the aquatic ecosystem Lakes and Ponds which are aquatic ecosystems that are common on the Tongass NF (Chestnut 2024). However, it is unclear if there are specific microhabitat requirements for this species. Without more information, it is difficult to generalize habitat preference, availability, and trends for this species on the Tongass. The one location for this species on the Tongass is broadly infested with reed canarygrass (*Phalaris arundinacea*). Reed canarygrass can form dense stands in shallow water and could strongly alter the habitat for *Riccia fluitans*. Herbicide treatments targeting the reed canarygrass have occurred since the *R. fluitans* was first observed, with at least two of the treatment polygons overlapping or nearly overlapping with the location for *Riccia fluitans* (USFS 2025b). Whether *Riccia fluitans* is likely to be affected by the herbicide applied is unknown. The one occurrence is within the Stikine-LeConte Wilderness, and timber harvest has not occurred within 1 km from the single occurrence (USFS 2025c).
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* Because there is only one record of this species on the Tongass, yet habitat as described on the specimen is broadly available, it is difficult to generalize habitat for this species across the Forest. Invasive species and climate change may impact the habitat of *Riccia fluitans*. In general, the shallow water habitats that *Riccia fluitans* prefers across its range may be affected by invasive species (particularly reed canarygrass) in the future. In addition, climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which will lead to drought stress for wetland species with high soil moisture requirements such as *Riccia fluitans* (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and	D	*D = Insufficient information to draw inferences about criterion.*

Criteria	*Rank*	*Rationale*
demographics		The life history of *Riccia fluitans* is largely unknown. It is an aquatic thalloid liverwort that forms tangled mats below the water surface or on land in drying areas adjacent to water bodies (Althoff and Zachgo 2020, IFAS 2025). It is rarely found with reproductive structures (IFAS 2025, Paton 1973).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	**X**☐
Declining populations or habitat trends	☐	☐	**X**☐
Restricted range	☐	☐	**X**☐
Low populations or restricted ecological conditions	**X**☐	☐	☐
Other factors (see conclusion rationale)	☐	☐	**X**☐

Conclusion Rationale

Riccia fluitans is not recommended as a Species of Conservation Concern in accordance with the following rationale:

- **Significant threats**: The single known occurrence of this species is currently threatened by invasive species and invasive species treatment actions. Suitable habitat for this species is likely to be threatened by expected increases in temperature and changes in precipitation patterns. However, the lakes, ponds, and small pools that are known to provide suitable habitat for this species are considered abundant in the plan area. Without more information, it is not possible to make conclusive assessments about threats to this species or its habitat on the Tongass NF.
- **Declining trends**: Trends in population are unknown. Due to invasive species encroashment and associated treatment activities, declining trends in habitat may be ongoing at the location occupied by the single record in the plan area. However, this habitat type is stable and abundant across the Tongass NF; additional information is needed to assess whether or not additional ecological factors may further restrict the habitat deemed suitable for this species in the plan area. The extremely low number of known occurrences on the forest may be due to these unknown ecological restrictions, but it is equally possible that this species has been overlooked in the absence of more thorough bryophyte surveys.

- **Restricted ranges**: *Riccia fluitans* is not endemic to the plan area, and occurrences of the species on the Tongass NF do not exist at the edge of the species' overall range. Occurrences in the plan area may be considered disjunct from the nearest records, but this inference cannot be conclusively made without additional information including focused surveys.
- **Low population numbers or restricted ecological conditions**: The limited records indicate that successful establishment of this species may be reliant on a specific and narrow range of ecological conditions, though it is equally likely that additional occurrences have been missed or overlooked in the absence of bryophyte-focused surveys in appropriate habitat. However, with documented existing threats and only a single known occurrence within the plan area, *Riccia fluitans* is highly vulnerable to extirpation from the plan area by stochastic events.
- **Other factors**: There is insufficient information to determine whether any additional characteristics of this species may support a basis of substantial concern.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [5/24/2015]**	**Southeast Alaska mainland. Collection locality on north shore of Twin Lakes 17 miles NNE of the Borough of Wrangell on the north shore of the Stikine River.**	**Lakeshore forest dominated by Alnus rubra with extensive Malus fusca thickets surrounded by Tsuga heterophylla and Picea sitchensis on higher ground. partially submerged in warm water, partially shaded. Substrate: mineral soil.**		

Rorippa curvisiliqua

Rorippa curvisiliqua [(Hook.) Besser ex Britton]

Curvepod yellowcress

Global Rank: **G5**
Alaska State Rank: **S1S2**



photo: © 2009 Keir Morse

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = There is a single known locality on the Tongass National Forest (TNF). On the Tongass NF, *Rorippa curvisiliqua* is known from two occurrences near Hyder that are less than 2km apart. Both are described as in beaver pond or beaver pond edge (ANHP ACCS 2023, CPNWH 2023). Additionally, there are three occurrences off NFS land in southeast Alaska: one occurrence in Juneau, one occurrence in Glacier Bay National Park, and an additional single occurrence along the Haines highway.
2 Distribution in surrounding geographic area	B	B = Broad distribution outside of the TNF, however TNF occurrences are widely disjunct from rest of range. Global Rank G5, Alaska State Rank S1S2 British Columbia Province Rank S5, Yellow List; SNR in Washington, Montana, Idaho, Oregon, or California. In Alaska, *Rorippa curvisiliqua* is also known to occur in two locations in Glacier Bay National Park, and several locations in central and western Alaska, where it is known to meadows and fens (CPNWH 2023, ARCTOS 2023, Carlson et al. 2004). The location on the TNF is at a distance of approximately 250 miles (400 kilometers) from these occurrences (CPNWH 2023). *Rorippa curvisiliqua* is widespread across western North America, where it is associated with shores of lakes, ponds, and reservoirs, edges of pools and sloughs, swales, marshy grounds, mud flats, streamsides, sandy banks, wet roadsides, meadows, and seepage areas (FNA 2020). In British Columbia, it is common in the southern part of the

Criteria	*Rank*	*Rationale*
		province, and associated with moist waste places, meadows and open woods in the lowland and lower montane zones (Klinkenberg 2023).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. Rorippa curvisiliqua is a low-growing annual species that produces small, lightweight seeds in siliques (FNA 2020). The majority of populations in southeastern Alaska are small and disjunct, a pattern that is consistent with long-distance transport by waterfowl (p. 57, Carlson et al. 2004).
4 Abundance on Tongass NF	A	A = Rare – the current number of known occurrences is low enough that stochastic and other factors could lead to potential imperilment. The number of plants found at the two known occurrences of *Rorippa curvisiliqua* on the TNF is unknown (ARCTOS 2023). The two occurrences are very close to each other (<2km).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for the documented occurrences of *Rorippa curvisiliqua* on the TNF are unknown (CPNWH 2023).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The known occurrence on the TNF is associated with a beaver pond, and other occurrences in Alaska and across the species range are associated with a wide range of wetland habitat types, from meadows and fens to mudflats, ponds, and lakeshores. On the Tongass NF, wetland habitat has high ecosystem integrity with low vulnerability to stressors.

Criteria	*Rank*	*Rationale*
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors Because this species is found in wet areas, it may be sensitive to changes in water dynamics. Climate change will likely alter temperature and precipitation patterns which will affect the water table, especially in summer (Turner and Mallot 2025). Declining water table depth in wetlands may allow for tree encroachment but this process appears to be slow. Some freshwater bodies in Alaska have shrunk due to decreased precipitation and increase temperature driven evapotranspiration (Halofsky et al DRAFT). However, impacts on *Rorippa curvisiliqua* are not documented. Beaver pond habitat is additionally vulnerable to invasive species such as reed canarygrass. Reed canarygrass invasion has the potential to form monotypic colonies and crowd out native vegetation. This invasive species has degraded beaver pond habitat elsewhere on the TNF (Huette et al. 2003). The closest mapped occurrence of reed canarygrass is four kilometers south of where *Rorippa curvisiliqua* locations are mapped, and confirms the invasive species' presence in the Salmon River Valley and Hyder area (USDA FS 2023).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. Species susceptibility to disease, predation and competition are unknown. Species response to disturbance is unknown. A discussion of this species in Carlson et al. 2004 expressed uncertainty about whether *Rorippa curvisiliqua* populations in Alaska are capable of achieving their replacement rates such that recruitment equals or exceeds mortality without the influx of propagules from outside the population. However, this is somewhat speculative without revisits to the sites.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Rorippa curvisiliqua* within the plan area based upon the following:

- **Significant threats** - Invasive species such as reed canarygrass may present a risk to beaver pond habitat for this species; infestations of this invasive are known to be present in the Salmon River Valley near Hyder.
- **Declining population or habitat trends** – Population trends for the known occurrence are unknown. Projected increased temperatures are likely to increase evapotranspiration, which may affect available water within habitat for this species. The tolerances of this species to projected climate change trends, however, are unknown.
- **Restricted range** – The TNF occurrence is somewhat disjunct (approximately 400 kilometers) from the main distribution of this species but the range continues north and south of the forest and the species may tend to be more disjunct due to waterfowl dispersal.
- **Low populations or restricted habitat conditions** – There are two documented occurrences of *Rorippa curvisiliqua* on the TNF, both near Hyder, indicating a risk of imperilment due to stochastic factors. Known habitat on the TNF is described from the single known location as the edges of a beaver pond. Potential habitat at other Alaska occurrences and across the range of this taxon has been described as meadows, fens, lakeshores, ponds, mudflats, marsh, and other wet habitats. These habitats are broadly distributed across the TNF.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO2)[8/04/1993]	Mile 8 N of Hyder	muddy beaver pond edge	NA	NA
1	CPNWH_April2025(ALA)[8/04/1993]	Mile 8 N of Hyder, Bradfield Cal Quad, Tongass National Forest.	Muddy beaver pond edge.		
2	ACCS_Mar25 (EO2)[no date]	Misty Fiords, Hyder, Salmon River valley, beaver pond, mile 8.0 from main town intersection, east side of road. Survey site #M93-48.			
		Occurrences not on TNF			
3	ACCS_Mar25 (EO1)[8/25/1940]	Juneau			
3	ACCS_Mar25 (EO1)[no date]	Juneau.			
4	ACCS_Mar25 (EO6)[8/16/2001]	Glacier Bay, N of Beartrack Cove, Beartrack 3-A, UTM 447099.31N, 6499945.1W	bog		
5	ACCS_Mar25 (EO4)[7/01/1946]	Haines Highway mile 37			

Salix hookeriana

photo: Saint Mary's College of California, Jepson eFlora



Salix hookeriana Barratt ex Hook

Hooker's willow

Global Rank: **G5**

Alaska State Rank: **S2S3**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A3	A = Scarce OR isolated. Habitat is naturally distributed as isolated patches, with limited opportunity for dispersal among patches. Some local populations may be extirpated, and rates of recolonization will likely be slow. *Salix hookeriana* is known from three estimated occurrences on the Tongass NF. We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The three occurrences are all on the Yakutat Ranger district: one at the edge of an herbaceous moist meadow in the Situk River estuary (recorded in 1991), one on wet alluvium in willow thickets near the mouth of the Italio River, and one in a thicket near the Tanis Mesa airstrip (both recorded in 1965) (Appendix 1). There is also a 1961 occurrence likely not on TNF land near Yakutat (Appendix 1). Conn et al. (2011) also reported the species much further south from their study plots on the Stikine River near Wrangell. Willows can be difficult to identify (often requiring multiple observations at different times of the year) so the species may be underreported. *Salix barclayi* × *S. hookeriana* hybrids or introgressants have been found at Tanis Lake, in the vicinity of the occurrences on the Tongass NF (Argus 2011).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	B = Widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G5 Alaska State Rank S2S3 *Salix hookeriana* can be found along the Pacific coast from south-central Alaska to northern California. Populations are disjunct north of southern British Columbia; the nearest populations are in the Chugach NF, with the western edge of its range around the head of Turnagain Arm, and to the south in Haida Gwaii (Argus 2007). It is common in appropriate habitats in the core of its range, which include marine coastal beaches and sand dunes, interdunal depressions, coastal marshes, pine barrens, floodplains, ravines, wet sedge meadows, lakeshores, floodplains, and morainal flats with sandy or gravelly substrates (Argus 2011, 2013; NatureServe 2024). It occurs on nitrogen-medium soils in the early stages of primary and secondary succession and is restricted to very moist to wet soils (eFlora BC). Plants are almost always near the coast or under the influence of saltwater on inland rivers (Dorn 2000). On Chugach NF the species may be found with *Calamagrostis canadensis* (bluejoint reedgrass), *Equisetum arvense* (common horsetail), *Myrica gale* (sweetgale), *Carex lyngbyei* (Lyngbye's sedge), and other willows (DeVelice et al. 1999). The next closest records to the occurences near Yakutat are over 200 miles away on Middleton Island.
3 Dispersal capability	B	B = Disperses only through suitable habitat *Salix hookeriana* is dispersed by wind-borne seeds but also asexually reproduces through vegetative growth (Dorne 2000, Argus 2013). Through its range it is usually found by the coast or salt-influenced areas, though collections outside its usual habitat further inland or at higher elevations may represent establishments through wind dispersal (Dorn 2000). The Yakutat Forelands consist of relatively flat, well-connected dune and wetland habitats through which the species is likely able to disperse.
4 Abundance on Tongass	D	D = Insufficient information to draw inferences about criterion. No plant counts or notes about abundance are included with occurrence data. Viereck and Little in “Alaska Trees and Shrubs” state that this willow is rare in Alaska, except in the Yakutat Bay region (Viereck & Little 2007).

Criteria	*Rank*	*Rationale*
NF		Conn et al. (2011) reported the species as common on their study plots on the Stikine River.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There are no population trend studies available for this species.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Habitat for this species on the Tongass appears to be estuaries, moist meadows/marshes, and clearings. The habitat for this species in the state is described as stabilized sand dunes, meadows, and beach ridges to willow thickets (Welsh 1974). Coastal habitat quality in the Yakutat Forelands has been impacted or threatened by isostatic rebound, increased wind speeds and storm intensity from climate change, recreation in some areas, and invasive plant species (Gubernick & Paustian 2007, EcoAdapt 2014). The area has also been modified by coastal erosion/deposition processes as well as earthquakes, which have resulted in up to 15 m of uplift in portions of Yakutat Bay and altered groundwater processes in affected areas (Shephard 1995, Gubernick & Paustian 2007). Isostatic rebound in coastal areas near Yakutat have raised the land by a rate of 0.5 cm a year since 1940 (Savage and Plafker 1991) causing some portions of perennial streams to become intermittent (Shepard 1995). Isostatic rebound on the Yakutat Forelands can cause succession of woody tree species such as *Picea sitchensis* into coastal ecosystems, which change the plant communities and soil in these areas (Shephard 1995). Moose first migrated into the Yakutat area in the early 20th century and their populations subsequently exploded into the thousands, and within a few decades environmental pressures such as over browsing caused significant population decreases (Dinneford 1988). Their current population density is about 0.5 moose/km2 (Oehlers et al. 2011). *S. hookeriana* is browsed by moose in Yakutat (Vierick & Little 1972) so the relatively new occupation of the area by moose may

Criteria	*Rank*	*Rationale*
		present herbivory pressure. Winter forage proportion of woody browse of Yakutat moose populations has been reported as 100% (White et al. 2007).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Sea level rise is a stressor for riparian habitat in coastal areas, though isostatic rebound is likely lessening the effects for now (Bryant 2009). An additional potential habitat threat is the advancement of Hubbard Glacier. In 1986 and 2002 the glacier blocked the north end of Russell Fiord and temporarily created Russell Lake. Complete blockage of the fiord could cause lake levels to rise to the elevation that it would spill into the Situk River channel, increasing average daily flows by 100-fold and causing significant short and long-term changes to the river ecosystem (Gubernick & Paustian 2007). Invasion of riparian systems by non-native plants is likely facilitated by changes to flow dynamics (Flanagan et al. 2015, Nilsson & Svedmark 2020). Southeastern Alaska's waterways are among the most vulnerable sites to invasive species. Reed canarygrass (*Phalaris arundinacea*) is an exotic grass that aggressively invades wetlands and riparian areas in southeastern Alaska. The grass forms thick monospecific mats that choke out other riparian vegetation (Huette et al. 2003). It has a high frost tolerance and can occupy saltier soils with adequate flooding (USDA NRCS 2002). Another invasive plant that has altered habitat in other floodplains of Alaska is *Melilotus albus*, a nitrogen-fixer. It can cause changes to the soil environment, affecting native plant communities and facilitating the invasion of other exotic species. Though this plant hasn't been found in the area, it has extensive populations on several rivers in Alaska (including the Stikine, where the other possible population of *S. hookeriana* may be found) and has the potential to invade other frequently disturbed floodplains (Conn et al. 2011). Warmer temperatures from climate change will likely influence riparian vegetation growth, survival, and distribution and allow for the encroachment of plant species limited by cold temperatures, causing competition from more southern species in novel environments (Savage & Cavender-Bares 2013, EcoAdapt 2014). However, because the bulk of its range is more southerly, it is possible that *S. hookeriana* might have higher fitness with a more temperate climate (Savage & Cavender-Bares 2013).
8	B	B = Life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known.

Criteria	*Rank*	*Rationale*
Life history and demographics		*Salix hookeriana* is a shrub or small tree up to 8 m high. It is dioecious and likely wind and/or insect pollinated (Argus 2013). Because it is both wind-dispersed and pollinated, *S. hookeriana* may be affected by climate-driven increases in wind speeds predicted in the region, though modelling suggests species' responses will be variable (Bullock et al. 2012, Kling and Ackerly 2020). In other areas the species hosts a highly diverse assemblage of herbivores as well as ant-aphid mutualisms. The herbivore type, distribution, and herbivory rate are likely influenced by the aggression of ants. Study suggests that branches with ant-aphid mutualisms present suffer significantly less herbivory than those without them (Crutsinger & Sanders 2005). The herbivore assemblages could result in highly variable selective pressures on many different genetic and phenotypic plant traits (Barbour et al. 2015).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Salix hookeriana is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Potential threats include isostatic rebound, increased storm frequency, and non-native plants such as reed canarygrass, but more information is needed to know whether these threats are significant.

- **Declining trends:** Population trends are unknown. Habitat may be experiencing a downward trend but the extent to which that will impact habitat suitability for *Salix hookeriana* is unknown.
- **Restricted ranges:** *Salix hookeriana* is not a narrrow endemic nor is it at the edge of its range on the Tongass NF, though it does appear to be near the northern edge of its range. The Yakutat location is possibly disjunct (the next nearest records are over 200 miles away) but willow species are difficult to identify and likely to be under reported.
- **Low population numbers or restricted ecological conditions:** Information about this species' abundance in the planning area is limited. None of the three occurrences have population estimates. Habitat preferences described from outside the planning area do not point to restricted ecological preferences.
- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO7) [6/9/65]**	**Yakutat Foreland, Tanis Mesa, Tanis Mesa airstrip**	**willow thicket**		
1	CPNWH_April2025(ALA)	Yakutat Foreland, Tanis Mesa, Tanis Mesa airstrip, Yakutat Quad.	Willow thicket.		
2*	**ACCS_Mar25 (EO8) [6/10/65]**	**Yakutat Foreland, Italio R., near mouth**	**wet alluvium, willow thickets**		
3*	**ACCS_Mar25 (EO9) [6/27/91]**	**Yakutat Foreland, Situk R. estuary**	**Edge of herbaceous moist meadow.**		
3	CPNWH_April2025(ALA)	Yakutat Foreland, Situk R. estuary, Yakutat Quad.	Edge of herbaceous moist meadow.		
4*	**ACCS_Mar25 (EO1) [5/15/61]**	**Yakutat**	**thickets and clearings**		
4	ACCS_Mar25 (EO1) [5/15/61]	North Tongass tiol Forest, Yakutat.	Wet soil, thickets and clearings near airport.		
4	ACCS_Mar25 (EO1) [5/15/61]	Yakutat	marsh edges, browsed by moose, wet soil		
4	ACCS_Mar25 (EO1)	Yakutat	marsh edges, browsed by moose, wet soil		
4	ACCS_Mar25 (EO1)	Yakutat	marsh edges, browsed by moose, wet soil		
4	ACCS_Mar25 (EO1) [5/15/61]	Yakutat, North Tongass tiol Forest.	Open areas, edges of marshes, wet soil.		
4	ACCS_Mar25 (EO1) [5/15/61]	Yakutat, North Tongass tiol Forest.	Wet soil, open areas, edge of marshes.		
4	ACCS_Mar25 (EO1)	Yakutat, North Tongass tiol Forest.	Wet soil, open areas, edge of marshes.		
4	ACCS_Mar25 (EO1)	Indian village, Head of Yakutat Bay.			
4	ACCS_Mar25 (EO1)	Yakutat Foreland, Yakutat	open areas, edge of marshes		
4	ACCS_Mar25 (EO1)	Yakutat, at edge of marshes.			
4	ACCS_Mar25 (EO5)	Thickets and clearings near Yakutat Airport.			

Saussurea americana

Saussurea americana [D. C. Eaton, 1881]

American saw-wort

Global Rank: **G5**

Alaska State Rank: **S2S3**



photo: (CC0) Gabriel Campbell

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy OR gaps. *Saussurea americana* is known from five estimated occurrences on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Prince of Wales Island near Big Creek (Occurrence 1), Baranof Island near Lake Diana (Occurrence 2), near Sitka (Occurrence 3), and Chichagof Island (Occurrence 4 and 5) (Appendices 1 and 2; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in subalpine meadows, avalanche tracks, and limestone ridges (Appendix 1). Occurrence 1 and 3 were collected in alpine meadows, occurrence 2 in avalanche tracks, and Occurrence 4 and 5 on limestone ridges (Appendix 1). These habitats are typical for this species. There is one occurrence of this species in southeastern Alaska outside of the Tongass NF near Mosquito Lake, AK (CPNWH 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2S3, British Columbia S5, Alberta S1, Yukon S3 (NatureServe 2025) *Saussurea americana* is broadly distributed throughout the Olympics and Cascades mountains in Washington; Yukon Territory to California, east to Alberta, Montana, and Idaho (UWBM 2025). It occurs in canyons, meadows, and streamsides in montane forests at elevations of 1,000 m to 2,600 m (FNA 2025). It is typically found in open and rocky slopes where it is moist (UWBM 2025, NatureServe 2025). In southeastern Alaska this species is known from the Tongass NF; its range continues barely north in Alaska approximately 50 km (30 mi) to the Mosquito Lake area (CPNWH 2025). It is frequent but scattered in and west of the Coast-Cascade Mountains in western British Columbia, and its range continues south through Washington, Oregon, Idaho, and California (Klinkenberg 2020).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion *Saussurea americana* is a perennial herb with a cespitose growth habit (FNA 2025). Its main dispersal mechanism is likely wind dispersal by seeds, given the presence of bristles and lack of prickles or hairs that would aid in other methods of dispersal (e.g. animals) so they likely do not disperse for long distances (FNA 2025, Singh et al. 2023).
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. *Saussurea americana* is known from 5 occurrences on the Tongass NF (Appendices 1 and 2). There is some abundance information for the confirmed occurrences on TNF (Appendix 1). Occurrence 1 notes the species was rare in 2003; at Occurrence 2 there were 10 individuals in 2002 and rare in 2004; Occurrence 4 noted 13 plants and 11 plants in 2004; occurrence 5 notes 40 seen, 9 seen, and common in 2004 (Appendix 1).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Due to lack of follow-up surveys, population trends of known occurrences of *Saussurea americana* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	A	A = Decline in habitat quality or quantity. The habitat for the 5 occurrences of *Saussurea americana* on the TNF is mostly avalanche tracks and limestone ridges, with one occurrence also mentioning subalpine meadows (Appendix 1). These habitats can be grouped under Alpine Vegetation and Subalpine Forest (Turner and Mallott 2025). While follow-up visits to the specific occurrence locations have not occurred, alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). Invasive species that can survive in or near Alpine Vegetation, such as *Taraxacum officinale*, are known to within 1 km from Occurrence 5; no other occurrences have reported invasive species within 1 km (USFS 2025b). Timber harvest has not occurred in the recent past within 1 km from all occurrences (USFS 2025c).
7 Habitat vulnerability or modification; other threats	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. Alpine vegetation on the Tongass is expected to be impacted broadly in the future by climate change, as well as potential localized impacts from communication sites, mining, and recreational use (Turner and Mallott 2025).Species occurring in alpine ecosystems are considered highly vulnerable to impacts of reduced snowpack, subalpine species encroachment, altered interactions with pollinators, and rising temperatures as a result of climate change (Inouye 2020, Halofsky et al. 2024). Climate change may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al DRAFT). In addition, climate change is predicted to warm temperatures and increase rainfall and shift winter precipitation from

Criteria	*Rank*	*Rationale*
		snow to rain, which will decrease snow accumulation and may negatively affect this species (Halofsky et al. 2025, Turner and Mallott 2024, Wiles and Warren 2025).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Saussurea americana* is a perennial herb with a cespitose growth habit (FNA 2025). It produces flowers and fruits with seeds (FNA 2025). It flowers from July to September (FNA 2025, UWBM 2025). Flowers are pollinated by insects (CPC 2025). Seeds have non deep physiological dormancy and may require short periods of cold stratification similar to other Asteraceae species for germination (Baskin and Baskin 2012). The life span of *Saussurea* plants has been described as "long" (Yun and Kim 2021).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Saussurea americana is not recommended as a Species of Conservation Concern according to the following rationale:

- **Significant threats**: This species is threatened by expected and ongoing changes in climatic conditions. The alpine habitat occupied by *Saussurea americana* is particularly vulnerable to increasing temperature and shifting precipitation patterns, particularly through decreases in yearly snowpack. There are potential highly localized threats from recreation, mining, and communication site construction and maintenance.
- **Declining trends**: There is not enough information to determine trends in population for this species. Alpine habitat is considered only moderately stable on the Tongass NF, and decreases in snow and ice in the alpine have already been recorded. However, more information is necessary to conclusively assess both habitat and population trends for this species.
- **Restricted ranges**: This species is not endemic to the plan area and is not considered disjunct from the nearest populations outside the Tongass NF. Occurrences in the plan area are close to the northern edge of their range, but additional records indicate *Saussurea americana* can persist at more northerly latitudes.
- **Low population numbers or restricted ecological conditions**: This species is somewhat vulnerable to extirpation by stochastic events, as records on the Tongass NF are limited to only five occurrences, many with low recorded populations and descriptions like "rare." This species may have a preference for a narrow range of ecological conditions. Many of these records occur on limestone, though it is unclear if this species is restricted to this substrate type in southeast Alaska.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO9) [8/08/2003]**	**Alexander Archipelago, Prince of Wales I., Big Cr. vicinity, ridge W of creek**	**subalpine meadow on limestone, rare**	**rare**	
1	CPNWH_April2025(ALA) [8/08/2003]	Alexander Archipelago, Prince of Wales I., Big Cr. vicinity, ridge W of creek, Craig Quad, Tongass National Forest, Alexander Archipelago.	Subalpine meadow on limestone, rare.	rare	
2*	**TESP_Mar25 (100531P000092) [7/02/2004]**	**Baranof Is., Lake Diana**	**edge of brushfield along avalanche track, rocky soil**	**10 plants**	
2	ACCS_Mar25 (EO8) [7/02/2004]	Alexander Archipelago, Baranof I., Lake Diana, SW side of lake	rare on 20¬ slope on SE aspect, avalanche snowfield	rare	
2	ACCS_Mar25 (EO8) [7/02/2004]	Baranof Is., Lake Diana, edge of brushfield along avalanche track	rocky soil	10 plants	
2	CPNWH_April2025(ALA) [7/02/2004]	Alexander Archipelago, Baranof I., Lake Diana, SW side of lake, Port Alexander Quad, Tongass National Forest.	Rare on 20 deg. slope on SE aspect, avalanche snowfield.	rare	
3*	**ACCS_Mar25 (EO5) [7/07/2013]**	**Harbor Mt., just NE of Sitka, Harbor Mt. Trail to shelter.**	**Adjacent to trail where it crosses a large, steep, S-facing meadow.**		
3	TESP_Mar25 (100531P000043) [7/06/2003]			Baranof,Harbor Mtn trail near Sitka	
3	CPNWH_April2025 (ALA) [7/07/2013]	Harbor Mt., just NE of Sitka, Harbor Mt. Trail to shelter, Sitka Quad, Alexander Archipelago, Baranof Island.	Adjacent to trail where it crosses a large, steep, S-facing meadow.		
3	ACCS_Mar25 (EO5) [7/06/2003]	Baranof,Harbor Mtn trail near Sitka			

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
3	ACCS_Mar25 (EO5) [no date]	Sitka, Harbor Mt., 3 km N of Sitka, Harbor Mtn. trail	growing in avalance zone near trail		
3	CPNWH_April2025 (ALA) [8/01/2001]	Sitka, Harbor Mt., 3 km N of Sitka, Harbor Mtn. trail, Sitka Quad.	Growing in avalance zone near trail.		
4*	**TESP_Mar25 (100531P000111) [7/21/2004]**	**Chichagof Is., Rust L. area**	**vegetated 'pocket' on bare limestone ridge**	**13 plants**	
4	ACCS_Mar25 (EO6) [7/21/2004]	Chichagof Is., Rust L. area	vegetated 'pocket' on bare limestone ridge	13 plants	
4	ACCS_Mar25 (EO6) [7/21/2004]	Alexander Archipelago, Chichagof I., Rust Lake, karst mountain E of lake	rare on W aspect, vegetated shelf amidst bare limestone		
4	ACCS_Mar25 (EO6) [7/21/2004]	Chichagof Is., Rust L. area	vegetated cracks or ledges on bare limestone ridge	11 plants	
4	CPNWH_April2025 (ALA) [7/21/2004]	Alexander Archipelago, Chichagof I., Rust Lake, karst mountain E of lake, Sitka Quad, Tongass National Forest.	Rare on W aspect, vegetated shelf amidst bare limestone.	rare	
4	TESP_Mar25 (100531P000112) [7/21/2004]	Chichagof Is., Rust L. area	vegetated cracks or ledges on bare limestone ridge	11 plants	
5*	**TESP_Mar25 (100531P000116) [7/22/2004]**	**Chichagof Is., Rust L. area**	**ATFI/HELA/VEVI etc field at base of steep limestone ridge**	**40 seen**	
5	ACCS_Mar25 (EO7) [7/22/2004]	Chichagof Is., Rust L. area	limestone ridge	9 stems	
5	ACCS_Mar25 (EO7) [7/22/2004]	Alexander Archipelago, Chichagof I., Rust Lake, ridge N of lake	common on 10 degree slope on E aspect, limestone boulder field	common	
5	ACCS_Mar25 (EO7) [7/22/2004]	Chichagof Is., Rust L. area	ATFI/HELA/VEVI etc field at base of steep limestone ridge	40 seen	
5	CPNWH_April2025(ALA) [7/22/2004]	Alexander Archipelago, Chichagof I., Rust Lake, ridge N of lake, Sitka Quad, Tongass National Forest.	Common on 10 degree slope on E aspect, limestone boulder field.	common	
5	TESP_Mar25 (100531P000118) [7/22/2004]	Chichagof Is., Rust L. area	limestone ridge	9 stems	

Saxifraga adscendens

Saxifraga adscendens [L.]

Ascending saxifrage

Global Rank: **G5**

Alaska State Rank: **S2S3**



Photo: Syd Cannings (CC-BY; iNaturalist 2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Saxifraga adscendens* is known from three estimated occurrences on the Tongass NF (Appendices 1 and 2; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The three occurrences are found on Hecate Island, Prince of Wales Island, and Chichagof Island (Appendices 1 and 2). None of the Tongass NF occurrences are in Wilderness Areas (Appendix 1). There is one additional non-Forest occurrence of *Saxifraga adscendens* in southeastern Alaska on Four Winds Mountain, northwest of Haines (ANHP ACCS 2025). Information recorded by observers and collectors indicates that *Saxifraga adscendens* grows in sparsely vegetated rocky or gravelly habitats on the Tongass NF including subalpine meadow, alpine talus meadow, and rocky alpine heath; one of the records indicates limestone substrate and all three records are in locations mapped as limestone (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a, USGS 2025). While limestone is not a requirement for this species across its range, the phenomenon of species on the edge of their ranges switching to a different habitat or soil type has been documented previously, and authors have hypothesized that the atypical habitat may provide an environment with less interspecific competition (Griggs 1914, Stanton-Geddes et al. 2012). Records on the Tongass NF range in elevation from approximately 1,930 to 3,235 ft (590 to 985 m) (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
		Associated species were not reported for any of the Tongass NF occurrences (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a).
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the TNF* Global Rank: G5 (Secure), Alaska State Rank: S2S3 (ANHP ACCS 2025, NatureServe 2025) State Ranks: Canadian provinces and territories: S3 (Vulnerable): Alberta, Yukon; all others are S5 (Secure), SNR (not ranked), or not present. United States: S1 (Critically Imperiled): Nevada; S2 (Imperiled): Idaho; S3 (Vulnerable): Wyoming; all others are S4 (Apparently Secure), SNR (not ranked), or not present (ANHP ACCS 2025, NatureServe 2025). *Saxifraga adscendens* occurs in northwestern North America and in Europe (Brouillet and Elvander 2009, POWO 2025). In North America, it ranges from Alaska east to the Northwest Territories of Canada and south to Oregon, Nevada, Utah, and Colorado (Brouillet and Elvander 2009, NRCS 2025). There are three estimated occurrences of *Saxifraga adscendens* from the Tongass NF (Arctos 2025, CPNWH 2025, USFS 2025a). Outside of southeastern Alaska, the nearest Alaskan records are approximately 300 miles northwest along the Chitina River (Arctos 2025, CPNWH 2025, SEINet 2025). *Saxifraga adscendens* records are sparsely distributed in western, central, and southern Alaska and southeast to the panhandle region (Hultén 1968, Welsh 1974, Arctos 2025, CPNWH 2025). To the east, the species is common in British Columbia mostly east of the Coast and Cascade mountains; it is absent from coastal British Columbia. The closest known occurrence to any of the Tongass occurrences is approximately one hundred miles north across mountain ranges and open water. (Klinkenberg 2020, CPNWH 2025). Throughout its North American range, *Saxifraga adscendens* occurs on moist cliff ledges, talus slopes, screes, rock crevices, glacial moraines, gravelly alpine meadows, and gravelly stream banks at elevations ranging from approximately

Criteria	*Rank*	*Rationale*
		4,000 to 13,800 feet (1,200–4,200 m) (Hultén 1968, Porsild and Cody 1980, Brouillet and Elvander 2009, Klinkenberg 2020).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* No dispersal information was found for *Saxifraga adscendens*. This species produces vegetative bulbils (Brouillet and Elvander 2009), but no information was found documenting bulbil dispersal methods or distances. *Saxifraga* seeds are very small and are probably wind dispersed (Margreiter et al. 2022). No information was found on the dispersal distance of *Saxifraga* seeds.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* None of the occurrences have population counts, qualitative information on abundance, or estimates of population extent (Appendix 1). While there is no information on abundance or population extent for any of the Tongass NF occurrences, the species is known from a limited distribution on the Tongass NF, with only three estimated occurrences (Appendices 1 and 2).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about the criterion* There is no information on population sizes or trends for any of the Tongass NF occurrences.
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity.* As explained in Criterion 1, *Saxifraga adscendens* grows in subalpine and alpine habitats on the Tongass NF (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
		Alpine habitat on the Tongass NF is currently considered moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). Subalpine ecological integrity is currently considered high, but climate change is likely to have some impact on this ecosystem (Turner and Mallott 2025). All of the Tongass occurrences are in areas with limestone bedrock, which is a more limited type of alpine/subalpine habitat. None of the Tongass NF occurrences are located within one mile of mapped non-native plants (Appendix 1; USFS 2025b). Of the three Tongass NF occurrences, one is within approximately 0.25 mile of a mapped historical or recent timber project (USFS 2025d). The unforested rocky alpine habitat is unlikely to be impacted by downslope activities such as timber projects or road building and subalpine forests are not prime areas for timber extraction.
7 Habitat vulnerability or modification; other threats	B	*B = similar to the range of historical conditions but impacted by modern stressors* Climate change is the main stressor of alpine and subalpine ecosystems on the Tongass NF (Turner and Mallott 2025). The ecological integrity of the alpine ecosystem is considered moderate and trending towards lower ecological integrity, and the subalpine integrity is considered high, but some climate change impacts are expected. Other comparatively minor, localized, or short duration stressors include mining, communication sites and recreation. (Turner and Mallott 2025). In the alpine and subalpine zones, climate change is predicted to cause increased air temperature, higher precipitation, a shift in winter precipitation from snow to rain, and lower total snowpack (Wiles and Warren 2024, Turner and Mallott 2025). In the alpine zone, a lower snowpack level and warmer temperatures will lead to earlier snowmelt and decreased soil moisture later in the season (Wiles and Warren 2024, Turner and Mallot 2025). Increasing temperature will result in longer growing seasons and higher evapotranspiration rates which will raise vegetation water demands (Wiles and Warren 2024, Turner and Mallot 2025). Precipitation is predicted to increase but not enough to fulfill increased summer water demand (Turner and Mallot 2025). There is uncertainty regarding potential changes to species composition in alpine and subalpine zones on the Tongass NF (Turner and Mallott 2025). While there are no models specifically assessing alpine vegetation in southeastern Alaska, models from other alpine or tundra ecosystems predict increases in shrubby and woody vegetation as temperatures

Criteria	*Rank*	*Rationale*
		increase, snowpack declines, and timberline elevation rises (Turner and Mallot 2025). Upslope encroachment by woody species may increase subalpine habitat at the expense of alpine habitat, while some subalpine species may also decline at their lower elevational limits (Turner and Mallot 2025). At the upper limits of alpine habitat, deglaciation and loss of permanent snow and ice fields will increase the area open to potential colonization by alpine vegetation (Turner and Mallot 2025). However, colonization rates are unknown and may not equal rates of habitat loss at lower elevations (Turner and Mallot 2025). As mentioned in Criterion 6, there are no mapped invasive species known to be present in the vicinity of the *Saxifraga adscendens* occurrences on the Tongass NF (USFS 2025b). Timber harvest activities have occurred adjacent to or in the vicinity of one occurrence of *Saxifraga adscendens* (Appendix 1; USFS 2025d). The alpine zone is not expected to be impacted by timber activities, and subalpine forests are difficult to access and have low timber abundance, so timber harvest is not considered a major stressor in either ecosystem (Turner and Mallot 2025).
8 Life history and demographics	D	**D = Insufficient information to draw inferences about the criterion** No published information on reproductive success or demography was found from inside or outside of the planning unit. *Saxifraga adscendens* is a biennial (sometimes annual) herb in the saxifrage family (Saxifragaceae) (Brouillet and Elvander 2009). It usually occurs as solitary rosettes and is not stoloniferous (Brouillet and Elvander 2009). In the summer, it produces inflorescences of 6–15 (rarely as many as 40) white flowers (Brouillet and Elvander 2009). No species-specific pollinator information was found. Confirmed pollinators of other *Saxifraga* species include flies, bees, and butterflies (Stenström and Molau 1992, Lindgaard-Hansen and Molau 1994, CPC 2025). Some *Saxifraga* taxa are capable of self-pollination while others are generally cross pollinated (Molau 1993, Lindgaard-Hansen and Molau 1994, Gugerli 1997). No published information was found on pollination or seed production in this species. *Saxifraga adscendens* is capable of vegetative reproduction via bulbils (Brouillet and Elvander 2009).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒

Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Saxifraga adscendens is not recommended as a Species of Conservation Concern according to the following rationale:

- **Significant threats**: Threats to this species are limited to the impacts of climate change on the alpine habitat that it occupies. Increasing temperatures and changes in precipitation patterns are expected to result in decreased snow and ice in the alpine, an effect already observed in southeast Alaska. Subalpine habitat is expected to be less severely impacted. *Saxifraga adscendens* is known to occupy both alpine and subalpine habitat, and changes in species composition (e.g. woody shrub encroachment into sparsely vegetated alpine habitat) may decrease suitable alpine habitat but increase suitable subalpine habitat. These impact of these climatic changes, as well as the potential affinity for limestone bedrock, cannot be conclusively interpreted without additional information.
- **Declining trends**: There is not enough information to determine trends in population or habitat for this species.
- **Restricted ranges**: This species is not endemic to the region, and occurrences within the plan area do not exist at the edge of the species' greater range. Tongass NF occurrences are somewhat disjunct from the nearest occurrences of the species outside the plan area, and are separated by rugged mountain ranges and open water. However, due to the species' preference for alpine and subalpine habitat, as well as the general remoteness of this habitat in the region, it is possible that additional occurrences exist in unsurveyed alpine/subalpine between the Tongass NF and the nearest external populations.
- **Low population numbers or restricted ecological conditions**: The limited number of occurrences on the Tongass NF indicate vulnerability of the species to extirpation from the plan area by stochastic events. Additionally, successful establishment of the species may be reliant on the presence of alpine/subalpine limestone bedrock.
- **Other factors**: Uncertainty surrounding the impact of known dispersal methods, as well as a lack of species-specific taxonomic and life history data, indicate that there is not currently enough information to assess the impacts of these factors on the ability of this species to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.

☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO17)[7/17/2013]**	**Chichagof Island, Freshwater Bay area.**	**Sparsely vegetated limestone pavement.**		
1	CPNWH_April2025(ALA)[7/17/2013]	Chichagof Island, Freshwater Bay area, Tongass National Forest.	Sparsely vegetated limestone pavement.		
2*	**ACCS_Mar25 (EO12)[7/23/1993]**	**Heceta Island, Bald Mountain, westernmost peak.**	**Alpine talus meadow.**		
2	ACCS_Mar25 (EO12)[7/13/1994]	Heceta Island, Bald Mountain, NW-facing slopes of mountain.	Moist subalpine meadow slopes, among rocks.		
2	CPNWH_April2025(ALA)[7/13/1994]	Heceta Island, Bald Mountain, NW-facing slopes of mountain, Craig Quad, Tongass National Forest, Alexander Archipelago.	Moist subalpine meadow slopes, among rocks.		
2	CPNWH_April2025(ALA)[7/23/1993]	Heceta Island, Bald Mountain, westernmost peak, Craig Quad, Tongass National Forest, Alexander Archipelago.	Alpine talus meadow.		
3*	**ACCS_Mar25 (EO11)[7/20/1993]**	**Prince of Wales Island, Perue Mt., N of Calder.**	**Alpine talus meadow.**		
3	ACCS_Mar25 (EO11)[7/20/1993]	Prince of Wales Island, Perue Mt., N of Calder.	Alpine gravel mountaintop.		
3	CPNWH_April2025(ALA)[7/20/1993]	Prince of Wales Island, Perue Mt., N of Calder, Petersburg Quad, Tongass National Forest.	Alpine talus meadow.		
3	CPNWH_April2025(ALA)[7/20/1993]	Prince of Wales Island, Perue Mt., N of Calder, Petersburg Quad, Tongass National Forest.	Alpine gravel mountaintop.		
	ACCS_Mar25 (EO6)[8/22/2000]	St. Elias Mts., Four Winds Mt., ridge trending SE from summit	rocky alpine heath and mesic meadows, limestone substrate	**Not on Tongass**	

Saxifraga hyperborea

Photo: Roland Wirth (CC-BY-NC; iNaturalist 2025)



Saxifraga hyperborea [R. Br.]

Pygmy saxifrage

Global Rank: **G5**
Alaska State Rank: **S4**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Habitat is broadly distributed across the planning area, but gaps exist within this distribution There are five estimated occurrences of *Saxifraga hyperborea* on the Tongass NF (Herbarium ALA 2025). There are 20 additional records of this species on iNaturalist, mostly clustered around Sitka (iNaturalist 2025). On the Tongass National Forest, the species is found in rocky alpine tundra habitat, typically on ridgelines or steep slopes (20 to 35 degrees) and on talus (Herbarium ALA 2025). The vegetation community is barren to low ericaceous scrub and associated with *Carex enanderi* and *Poa leptocoma,* in at least one population (Duffy 1993).
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the TNF* Global Rank: G5 (Secure), Alaska State Rank: S4 (NatureServe 2025). For this assessment, ACCS Lead Botanist evaluated the conservation rank for Alaska. State Ranks: Canadian provinces and territories: Yukon Territories S4, British Columbia S5, Alberta S3. United States: S3 (Vulnerable): Washington, Wyoming; all others are SNR (Not Ranked) or not present (NatureServe 2025). *Saxifraga hyperborea* is a perennial herb in the Saxifragaceae that is a circumpolar species occurring in North America and Eurasia (Brouillet and Elvander 2009; Elven et al. 2018). In North America, it occurs from Alaska east across northern

Criteria	*Rank*	*Rationale*
		Canada and parts of central Canada, and south in the United States to California, Arizona, and Colorado (absent from Nevada and Utah) (Brouillet and Elvander 2009, NatureServe 2025). *Saxifraga hyperborea* records are widely distributed in Alaska from the Arctic North Slope southward to the Alaska Peninsula and Southeast Alaska (Herbarium ALA 2025). To the east, the species is common across all of British Columbia (Klinkenberg 2020). Throughout its North American range, *Saxifraga hyperborea* occurs in a variety of habitats including wet tundra, stream and lake margins, open areas on gravel or silt, shady ravines and cliffs, sheltered seepage areas below rocks, and silty and gravelly seashores (Brouillet and Elvander 2009). Records range in elevation from near sea level to over 9850 feet (3000+ m) (Brouillet and Elvander 2009).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. *Saxifraga hyperborea* is not rhizomatous or stoloniferous and reproduces solely by seed (Brochmann and Håpnes 2001, Brouillet and Elvander 2009). Seed dispersal is assumed to be gravity and given the short stature of the plant, seed dispersal would be limited in distance unless blown by wind away from the alpine ridges (J. Fulkerson pers. obs.).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The population on the Tongass National Forest is unknown. The occurrence in Greens Creek on Admiralty Island was noted to be 'rare'.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no population trend data for the Tongass National Forest populations. There is no data to support that the populations have been revisited.
6	A	A = Decline in habitat quality or quantity

Criteria	*Rank*	*Rationale*
Habitat trend on Tongass NF		Climate change is anticipated to facilitate tree and shrub expansion in higher elevations, thus shrinking alpine plant community habitat, albeit at a slow rate (Halofsky et al 2025). However, talus slope *S. hyperborea* habitat lack soil horizons needed for plant establishment, thus shrub encroachment is likely to be slow. Decreased snowpack may result in summer drought for alpine vegetation, but the alpine plant community may benefit from a longer growing season (Halofsky et al 2025). Receding glacier and snowpack will expose more upper elevation alpine habitat and has been increasing in the Tongass in the late 1990's (Bennetsen et al 2023).
7 Habitat vulnerability or modification; other threats	D	D = insufficient information Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice in southeast Alaska and has high vulnerability to stressors (Turner and Mallott 2025). Other comparatively minor, localized, or short duration stressors include mining, communication sites, and recreation. Alpine ecosystem integrity is highly vulnerable due to climate change (Turner and Mallot 2025). Climate change may lead to upslope shift in elevation of tree line, increased proportion of woody vegetation relative to herbaceous, fragmentation and loss of alpine plant communities (Halofsky et al DRAFT). Talus slope habitat is unlikely to experience woody encroachment. There are no documented invasive species or young growth stand in the vicinity of the *S. hyperborea* populations on the Tongass (USDA Forest Service 2025 a,b).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. The lifespan of *S. hyperborea* is unknown. The plant does not require pollinators for seed set as it is documented to be autogamous (self-pollinating and self-compatible; Brochmann and Håpnes 2001). The mean seed set in an experiment was found to be 63 seed/plant, nearly 100% of capacity (Brochmann and Håpnes 2001). Seed viability and germination rate is unknown.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information

Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Saxifraga hyperborea is not recommended as a Species of Conservation Concern based upon the rational below*:*

- **Significant threats:** Alpine habitat on the Tongass NF has been expanding due to receding glacier and snowpack, however shrub and trees are expected to expand into the habitat and shift the alpine vegetation community. Direct effects of the alpine plant community are unknown. Further, *Saxifraga hyperborea* appears to be restricted to steep rocky talus with minimal soil, hence the taxon may not experience a habitat shift or competition.
- **Declining trends:** Population trends are unknown. Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice and has high vulnerability to stressors, but the extent to which those changes will impact habitat suitability for *Saxifraga hyperborea* is unknown.
- **Restricted ranges:** The species has an extensive range in Alaska and a large range across the Tongass, but its distribution is patchy. The species is circumpolar and occurs in many locations in neighboring British Columbia and southward to the Pacific Northwest and Rocky Mountains.
- **Low population numbers or restricted ecological conditions:** There are enough records that the species is not thought to have low population numbers, and habitat preferences do not appear to be highly restricted.
- **Other factors:** The species does not require pollinators for seed set, negating potential pollinator dependence and possible mismatch from climate change scenarios. Seed dispersal distances may be limited.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Scapania carinthiaca

Scapania carinthiaca [Stotler, R.E. and B. Crandall-Stotler, 2017]

Carinthian Earwort

Global Rank: **G3?**

Alaska State Rank: **S1**



photo: © Michaela Kropik

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Scapania carinthiaca* is known from two estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on the mainland along Garnet Creek 11.7 km (7.3 mi) NNE of Wrangell (Occurrence 1) and on Prince of Wales Island about 13.7 km (8.5 mi) SE of Point Baker (Occurrence 2) (Appendix 1, ACCS 2024, CPNWH 2025, USFS 2025a). Occurrence 1 was collected in *Picea sitchensis* and *Tsuga heterophylla* dominated forest with some exposed garnet-rich schist, on a drift log in an *Alnus rubra* thicket (ACCS 2024). Occurrence 2 was collected in subalpine forest dominated by *Abies lasiocarpa* and *Tsuga mertensiana* over limestone (ACCS 2024). There is one additional occurrence of this species known in southeastern Alaska outside of the Tongass NF, approximately 3.5 miles north of Occurrence 1. The habitat for this occurrence is river terrace dominated by *Populus balsamifera* with *Picea sitchensis* understory (CBH 2025, CPNWH 2025).

Criteria	*Rank*	*Rationale*
		Across its range, *Scapania carinthiaca* is typically found in forests in a humid, shady area and is deadwood-dwelling (Kropik and Zechmeister 2023).
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F.* Global Rank G3?, Alaska State Rank S1 *Scapania carinthiaca* is narrowly distributed throughout northern north America and western Europe (CBH 2025). In North America, *Scapania carinthiaca* occurs in southeast Alaska and Minnesota (CBH 2025). Across its range, *Scapania carinthiaca* occurs in forests (CBH 2025, Kropik and Zechmeister 2023). A study from Austria describes this species macrohabitat as consistently wet, with a high evenness of rainfall, and a low desiccation risk. The same paper described microhabitat for this species as shaded dead wood at a median distance of 2.5 meters from streams or springy areas in semi-natural forests of montane and submontane regions. (Kropik and Zechmeister 2023).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Scapania carinthiaca* is a leafy liverwort with a terrestrial growth habit (CBH 2025, Kropik and Zechmeister 2023). Its main dispersal mechanism is by clonal growth and/or gemmae (Kropik and Zechmeister 2023).
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Scapania carinthiaca* is known from two occurrences on the Tongass NF (Appendix 1). There is no abundance information for the confirmed occurrences on TNF (ACCS 2024).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Scapania carinthiaca* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The habitat for the two occurrences of *Scapania carinthiaca* on the TNF is *Picea sitchensis* and *Tsuga heterophylla* dominated forest at low elevation (Occurrence 1) and subalpine forest dominated by *Abies lasiocarpa* and *Tsuga mertensiana* over limestone (Occurrence 2) (ACCS 2024). Because the habitats of the two occurrences are different both in elevation and forest type, it is difficult to make generalizations about habitat for this species. No invasive species are known to occur in or near either of the occurrences (USFS 2025b). Timber harvest has not occurred in the recent past near either occurrence (USFS 2025c).
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* Recent timber harvest activities have not occurred in the vicinity of the forests at either occurrence (USFS 2025c). This species is likely sensitive to desiccation. Climate change is predicted to cause changes in soil moisture and precipitation, which may affect habitat suitability for this species, but there is not enough known to predict the extent or degree to which this will be a threat to the species on the Tongass NF.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Scapania carinthiaca* is a leafy liverwort (Kropik and Zechmeister 2023). It may reproduce strictly asexually, as plants in Europe only were observed reproducing asexually (Kropik and Zechmeister 2023). It produces gemmae (Kropik and Zechmeister 2023). A targeted survey conducted in Austria more than doubled the number of new locations of this species in Europe (Kropik and Zechmeister 2023).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Scapania carinthiaca is not recommended as a Species of Conservation Concern based upon the rational below*:*

- **Significant threats:** There is potentially broad habitat availability for this species on the Tongass. Climate change is predicted to change patterns of precipitation and soil moisture but the degree to which that will impact this species is unclear.
- **Declining trends:** Population trends are unknown. Habitat preference of this species on the Tongass NF is not defined well enough to predict trends.
- **Restricted ranges:** The species is globally distributed but with few known locations in North America. Outside of southeast Alaska, the nearest known locations are in northern Minnesota.
- **Low population numbers or restricted ecological conditions:** There are two occurrences on the Tongass NF with unknown population numbers. The habitats for the two occurrences as described are not highly restricted, so it is unclear why it is not more common. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors:** *Scapania carinthiaca* may only reproduce asexually. If true, this would limit its ability to disperse and thus limit its ability to respond to changes in habitat. A targeted survey conducted in Austria more than doubled the number of new locations of this species in Europe, indicating that it is potentially overlooked in southeast Alaska as well.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [8/01/2015]**	**Southeast Alaska panhandle mainland. Collection locality along Garnet Creek and USFS cabin 7.3 miles NNE of the Borough of Wrangell on the eastern shore of the Stikine River mouth.**	**Picea sitchensis and Tsuga heterophylla dominated undisturbed forest with some exposed garnet-rich schist. on drift log in Alnus rubra thicket just downstream of cabin. Substrate: CWD.**		
1	ACCSBryo_Oct24 [6/06/2015]	Southeast Alaska panhandle mainland. Collection locality along Garnet Creek and USFS cabin 7.3 miles NNE of the Borough of Wrangell on the eastern shore of the Stikine River mouth.	Picea sitchensis and Tsuga heterophylla dominated undisturbed forest with some exposed garnet-rich schist. east of GL cabin Cephaloziella with entire lvs, sterile. Subsrate: snag.		
2*	**ACCSBryo_Oct24 [5/07/2016]**	**Southeast Alaska panhandle, Prince of Wales Island. Approximately 8.5 miles SE of Point Baker. Access via Flicker Ridge logging road.**	**Subalpine forest dominated by Abies lasiocarpa and Tsuga mertensiana over limestone. cool black scapania on bottom of late snowmelt fed rock base. Keel distinct to insertion point, base appr. Clasping stem but not S. cusp beause of prominent teeth on leaves**		

Schoenoplectus subterminalis

Photos: L top and bottom: Dean Taylor. R: Jessica O'Brien-SPI (used with permission).



Schoenoplectus subterminalis [(Torr.) Soják]

Water bulrush

Global Rank: **G5**

Alaska State Rank: **S2**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps* *Schoenoplectus subterminalis* is known from 10 estimated occurrences on the Tongass NF (Appendices 1 and 2). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The ten occurrences are located on: Prince of Wales Island (4 occurrences), Revillagigedo Island (2), Baranof Island (1), Mitkof Island (1), Duke Island (1), and Woewodski Island (1) (DeLapp 1994, Meridian Environmental 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, SEINet 2025, USFS 2025a). The Tongass NF occurrences are the only known locations of this species in Alaska, and the occurrence on Mitkof Island is the northernmost known location of this species in North America (Klinkenberg 2020, Arctos 2025, CPNWH 2025, SEINet 2025). Two of the occurrences are located in wilderness areas; the two on Revillagigedo Island are in the Misty Fjords National Monument Wilderness. The ten Tongass NF occurrences were all observed at 25–100 m in elevation in at the edge of freshwater lakes in 8 to 24 inches of standing water. Plants observed or collected in the same habitat and place on the same date include *Carex utriculata*, *Carex sitchensis*, *Eriophorum angustifolium*, *Eriophorum chamissonis*, *Potamogeton* sp., *Nuphar polysepalum, Coptis trifolia*, *Glyceria borealis*, and *Juncus falcatus* (DeLapp 1994, Meridian Environmental 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, SEINet 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the TNF* Global Rank: G5 (Secure), Alaska State Rank: S2 (Imperiled) (NatureServe 2025) State Ranks: Canadian provinces and territories: SH (Possible Extirpated): Saskatchewan; S1 (Critically Imperiled): Manitoba, Prince Edward Island; S3 (Vulnerable): Newfoundland Island, Québec; all others are S4 (Apparently Secure), S5 (Secure), SNR (Not Ranked), or not present. United States: S1 (Critically Imperiled): Alabama, Florida, Illinois, Maryland, Mississippi, Missouri, Ohio, Rhode Island, Tennessee, Virginia, Wyoming; S2 (Imperiled): Alaska, Delaware, Oregon, South Carolina; S3 (Vulnerable): California, Idaho, Indiana, Montana, North Carolina, Pennsylvania, Vermont; all others are S4 (Apparently Secure), S5 (Secure), SNR (Not Ranked), or not present (NatureServe 2025). *Schoenoplectus subterminalis* is broadly but patchily distributed in North America (Smith 2002). In Canada, it occurs in British Columbia and from Manitoba east to Labrador and Newfoundland (Smith 2002). It is considered possibly extirpated from Saskatchewan (Smith 2002). In the United States, it occurs in Alaska and from Washington east to Montana and south to California and Utah, and in the eastern states from Minnesota east to Maine and discontinuously south to Missouri, Alabama, and Florida (Smith 2002, NatureServe 2025, NRCS 2025). There are 10 occurrences of *Schoenoplectus subterminalis* from the Tongass NF (DeLapp 1994, Meridian Environmental 2014, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, SEINet 2025, USFS 2025a). These 10 occurrences are the only known Alaskan records (Hultén 1968, Welsh 1974, Klinkenberg 2020, Arctos 2025, CPNWH 2025, SEINet 2025). To the east, the species is uncommon in coastal and south-central British Columbia (Klinkenberg 2020). Throughout its North American range, *Schoenoplectus subterminalis* occurs in shallow (< 1m) and often low-nutrient freshwater of lakes, ponds, bogs, and streams (Smith 2002, Smith 2012, Klinkenberg 2020, Flora of Oregon 2025). Except for emergent inflorescences, vegetation is usually submerged, but plants may persist terrestrially if water levels drop (Smith 2002, Flora of Oregon 2025). Records range in elevation from near sea level to over 7550 feet (2300 m) (Smith 2002, Smith 2012, Flora of Oregon 2025).

Criteria	*Rank*	*Rationale*
3 Dispersal capability	B	*B = Disperses only through suitable habitat* *Schoenoplectus subterminalis* produces small (3–3.5 × 1.5–1.7 mm) dry fruits called achenes each containing one seed; the seeds and achenes are dispersed as a unit (Smith 2002). No species-specific information on seed dispersal mechanisms or dispersal distance was found. Some *Schoenoplectus* achenes are dispersed by wind and water (Esser 1995 and references therein), and many aquatic plants are dispersed by waterfowl, with smaller seeds having a greater dispersal potential (Mueller and van der Velk 2002, Soons et al. 2008). *Schoenoplectus subterminalis* grows from rhizomes, and it may reproduce clonally via rhizome fragmentation as seen in other species of *Schoenoplectus* (Uchytil 1992, Snyder 1993, Esser 1995). As explained in Criteria 1 and 2, *Schoenoplectus subterminalis* occurs in shallow freshwater in lakes, ponds, bogs, and streams; on the Tongass NF it is found on the edge of lakes on six islands in the southern half of the Forest ((DeLapp 1994, Smith 2002, Smith 2012, Meridian Environmental 2014, Klinkenberg 2020, ANHP ACCS 2025, Arctos 2025, CPNWH 2025, Flora of Oregon 2025, SEINet 2025, USFS 2025a). These occurrences are the northernmost locations for North America (Klinkenberg 2020, Arctos 2025, CPNWH 2025, SEINet 2025). If this species were to disperse, it would only survive in suitable habitat.
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Schoenoplectus subterminalis* is known from 10 occurrences on the Tongass NF (Appendices 1 and 2). Five of the occurrences have population estimates ranging from 10 to 500 plants with three having fewer than 100 plants and two having 100 or more (Appendix 1; USFS 2025a). Based on the number of occurrences and the total number of individuals observed, this species is uncommon within the Tongass NF boundary.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow up surveys, the population trends for the occurrences of *Schoenoplectus subterminalis* on the Tongass NF are unknown (USFS 2025a).

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* All ten occurrences are in freshwater lakes that are likely fed by snowmelt as well as rain. Lakes and ponds on the Tongass NF are thought to be overall in pristine condition, but as with many other resources, are likely to change with projected changes in temperature and hydrologic regime (Chestnut and Tucker 2025). Approximately 890 acres of lake riparian harvest has occurred on national forest lands. The majority (57%) of this harvest is clustered in three areas, Yakutat, South Prince of Wales Island and Admiralty Island (Chestnut and Tucker 2025). Under the 2016 Forest Plan, lakes are protected by a 100' no-cut commercial harvest buffer. Two occurrences (#s 3 and 9) located on Prince of Wales Island and one occurrence on Mitkof Island (#7) are within one mile of a historical timber project carried out between 1972 and 1997 (USFS 2025d). The lake where occurrence 7 is located is particularly close to a 1982 timber project that is adjacent to the north side of the lake (USFS 2025d). Based on aerial imagery, the lakes where the other two occurrences are located would likely not have been impacted by the timber projects mapped in their vicinity. In addition, three of the occurrences (#s 5, 7, and 9) on Prince of Wales Island and Mitkof Island are located within one mile of mapped non-native weeds including *Phalaris arundinacea*, *Phleum pratense*, *Trifolium repens*, *Taraxacum officinale*, *Poa annua*, and *Plantago major* (USFS 2025b). The mapped weeds 70 feet from occurrence 5 along the causeway of Neck Lake are the only infestations of concern; these weeds are growing directly adjacent to the lake and include *Phalaris arundinacea*, a known wetland invader (APMC 2014, Meridian Environmental 2014, USFS 2025b). The weeds mapped near occurrences 7 and 9 are near roads and historic timber sales that are removed from the lake habitat where this species is found (USFS 2025b, 2025d).
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Lake conditions are likely to change with projected changes in temperature and hydrologic regime (Chestnut and Tucker 2025).Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit; winters are predicted to be warmer (with more rain and less snow) and summers drier (Turner and Mallott 2025, Wiles and Warren 2025).

Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	**D = Insufficient information to draw inferences about the criterion** *Schoenoplectus subterminalis* is an aquatic perennial herb that grows from rhizomes (Smith 2002). Unlike other *Schoenoplectus* taxa that have rigid, emergent leaves, the leaves of *S. subterminalis* are often completely submerged and float loosely in the water (Smith 2002). Inflorescences are borne on rigid stalks that emerge above the water surface, and fruits mature in the summer (Smith 2002). No information on pollination was found but *Schoenoplectus subterminalis* is probably wind pollinated like other species of *Schoenoplectus* (CPC 2025). *Schoenoplectus subterminalis* produces small (3–3.5 × 1.5–1.7 mm) dry, one seeded, indehiscent fruits called achenes on solitary, erect spikelets (Smith 2002). The seeds and achenes are dispersed as a unit (Smith 2002). In addition to reproducing by seed, other species of *Schoenoplectus* also reproduce by rhizomes, with long-lived seeds sometimes persisting in the seedbank (Uchytil 1992, Snyder 1993, Esser 1995). No published information on the reproductive success or demography from inside or outside the planning unit was found. Since *Schoenoplectus subterminalis* is among the most aquatic of the *Schoenoplectus* species, life history and demographic information from other taxa may not be applicable.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Schoenoplectus subterminalis is not recommended as a Species of Conservation Concern according to the following rationale:

- **Significant threats**: This species is potentially threatened by the encroachment of invasive species as well as hydrological changes resulting from shifting climatic conditions. However, *S. subterminalis* is known to grow in slightly deeper water than most wetland invading species on the Tongass, particularly highly invasive reed canarygrass. Additionally, while climate change is predicted to impat lake and pond habitat in the future, it is uncertain to what extent this species will be impacted.
- **Declining trends**: There is not enough information to determine trends in population for this species. Lakes and ponds on the Tongass NF are abundant and in overall pristine condition; available information does not reveal noticeable negative trends in this habitat type.
- **Restricted ranges**: *S. subterminalis* is not endemic to the region and is not disjunct from the nearest occurrences outside the plan area. However, occurrences of this species on the Tongass NF are at the northern edge of their overall range and are thus subjected to conditions at the limits of the species' tolerance.
- **Low population numbers or restricted ecological conditions**: Ecological conditions do not seem to be particularly restricted, though the uncommonness of the species may indicate the existence of currently unknown microhabitat requirements or other limiting factors (e.g. dispersal limitation, competitive exclusion). There is at this time not enough information to sufficiently define these limiting factors.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**USFS-TESP_Mar25 (100552P000003)[6/26/2008]**	**[Duke Island], Duke mineral ws02.**			
1	ANHP ACCS_Mar25 (EO1)[6/26/2008]				
1	ANHP ACCS_Mar25 (EO1)[6/26/2008]	west central part of island	muskeg, growing in a small lake near shore, leaves floating, uncommon		
1	Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:242476)[6/26/2008]	West central part of island, Prince Rupert Quad, Alexander Archipelago, Duke Island.	Muskeg, growing in a small lake near shore, leaves floating, uncommon.		
1	USFS-TESP_Mar25 (100552P000005)[6/27/2008]	Duke Mineral WS05	This is sketched from memory. Also there is some confusion in my field notes whether I found SCSU in watersource four or five. This one is depicted in watersource five, but if future visits dont find scirpus in this pond, try watersource 4. Identification as SCSU was confirmed on revisit July 18 2008.	100 plants. revisit July 18 found approx 50% in flr	
1	ANHP ACCS_Mar25 (EO1)[6/27/2008]		This is sketched from memory. Also there is some confusion in my field notes whether I found SCSU in watersource four		
2*	**DeLapp 1994, Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:10194)[7/17/1993]**	**[Misty Fjords National Monument Wilderness] Princess Bay lake, E side of bay, E of banding cabin, Ketchikan Quad.**	**In freshwater graminoid marsh. [Collected on same date in same place and habitat: Eriophorum chamissonis, Carex utriculata, Carex sitchensis, Coptis trifolia, Glyceria borealis]**		
2	ANHP ACCS_Mar25 (EO2)[no date]	Misty Fiords, Revillagigedo Island, Princess Bay, banding station lake. Survey site #M93-41.			
2	ANHP ACCS_Mar25 (EO2)[7/17/1993]	Princess Bay lake, E side of bay, E of banding cabin	In freshwater graminoid marsh		

3*	**USFS-TESP_Mar25 (100551P000003)[8/07/1997]**	**[Maps to Prince of Wales Island, lake south of Skowl Arm, south of Khayyam Point] Cholmondeley TS, U614-001, pond, Mack. Inlet,**			
3	ANHP ACCS_Mar25 (EO3)[8/07/1997]	Prince of Wales Island. Skowl Arm. West of Satery Cove. CholmondeleyTS,U614-001,pond,Mack.Inlet,	Immersed in lake near margin. Small lake surrounded by muskeg and scrub/shrub fen complex.		
4*	**DeLapp 1994, Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:10122)[7/14/1993]**	**[Misty Fjords National Monument Wilderness] Ella Lake, lower lake outlet, E shore, Ketchikan Quad.**	**[Ella Lake, lower lake outlet, E shore] Freshwater meadow. [Collected on same date in same place and habitat: Carex utriculata, Carex sitchensis, Eriophorum angustifolium, Juncus falcatus]**		
4	ANHP ACCS_Mar25 (EO4)[7/14/1993]	Ella Lake, lower lake outlet, E shore	[Ella Lake, lower lake outlet, E shore] Freshwater meadow		
4	ANHP ACCS_Mar25 (EO5)[no date]	Misty Fiords, Revillagigedo Island, Ella Lake outlet, east side, freshwater meadow. Survey site #M93-32.			
5*	**Meridian Environmental (2014); USFS-TESP_Mar25 (100554P000535Y13)[7/17/2013]**	**[Prince of Wales Island] Site 525, east shore of Neck Lake [maps to causeway across neck lake near rip rap on north side of causeway]**	**Full sun. Plants growing in silty lake sediments in approximately 8 inches (6-10 inch range) of water. Lake levels very low after prolonged drought. Few plants in flower. Plants overall length, leaf + stem width smaller than described in Hulten, Hitchcock, Flora BC. Stems no flaccid; stiff and emergent. Spikelets not light brown; bright white, 5 mm (not >7 mm), scales smaller than described. Population along shallow shoreline margin, deeper than DUAR3, Carex spp. Growing with Nuphar polysepala, Potamogeton sp., and Carex sitchensis, with Dulichium arundinaceum, Glyceria pauciflora, and Phalaris arundinacea nearby (Meridian Environmental 2014).**	**500 plants in 3 subpopulations. Most not in flower.**	
5	ANHP ACCS_Mar25 (EO6)[7/17/2013]	N end of island, Neck Lake, causeway along lake.	Rockfill adjacent to mud lake bottom.	Uncommon.	
5	Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:250691)[7/17/2013]	N end of island, Neck Lake, causeway along lake, Petersburg Quad, Alexander Archipelago, Prince of Wales Island.	Rockfill adjacent to mud lake bottom, uncommon.		

6*	**USFS-TESP_Mar25 (100531P000031)[8/31/1979]**	**[Baranof Island, Port Walter Inlet, Tranquil Lake] REIFENSTUHL LOC APP TNFS 318**			
6	ANHP ACCS_Mar25 (EO7)[8/31/1979]	REIFENSTUHL LOC APP TNFS 318 [maps to eastern shore of Tranquil Lake on south side of Port Walter inlet, Baranof Island]			
6	ANHP ACCS_Mar25 (EO8)[8/31/1979]	Alexander Archipelago, Big Port Walter, S end Baranof I., Tranquil Lake	[lake] in 15 cm water near shore		
6	Arctos 2025, CPNWH_April2025, SEINet 2025 (ALA-UAM:Herb:42210)[8/31/1979]	United States, Alaska, Alexander Archipelago, Big Port Walter, S end Baranof I., Tranquil Lake	[lake] in 15 cm water near shore		
6	ANHP ACCS_Mar25 (EO9)[no date]	South end Baranof Island, near Big Port Walter, at Tranquil Lake.			
7*	**USFS-TESP_Mar25 (100521P000118Y16)[9/02/2016]**	**[Mitkof Island] Crane Lake [maps to east side of Crane Lake]**	**In water in full sun.**	**50 plants. dense patch; stems/leaves covered in algae**	
7	ANHP ACCS_Mar25 (EO10)[9/03/2016]	Tongass National Forest, Petersburg Ranger District, Mitkof Island, Crane Lake.	Shallow, mucky finger of Crane Lake fed by small stream.		
7	CPNWH_Mar25 (UAAH12558)[9/03/2016]	Tongass National Forest, Petersburg Ranger District, Mitkof Island, Crane Lake	Shallow, mucky finger of Crane Lake fed by small stream.		
8*	**USFS-TESP_Mar25 (100521P000116Y16)[6/14/2016]**	**Woewodski Island Amber Lake**	**In water in full sun.**		
8	ANHP ACCS_Mar25 (EO11)[6/14/2016]	Tongass National Forest, Petersburg Ranger District, Woewodski Island.	Along margin of small lake within 1 m. of water or less, only one area on south side; mucky substrate.		
8	CPNWH_Mar25 (UAAH12559)[6/14/2016]	Tongass National Forest, Petersburg Ranger District, Woewodski Island	Along margin of small lake within 1 m. of water or less, only one area on south side; mucky substrate		
9*	**Meridian Environmental (2014); USFS-TESP_Mar25 (100554P000533Y13)[7/09/2013]**	**Site 522, South of Neck Lake. [maps to Prince of Wales Island, unnamed lake SSW of Neck Lake]**	**In shallow water at lake margin near rocky outcrop. In much over rock. In water in full sun.**	**10 plants**	

10*	**Meridian Environmental (2014); USFS-TESP_Mar25 (100554P000534Y13)[7/10/2013]**	**Site 523, south end of project area. [Maps to Prince of Wales Island, Salmon Bay LUD II Management Area, unamed lake]**	**[lake] ~12"-24" of water; plants growing 3'-10' from shore in this 1 location (near stream inlet). In water in full sun.**	**75 plants**	

Scolochloa festucacea

Scolochloa festucacea [(Willd.) Link]

Sprangletop, whitetop

Global Rank: **G5**
Alaska State Rank: **S1**



photo: Viktoria Wagner, iNaturalist

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	D	*D = Insufficient information to draw inferences about criterion* Records of this species are currently deemed unreliable resulting from improperly attributed synonymy with *Schedonorus arundinaceus*. Until identification of these records can be confirmed, there is not enough verifiable information to make definitive conclusions on assessment criteria. Records on the Tongass NF that are currently attributed to this species are as follows: Two occurrences recorded on the north end of eastern Chichagof Island at Eight Fathom Bight as well as north of Sonyakay Ridge, and four occurrences across the Chatham Strait on the north end of Admiralty Island, at Youngs Bay, Hawk Inlet, and near Wheeler creek (USDA FS 2023, CPNWH 2024). Occurrences on the Forest are recorded in intertidal emergent salt marsh, salt marsh estuary habitat, or disturbed gravel areas adjacent to parking lots and roads (Smith 2016, USDA FS 2023, CPNWH 2024).
2 Distribution in surrounding geographic	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank: G5 Alaska State Rank: S1

Criteria	*Rank*	*Rationale*
area		*Scolochloa festucacea* is circumpolar in distribution, ranging in North America from northern Iowa and Nebraska to south central Canada and westward through Wyoming and Montana into eastern Oregon. Species distribution in Canada includes Manitoba, Saskatchewan, Alberta, British Columbia and the Northwest Territories. It also occurs within the Yukon River Basin of Alaska, but its greatest abundance is in northwest Iowa, Minnesota, North Dakota, Manitoba, and the south eastern Saskatchewan region. Eurasian distribution includes the Scandinavian countries and from central Europe to northern Mongolia (Smith 1973, Klinkenberg 2020, NatureServe 2024). This species is a member of the great plains freshwater marsh group across some of its Canadian range and eastern part of its U.S. range, also part of the northern plains sedge marsh alliance in Manitoba, Saskatchewan, Montana and North Dakota (NatureServe 2024).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Scolochloa festucacea* reproduces mainly by vegetative means, but it does possess a high potential for sexual reproduction. Sexual reproduction appears to be more important in spreading to new areas than vegetative reproduction, which is relevant to how isolated the occurrences are on Tongass NF (Smith 1973). Fallen caryopses may need to be covered by accumulated litter and root mats from neighboring plants and undergo fermentation in conducive temperature and moisture conditions that may not arise until the following season (Smith 1973). This species is generally considered the least flood-tolerant of its assemblage (McKee et al. 1988, van der Valk 1994); displaying little resilience to flooding or ability to expand quickly into surrounding suitable habitat upslope and adjacent (deSwart et al. 1994). It is unknown if its seeds are buoyant and able to disperse over water, or what the estimated range is for dispersal.
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* This species has six singular occurrences on the Forest, with no other record of other occurrences currently documented. Occurrences are currently in need of identification verification.

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Records lack verification, and current records offer very little information on population trends. There are no known population studies related to this species on the Forest.
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* There is a high abundance and broad distribution of salt wetlands, estuaries, marshes, seasonally flooded meadows, ponds, and lake-side habitat present in southeast Alaska (Smith 2016) that supports the habitat requirements for this species (Neill 1900a, b, Kenkel 1993, Klinkenberg 2020). Marsh and mesic areas within the Forest are projected to receive downstream effects of precipitation changes that are likely to contribute larger magnitude floods and disturbance. Negative impacts from movement of sediment can cause a decrease in riparian biodiversity in the long term (Nilsson and Svedmark 2002, Hamlet and Lettenmaier 2007, EcoAdapt 2014, Garssen et al. 2015). It is unknown if hydrologic changes may drive shrub or conifer encroachment into mesic meadow habitat specifically on the Forest (Dial et al. 2016). Sea level changes in the coastal areas of southeast Alaska are also unknown; ranging from a projected significant fall due to isostatic rebound, and / or rise due to climate-change driven sea-level rise (Carter 1991, Boggs et al. 2019). Specific, recent habitat trends within the Forest are unknown.
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion.* Threats cannot be conclusively assessed until records in the plan area have been verified. With regards to habitat, urbanization, agricultural development, hydrological modification, livestock grazing, intensive forestry, and introduction of invasive species pose the gravest threats to wetland and riparian ecosystems (MacKenzie and Shaw 1999). On the Forest, reed canarygrass (*Phalaris arundinaceae*) is widespread in many watersheds, completing with native plants particularly in palustrine streams, beaver pond areas and lakeshore habits (Huette et al. 2003, Klinkenberg 2020, USDA FS 2023). Climate change driven shifts in hydrology may synergistically influence spread of reed canarygrass as well (Nilsson and Svedmark 2002, Flanagan et al. 2015). More abundant and tolerant guild members like *Carex atherodes*

Criteria	*Rank*	*Rationale*
		may eventually outcompete this species as well (Smith 1973). Indirect climate change effects on coastal areas on the Forest may be increased storm intensity and/or frequency, resulting in higher wind speeds and larger storm swells accelerating coastal erosion, or coastal movement further inland (Carter 1991, Boggs et al. 2019). Coastal habitat may also be threatened by human development and recreational use, including ORV traffic (USDA FS 2014).
8 Life history and demographics	B	*B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. Temper conclusions based on life-cycle considerations and whether population growth is likely to be more sensitive to changes in reproduction or age-specific mortality.* Sprangletop (*Scolochloa festucacea*) is rhizomatous, with the adaptation for gaseous exchange between rhizomes and the atmosphere through hollow-stems 100-150 cm tall. It is a perennial, emergent, hydrophytic grass, typically occurring in seasonally flooded meadows. It can be found at the centers of small basins (prairie 'potholes'), and along the shallow edges of larger marshes in areas inundated by snowmelt water (Smith 1973, Kenkel 1993, Klinkenberg 2020). The typical pattern of pothole vegetation usually forms concentric zones, with *Scolochloa festucacea* generally bordered by *Typha* or *Scirpus* species in deeper water, and *Carex atherodes* on the xeric side (Smith 1973). The species tolerates a wide range of conductivities, doing best in moderately saline habitats (Neill 1990a, b, Kenkel 1993), but is very intolerant to changes in flooding regimes that effect its seasonal growth (Neill 1992). On the prairies, vernal growth is initiated between mid-April and mid-May. Smith (1973) suggests that accumulation from fallen litter from the previous year is detrimental to the species productivity, recommending burning or mowing after a season without disturbance, and indicating low shade tolerance. Flowers are an open panicle, 15-25 cm long, with the branches mostly smooth below midlength, ascending; spikelets 3- to 4-flowered; lower glumes 4-6 mm long, the upper ones 5-7 mm long, awnless; lemmas about 6 mm long, 7-nerved; calluses bearded; anthers 3-4 mm long (Klinkenberg 2020). They develop on mature plants in water depths from 21 to 40 cm, with caryopses produced in mid-summer (Smith 1973). In new growth, survival is dependent on the amount of growth and presence of rhizomes before winter, with first rhizomes developing within 30 to 60 days after seedling emergence (Smith 1973). Mortality is not well known.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Scholochola festucacea is not recommended as a Species of Conservation Concern according to the following rationale:

A conclusive determination for this species cannot be established until records in the plan area are verified as *S. festucacea*. The criteria reviewed above are ranked to the greatest specificity possible without verified occurrence data. Until species identifications are verified, *S. festucacea* does not qualify as a potential Species of Conservation Concern.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO6)[8/22/2012]	Juneau Quad.: Admiralty I., N end on the E side of Hawk Inlet, Greens Creek Mine, about 2 km N of the mine headquarters at the sand pit, W side of road.	Weedy roadside vegetation.	NA	NA
2	ACCS_Mar25 (EO5)[8/22/2012]	Juneau Quad.: Admiralty I., N end on the W shore of Youngs Bay, Greens Creek Mine, about 2.6 km SW of the boat dock by road.	Disturbed gravelly area adjacent to the road.		
3	ACCS_Mar25 (EO7)[8/22/2012]	Juneau Quad.: Admiralty Island, Alexander Archipelago, N end on the W shore of Youngs Bay, Greens Creek Mine, parking area at the boat dock	Disturbed gravelly area adjacent to parking area.		

Sedum oreganum oreganum

Sedum oreganum oreganum [Nutt.]

Oregon stonecrop

Global Rank: **G5TNR**
Alaska State Rank: **S1**

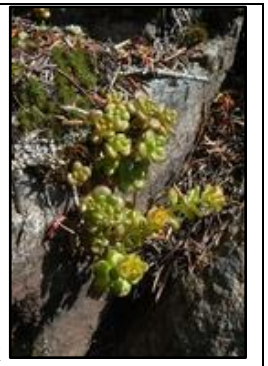


photo: © 2011 Jean Pawek

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated. *Sedum oreganum* ssp. *oreganum* is known from three estimated occurrences on the Tongass National Forest. We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). The three occurrences are all within about 33 miles of each other; two are on Admiralty Island and one is on Baranof Island. (Note: One of the Admiralty Island occurrences is from 1937 with the locality "Pybus Bay". While the record is old and the location is not very specific, the area surrounding Pybus Bay is all TNF so we will assume that this occurrence is on the TNF. Of course, because there are no records of revisits to this occurrence in nearly ninety years, it may or may not persist.) The habitat for the Baranof Island occurrence is talus near lakeshore. The 1937 occurrence on Admiralty Island (Pybus Bay) does not have a habitat description The habitat for the other occurrence on Admiralty Island was described as cliff and rock outcrop faces along shoreline (Appendix 1). It is unknown whether additional locations reported from near Baranof Warm Springs (1963), Juneau (1942), and Hyder (1940) are on the TNF, and these records did not include habitat descriptions. There is one other record in southeast Alaska, near Haines, that is not on the Tongass (Appendix 1). The habitat for that record was described as dry, rocky cliffs.

Criteria	*Rank*	*Rationale*
		Sedum oreganum is not likely to be confused with any other plants in southeast Alaska. No other *Sedum* species have been found on the Tongass. The fairly common alpine species *Rhodiola integrifolia* has been placed in the genus *Sedum* in the past, but it would not be easily confused with the distinctive *Sedum oreganum*.
2 Distribution in surrounding geographic area	B	B = Widely disjunct taxon for which the main distribution is a significant distance from the TNF. Global Rank G5, Alaska State Rank S1 British Columbia Province Rank S5, Yellow List; California, Washington and Oregon SNR. *Sedum oreganum* ssp. *oreganum* is widespread in coastal Oregon, Washington, and southern British Columbia. Its range extends down the Pacific Coast from near Haines, Alaska (NatureServe 2023) to northwest California (Hulten, 1968), however accounts from northwestern California may have been misidentified (Zika et al. 2022). In British Columbia it is known from mesic to dry rocky cliffs and talus slopes in the lowland and montane zones (Klinkenberg 2023). The southeast Alaska occurrences represent the northwesternmost edge of this species' range and very few records connect the Tongass occurrences to where this species is widespread in southern British Columbia (CPNWH 2025).
3 Dispersal capability	B	B = Disperses only through suitable habitat. *Sedum oreganum* ssp. *oreganum* is a succulent, perennial forb that produces leafy rosettes and produces small seeds in carpels (FNA 2020). No additional information related to dispersal of this species was found. Other *Sedum* species have been found to be dispersed as rain hits open carpels, dispersing seeds less than a meter from the parent plant (Nakanishi 2002).
4 Abundance on Tongass NF	B	B = Uncommon – current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Together, the four locations inventoried on the TNF above Whitewater Bay (Occurrence 1) in 2012 and 2013 were estimated to number approximately 1,100 individuals. Abundances at the other locations are unknown (USDA FS 2023).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for the known occurrences of *Sedum oreganum* ssp. *oreganum* on the TNF are unknown.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. In British Columbia habitat for this species is described as mesic to dry rocky cliffs and talus slopes in the lowland and montane zones (Klinkenberg 2023). Habitat for the Tongass occurrences is cliff and rock outcrop faces along shoreline and talus near lake shoreline (Appendix 1). Habitat for this species on the Tongass is apparently not highly restricted, but it is unknown whether there are specific habitat requirements that may contribute to the rarity of this species on the TNF.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. An assessment of threats to this species completed in 2009 concluded that although road building, bench cutting, and rock pit construction might have reduced habitat in some locations, there was not enough information available to make inferences about habitat trends (Goldstein et al. 2009). Inventory forms for recent discoveries on Admiralty Island did not report any specific threats to these occurrences (USDA FS 2023).
8 Life history and	D	D = Insufficient information to draw inferences about criterion. No information specific to *Sedum oreganum* ssp. *oreganum* response to disturbance, susceptibility to competition, or reproductive rate was found.

Criteria	*Rank*	*Rationale*
demographics		

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Sedum oreganum* ssp. *oreganum* within the plan area based upon the following:

- **Significant threats**: There is not enough information available to make inferences about threats to populations or habitat, although road building, bench cutting, and rock pit construction may have reduced habitat in some locations. No threats were reported for occurrences recently inventoried on Admiralty Island.
- **Declining trends**: There is not enough information to infer trends in population or habitat for this species.
- **Restricted ranges**: Tongass occurrences represent the northwestern edge of this species range and very few records connect the Tongass occurrences to where this species is widespread in southern British Columbia.
- **Low population numbers or restricted ecological conditions**: The only occurrence with population data indicates an estimate of over 1,000 individuals as recorded in a 2013 survey. This occurrence has not been revisited, and populations of other occurrences are not known. There is no information indicating a requirement for restricted ecological conditions, but the sparsity of observations implies that there may be more restriction to establishment of this species than current available information allows us to conclude.
- **Other factors**: There is not enough information to establish the existence of any additional factors that may impact this species' ability to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO6)[8/05/2013]	Admiralty I., Whitewater Bay, NE side.	On cliff and rock outcrop faces along shoreline, locally abundant in scattered patches.		
1	TESP_Mar25 (100534P00064Y13)[8/05/2013]	sw Admiralty Is, Whitewater Bay, se edge	On face of small area of rock outcrop; plants scattered along, and within the lower edge of a thick blanket of moss for ~ 4 meters.	8, scattered across ~4meters	
1	TESP_Mar25 (100534P00066Y13)[8/05/2013]	sw Admiralty Is, Whitewater Bay, ne end	on long exposed "bare" cliff face.	50 (estimated), scattered in clumps along cliff face	
1	TESP_Mar25 (100534P00065Y13)[8/05/2013]	sw Admiralty Is, Whitewater Bay, ne side	On exposed rock outcrop face in moss and/or crevices	60 (estimated), scattered along cliff face in crevices for ~ 40 meters	
1	TESP_Mar25 (100534P000022Y12)[7/17/2012]	ANM, Whitewater Bay, lagoon at far east end of bay	On small cliff ledges and sloped areas	1000 (estimated), >20 patches scattered across cliff face ledges	
2	ACCS_Mar25 (EO2)[6/01/1937]	Pybus Bay, southeast Admiralty Island			
3	iNaturalist [5/25/2017] kilasiak	Baranof Lake, Baranof Island			
4*	ACCS_Mar25 (EO5)[8/08/1963]		ALA V99353		
4*	ACCS_Mar25 (EO5)[8/08/1963]	Alexander Archipelago, Baranof Island, Warm Springs Bay, Baranof Lake			

5*	ACCS_Mar25 (EO1)[no date]	Haines, dry rocky bluffs.			
6*	ACCS_Mar25 (EO4)[6/01/1942]	Juneau			
7*	ACCS_Mar25 (EO3)[6/01/1940]	Hyder	rocky	NA	NA

Silene uralensis

Silene uralensis [(Ruprecht) Bocquet, 1967]

Apetalous Catchfly

Global Rank: **G4G5**

Alaska State Rank: **SNR**



photo: (CC0) Steve B

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	*B = Patchy OR gaps.* *Silene uralensis* is known from six estimated occurrences on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are located on Chichagof Island near Whitestripe Lake and Whitestripe Mountain (Occurrence 1) and Otter Lake (Occurrence 2), Dall Island near Thunder Mountain (Occurrence 3), the North coast of Baranof Island (Occurrence 4), Prince of Wales Island on Perue Mountain (Occurrence 5), and the North end of Admiralty Island (Occurrence 6) (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs near streams and lake shores and in alpine areas (Appendix 1). It occurs in ephemeral stream channels on cobble with a north aspect (Occurrence 1), on a small rock island in a seasonal stream with a south aspect (Occurrence 2), in alpine (Occurrence 3), and in lake shores (Occurrence 4) (Appendix 1). There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025). Across its range, *Silene uralensis* is typically found in arctic tundra, grasslands, cliffs, and alpine habitats (FNA 2025). In Southeast Alaska, the species tends to co-occur with cobble and rocky soils (Appendix 1). Subspecies of *Silene uralensis* on the Tongass NF may include *ogilviensis*, *porsildii*, and *uralensis* (FNA 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank SNR British Columbia Provence S5, Yukon and Alberta SNR, Idaho and Montana SNR. *Silene uralensis* is broadly distributed throughout circumboreal North America and Eurasia (FNA 2025, GBIF 2025), ranging from Nunavut to Colorado in North America (FNA 2025, GBIF 2025, NatureServe 2025). It occurs in arctic tundra, grasslands, cliffs, and alpine habitats at elevations of 0 m to 4,000 m (FNA 2025, Moreau et al. 2009). It occurs in open areas with talus and gravelly soils that are moist (Cooper et al. 2004, FNA 2025, Moreau et al. 2009). The next nearest records to the southeast Alaska occurrences are approximately 150 miles to the north in British Columbia. The range of the species continues south down the Rocky Mountains into Colorado, but on the west coast, the Tongass NF is the southern edge of its range (SEINet 2025, Klinkenberg 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Silene uralensis* is a perennial herb with a cespitose growth habit (FNA 2025). Its main dispersal mechanism is by seeds which are likely dispersed by wind (FNA 2025, SID 2025).
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Silene uralensis* is known from six occurrences on the Tongass NF (Appendix 1). One of the occurrences says that the species was "rare" and another states that it was "infrequent" (Appendix 1; CPNWH 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends of *Silene uralensis* on the TNF are unknown (USFS 2025a, CPNWH 2025).

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	A	*A = Decline in habitat quality or quantity* . Habitat for *Silene uralensis* on the Tongass NF is along streams and lake shores and in alpine areas (Appendix 1). These habitats can be grouped under Alpine Vegetation which occurs above the tree line and consists mainly of herbaceous and dwarf shrub species (Turner and Mallott 2025). Alpine vegetation has a moderate ecological integrity status due to impacts from climate change but is trending toward a lower ecological integrity (Turner and Mallott 2025). There are no documented invasive species within 1 km from all occurrences (USFS 2025b). Timber harvest has not occurred in the recent past within 1 km from all occurrences (USFS 2025c).
7 Habitat vulnerability or modification; other threats	A	*A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on natural range of variations, and/or habitat is impacted by modern stressors* Climate change may impact the habitat of *Silene uralensis*. Forbs in alpine ecosystems are considered highly vulnerable to impacts of reduced snowpack, subalpine species encroachment, altered interactions with pollinators, and rising temperatures as a result of climate change (Inouye 2020, Halofsky et al. 2025). It is uncertain how community composition of alpine ecosystems will shift with variance in site specific conditions as topographic heterogeneity may offer a buffer to alpine habitat loss (Halofsky et al. 2025, Seastedt and Oldfather 2021).
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Silene uralensis* is a perennial herb with a cespitose growth habit (FNA 2025). It produces single terminal flowers and capsule fruits with broadly winged, round seeds. It flowers from May to August (GBIF 2025, FNA 2025). Flowers are possibly pollinated by some insects (Reynolds et al. 2009, CPC 2025), but plants are likely mostly self-pollinating (LAB 2023). Mature fruits are produced from August to September (GBIF 2025). Seeds may exhibit physiological dormancy and require a period of cold stratification for germination (Cooper et al. 2004, Alsos et al. 2013). Seeds of other species within the genera with distribution in similar ecoregions exhibit non dormancy or show variation in germination characteristics depending on collection site substrate (SID 2025, Baskin and Baskin 2012).

Criteria	*Rank*	*Rationale*
		Silene uralensis favors physically disturbed soils (Cooper et al. 2004). It is unclear what severity of disturbance may benefit seedling recruitment to novel sites and is likely dependent on location of source populations and vegetation successional gradients (Moreau et al. 2009, Cooper et al. 2004). This species is found in deglaciated habitats as pioneer species richness stabilizes, but wanes in population as a deglaciated site becomes xeric in the course of vegetation succession (Moreau et al. 2009). The life span of *Silene* plants has been described as "long-lived" and have been estimated to reach over 300 years old (Morris and Doak 1998).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	X	☐	☐
Low populations or restricted ecological conditions	☐	☐	X
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

Silene uralensis is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats** – Alpine habitat on the Tongass NF is currently considered only moderately stable due to the already evident loss of snow and ice. Not enough is known about the microhabitat preferences of this species to know if these changes are a significant threat to the species. *Silene uralensis* may have an affinity for disturbed

habitat including recently deglaciated areas.

- **Declining trends** – Population trends are unknown. Alpine habitat is changing, but it is unclear to what extent these changes will impact the ability of *Silene uralensis* to persist on the Tongass NF.
- **Restricted ranges** – While the range of the species continues further south along the Rocky Mountains, the Tongass NF is the southern edge of the species' range on the west coast. The next nearest records to the southeast Alaska occurrences are approximately 150 miles to the north in British Columbia.
- **Low population numbers or restricted ecological conditions** – Six occurrences are known from the Tongass NF but overall population numbers are unknown. The occurrences are scattered on different islands so the species as a whole is not likely to be vulnerable to extirpation by stochastic events. Habitat preferences do not appear to be highly restricted.
- **Other factors** – It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_Mar25 (WTU383698) [6/14/2004]**	**Alexander Archipelago, Chichagof Island, Whitestripe Lake and Whitestripe Moutain, valley east of lake.**	**on 20 degree slope on north aspect, ephemeral stream channel, cobble pavement.**	**Rare. Flowers.**	
1	CPNWH_April2025 (ALA) [6/14/2004]	Alexander Archipelago, Chichagof I., Whitestripe Lake and[X]Whitestripe Mt., valley E of lake, Sitka Quad, Tongass National Forest.	on 20 degree slope on N aspect, ephemeral stream channel, cobble pavement.	Rare	
2*	**CPNWH_April2025 (ALA) [9/03/2009]**	**Otter Lake, S slope of Big Chief Mtn., Sitka Quad, Alexander Archipelago, Chichagof Island.**	**On small rock islands in seasonal stream, S aspect, 5% slope.**	Infrequent	
3*	**CPNWH_April2025 (ALA) [8/15/1990]**	**Alexander Archipelago, Dall, I., Thunder Mtn., Craig Quad, Alexander Archipelago.**	**Low-growing herb-dwarf shrub alpine.**		
4*	**CPNWH_April2025 (ALA) [7/24/1980]**	**Alexander Archipelago, Rodman Bay, N coast Baranof I., Hemorrhoid Lake, between Rodman Bay and He[check loc!], Sitka Quad.**	**Lake shore.**		
5*	**CPNWH_April2025 (ALA)[7/20/1993]**	**Prince of Wales Island, Perue Mt., N of Calder, Petersburg Quad, Tongass National Forest.**	**Alpine gravel slopes.**		
6*	**CPNWH_April2025 (ALA)[7/09/2004]**	**N end of island, ridge just N of the Greens Creek mine, Juneau Quad, Alexander Archipelago, Admiralty Island.**	**Alpine ridge, rock outcrop with little vegetation**.		

Sphenolobopsis pearsonii

Sphenolobopsis pearsonii [Stotler, R.E. and B. Crandall-Stotler, 2017]

Horsehair threadwort

Global Rank: **G4**

Alaska State Rank: **S1**



photo: © BBS 2025

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce OR isolated. *Sphenolobopsis pearsonii* is known from one estimated occurrence on the TNF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is located on Baranof Island about 9.5 km (6 mi) east of Sitka (Appendix 1; ACCS 2024). The occurrence was collected from humid cliff rocks in a steep walled canyon (Appendix 1). This habitat is typical for this species. There are no occurrences of this species in southeastern Alaska outside of the Tongass NF. Across its range, *Sphenolobopsis pearsonii* is typically found in damp shaded cliff shelfs growing on rocks, in sheltered ravines, and on vertical montane cliffs with a north to east aspect (Blockeel et al. 2014, CBH 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F. Global Rank G4, Alaska State Rank S1 *Sphenolobopsis pearsonii* is narrowly distributed in clusters in western North America, the Appalachian Mountains in the eastern United States, and western Europe (CBH 2025). In North America, *Sphenolobopsis pearsonii* is present in British Columbia as well as Alaska, northern California, and a few eastern states (CBH 2025). Across its range, *Sphenolobopsis pearsonii* occurs in outcrops, scree beds, cliff shelves, mountain slopes, and crags at low elevations (BBS 2025, CBH 2025). It is typically found in neutral or acidic shale or sandstone and in crags of granite or gneiss (BBS 2025). It is found in mostly moist sites (BBS 2025, Blockeel et al. 2014, CBH 2025). The next closest occurrences to the Tongass NF occurrence are approximately 250 miles to the south on Haida Gwaii (CBH 2025). In southeastern Alaska this species is known from the Tongass NF; its range continues northwest in Alaska 900 km (560 mi) to Kenai Fjords National Park; 1400 km (870 mi) to Simeonof Island; and 2800 km (1740 mi) to Adak Island (CBH 2025).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. *Sphenolobopsis pearsonii* is a leafy liverwort with a terrestrial growth habit (BBS 2025, Blockeel et al. 2014, CBH 2025). Its main dispersal may be by clonal growth as gemmae as sporophytes have not been found in Europe (Blockeel et al. 2014).
4 Abundance on Tongass	D	D = Insufficient information to draw inferences about criterion. *Sphenolobopsis pearsonii* is known from one occurrence on the Tongass NF (Appendix 1). There is no abundance information for the confirmed occurrence on TNF (ACCS 2024).

Criteria	*Rank*	*Rationale*
NF		
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends of *Sphenolobopsis pearsonii* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The habitat for the one occurrence of *Sphenolobopsis pearsonii* on the TNF is humid cliff rocks in a steep walled canyon (ACCS 2024). In adjacent locations, including British Columbia, it occurs in similar habitats (CBH 2025). The construction of a dam on Blue Lake, a campground on Sawmill Creek, and a road to both of these locations, may have impacted the habitat of the one occurrence. Many invasive species (including reed canarygrass, *Phalaris arundinacea*) are recorded along the road, in the campground, and near the dam. The impact of these invasive species on the habitat of *Sphenolobopsis pearsonii,* however, is unclear. Timber harvest has not occurred in the recent past near the sole occurrence but is widespread nearby on Baranof Island (USFS 2025d) and may have impacted potential habitat.
7 Habitat vulnerability or modification;	D	D = Insufficient information to draw inferences about criterion Invasive species, timber activities, and climate change may impact the habitat of *Sphenolobopsis pearsonii*. Several invasive species are nearby the single occurrence of this species on the Tongass NF (USFS 2025b). On the Tongass, reed canarygrass was historically used in the seed mix spread to prevent erosion. Because of this, reed canarygrass is widespread in many watersheds where it has entered riparian habitat at road crossings and then spread downstream. It out competes native plants particularly well in more palustrine streams, beaver pond areas and

Criteria	*Rank*	*Rationale*
other threats		lakeshores. Very shady, rocky habitat that this species is expected to occur in will likely be less affected by invasive species. Recent timber harvest activities have not occurred in the vicinity of the cliff rocks at Occurrence 1 (USFS 2025c), but timber harvest activity will likely continue on Baranof Island in the future. However, if the hydrology of these riparian forest ecosystems remains intact, the deciduous and coniferous riparian forests on the Tongass are not expected to change in the short or long term (Turner and Mallott 2025). Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit which may lead to drought stress for species with high soil moisture requirements such as *Sphenolobopsis pearsonii* (Turner and Mallot 2025, Wiles and Warren 2025).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. The life history of *Sphenolobopsis pearsonii* is largely unknown. It is a leafy liverwort with a dense mat growth habit (Blockeel et al. 2014). Plants are dioicous. In Europe, male plants are frequent while female plants rare, sporophytes have not been found, and gemmae are absent (Blockeel et al. 2014).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Sphenolobopsis pearsonii is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** Timber harvest and climate change may pose a threat to this species, but without more information it is unknown how significant these threats are.
- **Declining trends:** Population trends are known. Habitat may have experienced declines but the degree to which this has impacted habitat suitability for *Sphenolobopsis pearsonii* is unknown.
- **Restricted ranges:** The species is not endemic nor at the edge of its range in Southeast Alaska. It may be disjunct, as the next closest occurrence is over 250 miles away. However, survey data and information on dispersal mechanisms are not complete enough to say for sure.
- **Low population numbers or restricted ecological conditions:** Only one occurrence is known on the Tongass NF, but ecological conditions do not appear to be highly restricted. Bryophytes are not typically recorded in botanical surveys so it may be more common than survey data indicates.
- **Other factors:** Dispersal may be limited due to apparent lack of sporophytes and gemmae.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [8/03/1968]**	**steep walled canyon below blue l. dam. 6 mi e. of sitka, baranof isl.**			

Stachys mexicana

Stachys mexicana [Benth.]
Mexican hedge-nettle

Global Rank: **G5**
Alaska State Rank: **S1**



photo:© Jamie Fenneman

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A= Scarce or isolated Three occurrences are known in Southeast Alaska, but only one is confirmed on TNF ownership (ACCS ANHP 2023, CPNWH 2023, USDA FS 2023). The confirmed occurrence is from a 1982 herbarium specimen describing the locations as in the Coast Mountains near Upper Wilson Arm, Smeaton Bay, along the Wilson River on grassy gravel bars. An occurrence on Tongass Island near Fort Tongass cannot be confirmed on TNF ownership, as portions of the island near the fort site and where specimen coordinates fall are not on TNF ownership. The records indicate Stachys mexicana is found on a low hilltop above the fort site in second-growth Stika spruce forest, and in open spruce forest near beach at south of island (CPNWH 2023). An additional location is recorded from Revillagigedo Island at the Orton Ranch in riverside scrub vegetation. As Orton Ranch is owned by the Ketchikan Indian Community, these occurrences are not in the plan area (CPNWH 2023).
2 Distribution in surrounding	B	B: Limited distribution outside the TNF, and widely disjunct for which the main distribution is a significant distance from the TNF. Global Rank G5, Alaska State Rank S1 British Columbia Province Rank S4. SNR in CA, OR, and WA.

Criteria	*Rank*	*Rationale*
geographic area		The TNF represents the northern edge of this species range. The nearest herbarium record to occurrences within the TNF administrative boundary are approximately 500 kilometers (300 miles) away in Vancouver Island British Columbia, disjunct from the TNF locations. However, there are around seven unverified observations recorded in the citizen science database iNaturalist. If verified, these British Columbia occurrences (Haida Gwaii, Prince Rupert, Goose Island, and along the Skeena river) fill in the distribution gaps between occurrences in the plan area and those in Washington state. The distribution depicted by herbarium records continues south as far as Northern California (CPNWH 2023). Flora of British Columbia (2025) describes habitat as, "moist to mesic forests, forest margins, swamps, thickets and clearings in the lowland zone".
3 Dispersal capability	B	B: Disperses only through suitable habitat. There is no information about the dispersal capability specific to *Stachys mexicana*. In general, Lamiaceae produce nutlets which disperse by water with buoyancy facilitated by an air space between the true seed and the pericarp seeds are primarily dispersed via wind or water (Darbyshire et al. 2014).
4 Abundance on Tongass NF	A	A: Rare. Current abundance is low enough that stochastic and other factors could lead to potential imperilment. With a single location confirmed to the TNF, it is possible that stochastic factors could lead to imperilment. There is no population data for this occurrence.
5 Population trend on Tongass NF	D	D: Insufficient information to draw inferences about criterion. Population trend for the known occurrences of *Stachys mexicana* on the TNF is unknown. The most recent site visit was in 2005.

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	B: Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. On the Tongass NF, Stachys mexicana occurs in coastal and riparian forest habitat, seemingly in openings that receive sun (i.e. gravel bars, riparian scrub, open spruce forest). Riparian forest has high ecosystem integrity with moderate vulnerability to stressors (Turner and Mallot 2025). Coastal forest has high ecosystem integrity with low vulnerability to stressors (Turner and Mallot 2025). Riparian and coastal forest was historically targeted for harvest due to quality trees and ease of access. Stachys mexicana is also known to occupy a wide range of wet habitat types in British Columbia (E-Flora BC 2025).
7 Habitat vulnerability or modification; other threats	B	B: Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Overall, riparian forests have high ecological integrity and are naturally resilient to disturbances. However, the timing and frequency of large rain events and rain on snow events that contribute to flooding will be altered under future climate scenarios (Halofsky et al DRAFT). Peak flows and floods can scour riparian aras, erode stream channels, undercut riparian trees and alter plant community composition (Halofsky et al DRAFT). Furthermore, riparian habitat is susceptible to invasion by non-native species and invasive species spread rapidly downstream as seeds and vegetative parts are moved by water. On the Tongass, reed canarygrass was historically used in the seed mix spread to prevent erosion. Because of this reed canarygrass is widespread in many watersheds where it has entered riparian habitat at road crossings and then spread downstream. Coastal forested habitat for this species is likely stable and habitat reported for adjacent areas in British Columbia (moist to mesic forests, forest margins, swamps, thickets and clearings in the lowland zone) are common throughout the forest. Projected increased temperatures and increased evapotranspiration are likely to lead to summer water deficit (Halofsky et al DRAFT), which may create drought stress for Stachys mexicana.
8 Life history and	D	D: Insufficient information to draw inferences about criterion. Little is known about the life history and demographics of *Stachys mexicana*. It is a perennial herb in the *Lamiaceae* family.

Criteria	*Rank*	*Rationale*
demographics		

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Stachys mexicana is not recommended as a Species of Conservation Concern for the following reasons:

Significant threats: No threats specific to the confirmed location on the Tongass NF are known. *Stachys mexicana* is vulnerable to general threats anticipated with climate change that include projected increased temperatures, increased evapotranspiration, and potential declines in available water for this species. The tolerances of this species to projected climate change trends, however, are unknown, and it is found in a broad range of habitat in British Columbia.

Declining population or habitat trends: There is no population trend data for the known location on the TNF. Habitat types in southeast Alaska include, river gravel bars, open spruce forest, and riparian scrub, and there is insufficient information to suggest a declining trend.

Restricted range: The confirmed TNF occurrence, along with locations on Orton Ranch and Tongass Island, represent the northernmost extent of this species' range. These locations are disjunct from the main distribution of the species by approximately 500 kilometers.

Low populations or restricted ecological conditions: The single population confirmed to the TNF is vulnerable to extirpation by stochastic factors. Ecological conditions do not appear to be restricted, as this species occurs in open and second growth spruce forest and riparian habitats that are widespread across the TNF.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO3)[7/24/1982]	Coast Mts., Upper Wilson Arm, Smeaton Bay	Along Wilson River. Grassy gravel bars.		
1	CPNWH_April2025(ALA)[7/24/1982]	Coast Mts., Upper Wilson Arm, Smeaton Bay, Ketchikan Quad.	Along Wilson River. Grassy gravel bars.		
2	TESP_Mar25 (100552P000207)[7/18/2005]			Occurrences not on the Tongass	
2	ACCS_Mar25 (EO4)[7/18/2005]	Tongass Island. Misty Fiords National Monument.	In open spruce forest near beach at south of island.	Occurrences not on the Tongass	
2	ACCS_Mar25 (EO2)[7/09/1993]	Tongass I., Port Tongass, Fort site area	On low hilltop above fort site in second-growth Sitka spruce forest	Occurrences not on the Tongass	
2	ACCS_Mar25 (EO2)[no date]	Tongass Island, Port Tongass, fort site. Survey site #M93-28.		Occurrences not on the Tongass	
2	CPNWH_April2025(ALA)[7/09/1993]	Tongass I., Port Tongass, Fort site area, Prince Rupert Quad.	On low hilltop above fort site in second-growth Sitka spruce forest.	Occurrences not on the Tongass	
3	ACCS_Mar25 (EO1)[no date]	Revillagigedo Island, Loring Area, ha River, at the Orton Ranch. Survey site #R93-02.		Occurrences not on the Tongass	
3	ACCS_Mar25 (EO1)[7/05/1993]	Revillagigedo I., Orton Ranch, ha R.	riverside scrub vegetation	Occurrences not on the Tongass	
3	CPNWH_April2025(ALA)[7/05/1993]	Revillagigedo I., Orton Ranch, ha R., Ketchikan Quad, Tongass National Forest.	Riverside scrub vegetation.	Occurrences not on the Tongass	

Stereopsis humphreyi

Stereopsis (*Baisuzhenia*) *humphreyi* [(Burt) Redhead & D.A. Reid, 1984]

Ghost funnel fungus

Global Rank: **GNR**

Alaska State Rank: **SNR**



photo: gwark CC-BY-NC-SA via iNaturalist (2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Stereopsis humphreyi* is known from three estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are all in the vicinity of Sitka (on Baranof Island near the coast across from Partofshikof Island and on Kruzof Island south of Mt Edgecumbe) (Appendix 1; GBIF 2025b, Turner and Mallott 2025, USFS 2025a). Occurrence 1 was collected in coniferous forest on humus under deadfall conifers near a small creek (MyCoPortal 2025). Occurrence 3 was found growing in the shade of a fallen tree. *Stereopsis humphreyi* has recently been moved to a new genus, *Baisuzhenia*, due to genomic molecular analysis (MycoBank 2025, Qu et al. 2025).
2 Distribution in surrounding	B	*B = Limited distribution outside of the Tongass National Forest.* Global Rank GNR, Alaska State Rank SNR, British Columbia S3 (NatureServe 2025), IUCN Near Threatened since 2019 (IUCN 2025, Vellinga 2019)

Criteria	*Rank*	*Rationale*
geographic area		*Stereopsis humphreyi* is only found in western North America, from Sitka, AK south to Coos Co, OR with one isolated occurrence in Mendocino Co, California (iNaturalist 2025, MyCoPortal 2025). On the west coast of North America this species occurs exclusively near the coast of the Pacific Ocean or along other large bodies of water, like the Puget Sound (MyCoPortal 2025). *Stereopsis humphreyi* is also present in British Columbia, Canada along the coast (MyCoPortal 2025). Across its range, *Stereopsis humphreyi* occurs solitary to scattered in mature Spruce forests among moss in bog-like settings at elevations of 0 m to 700 m (iNaturalist 2025, MyCoPortal 2025, Roberts et al. 2004). It is typically found in swamp-like, moss-covered undergrowth of conifer forests with thick needle litter, under tall spruce and hemlocks with "little undergrowth" (MyCoPortal 2025, Siegel and Schwarz 2024). In southeastern Alaska this species is only known from the Tongass NF; its range continues south in Canada about 400 km to the Naikoon Provincial Park on Graham Island, Canada (MyCoPortal 2025). The occurrences of *Stereopsis humphreyi* in the Tongass NF occupy the northern extent of its range (MyCoPortal 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may mor may not be corridors).* *Stereopsis humphreyi* is a mushroom-forming fungus which grows in association with *Picea* species including *Picea sitchensis* (iNaturalist 2025, MyCoPortal 2025, Sjökvist et al. 2012). Its main dispersal mechanism is by sexual spores dispersed by wind (Gibson 2007). Fungal spore dispersal success is species-specific, dependent on spore size and ornamentation, volume of spores produced, environmental factors like wind and other dispersal agents like animals, and availability of suitable habitat and host plants (Golan and Pringle 2017, Peay and Bruns 2014). Most wind-dispersed fungal spores have unknown longevity and dispersal success.
4 Abundance on Tongass NF	B	*B = Uncommon.* Occurrence 1 states 10 individual fruiting bodies, while Occurrence 3 mentions 6-8 individuals in a group. Though, to count abundance of fungi for conservation, we use the concept of a functional individual, where all conspecific sporocarps within a diameter of 10 m are counted as one genetic individual (Dahlberg and Mueller 2011). So, the total number of individuals on the TNF is estimated to be 3 (Appendix 1; MyCoPortal 2025, USFS 2025a).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Stereopsis humphreyi* on the TNF are unknown (USFS 2025a, MyCoPortal 2025).
6 Habitat trend on Tongass NF	B	*B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.* The habitat for the 3 occurrences of *Stereopsis humphreyi* on the TNF is spruce forest at the edge of the beach fringe (MyCoPortal 2025). In adjacent locations including Vancouver Island, it also occurs in low depressions under *Picea sitchensis* behind shore dunes (Appendix 1; MyCoPortal 2025). Historically, forest near the beach was harvested due to ease of access and transport, but only a fraction of forest has been harvested and forested habitat on the Tongass NF is abundant and stable (Turner and Mallot 2024).
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Timber harvest may impact forested habitat for this species. However, the occurrences on the Tongass NF are all near the coast, which is usually excluded from harvest with a 1000 foot buffer in old growth and a 200 foot buffer in young growth forest (USFS 2008).Climate change is predicted to lead to increased air temperature, decreased soil moisture (due to increased evapotranspiration), and growing season water deficit, which may lead to drought stress for *Stereopsis humphreyi* (Turner and Mallott 2024, Wiles and Warren 2024). Additionally, increased fall and winter storms may increase windthrow, especially in coastal areas (Halofsky et al 2024). It is unclear if increased windthrow would harm *Stereopsis humphreyi*.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Stereopsis humphreyi* is described minimally (Gibson 2007, Ryvarden 2010, Siegel and Schwarz 2024). It is an annual fungus that produces a stereoid or veined sporocarp with white cap which has wavy margins with a cleft on one side of the cap, and a tough, thin stipe with a hairy base (Gibson 2007). *Stereopsis humphreyi* is putatively a saprotrophic species that grows terrestrially or on dead wood in conifer forests which produces sporocarps singly or in

Criteria	*Rank*	*Rationale*
		groups from October to December (iNaturalist 2025, Siegel and Schwarz 2024). Specialized asexual reproduction is absent for this species (Gibson 2007).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	X	☐	☐
Low populations or restricted ecological conditions	X	☐	☐
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

Stereopsis humphreyi is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats:** *Stereopsis humphreyi* occurs in coastal old growth forest. Timber harvest historically affected coastal areas disproportionately due to ease of access, but habitat in beach buffer should be protected if within 1000 ft of beach. It is unknown how climate change and increased summer drought would affect this species.
- **Declining trends:** Population trends are unknown. Old growth coastal forest is relatively stable; habitat could be impacted by increased storm events, windthrow and beach erosion, but it is unclear what impact these would have on *Stereopsis humphreyi*.
- **Restricted ranges:** *Stereopsis humphreyi* is endemic to the Pacific Northwest and is known only from Oregon to Southeast Alaska, with an isolated occurrence in California. The Tongass NF is the northern extent of the range.
- **Low population numbers or restricted ecological conditions:** There are three occurrences of *Stereopsis humphreyi* on the Tongass NF, all on the Sitka Ranger District (specifically Baranof and Kruzof Islands). The habitat as described for this species is broadly available on the Tongass, so it is unclear why the species is not more common. It is possible there are unknown microhabitat requirements or other factors

(e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.

- **Other factors:** Life history and dispersal capabilities of this species are largely unknown so it is difficult to assess how it might respond to disturbance or climate change.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. #	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**MyCoPortal 2025b (WTU) [09/14/2013]**	**Sitka Sound, Kruzof Island. Found on the south end of the island.**	**Substrate: terricolous. Growing on humus under deadfall conifers near a small creek. Site was roughly 20ft inland of the beach/forest ecotone. The deadfall had created a shaded area with about 2ft of head room.**	**There was a group of 10 individual fruiting bodies.**	
2*	**MyCoPortal 2025b (iNaturalist) [10/27/2013]**	**Sitka County, US-AK, US**			
3*	**MyCoPortal 2025b (iNaturalist) [09/14/2013]**	**Sitka County, US-AK, US**		**a group of 6-8 individuals growing in the shade of a fallen tree**	

Suaeda calceoliformis

Suaeda calceoliformis [(Hook.) Moq.]

American sea-blite

Global Rank: **G5**

Alaska State Rank: **S1S2**



photo: Maine DACF

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated There are four known occurrences of *Suaeda calceoliformis* on the Tongass National Forest (TNF). All four occurrences are located on the southern end of Admiralty Island within a 300 square kilometer area. Locations of the four occurrences are as follows: tidal flat in Wilson Cove, tidal flat on south end of Gambier Bay, beach strands along Pybus Bay, and upper tidal meadows at head of Whitewater Bay (CPNWH 2023). The most recent collection of *Suaeda calceoliformis* on the TNF was in 1993. There are two additional occurrences in Southeast Alaska just outside the Tongass NF: one in Scidmore bay within Glacier Bay National Park and Preserve, and another in an overburden site within the municipality of Hoonah, AK (ACCS 2023). Habitat in British Columbia includes wet salt marshes, beaches and saline and alkaline habitat in the lowland and montane zones.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S1S2 Alberta: S5, British Columbia: S5, Island of Newfoundland: S1S2, Manitoba: S4S5, New Brunswick: S4, Northwest Territories: SNR, Nova Scotia: S4, Nunavut: S3, Ontario: S2, Prince Edward Island: S3S4, Quebec: S3, Saskatchewan: S4, Yukon Territory: S3, Arizona: SNR, California: SNR, Colorado: SNR, Connecticut: SU, Idaho: SNR, Illinois: SNA, Indiana: SNR, Kansas: S2, Kentucky: SNA, Maine: S2, Massachusetts: S2S3, Michigan: SNA, Minnesota: SNR, Missouri: SNR, Montana: SNR, Nebraska: SNR, Nevada: S3, New Hampshire: S3, New Jersey: S3, New Mexico: SNR, New York: S4, North

Criteria	*Rank*	*Rationale*
		Dakota: SNR, Oklahoma: SNR, Oregon: SNR, Rhode Island: SNR, South Dakota: SNR, Texas: SNR, Utah: SNR, Washington: SNR, Wisconsin: SNR, Wyoming: S3 Two additional occurrences are located adjacent to the TNF in the municipality of Hoonah, AK, and Glacier Bay National Park (CPNWH 2023, ANHP ACCS 2023). Additional occurrences within Alaska are located near Anchorage, Homer, and the Yukon Flats in the Yukon National Wildlife Refuge (CPNWH 2023). *Suaeda calceoliformis* is widespread throughout western North America with scattered populations in the eastern United States.
3 Dispersal capability	B	B = Disperses only through suitable habitat Species in the genus *Suaeda* are typically wind or self-pollinated and disperse by seed (Solomon Raju and Kumar 2016). Although there is no information specific to the dispersal capabilities of *S. calceoliformis*, it may employ similar dispersal methods as other annual halophytes in tidal salt marshes. A study from the Netherlands found annual halophytes, including *Suaeda maritima*, locally dispersed through tidal marshes either by floating on water surface or moving along soil surfaces during tidal movements (Huiskes et al. 1995). However, rangewide *S. calceoliformis* is not restricted to coastal habitats and can be found in a variety of inland habitats including disturbed areas, reservoir margins, and along salted roadsides (Ferren and Jochen Schenk). While tidal movements likely facilitate *S. calceoliformis* seed dispersal within salt marshes, the species likely has other dispersal methods that are unknown at this time.
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Occurrences are based upon herbarium records and do not contain population census data. The four occurrences of *Suaeda calceoliformis* are all on the south end of Admiralty Island. Two herbarium records note that the species is locally common.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trend information for *Suaeda calceoliformis* on the TNF is not available.

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The occurrences on the TNF are within tidal flats or marshes and beach strand habitat. Tidal marshes and beach strands are well distributed on the TNF.
7 Habitat vulnerability or modification; other threats	B	B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. All occurrences of *S. calceoliformis* are within designated wilderness which affords them protection from development and many management activities. Tidal wetlands on the Tongass NF have moderate integrity and are vulnerable to the future effects of climate change (Turner and Mallot 2024). The long-term loss of coastal habitat due to climate-induced sea level rise is difficult to predict as projections must account for local trends of tectonic uplift and subsidence, the potential for seismic repositioning of the shoreline and glacial rebound in relation to global sea level rise. Sea level, however, has rarely been constant in southern Alaska. Some land is currently rising due to isostatic rebound and tectonic uplift, while other coastlines are falling due to tectonic down-warping (Boggs et al 2019).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Suaeda calceoliformis* is an annual, halophytic, succulent herb in the *Chenopodiaceae* family. Several characteristics of the genus *Suaeda* including succulence and tolerance of salt and heavy metals allow it to cope with various environmental stressors (Solomon Raju and Kumar 2016). Seed germination potential in the laboratory setting is 96–98% but field sown seeds had much lower germination rates of 16 or 17% (Kieffer and Ungar 2002). An erect and a prostrate growth form are documented, with the more prostrate growth form occurring on soils with higher salinities (Youngman and Heckathorn 1992).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☒	☐
Declining populations or habitat trends	☐	☐	☒

Restricted range	☐	☒	☐
Low population numbers or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

- **Significant threats**: While scientific evidence points to potential long-term threats to the Pacific tidal marsh biophysical setting, these threats are difficult to predict at the local scale, and Pacific tidal marsh is considered secure in the plan area. Occurrences on the TNF are within designated wilderness, which is not threatened by development and most management activities. Life history and demographics information regarding the species response to disturbance is sparce but suggests it may be tolerant of certain environmental stressors (salts, heavy metals).
- **Declining populations or habitat trends:** There is insufficient information on population trends within the plan area. There is no scientific information indicating habitat is declining, and the Pacific tidal marsh biophysical setting is considered secure.
- **Restricted range**: *Suaeda calceoliformis* is restricted within a 300 square kilometer area on the TNF and has not been collected since 1993. It is not endemic to the region and can be found elsewhere within Alaska and is widespread throughout Western North America. *S. calceoliformis* has a state ranking in Alaska indicating that it is either critically imperiled or imperiled, but more information and additional focused surveys are required to inform conclusions in the plan area. Occurrences on the Tongass NF are not at the edge of the species' range.
- **Low population numbers or restricted ecological conditions**: There are just three documented locations of this species on the Tongass NF, and their relative proximity may render them vulnerable to stochastic events. Population numbers are unknown, and it is likely this species has been missed or overlooked in passed surveys. *S. calceoliformis* does not appear to require restrictive ecological conditions for establishment.
- **Other factors**: There is not enough information to determine whether any additional factors may impact this species' ability to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.

☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO7)[8/31/1993]	Alexander Archipelago, Wilson Cove, Admiralty I., S side of the mouth	Growing on upper beach in coarse sand-pebble gravel	NA	NA
1	CPNWH_April2025(ALA)[8/31/1993]	Alexander Archipelago, Wilson Cove, Admiralty I., S side of the mouth, T54S, R68E, S33, SW1/4,SW1/4, Sitka Quad, Tongass tiol Forest.	Growing on upper beach in coarse sand-pebble gravel. Common in this habitat.		
2	ACCS_Mar25 (EO0)[7/19/1978]	Whitewater bay, southwest. coast of admiralty Island, about 16 miles south of angoon.Â	Common in upper tidal meadows at head of bay.Â		
3	ACCS_Mar25 (EO9)[8/17/1958]	Alexander Archipelago, Pybus Bay, Admiralty I., Sitka Quad	Beach stand. On islands and mainland beaches and adjacent mountains along coast		
4	ACCS_Mar25 (EO8)[8/06/1980]	Alexander Archipelago, Gambier Bay, Church Pt. Cove, Admiralty I., Sumdum Quad	Most SE cove in W side of cove along beach-forest ecotone. SE part of Gambier Bay at sea level		
4	CPNWH_April2025(ALA)[8/06/1980]	Alexander Archipelago, Gambier Bay, Church Pt. Cove, Admiralty I., Sumdum Quad, Admiralty Island tiol Monument, Alexander Archipelago, Admiralty Island.	Most SE cove in W side of cove along beach-forest ecotone. SE part of Gambier Bay at sea level.		
5	ACCS_Mar25 (EO4)[8/29/2006]	Hooh, Chichagof I., overburden site	mixed landfill material		
6	ACCS_Mar25 (EO2)[6/01/2000]	Glacier Bay, Scidmore Bay.	Beach region.		

Tetralophozia filiformis

Tetralophozia filiformis [(Steph.) Urmi, 1909]

A pawwort

Global Rank: **G3G5**

Alaska State Rank: **S2**



photo: (CCO) Randal via iNaturalist

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Tetralophozia filiformis* is known from 4 occurrences on the TNF (Fig. 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are all located on the mainland south of Wrangell including on the north shore of the Cleveland Peninsula (Occurrence 1 and 2), near the northeast entrance of Wrangell Narrows (Occurrence 3), and near the USFS Berg Bay Cabins (Occurrence 4) (Appendices 1 and 2; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species occurs in mostly undisturbed forest (Occurrence 1, 2, and 4) and steep granitic rock outcrops (Occurrence 3) (Appendix 1). This habitat is typical for this species. There are no occurrences of this species in southeastern Alaska outside of the Tongass NF (CPNWH 2025).
2 Distribution in surrounding	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G3S5, Alaska State Rank S2 *Tetralophozia filiformis* is known from Spain, eastern Russia, Japan, Taiwan, China, Bhutan, Indonesian and western Northern America (Bakalin et al. 2022, Urmi 1983, CBH 2025), in coastal regions from Alaska and British Columbia

Criteria	*Rank*	*Rationale*
geographic area		(NatureServe 2025). It occurs in oceanic environments and is found in salacious rocks and sheltered places (Urmi 1983). It occurs in moist shaded environments (Bakalin et al. 2022). There is one additional occurrence in Alaska on Simeonof Island in the Aleutian Island chain (CPNWH 2025).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Tetralophozia filiformis* is a pleurocarpous- like leafy, liverwort with a terrestrial growth habit (Bakalin et al. 2022). Its main dispersal mechanism is by spores and clonal growth; spores are dispersed by wind (Bakalin et al. 2022).
4 Abundance on Tongass NF	B	*B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.* *Tetralophozia filiformis* is known from 4 occurrences on the Tongass NF (Appendices 1 and 2). None of the occurrences have population estimates or any indication of abundance (Appendix 1; CPNWH 2025, USFS 2025a).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Tetralophozia filiformis* on the TNF are unknown (USFS 2025a, CPNWH 2025).
6 Habitat trend on Tongass NF	A/B	*A/B = Decline in habitat quality or quantity, but stable amounts of suitable or potential habitat remain.* *Tetralophozia filiformis* occurs in mature Sitka spruce – Western hemlock forest on moist to mesic soils and exposed steep granitic rock outcrops above the coast on the TNF (Appendix 1). Invasive species that can survive in or near moist habitats, such as *Phalaris arundinacea*, are known to occur within 1 km of Occurrence 2 (USFS 2025b).

Criteria	*Rank*	*Rationale*
		Mature forest has high ecological integrity on the Tongass NF but has been harvested extensively in accessible areas. Mature forest is relatively resilient to small scale disturbances, but continued old growth timber harvest is likely to alter additional habitat.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Remaining mature forest habitat generally has high ecosystem integrity and is unaffected by frequent or large-scale disturbances. Climate change may alter water availability, particularly in the summer when increased temperatures are likely to lead to increased evapotranspiration and a water deficit for plants. Additionally, timber harvest is likely to impact additional habitat.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Tetralophozia filiformis* is not well described. It is a leafy liverwort that forms loose mats and has a creeping branched growth habit, never distinctly creeping or erect; it is commonly mixed with pleurocarpous mosses (Bakalin et al. 2022). It produces leafy stems with ecostate leaves that are simple (Bakalin et al. 2022).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐

Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Tetralophozia filiformis is not recommended as a Species of Conservation concern based on the following rationale:

- **Significant threats:** Little is known about life history of this plant and habitat requirements are also quite broad, so it is difficult to assess threats to *Tetralophozia filiformis*. Timber harvest may alter canopy and hydrology, which could make habitat unsuitable in some areas. Additionally, climate change is likely to alter water availability spatially (some areas may become drier due to increased temperatures) and temporally (less precipitation in summer, more precipitation as rain), which could impact this species. However, mature forest habitat in the plan area is common, continuous, and generally recognized as a high integrity ecosystem.
- **Declining trends:** Population trends are not known. Broadly described mature forest habitat is relatively stable with low vulnerability to stressors, but more information on the rocky, shaded microhabitat occupied by this liverwort would be necessary to infer trends.
- **Restricted ranges:** Tetralophozia is known globally, but the occurrences on the Tongass NF are the northern edge of the range in North America. In the plan area, increasing temperatures associated with changing climatic conditions are expected to negatively impact species at the southern edge of their range to a greater degree than those species at their northern limits.
- **Low population numbers or restricted ecological conditions:** There are four occurrences on the Tongass NF; the limited number of occurrences would indicate the potential for extirpation by stochastic events. However, there is a high likelihood for small liverwort species to be overlooked in surveys, and little is known about the life history of this species that would help assess its vulnerability to stressors.
- **Other factors:** There is not enough information to determine whether or not any additional factors may impact the ability of this species to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCSBryo_Oct24 [11/25/2014]**	**Southeast Alaska panhandle mainland. Approximately 27 miles SE of the Borough of Wrangell on the north shore of the Cleveland Peninsula. Collections from along the trail east of the Anan lagoon.**	**Mostly undisturbed forest dominated by Picea sitchensis and Tsuga heterophylla with scattered exposed rock. mesic; mostly exposed. Substrate: rock.**		
1	ACCSBryo_Oct24 [6/01/2015]	Southeast Alaska panhandle mainland. Approximately 27 miles SE of the Borough of Wrangell on the north shore of the Cleveland Peninsula. Collections from along the trail along Anan Creek.	Mostly undisturbed forest dominated by Picea sitchensis and Tsuga heterophylla with scattered exposed rock. moist; partially shaded. Substrate: cliff.		
2*	**ACCSBryo_Oct24 [5/08/2015]**	**Alaska mainland. Collections from the immediate (north) shore of the Cleveland Peninsula, 1 mile south of Pt Ward. Approximately 27 miles SE of the Borough of Wrangell.**	**Mostly undisturbed Tsuga heterophylla and Picea sitchenis dominated beach forest with steep rocky shore. moist; mostly exposed. Substrate: rock.**		
2	CBH 2025 (ALA) [05/08/2015]	Alaska mainland. Collections from the immediate (north) shore of the Cleveland Peninsula, 1 mile south of Pt Ward.Approximately 27 miles SE of the Burrough of Wrangell.	Vegetation Type: Mostly undisturbed Tsuga heterophylla and Picea sitchenis dominated beach forest with steep rocky shore. Substrate: mostly exposed moist immediate coast rock; Martin Hutten is working on catalogging the bryoflora of SE Alaska (2014-2018).		
3*	**ACCSBryo_Oct24 [6/21/2015]**	**Southeast Alaska panhandle mainland. NE entrance of Wrangell Narrows, approximately 12.5 miles SE of the Borough of Wrangell.**	**Steep granitic rock outcrops over saltwater of the Wrangell Narrows. moist; mostly exposed. Substrate: cliff.**		

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
3	ACCSBryo_Oct24 [6/20/2015]	Southeast Alaska panhandle mainland. NE entrance of Wrangell Narrows, approximately 12.5 miles SE of the Borough of Wrangell.	Steep granitic rock outcrops over saltwater of the Wrangell Narrows. moist; mostly exposed. Substrate: cliff.		
3	CBH 2025 (ALA) [06/21/2015]	Southeast Alaska panhandle mainland. NE entrance of Wrangell Narrows, approximately 12.5 miles SE of the Burough of Wrangell.	Vegetation Type: Steep granitic rock outcrops over saltwater of the Wrangell Narrows. Substrate: mostly exposed moist immediate coast cliff;		
3	CBH 2025 (ALA) [06/20/2015]	Southeast Alaska panhandle mainland. NE entrance of Wrangell Narrows, approximately 12.5 miles SE of the Burough of Wrangell.	Vegetation Type: Steep granitic rock outcrops over saltwater of the Wrangell Narrows. Substrate: mostly exposed moist steeply inclined cliff;	Identification remarks: Verified by Bakalin VI/2017. Duplicate also sent to Wagner III/2017.	
4*	**ACCSBryo_Oct24 [6/20/2015]**	**Southeast Alaska panhandle mainland. Collection locality near USFS Berg Bay Cabin, approximately 15 miles southeast of the Borough of Wrangell.**	**Mostly undisturbed forest dominated by Picea sitchensis and Tsuga heterophylla with Callitropsis nootkatensis and Alnus rubra on perennially wet soils. moist; fully shaded. Substrate: rock face.**		

Tetrodontium repandum

Tetrodonium repandum [(Funck) Schwägrichen, 1824]

Small four-toothed moss

Global Rank: **G2G3**

Alaska State Rank: **S2**



photo: (CC BY 4.0) Perry Gunnar Larsen

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Tetrodontium repandum* is known from one estimated occurrence on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). This occurrence is located in Sitka County on Baranof Island in the alpine (Appendix 1; iNaturalist 2025, USFS 2025a). Occurrence 1 was collected from a well-shaded crevice at around 3,800 ft elevation with *Diplophyllum* sp. and *Cephaloziella* sp. in rocks with little direct sunlight (iNaturalist 2025). There are no other occurrences of this species in southeastern Alaska outside of the Tongass NF (CBH 2025). Across its range, *Tetrodontium repandum* is typically found in alpine wet tundra and in shaded cliffs or ridges (CBH 2025). This species may be confused for *Tetrodontium brownianum* which is also present nearby but has much larger leaves (ACCS 2025).

Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	B	*B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass N.F.* Global Rank G2G3, Alaska State Rank S2, British Columbia S3 *Tetrodontium repandum* is narrowly distributed throughout Europe, eastern Asia, Canada, and the United States (Lawton 1971), ranging from British Columbia, Washington, Alaska (Lawton 1971). In Europe it occurs in the Pyrenees and Fennoscandia but is very rare in Great Britain (Hill et al. 1994). Across its range, *Tetrodontium repandum* grows under rock ledges and in crevices, often growing inverted, in high humidity, and sometimes mixed within other bryophytes (CBH 2025). It can be found at elevations of 150 to 2,600 m and is typically found in the shade (CBH 2025). The next closest occurrences to the Tongass NF occurrence are approximately 650 miles to the northwest in the vicinity of Anchorage and approximately 700 miles to the southeast in the vicinity of Vancouver, BC (CBH 2025).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion.* *Tetrodontium repandum* is an acrocarpous 3- ranked leafy moss with a terrestrial growth habit (BBS 2025). Its main dispersal mechanism is by spores (FNA 2025). Spores are dispersed mainly by wind and by water in habitats near a water source (BBS 2025).
4 Abundance on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* The one known occurrence does not have a population count (Appendix 1; iNaturalist 2025, USFS 2025a). Bryophytes are not typically recorded in botanical surveys so it may be more common than survey data indicates.
5 Population trend on	D	*D = Insufficient information to draw inferences about criterion.* Population trends of *Tetrodontium repandum* on the TNF are unknown (USFS 2025a, iNaturalist 2025).

Criteria	*Rank*	*Rationale*
Tongass NF		
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion* The one occurrence for *Tetrodontium repandum* on the Tongass NF is subalpine, rocky, and shaded (iNaturalist 2025, CBH 2025). In adjacent locations including Alaska, British Columbia, it often grows inverted under rock ledges or crevices, especially in areas of high humidity; in North America it grows in subalpine areas (FNA 2025). These habitats can be grouped under Alpine Vegetation which occurs above the tree line and consists mainly of herbaceous and dwarf shrub species (Turner and Mallott 2025). Alpine vegetation has a moderate ecological integrity status due to impacts from climate change but is trending toward a lower ecological integrity (Turner and Mallott 2025). How these changes have impacted habitat suitability for *Tetrodontium repandum* is unknown.
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion* Threats specific to *Tetrodontium repandum* include drought, changes in relative humidity and direct sun exposure (IUCN 2025). This species requires a constantly wet microclimate for successful growth (Schanz et al. 2021). Climate change will likely alter temperature and precipitation patterns, which may cause drought stress for *Tetrodontium repandum* (Turner and Mallot 2025). Additionally, climate change may lead to upslope shift in elevation of tree line, and increased proportion of woody vegetation relative to herbaceous (Halofsky et al draft). However, it is unclear to what degree these changes will impact habitat suitability for *Tetrodontium repandum*.
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* The life history of *Tetrodontium repandum* is largely unknown (Lawton 1971). It is an acrocarpus moss with a mat growth habit (BBS 2025, FNA 2025). It produces leafy stems with ecostate leaves that are simple (FNA 2025). *Tetrodontium repandum* produces sporocarps very rarely, and the frequency of capsule production within its TNF range is very high for the one known occurrence (iNaturalist 2025, FNA 2025). Specialized asexual reproduction is not reported for this species (BBS 2025, FNA 2025, Lawton 1971). The life span of *Tetrodontium* plants has not been

Criteria	*Rank*	*Rationale*
		measured for any reported species (BBS 2025, FNA 2025). The occurrence from TNF has abundant sporocarp capsules which is in direct contrast to occurrences outside of the TNF which rarely produce sporocarps (FNA 2025).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	X
Declining populations or habitat trends	☐	☐	X
Restricted range	☐	☐	X
Low populations or restricted ecological conditions	☐	☐	X
Other factors (see conclusion rationale)	☐	☐	X

Conclusion Rationale

Tetrodontium repandum is not recommended as a Species of Conservation Concern based upon the rational below:

- **Significant threats:** Climate change may cause drought stress for this species as well as allowing for encroachment of woody plants into alpine habitat, but it is unknown how significant these threats are for *Tetrodontium repandum*.
- **Declining trends:** Population trends are not known. This species requires wet, humid habitat, which may be declining due to climate change. However, the Tongass NF is a temperate rainforest, and much wet, humid habitat is likely to remain.
- **Restricted ranges:** The species is not endemic nor at the edge of its range in Southeast Alaska. It may be disjunct, as the next closest occurrence is over 650 miles away. However, survey data and information on dispersal mechanisms are not complete enough to say for sure.
- **Low population numbers or restricted ecological conditions:** Only one occurrence is known on the Tongass NF, but ecological conditions do not appear to be highly restricted. Bryophytes are not typically recorded in botanical surveys so it may be more common than survey data indicates. However, the species is uncommon globally (G2G3), so it may actually be very rare on the Tongass NF.

- **Other factors:** It is unknown whether other factors exist that could impact the persistence of this species in the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**iNaturalist 2025 [06/01/2024]**	**Sitka County**	**Found in a reasonably well shaded large crevice in the broken rocky ridgeline. Probably around 3800 feet elevation - over 1000 feet above treeline. Growing with *Diplophyllum* (*obtusifolium*?) and some *Cephaloziella*(?).**	**Specimen collected.**	

Thalictrum occidentale

Thalictrum occidentale Gray

Western Meadowrue

Global Rank: **G5**

Alaska State Rank: **S2S3**



photo: Micah Lauer, iNaturalist

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Patchy OR gaps. *Thalictrum occidentale* is a species with at least 15 estimated occurrences on the Tongass (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). These occurrences are found on the northern half of Prince of Wales Island in patchy, widely distributed clusters. The habitat for the 15 validated occurrences on the Tongass is primarily riparian areas, but also alpine meadow and fen-forest ecotone (Appendix 1). When flowering, this distinctive species is unlikely to be confused with any other species on the Tongass NF. When not flowering, the leaves look somewhat similar to the leaves of *Aquilegia formosa*, which is common on the Tongass and can grow in similar habitats. *T. occidentale* has a rhizomatous growth habit though while *A. formosa* is taprooted.
2 Distribution in surrounding geographic	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2S3 Yukon S3, Northwest Territories SNR, British Columbia S5, Alberta S5, Saskatchewan S2 California, Idaho, Nevada, Oregon, and Washington SNR, Montana S5, Wyoming S4

Criteria	*Rank*	*Rationale*
area		*Thalictrum occidentale* is common throughout British Columbia except in Haida Gwaii. It occurs throughout Northern Vancouver Island and the adjacent coast; north to southeast Alaska, Yukon Territory and Northern Territory, east to Saskatchewan, and south to Colorado, Utah and northern California (Clason et al. 2008, Klinkenberg 2020, NatureServe 2024). The occurrences of *Thalictrum occidentale* on northern Prince of Wales and Kosciusko Islands appear to be somewhat disjunct, as there are no records of this species on islands to the north, south, or east. The closest known occurrences are approximately 100 miles away near Hyder. In British Columbia, the habitat for this species is moist to mesic meadows, thickets, clearings, and open forests from the lowland to subalpine zones (Klinkenberg 2020). Range-wide, Flora of North America describes its habitat as open woods, meadows, and copses (FNA 2020).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). This species is a dioecious, wind-pollinated, perennial herb (Culley et al. 2002, Ida et al. 2015). The male individuals feature long stamen filaments, while females house multiple stigmas. Both sexes have a reduced perianth, all collectively facilitating dispersal and receipt of pollen grains in a stochastic fashion (Culley et al. 2002). *Ranunculus* achenes have been shown to be dispersed by winds, birds, and water (Emadzade and Horandl 2011). The exact dispersal mechanisms for *Thalictrum occidentale* are not documented.
4 Abundance on Tongass NF	B	B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat. Six records have over 1000 plants recorded and often occurrences have over 100 plants. (USDA FS 2023, CPNWH 2024). However, occurrences on the Tongass are restricted to northern Prince of Wales and Kosciusko Island despite the presence of apparently suitable habitat elsewhere on the Forest (Smith 2016, USDA FS 2023, CPNWH 2024, iNaturalist 2024).

Criteria	*Rank*	*Rationale*
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no population trend data for this species on the Tongass.
6 Habitat trend on Tongass NF	A/B	A/B = Decline in habitat quality or quantity, but a stable amount of suitable or potential habitat remains Habitat for *Thalictrum occidentale* on the Tongass is primarily riparian areas, but also alpine meadow and fen-forest ecotone (Appendix 1). While short term effects of climate change may increase stream flows in winter, late summer flows will be lower in the areas of Tongass NF relevant to this species (Hodgkins 2009, EcoAdapt 2014, Shanley et al. 2015). Marsh and mesic areas are projected to receive downstream effects of precipitation changes that are likely to contribute larger magnitude floods and disturbance, and negative impacts from movement of sediment thus risking a decrease in riparian biodiversity in the long term (Nilsson and Svedmark 2002, Hamlet and Lettenmaier 2007, EcoAdapt 2014, Garssen et al 2015). It is unknown if hydrologic changes may drive shrub or conifer encroachment into mesic meadow habitat specifically in Tongass NF (Dial et al. 2016). However, unharvested riparian forest ecosystems in the plan area have high ecological integrity; these ecosystems are resilient and highly adaptive to their dynamic driving processes (Turner and Mallot 2025). Highly invasive species like reed canarygrass also present threats, and infestations are known to occur within or nearby several of the *Thalictrum occidentale* locations. Timber harvests have the capacity to threaten occurrences of this species, but harvest activities are restricted within 1000 feet of riparian systems under the Tongass NF management plan.
7 Habitat vulnerability or	A	A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc.

Criteria	*Rank*	*Rationale*
modification; other threats		This species is directly vulnerable, like many other riparian plants, due to brittle stems and branches easily being damaged in the face of a disturbance such as foot traffic, windthrow, or flooding (Cole 1978, EcoAdapt 2014, Boggs et al. 2019). On the Tongass, reed canarygrass (*Phalaris arundinaceae*) is widespread in many watersheds, competing against native plants particularly well in palustrine streams, beaver pond areas and lakeshores, all of which describe this species'-specific habits (Huette et al. 2003, Klinkenberg 2020, USDA FS 2023). Climate change driven shifts in hydrology may synergistically influence spread of reed canarygrass as well (Nilsson and Svedmark 2002, Flanagan et al. 2015).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. *Thalictrum occidentale* is a flowering, perennial herb growing erect to a maximum height of around a meter. It is hairless to lightly hairy and glandular. The leaves have compound blades divided into a few or many segments, often with three lobes, and are borne on long, slender petioles. The roots are black, thin and fibrous. The species is dioecious, and wind pollinated, flowering early to mid-summer. The male flower has a bell-shaped calyx of four sepals that occur in shades of greenish white or purple. Many long, purple stamens tipped with large anthers dangle from the calyx. The female flowers have a cluster of immature fruits tipped with styles in shades of purple. A cluster has 4 to 9 (at times up to 14) achene fruits that are granular and tapered, approx. 8 mm long and 2 mm wide (Culley et al. 2002, Klinkenberg 2020, Jepson 2024). Reproductive rate and mortality are not well known. A study from British Columbia found this species to be resilient to timber harvest in lodgepole pine forest (Clason 2008). Whether the findings of this study transfer to the Tongass is unknown.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒

Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☒	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Thalictrum occidentale is not recommended as a Species of Conservation Concern according to the following rationale:

- **Significant threats**: This species is threatened by the encroachment of highly invasive species like reed canarygrass. Alterations to site hydrology induced by changing climatic conditions may also threaten the otherwise stable riparian and alpine meadow habitat *Thalictrum occidentale* is known to occupy.
- **Declining trends**: There is not enough available information to infer trends in population or habitat. Initial population counts are high, and site revisits have not been recorded for most occurrences. Riparian and alpine habitat are threatened by changing hydrology, but the majority of occurrences exist within riparian corridors; these ecosystems are known to be highly resilient.
- **Restricted ranges**: This species is not endemic to the plan area, and occurrences on the Tongass NF do not exist at the edge of the species' range. Occurrences in the plan area are disjunct by approximately 100 miles from populations on the mainland, but it is unknown how this may impact the large populations occurring on the Tongass NF.
- **Low population numbers or restricted ecological conditions**: Occurrences with population data indicate high population numbers; the full extent of some known occurrences has yet to be mapped. This species is not known to require restricted ecological conditions for establishment.
- **Other factors**: There is not enough information to establish the existence of additional factors related to this species that may impact its ability to persist in the plan area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.

X	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	ACCS_Mar25 (EO25)[7/11/2011]	Prince of Wales Island, Black Lake area, Craig Quad, Tongass tiol Forest, Alexander Archipelago	Alpine meadow		
1	CPNWH_April2025(ALA)[7/11/2011]	Prince of Wales Island, Black Lake area, Craig Quad, Tongass tiol Forest, Alexander Archipelago.	Alpine meadow, rare.		
2	TESP_Mar25 (100554P000278)[6/23/2011]		Streambank with Alnus rubra, Picea sitchensis, Thuja plicata. Inside bends of stream that are flat dominated by forbs and Alnus contained the most Thalitrum along with the lake outlet area.	1000 genets (estimated)	
2	ACCS_Mar25 (EO2)[6/23/2011]				
3	TESP_Mar25 (100554P000280)[7/06/2011]		Hundreds of THOC along uppper Steelhead Creek just below the bridge on the 2000-300 rd. Vigor was mostly good, but some plants had yellow leaves. We saw lots flowering, but only female flowers.	100 genets (estimated)	
3	ACCS_Mar25 (EO3)[7/06/2011]				
4	ACCS_Mar25 (EO4)[7/07/2009]	near Big Salt Rd, about 2.17 km S of Control Lake Junction.near Big Salt Rd, 60 m S of the road	growing at at ecotone between mixed conifer forest and fen, abundant at this site		
4	ACCS_Mar25 (EO4)[6/23/2009]		Vegetation= ; Slope = 10; Aspect= SE; Substrate= Moss; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Full Sun; Comments=		
4	TESP_Mar25 (100554P000102)[6/23/2009]		At edge of wetland fen, at edge of scrub timber	40 genets (estimated)	
4	TESP_Mar25 (100554P000104)[6/23/2009]			20 genets (estimated)	

4	ACCS_Mar25 (EO4)[6/23/2009]		Vegetation= ; Slope = 10; Aspect= SE; Substrate= Moss; Parent Material= Mixed; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Partial Shade; Comments=		
4	CPNWH_April2025(ALA)[7/07/2009]	Near Big Salt Rd, about 2.17 km S of Control Lake Junction.near Big Salt Rd, 60 m S of the road, Craig Quad, Alexander Archipelago, Prince of Wales Island.	Growing at at ecotone between mixed conifer forest and fen, abundant at this site.		
5	ACCS_Mar25 (EO5)[7/29/2005]		Comments= POW, Not a rare pl survey. Rio Roberts River, stream bank and cobble bar. 15 stems		
5	TESP_Mar25 (100554P000052)[7/29/2005]			15 stems	
6	TESP_Mar25 (100554P000429)[7/07/2011]			1000 (estimated)	
6	ACCS_Mar25 (EO6)[7/07/2011]				
6	ACCS_Mar25 (EO6)[7/07/2011]				
6	TESP_Mar25 (100554P000430)[7/07/2011]			50 (not estimated)	
7	ACCS_Mar25 (EO8)[8/11/2010]				
7	TESP_Mar25 (100554P000165)[8/11/2010]		Clump of THOC along Rio Roberts stream bank under 40' stream embankment.		
8	TESP_Mar25 (100554P000641)[8/08/2024]				
9	ACCS_Mar25 (EO9)[8/25/2010]		Comments= Survey did not extend very far up-or-downstream, plant possibly occurs elsewhere along Cutthroat Creek		
9	TESP_Mar25 (100554P000157)[8/25/2010]		THOC growing along bank of Cutthroat Creek, mostly tucked under PTAQ, ARAM2, AQFO, GEER2	100 genets (estimated)	
9	TESP_Mar25 (100554P000159)[8/25/2010]		THOC found in riverside meadow growing among ATFI (5-6' tall), AQFO, ACDE. Survey did not	100 genets (estimated)	

			extend very far along the river, but THOC likely exists all along banks		
9	ACCS_Mar25 (EO9)[8/25/2010]				
10	ACCS_Mar25 (EO10)[7/08/2011]				
10	TESP_Mar25 (100554P000283)[7/08/2011]		Fern/Carex domited area with ALRU along lake outlet with beaver activity	100 genets (estimated)	
11	ACCS_Mar25 (EO11)[7/08/2011]				
11	TESP_Mar25 (100554P000282)[7/08/2011]		in PISI/ALRU forest. On islands and streambanks	30 genets (estimated)	
12	TESP_Mar25 (100554P000147)[8/03/2010]		Along a cobelly section of stream, approx. 20' wide. 60% canopy cover, with open canopy directly above stream.	300 genets (estimated)	
12	ACCS_Mar25 (EO12)[8/03/2010]				
13	TESP_Mar25 (100554P000202)[8/10/2023]		along stream edge mixed in with reed cary grass. Found while looking for RAPA and FESU occurrences nearby. Did not find either RAPA or FESU	50 genets (estimated)	Reed canarygr ass
14	ACCS_Mar25 (EO13)[6/02/2011]				
14	TESP_Mar25 (100554P000410)[6/02/2011]		THOC growing in clumps of 50-100 individuals each, hundreds of clumps scattered along bank of Logjam Creek. It seemed that whenever we encountered a flat, open grassy bank it was growing. Because of the abundance we saw in our limited survey area, we suspect the population continues upstream and downstream.	2000 genets (estimated)	
15	TESP_Mar25 (100554P000417)[5/23/2011]		Hundreds of THOC scattered sparsely on both banks of a karst-influenced stream. we surveyed about 0.2 mi. of stream and saw THOC in various spots the whole way. The same stream was surveyed 0.25 mi. north of where we stopped and it was there, too.	100 genets (estimated)	
15	ACCS_Mar25 (EO14)[5/23/2011]				

15	TESP_Mar25 (100554P000419)[5/23/2011]		Small stream; insurgence into small cave, sinkhole very rich soil, basin must fill with water at high flows.		
15	ACCS_Mar25 (EO14)[5/23/2011]			1000 genets (estimated)	
15	ACCS_Mar25 (EO15)[5/23/2011]				
15	TESP_Mar25 (100554P000418)[5/23/2011]		THOC scattered along bank of karst-influenced stream, both sides of bank, from just below a falls up several hundred yards of stream. Possibly exists further upstream.	200 genets (estimated)	
18	TESP_Mar25 (100554P000449Y12)[7/16/2012]		Open streambanks mixed in with forbs and grasses.		
19	TESP_Mar25 (100554P000409)[5/24/2011]		Small karst-influenced stream lined with grasses/sedges and forbs.		
19	ACCS_Mar25 (EO16)[5/24/2011]				
20	TESP_Mar25 (100554P000412)[5/10/2011]		Plants observed growing in a few dense clumps along the edge of a karst-influenced stream.		
20	ACCS_Mar25 (EO17)[5/10/2011]				
21	ACCS_Mar25 (EO18)[7/05/1939]	Coast Mts., Hyder			
22	TESP_Mar25 (100554P000413)[5/26/2011]		Riparian area with Alnus rubra and Pysocarpus capitatus. Flat, graminoid-domited areas on south side of creek.		
22	ACCS_Mar25 (EO19)[5/26/2011]		Vegetation= ; Slope = ; Aspect= S; Substrate= ; Parent Material= ; Soil Moisture= Moist; Soil Texture= ; Light Exposure= Full Sun; Comments=		
23	TESP_Mar25 (100554P000462Y12)[6/23/2012]				
23	TESP_Mar25 (100554P000466Y12)[6/23/2012]				
23	TESP_Mar25 (100554P000467Y12)[6/23/2012]				
23	TESP_Mar25 (100554P000541Y14)[7/31/2014]				
24	CPNWH_Mar25 (UAAH15319)[6/27/2018]	Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.	Hemlock forest, lake edge, organic soil, full shade.		

24	ACCS_Mar25 (EO24)[6/27/2018]	Prince of Wales Island: Sarkar Lake, south west end, near road and boat ramp.	Hemlock forest, lake edge, organic soil, full shade		
25	TESP_Mar25 (100554P000130)[6/11/2009]				
25	ACCS_Mar25 (EO20)[6/11/2009]		Vegetation= ; Slope = 5; Aspect= SE; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
25	ACCS_Mar25 (EO20)[6/25/2009]		Vegetation= ; Slope = 5; Aspect= S; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments=		
25	TESP_Mar25 (100554P000135)[6/25/2009]				
26	TESP_Mar25 (100554P000505Y12)[6/22/2012]				
27	TESP_Mar25 (100554P000544Y12)[6/24/2012]				
27	TESP_Mar25 (100554P000495Y12)[6/24/2012]		Along the streambanks for one tributary of upper Survey Creek. Entire channel has high amount of karst influence, and appears to be a very flashy system.		
28	TESP_Mar25 (100554P000501Y12)[8/04/2012]		Streambank		
29	ACCS_Mar25 (EO21)[7/12/2010]	Trout Creek, N bank	in dense Rubus spectabilis and riparian vegetation		
29	CPNWH_Mar25 (WTU408796)[7/12/2010]	Petersburg Quad.: Kosciusko Island, Alexander Archipelago, Trout Creek, north bank.	In dense Rubus spectabilis and riparian vegetation.		
29	CPNWH_April2025(ALA)[7/12/2010]	Trout Creek, N bank, Petersburg Quad, Alexander Archipelago, Kosciusko Island.	In dense Rubus spectabilis and riparian vegetation.		
30	TESP_Mar25 (100554P000550Y14)[8/18/2014]				
30	ACCS_Mar25 (EO22)[7/17/2013]	N end of island, Neck Lake, causeway along lake.	Rockfill adjacent to mud lake bottom.		
30	TESP_Mar25 (100554P000517Y13)[7/09/2013]		Plants growing on quarry spall of causeway fill.		
30	ACCS_Mar25 (EO22)[8/01/2002]	Prince of Wales Island, Neck Lake	stream banks and scattered within palustrine beaver complex, common		
30	CPNWH_April2025(ALA)[7/17/2013]	N end of island, Neck Lake, causeway along lake, Petersburg Quad, Alexander Archipelago, Prince of Wales Island.	Rockfill adjacent to mud lake bottom, uncommon.		

30	CPNWH_April2025(ALA)[8/01/2002]	Prince of Wales Island, Neck Lake, Petersburg Quad, Tongass tiol Forest.	Stream banks and scattered within palustrine beaver complex, common.		
31	TESP_Mar25 (100554P000510Y13)[7/09/2013]		Thick herbaceous cover on moist soil in full sun to part shade, along lakeshore and streambanks. Partially shaded by cedar-spruce forest. Not found under full shade in the forest; not found more than 20' from lake or stream.		
32	ACCS_Mar25 (EO23)[6/30/2010]	Cavern Lake, near outlet on N shore of Lake	upper end of herbaceous area around lake, just below forest edge		
32	CPNWH_April2025(ALA)[6/30/2010]	Cavern Lake, near outlet on N shore of Lake, Petersburg Quad, Alexander Archipelago, Prince of Wales Island.	Upper end of herbaceous area around lake, just below forest edge. Growing with Athyrium filix-femi, Pteridium aquilinum, Carex flava, C. sitchensis, and Veratrum viride		
	Occurrences in SE but not on TNF				
8	ACCS_Mar25 (EO7)[8/01/1979]	Alexander Archipelago, Control Lake Jct. On Road To Craig, Prince of Wales I.	growing along stream in forest		
8	CPNWH_April2025(ALA)[8/01/1979]	Alexander Archipelago, Control Lake Jct. On Road To Craig, Prince of Wales I., Craig Quad, Tongass tiol Forest, Alexander Archipelago.	Growing along stream in forest.	30 genets (not estimated)	
1	ACCS_Mar25 (EO1)[6/04/1983]	Alexander Archipelago, Craig, Prince of Wales I.	12 km along road to Thorne Bay.	NA	NA

Tiarella trifoliata var. laciniata

Tiarella trifoliata var. *laciniata* [(Hooker) Wheelock]

Cutleaf foam flower

Global Rank: **T5**
Alaska State Rank: S3



photo: Paul Slicter (2025)

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	B	B = Habitat exists primarily as patches. There are 18 known locations on the TNF identified as *Tiarella trifoliata* var. *laciniata*. These records range from Stikine-LeConte Wilderness in the north to Misty Fjords Monument Wilderness in the south (ACCS 2025, CPNWH 2025, USDA 2025). There are many additional records of "*Tiarella trifoliata*" that are not keyed to variety. We reviewed 128 records that contained photos (4 records had no photos) and no additional "var. *laciniata*" specimens were found. This variety is shown as not occurring in Alaska in the Flora of North America (Jog 2020), where the author notes: "*Varieties of* Tiarella trifoliata *have overlapping ranges and differ from each other in leaf form and marginal dissection. Their floral features are stable throughout. They were previously suspected of hybridizing when sympatric. They are differentiated along elevational gradients and often remain distinct in sympatric populations*." The habitats associated with this variety on the Tongass National Forest are typically found under a coniferous canopy and often adjacent to streams, or seeps, on mossy rocks. Much more apparently suitable habitat is present throughout Tongass NF that appears to not be occupied by this taxon.

Criteria	*Rank*	*Rationale*
		While some authors accept this as a valid taxon and indicate that they occur sympatrically without hybridization (e.g., Jog 2022), others note that there appears to be widespread hybridization among forms and this variety is one end of a spectrum of morphologies (see Kerns 1966, Hultén 1968). Additionally, chloroplast genetic study did not find that haplotypes corresponded to described varieties (Soltis et al. 1992), however studies of only maternally inherited genes are not conclusive.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest; Global Rank T5, Alaska State Rank S3 This taxon is ranked in the adjacent territories of British Columbia as S5. It is not ranked in Washington and Oregon and does not occur in Yukon (NatureServe 2025). The range of *Tiarella trifoliata* var. *laciniata* is restricted to the Pacific Northwest (Kerns 1966, CPNWH 2025, NatureServe 2025). Flora of North America (Jog 2022) and CPNWH list this variety as occurring in British Columbia, Washington, and Oregon in "shaded, moist woods."
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There are no studies on dispersal in *Tiarella*. It produces small seeds from dry capsules from a low stature plant and therefore, seed dispersal is expected to be very localized and long-distance dispersal very rare. This species is also rhizomatous that would facilitate local colonization of appropriate habitat.
4 Abundance on Tongass NF	B	B = Uncommon. Populations of this variety are uncommon and scattered and population sizes are almost always small. Population sizes on the Tongass National Forest are listed as 1 individual (6 records), 2, individuals (2 records), 3, 4, 6, 8, 10 individuals (2 records), 50+ individuals, and "many individuals."
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for *Tiarella trifoliata* var. *laciniata* on the TNF are unknown. None of the sites to our knowledge have been revisited to estimate changes over time (ACCS 2025).

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable habitat. This species is recorded from shaded moist forests in TNF, often adjacent to streams and on mossy rocks or boulders. This habitat is common and stable throughout the TNF.
7 Habitat vulnerability or modification; other threats	C	C = Habitat resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors not significant. Populations in the TNF are associated with western hemlock and Sitka spruce forests that could be subject to timber harvest, although a number of the records are from Wilderness Areas and not subject to this threat. Eight occurrences occur within or up to 300 meters of mapped young growth forest with variable to be logged dates of 2022 to 2088. Additionally, this plant often occurs in riparian areas and timber harvest is not allowed in 100-foot buffers on either side of Class I and Class II streams (see Engleman 2024). EO 19 occurs within 700 meters of a *Phalaris arundinacea* population but not likely to experience negative impacts of non-target herbicide treatment or direct effect of *P. arundinacea*.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. Unknown life history and demographics in Alaska or elsewhere. It is assumed to be a long-lived species based on its rhizomatous behavior (see Jog 2022).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

There is a lack of scientific information to determine if there is substantial concern for the long-term persistence of *Tiarella trifoliata* var. *laciniata* within the plan area based upon the following:

- **Significant threats:** No significant threats to this taxon are known. Populations in the TNF are often recorded in Wilderness Areas or along riparian zones that are unlikely to be substantially impacted by timber harvest or other disturbances.
- **Declining populations or habitat trends:** Population trends for *Tiarella trifoliata* var. *laciniata* on the TNF are unknown. Habitat trends appear stable enough to not impact the resiliency of the taxon.
- **Restricted range:** *Tiarella trifoliata* var. *laciniata* is found in Alaska, British Columbia, Washington, and Oregon. Within the Tongass NF it is known from at least the Petersburg to Ketchikan Ranger Districts. The central Tongass appears to be the northern edge of this taxon's range.
- **Low population numbers or restricted ecological conditions:** There are 19 recorded sites on the Tongass NF. However, populations are uncommon, widely scattered, and are often composed of less than ten individuals. There are a few records of more than 50 individuals or "many individuals." The ecological context for this variety does not appear to be highly restricted.
- **Other factors:** While some authors accept this as a valid taxon, others note that there appears to be widespread hybridization among forms and that this variety may be one end of a spectrum.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Vicia americana

Vicia americana [Muhl. Ex Willd.]

American purple vetch



Photo: Ingolf Askevold (CC0; iNaturalist 2025)

Global Rank: **G5**
Alaska State Rank: **S2**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Vicia americana* is known from two estimated occurrences on the Tongass NF (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). One occurrence was observed and collected on Coronation Island in 1960, and the other was observed and collected on the mainland at Eagle Beach in 1981; although the Eagle Beach specimen was in the Tongass NF herbarium, it is unclear if it was actually collected within the Forest boundary (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, Fulkerson 2025 pers. comm., SEINet 2025). The Coronation Island occurrence is within the Coronation Island Wilderness. There are three other occurrences in southeast Alaska located outside the boundary of the Forest, based on historical collections made in 1921, 1939, and 1946 (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, SEINet 2025). Both Tongass NF occurrences are based on herbarium specimens collected more than 40 years ago, and their location coordinates are estimated with large errors. The label for the Coronation Island specimen (*Neiland 49*) just says "Coronation Island," and the coordinates estimated by the ALA herbarium were placed in the middle of the island (Arctos 2025). However, based on the majority of specimens collected by Neiland on July 29, 1960, her collecting was mostly in the vicinity of Egg Harbor (Arctos 2025, SEINet 2025); therefore, the location was adjusted for this analysis to the vicinity of Egg Harbor with a 2000 m error. Similarly, the exact location of the Eagle Beach specimen, which was in the Tongass NF herbarium (*Spalinger 81*), is not known with certainty, and the original georeferencing by Biotics placed the specimen in a very steep drainage on the side of a mountain to the NE of the beach (ANHP ACCS 2025). This

Criteria	*Rank*	*Rationale*
		location was re-georeferenced closer to the coastal road and beach within the Tongass NF boundary with a 500 m error. It should also be emphasized that two of the locations georeferenced outside of the Tongass NF boundary ("Juneau" and "Hyder") are very general herbarium specimen historical locations, and the specimens could have been collected far from those towns. The location uncertainty associated with the southeast Alaska occurrences of *Vicia americana*, in combination with the paucity of habitat data provided on the specimen labels (and lack of companion herbarium collections), makes it difficult to know what habitat this species occupies in southeast Alaska. The specimen from Eagle Beach was near the beach and collected in sandy soil with *Elymus arenarius* and *Cerastium* (ANHP ACCS 2025, Fulkerson 2025 pers. comm.). The Coronation Island specimen may or may not have been on the coast of the island and was collected in an opening (at the edge) of a forest with grasses (Arctos 2025). Therefore, possible vegetation types for *Vicia americana* on the Tongass NF and in southeast Alaska are likely beach meadow, meadow, and mesic forest.
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the TNF* Global Rank: G5 (Apparently Secure), Alaska State Rank: S2 (Imperiled) (NatureServe 2025) State Ranks: Canadian provinces and territories: all are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present. United States: SH (Possibly Extirpated): Maryland; S1 (Critically Imperiled): Virginia, Missouri, Ohio; S3 (Vulnerable): New York; all others are S4 (Apparently Secure), S5 (Secure), SNR (not ranked), or not present (NatureServe 2025). *Vicia americana* occurs in North America and eastern Asia (Broich 2023). In North America, it occurs in most of the provinces and territories of Canada and most of the United States except for the southeastern and far northeastern states (Broich 2023, NRCS 2025). *Vicia americana* is sparsely distributed in Alaska with very few records that range from the Susitna River southeast to the panhandle region (Hultén 1968, Welsh 1974, Porsild and Cody 1980, Arctos 2025, CPNWH 2025, SEINet 2025). *Vicia americana* is common in southern British Columbia, becoming less common to the north; it is absent from Haida Gwaii (Klinkenberg 2020). The Tongass NF occurrences are separated from other records by approximately 200 miles. Given insufficient information about dispersal distances, it is unclear if the Tongass NF occurrences are disjunct.

Criteria	*Rank*	*Rationale*
		Throughout its range, *Vicia americana* grows in a wide range of habitats including open, moist areas in mesic woods, thickets, meadows, prairies, sagebrush steppe, shrublands, valley and foothill grasslands, and disturbed areas ranging in elevation from near sea level to approximately 11700 feet (3570 m) (Hultén 1968, Welsh 1974, Porsild and Cody 1980, Preston and Isely 2012, Gucker and Shaw 2022, Broich 2023, Oregon Flora 2025). It is an early colonizer and common on a variety of disturbed sites (Gucker and Shaw 2022).
3 Dispersal capability	D	*D = Insufficient information to draw inferences about criterion* *Vicia americana* can reproduce by seed or vegetatively via rhizomes (Gucker and Shaw 2022). Seeds are ballistically dispersed when the fruits dehisce and can be flung distances up to 16 feet (Gucker and Shaw 2022, and references therein). Despite these potential dispersal distances, most *Vicia americana* seeds in the soil seed bank are found in areas where *Vicia americana* currently or recently grew (Gucker and Shaw 2022), suggesting that typical dispersal distances are short. Seeds or rhizome pieces can colonize open sites (Gucker and Shaw 2022).
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Vicia americana* is known from two occurrences on the Tongass NF with no estimated population size given for either occurrence (Appendix 1; ANHP ACCS 2025, Arctos 2025, CPNWH 2025, iNaturalist 2025, SEINet 2025). Based on the number of occurrences, this species is rare on the Forest.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow up surveys, the population trends for the occurrences of *Vicia americana* on the Tongass NF are unknown (Arctos 2025, CPNWH 2025, USFS 2025a).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion* The locations of the Tongass NF occurrences are not known with certainty, and very little is known about the habitats where this species has been found in southeast Alaska (Appendix 1). Possible habitats for this species could be classified in Turner and Mallott (2025) as meadow (beach meadow and mesic meadow), unharvested well-drained forest, poorly-drained forest, or forested (palustrine) wetland. All of these habitats are currently considered to have high ecosystem

Criteria	*Rank*	*Rationale*
		integrity on the Tongass NF, but there is uncertainty regarding the effects of climate change on beach meadows (Turner and Mallott 2025). The coordinates of the Coronation Island occurrence are approximately one mile from a mapped infestation of orchard grass (*Dactylus glomerata*) (USFS 2025b). Given that the coordinates of the occurrence have a 2000 m error, the proximity of this weed, or any other mapped weed, to the Coronation Island occurrence is uncertain. There are no mapped timber projects in the vicinity of either Tongass NF occurrence (USFS 2025d).
7 Habitat vulnerability or modification; other threats	D	*D = Insufficient information to draw inferences about criterion* The locations of the Tongass NF occurrences are not known with certainty, and very little is known about the habitats where this species has been found in southeast Alaska (Appendix 1). Therefore, it is difficult to evaluate the habitat vulnerability and other threats for this species. However, given the presence of *Elymus arenarius* at the location of the Eagle Beach occurrence, it is likely the habitat was a beach meadow. Beach meadow and immediate coast habitats are predicted to be impacted by climate change which will likely increase ocean temperatures, increase or intensify storm frequency, and cause sea level changes (Turner and Mallot 2025). This will likely alter current beach meadow habitat. The degree to which these changes will affect habitat suitability for *Vicia americana* is unknown.
8 Life history and demographics	D	**D = Insufficient information to draw inferences about the criterion** No published information on the reproductive success or demography from inside or outside the planning unit was found. *Vicia americana* is a perennial climbing or trailing herb in the pea family (Fabaceae) (Broich 2023). It grows from a branched taproot that has rhizomes and fibrous roots (Gucker and Shaw 2022). Inflorescences of 2 to 10 rose to purple (aging to blue) flowers are produced from May to August (Gucker and Shaw 2022, Broich 2023). Insect pollination is required for seed production (Gucker and Shaw 2022). Insects observed visiting *V. americana* flowers include bees (Apidae, Halictidae, and Megachilidae) and flies (Bombyliidae and Syrphidae) (Gucker and Shaw 2022, CPC 2025). Large bees (e.g., *Bombus* spp. and large leafcutter bees) are confirmed pollinators of *V. americana* and other *Vicia* species (Gucker and Shaw 2022, CPC 2025). *Vicia americana* produces pods (legumes) that contain two to five brownish seeds that are 3–4 mm long (Gucker and Shaw 2022, Broich 2023). *Vicia americana* reproduces by seed and clonally by rhizomes (Gucker and Shaw 2022). Seedling growth and establishment can occur quickly in areas where competition is

Criteria	*Rank*	*Rationale*
		low (e.g., open recently disturbed floodplains) (Gucker and Shaw 2022). Plants can survive some top kill disturbances and grow back from surviving roots (Gucker and Shaw 2022).

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Vicia americana is not recommended as a Species of Conservation Concern for the following reasons:

The two records for this species on Tongass NF are older than 40 years and have imprecise location information, so habitat preference and therefore habitat trends and significant threats for this species on the Tongass NF are not clear. The Tongass NF occurrences are separated by approximately 200 miles from the next nearest records, but the species is not a narrow endemic nor at the edge of its range. In other parts of its range, the species does not have restricted ecological conditions and does show some tolerance of disturbance.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Personal Communications

Fulkerson, Justin. 2025. Lead Botanist and Collections Manager, Alaska Center for Conservation Science. Email correspondence about location of *Vicia americana* at Eagle Beach. Personal Communication (including specimen image) 24 November 2025.

Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**Fulkerson2025Pers.Comm., ANHP ACCS_Mar25 (EO1)[7/7/1981]**	**Eagle Beach, Tongass National Forest. T38S, R64E, Sec. 34 [Coordinates maps N of Eagle Beach in extremely steep forested drainage]**	**Sandy soils, with Elymus arenarius, Cerastium sp. [no other collections from this date online]**	**Flowers purple.**	
2	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:42018)[7/29/1960]**	**[Coronation Island Wilderness] Coronation Island. [Most of Neiland's collections from this day were from Egg Harbor]**	**Opening of forest edge with grass, etc.**		
2	ANHP ACCS_Mar25 (EO7)[7/29/1960]	Alexander Archipelago, Coronation Island	opening of forest edge with grass, etc.		
		Not on Tongass NF			
3	**ANHP ACCS_Mar25 (EO4)[6/28/1939]**	**Hyder**			
3	Arctos 2025, (ALA-UAM:Herb:202403) [6/28/1939]	Hyder	[No habitat data provided on label or on labels of other collections made by Anderson at Hyder on this date].		
4	**ANHP ACCS_Mar25 (EO6)[6/03/1946]**	**Taku cannery**	**[No other collections from this date online]**		
4	Arctos 2025 (ALA-UAM:Herb:202404)[6/3/1946]	Taku cannery			
5	**Klinkeberg 2020, NYBG 2025 (NY2531436) [7/4/1921]**	**Juneau [Juneau is not on the Forest. Uncertain where collection made]**			

Viola sempervirens

photo: Neal Cramer, Jepson eFlora



Viola sempervirens Greene

Redwood violet

Global Rank: **G5**
Alaska State Rank: **S1**

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	A = Scarce or isolated. *Viola sempervirens* is known from one estimated occurrence on the Tongass NF (Appendix 1). The one occurrence is on Gravina Island in forested habitat at around 650 ft (200 m) elevation. The record is from 1999 though, so there is some uncertainty regarding the specific location. There is an additional occurrence in Silver Bow Basin near Juneau in forested habit on non-NFS lands from 1946. There may be an herbarium record associated with the one occurrence on the Tongass NF (Dillman pers comm), but it has not been located. When not flowering species of *Viola* can be difficult to identify.
2 Distribution in surrounding geographic	B	B = Widely disjunct taxa for which the main distribution is a significant distance from the Tongass National Forest Global Rank G5, Alaska State Rank S1 British Columbia: S5 California: SNR, Idaho: S3, Oregon: SNR, Washington: SNR

Criteria	*Rank*	*Rationale*
area		This species is only known from northwest North America. It is widespread and common in appropriate habitat in northwestern North America outside of the Tongass NF, with thousands of occurrences (NatureServe 2024). There is one occurrence on the Chugach NF on Montague Island north of Hanning Bay, found in an alpine meadow stream margin (Duffy 1993, CPNWH 2024). The nearest CPNWH records to Tongass NF are in British Columbia near Vancouver Island, around 400 miles to the south. In British Columbia it is found on submontane to montane sites on moderately dry to fresh, nitrogen medium soils, becoming rarer with increasing latitude and continentality. It is common in mossy understories on water-shedding sites and occasionally persists on cutover areas (Ceska & Scagel 2011).
3 Dispersal capability	B	B = Disperses only through suitable habitat. *Viola sempervirens* grows vegetatively via rhizomes and stolons but has limited lateral spread (Ingersoll & Wilson 1989, Lezberg et al. 1999). The majority of *Viola* species have two methods of seed dispersal: partial myrmecochory (ant dispersal) and ballistic dispersal via explosive capsule dehiscence. Capsule dehiscence can propel seeds up to 3-5 m away from the seed source, which may then be carried further distances by ants (Bülow-Olsen 1984, Beattie & Lyons 1975). However, myrmecochory is not an effective method of long-distance dispersal (Takahashi & Kamitani 2004). Dispersal distances of *Viola* seeds likely rarely exceed 6 m (Westoby & Rice 1981, Bülow-Olsen 1984). Woodland herbs in general disperse extremely slowly and likely have relied on occasional long-distance dispersal events to expand their ranges (Cain et al. 1998).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The one occurrence was recorded as over 100 plants.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion Population trends are unknown.

Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Occurrence data does not note what habitat the *Viola sempervirens* population occupies on Gravina Island. Much of the island is covered by hemlock and spruce-hemlock forest with significant red and yellow cedar components accompanied by mixed conifer muskeg, all of which are common habitat types throughout the Tongass NF. Old growth forest has high ecological integrity and is relatively resilient to climate change. Forest stands may be susceptible to increased insect and disease outbreaks, which could alter habitat. Additionally, environmental changes could affect seed germination and establishment (Turner and Mallott 2025) Logging operations occur on Gravina Island, though not currently in close proximity to the single known occurrence. However, if there are undiscovered populations on the island logging could be a threat. Much of the island is productive old-growth forest, with some patches of large tree productive old-growth (Smith 2016).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. In 2016-2018 an 8.5-mile one lane road was built on the north end of Gravina Island to facilitate a timber sale that occurred in February 2019 (Associated Press 2016, 2019; Schoenfield 2016). Little logging had occurred on Gravina Island before this project, except on the southwestern portion of the island roughly 2.5 miles from the known population (Smith 2016). Logging generally reduces populations of rare understory herbaceous plants, by direct mortality or during successional stages after logging from changed microclimates and/or increased competition. Because forest-floor herbs disperse and grow slowly they are less likely to reoccupy sites once extirpated or will be present in greatly reduced numbers (Halpern 1989, Meier et al. 1995). *Viola sempervirens* often shows strong associations with older forests (Russell & Michels 2011, Russell 2020) and generally exhibits reductions in regeneration or expansion on disturbed or managed sites (Halpern 1989, Ingersoll & Wilson 1989, Hanover & Russell 2018). However, in coastal British Columbia a logging regeneration survey found *V. sempervirens* to be a frequent understory component (Houseknect 1972) and other post-disturbance studies have found that they can produce a significant number of seedlings (Zobel & Antos 2007, Lindt 2010). Future timber sales could affect habitat for this species but there is a large amount of old growth forest remaining on the Tongass NF.

Criteria	*Rank*	*Rationale*
8 Life history and demographics	B	*B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known.* *Viola sempervirens* is a perennial, evergreen herb with prostrate, stolon-like stems and rhizomatous roots. Flowers are bright yellow with purple streaks or spots (Little 2012). Generally, *Viola* species are pollinated by a variety of bees and flies (Beattie 1971). *V. sempervirens* is associated with older forests and may be sensitive to disturbance, although studies in BC have shown they can recover post logging.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☒	☐	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☒	☐

Conclusion Rationale

Viola sempervirens is not recommended as a Species of Conservation Concern for the following reasons:

- **Significant threats**: Logging, increased insect and disease outbreaks, and more extreme weather events are potential threats, but it is unknown how significant these threats may be to the persistence of this species on the Tongass NF.
- **Declining trends**: Population trends are unknown. Historically, timber harvest has targeted habitat for this species. Old growth habitat is expected to persist in the planning area, but timber harvest is an ongoing threat to habitat.
- **Restricted ranges**: The documented occurrence is approximately 400 hundred miles north from other known populations. There are two single records of this species north of the Tongass NF occurrence, but the majority of the species distribution is to the south.
- **Low population numbers or restricted ecological conditions**: There is a single documented occurrence on the forest. Old growth forested habitat is relatively abundant, so it is unclear why the species is not more widespread on the Forest. It is possible there are specific microhabitat requirements or other factors (e.g. dispersal limitation, competitive exclusion) that contribute to the rarity of this species.
- **Other factors**: The one occurrence may have an herbarium specimen associated with it, but that specimen has not been located. No photos are associated with the record. The record states that the population was not flowering, and species of *Viola* can be difficult to identify without flowers. These things, combined with the only other record in southeast Alaska being historic (1946) and the next nearest records being approximately 400 miles away, mean that the occurrence should be a priority for revisit and identity confirmation.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**ACCS_Mar25 (EO2)[7/13/1999]**		**Vegetation= ; Slope = ; Aspect= ; Substrate= ; Parent Material= ; Soil Moisture= ; Soil Texture= ; Light Exposure= ; Comments= Gravi Is.over 100 plants no flowers**		
1	TESP_Mar25 (100552P000130)[7/13/1999]				
	Occurrences in SE but not on TNF				
2	ACCS_Mar25 (EO4)[5/10/1946]	Silver Bow Basin. Juneau			

Woodsia alpina

Woodsia alpina [(Bolton) Gray]

Northern woodsia

Global Rank: **G4G5**
Alaska State Rank: **S4**

Species Assessment

Criteria	*Rank*	*Rationale*
1-8	NA	*NA = No confirmed location on the Tongass NF* CNPS was tasked with evaluating the species *Woodsia alpina*, and a location spreadsheet was prepared. No records for this species were included in the project location database, and so locations were researched in the Electronic Flora of British Columbia (Klinkenberg 2020) and the Arctos Database (2025). The main documented location is on "Chichagof Island, north part, at Hoonah." This location in the vicinity of Hoonah is not on the Tongass NF. The Deliberative Record indicates the following: "one MS collection from Hoonah, MS believes to be incorrectly IDed, need verification. 11/23; location for MS (Mary Clay Muller)'s 1982 specimen is ambiguous "at Hoonah... Open area near a road". cannot be confirmed as TNF LH 10/24" Therefore, this species cannot be confirmed as being on the Tongass NF and cannot be considered as a Species of Conservation Concern. In addition, on the specimen there are two question marks after name on label. This may have to do with the ID being questionable or with author error (S.F. Gray rather than A.Gray or Gray). In Arctos it says the ID of specimen just taken from herbarium folder - has not been rechecked since original label made. This agrees with Mary Stensvold's statement in the Deliberative Record that the specimen may not be *Woodsia alpina*.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Woodsia alpina is not recommended as an SCC as it is not known to occur within the planning area.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Woodsia ilvensis

Photo: Bruce Cook (CC0: iNaturalist 2025)



Woodsia ilvensis [(L.) R. Br.]

Rusty woodsia

Global Rank: **G5**
Alaska State Rank: **S3**

DRAFT

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce or isolated* *Woodsia ilvensis* is known from four estimated occurrences on the Tongass National Forest (Tongass NF) (Appendix 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Occurrence 1 is located on Chichagof Island above Phonograph Creek, and occurrences 2, 3, and 4 are on the mainland, with two near Mendenhall Glacier and one near Eagle Glacier (Arctos 2025, CPNWH 2025). None of the occurrences are within Wilderness Area. There is just one other occurrence of *Woodsia ilvensis* in southeast Alaska located on Willoughby Island in Glacier Bay National Park (Appendix 1). On the Tongass NF, *Woodsia ilvensis* is found on open rock outcrops, cliffs, and rocky ridges from 200 to 2300 ft (60 to 710 m) (Appendix 1; Arctos 2025, CPNWH 2025). Throughout its distribution this species is found on a wide variety of substrates. The substrate at occurrence 1 on Chichagof Island is granodiorite, the substrate at occurrence 4 near Eagle Glacier might be volcanics, and the other two near Mendenhall Glacier map to unconsolidated surficial deposits left from glacial retreat, but the actual outcrops where the plants are found could be different (USGS 2025). Occurrences 2, 3, and 4 are near glaciers, with occurrences 2 and 3 located between 200 to 2000 ft from the southern point of Mendenhall Glacier at the date of collection in 1993; occurrence 4 is an unknown distance from Eagle Glacier, but likely ca. 2 miles (Appendix 1). Occurrence 2 near Mendenhall Glacier is based on three collections (subpopulations)

Criteria	*Rank*	*Rationale*
		that are within 1 km of one another: one is from 1939 ("near Mendenhall Glacier"), one is from 1967 (by the old powerhouse south of the Glacier), and one is from 1993 (at the current Visitor Center) (Arctos 2025, CPNWH 2025). The habitats surrounding the rock outcrops where *Woodsia ilvensis* grows on the Tongass NF are not well documented (Appendix 1). However, the elevation of occurrence 1 on Chichagof Island (2300 ft) is in the alpine zone on the Tongass NF (Turner and Mallott 2024, Arctos 2025). The habitat at the Visitor Center in 1993 (occurrence 2) is on glacially scoured rock (ACCS 2025, Arctos 2025). The habitat near the old powerhouse in 1967 (also occurrence 2) is a rocky outcropping in a stage of early succession with *Arabis kamchatica*, *Saxifraga* (species and current genus uncertain [Ickert-Bond et al. 2019]), *Lycopodium*, and mosses, but plants collected nearby included *Polystichum braunii*, *Polystichum lonchitis*, *Salix*, *Athyrium*, *Alnus*, *Picea*, and mosses (Arctos 2025). At occurrence 3 near Mendenhall Glacier, the only other collection made with *Woodsia ilvensis* was the lichen *Cladonia mitis* (Arctos 2025). Outside of the Tongass NF in Glacier Bay National Park, the habitat of *Woodsia ilvensis* is described as NW-facing limestone cliffs, associated with *Salix sitchensis*, *Salix barclayi*, and *Adiantum pedatum* (Arctos 2025). Therefore, it is likely that on the Tongass NF *Woodsia ilvensis* is found on nearly bare rock outcrops with low soil deposition and low competition. This is similar to the rock outcrop habitat that this species inhabits elsewhere (MDNR 2025).
2 Distribution in surrounding geographic area	C	*C = Widely distributed outside of the TNF* Global Rank: G5 (Secure), Alaska State Rank: S3 (Vulnerable) (NatureServe 2025) State Ranks: Canadian provinces and territories: S3 (Vulnerable): Alberta, Labrador, Newfoundland, Yukon; all others are S4 (Apparently Secure) or S5 (Secure). United States: SX (Presumed Extirpated): Ohio; SH (Possibly Extirpated): Rhode Island; S1 (Critically Imperiled): Illinois, Iowa, North Carolina; S2 (Imperiled): Maryland, West Virginia; S3 (Vulnerable): Alaska, New Jersey; all others are S4 (Apparently Secure), S5 (Secure), SNR (Not Ranked), or does not occur (NatureServe 2025). *Woodsia ilvensis* is a perennial herb in the Dryopteridaceae with a broad distribution in northern North America and Eurasia (Windham 1993, POWO 2025). It has been reported from all the provinces and territories of Canada (Windham

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Criteria	*Rank*	*Rationale*
		1993, NatureServe 2025, NRCS 2025). In the United States it is known from Alaska, and from the northeastern quadrant of the country from Minnesota, Iowa, and Illinois northeast to Maine and south to North Carolina (Windham 1993, NatureServe 2025, NRCS 2025). The closest known occurrence outside of Southeast Alaska is in British Columbia approximately 180 miles (290 km) away. The Tongass NF occurrences are separated from the British Columbia occurrences by the Coast Mountains, but survey effort is likely low in the rugged mountain range and known populations as well as rock outcrop habitat is scattered, so it is difficult to assess whether the Tongass NF occurrences are disjunct. There are widely scattered records throughout much of the southern and central Alaskan mainland and British Columbia (Arctos 2025, CPNWH 2025). *Woodsia ilvensis* occurs on dry cliffs, rocky slopes, and scree on a variety of substrates including serpentine and acidic rocks (Porsild and Cody 1980, Windham 1993, Klinkenberg 2020). It occurs from montane to alpine zones at elevations ranging from near sea level to approximately 4925 feet (1500 m) (Porsild and Cody 1980, Windham 1993, Klinkenberg 2020). Research in Europe indicates this fern requires a cool continental climate and regenerating populations occur inland and at higher elevation (Dyer et al. 2001).
3 Dispersal capability	B	*B = Disperses only through suitable habitat* *Woodsia ilvensis* occurs on dry cliffs, rocky slopes, and scree on a variety of substrates from montane to alpine zones (Porsild and Cody 1980, Windham 1993, Klinkenberg 2020; Appendix 1). *Woodsia ilvensis* has a typical fern life-cycle with a conspicuous sporophyte (spore-bearing) generation alternating with a free-living but tiny gametophyte (sexual) generation (USFS 2010). Spores, rather than seeds, are the dispersal unit of ferns (USFS 2010). Spores are thought to mainly be dispersed via wind and animals (Brock 2025), although they might also be dispersed via water movement. Under the right conditions, a spore produces a gametophyte which produces sperm and eggs, and a moist environment with a film of water is required for the sperm cell to travel to the egg cell (USFS 2010). If there is an extended period of summer drought, the spores abort, meaning they are not viable (Dyer et al. 2001, McHaffie 2006). If the gametophyte does survive and reproduce, some *Woodsia* species have been found to be bisexual and thus have a high likelihood of self-fertilization; this increases the potential for new populations to become established through long-distance spore dispersal (Peck et al. 1990); we do not know if this is true for *Woodsia ilvensis*.

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Criteria	*Rank*	*Rationale*
4 Abundance on Tongass NF	A	*A = Rare – current abundance is low enough that stochastic and other factors could lead to potential imperilment. Woodsia ilvensis* has four occurrences on the Tongass NF (Appendix 1). Occurrence 1 is on Chichagof and the other three are on the mainland on the eastern side of the Forest (Appendix 1). Occurrences 2 and 3 near Mendenhall Glacier have population estimates of 5–10 plants each (Stensvold 2025 pers. comm.), and occurrence 4 near Eagle Glacier has a population estimate of three plants (Arctos 2025). Based on the number of Tongass NF occurrences (4) and the small number of plants at occurrences 2, 3, and 4, *Woodsia ilvensis* is rare within the Tongass NF boundary.
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Population trends for known occurrences of *Woodsia ilvensis* on the Tongass NF are unknown due to lack of repeat visits and population counts of the occurrences (Arctos 2025, CPNWH 2025). However, according to Stensvold, the plants at the Visitor Center subpopulation of occurrence 2 are extant and were not disturbed by the building's remodel in 1997 (Stensvold 2025 pers. comm.).
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion* On the Tongass NF *Woodsia ilvensis* is found on nearly bare rock outcrops with low soil deposition and low competition, and the surrounding habitat ranges from alpine to riparian to wet conifer forest (ACCS 2025, Arctos 2025). Some of these habitats may be invaded by other plant species as succession occurs in deglaciated habitat or as warmer temperatures and loss of snowpack allow woody plants to expand into the alpine. Additional habitat may also be exposed as glaciers continue to melt. The habitat as described is broad and difficult to characterize at the landscape scale, so it is difficult to assess habitat trends.
7 Habitat vulnerability or modification; other	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors.* Recreation activities could impact the occurrences along the Eagle Glacier trail and near the Mendenhall Glacier. Additionally, climate change may impact this species because it requires moisture to complete sexual reproduction, and an extended period of summer drought causes the spores to abort, meaning they are not viable (Dyer et al. 2001, McHaffie 2006). Climate change is predicted to lead to increased air temperature and growing season water deficit

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Criteria	*Rank*	*Rationale*
threats		which may lead to drought stress and perhaps sexual reproductive failure for species with moisture requirements such as *Woodsia ilvensis* (Turner and Mallott 2025, Wiles and Warren 2025).
8 Life history and demographics	B	*B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known.* The fern *Woodsia ilvensis* is a perennial herb that grows from 4.5–25 cm high (Windham 1993). It has a typical fern life-cycle with a conspicuous, leafy sporophyte (spore-bearing generation) alternating with a free-living but tiny gametophyte (sexual generation) (USFS 2010). The sporophytes are summer-green (Sato 1982) and well-adapted to surviving drought periods through the "resurrection fern" strategy, i.e., the leaves become dry and shriveled only to turn green again when rains return (Dyer et al. 2001, McHaffie 2006, Aguraiuja 2010). However, an extended period of summer drought causes the spores to abort, meaning they are not viable (Dyer et al. 2001, McHaffie 2006). In late summer to early fall, the leaves die back and the spores are released (Sato 1982, Windham 1993). In the laboratory, viable spores germinated after about six weeks at 10°C (50°F) and within two weeks at 20°C (68°F) (Dyer et al. 2001). In *Woodsia obtusa*, 80% of gametophytes are bisexual and have a high potential for self-fertilization; this in turn increases the potential for new populations to become established through long-distance spore dispersal (Peck et al. 1990). In *Woodsia scopulina*, the sporophyte and gametophyte generations were found to have different microhabitat preferences; the gametophytes were only observed in sheltered places (i.e., talus hollows and rock crevices) without direct sunlight, and they only grew on patches of fresh, bare soil (Watson and Vazquez 1981). Survivorship of individual gametophytes and juvenile sporophytes was estimated to be very low (Watson and Vazquez 1981). Microhabitat differences between sporophyte and gametophyte have also been observed in *Woodsia obtusa*; the rarity of this fern species in Canada was explained by a low likelihood of any given site meeting the habitat requirements of both generations (Wild 2010). However, we lack information on the longevity of *Woodsia ilvensis* sporophytes.

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☒	☐	☐
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☒	☐
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Woodsia ilvensis is not recommended as a Species of Conservation Concern for the following reasons

- **Significant threats**: There is recreational infrastructure and trails near three of four known occurrences (Mendenhall Glacier and Eagle Glacier). Climate change may lead to drought stress that would negatively impact reproduction.
- **Declining trends**: Population trends are not known. Habitat trends are difficult to assess because habitat is rock outcrops in a wide variety of habitat types, including alpine, riparian, and wet conifer forest, so habitat is difficult to characterize on the landscape. Succession and woody encroachment may degrade habitat in some areas, while glacial melt may expose new habitat
- **Restricted ranges**: Woodsia ilvensis is not a narrow endemic or at the range edge on the Tongass NF. Tongass NF occurrences may be disjunct due to the rugged mountains that separate them from occurrences in British Columbia, but it is difficult to say with certainty.
- **Low population numbers**: There are four known occurrences on the Tongass NF. Woodsia ferns have complex reproductive processes that may be disrupted by changes in temperature and moisture availability.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1	**Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:240502)[8/21/2009]**	**Phonograph Creek headwaters, Sitka Quad, Alexander Archipelago, Chichagof Island.**	**Rock outcrop, 40 degree slope, E aspect. [no other plants recorded on this date in this habitat at this location]**		
2	**Stensvold 2025 pers. comm.; Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:9493)[7/07/1993]**	**Mendenhall Glacier Recreation Area, 50 ft behind Visitor's Center, Juneau Quad, Tongass National Forest, Alexander Archipelago.**	**Glacially scoured rock, in crack. [no other species observed or collected in this spot on this date]**	**5 to 10 plants [According to Stensvold, this location is extant]**	
2	CPNWH_Mar25 (UAAH9993)[7/07/1993]	JUNEAU QUAD.: Mendenhall Glacier Recreation Area, Visitor's Center	in crack of glacially scoured rock		
2	CPNWH_Mar25 (WTU408364)[7/07/1993]	Juneau Quad.: Mendenhall Glacier Recreation Area, 50 feet behind Visitor's Center.	Glacially scoured rock, in crack.		
2	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:44594)[7/24/1967]	Coast Mts., rocky outcropping east of powerhouse, near the Mendenhall Glacier, Juneau Quad, Tongass National Forest, Alexander Archipelago.	Rocky outcropping, early succession, with mosses, Lycopodium, Saxifraga, Arabis. [Collected in same location and habitat on same date: Arabis kamchatica] [Collected or observed nearby on or by other rock outcroppings in same location on same date: Polystichum braunii, Polystichum lonchitis, Salix, Athyrium, Alnus, Picea, mosses]	Common	
2	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:44593)[9/11/1939]	Coast Mts., rocky hillside near Mendenhall Glacier, Juneau Quad, Alexander Archipelago.	Rocky hillside near glacier.		
3	**Stensvold 2025 pers. comm.;**	**Mendenhall Glacier Recreation Area, 9 miles NW of Juneau,**	**Open rock outcrops, with moss in cracks. [According to Stensvold, the glacier was very**	**5 to 10 plants**	

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	Arctos 2025, CPNWH_April2025(ALA-UAM:Herb:256634)[7/26/1993]	**Nugget Creek Falls, ca. 5/8 miles NE of Visitor's Center.**	**close to this location in 1993. Collected at same location on same date: the lichen Cladonia mitis].**		
4	**Arctos 2025 (UAM:Herb:44592) [8/21/1980]**	**United States, Alaska, Coast Mts., Eagle R., about 28 miles N of Juneau, on trail to Eagle Glacier.**	**rock cliff along n side of trail, ca. 3 [plants].**	**About 3 plants**	
5	**Arctos 2025 (UAM:Herb 2007.004.Herb) [8/11/2001]**	**United States, Alaska, Glacier Bay NP, Glacier Bay, W side of Willoughby Island, E of VABM Else , UTM 433409.38N, 6495224W, T 38 S, R 56 E, S 10**	**NW-facing limestone cliffs, associated with Salix sitchensis, S. barclayi, and Adiantum pedatum.**	**Not on Tongass**	

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Xanthoria alaskana

Xanthoria alaskana [J.W. Thomson, 1992]

A lichen

Global Rank: **G5**

Alaska State Rank: **SNR**



photo: (CC0) Stephen Sharnoff

Species Assessment

Criteria	*Rank*	*Rationale*
1-8	D	*D = Insufficient information to draw inferences about criteria.* It is unclear if this species is synonymous with *Xanthoria polycarpa* and *Polycauliona polycarpa*. Esslinger 2018 expanded *Xanthoria polycarpa* to include *Xanthoria alaskana*. However, in the Compendium of the Lichens and Associated Fungi of Alaska, Spribille et al. (2023) say, "Lindblom (1997) considered this a pigment-deficient form of *Xanthoria (Polycauliona) polycarpa* but has since suggested it may be worthy of recognition (L. Lindblom, pers. comm. 2012)." If *Xanthoria alaskana* is a distinct species, there is one occurrence on the Tongass National Forest (Tongass NF) on Mitkof Island. The record indicates Xanthoria polycarpa but the notes say it is a pale form. The closest occurrences outside the Tongass NF are on Afognak Island and the Kenai Peninsula (Spribille et al. 2023). If *Xanthoria alaskana* is part of *Xanthoria (=Polycauliona) polycarpa*, there are more than 10 occurrences on the Tongass NF and Macrolichens of the Pacific Northwest describes it as common in coastal states (McCune and Geiser 2023).

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Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☐	☐	☒
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

Xanthoria alaskana is not reccommended as a Species of Conservation Concern because there is some uncertainty as to its taxonomic identity. Currently, *Xanthoria alaskana* is part of *Polycauliona polycarpa*, which is a more common lichen species in southeast Alaska. However, some have suggested that the pale form should be recognized as *Xanthoria alaskana*, a distinct species. This species has not yet been published so it is not considered.

Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CLH 2025 (BG) [08/18/2003]**	**Mitkof Island, the E side, NE of Hill Lake, small point**	**Corticolous on twig(s) of *Picea sitchensis* at upper edge of beach and on tip of point.**	Recorded as X. polycarpa but notes say, "Specimen is a pale form", indicating if Xanthoria alaskana is confirmed as a distinct species, there is one occurrence on the Tongass NF	

1	CLH 2025 (BG) [08/18/2003]	Mitkof Island, the E side, NE of Hill Lake, small point	Corticolous on dry twigs of *Picea sitchensis* at upper edge of beach and on tip of point.		

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Zigadenus elegans

Zigadenus elegans [Pursh, 1814]

Mountain death camas

Global Rank: **G5**

Alaska State Rank: **SNR**



photo: (CC0) Kallum McDonald

Species Assessment

Criteria	*Rank*	*Rationale*
1 Distribution on Tongass NF	A	*A = Scarce OR isolated.* *Zigadenus elegans* is known from two estimated occurrences on the Tongass National Forest (Tongass NF) (Fig. 1). We define an estimated occurrence as a grouping of individuals that are separated by less than 1 km (0.62 mile). Occurrence 1 is located in the northern portion of the Tongass NF and on the east side of the Chilkat Peninsula; Occurrence 2 is located on the mainland about 17 km (10.5 mi) east of Juneau in Taku Inlet (Appendix 1; CPNWH 2025, USFS 2025a). Within the Tongass NF boundary, this species is only documented to occur in upper beach meadows at Occurrence 1 (USFS 2025a). This habitat is typical for this species. Occurrence 2 notes the plant is present in a "hydro powerline" area (USFS 2025a). There is one occurrence of this species in southeastern Alaska outside of the Tongass NF along the Lower Alsek River in Glacier National Park (CPNWH 2025). Across its range, *Zigadenus elegans* is typically found in mesic grasslands, shorelines near bodies of water, alpine slopes, and coniferous forest bogs (FNA 2025).

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Criteria	*Rank*	*Rationale*
2 Distribution in surrounding geographic area	C	*C = Wide distribution outside the Tongass National Forest.* Global Rank G5, Alaska State Rank SNR *Zigadenus elegans* is broadly distributed throughout North America (NatureServe 2025), ranging from Arizona to disjunct populations in southern Appalachia, to Alaska, Québec, and the Northwest Territories (NatureServe 2025). It occurs in mesic grasslands, shorelines near bodies of water, alpine slopes, and coniferous forest bogs at elevations of 0 ft to 11,811 ft (0 m to 3,600 m) (BCCDC 2023, FNA 2025, NatureServe 2025). It occurs in moist to xeric environments with full light exposure in cooler temperatures typical of higher altitudes and commonly in calcareous soils (NatureServe 2025). In southeastern Alaska this species is known from the Tongass NF; its range continues throughout much of Alaska including the nearest occurrence about 40 miles (65 km) to the north in the St. Elias Mts (Klinkenberg 2020).
3 Dispersal capability	B	*B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).* *Zigadenus elegans* is a perennial herb with a cespitose growth habit (FNA 2025). Its main dispersal mechanism is by seeds (FNA 2025). Seeds are dispersed by passive abiotic factors such as wind and gravity (FNA 2025).
4 Abundance on Tongass NF	A	*A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment.* *Zigadenus elegans* is known from two occurrences on the Tongass NF (Appendix 1). One observation from 1999 at Occurrence 1 notes "common in this area only" (Appendix 1; CPNWH 2025, USFS 2025).
5 Population trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Due to lack of follow-up surveys, population trends of known occurrences of *Zigadenus elegans* on the Tongass NF are unknown (USFS 2025a, CPNWH 2025).

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Criteria	*Rank*	*Rationale*
6 Habitat trend on Tongass NF	D	*D = Insufficient information to draw inferences about criterion.* Habitat for Occurrence 1 is an upper beach meadow. This habitat can be grouped under Meadow which is a well-drained system that is a small inclusion at the edges of or within larger forested or wetland ecosystems that is rare on the Tongass NF (Turner and Mallott 2025). Occurrence 2 states the plant was growing in a "hydro powerline", thus in a disturbed habitat (USFS 2025a). Invasive species that can survive in or near upper beach meadows, such as *Taraxacum officinale*, are known to occur within 1 km from Occurrence 1; none are known in the vicinity of occurrence 2 (USFS 2025b). Timber harvest has occurred in the recent past less than 500 m from occurrence 1 (USFS 2025c). This might indicate a negative trend in habitat quality at this site. Without follow-up visits to the upper beach habitat at the two occurrences, there is not enough information to decide if the habitat has declined.
7 Habitat vulnerability or modification; other threats	B	*B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Rank B when no localized threats are documented, but there are general threats and stressors.* Invasive species, timber activities, and climate change may impact the habitat of *Zigadenus elegans*. The habitats most vulnerable to invasion by non-native species on the Tongass NF include meadows (Chestnut and Tucker 2025, Wiles and Warren 2025). Therefore, the habitat of *Zigadenus elegans* may be impacted by invasive species in the future. Recent timber harvest activities have occurred in the vicinity of the upper beach meadows at Occurrence 1 (USFS 2025c), and this activity will likely occur in the future. It is uncertain how shifts in plant and pollinator distributions along elevation gradients and earlier flowering phenology associated with climate change, combined with the narrow range of syrphid pollinators this species relies on, will impact the reproduction of this species in the future (Minachilis et al. 2021, Richman et al. 2020, Terpedino 1981).

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Criteria	*Rank*	*Rationale*
8 Life history and demographics	D	*D = Insufficient information to draw inferences about criterion.* *Zigadenus elegans* is a perennial herb with a cespitose and bulb-forming growth habit (FNA 2025, NatureServe 2025). It produces flowers and capsule fruits with seeds (FNA 2025). It flowers from June to August (FNA 2025). Flowers are pollinated by a narrow range of insects that can tolerate the toxins present in the nectar and pollen, including some syrphid flies (Cane 2024, CPC 2025, Tepedino 1981). Plants within the genus are primarily outcrossers (Terpedino 1981). Mature fruits are produced from June to September (Abata 2010). Seeds are orthodox (SID 2025). Seeds may be physiologically dormant and require a 3-month period of cold stratification (Abata 2010). Seeds of other species within the genus have physiological or morphophysiological dormancy (Baskin and Baskin 2014, Guerrant et al. 1999, Probert et al. 2009). The life span of this or other *Zigadenus* species is not well documented.

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	☐	☐	☒
Declining populations or habitat trends	☐	☐	☒
Restricted range	☐	☐	☒
Low populations or restricted ecological conditions	☒	☐	☐
Other factors (see conclusion rationale)	☐	☐	☒

Conclusion Rationale

There is insufficient information to recommend *Zigadenus elegans* as a Species of Conservation Concern. Climate and habitat change, including invasive species, may impact the species in the future, but one of two occurrences was found in a disturbed habitat (powerline corridor), indicating some resilience to disturbance and change. Range of this species may be continuous to the north.

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Conclusion

☐	The species is secure and its continued long-term persistence in the plan area is not at risk based on knowledge of its abundance, distribution, lack of threats to populations and/or habitats, and stable or increasing habitat and/or population trends. Not recommended as a potential Species of Conservation Concern.
☒	There is a lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Not recommended as a potential Species of Conservation Concern.
☐	The scientific information supports a conclusion that there is substantial concern for long-term persistence of the species in the plan area. Recommended as a potential Species of Conservation Concern.

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Appendix 1. Abbreviated Location Table

Individual occurrences within 1 km are grouped into estimated occurrences, which represent populations separated by more than 1 km. Parent occurrence rows are in bold font with the occurrence number having an asterisk and additional data belonging to that occurrence in regular font below the parent occurrence with the same number. Cited data sources are provided in the Literature Cited section.

Occ. Num.	Data Source [Date]	Locality	Habitat	Population Data	Threats
1*	**CPNWH_April2025 (ALA) [6/30/1999]**	**Mainland, E side of Chilkat Peninsula, ca. 1 km N of the Endicott R. mouth, E of the landing strip, Juneau Quad, Alexander Archipelago.**	**Upper beach meadow, common in this area only.**		
1	TESP_Mar25 (100533P000010) [6/30/1999]	Lynn Canal, Endicott strip area	Upper Beach meadow/ open gravel substrate	Common in this area only.	
1	TESP_Mar25 (100533P000916) [no date]	shore n of Endicott R.	On carbonate rock outcrop above beach	Species found.	
1	TESP_Mar25 (100533P000916) [7/28/2016]	shore n of Endicott R.	On carbonate rock outcrop above beach	Species found.	
2*	**TESP_Mar25 (100533P001006Y13) [7/13/2012]**	**Taku Inlet, AELP hydro powerline**		**Species found.**	

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