



United States Department of Agriculture

Wildlife Species Not Recommended as Species of Conservation Concern Draft Evaluations

Tongass National Forest Plan Revision



Forest
Service

Alaska
Region

Tongass
National Forest

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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 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.

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.

DRAFT

Table of contents

This Table of contents is ordered by taxa group and then the species' scientific names in alphabetical order.

Wildlife Species Draft Evaluations	6
<i>Ambystoma gracile</i>	7
<i>Ambystoma macrodactylum</i>	13
<i>Anaxyrus boreas</i>	21
<i>Aythya collaris</i>	29
<i>Brachyramphus brevirostris</i>	35
<i>Calidris canutus roselaari</i>	44
<i>Calidris virgata</i>	53
<i>Canis lupus ligoni</i>	59
<i>Clethrionomys gapperi soleus</i>	67
<i>Clethrionomys gapperi wrangeli</i>	75
<i>Clethrionomys rutilus glacialis</i>	82
<i>Empidonax flaviventris</i>	89
<i>Eumetopias jubatus</i>	95
<i>Euphagus carolinus</i>	100
<i>Falco peregrinus pealei</i>	108
<i>Fulica americana</i>	113
<i>Gavia adamsii</i>	118
<i>Haematopus bachmani</i>	126
<i>Hydroprogne caspia</i>	132
<i>Lasionycteris noctivagans</i>	137
<i>Lontra canadensis mira</i>	142
<i>Marmota caligata vigilis</i>	148
<i>Megascops kennicottii</i>	153
<i>Microtus longicaudus coronarius</i>	161
<i>Alexandromys oeconomus sitkensis</i>	167
<i>Alexandromys oeconomus yakutatensis</i>	173
<i>Microtus pennsylvanicus admiraltiae</i>	179

<i>Mictomys borealis wrangeli</i>	186
<i>Mustela richardsonii initis</i>	194
<i>Mustela erminea salva</i>	201
<i>Mustela haidarum seclusa</i>	208
<i>Mustela haidarum celenda</i>	216
<i>Myotis evotis</i>	224
<i>Myotis lucifugus</i>	230
<i>Myotis volans</i>	239
<i>Ochotona collaris</i>	246
<i>Urile penicillatus</i>	252
<i>Rana luteiventris</i>	258
<i>Sorex monticolus malitiosus</i>	265
<i>Tamiasciurus hudsonicus picatus</i>	271

Wildlife Species Draft Evaluations

Ambystoma gracile*Ambystoma gracile* [Baird, 1857]

Northwestern salamander

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

photo: S. O. MacDonald (2010)

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	A	A = Scarce OR isolated. The northwestern salamander (<i>Ambystoma gracile</i>) has only been collected in two localities in southeast Alaska: SE of Ketchikan on Mary Island, and on NW Chichagof Island near Pelican (MacDonald and Cook 2007; MacDonald 2010). Two additional unverified records include a globular egg mass found in Figure Eight Lake in the Stikine River in 1991, and an adult observed near Graves Harbor on the outer coast of Glacier Bay National Park in 2000 (MacDonald 2010; MacDonald and Cook 2007). Northwestern salamanders require freshwater associated habitat to complete their life cycle, and eggs are deposited in lakes and ponds (MacDonald 2010). The larvae are aquatic whereas adults live underground or in moist habitats near freshwater (Hoffman et al. 2003; Anderson 2004; MacDonald 2010). Elsewhere, outside the plan area, they occupy different habitats including moist meadows, wetlands, and forests from sea level to >1,900 meters (Snyder 1956; Hoffman et al. 2003). In British Columbia, a study revealed that although forest type (forested vs. clearcut) nor supplemental feeding did not affect the growth of juvenile northwestern salamanders, fewer animals were recaptured in clearcut areas compared to forested ones, indicating that clearcuts may provide unsuitable habitats for western salamanders during the summer in the Pacific Northwest (but not during winter) (Hilton 1998).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S3, IUCN status of least concern, COSEWIC status of not at risk. The northwestern salamander ranges along the Pacific coast of North America, from northern California through western Canada and the US (west of the Cascades), up to southeast Alaska, which is considered the edge of its northern range (Snyder 1963; MacDonald and Cook 2007; MacDonald 2010).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). There is no information on the dispersal capability of northwestern salamanders from the plan area. However, in second-growth forests British Columbia, these animals moved a mean minimum distance of 32 m but limited to upstream or downstream directions and were found more often within 30 m from streams during both fall and winter (Maxcy and Richardson 2000). Given the life history characteristics of aquatic breeding salamander, and extrapolating this information to southeast Alaska, we would expect northwestern salamanders to disperse only through suitable forested riverine habitat.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about this criterion. There is no information on the abundance of northwestern salamanders on the plan area. In a lake surrounded by secondary confiner forest in British Columbia, a study found that the average density northwestern salamanders was 175 individuals/ha and reached densities as high as 1,678 individuals/ha around the edge of the lake (Efford and Mathias 1969). However, given the low number of occurrences recorded for the species on the Tongass National Forest (Tongass NF), and that southeast Alaska is considered the northern edge of their range, densities of northwestern salamanders on the plan area are probably much lower.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about this criterion. There is no information on the population trends of northwestern salamanders in the plan area.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Although we did not find habitat information from the plan area, Northwestern salamanders are tightly associated with freshwater habitats surrounded by forested areas elsewhere (see above). Using this information, we determined the potential terrestrial and aquatic ecosystems that this species may use on the Tongass. Turner and Mallott (2025), and Chestnut and Tucker (2025) assessed the state of terrestrial and aquatic ecosystems on the Tongass, respectively (see assessments for ecosystem descriptions). Unharvested riparian forests, forested wetlands and meadows have a high ecological integrity, but the ecological integrity of riparian forests decreases to moderate or low, depending on the levels of timber harvest they have experienced (Turner and Mallott 2025). From the aquatic ecosystems' perspective, rivers, streams, lakes and ponds have a high ecological integrity (Chestnut and Tucker 2025).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about this criterion. Drivers and stressors for terrestrial ecosystems, comprised by riparian forests, forested wetlands and meadows, include hydrology, soil saturation, flooding, sediment transport, legacy harvest-reduced wood recruitment, development, invasive species and climate change, which adds to hydrologic uncertainty (Turner and Mallott 2025; Halofsky et al. 2025). However, note that these ecosystems are currently recovering where previously harvested, and so the ecosystem integrity is increasing under current management practices (e.g., established riparian buffers and restoration thinning; Turner and Mallott 2025). From the aquatic ecosystems' perspective, drivers and stressors of rivers, streams, lakes and ponds include hydrology, flooding, recruitment of sediment and large wood, landslides, windthrow, water warming and eutrophication (the latter four are increasing in frequency and intensity with climate change), legacy timber harvest of old-growth, and roads and crossings, development, and invasive species (Chestnut and Tucker 2025). As with the terrestrial ecosystems, these aquatic ecosystems are improving where restoration is implemented (Chestnut and Tucker 2025). However, how these factors may affect the persistence of northwestern salamanders remains unknown.
8 Life history	D	D = Insufficient information to draw inferences about this criterion.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
and demographic s		Information on the life history and demographics of northwestern salamanders in the plan area is virtually non-existent (i.e. information on survival or mortality and reproductive success), and we found little applicable information from elsewhere. Therefore, we determined that we cannot draw inferences about this criterion.

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

Occurrence records of the northwestern salamander on the Tongass National Forest are restricted to two confirmed collections and one unconfirmed observation (with an additional unconfirmed observation from the nearby Glacier Bay National Park). Consequently, the status of the northwest salamander population and information on the different criteria remains largely unknown. The following factors were used to determine if there is substantial concern over the long-term persistence of the species on the Tongass:

- **Significant threats:** Although we identified different threats to the ecosystems assumed to be occupied by the northwestern salamander, no evidence of direct threats was found for the species in the plan area. Moreover, and in general, the ecosystem types presumably occupied by the species have either high ecological integrity or are progressing (recovering) towards high integrity.
- **Declining trends:** We found no indication of a declining trend in the habitats presumably occupied by the northwestern salamander. On the other hand, no information on the population trends for the species is available.
- **Restricted ranges:** Although the species has an extensive range across the Pacific Northwest, southeast Alaska is the northern edge of the northwestern salamander's range, and occurrence records of the species in the plan area are very limited.
- **Low population numbers or restricted ecological conditions:** There is no information available about the abundance of northwestern salamanders on the Tongass, and although they seem to be restricted to freshwater ecosystems, these are abundant across the plan area.
- **Other factors:** No other factors were identified as a cause of substantial concern over the long-term persistence of northwestern salamanders in the plan area.

After reviewing the available information, we conclude that 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. Therefore, we are not recommending the northwestern salamander as a potential SCC.

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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Ambystoma macrodactylum

photo: M.O. MacDonald (2010)

Ambystoma macrodactylum [Baird, 1849]

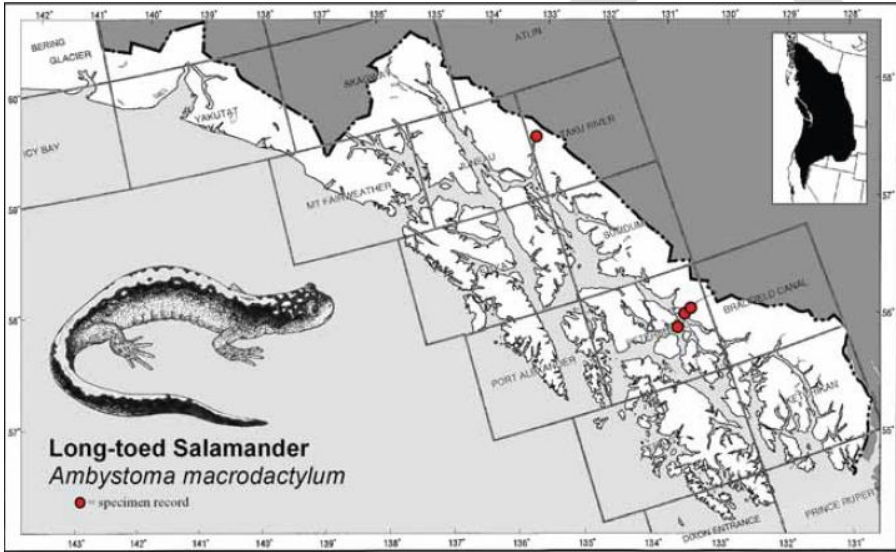
Long-toed salamander

Global Rank: G5

Alaska State Rank: S3

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	A	A = Scarce OR isolated. Long-toed salamanders (<i>Ambystoma macrodactylum</i>) have been found in the Stikine and Taku watersheds in southeast Alaska, where it has been reported near the mouth of the Stikine River at Figure Eight (= Twin) Lake, Mallard Slough, Paradise Slough, Little Dry Island, Cheliped Bay, Andrew Slough, Farm Island, farther out from the river delta on Sokolof Island and on the Coast Range in the Taku River Valley (Hodge 1973; Miller 1976; Norman 1999, 2004; MacDonald and Cook 2007; Ream et al. 2019). More recently, long-toed salamanders have also been recorded at Ward Lake, Revillagigedo Island (Ream et al. 2019). Only four voucher specimens at different geographic areas have been historically collected in southeast Alaska (Fig. 1; MacDonald and Cook 2007). Long-toed salamanders use forested cover adjacent to breeding freshwater ponds and lakes for foraging and overwintering habitat (MacDonald 2010). They are mostly nocturnal and subterranean, adults may be found during the breeding season under rocks, decaying logs, or other debris, usually close to their breeding ponds, which tend to be shallow (<1 m), not necessarily permanent, and fish-free (MacDonald 2010). Adults are terrestrial and only enter the water during the early spring breeding season in southeast Alaska and migration to breeding sites usually occurs on

Criteria	Rank	Rationale
		rainy nights (MacDonald 2010). Up to 14 individuals have been found hibernating together in gravel substrate below the frost line (MacDonald 2010). Outside Alaska, habitat types include moist meadows, riparian shrub thickets, shaded forests, and sparsely vegetated alpine sites from sea level to >2,100 meters (Anderson 1967; Howard and Wallace 1985; Hoffman et al. 2003).  Long-toed Salamander <i>Ambystoma macrodactylum</i> ● specimen record Figure 1: Distribution of long-toed salamander specimens collected in southeast Alaska. Figure from MacDonald and Cook (2007).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. NatureServe Global Rank G5, Alaska State Rank S3, IUCN status of least concern.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Long-toed salamanders have an extensive range along the Pacific Coast of North America, spanning from northern California and Nevada up to southeast Alaska, and eastward including western Alberta, Idaho, and western Montana (see inset in Fig. 1; Ferguson 1961, 1963; MacDonald and Cook 2007).
3 Dispersal capability	D	D = Insufficient information to draw inferences about this criterion. We found no information on the dispersal capabilities of the long-toed salamander in the plan area or elsewhere. However, note that microhabitat conditions affect the dispersal capabilities of long-toed salamanders under laboratory conditions (Lee-Yaw et al. 2015).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about this criterion. Information related to the abundance of long-toed salamanders in the plan area is limited to one source. Fifty-one individuals of long-toed salamanders were recently collected Stikine River area, where they were thought to be extirpated, although the catch per unit effort was low (0.01) (Ream et al. 2019).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about this criterion. We found no information on the population trends of long-toed salamanders in the plan area.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Although we did not find habitat information from the plan area, long-toed salamanders are associated with freshwater habitats surrounded by forested areas elsewhere (see above). Using this information, we determined the potential terrestrial and aquatic ecosystems that this species may use on the Tongass. Turner and Mallott (2025), and Chestnut and Tucker (2025) assessed the state of terrestrial and aquatic ecosystems on the Tongass, respectively (see assessments for ecosystem descriptions).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Unharvested riparian forests, forested wetlands and meadows have a high ecological integrity, but the ecological integrity of riparian forests decreases to moderate or low, depending on the levels of timber harvest they have experienced (Turner and Mallott 2025). From the aquatic ecosystems' perspective, rivers, streams, lakes and ponds have a high ecological integrity (Chestnut and Tucker 2025).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about this criterion. Drivers and stressors for terrestrial ecosystems, comprised by riparian forests, forested wetlands and meadows, include hydrology, soil saturation, flooding, sediment transport, legacy harvest-reduced wood recruitment, development, invasive species and climate change, which adds to hydrologic uncertainty (Turner and Mallott 2025; Halofsky et al. 2025). However, note that these ecosystems are currently recovering where previously harvested, and so the ecosystem integrity is increasing under current management practices (e.g., established riparian buffers and restoration thinning; Turner and Mallott 2025). From the aquatic ecosystems' perspective, drivers and stressors of rivers, streams, lakes and ponds include hydrology, flooding, recruitment of sediment and large wood, landslides, windthrow, water warming and eutrophication (the latter four are increasing in frequency and intensity with climate change), legacy timber harvest of old-growth, and roads and crossings, development, and invasive species (Chestnut and Tucker 2025). As with the terrestrial ecosystems, these aquatic ecosystems are improving where restoration is implemented (Chestnut and Tucker 2025). However, how these factors may affect the persistence of long-toed salamanders remains unknown. Potential threats described for the species, but not confirmed affecting the species in the plan area, include pathogens, climate-related habitat loss (e.g., wetland drying), and introduce species (MacDonald 2010). Note, however, that although not detected in long-toed salamanders, chytridiomycosis (a fungal pathogen infection), which has caused amphibian populations to decline globally (Kilpatrick et al. 2010), has been detected on western toads (<i>Anaxyrus boreas</i>) in southeast Alaska (Hossack et al. 2020).
8 Life history and demographic	D	D = Insufficient information to draw inferences about this criterion. Information on the life history and demographics of long-toed salamanders in the plan area is virtually non-existent (i.e. information on survival or mortality and reproductive success), and we found little applicable information from elsewhere. Therefore, we determined that we cannot draw inferences about this criterion.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
s		However, two aspects that affect life history and demographics of long-toed salamanders should be noted. Firstly, that long-toed salamanders from elsewhere may exhibit metapopulation dynamics, where breeding areas can experience temporal extirpations and re-colonization by the animals, and so habitat connectivity between breeding areas may be an important limiting factor (Funk and Dunlap 1999; Blaney 2022). Secondly, that different trout species (<i>Oncorhynchus</i> spp.) are predators of long-toed salamanders and are known to exclude salamanders from bodies of water where they occur (Funk and Dunlap 1999). However, and tying in with the metapopulation dynamics that these salamanders exhibit elsewhere, they may re-colonize bodies of water after trout extinction (Funk and Dunlap 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 are few occurrence records of the long-toed salamander on the Tongass National Forest, which are restricted to Stikine and Taku watersheds. Consequently, the status of the long-toed salamander population and information on the different criteria remains largely unknown. The following factors were used to determine if there is substantial concern over the long-term persistence of the species on the Tongass:

- **Significant threats:** Although we identified different threats to the ecosystems assumed to be occupied by the long-toed salamander, and potential threats to long-toed salamanders, no evidence of direct threats was found for the species occurring in the plan area. Moreover, and in general, the ecosystem types presumably occupied by the species have either high ecological integrity or are progressing (recovering) towards high integrity.
- **Declining trends:** We found no indication of a declining trend in the habitats presumably occupied by the long-toed salamander. On the other hand, no information on the population trends for the species is available.
- **Restricted ranges:** Although the species has an extensive range across the Pacific Northwest, southeast Alaska is the northern edge of the long-toed salamander's range, and occurrence records of the species in the plan area are very limited.

- **Low population numbers or restricted ecological conditions:** There is limited information available about the abundance of northwestern salamanders on the Tongass, and although they seem to be restricted to freshwater ecosystems, these are abundant across the plan area.
- **Other factors:** No other factors were identified as a cause of substantial concern over the long-term persistence of long-toed salamanders in the plan area.

After reviewing the available information, we conclude that 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. Therefore, we are not recommending the long-toed salamander as an SCC.

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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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DRAFT

*Anaxyrus boreas**Anaxyrus boreas* [Baird and Girard, 1852]

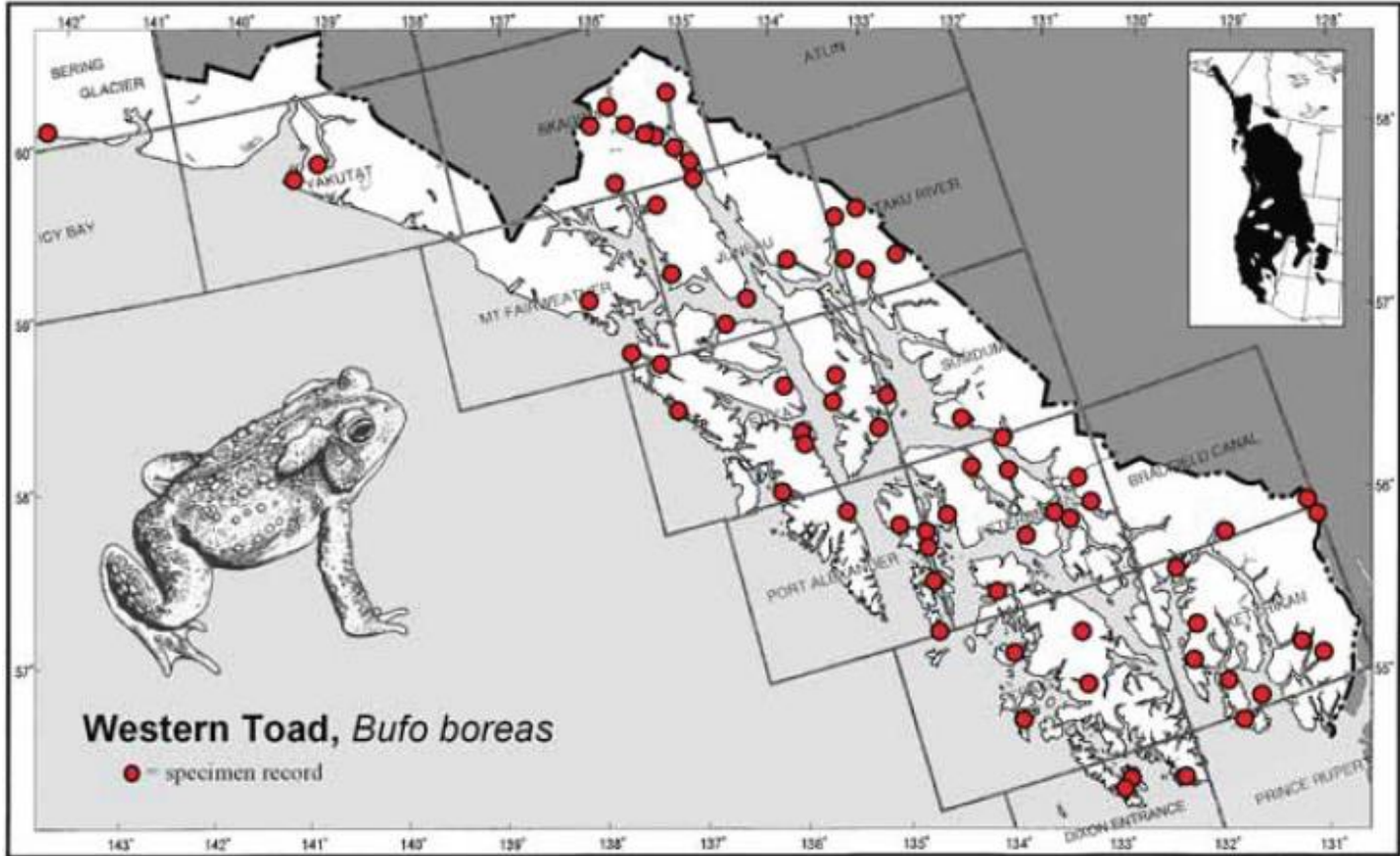
Western toad

Global Rank: **G4**Alaska State Rank: **S3S4**

photo: Chris Brown, USGS

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	B	B = Patchy OR gaps. The Western toad (<i>Anaxyrus boreas</i>) is widespread throughout southeast Alaska and is found in the mainland and all major islands of the Alexander Archipelago (MacDonald and Cook 2007; Fig. 1). Moreover, data from the last 20 years from the Global Biodiversity Information Facility (GBIF; https://www.gbif.org/species/2422924) indicates that the western toad is widespread in southeast Alaska, including occurrences in both major and minor islands of the Alexander Archipelago. Western toads specialize in using disturbed habitats (Pearl and Bowerman 2006), and adults readily colonize recently exposed ponds, even those that are still inundated by the highest tides of the year or that are close to terminus of glaciers (Holmes 2015), which harbor their preferred plant communities (Murphy et al. 2010). Moreover, western toads preferentially select ponds exposed to full sun for breeding (Holmes 2015). In the fjords of northern southeast Alaska (Lynn Canal), close to the northern limit of the western toad, and where glaciers retreated and there is rebounding which continually exposes new breeding habitat, the available terrestrial habitat is covered in dense conifer forest and ideal breeding habitat is patchily distributed across the landscape (Holmes 2015). Elsewhere in their native range, the western toad preferentially disperses through habitat with mid-range canopy cover (Murphy et al. 2010), and the analogous habitat in the fjords of northern southeast Alaska is the willow-alder scrub that dominates between 20 and 50 years after deglaciation or uplift and is restricted to recently uplifted areas near the ocean, river banks, and human disturbed areas (Holmes 2015). Juveniles (yearlings) are highly observable in meadow or marsh environments near or at some distance from standing water (Carstensen et al. 2003).

Criteria	Rank	Rationale
		 Western Toad, <i>Bufo boreas</i> ● = specimen record
		Figure 1: Known distribution of Western toad (<i>Anaxyrus boreas</i>) in southeast Alaska, and its general distribution (inset). From MacDonald and Cook (2007).
2	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4, Alaska State Rank S3S4, the Alaska Department of Fish and Game (ADF&G) considers the western toad a Species of Greatest Conservation Need based on their ranking in the Alaska Species Ranking System.
Distribution in		

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
surrounding geographic area		The western toad is widely distributed along the west coast of North America and ranges from Baja California to the Yukon and east to the Rocky Mountain Divide (Goebel et al. 2009; see inset on the top right of Fig. 1).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). For a pond-breeding amphibian, western toads have a relatively high dispersal ability and adults can move up to 13 km along watercourses and 1.5 km overland in one active season (Barlet et al. 2004; Young and Schmetterling 2009). Moreover, a study in the fjords of northern southeast Alaska (Lynn Canal) found that there is high gene flow both within and between regional pond groups in the area (Holmes 2015). In addition, coniferous forests exclude toads from breeding ponds and make dispersal more difficult (Hossack et al. 2011; Holmes 2015).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Although there are anecdotal reports of declines on western toads in southeast Alaska (Carstensen et al. 2003; Anderson 2004; Pyare et al. 2007; Ream 2016; Surdyk and Waldo 2018; Ream et al. 2019), there is no information available on the abundances in the planning area. However, note that there have been approximately 160 verified reports of western toads in southeast Alaska in the last five years according to records in GBIF (see above).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Although there are anecdotal reports of declines on western toads in southeast Alaska (see above), there is no information available on the population trends in the planning area.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Western toads occupy a variety of habitats and ecosystems, and according to the classification of terrestrial ecosystems in southeast Alaska by Turner and Mallott (2025), western toads can be found in riparian forests, forested and non-forested wetlands, tidal wetlands and meadows. When unharvested (for timber), the ecological integrity of riparian forests, forested and non-forested wetlands and meadows is high, whereas that for tidal wetlands is moderate (Turner and Mallott 2025). Ecosystems with high ecological integrity are expected to continue delivering major functions and

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		services including supporting biodiversity and productivity without human interference if the ecosystem remains on its current trajectory, and drivers, stressors and key ecosystem characteristics exhibit the range of variation that was common in the past (Turner and Mallott 2025). On the other hand, ecosystems with moderate ecological integrity are expected to deliver major functions and services including supporting biodiversity and productivity at a reduced level relative to expectations if the ecosystem remains in its current trajectory; one or more drivers, stressors of key ecosystem characteristics are compromised in a way that disrupt disturbance regimes or characteristics of the system, but key ecosystem characteristics exhibit a range of variation that is well within the range that result in resilience (Turner and Mallott 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, the ecosystems on the Tongass in which the western toad is found, including riparian forests, forested and non-forested wetlands, tidal wetlands and meadows, have high ecological integrity so habitat modification is expected to result in ecological patterns similar to the range of historical conditions, and although there is still uncertainty about the effects, they are expected to be impacted by climate change (Turner and Mallott 2025). Riparian forests have been impacted by timber harvest in the past, and those areas of young riparian forests that have been pre-commercially thinned have moderate ecological integrity and those that have not been thinned have low ecological integrity (Turner and Mallott 2025). However, both resources are expected to trend towards high ecological integrity as they develop with little management intervention needed and timber harvest is virtually absent from riparian forests under the current land management plan (Turner and Mallott 2025). Moreover, according to Halofsky et al. (2025), it is expected that with the change from less snow and more rainfall due to climate change, there will be a shift in vegetative communities in the riparian forest due to reduced soil moisture and lower stream flows. Moreover, riparian forest vegetation may also become more vulnerable to frost damage with less snow cover. In addition, growing seasons may also be lengthier, allowing for improved growth rates and transpiration of riparian vegetation. A more direct threat that the western toad is facing is chytridiomycosis (Bd, a fungal pathogen infection), which has caused amphibian populations to decline globally (Kilpatrick et al. 2010). Studies have detected a prevalence of chytridiomycosis infection of 38% in adults and 11% for juveniles and metamorphs in southeast Alaska (Hossack et al.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		2020). Moreover, prevalence is related to the same rank-order that toads use habitats, where prevalence from river habitats was 55%, followed by human-modified upland wetlands (32%) and natural upland wetlands (13%) (Hossack et al. 2020). Based on 2005-2015 samples, the prevalence of Bd has decreased in parts of southeast Alaska, but interpreting whether this is positive is difficult due to the lack of information of the effects of Bd on vital rates and abundance of western toads (Hossack et al. 2020).
8 Life history and demographic s	D	D = Insufficient information to draw inferences about criterion. Adult western toads congregate in ponds to mate and lay eggs in southeast Alaska from late April to July (MacDonald 2003; Carstensen et al. 2003). Egg strings are laid in ponds and tadpoles hatch about 8 days after being laid and subsequently metamorphose into toadlets (Carstensen et al. 2003). Toadlets may resort to mounding behavior (tight aggregations of individuals), with mounds consisting of hundreds of individuals, which is thought to be a response to avoid desiccation (Carstensen et al. 2003). Toadlets have a period of winter dormancy and emerge in their second summer as yearlings (Carstensen et al. 2003). Western toads seem to attain breeding size by their 3 rd summer, so they are thought to become breeding adults on their fourth year of age (Carstensen et al. 2003). Marked individuals of western toads in the Rockies have lived for over 13 years, and although there is a tendency for amphibians to be longer-lived at higher latitudes, there is no information on the longevity of western toads in southeast Alaska (Carstensen et al. 2003).

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

Despite numerous sighting reports in recent years, in southeast Alaska and on the Tongass, the status of the western toad population and information on the different criteria remains largely unknown. The following factors were used to determine if there is substantial concern over the long-term persistence of the species on the Tongass:

- **Significant threats:** Western toad habitat may be negatively impacted by climate change-induced changes in plant communities in the future. However, it should be noted that western toads readily use disturbed habitats and readily colonize recently exposed ponds, so the main threat related to this comes from vegetation encroaching reproductive ponds. Moreover, chytridiomycosis, which is a pathogen known to cause amphibian populations decline across the planet, has been identified in western toads in southeast Alaska, and although its prevalence on the species has decline over the years, its effects on the vital rates and abundance of western toads are unknown.
- **Declining trends:** Modifications to the western toad habitat are likely to result in ecological patterns similar to the range of historical conditions, the integrity of habitats occupied by the toads is generally high and no declining trends have been detected. On the other hand, despite numerous sightings reported in the recent past, there is no information about population trends of western toads in the planning area.
- **Restricted ranges:** Western toad are historically and currently widespread across the Tongass National Forest, with recent sighting reports all over the planning area, with the northwestern part of the Tongass constitutes the northern edge of the species' range. Moreover, western toads have an extensive range across western North America. Therefore, the western toad is not range-limited.
- **Low population numbers or restricted ecological conditions:** There is no information on the abundance or population numbers of western toads in the planning area. Moreover, although western toads depend on ponds for reproduction, they are generally considered habitat generalists and, as mentioned above, readily use disturbed habitats and colonize recently exposed ponds.
- **Other factors:** There are no other factors known to negatively affect the western toad.

After reviewing the available information, we conclude that 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. Therefore, we are not recommending the western toad as an SCC.

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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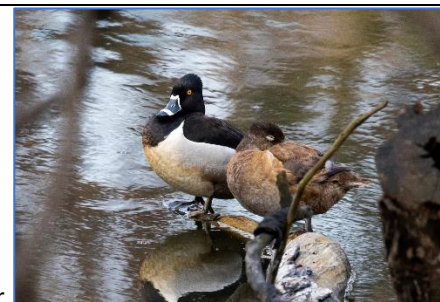
*Aythya collaris**Aythya collaris* Donovan, 1809

Ring-necked duck

Global Rank: G5

Alaska State Rank: S2N, S3B

photo: Ryan Mandelbaum/Flickr

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Little data is available on ring-necked duck distribution on the Tongass National Forest. Observations recorded in eBird (eBird 2023) show most occurrences near towns and the city of Juneau, likely representing where people are birding. Observations have been recorded all months of the year but peak in spring and fall (eBird 2023), which indicates that most birds in this area are likely using stopover habitat during migration.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2N, S3B The breeding range is widely distributed across Canada, south to northeastern California, southeastern Arizona, southern Colorado, Iowa, Illinois, northern New York, Massachusetts, and sparingly in southeastern and east-central Alaska (NatureServe 2023). Ring-necked ducks are migratory and winter across the western U.S., south and south-eastern U.S., central America, and Caribbean.
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. Ring-necked duck is migratory and has demonstrated an ability to expand its range. Its breeding range expanded east of the Great Lakes beginning in the 1930s and westward into Alaska and Yukon Territory during the 1980s (Roy et al.

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		2020). A sharp increase in numbers of ring-necked ducks was documented on and around Salt Spring Island, British Columbia, from 1978 through 2004, with the greatest increase on St. Mary Lake after 1992 (Weeden 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. Ring-necked duck occurs in low numbers on the Tongass National Forest (Gotthardt et al. 2012), with most birds documented during migration (eBird 2023). The Alaskan WatchList is a tool to focus attention and resources on vulnerable and declining bird populations in the state. Ring-necked duck is not identified as a WatchList bird species in southeast Alaska (Audubon 2016).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Breeding Bird Survey data indicates that populations trends of ring-necked duck are increasing rangewide (Sauer et al. 2020). This survey also indicates a slight increasing trend in Alaska from 1966 to 2019 and a slight decreasing trend from 1993 to 2019 (Sauer et al. 2020). However, both rangewide and Alaska Breeding Bird Surveys data sets are deficient due to low abundance, small sample size, or imprecision. No population trend data specific to the Tongass National Forest is available for ring-necked duck.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Most of the watersheds within the Tongass National Forest are in near-natural condition and all watersheds are "functioning properly" (USDA Forest Service 2021).
7 Habitat vulnerability or modification;	C	C = Habitat resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors not significant. Habitat is freshwater wetlands, especially marshes, fens, and bogs that are generally shallow and acidic to near-neutral (Roy et al. 2020). Although Alaska's freshwater habitat is generally healthy, threats include point and nonpoint source pollution, development and associated sediment erosion and removal or riparian vegetation, blockages, diversions, channelization, dams, unmonitored water withdrawals, natural resources extraction, mixing zones, invasive species, water

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
other threats		withdrawals, and climate change (Alaska Department of Fish and Game 2015). Forest Plan components and best management practices would reduce the likelihood of adverse effects to aquatic habitats as a result of land management or permitting on the forest. Habitats occupied by the ring-necked duck may be highly sensitive to climate change (Halofsky et al. 2025). For example, projected changes in temperature and soil moisture deficits will lead to drying of freshwater bodies and encroachment of forests into wetlands, reducing the availability of shallow marshes and bogs (Baer et al. 2025). Projected changes in temperature and soil moisture deficits will lead to drying of freshwater bodies and encroachment of forests into wetlands, reducing the availability of shallow marshes and bogs (D'Amore et al. 2025). More frequent atmospheric river events may cause flooding and sedimentation in wetland areas (D'Amore et al. 2025), potentially disrupting nesting and foraging habitat. Changes in timing of water availability and vegetation growth could affect nesting success and food resources (Bennetsen et al. 2025).
8 Life history and demographic s	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 event and no other demographic risk factors are known. Both sexes breed in their first year. Ring-necked ducks are single-brooded but may reneest if the initial nest is destroyed. The typical clutch size of 8-9 eggs per nest, with smaller clutches in reneesting attempts compared to a first nest (Roy 2020). Nests are overwater at high latitudes so eggs are not subject to temperature extremes experienced by species nesting in uplands. Ring-necked ducks are a game species throughout much of the range. Other factors of mortality are not quantified but include pesticides and other contaminants, ingestion of plastics or lead, collisions, commercial fishing nets, habitat degradation, and disturbance at nest and roost sites (Roy 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

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

- **Significant threats** – While freshwater habitats have the potential to be impacted by point and non-point pollution, watersheds across the Tongass National Forest are properly functioning. There are no identified threats specific to the survival or distribution of ring-necked ducks on the Tongass National Forest.
- **Declining populations or habitat trends** – No population trend data specific to the Tongass National Forest is available for ring-necked duck. Breeding Bird Survey data indicates that populations trends of ring-necked duck are increasing rangewide although survey data is limited by low abundance, small sample size, and imprecision. Freshwater habitats across the Tongass National Forest are considered stable with no evidence of declining trends.
- **Restricted range** – Ring-necked ducks have a large range along the western U.S., south and south-eastern U.S., central America, and Caribbean.
- **Low populations or restricted ecological conditions** – Ring-necked duck occurs in low numbers on the Tongass National Forest with most birds documented near towns and cities where observers are likely to report sightings. Habitat on the Forest is primarily used during stop overs during migration. Ecological conditions are not restricted, as habitat is widely distributed across the Tongass National Forest and ring-necked ducks are highly migratory and capable of dispersing into 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.
☐	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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Brachyramphus brevirostris*Brachyramphus brevirostris* [Vigors, 1829]

Kittlitz's murrelet

Global Rank: **G2**Alaska State Rank: **S2B, S2N**

photo: Thomas Kallmeyer

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	B	B = Patchy or gaps. Habitat is broadly distributed across the planning area but gaps exist within this distribution. Disjunct patches of habitat are typically large enough and close enough together to other patches to permit dispersal among patches and to allow species to interact as a metapopulation. Kittlitz's murrelet move nearshore to south and southeast coastal Alaska during the breeding season and resident birds have been documented in Wilderness Bay (Tracy and Endicott arms, Kissling personal communication). Kittlitz's murrelet locations are distributed in relatively small number across mainland coastal Tongass National Forest from the Endicott and Tracy arms in the south to Yakutat Bay where they are closely associated with glacially influenced marine and terrestrial systems. A scattering of reports around Baranof Island, the only glaciated island in the Archipelago, suggests that these birds may also use some areas on Baranof for breeding, but this is unconfirmed. Although it is thought to provide suitable habitat with tide-water glaciers and steep inaccessible terrain, Kittlitz's have not been found in LeConte and Thomas Bays since 1994 and 1980 respectively, although multiple searches have been conducted there since. Surveys in the 2000s found Kittlitz's were mainly concentrations in sheltered bays (Kissling et al. 2011, USDI FWS 2013 and papers cited therein).
2 Distribution in surrounding	C	C = Wide distribution outside the Tongass National Forest. Global Rank G2, Alaska State Rank S2B, S2N Yukon Territorial Rank S1B

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
geographic area		The Kittlitz's murrelet is rare seabird endemic to coastal Alaska and the Russian Far East. Breeding groups are concentrated in south coastal Alaska in glacially influenced systems. Large concentrations are found in Glacier, Yakutat, and Icy bays near and adjacent to the Tongass National Forest, and in Prince William Sound. Breeding groups are considerably less dense in the Aleutians and northern coastal Alaska and nests are consistently found in the least vegetated and most extreme terrain within the landscape. After breeding they move north and west remaining near-shore then move further north to the Bering and Chukchi seas and Beaufort Sea. As sea ice builds, they winter in the Bering Sea in open water leads (fractures in sea ice caused by wind drift or ocean currents) and polynyas (a large area of open water surrounded by sea ice), primarily south of St. Lawrence Island, between Nunivak and St. Matthew islands, and east of the Pribilof Islands (Artukhin et al. 2011, Day et al. 2011, Kuletz et al. 2011a, Kuletz et al. 2011b, USDI FWS 2013 and papers cited therein, Kirchhoff et al. 2014, Day et al. 2020, NatureServe 2023).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. As a sea bird, the Kittlitz's murrelet has great dispersal capability. This is evidenced by its global range and its range in Alaska. Daily movements between Icy and Yakutat bays also demonstrate the vagile nature of this avian species (Kissling personal communication in Day 2011).
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 greatest concentrations of Kittlitz's murrelets during the breeding season in Alaska occur in decreasing order in Glacier Bay, Yakutat Bay, Prince William Sound, and Icy Bay. The Glacier Bay population is the largest by far with an estimated 18,000 birds in 2012. In contrast, the Kittlitz's murrelet abundance is relatively low on the Tongass National Forest. The greatest concentrations of nesting on the Tongass National Forest likely occur on Tongass National Forest lands adjacent to Yakutat Bay and Tracy and Endicott arms. Abundance estimates from at-sea surveys by the U.S. Fish and Wildlife Service in Yakutat Bay have been as high as 4,414 (SE 965) and 555 (SE 235) for Endicott and Tracy arms. The U.S. Fish and Wildlife Service estimate the minimum range wide population of Kittlitz's murrelet to be 33,583 birds (95 percent CI = 25,620–41,546) in the breeding season, which is a minimum estimate because many areas within the range of this species remain un-surveyed (Kissling et. al. 2011, USDI FWS 2013 and papers cited therein, Kirchhoff et al. 2014).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Population trends for Kittlitz's murrelets on the Tongass National Forest are not known because few population surveys have been conducted there. Range-wide the U.S. Fish and Wildlife Service recently concluded the population declined by 30 percent per annum between 1989 and 2000, but has since stabilized or may be declining, but at a much lower rate. The best available information for southeast Alaska comes from monitoring in Glacier and Icy Bay. Eight years of surveys in Icy Bay between 2002 and 2012 indicate the local population declined annually by 10.0 percent over the period; this rate of decline was statistically significant (slope estimate=negative 0.10 [SE=0.03]). Population modeling for the Icy Bay population that incorporated demographic characteristics including reproduction, survival, and abundance substantiated these results by indicating an 8 percent decline annually, but the variance surrounding this estimate is large (USDI FWS 2013 and papers cited therein). There is notable disagreement among researchers about the current population size and trend of the population in Glacier Bay. This is because of differences in survey methods and lower quality design of historic surveys used to establish a baseline. However, the latest peer reviewed research provides strong evidence the population in Glacier Bay was unchanged from surveys conducted in 1993, 2009, and 2010 with high power (>0.99) to detect a real annual decline of 11 percent. Previously published annual declines for Glacier Bay have ranged between 10.7 and 14.4 percent (Kirchhoff et al. 2014). In Yakutat Bay, surveys conducted in 2000 and 2009 suggested a marked increase in the number of Kittlitz's murrelets, although with only two surveys the data do not yield a reliable trend (Kissling et al. 2011). When these surveys were repeated in 2015 and 2016, the estimated population trend showed an annual increase by nine percent (95 percent CI = negative 9 to positive 30 percent per year) (Day 2020). The apparent lack of birds in LeConte and Thomas bays on the Tongass National Forest during surveys in the 2000s may suggest a change in the range of Kittlitz's murrelets because historical accounts from the 1940s indicate the species was common there. The species was last verified in LeConte Bay in 1994 although at least two searches of the Bay have occurred since then. The species was last documented in Thomas Bay in the 1980s although surveys were conducted in at least 3 years since then (Kissling et al. 2011).
6 Habitat trend	D	D = Insufficient information to draw inferences about criterion. The habitat requirements of the Kittlitz's murrelet are not well understood, thus trends in their habitat are difficult to know. The reason for the association with glacial ice in south coastal Alaska, but not elsewhere in Alaska is not clear, nor

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
on Tongass NF		is it known if it is biologically meaningful or is simply a proxy for an unidentified, but important, habitat feature. Furthermore, it is not known whether the explanatory factor(s) occur in the marine or terrestrial habitat of the Kittlitz's murrelet, or both. That Kittlitz's murrelet nests in landscapes recently deglaciated, but without glaciers, suggests some flexibility and adaptability to loss of glacial cover. Nesting locations and habits seem to be driven by predator avoidance. Kittlitz's murrelet consistently nest in the least vegetated and accessible sites available and do not fly over vegetated terrain to access nesting sites. Although we do not know the mechanisms underlying Kittlitz's choice of nesting habitat, the quantity and quality of that habitat on the Tongass National Forest may be decreasing due to loss of glacial and icefield cover. As this cover is reduced and vegetation cover advances the distances between nesting and foraging habitats increases (Lawonn 2012, USDI FWS 2013 and papers cited therein).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Climate change may affect the habitat characteristics of the Kittlitz's murrelet (Halofsky et al. 2025). The Kittlitz's Murrelet is explicitly identified as a species with high vulnerability to climate change in the Tongass National Forest (Bennetsen et al. 2025). It is associated with glacier-specialized habitats, including tidewater glaciers and icebergs, which are among the most vulnerable habitats under projected climate scenarios (Bennetsen et al. 2025). Southeast Alaska glaciers are projected to lose 26–36% of their volume by the end of the 21st century (Radić et al. 2013). This will reduce tidewater glacier and iceberg habitats critical for foraging and nesting. As glaciers recede, vegetation advances into previously barren areas, reducing the availability of sparsely vegetated nesting sites and increasing distances between nesting and foraging habitats (Lawonn 2012; USDI FWS 2013). Vegetation encroachment may increase predator access to nesting sites, undermining the species' predator-avoidance strategy (Lawonn 2012). Loss of glacial input will alter nearshore marine ecosystems, potentially affecting prey availability (D'Amore et al. 2025). However, in their 12-month ruling not to list the Kittlitz's murrelet under the Endangered Species Act, the U.S. Fish and Wildlife Service considered climate change and environmental contaminants as potential threats to the habitats used by Kittlitz's murrelet (see criterion 6 above). Although they concluded climate change will cause changes to both nesting and foraging habitats and these are potential stressor on the Kittlitz's murrelet now and in the future, the underlying mechanisms of these stressors are not well understood. The U.S. Fish and Wildlife Service noted in their 12-month finding (2013) that there is no evidence to suggest that Kittlitz's murrelets in glacial-affected areas outperform those in non-glaciated areas, although Kissling (personal communication) notes nesting success is extremely low in areas without

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		a glacial influence due to predation. In addition, the highest concentrations of breeding Kittlitz's are found in glacially influenced areas so changes in the habitats here may disproportionately influence the overall population. In addition, there is little evidence that foraging habitats have been impacted where there is some evidence that seasonal foraging patterns have not changed over the last century. The species' seasonally varied and diverse diet at multiple trophic levels and apparent ability to switch prey types also demonstrate adaptability to changes in ocean conditions that are likely to influence prey. Although, high lipid fishes are thought to be important food for chicks and so changes in the availability of this food could affect reproductive success (USDI FWS 2013 and references cited therein). Most glaciers along the Gulf of Alaska have been retreating since the Little Ice Age and rapid acceleration of mass loss Alaska-wide began in the mid-1990s. However, it is not known whether or at what rate this trend will continue. Still, maritime glaciers, with high precipitation and moderate temperatures, such as those in south coastal Alaska, are very responsive to changes in climate. The exception is tidewater glaciers, where much of the ice that is formed at high elevation is eventually calved, but their advance and retreat are insensitive to climate and occur over time scales that are independent of climate. In addition, glacier surges and rapid rates of erosion alter the dynamics and geometry of ice in ways that are difficult to predict. Thus, glacier systems are individuals. Also, because glaciers can change year-to-year, there is much interannual variability in that change making projecting future extents difficult. As concluded by the U.S. Fish and Wildlife Service in their 12-month ruling not to list Kittlitz's murrelet under the Endangered Species Act (2013), "...we cannot predict the response of Kittlitz's murrelet to future changes in habitat conditions [caused by climate change]. This species uses a variety of habitats across a broad range, does not have a highly specialized diet, and appears to be a flexible forager.... Therefore, with limited data and assumptions, we conclude at this time that there is not likely to be a population- or species-level response of the Kittlitz's murrelet to the forecasted loss of glaciers, especially given that this species currently occurs in areas without glacial influence and that population trend has been stable since 2000, despite continued loss of glaciers." There are six existing tidewater glaciers within waters surrounding the Tongass National Forest. Ice coverage in front of the six tidewater glaciers has not changed substantially in recent decades, but the number of tidewater glaciers is decreasing in the region.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Other potential threats to Kittlitz's murrelet include marine oil pollution, mortality from gill net fisheries, and anthropogenic disturbances (Day 2020, NatureServe 2023). As shown by Van Hemert and others (2020), individual Kittlitz's murrelets can be at risk for saxitoxin poisoning during harmful algal blooms (USDI FWS 2013).
8 Life history and demographic s	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 Kittlitz's murrelet is thought to be long lived (assumed approximately 15 years), exhibits delayed reproductive maturity (assumed to be approximately three years old), intermittent breeding, low rates of reproduction (only one egg is laid and both the number of birds that attempt to breed annually and the number that breed successfully are low with some variation among study sites and years). There is little information available on annual and lifetime reproductive success, primarily because of great difficulty in finding highly dispersed nests; however, nesting attempts and success as well as productivity appear to be very low across the species' range, as shown in studies of the population at Icy Bay in southcentral Alaska (Kissling et al. 2015a, Kissling et al. 2016). This life-history strategy requires the survival of at least a few offspring and recruitment of those offspring into the adult breeding population to maintain population stability. Thus, the mortality rate of the reproductive adult segment of the population has the greatest influence on the overall population status. Kissling and others (2015b) estimated apparent annual survival to be 80 percent – somewhat lower than the 85 to 90 percent expected based on adult body mass (Lawonn 2012, USFWS 2013 and papers cited therein, Day 2020, 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

There is not sufficient evidence to suggest that there is substantial cause concern for the long-term persistence of Kittlitz's murrelet (*Brachyramphus brevirostris*) within the plan area based upon the following:

- **Significant threats:** There is insufficient information available about stressors to populations of Kittlitz's murrelet or habitats they inhabit in the plan area to determine presence of significant threats.
- **Declining populations or habitat trends:** There is insufficient information available about populations of Kittlitz's murrelet or habitats they inhabit in the plan area to determine if either are declining.
- **Restricted range:** The Kittlitz's murrelet is widely distributed outside the Tongass National Forest.
- **Low populations or restricted ecological conditions:** There is insufficient information available on populations of Kittlitz's murrelet in the plan area. The Kittlitz's murrelet is thought to be long-lived and exhibits small clutch sizes, but the species is widely outside the plan area and has high dispersal capability, potentially mitigating some risks associated with their relatively low survival rate and intermittent breeding.

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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Calidris canutus roselaari

Photo: Alaska Department of Fish and Game

Calidris canutus roselaari [Tomkovich, 1990]

Red knot

Global Rank: **G4TNR**Alaska State Rank: **SNRB****Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	B	B = Patchy OR gaps. The range extent of the Red knot (<i>Calidris canutus roselaari</i>) includes coastal areas and estuaries of the Tongass National Forest in southeast Alaska, especially on the Seal Creek-Ahrnklin River estuary of the Yakutat Forelands (Andres and Browne 1998; Alaska Natural Heritage Program [ASNHP] 2024) during spring, but breeding is restricted to outside of the Tongass National Forest, in the far north/arctic region (Alaska Department of Fish and Game [ADF&G] 2024).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. The red knot (<i>C. canutus</i>) has a Global Rank of G5T3, and an Alaska State Rank of S3. However, in Alaska, only the subspecies <i>C. c. roselaari</i> occurs, which has a Global Rank of G4TNR and an Alaska State Rank of SNRB (no status rank). The range extent of the Red knot (<i>C. c. roselaari</i>) includes southeast and southcentral Alaska, as well as the far north/arctic region (ASNHP 2024), but breeding is restricted to outside the Tongass National Forest, in the far north/arctic region (ADFG 2024). This subspecies breeds in northwestern Alaska, and also on Wrangel Island and the Chukchi Peninsula (Russia), and migrates along the Pacific Flyway to wintering areas in northwestern Mexico (Kessel 1989 cited in Baker et al. 2020; COSEWIC 2007). They are known as “jump” migrants, undertaking long portions of the migration in a

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		single flight. The northern migration generally occurs April-June, and Red knots migrate southward from July-October (ADF&G).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. As a migratory species, <i>Calidris canutus roselaari</i> travels along the Pacific coast of the Americas (Tomkovich 1992; Patten et al. 2003; Buehler and Piersma 2008). During the breeding season, they are found in the far north/artic regions of Alaska and Wrangel Island (Russia) (ADFG 2024). During the post-breeding and non-breeding season they have been recorded along the Pacific coast of the Americas, from western Alaska to Mexico in the south (Soto-Montoya et al. 2009; Carmona et al. 2008; Carmona et al. 2013; Baker et al. 2020, and references therein).
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 is little information on the abundance of Red knots on the Tongass, and considering they only use the Tongass as a stopover site, they seem to be uncommon. For example, substantial aggregations of thousands of birds have been documented at Seal Creek/Ahrnklin River within the Tongass NF, but these only account for 1.6% of all shore birds recorded in the area between 1996-1997 (Andres and Brown 1998). According to Andres and Brown (1998), 2,406 Red knots were recorded in the Seal Creek-Ahrnklin River estuary during the spring of 1996 and 1,576 individuals during the spring of 1997. Moreover, according to the Global Biodiversity Information Facility (www.gbif.org) there are 1,162 records of Red knots mainly in coastal areas within the Tongass NF in the last 20 years (2004-2024) of which 300 are unique location records.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Red knots are not resident birds in the Tongass NF, but coastal areas of the forest provide important stopovers for these and other migrant birds (Andres and Brown 1998). However, there is no information that could be used to infer population trends, and this subspecies has not been systematically monitored in Alaska (Alaska Center for Conservation Science [ACCS] 2019).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		In addition, considering the whole distribution of <i>C. c. roselaari</i> , their population trend is not certain, and it is complicated due to the knowledge of wintering distribution being incomplete (Morrison et al. 2006; Andres et al. 2012; Baker et al. 2020). The global population for the subspecies was estimated to be approximately 17,000 individuals in 2012 (95% Confidence Interval: 14,000-20,000) based on banding and mark-recapture results (Andres et al. 2012; Carmona et al. 2013).
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. During migration, in which they may make stops at the Tongass NF, Red knots are associated with inter-tidal habitats such as deltas, beaches, and mudflats (Isleib and Kessel 1973; Gill and Handel 1990; Baker et al. 2020), which are part of the tidal wetlands and estuarine ecosystems. According to Turner and Mallott (2025), tidal wetlands have moderate ecological integrity, with sedimentation, freshwater inflows, invasive species and warming seas acting as drivers and stressors. Moreover, according to Chestnut and Tucker (2025), estuarine ecosystems have high ecological integrity, with localized legacy harvest and infrastructure effects. During migration, Roselaari Red Knots use intertidal habitats such as deltas, beaches, and mudflats, which fall within the tidal wetlands and estuarine ecosystems of the Tongass National Forest (Isleib & Kessel, 1973; Gill & Handel, 1990; Baker et al., 2020). These ecosystems remain largely intact and exhibit moderate ecological integrity, meaning they are expected to continue delivering major functions and services, including supporting biodiversity and productivity, but at a reduced level relative to expectations for this ecosystem. One or more drivers, stressors, and key ecosystem characteristics are compromised in a way that disrupts disturbance regimes or characteristics of the system, though resilience remains possible (Turner and Mallott 2025). Estuarine channels are highly dynamic and sensitive to both terrestrial and marine drivers. They receive and deposit sediment from upland watersheds and are influenced by tidal flooding and saltwater inundation (Chestnut and Tucker 2025). While estuarine riparian areas harvested decades ago are regenerating, current Forest Plan standards exclude these areas from development, maintaining their natural condition (Turner and Mallott 2025). However, climate-driven changes—including shifts in freshwater flow, sediment transport, and marine temperature—are expected to alter estuarine processes over time (Chestnut and Tucker 2025). Increased storm frequency and intensity, combined with isostatic rebound and sediment deposition, may change the extent and configuration of tidal wetlands (Turner and Mallott 2025).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Tidal wetlands and estuarine ecosystems currently exhibit moderate ecological integrity, as defined above. They continue to provide essential ecological functions—such as sediment trapping, nutrient cycling, and habitat for migratory shorebirds—but climate change is projected to influence hydrology, salinity gradients, and vegetation composition (Turner and Mallott 2025). Unlike freshwater wetlands, which are rated high integrity (expected to continue delivering major functions and services without human interference), tidal wetlands are more exposed to marine heatwaves, storm surges, and potential changes in streamflow timing (Chestnut 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. According to Bellmore et al. (2025), ocean temperatures are increasing globally and regionally, anomalous marine heating events are becoming more frequent, and oceans are becoming more acidic as they take up more atmospheric CO₂. These ocean changes, along with loss of tidewater glaciers, result in changes in upwelling patterns, nutrient circulation, and oxygen concentration (Bennetsen et al. 2025). Ocean acidification further impacts shellfish and other calcium carbonate-dependent organisms (Markon et al. 2018), which may serve as prey items for the species. All of these changes in saltwater habitat impact primary and secondary ocean productivity and food webs involving marine and marine-foraging wildlife (Bennesten et al. 2025, and references therein). Sea level rise is also expected to adversely modify the habitat of Red knots, and for example in northwest Mexico, sea level rise projections have been shown to potentially result in habitat loss and reduce the quality of the remaining habitat (Garcia-Walther et al. 2024). It is uncertain how sea level rise may impact Red knots on the Tongass, but one potential effect is reduced foraging habitat. Estuarine ecosystems are sensitive to both upland (flow/sediment) and marine (sea-level, temperature, chemistry) drivers, isostatic rebound, and roads and access points can dike or fringe channels and introduce pollutants (Chestnut and Tucker 2025). Similarly, tidal wetland ecosystems are vulnerable to sea-level rise and temperature shifts (Turner and Mallott 2025).
8 Life history and demographic	D	D: Insufficient information to draw inferences about criterion. <i>Calidris canutus roselaari</i> is one of six recognized subspecies of the Red Knot, and among these, it is the least studied one (Baker et al. 2020). It was first described from specimens collected in Alaska and is genetically and morphologically distinct from the more thoroughly studied <i>C. c. rufa</i> of the Atlantic Flyway (Tomkovich 1992; Baker et al. 2020, and references therein).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
s		The breeding season is tightly linked to the Arctic summer, typically running from late May through July (Baker et al. 2020). Arrival at the breeding grounds coincides with snowmelt and timing is critical because early arrival risks exposure to late snowstorms, while late arrival may reduce chick growth opportunities due to declining invertebrate prey abundance (Tulp & Schekkerman 2008). Stopover sites along the Pacific coast of North America include areas like mudflats, sandy beaches, and coastal lagoons, where they feed on bivalves, crustaceans, and other benthic invertebrates (Schneider and Harrington 1981; Piersma et al. 1993; Carmona et al. 2013). Red Knots likely reach sexual maturity at two years, and birds may live up to 20 years, though the average reproductive lifespan is likely 5–10 years (Baker et al. 2020). Survivorship information is not available for <i>C. c. roselaari</i>, but is very variable in other sub-species (see Baker et al. 2020). Nests are shallow scrapes on open, well-drained tundra, often on ridges or dry hummocks and the female typically selects the nest site and lines it with leaves, lichens, and mosses for insulation and camouflage (Johnson et al. 2011). The clutch size is usually four eggs, laid over 4–5 days, and clutch size is consistent across most <i>Calidris canutus</i> subspecies (Piersma & Davidson, 1992). Moreover, Red knots can lay a replacement clutch of eggs if the first one fails (Johnson et al. 2011; Baker et al. 2020). Fledging occurs in 18–20 days, although survival is strongly influenced by weather, predation (e.g., by foxes, jaegers), and the phenology of invertebrate prey (Tulp & Schekkerman, 2008; Baker et al. 2020). Apparent nest success (≥ 1 eggs hatched) of ten nests located in the Seward Peninsula (Western Alaska) was 40% (Johnson et al. 2011), and the average number of young fledged per female is 2 (J. Johnson, US Fish and Wildlife Service, pers. comm. in ACCS 2019). Because <i>C. c. roselaari</i> nests in remote and relatively undisturbed regions, direct human disturbance is low, but climate-driven impacts are increasing (Morrison et al. 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

The *roselaari* subspecies of the Red knot is perhaps the least studied of the six subspecies of *Calidris canutus*. As a result, there is generally scant scientific information to inform the different criteria. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** Climate change, sea level rise and ocean acidification are expected to negatively affect Red knot populations by limiting prey abundance and habitat loss or the loss of quality in remaining habitats in the future.
- **Declining population or habitat trends:** Compared to other shorebirds, Red knots are uncommon on the Tongass, and besides sporadic records of red knot numbers on the Tongass, there is no information about population trends. There is no information on habitat trends on the Tongass, although sea level rise may result in habitat loss.
- **Restricted range:** Red knots are not restricted in their range and only use the Tongass as a stopover during their migration to or from their nesting areas in Western Alaska and eastern Russia. Their entire range spans from eastern Russia and Western Alaska to Mexico along the Pacific Coast.
- **Low populations or restricted habitat conditions:** There is no systematic information on the population size on the Tongass; observed flock size range from 1,576 to 2,406 individuals in two different years, and in some areas they only account for 1.6% of all shore birds recorded. The global population of the *roselaari* subspecies was estimated at 17,000 individuals in 2012, but there is no information on global trends.

Overall, and although there may be potential significant threats that could affect Red knots in the plan area in the future, the effects of these on this subspecies are not well understood. Moreover, there is lack of information to be able to determine the population size during the stopovers on the Tongass, and if there are declining trends. Therefore, we conclude that there is lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area and are not recommending the species as a potential SCC.

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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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DRAFT

Calidris virgata*Calidris virgata* Audubon

Surfbird

Global Rank: **G4**Alaska State Rank: **S2N, S3B**

photo: Steve Heintz

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	C	C = Habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species, little or no limitation on interaction among populations. There are no known breeding areas recorded within Tongass National Forest for the Surfbird. It is likely that these birds are using the shorelines within the forest as wintering, nonbreeding habitat or stopover habitat during migration to and from breeding areas (AOU 1983). No official records of observations were found for the forest; however, observations of varying densities have been recorded within the forest boundary via citizen science source eBird (2023). Sightings on eBird occur regularly during the migration and non-breeding seasons. Sightings are distributed throughout the forest boundary, but are concentrated on shorelines, particularly the rocky shores of Baranof Island and near Ketchikan.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4, Alaska State Rank S2N, S3B Surfbirds are a highly migratory species with a large range along the Pacific coast of the Americas. Their breeding range is widely distributed throughout interior Alaska and the Yukon territory (Frisch 1978). It is estimated that greater than 75% of the Surfbird breeding populations breeds in Alaska (Morrison <i>et al.</i> 2006). Non-breeding range extends along the coast from south central Alaska to Tierra del Fuego in South America (AOU 1983).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). Surfbirds are rarely observed inland, mostly staying along the coast in rocky, intertidal zones (AOU 1983). Some observations have been made on sandflats and islands (Stiles and Skutch 1989). This species relies on marine invertebrates found in the intertidal zone for foraging, limiting the habitat types it can utilize (Connors 1977, Norton <i>et al.</i> 1990, Navarro <i>et al.</i> 1989).
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. Occurrence data from eBird is widely distributed throughout Tongass National Forest. Sightings from the last five years (2018 to 2023) range from one individual to flocks reaching more than 800 birds. All sightings are of non-breeding birds.
5 Population trend on Tongass NF	B	B = Stable population. Population estimates are limited. Norton <i>et al.</i> (1990) estimated that the global population of Surfbirds could be approximately 100,000 individuals at the time of the publication. Given that Surfbirds nest in central Alaska before migrating to wintering grounds to the south, Tongass National Forest may provide important stopover habitat for the population as a whole. Number of individuals sighted via eBird is consistent among the last ten years, ranging from single individuals to hundreds in one location. Bishop (2011) noted a decline in Surfbirds observed at an identified stop-over site outside of Tongass. There has been no update on this trend or identification of additional stop-over sites.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Tongass National Forest has approximately 11,000 miles of ocean shoreline (U.S. Forest Service). Fragmentation due to island isolation is unlikely to impact this species as Surfbirds are capable of moving freely between islands, though they may favor rocky intertidal habitats over sandy shores (Bishop 2011).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Breeding sites, both on and off public lands, are considered well protected from human disturbance. Main threats to breeding success include depredation. Migratory routes overlap areas of potential oil pollution, affecting adult and juvenile survivorship. Surfbirds are considered highly vulnerable to exposure to oil spills (King and Sanger 1979). Human development may encroach on foraging and roosting habitat within migratory and non-breeding range along the Pacific coast, though the extent of impact is not known. Use of habitat along the Alaskan coast may be linked to abundance of Herring roe, a potential food source for Surfbirds, though this relationship has not been definitively established (ASG 2019). Although the ecological implications are not well understood, climate change may affect the habitat of Surfbirds on the Tongass in the future (Halofsky et al. 2025). Southeast Alaska experiences complex patterns of shoreline change due to glacial melt and isostatic rebound (Halofsky et al. 2025). Some areas may see sea-level rise (e.g., Ketchikan +0.11 m by mid-century), while others may experience relative sea-level drop (e.g., Yakutat -0.26 m) (Sweet et al. 2022). These changes will alter intertidal zones, potentially reducing or shifting rocky habitat availability. Loss of glacial ice and altered runoff timing will affect salinity gradients and sediment delivery to estuarine systems, influencing prey availability (Radić et al. 2013; D'Amore et al. 2025). Increased frequency and intensity of atmospheric river events will lead to flooding and erosion in coastal zones, disrupting intertidal habitats (Nash et al. 2023; D'Amore et al. 2025). Dependence on rocky intertidal zones makes Surfbirds vulnerable to changes in shoreline configuration and sedimentation patterns (Bennetsen et al. 2025).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. Information on life history and demographics is limited. Each breeding pair, if successful, will produce one brood of up to four chicks per year (Petersen <i>et al.</i> 1991). Renesting probability in the event of nest failure is not well known. Both uniparental and biparental care has been observed (Kessel and Gibson 1978). Flocks migrating from breeding areas will include young birds that may be accompanied by parents or independent (Petersen <i>et al.</i> 1991).

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

Scientific information suggests Surfbirds are secure within the plan area based upon the following:

- **Significant threats** – While oil pollution, and human development have the potential to impact Surfbird survival and nesting, the extent of the impact is unknown. Breeding sites, both on and off public lands, are considered well protected from human disturbance.
- **Declining populations or habitat trends** – Number of individuals sighted via eBird is consistent among the last ten years, ranging from single individuals to hundreds in one location. Bishop (2011) noted a decline in Surfbirds observed at an identified stop-over site outside of Tongass. There has been no update on this trend or identification of additional stop-over sites. Habitat fragmentation due to island isolation is unlikely to impact this species as Surfbirds are capable of moving freely between islands.
- **Restricted range** – Surfbirds have a large range along the Pacific coast of the Americas.
- **Low population numbers or restricted ecological conditions** – Occurrence data from eBird is widely distributed throughout Tongass National Forest. Sightings from the last five years (2018 to 2023) range from one individual to flocks reaching more than 800 birds. Ecological conditions are not restricted, as habitat is widely distributed along coastlines and Surfbirds are highly migratory and capable of dispersing into 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.
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☐	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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Canis lupus ligoni*Canis lupus ligoni* (Goldman, 1937)

Alexander Archipelago wolf

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

photo: Bob Armstrong

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	B	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. 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. The Alexander Archipelago (AA) wolf occupies southeast Alaska mainland and the large islands south of Frederick Sound excluding Coronation, Forrester, and the smaller, more isolated islands without an adequate prey base (Person et al. 1996). Wolves are present in the State of Alaska's Game Management Units (GMU) 1, 2, 3, and 5A, which corresponds to the Yakutat, Juneau, Hoonah, Petersburg, Wrangell, Prince of Wales (Craig and Thorne Bay), and Ketchikan ranger districts of the Tongass National Forest (TNF). Within GMU 2, only the three largest islands—Prince of Wales (POW), Kosciusko, and Dall—are known to have been continuously occupied by wolves for more than 20 years (Person and Ingle 1995).
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 G5T3, Alaska State Rank S3

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
area		The distribution of wolves in the surrounding geographic area is limited due to geographical barriers. The wolves occur in Southeast Alaska, including state, federal, and private lands, however, the Tongass National Forest covers most of Southeast Alaska. Wolves are also known to occur in areas in Coastal British Columbia (BC).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. Within its range, dispersal potential is high but dispersal of wolves among individual islands (or island groups) may be restricted by water barriers (e.g., Clarence Straight and Frederick Sound). Although wolves are capable of swimming, the shapes and distribution of land masses, currents, and the high frequency of storms combine with distance to impede dispersal among the major island groups in the archipelago (Person et. al 1996). However, based on documented distances across water covered by Alexander Archipelago wolves in coastal BC, it is assumed the wolves are capable of swimming the distance between the islands from the POW Complex to the Southern mainland. Documentations of two wolves were made moving within and through the islands further suggests that wolves can move between the mainland and the POW complex, although further data of successful dispersal and immigration is lacking (USFWS 2023). On Prince of Wales Island, annual rates of dispersal averaged 39 percent; 71 percent of dispersers were adults 2 years old and dispersal distances were relatively short (13 to 182 kilometers [5 to 71 mi]), presumably due to inter-island water barriers (Person et.al. 1996).
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. Quantitative estimates of wolf abundance are not available for Southeast Alaska as a whole. However, an estimate is available for the Game Management Unit 2 (GMU 2)- which includes Prince of Wales and surrounding islands known to support a significant portion of the wolves (Person et al. 1996). Alaska Department of Fish and Game (ADF&G) estimated the size of the autumn 2021 GMU 2 wolf population to be around 268 wolves (ADF&G 2023).
5 Population trend on	D	D = Insufficient information to draw inferences about criterion. Data on population trends is limited temporally and spatially. During the 1990s, wolf research conducted on POW resulted in a rigorous population estimate of 250-350 wolves in GMU 2 (Person et al. 1996). Results from the GMU 2 study were used in conjunction with modeled habitat capability for prey to produce a region-wide population estimate

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
Tongass NF		of 750 to 1,100 wolves during the 1990s. Roffler et al. (2019) estimated the autumn population size in 2014 to be 89 and 107 in 2015. Alaska Department of Fish and Game (2023) estimated the autumn 2021 population to be around 268. US Fish and Wildlife Service (2023) estimated median projected population size at six years to be 476 for the Southern Southeast Alaska Unit, 306 for the Northern Southeast Alaska Analysis Unit, and 297 for the POW Complex. These model results indicate moderately high resiliency in terms of population growth for both the Southern and Northern Southeast Alaska units and a population decline and low resiliency for the POW Complex. Maximum population sizes used in the model were based on estimates of available prey biomass due to the lack of available science providing accurate estimates of population size. Because the data is limited over time, there is insufficient data to determine a population trend.
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 Past declines in habitat quantity and quality were common, especially in southern portions of the forest. Downward trends in these areas are anticipated to continue at a lower rate. Habitat quality and quantity throughout the remaining areas on the forest has been stable. The Forest has a history of timber harvest in southern portions of the Tongass that has altered the distribution and structure of habitat and contributed to a decline in local deer populations, and therefore the quality of habitat for wolves (USFWS 2015, 2023). Though old-growth logging is transitioning to predominantly young growth harvest (USDA 2016, 2021), habitat declines for deer are expected to continue in previously logged areas with young growth succession into stem exclusion (Person and Brinkman 2013). Some of this continued downward trend will be offset by thinning if done with un-thinned movement corridors that promote accessible forage and retain landscape connectivity (Bennetsen 2020). Road density has increased substantially on POW island since the late 1970's. Although wolves select areas with low road densities, the access and human-caused mortality that roads and those areas with high densities facilitate have been identified as the key driver of wolf mortality in GMU 2 (Wolf Technical Committee 2017). Recommendations for road density management are included in the 2017 Interagency Wolf Habitat Management Program: Recommendations for Game Management Unit 2.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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. There are multiple vulnerabilities present to AA wolf and their habitat including the following: - Projections of long-term declines in deer numbers, based on an evaluation of forage, are well founded (USFWS 2015). This may put pressure on the POW Complex during years when deer populations are low because deer are the only available ungulates and most of the other populations are not strongly dependent on one or a few species (USFWS 2023). - Climate change may influence prey availability for wolves over the long-term (via changes in snowfall, disease dynamics, and heat stress) and expected future wolf survival, reproduction, and dispersal could be affected by lagged adjustments to their prey populations (Barber-Meyer et al. 2021, p. 11). Changing environmental conditions and the cumulative impact from them, could be more detrimental to populations where shifts in behavior are limited, such as the POW Complex. (USFWS 2023). However, the Alexander Archipelago Wolf is listed among species with low vulnerability to climate change in the Tongass National Forest, which indicates that, relative to other species, it is considered resilient under projected climate scenarios (Bennetsen et al. 2025). - Increased road densities can limit available habitat. Wolves on POW island, during Roffler's study (2018), avoided areas of high road density during denning season and late summer. The access and human-caused mortality that roads and those areas with high road densities facilitate have been identified as the key driver of wolf mortality in GMU 2 (Wolf Technical Committee 2017). - Recent studies (Zarn 2019) suggest inbreeding is likely affecting the wolf populations on multiple islands and therefore they may be at risk for inbreeding depression.
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. The AA wolf is found primarily in rugged coastal spruce-hemlock forests in areas frequented by their prey such as deer, beaver, mountain goat, small mammals, waterfowl, spawning salmon, and marine mammals (Person et al. 1996). Studies

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
s		on AA wolf diet by Roffler et al (2021) demonstrated diversity of species consumed and a widened dietary niche as the proportion of ungulates in their diet declined. Studies on Prince of Wales Islands indicate that wolves select for low-volume old growth forest at low elevations for denning, pup-rearing, and wintering activities (Person 2001, Roffler et al. 2018). Wolves select forest types indicative of high quality deer habitat (old growth forests and young successional clearcuts (Wolf Technical Committee 2017, Roffler et al. 2018). During pup-rearing season, wolves select for open-canopy and closed-canopy old-growth forest at low elevations. Before and after pup-rearing, wolves select for closed-canopy old-growth forest and avoided seral forests and clearcuts. Documented denning sites have been located in low elevation old-growth in proximity to freshwater sources (e.g., beaver ponds and streams) (Person 2001). Age at first breeding is about 22 to 34 months. Litters of 3 to 7 young are produced. Legal harvest by hunters and trappers accounts for most of the annual take, and is typically managed by adjusting season lengths, harvest limits, or restrictions on methods of take. During a study on Prince of Wales Island, legal and illegal harvest accounted for 87% of the mortality of radio collared resident and nonresident wolves and mean annual survival was 0.54 (SE ¼ 0.17) for all wolves. Annual survival was 0.65 (SE ¼ 0.17) for resident wolves and 0.34 (SE ¼ 0.17) for non-residents (Person and Russell 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

The Alexander Archipelago Wolf is not recommended to be considered as a Species of Conservation Concern. There is not substantial concern for the persistence of the species within the plan area based upon the following:

- **Significant threats:** Significant threats to Alexander Archipelago wolf have been identified, including climate change (loss of suitable habitat, loss of prey availability, inbreeding depression risk) and disjunct habitat corridors resulting from increasing road densities. However, the high breeding rate and relatively common abundance of the wolf suggest these threats will not have significant impacts on the species or its ability to persist in the plan area at this time.
- **Declining populations or habitat trends:** Though there is a paucity of quantitative data with which to assess actual population levels, there are clear vulnerabilities for wolves in GMU 2 and the Prince of Wales Island Complex. These populations, however, represent only a small proportion (about 4.5%) of the species' range. The greater population of the Alexander Archipelago wolf within the plan area but outside of GMU2 and the Prince of Wales Complex has been characterized as having moderate to high population resiliency.
- **Restricted range:** The range for the wolf extends from Southeast Alaska (including the Tongass National Forest) down through coastal British Columbia.
- **Low populations or restricted ecological conditions:** The most population figure available for the wolf is from the Alaska Department of Fish and Game (2023), estimating the autumn 2021 population to be around 268, distributed among multiple areas across the plan area. This distribution lessens the risk of extirpation within the plan area due to stochastic 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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Clethrionomys gapperi soleus*Clethrionomys gapperi soleus* (Hall and Cockrum, 1952)

Revillagigedo Island red-backed vole

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

photo: Alaska Natural Heritage Program

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	A	A = 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. The entirety of the population of the Revillagigedo Island red-backed vole is currently known to only two localities on Revillagigedo Island: Loring and the mouth of Fish Creek, Ketchikan; there are no known occurrences outside of those on Revillagigedo Island, Alaska (NatureServe 2023).
2 Distribution in surrounding geographic area	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank G5T3, Alaska State Rank S3 Known current and historical population incidences of the subspecies Revillagigedo Island red-backed vole are limited to Revillagigedo Island (Arctos 2023, NatureServe 2023). The parent species is widely distributed across North America, particularly Canada and the northern US, but the subspecies has never been found outside of the Island (NatureServe 2023).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. No specific dispersal information is known for the Revillagigedo Island red-backed vole, but the parent species <i>Clethrionomys gapperi</i> is widely distributed across Canada and the northern United States in a diverse array of habitats including coniferous and deciduous forests, mixed forests, marshes, shrublands, and peatlands (NatureServe 2023). This habitat diversity may suggest that the parent species is highly capable of dispersing among and between different habitats across its large range, but the ability to extrapolate this information to the Revillagigedo Island red-backed vole is limited due to insufficient ecological information known about the subspecies.
4 Abundance on Tongass NF	A	A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. Revillagigedo Island red-backed vole is known from two locations restricted to Revillagigedo Island (NatureServe 2023). There is no known abundance or population information available. Only 6 cataloged museum specimens have been identified down to subspecies <i>C. gapperi soleus</i>, ranging back to the 1940s, possibly suggesting low abundance or poor/insufficient sampling efforts across the known range (Arctos 2023). Museum catalog information from the ISLES Project suggests the distribution was historically the entirety of Revillagigedo Island, with one specimen captured 56 kilometers (35 miles) north of Ketchikan in 1949 (Arctos 2023). Known populations of the parent species <i>C. gapperi</i> are estimated at 0 to 54 individuals per hectare in the Northwest Territories, Canada (NatureServe 2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion No population data for the Revillagigedo Island red-backed vole is available. Population trends for the parent species <i>C. gapperi</i> are not currently monitored in the state of Alaska as of 2020, and no other information about population trends of the parent species are available (Alaska Species Ranking System 2020).
6 Habitat trend on Tongass	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. The Revillagigedo Island red-backed vole appears to prefer mesic areas in coniferous, deciduous, and mixed forests with dense cover, and abundant litter of stumps, rotting logs, exposed roots, and a dense leaf litter (NatureServe 2023). Revillagigedo Island is largely forested, hosting stands of both productive old-growth and young-growth timber, as well

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
NF		as plentiful shrub understory vegetation (Alaska Department of Game and Fish 2015, Ecological Atlas of Southeast Alaska 2016). Dominant forest species on the Island include hemlocks and spruces, and the area surrounding Ketchikan is particularly abundant with mixed conifer woodlands (Ecological Atlas of Southeast Alaska 2016). 46.7% of Revillagigedo Island is designated as being of good quality habitat for <i>C. gapperi</i>, with 34.5% of that habitat being of high quality and 12.2% being moderate (Suring 2014). Red-backed voles are strongly positively associated with shrub understory habitat, which provides protection from predation as well as seeds and berries that contribute to red-backed voles' varied diets (Suring 2014). Shrub abundance is increasing with increasing high elevation temperatures due to climate change, and that is expected to continue with the changing climate in Alaska (Alaska Department of Game and Fish 2015). Because the red-backed vole is strongly positively associated with shrub understory, it is possible that increasing shrub abundance could have a positive effect on red-backed vole abundance, but specific information about the subspecies Revillagigedo Island red-backed vole abundance related to shrub density is not available.
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 Revillagigedo Island red-backed vole appears to prefer mesic areas in coniferous, deciduous, and mixed forests with dense cover, and abundant litter of stumps, rotting logs, exposed roots, and a dense leaf litter (NatureServe 2023). Revillagigedo Island is largely forested, hosting stands of both productive old-growth and young-growth timber, as well as plentiful shrub understory vegetation (Alaska Department of Game and Fish 2015, Ecological Atlas of Southeast Alaska 2016). Dominant forest species on the Island include hemlocks and spruces, and the area surrounding Ketchikan is particularly abundant with mixed conifer woodlands (Ecological Atlas of Southeast Alaska 2016). While logging has been associated with declining abundance in some parts of the parent species <i>C. gapperi</i> range, <i>C. gapperi</i> populations in Southeastern Alaska have not been as sensitive to canopy removal, possibly due to the wetter climate of the area compared to other parts of the range and the positive association of the species with shrub understory that is common in SE Alaska and on Revillagigedo Island (Smith and Nichols 2004, Suring 2014). However, <i>C. gapperi</i> abundance declined in areas of clearcutting and remained low >20 years after clearcutting activity, and downed wood was not shown to be a substitute for important shrub understory habitat, though downed wood does provide

Criteria	Rank	Rationale
		substrate for fungi that constitutes part of their varied diets (Cockle and Richardson 2004, Keinath and Hayward 2003, Suring 2014). Logging has historically occurred on Revillagigedo Island and is preliminarily scheduled to occur over the next 5 years (Alaska Division of Forestry & Fire Protection 2023). However, the loss of Case No. 1:19-cv-00006-SLG, Southeast Alaska Conservation Council, et al. v. United States Forest Service, et al. in the District Court for the Alaska on March 11, 2020, for the Prince of Wales Landscape Level Analysis decision dramatically reduced the availability of the amount of timber that could be offered for sale (USFS 2021). With the decrease in logging activity, particularly in old-growth forested areas, the risk of losing vital forested habitat for red-backed voles is diminished. Additionally, consideration of conservation of productive old-growth forest habitats is a priority for the state of Alaska (Alaska Department of Game and Fish 2015). Specific population responses to habitat changes have not been studied for the subspecies Revillagigedo Island red-backed vole, but <i>C. gapperi</i> is adaptable across habitat types known throughout its range. Productive old-growth forest habitat is designated as a habitat of priority in the 2015 Alaska Wildlife Action Plan due to its use by many threatened and vulnerable species. Because of this designation, conservation of this important habitat is a priority for the state of Alaska and is considered in management decisions (Alaska Department of Game and Fish 2015). The protection of this rare and ecologically diverse habitat is important for many species, including red-backed voles.
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. Like many small rodents, southern red-backed voles have relatively short lifespans, averaging less than two years; most individuals likely do not survive more than one (Ballenger 2011). The parent species <i>C. gapperi</i> is a prolific breeder, with populations in other parts of its range producing litters at least two times per year and litter sizes averaging five to six young (Alaska Species Ranking System 2020). Red-backed voles are believed to reach sexual maturity around 60 days and breed in late autumn, though information on reproduction is limited and no specific information for <i>C. gapperi</i> in Alaska is available. Interspecies competition is not well studied for southern red-backed voles in North America, despite being considered an indicator species of closed-canopy forests in both natural and managed landscapes, and a good candidate species

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		for evaluation of the development of “old forest” structural attributes in young stands (Sullivan et al. 2017). Competition with mice species for habitat and red squirrels for trees seeds as a food source may impact southern red-backed vole populations, but limited available science for North American populations make it difficult to come to conclusions about the effect of interspecies competition for the parent species <i>C. gapperi</i>, let alone the subspecies Revillagigedo Island red-backed vole (Smith and Fox 2017). The generalization of the few studies available is limited by the varied characteristics of <i>C. gapperi</i> populations across its large range. Predation on the parent species <i>C. gapperi</i> is by the usual small rodent prey species, including owls, hawks, mustelids, and large mammals (Ballenger 2011) However, quality understory shrub provides protection from both aerial and land predation, as well as downed wood, which additionally provides important nesting habitat (Suring 2014). Revillagigedo Island is well-forested and shrubbed (see Criteria 6) and shrub abundance is increasing with increasing climate temperatures, so the ability to avoid predation in shrub habitat may be increasing as well.

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 *Clethrionomys gapperi soleus* within the plan area based upon the following:

- Significant threats** – Logging may be a potential threat to *C. gapperi soleus* populations on the Tongass National Forest. Logging has been associated with declining abundance in some parts of the parent species *C. gapperi* range notably in areas of clearcutting where abundance remained low more than 20 years after logging. However, *C. gapperi* populations in Southeastern Alaska have not been as sensitive to canopy removal, possibly due to the wetter climate of the area compared to other parts of the range and the positive

association of the species with shrub understory that is common in SE Alaska and on Revillagigedo Island. Logging has historically occurred on Revillagigedo Island and is preliminarily scheduled to occur over the next 5 years. However, a recent legal case decision dramatically reduced the availability of the amount of timber that could be offered for sale. With the decrease in logging activity, particularly in old-growth forested areas, the risk of losing vital forested habitat for red-backed voles may be diminished.

- **Declining populations or habitat trends** –Population trend for Revillagigedo Island red-backed vole on the Tongass National Forest is unknown. However, museum catalog information from the ISLES Project suggests the distribution was historically the entirety of Revillagigedo Island suggesting a reduction in the species range. There is no documented declines in habitat occupied by Revillagigedo Island red-backed vole however, logging on the island may have impacted suitable or occupied habitat historically as evidence by the apparent reduction in species range.
- **Restricted range** – Revillagigedo Island red-backed vole is endemic to Revillagigedo Island. There are no known current or historical population incidences outside Revillagigedo Island (Arctos 2023, NatureServe 2023).
- **Low population numbers or restricted ecological conditions** – There are two known locations of Revillagigedo Island red-backed vole on the Tongass National Forest. There is no known abundance or population information available for these locations. Only six cataloged museum specimens have been identified down to subspecies *C. gapperi soleus*, ranging back to the 1940s, possibly suggesting low abundance or insufficient sampling efforts across the known range. The Revillagigedo Island red-backed vole prefers mesic forest with dense cover, and abundant litter of stumps, rotting logs, exposed roots, and a dense leaf litter. While this habitat is not limited on the Tongass National Forest, the species is restricted to Revillagigedo Island.

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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DRAFT

Clethrionomys gapperi wrangeli

Clethrionomys (Myodes) gapperi wrangeli [V.
Bailey, 1897; INVALID]

Wrangell red-backed vole

Global Rank: **G5T3**

Alaska State Rank: **S3**

photo: Maryse Neukomm via iNaturalist

**Species Assessment**

Criteria	Rank	Rationale
1 Distribution on Tongass NF	C/B	C = Contiguous./ B = Patchy OR gaps. The range extent of the Wrangell red-back vole subspecies is described as limited to Wrangell Island and the nearby Sergief Island at the mouth of the Stikine River, in Southeast Alaska (McDonald and Cook 2007). Originally described as <i>Evotomys wrangeli</i> (Bailey 1897), NatureServe (2024) has the presumed subspecies of Wrangell red-back vole listed as <i>Clethrionomys gapperi wrangeli</i>. However, according to the Integrated Taxonomic Information System (www.itis.gov) this name is invalid and the current valid name for the presumed subspecies is <i>Myodes gapperi</i>, which is partially correct. This is based on the work by Runck et al. (2009) who found that samples of the presumed subspecies <i>Myodes gapperi wrangeli</i> group together in a clade of the phylogenetic tree with samples from other islands (Rudyard, Etolin and Ravallagigedo), the continental coast (Point Louise, close to Juneau, and Mallard Slough) and British Columbia nested within other samples from southeast Alaska and elsewhere (e.g., Minnesota), indicating that there is no subspecific division and voles from Wrangell and Sergief islands are in fact red-back voles (<i>M. gapperi</i>). On the other hand, the change from <i>Clethrionomys</i> to <i>Myodes</i> for the species and presumed subspecies in question was recently invalidated and switched back to <i>Clethrionomys</i> because it is the oldest valid name for red-backed voles (Kryštufek et al. 2019). Therefore, the red-backed vole that occurs on Wrangell and Sergief islands is not a subspecies and will be treated as <i>Clethrionomys gapperi</i> (Vigors, 1830).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. The presumed subspecies of Wrangell Island red-backed vole NatureServe Global Rank is G5T3, and the Alaska State Rank is S3. However, the valid species, <i>M. gapperi</i>, is ranked as Global Rank G5 and Alaska State Rank S4S5. In southeast Alaska, the red-backed vole occurs on the mainland from about the Stikine River south and on a few islands of Stikine Strait and east of Clarence Strait, including Bell, Black, Deer, Etolin, Hassler, Misey, Revillagigedo and Wrangell islands (MacDonald and Cook 2007). Outside Alaska, they are commonly found on forest of the Hudsonian and Canadian life zones, and they also occur in the Rocky Mountains south to western New Mexico and Arizona (Merritt 1981).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). According to Smith et al. (2005), red-backed voles readily move relatively long distances of ~200 m during intervals of <24 hours, especially from sub-optimal to higher quality habitats. Merritt (1981, and references therein) summarized what is known about the red-backed voles and indicates that mean home ranges vary between 0.01-0.50 ha.
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. According to Smith et al. (2005), mean densities of red-backed voles in Wrangell Island 1998-2000 varied between years and habitats, and ranged between 0.7 voles/ha (± 0.4 SD) and 25.5 voles/ha (± 5.0 SD). They indicated that densities of red-backed voles were highest in young growth forest, gap-phase had intermediate densities and peatland mixed-conifer had the lowest densities of voles during spring and fall. Merritt (1981, and references therein) summarizes what is known about the red-backed vole throughout its range and reports densities ranging from 0-65 voles/ha, with densities tending to increase during the summer.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the population trends of the red-backed vole in the Tongass NF, but population densities in Wrangell Island varied between years and populations recovered after a decline in densities (see above; Smith et al. 2005).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Red-backed voles occupy a variety of habitats throughout their range, and mainly frequent mesic habitats in coniferous, deciduous and mixed forests with abundant litter of stumps, rotting logs and exposed roots (Merritt 1981). In Wrangell Island, southeast Alaska, red-backed voles occupied a variety of habitats, including old-growth at high densities, were found at larger proportions in young growth when population densities were lower and population fluctuations were minimal in gap-phase habitat indicating that this was the highest quality habitat for <i>C. gapperi</i> (Smith et al. 2005). Furthermore, red-backed voles captures were positively correlated with the percent cover of deciduous shrubs in the understory and their density was correlated with decayed downed wood in the understory (Smith et al. 2005). Additionally, and contrary to what is known of population in western North America, red-backed voles in Wrangell Island may be able to persist in rain forest patches where the overstory has been removed (Smith et al. 2005). These habitats correspond primarily to well-drained forest ecosystems and, to a lesser extent, riparian forests, both of which are critical components of the Tongass landscape. Unharvested well-drained forests currently exhibit high ecological integrity, meaning they are expected to continue delivering major functions and services, including supporting biodiversity and productivity, without human interference (Turner and Mallott 2025). Drivers, stressors, and key characteristics exhibit the range of variation common in the past (Turner and Mallott 2025). However, past timber harvest targeted productive old-growth stands, reducing structural complexity and downed wood abundance in some areas, which are key microhabitat features for voles (Turner and Mallott 2025; Engelmann 2025). Young-growth stands created by harvest exhibit low to moderate integrity, meaning they deliver only some major functions and services at a reduced level if no restorative intervention occurs, but resilience is possible (Turner and Mallott 2025). Most of the areas occupied by red-backed voles in southeast Alaska are within the Tongass NF, and some are designated Wilderness Areas.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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. Under current management, areas occupied by red-back voles are protected, and a considerable part of their range in southeast Alaska are designated Wilderness Areas. Therefore, habitat modifications are expected to result in ecological patterns similar to the range of historical conditions. However, according to Bennetsen et al. (2025) changes to biological processes as a result of climate change, specifically reduced snow persistence and the availability of subnivean refugia, can potentially negatively affect red-backed voles.
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. There is no information available on the life history and demographics of red-backed voles in southeast Alaska, but Merritt (1981, and references therein) summarized what is known throughout their range. <i>Clethrionomys gapperi</i> are polyestrous and gestation takes from 17-19 days. The breeding season lasts from late winter to late fall in the wild and litter size varies from 2-8 young. Red-backed voles reach sexual maturity at about 2-4 months and breeding has been reported to occur below snow cover. The maximum longevity has been reported to be 20 months, but few voles survive two winters and most live about 10 to 12 months. Interspecies competition is not well studied for southern red-backed voles in North America, despite being considered an indicator species of closed-canopy forests in both natural and managed landscapes, and a good candidate species for evaluation of the development of "old forest" structural attributes in young stands (Sullivan et al. 2017). Competition with mice species for habitat and red squirrels for trees seeds as a food source may impact southern red-backed vole populations, but limited available science for North American populations make it difficult to come to conclusions about the effect of interspecies competition for the parent species <i>C. gapperi</i> (Smith and Fox 2017). The generalization of the few studies available is limited by the varied characteristics of <i>C. gapperi</i> populations across its large range. Predation on the parent species <i>C. gapperi</i> is by the usual small rodent prey species, including owls, hawks, mustelids, and large mammals (Ballenger 2011) However, quality understory shrub provides protection from both aerial and land predation, as well as downed wood, which additionally provides important nesting habitat (Suring 2014). Revillagigedo

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		and Wrangell islands are well-forested and shrubbed and shrub abundance is increasing with increasing climate temperatures, so the ability to avoid predation in shrub habitat may be increasing as well.

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

Recent genetic data has rendered the Wrangell red-back vole subspecies (*Clethrionomys gapperi wrangeli*) invalid, and the correct denomination is that of the parent species, *Clethrionomys gapperi*. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** No known threats are present in the planning area. The occupied areas are protected, with many designated as Wilderness Areas. While climate change might cause reduced snow persistence and the availability of subnivean refugia (under-snow cover), the species' ability to avoid predation in shrub habitat may be increasing as shrub abundance increases with warmer temperatures.
- **Declining trends:** There is insufficient information available on the specific population trends within the Tongass National Forest. However, habitat is considered stable, as the red-backed vole occupies a variety of resilient forest habitats.
- **Restricted ranges:** The species does not have a restricted range. The presumed subspecies name was found to be invalid by genetic data, and the valid species *Clethrionomys gapperi* has a wide and contiguous distribution both within and outside the Tongass National Forest.
- **Low population numbers or restricted ecological conditions:** The species is common, with densities in one area reaching 25.5 voles per hectare. Abundance is large enough that the species' persistence is not threatened by demographic stochasticity.
- **Other factors:** The presumed subspecies name is invalid based on recent genetic data. The species has a high reproductive rate and life history characteristics that suggest a high ability to recover from disturbances.

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

Overall, the red-back vole seems to be 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. Thus, we are not recommending the red-back vole 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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Clethrionomys rutilus glacialis*Clethrionomys (Myodes) rutilus glacialis* [Orr, 1945]

Glacier Bay red-backed vole

Global Rank: **G5T2**Alaska State Rank: **S3**

PICTURED: parent species
C. rutilus, no imagery of
subspecies available.

photo credit: Christian

**Species Assessment**

Criteria	Rank	Rationale
1 Distribution on Tongass NF	C	C = Habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species (<i>Clethrionomys rutilus</i>) The Glacier Bay red-backed vole (<i>Clethrionomys rutilus glacialis</i>), has previously been considered an endemic subspecies with a limited distribution that ranges from the area of Glacier Bay north of Icy Strait northwest to Icy Bay (Orr 1945, NatureServe 2023, Gotthardt et al. 2012). A visual estimate of a range map for this taxon indicates that approximately 35-40% of the range of <i>Clethrionomys rutilus glacialis</i> is on the Tongass National Forest, with the other portion being in the Glacier Bay National Park and Preserve area, except for a small sliver on the western shore of Lynn Canal (Gotthardt et al. 2012). While most collections of this taxon were made in Glacier Bay National Park, administered by the National Park Service, several collections from the 20th century are described from Douglas Island and Holkham Bay, both areas within the Tongass NF plan area (ARCTOS 2025). An overview of southeast Alaska's endemic mammals has determined, however, that based upon the lack of genetic divergence and recent colonization, <i>Clethrionomys rutilus glacialis</i> is taxonomically invalid and is subsumed under <i>Clethrionomys rutilus</i> (Androski et al. 2023). A recent genetic study of the taxon concluded that <i>Clethrionomys rutilus</i> likely colonized the Glacier Bay area following the latest glacial maximum, and shows little genetic divergence from

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		sister populations (Runck et al. 2009). This study placed populations from the Glacier Bay area in the Southeast Alaska <i>Clethrionomys rutilus</i> clade, which is widely distributed on the Tongass NF in areas north of the Stikine River (Runck et al. 2009). Habitat as described for <i>Clethrionomys rutilus</i> (forest, woodland, and shrub habitats, Gotthardt et al. 2012), is common across the Tongass NF.
2 Distribution in surrounding geographic area	C	C = Broad distribution across and outside the Tongass National Forest (for the parent species, <i>Clethrionomys rutilus</i>). Global Rank: G5T2, Alaska State Rank: S3 (<i>Clethrionomys rutilus glacialis</i>) Global Rank: G5, Alaska State Rank: S5 (<i>Clethrionomys rutilus</i>) <i>Clethrionomys rutilus glacialis</i> is restricted to the area of Glacier Bay north of Icy Strait, northwest to Icy Bay, and west of Yakutat Bay (Orr 1945, Gotthardt et al. 2012). By visual estimate, about 35-40% of the range of the Glacier Bay red-backed vole is on the Tongass National Forest, with the other portion being in the Glacier Bay National Park and Preserve area, except for a small sliver on the western shore of Lynn Canal. However as this taxon is considered taxonomically invalid, we will describe instead the distribution of the parent species, <i>Clethrionomys rutilus</i>, which is widely distributed in the North American boreal forest, widely distributed across its range, and considered secure within the state of Alaska (Audubon Alaska 2016, Krebs et al. 2023, NatureServe 2023). Recent genetic analysis described the <i>Clethrionomys rutilus</i> clade as including Siberia, through western Alaska, and along the southeast Alaskan coast north of Hut Point (Runck et al. 2009). An evaluation of the status of this species in Alaska concluded low biological vulnerability or action need (ACCS 2018).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations (<i>Clethrionomys rutilus</i>). Because <i>C. rutilus glacialis</i> is considered taxonomically invalid (Androski et al. 2023), dispersal capability will be described for the parent species, <i>C. rutilus</i>. <i>Clethrionomys rutilus</i> is widely distributed across northern North America in tundra and boreal forest environments where it is a dominant small rodent species (NatureServe 2023). This wide distribution may suggest that the parent species has few barriers to dispersal among and across the varied habitats throughout its large range.
4 Abundance	C	C = Common – current abundance is large enough that species persistence is not threatened by demographic stochasticity in combination with environmental variation (<i>Clethrionomys rutilus</i>).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
on Tongass NF		Because <i>C. rutilus glacialis</i> is considered taxonomically invalid (Androski et al. 2023), abundance will be described for the parent species, <i>C. rutilus</i> . <i>Clethrionomys rutilus</i> is periodically abundant and widely distributed across its range in suitable habitat, often being captured in small mammal surveys in Alaska (ACCS 2018).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion (<i>Clethrionomys rutilus</i>). Because <i>C. rutilus glacialis</i> is considered taxonomically invalid (Androski et al. 2023), population trends will be described for the parent species, <i>C. rutilus</i>. A statewide assessment concluded that population trends for <i>C. rutilus</i> in Alaska are unknown. Food availability mediated by weather appears to be one of the only predictors of population dynamics for northern red-backed vole (ACCS 2018, Boonstra and Krebs 2006). Berry production by dwarf shrubs in preceding summers predicts overwinter survival of the parent species <i>C. rutilus</i> (ADFG 2015, Boonstra and Krebs 2006). Predation, interspecific competition, fire, and deforestation appear to have little effect on population dynamics (ACCS 2018).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality (<i>Clethrionomys rutilus</i>). Because <i>C. rutilus glacialis</i> is considered taxonomically invalid (Androski et al. 2023), habitat trends will be described for the parent species, <i>C. rutilus</i>. As the ecological niche for <i>C. rutilus</i> is broad, encompassing a wide range of vegetation types and food sources, habitat trends were not evaluated as a conservation concern for this species (ACCS 2018).
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 (<i>Clethrionomys rutilus</i>). Because <i>Clethrionomys rutilus</i> inhabits a variety of habitat types and moisture regimes, including grasslands, shrubland, deciduous, and coniferous forests (ACCS 2018), it may be resilient to changes in habitat such as vegetation type shifts that may occur with predicted increases in temperature or changes in precipitation regimes (Bennetsen 2023). Additional research is needed to determine the role of parasites (Murrell et al. 2003; Matsumoto et al. 2010; Cook et al. 2017) and the effects of climate change. Populations may be adversely affected by spruce beetle infestations (McDonough and Rexstad 2005; Lance et al. 2006). There is some uncertainty as to whether increased temperatures will

Criteria	Rank	Rationale
		increase (Hope et al. 2015) or decrease (Baltensperger and Huettmann 2015; Marcot et al. 2015) the distribution of <i>C. rutilus</i> in Alaska (ACCS 2018).
8 Life history and demographics	C	C = High reproductive rate and not especially susceptible to disease, predation, or competition (<i>Clethrionomys rutilus</i>). This criteria was considered for <i>Clethrionomys rutilus</i> , which is a prolific breeder, capable of producing as many as five litters in a season. Litter size can be one to nine young but are most typically between five and six (Belik 2005). This high reproductive rate of the parent species may make it less susceptible to population disturbance from factors like predation or habitat modification or loss. Predation and interspecific competition appear to have little effect on population dynamics of the parent species <i>C. rutilus</i> (ACCS 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

The Glacier Bay red-backed vole (*Clethrionomys rutilus glacialis*) was recently determined to be taxonomically invalid as a subspecies based upon recent genetics work within the *Clethrionomys* genus along the Northern Pacific Coast. As such, this evaluation considered whether there was an indication of substantial concern for *Clethrionomys rutilus* on the Tongass National Forest, and concluded that the species is secure based upon the following:

- **Significant threats:** No significant or specific threats are documented for *Clethrionomys rutilus* on the Tongass National Forest.
- **Declining populations or habitat trends:** Population trends for *Clethrionomys rutilus* on the Tongass National Forest are not known.

- **Restricted range:** *Clethrionomys rutilus* is broadly distributed across the northern portion of the Tongass National Forest.
- **Low populations or restricted ecological conditions:** *Clethrionomys rutilus* is a prolific breeder that can readily disperse and is associated with a broad range of ecological 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 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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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Empidonax flaviventris*Empidonax flaviventris* Audubon

Yellow-bellied Flycatcher

Global Rank: **G5**Alaska State Rank: **S2B**

photo: Sue Barth

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There are no known breeding occurrences within Tongass National Forest. Breeding range has been shifting westward into southeastern Alaska (Martin et al. 2006). There are seven unconfirmed sightings from eBird (eBird access on 11/21/2023) and it is considered a casual summer visitant (Johnson et al. 2008).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2B The western extent of <i>Empidonax flaviventris</i> 's breeding range has historically been east-central Alaska, though density in Alaska and northwestern Canada is relatively lower than in the rest of the breeding range. Most breeding occurs in central to eastern Canada and New England. Migration occurs mostly in the central to eastern United States (Kessel & Gibson 1978). Wintering grounds include northeast Mexico through central America to the Isthmus of Panama (Howell and Webb 1995). At least one eBird report near Juneau included a breeding individual with four fledglings observed (eBird access on 11/21/2023).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. <i>Empidonax flaviventris</i> are migratory. Their breeding range extends across Canada and the Northeastern United States. They spend the winter in tropical forests in Mexico and Central America. Their breeding range seems to be expanding into southeastern Alaska.
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 information on abundance within Tongass National Forest. The seven reports from eBird do not include sightings from within the forest (eBird access on 11/21/2023). The Tongass, and southeastern Alaska in general, are not part of this species historical range.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on population trends within Tongass National Forest. As the range for <i>Empidonax flaviventris</i> shifts further into southeastern Alaska, breeding population size within Tongass may be expected to increase (Martin et al. 2006).
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. <i>Empidonax flaviventris</i> prefers wet coniferous forests and swamps for breeding. This species will utilize a variety of scrub and forest habitats during migrations. There have been reports of breeding <i>Empidonax flaviventris</i> in southeastern Alaska following a suspected range shift that may be driven by climate change. This expansion may include habitat within Tongass National Forest.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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 Climate change is likely causing a northward range shift for this species, with population size decreasing in the southeastern extent of its breeding range and increasing in central and north-northwestern extents. Climate change models predict that by the year 2080 <i>Empidonax flaviventris</i> will abandon 73% of its current breeding range in favor of breeding habitat to the north-northwest (Vermont Center for Ecostudies 2023). Friedmann (1963) reported three occurrences of brood parasitism from Brown-headed Cowbirds (<i>Molothrus ater</i>). The geographical range of <i>Empidonax flaviventris</i> and cowbirds has, historically, had little overlap. However, cowbirds are known to breed in southeastern Alaska, so an expansion of <i>Empidonax flaviventris</i> into the region may lead to an increase in exposure to nests parasitism (AOU 1983). This species uses mossy habitats for their ground nests, so habitat modification that can lead to desiccation can limit potential breeding habitat (Peterson 1988).
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. Females typically select nest sites on or near the ground in heavily vegetated areas that are cool and moist. Clutch sizes can be 1-5 eggs in one brood (Peck and James 1987). Each breeding pair will produce one brood per nesting season. Hatchlings are altricial and fledge at approximately 15 days (Martin et al. 2006). It is assumed from other <i>Empidonax</i> spp. that <i>Empidonax flaviventris</i> reaches sexual maturity at one year of age and breeds annually after that. Breeding populations in the Northeastern U.S. and eastern Canada have been declining at approximately 0.2% per year likely due to a climate change driven northward range shift (Vermont Center for Ecostudies 2023). The species is considered to be increasing within most of its range, particularly within its northern extents. According to the Partners in Flight population database (accessed 11/24/2023) there is an estimated 13,000,000 individuals globally, including 270,000 in 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)	☐	☐	☒

Conclusion Rationale

- **Significant threats:** Climate change is likely responsible for causing a major shift in this species' overall range. Birds are abandoning the southeast extend of their range and shifting to the northwest, possibly into the TNF. This shift will create a greater overlap in range between the yellow-bellied flycatcher and the cow bird, which is a known brood parasite of the yellow-bellied flycatcher. Increased overlap could mean increased parasitism and threat to this species.
- **Declining populations or habitat trend:** There is no information regarding population on the TNF. The TNF is historically outside this species range, but this will likely change as climate change progresses. Birds prefer wet coniferous forests and swamps for breeding. This species will utilize a variety of scrub and forest habitats, the likes of which can be found on the TNF. Birds have already been observed in southeast Alaska.
- **Restricted range:** Breeding range is widespread across Canada and the Northeastern United States. Winter range is Mexico and Central America. Their breeding range seems to be expanding into southeastern Alaska.
- **Low populations or restricted ecological conditions:** According to the Partners in Flight population database (accessed 11/24/2023) there is an estimated 13,000,000 individuals globally, including 270,000 in Alaska. Favored ecological conditions are shifting northward with climate change, and birds are shifting their range accordingly.

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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DRAFT

Eumetopias jubatus

Eumetopias jubatus [Schreber 1776]

Steller sea lion (Eastern Distinct Population Segment)

Global Rank: **G3**

Alaska State Rank: **S3**

photo: L.A. Jemison



Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	C	C = Contiguous. Population or habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species, little or no limitation on interaction among populations. The species is widely distributed throughout Southeast Alaska with 59 major haul outs and 15 major rookeries.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G3, Alaska State Rank S3 Washington State Rank S3N, Oregon State Rank S3, California State Rank S2 British Columbia Provincial Rank S3S4B, S4N The Eastern population segment ranges from Prince William Sound to California (National Marine Fisheries Service 2013, NatureServe 2023).
3 Dispersal	C	C = Readily disperses across landscapes with few habitat-related limitations. Being a marine species there are no physical barriers between populations (National Marine Fisheries Service 2013, NatureServe 2023).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
capability		
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. Common throughout Southeast Alaska. Delisted from the Endangered Species Act in 2013 (National Marine Fisheries Service 2013).
5 Population trend on Tongass NF	C	C = Upward population trend. The overall population increased from 18,313 individuals in 1979 to 70,174 individuals in 2010 – a 4.18% annual growth rate. Most recruitment has come from Southeast Alaska and British Columbia (National Marine Fisheries Service 2013). In 2022, the predicted non-pup count of the Eastern Distinct Population Segment of Steller sea lion in Southeast Alaska was estimated at 17,106 and the predicted pup count was estimated at 6,945. These estimates represent an approximate annual growth rate of 2.1% and 2.5%, respectively, from 1992 to 2022. Population trends in this region steadily increased over most of the 30-year period but realized counts of non-pups declined by approximately 23% between 2019 and 2021. Non-pup counts in 2021 were similar to counts observed a decade earlier. Despite this recent decline in non-pups, pup counts in Southeast Alaska have remained relatively stable since 2009 (Sweeney et al. 2022, Sweeney et al. 2023).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. No known change in habitat quality or quantity (National Marine Fisheries Service 2013, Rehberg et al. 2018), though recent studies have observed anomalous warming events occurring in the Gulf of Alaska from 2014 to 2016 and 2018 to 2019 (Litzow et al. 2020). The long-term impacts of these warming events are unknown (Sweeney et al. 2022, Sweeney et al. 2023).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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 impacted by modern stressors. Terrestrial Steller sea lion habitats used within the Tongass National Forest are not at risk of alteration because regulations protect rookeries and haul outs. In marine habitats, ocean temperature extremes may become more frequent, such as observed in the anomalous warming events in the Gulf of Alaska from 2014 to 2016 and 2018 to 2019 (Litzow et al. 2020). An additional concern of climate change is the potential effect of increasing ocean acidification (National Marine Fisheries Service 2013).
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. The species is relatively productive with females becoming sexually mature between three and six years of age and producing one pup per year. Most recruitment to the population in recent years has occurred in Southeast Alaska and British Columbia (National Marine Fisheries Service 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

- **Significant threats:** Terrestrial Steller sea lion habitats used within the Tongass National Forest are not at risk of alteration because regulations protect rookeries and haul outs.

- **Declining populations or habitat trends:** Population trends in this region have steadily increased over most of the 30-year period from 1992 to 2022 but realized counts of non-pups declined by approximately 23% between 2019 and 2021. Non-pup counts in 2021 were similar to counts observed a decade earlier. Despite this recent decline in non-pups, pup counts in Southeast Alaska have remained relatively stable since 2009. Ocean temperature extremes may become more frequent, such as observed in the anomalous warming events in the Gulf of Alaska from 2014 to 2016 and 2018 to 2019. The long-term impacts of warming events on marine communities are not yet known.
- **Restricted range:** The Eastern DPS ranges from Prince William Sound to California. The species is widely distributed throughout Southeast Alaska with 59 major haul outs and 15 major rookeries.
- **Low populations or restricted ecological conditions:** The Steller sea lion is common throughout Southeast Alaska, and was delisted from the Endangered Species Act in 2013. Being a marine species, there are no physical barriers between populations.

Note: The Western Distinct Population segment occurs in the plan area and is still listed as endangered.

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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Euphagus carolinus*Euphagus carolinus* [Muller, 1776]**Rusty Blackbird**Global Rank: **G4**Alaska State Rank: **S4B/S3N**

photo: Marcel Gauthier

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	B	B = Patchy OR gaps. The Rusty Blackbird (<i>Euphagus carolinus</i>) is said to be an uncommon migrant and breeder in southeast Alaska along mainland and coastal rivers, and somewhat more numerous there in the fall than in spring (Kessel and Gibson 1978; Hannah 2004). According to Gibson and MacDonald (1975) a total of 14 Rusty Blackbirds were detected along a 39 km transect of the Unuk River from June to July 1974 in freshwater marshes. They also detected the species in the Salmon River/Hyder (6 individuals), Stikine River (1 individual) and Taku River/Juneau (30 individuals), along the Chickamin River and in Glacier Bay (Gibson and MacDonald 1975). Moreover, according to the Alaska Natural Heritage Program's Wildlife Conservation Data Portal (https://biotics.aknhp.axds.co/), there are reports of breeding Rusty Blackbirds throughout the coastal and riverine areas of southeast Alaska, in the Misty Fjords National Monument, along the Stikine River and smaller islands outside of the Stikine River mouth, Mitkof Island, Admiralty Island, Juneau, Douglas Island, Mendenhall Valley, Haines and Yakutat. In its breeding habitat, such as southeast Alaska, the Rusty Blackbird is often associated with forested wetlands and open shallow-freshwater or wet meadow habitats (Matsuoka et al. 2010a, 2010b; Greenberg et al. 2011). In Alaska, they nest primarily on low (3-6 m), dense sitka and black spruce forests, but also in willows near water (Matsuoka et al. 2010a, 2010b; Loomis 2013). Moreover, in a study in the Copper River Delta, all nests were located within 30 m of the water (Loomis 2013), which seems to be the case throughout its range (Avery 2020).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4, Alaska State Rank S4B/S3N, classified by Partners in Flight as a Common Bird Species in Steep Decline (Handel et al. 2021). The Rusty Blackbird is found throughout North America: it breeds across North America's boreal forests, from New England (US) and the Maritime Provinces (Canada) to the tree line in northern Alaska (US), and it winters throughout the southeastern US (Greenberg and Matsouka 2010; Hobson et al. 2010). Rusty Blackbirds from Alaska, specifically, overwinter in the Great Plains or in the Mississippi Alluvial Valley (Johnson et al. 2012; Wright et al. 2021).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. As volant and migrant organisms, Rusty Blackbirds are capable of long-distance movements, spanning thousands of miles from their breeding grounds in the boreal forested wetlands of North America, to their wintering grounds in the southeastern US (Avery 2020). Although they are tightly associated with woody wetlands in their breeding range, and they use predominantly woody wetlands and emergent marshes during stopovers and the nonbreeding period (Matsuoka et al. 2010a, 2010b; Greenberg et al. 2011; Wright 2021), they also use stubble, pastures, plowed fields and edges of swamps for foraging and wooded areas for roosting during migration (Brewster 1906; Bent 1958; Avery 2020). Therefore, Rusty Blackbirds are presumed to readily disperse across the landscape.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The Rusty Blackbird is said to be an uncommon migrant and breeder in southeast Alaska along mainland and coastal rivers, and somewhat more numerous there in the fall than in spring (Kessel and Gibson 1978; Hannah 2004). However, there is no recent information about the number of individuals (abundance) of Rusty Blackbirds on the Tongass.
5 Population trend on	D	D = Insufficient information to draw inferences about criterion. Considering its entire population, the Rusty Blackbird population has declined at least 88% since 1966, and the species continues to decline at a rate of 4.8% per year (Greenberg and Matsouka 2010; Sauer et al. 2013). Based on inferences from the number of birds detected along the North America Breeding Bird Survey routes, it has been estimated that

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
Tongass NF		between 158,000 and 2 million Rusty Blackbirds remained in the mid-2000s (Savignac 2006). The breeding population in Alaska is estimated at 14% of the total population (Handel et al. 2021). In Alaska, an estimated statewide decline of ~5% annually has been reported from 1980-2005 based on the North American Breeding Bird Survey (Sauer et al. 2005; Greenberg et al. 2011). However, there is no information about the population size in Alaska, nor on the population trends on the Tongass.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Land-use practices that reduce forested wetlands may adversely affect the species (Avery 2020), and clearcutting large areas of forested areas on wetlands not only removes Rusty Blackbird habitat but also facilitates the invasion by other more common bird species that may outcompete Rusty Blackbirds (Ellison 1990 and Erskine 1992, cited in Avery 2020). In their wintering grounds in southeastern US, losses and alterations of bottomland forests may be degrading suitable wintering habitat for the Rusty Blackbird and high mercury exposure may be lowering the physiological condition of birds, although the latter is more prevalent in the eastern portion of its range (Greenberg et al. 2011). Twenty-three percent of southeast Alaska is classified as wetlands and these are widely distributed on the Tongass (Smith 2016), with approximately 1.13 million acres of forested wetlands found in the forest (Turner 2024). On the Tongass, all watersheds are considered properly functioning under the Watershed Condition Framework classification process, over 95% of sub-watersheds with riparian and wetland vegetation conditions are good or fair, with the rest being poor, but those with poor conditions have been decreasing over the years (from 62 to 36 between 2010-2020) (Bousfield 2024). Moreover, forested wetlands on the Tongass exhibit high ecological integrity due to their wide distribution across latitude, landforms, geology, parent material and elevation (Turner 2024). Past timber harvest has occurred on about 4% of the forested areas of the Tongass, and although there was industrial scale harvest from the 1950s through the 1990s, since the completion of the 1997 Forest Plan, timber harvest on the forest has steadily decreased (Turner 2024; Engelmann 2024). As such, timber does not currently appear as a major threat to forested wetlands, unlike climate change which may negatively impact this ecosystem (Turner 2024; see below).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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. Despite the massive declines of Rusty Blackbirds throughout their range, especially in the eastern portion, the specific causes are not well understood, but likely include the loss of wooded wetlands on breeding and wintering grounds and potentially the loss of food sources on breeding grounds due to increased acid rains and drying of wetlands with a warming climate (Greenberg and Droege 1999, Greenberg and Matsuoka 2010, Matsuoka et al. 2010a). Models indicate that Rusty Blackbirds are expected to lose at least 64% of their core boreal wetland breeding habitat by the end of the century due to climate change (Stralberg et al. 2015; Wright et al. 2021). Moreover, according to Bennetsen et al. (2025), Rusty Blackbirds are associated to vulnerable habitats on the Tongass, including wetlands, meadows, and muskegs. This is because a projected decreased soil moisture of 1-3% in southeast Alaska could lower water tables below the critical levels needed to generate discharge and maintain wetland soil saturation (Little and Johnson 2025), and a sustained drop in soil water tables below ~10 inches (25 cm) could compromise wetland vegetation (D'Amore et al. Draft 2025). For example, in the Tongass, freshwater bodies have already shrunk likely due to a combination of drying and temperature-driven increased evapotranspiration because of the longer growing seasons (Baer et al. 2025, and references therein). However, note that the loss of some freshwater bodies on the Tongass may be offset by the creation of others from receding glaciers (Baer et al. 2025, and references therein). Moreover, a declining water table may encourage forest encroachment into previously treeless wetlands (Baer et al. 2025, and references therein), which may benefit Rusty Blackbirds in the short-term by providing nesting habitat, and for example, conifers have been observed encroaching scrub wetlands on the Tongass (Buma and Barret 2015). Everything considered, and although habitat is being impacted by climate change and there is uncertainty regarding the effects of this on species composition in wetlands, it is expected that these ecosystems will persist (Turner 2024), albeit with a likely different configuration or distribution in the next 20-60 years.
8 Life history and	D	D = Insufficient information to draw inferences about criterion. There is no information about the life history and demographics of the Rusty Blackbird on the Tongass, but there are some studies from Alaska that provide some insights on this. Densities of nests in Alaska have been reported at 2.2 nests/km² near Anchorage and 3.4 nests/km² near Fairbanks (Matsouka et al. 2010a). In a study in the Copper River

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
demographics		Delta, mean clutch size was 5.5 eggs and ranged from 5-7 eggs with most eggs being viable (89%) (Loomis 2013). Moreover, nesting success was 89%, with a fledging rate of 4.13 chicks per nest (Loomis 2013). Nest predation was low, with nest survival estimated at 0.78 (Loomis 2013). Similarly, Matsouka et al. (2010b) found that, in Alaska, nests in spruce were more successful hatching chicks with 79% nesting success than nests in deciduous vegetation (59%). Moreover, of the successful nests, there was a 96% fledging success (Matsouka et al. 2010b). Nest failure is low, with thirty-two percent of the nests monitored in Alaska were known or assumed to be lost to predators (Matsouka et al. 2010b). Therefore, reproductive success in Alaska is considered high and Rusty Blackbirds do not seem to be limited by reproduction. Besides the information on the range-wide declines of Rusty Blackbirds, we found no information in terms of individual mortality or survival rates on the Tongass, nor throughout their range. Considering the high reproductive success of the species, it is likely that factors reducing the survival of adults or juveniles are limiting population growth (Matsouka et al. 2010b). However, no evidence of this has been provided. We, therefore, cannot make inferences about this criterion.

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

Considering all the findings and rankings of the different evaluation criteria, summarized below, we determined that there is lack of sufficient scientific information to make a determination about the long-term persistence of the Rusty Blackbird on the Tongass National Forest.

- **Significant threats**- No significant threats were found currently affecting Rusty Blackbirds in the planning area. Climate change is considered a potential threat, but there is uncertainty about the effects on the habitat of the species (while there might be losses on one side, there might be gains on the other).
- **Declining trends**- Although the Rusty Blackbird has experienced decreasing trends throughout its range, and in Alaska a 5% decline has

been reported statewide, there is no information on the population trends on the Tongass, and elsewhere in Alaska Rusty Blackbirds appear to have high reproductive rates. Moreover, there are no indications of declining habitat trends, and forested wetlands are considered to have high ecological integrity on the Tongass.

- **Restricted ranges-** Rusty Blackbirds breed and occur throughout the Tongass and the species is widespread and not range-limited in North America.
- **Low population numbers or restricted ecological conditions-** There is no information on the abundance of Rusty Blackbirds on the Tongass, and although they are restricted to forested wetlands in its breeding grounds on the Tongass, this ecosystem is abundant throughout the forest, occupying over 1 million acres.
- **Other factors-** No other factors were found to affect the Rusty Blackbird 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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Falco peregrinus pealei*Falco peregrinus pealei* Audubon

Peale's Peregrine Falcon

Global Rank: **G4T3**Alaska State Rank: **S2S3**

photo: Zak Pohlen

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	C	C = Contiguous. Habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species, little or no limitation on interaction among population. There are four unconfirmed sightings of <i>Falco peregrinus pealei</i> within Tongass National Forest reported via eBird in the last 10 years (eBird accessed on 11/22/2023).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside of the Tongass National Forest. Global Rank G4T3, Alaska State Rank S2S3 <i>Falco peregrinus pealei</i> are likely widely distributed along the coast of Southeastern Alaska. The Peale's subspecies is the most commonly reintroduced subspecies of Peregrine falcon, leading to an increase in number as well as an expanded range northward from historic ranges (Swem and Ambrose 1994). According to eBird (accessed on 11/22/2023), their range extends along the western coast of North America, across the Bering Sea into eastern Asia.
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). <i>Falco peregrinus</i> are usually migratory, but most <i>Falco peregrinus pealei</i> likely remain in breeding areas year-round. This subspecies relies on coastal habitats for foraging and is rarely observed inland (Guldager et al. 2007). Young can disperse up to 300 kilometers away from their natal site (NatureServe 2023).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. No confirmed occurrences of <i>Falco peregrinus pealei</i> have been reported on the Tongass, though it is likely that these birds are utilizing the coastal habitat within the forest. Most sightings reported via eBird were made as a falcon pursued prey in open areas (eBird accessed on 11/22/2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There are no population data available for the Tongass. Population size outside of the Tongass appears to be stable or increasing (NatureServe 2023).
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. <i>Falco peregrinus pealei</i> are often associated with coastal beaches, marshes, estuaries, and islands. Nests are typically situated on cliff ledges along the coast and are often near seabird colonies, as seabirds make up the bulk of <i>Falco peregrinus pealei</i>'s diet (Campbell et al. 1990). There is little information available regarding habitat quality within Tongass National 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. <i>Falco peregrinus pealei</i> may be exposed to toxic pollutants through their prey. A report by Guldager et al. (2007) suggests that mercury levels detected in <i>Falco peregrinus pealei</i> eggs are at levels that may reduce survival and that these levels may be increasing. There has been no further update on whether or not survival rates of <i>Falco peregrinus pealei</i> have decreased in response to mercury contamination, though studies on other bird species report lower reproductive success due to mercury exposure (Mills et al. 2020, Varian-Ramos et al. 2014). This subspecies was greatly impacted by DDT and only recovered after the toxin was banned. Future contaminants, such as mercury or from oil spills, may lead to a decrease in survivorship through bioaccumulation in adults and the passing on of contaminants to eggs and developing young (Ambrose et al. 2016).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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. It is likely that the population has remained stable or increased due to most breeding taking place in protected areas and the outlawing of DDT. These birds nest within scrapes on rocky ledges and a pair will reuse a nest in subsequent years. Clutch sizes are typically 1-4 eggs, but clutches of up to 6 eggs have been reported (Hickey 1969). Most young reach breeding age at about 3 to 4 years of age (Johnstone 1998). Ambrose et al. (2016) reported an estimated annual breeding success of 57% along the Yukon River in east-central Alaska during the 2000s. According to the study, population size started to increase after the use of DDT was outlawed. There was a significant initial increase in population growth rate (8.6%) followed by a stabilization of population growth (1.5%) as of the 2015. <i>Falco peregrinus pealei</i> prey upon other birds, including shorebirds, waterbirds, and songbirds, making them more susceptible to accumulation of toxins through prey (Guldager et al. 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

There is a lack of evidence to determine if there cause for substantial concern for the persistence of the Peale's Peregrine Falcon (*Falco peregrinus pealei*) within the plan area, based upon the following:

- **Significant threats:** Contaminants including oil, mercury, and dichlorodiphenyltrichloroethane (DDT) pose significant threats to the species, but DDT was outlawed in the United States in the 1970s and the lack of information available on population and habitats in the plan area prevent conclusions about impacts of contaminants to the species.

- **Declining populations or habitat trends:** There is insufficient information available about populations or habitat trends in the plan area.
- **Restricted range:** The species is widely distributed outside of the Tongass National Forest.
- **Low population or restricted ecological conditions:** There is insufficient information available about the current population of the species in the plan area though it is widely distributed elsewhere. Suitable habitat for the species is contiguous throughout the plan area and the banning of DDT allowed populations to increase and then stabilize.

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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Fulica americana*Fulica americana* [Gmelin, 1789]**American coot**Global Rank: **G5**Alaska State Rank: **S2B, S2N**

photo: August Davidson-Onsgard

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	C	C = Contiguous. The Tongass National Forest is within the non-breeding range (Brisbin and Mowbray 2020) and this species is suspected to be well-distributed across the plan area (Gotthardt et al. 2012). Observations recorded in eBird (eBird 2023) are throughout the non-breeding season, from October to May 1. Occurrences are numerous and widely distributed, though mostly near towns and along roads and likely represent where people are birding. Non-breeding habitat is varied, habitat is continuous, and coots are assumed to be more widely distributed based on the number and distribution of occurrence records.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2B, S2N American coot is the most abundant and widely distributed species of rail in North America (Brisbin and Mowbray 2020). The breeding range is centered in the prairie-pothole region of southern Canadian Prairie Provinces and north-central U.S. The year-round range covers much of the southwestern U.S., includes the Pacific coast, south to Costa Rica, and east to Caribbean islands (Brisbin and Mowbray 2020). Southeast Alaska falls within the non-breeding range but two distinct populations over 1,000 km north of the main breeding range occur in extreme east-central Alaska (Trapp et al. 1981).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. American coot breeds in freshwater marshes, but habitat is varied outside of the breeding season (see criteria 7). Most northerly populations are regular medium- or long-distance fall and spring migrants (Brisbin and Mowbray 2020). Coots are known to readily inhabit new areas as habitat becomes available (Gorenzel, Ryde, and Braun 1981).
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 plan area is within the non-breeding range and is outside of the core area for American coot. The Alaskan WatchList is a tool to focus attention and resources on vulnerable and declining bird populations in the state. American coot is not identified as a WatchList bird species in southeast Alaska (Audubon 2016). Abundance data is lacking, but eBird has regularly documented occurrences (eBird 2023). This species may be more common than records indicate due to contiguous habitat and lack of data.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Breeding Bird Survey data indicated that populations are stable to slightly increasing range-wide throughout the U.S. and increasing in Canada (Sauer et al. 2020). Alaska is outside of the core area and Breeding Bird Survey results are not available for the state. No population trend data specific to the Tongass National Forest is available for American coot.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Most of the watersheds within the Tongass National Forest are in near-natural condition and all watersheds are “functioning properly” (USDA Forest Service 2021). Habitat is varied during the non-breeding season and is not limiting for this species. Coastal marine habitats selected in the non-breeding range, including the Tongass NF area, are generally healthy (Alaska Department of Fish and Game 2015).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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. Breeding habitat is almost exclusively freshwater marshes, but non-breeding habitat is more varied and includes freshwater lakes, ponds, marshes, roadside ditches, impoundments, and coastal marine habitats (Brisbin and Mowbray 2020). Although Alaska's freshwater habitat is generally healthy, threats include point and nonpoint source pollution, development and associated sediment erosion and removal or riparian vegetation, blockages, diversions, channelization, dams, unmonitored water withdrawals, natural resources extraction, mixing zones, invasive species, water withdrawals, and climate change (Alaska Department of Fish and Game 2015). Forest Plan components and best management practices would reduce the likelihood of adverse effects to aquatic habitats as a result of land management or permitting on the forest. Threats to coastal marine habitat include localized development, water pollution, increases in marine water transport activities, invasive species, climate change, and some fishing techniques. Water pollution, particularly from the oil industry, is a major concern in Alaska marine waters (Alaska Department of Fish and Game 2015).
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 event and no other demographic risk factors are known. Most individuals breed their first year (Crawford 1980). American coots are typically single-brooded in northern areas but are known to raise more than one brood in southern areas. A clutch typically ranges from 8 to 12 eggs, with late-season nests often smaller than early-season nests and older birds producing larger clutches than younger birds (Crawford 1980, Gullion 1954, Brisbin and Mowbray 2020). American coots are a game species throughout much of the range. Other factors of mortality are not quantified but include pesticides and other contaminants, ingestion of plastics or lead, habitat degradation, collisions, and disturbance at nest sites (Brisbin and Mowbray 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:** Threats to the coot's freshwater habitat include point and nonpoint source pollution, development and associated sediment erosion and removal or riparian vegetation, anthropogenic flow changes, and invasive species. Threats to marine habitat include pollution, mainly from the oil industry, as well as invasive species. Appropriate Forest Plan components and best management practices could reduce the likelihood of adverse effects to aquatic habitats as a result of land management or permitting on the forest.
- **Declining populations or habitat trends:** Habitat is widely available on the Tongass and is in good condition. There is no information regarding population fluctuations on the Tongass, however, data from across the coot's range suggests it is stable to increasing, and the species has a high reproductive rate.
Restricted Range: American coot is the most abundant and widely distributed species of rail in North America and is a game species in much of the range. The Tongass National Forest is on the edge of the non-breeding range of American coot, with the nearest breeding areas in southwest British Columbia and two disjunct populations in east-central Alaska.
- **Low populations or restricted ecological conditions:** Due to its wide range and the amount of suitable habitat across North America and on the Tongass, it is unlikely that this species would be vulnerable to extirpation by stochastic events.

American coot is not recommended as a Species of Conservation Concern because there is a lack of scientific information to determine that there is a substantial concern for long-term 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 Species of Conservation Concern.
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☒	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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Gavia adamsii*Gavia adamsii* [Gray, 1859]

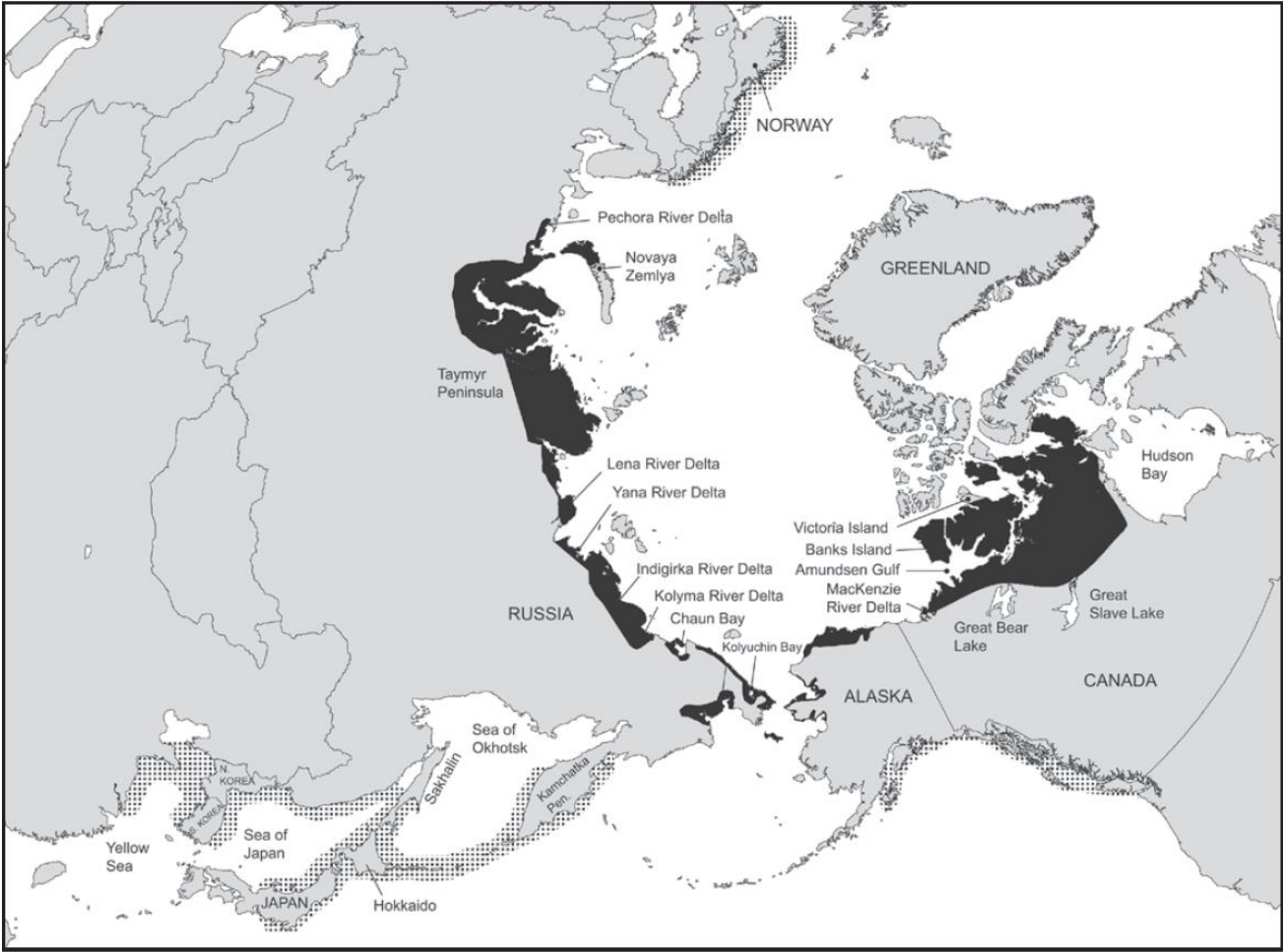
Yellow-billed loon

Global Rank: **G4**Alaska State Rank: **S2S3B/S3N**

photo: Glenn Bartley

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	C	C = Contiguous. The Yellow-billed loon (<i>Gavia adamsii</i>) does not breed on the Tongass but adults can be found in wintering grounds throughout southeast Alaska after their post-breeding migration during the winter (Earnst 2004). Moreover, 1–2-year-olds are thought to remain in immature plumage and to summer in traditional marine wintering grounds (Earnst 2004). They are found almost exclusively in marine environments, and they tend to occur near shore, in waters protected by bays or archipelagos (Earnst 2004), such as estuarine waters (Alaska Department of Fish and Game [ADF&G] 2025).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4, Alaska State Rank S2S3B, S2N, considered a Species of Greatest Conservation Need (SGCN) by the Alaska Department of Fish and Game based on information from the Alaska Species Ranking System, Avian Conservation Assessment Database and the USFWS list of Birds of Conservation Concern (ADF&G 2025). Yellow-billed loons breed in some parts of the Arctic Region, from west of the Hudson Bay to the MacKenzie River Delta in Canada, in the northern and western parts of the far north Alaska, including St. Lawrence Island, and from Kolyuchin Bay to the Pechora River Delta in Russia (Earnst 2004; Fig. 1). They have wintering grounds in the coastal areas of the Gulf of Alaska, from southeast Alaska to Kodiak Island, the whole coast of Norway, and in east Asia, from the Kamchatka

Criteria	Rank	Rationale
		Peninsula (Russia) to Japan in the Sea of Okhotsk and the Pacific Ocean, and the continental coastal areas in the Sea of Japan from east Russia to North and South Korea and Qingdao in China (Earnst 2004).  The map displays the North Pacific region, including parts of Russia, Alaska, Canada, Greenland, Norway, and Japan. Key geographical features and locations are labeled: Pechora River Delta, Novaya Zemlya, Taymyr Peninsula, Lena River Delta, Yana River Delta, Indigirka River Delta, Kolyma River Delta, Chaun Bay, Kolyuchin Bay, Victoria Island, Banks Island, Amundsen Gulf, MacKenzie River Delta, Great Bear Lake, Great Slave Lake, Hudson Bay, Sea of Okhotsk, Sea of Japan, Yellow Sea, Korea, Japan, Hokkaido, Sakhalin, Kamchatka Pen., and Alaska. Distribution areas are indicated by black shading along the Russian coast and in the Sea of Japan, and by stippled patterns in the Sea of Okhotsk and around Japan.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Figure 1: World-wide range of Yellow-billed loon, including breeding range (black), and wintering range (hatched). From Earnst (2004).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. As a volant migratory species (see above), the Yellow-billed loon readily disperses across the landscape and have been reported to reach flying speeds of 64 km/h (Earnst 2004; Uher-Koch and Schmutz 2020).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is little information on the abundance of Yellow-billed loon on the Tongass National Forest. On traditional wintering grounds, Yellow-billed loons are found in low densities during surveys of southeast Alaska during June and July (Earnst 2004). Boat-based surveys conducted from Haines to Ketchikan indicate a total abundance of 267 ± 422 Yellow-billed loons in the area in June-July 1994 (Aglar et al. 1995a). The Yellow-billed loon relative abundance on wintering sites during winter is poorly known, and no studies during this time have been conducted at the species level in southeast Alaska (Earnst 2004).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information available concerning the population trends of Yellow-billed loons on the Tongass National Forest. Although there is information on the population size of Yellow-billed loons in the breeding grounds of northern Alaska, estimated at 3,369 (± 663) individuals (95% CI: 1,910–4,828) in late June (Earnst 2004), and estimations for the whole state of Alaska at 6,000 individuals, it should be noted that 11 marked individuals from Alaska breeding grounds were found to winter off the coast of North Korea, Japan or China, and not in southeast Alaska (Earnst 2004). We found no information on the origin of Yellow-billed loons in southeast Alaska, but is possible that they originate from breeding grounds in Canada. In all of North America (Alaska and Canada), the population of Yellow-billed loons is estimated at 16,000 individuals (Earnst 2004). In general, no evidence of a long-term population trend in Yellow-billed loons over the 18-year Arctic Coastal Plain Survey or the 12-year North Slope Eider Survey was found, with both surveys not showing statistical significance for

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		increasing or declining population trends since 1986 (Earnst 2004). We found no recent data on the population trends of Yellow-billed loons in Alaska, Canada or elsewhere, and a recent study concluded that there is lack of available scientific information to establish population trends of the species (Pollet et al. 2024).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Ecological integrity is the quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence (36 CFR 219.19). According to Chestnut and Tucker (2025), estuarine and nearshore ecosystems have a moderate ecological integrity. This means that if the ecosystem remains on the current trajectory it is expected to deliver major functions and services including supporting biodiversity and productivity at a reduced level relative to expectations for this ecosystem (Turner and Mallott 2025). Moreover, one or more drivers, stressors, and key ecosystem characteristics are compromised in a way that disrupts disturbance regimes or characteristics of the system. However, compromised features are not those that determine the identity of this system or significant characteristics are only modestly compromised. In the case of estuarine ecosystems, these are sensitive to changes in both upland and marine processes (Chestnut and Tucker 2025). Sediment deposition combined with isostatic rebound is extending estuarine systems seaward, especially where the immediate nearshore environment is shallow (Chestnut and Tucker 2025). Moreover, changes to sea surface temperatures, sea level and changes to water chemistry can affect the biological capabilities of estuaries (Chestnut and Tucker 2025). In addition, coastal roads and marine access points that intersect or are adjacent to estuarine channels can alter natural channel movement and inhibit fish passage, and elevated road prisms act as dikes that restrict natural channel location and deposition patterns and have the potential to introduce pollutants to estuarine waters (Chestnut and Tucker 2025). Although approximately 400 acres of estuarine riparian areas were harvested on the Tongass in the past (mostly between 1958-1972), the current Forest Plan (2016) exclude these areas from development and harvested areas have been left to regenerate naturally (Chestnut and Tucker 2025). Moreover, although there are currently three red crossing roads affecting estuarine channels, these are listed for remediation as funding allows (Chestnut and Tucker 2025).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Finally, estuarine channels and their adjacent intertidal areas are vulnerable to climate driven changes in freshwater and marine temperatures and upland conditions that influence the magnitude and timing of streamflow and sediment transport (Chestnut and Tucker 2025). Much less is known about the nearshore marine environment adjacent to the Tongass, and while this ecosystem component is not within the bounds of the Tongass, there are strong physical and biological linkages between land and ocean (reviewed in Chestnut 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. According to Halofsk et al. (2025), estuarine and nearshore marine ecosystem are being affected by sea-level rise and climate change-mediated glacial retreat, freshwater input changes and increased storm intensity and atmospheric rivers. Vulnerable habitats of the Yellow-billed loon due to loss and fragmentation include low slope tidelands, tidewater glaciers and saltwater habitats (Bennetsen et al. 2025). Moreover, increased competition and predation from invasive species favored by warmer climates, and potential changes in prey distribution due to ocean warming and altered nutrient flows are expected to negatively affect marine birds (Bennetsen et al. 2025). In addition, increased storm frequency and intensity can affect nesting success and chick survival for marine birds in coastal areas (Bennetsen et al. 2025). However, and although climate-mediated changes are the primary modern stressors expected to impact estuarine and nearshore marine ecosystems, the potential effects on ecological patterns are not well understood (Chestnut and Tucker 2025). By having a moderate ecological integrity, drivers, stressors, and key ecosystem characteristics of estuarine and nearshore marine ecosystems are expected to exhibit a range of variation that was not common in the past but well within the range that results in resilience (Chestnut and Tucker 2025).
8 Life history and demographic	D	D = Insufficient information to draw inferences about criterion. Little is known about the Yellow-billed loon life history and demographics compared to other loon species, and the little we know comes from a few studies reviewed in Earnst (2004). Because the Yellow-billed loon does not breed in southeast Alaska, only survival in the wintering grounds is important for management of the species on the Tongass (i.e., reproductive rate information is not applicable for management on the Tongass). However, through their range in Alaska, including southeast Alaska, estimates of adult and subadult annual mortality rates are not available for the

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
s		Yellow-billed loon due to the lack of studies on individually marked birds (Earnst 2004). Although none of these sources have been reported in the planning area, known sources of mortality include oil-spill related mortality, subsistence harvest, bycatch in commercial and subsistence fisheries, die-offs during spring migration in years when open-water leads are not available, and aspergillosis (Earnst 2004). Moreover, and although predation on nests and young chicks is common, predation on adults is thought to be uncommon (Earnst 2004). In addition, information from few studies (reviewed in Earnst 2004) indicate that Yellow-billed loons have a low reproductive success.

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

The Yellow-billed loon is perhaps the most understudied species of loon, and little is known about the species in their wintering grounds of southeast Alaska. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats-** We found no current significant threats to Yellow-billed loons or their habitats in the planning area; most threats occur in their breeding grounds in the arctic regions, or in the wintering grounds in east Asia. Climate change, however, is posed to affect estuarine and nearshore marine ecosystems, but the potential effects on Yellow-billed loons are poorly understood.
- **Declining trends-** There is no recent information on the population trends of the Yellow-billed loon, and although they have a relatively low population size, 12-18 years data from 1986 did not show any significant downward or upward trend (i.e., the population seemed stable) in their breeding grounds outside of southeast Alaska. There is no information (historic or present) on the population trends of Yellow-billed loons in the planning area, although abundances seem to be very low. In terms of habitat, although estuarine riverine areas were affected in the past by logging, the current Land Management Plan (2016) protect these areas from this activity, and we expect the habitat to have recovered and remained stable to present. There is little information on the habitat trends of the nearshore marine environment, and

although climate change is expected to incur changes in the future, this ecosystem is expected to show resiliency.

- **Restricted ranges-** The Yellow-billed loon has an extensive breeding range in the arctic region, and in their wintering grounds, so the species is not range-limited. Birds that breed in northern Alaska are thought to winter in east Asia, and the origin of wintering birds in southeast Alaska is unknown. Southeast Alaska is at the edge of the wintering range of the Yellow-billed loon in North America
- **Low population numbers (vulnerable to extirpation by stochastic events) or restricted ecological conditions-** As a whole, the species have relatively low population numbers, with an estimate of 16,000 birds in North America, and 6,000 birds in Alaska. In southeast Alaska, where they winter, they seem to be rare and occur at low densities, but there are no population estimates. They are restricted to nearshore marine and estuarine environments, but these are widespread throughout the Tongass.
- **Other factors-** No other factors were found to negatively affect the Yellow-billed loon viability in the planning area.

Taken together, we find that there is insufficient scientific information to determine whether there is substantial concern over the long-term persistence of the species or if the species is secure in the planning area, and we are therefore not recommending the Yellow-billed loon as a 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 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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Haematopus bachmani*Haematopus bachmani* (Audubon, 1838)

Black oystercatcher

Global Rank: **G5**Alaska State Rank: **S2S3B, S2N**

photo: Brian Sullivan

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. Disjunct patches of habitat are typically large enough and close enough together to other patches to permit dispersal among patches and to allow species to interact as a metapopulation. The black oystercatcher nests, feeds, and winters in the intertidal margins. This species is distributed throughout the Tongass National Forest (Andres and Falxa 1995, Tessler et al. 2007, Tessler et al. 2014, Alaska Department of Fish and Game 2015).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S2S3B, S2N Washington State Rank S4, Oregon State Rank S3, California State Rank SNR, British Columbia Provincial Rank S4 The wide nesting distribution of black oystercatcher extends from the Aleutian Islands to Baja California (Andres and Falxa 1995, NatureServe 2023). The species may migrate or stay resident in winter. For example, populations in Kodiak may stay resident, populations from Middleton Island or Prince William Sound may migrate to the Tongass National Forest or British Columbia coastlines, and populations on the Tongass National Forest may migrate to British Columbia or simply to more southern locales on the Tongass National Forest coastlines (Johnson et al. 2010). They are broadly distributed in winter or summer (Tessler et al. 2014, Alaska Center for Conservation Science 2019).

Criteria	Rank	Rationale
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. Migratory oystercatchers show fidelity to breeding and nonbreeding sites. See above. Birds disperse short and medium-long distances (Johnson et al. 2010). Following colonization of Middleton Island after formation of nesting habitat by the 1964 earthquake (Gill et al. 2004), the population grew to 800 birds by 2005. This demonstrates ability to disperse to remote sites and form breeding subpopulation. While nesting adults show high nest site fidelity (Andres and Falxa 1995), dispersal does not appear to be limiting (e.g., Gill et al. 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. Oystercatchers are large shorebirds that occur at relatively low densities throughout their range (Poe et al. 2009), although high densities have been recorded (Andres and Falxa 1995, NatureServe 2023). Distribution observed in agency surveys (Alaska Department of Fish and Game and Forest Service) suggest suitable habitat is occupied throughout coastal habitats on the Tongass. Abundance appears in line with the ecology of the species and not seen as an issue because of the relationship with expectations for a shorebird of this size.
5 Population trend on Tongass NF	A/B	A/B = Stable to declining population trend. No population trend is known for the Tongass National Forest. Survey data elsewhere (Chugach National Forest, Middleton, Kodiak) suggest a stable long-lived population with high inter-annual variability in success and recruitment (Alaska Center for Conservation Science 2019). Survey data for islands north of Juneau suggest a stable population. Overall, populations in Alaska appear productive and stable (Alaska Department of Fish and Game 2015), although survey data for the Sitka Sound shows a large population decline of 80 percent from 1940 to 2007 likely due to human development occurring during this period (Andres and Christensen 2009). There was some past concern regarding disturbance from recreation leading to poor breeding success and downward population trends (Tessler et al. 2014).
6 Habitat trend on Tongass NF	C	C = Improving habitat quality or increasing amounts of suitable or potential habitat. Loss of shoreline habitat from sea level rise in southeast Alaska is substantially offset by the land rising up in isostatic rebound as glaciers lose mass and retreat (Alaska Department of Fish and Game 2015). Resulting relative sea levels are projected to be as much as 5.9 feet lower 100 years from now at northerly latitudes of the Tongass (Draft Wildlife Climate Change Vulnerability Assessment for the Tongass National Forest). There was some past concern for habitat in

Criteria	Rank	Rationale
		other areas of Alaska. For example, oystercatcher habitat in Prince William Sound was severely compromised by the consequences of the Exxon Valdez oil spill (Andres 1997). Evidence suggests habitat has largely recovered (Murphy and Mabee 2000). Habitat is influenced periodically by uplift from earthquakes. Population is likely not responding strongly to 1964 earthquake over 50 years after, but these events influence availability of nesting habitat and status of prey. Disturbance by recreation is the dominant threat and influences oystercatchers most strongly in isolated portions of coastal Alaska (Tessler et al. 2014), as evidenced by studies on the Chugach (Poe et al. 2009) and Sitka Sound (Andres and Christensen 2009).
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. Current management direction and human use of shoreline suggest that oystercatcher habitat is unlikely to be negatively modified over extensive areas by management activities or permitted activities. Although recreation may represent the most likely threat related directly to management, Poe et al. (2009) appear to suggest that threat is not widespread and substantial but is important at individual sites. Studies for the Sitka Sound attribute a large population decline of oystercatchers at that location to human development and associated activities (Andres and Christensen 2009). In particular, that study noted the impact of human disturbance from nearby residences and boat traffic, as well as the potential for flooding of nests caused by the wake of large ships. The more substantial, potential threats to oystercatcher habitat currently appear to result from shifts in ocean conditions, including sea water pH that could influence prey populations, and frequency and intensity of storms which could increase the proportion of nests lost to flooding (Tessler et al. 2014). Other potential stressors include oil and other xenobiotic pollutants (Flemming et al. 2022).
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 black oystercatcher has a low reproductive rate that is highly variable by year (Andres and Falxa 1995). High nest mortality due largely to flooding at high monthly tide. They are recognized as a long-lived species, therefore life history suggests population growth is most sensitive to stressors influencing adult survival. No current, chronic stressors are recognized as threats to adult survival. Prey populations in Prince William Sound recovered after Exxon Valdez oil spill. However, oystercatcher population at Sitka Sound has not recovered from a large decline observed from 1940 to 2007. While it is likely that ocean acidification, warming temperatures, sea level rise, and increased storm frequency will alter

Criteria	Rank	Rationale
		the availability and distribution of prey (Tessler et al. 2014; e.g., Saalfeld et al. 2021), a high input of glacier fed, fresh water in region suggests conditions along the coast may be different from the broader ocean patterns in pH and temperature. Additionally, isostatic rebound from deglaciation is expected to substantially offset sea level rise 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)	☒	☐	☐

Conclusion Rationale

There is not substantial concern for the persistence of the black oystercatcher (*Haematopus bachmani*) within the plan area for these reasons:

- Significant threats: Current management direction and human use of shoreline suggest that oystercatcher habitat is unlikely to be negatively modified over extensive areas by management activities or permitted activities. Effects of sea levels from climate change (e.g. rising levels) are expected to be offset by isostatic rebound causing the land mass to rise. Xenobiotic contaminants, such as oil, may present future challenges to shorebirds but are not directly attributed to declines in black oystercatcher populations or abundance.
- Declining populations or habitat trends: The Sitka Sound population on the Tongass National Forest declined over 80 percent between 1940 and 2007 and has not since recovered. Population trend of oystercatchers in Alaska is unknown but suspected to be productive and stable. Human activity may cause declining habitat at individual populated sites, but isostatic rebound causing the land to rise is expected to combat rising sea levels, increasing shoreline habitat for the birds.
- Restricted range: The black oystercatcher is widely distributed outside the Tongass National Forest.
- Low populations or restricted ecological conditions: There is not specific population trend information available for the Tongass National Forest, but studies have demonstrated that the Sitka Sound populations declined over 80 percent from 1940 to 2007. Past stochastic

events have negatively impacted specific sites, but high dispersal ability of the birds across the landscape suggests that future stochastic events would not impact the population overall and impacted individuals would be able to relocate.

- Other factors: Human activity, localized and more broadly (e.g. oil spills) have negatively impacted black oystercatchers in the past in the plan area and those threats are expected to continue. While it is likely that ocean acidification, warming temperatures, sea level rise, and increased storm frequency will alter the availability and distribution of prey, a high input of glacier fed, fresh water in region suggests conditions along the coast may be different from the broader ocean patterns in pH and temperature.

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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Hydroprogne caspia*Hydropogne caspia*, AOU 2006**Caspian Tern**Global Rank: **G5**Alaska State Rank: **S1S2B**

photo: Adam Peck-Richardson

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	C	C = Contiguous - habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species, little or no limitation on interaction among populations. The Tongass National Forest is not within the range mapped for the Alaska GAP analysis (Gotthardt et al. 2012). However, this species has expanded its range (Gill and Mewaldt 1983, McCaffery et al. 1997) and multiple occurrences have been recorded in eBird both on and adjacent to the Forest. All occurrence records are within the breeding season of May through September, with most in June and July (eBird 2023). Records are patchily distributed across the forest, likely reflecting where people are birding, but habitat is contiguous.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest Global Rank G5, Alaska State Rank S1S2B Caspian tern is widely distributed globally and across North America in coastal and freshwater habitats (Cuthbert and Wires 2020). The breeding range covers large parts of six geographic regions in North America and is expanding along the Pacific coast and in central Canada. Summer observations in Alaska were reported annually beginning in 1981 and breeding was confirmed in 1996 on the Copper River Delta and Neragon Island in the Bering Sea (McCaffery et al. 1997).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. Caspian terns are migratory, disperse readily, and are known to establish breeding colonies in new locations (Gill and Mewaldt 1983, McCaffery et al. 1997, Roby et al. 1998, Cuthbert and Wires 2020). Adults show strong fidelity to the colony where they bred the previous year but birds do not exhibit fidelity to natal colony (Cuthbert and Wires 2020).
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 breeding colony is known in the Twin Glacier Lake area (World Seabird Union 2023) on the Tongass NF. A small colony of 16 individuals breeding and roosting was confirmed in 2000, with no more recent data available (World Seabird Union 2023). The number and distribution of eBird occurrences in recent years (see Criteria 1) suggest Caspian terns may currently be more abundant on the Tongass NF.
5 Population trend on Tongass NF	C	C = Upward population trend. North American populations have increased and expanded, including north along the Pacific Coast (Gill and Mewaldt 1983, Wires and Cuthbert 2000, Sauer et al. 2020). Alaska is outside of the core area and Breeding Bird Survey results are not available for the state (Sauer et al. 2020). No population trend data specific to the Tongass National Forest is available for Caspian tern. However, with the expanding range, recent observations, and relatively recently discovered breeding colony, it is assumed the population on the Forest has been increasing in recent decades.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Most of the watersheds within the Tongass National Forest are in near-natural condition and all watersheds are “functioning properly” (USDA Forest Service 2021). Coastal marine habitats in Alaska are generally healthy (Alaska Department of Fish and Game 2015).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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. Wide variety of habitats for breeding, but very specific requirements due to vulnerability to predators. Habitats include coastal estuarine, salt marsh, and barrier islands. Nests on flat rocky islands, beaches, and sandy shores, sparsely vegetated and littered with driftwood (Cuthbert and Wires 2020). In some areas where numbers are increasing, large numbers are breeding in artificial habitat including dredge spoil islands, salt dikes and levees, landfills, and artificial lakes (Wires and Cuthbert 2020). Although Alaska's freshwater habitat is generally healthy, threats include point and nonpoint source pollution, development and associated sediment erosion and removal or riparian vegetation, blockages, diversions, channelization, dams, unmonitored water withdrawals, natural resources extraction, mixing zones, invasive species, water withdrawals, and climate change (Alaska Department of Fish and Game 2015). Forest Plan components and best management practices would reduce the likelihood of adverse effects to aquatic habitats as a result of land management or permitting on the forest. Threats to coastal marine habitat include localized development, water pollution, increases in marine water transport activities, invasive species, climate change, and some fishing techniques. Water pollution, particularly from the oil industry, is a major concern in Alaska marine waters (Alaska Department of Fish and Game 2015).
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. Most individuals do not breed until 3 years of age (Cuthbert and Wires 2020). Caspian terns are typically single brooded with 1-3 eggs per clutch and fledge one chick per pair. Breeding colonies can be large, with the largest known colony on an island in the Columbia River estuary supporting over 16,000 birds in 1997 (Roby et al. 1998).

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 persistence of the Caspian tern (*Hydroprogne caspia*) within the plan area, based upon the following:

- **Significant threats:** Potential threats to the species include effects of human development, including pollution, erosion, loss of vegetation or habitat alteration, invasive species, and climate change. However, populations of this species are expanding and adapting to survive in artificial and urban environments, suggesting they may be relatively unaffected by urbanization. Habitats in Alaska are generally healthy and Forest Plan components are expected to reduce harm to the species.
- **Declining populations or habitat trends:** Habitats for this species are ubiquitous and relatively stable, and populations are believed to be increasing.
- **Restricted range:** This species is widely distributed outside the Tongass National Forest and has been sighted during the breeding season in the plan area.
- **Low populations or restricted ecological conditions:** This species has stable to increasing populations and has demonstrated high dispersal ability and adaptability to urbanization and anthropogenic habitat alterations.

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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Lasionycteris noctivagans*Lasionycteris noctivagans* Le Conte

Silver-haired bat

Global Rank: **G3G4**Alaska State Rank: **S4**

photo: John MacGregor

**Species Assessment**

Criteria	Rank	Rationale
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There have been four verified specimens of <i>Lasionycteris noctivagans</i> collected in Alaska, all four being collected within Tongass National Forest or in adjacent national wilderness area (Alaska Department of Fish and Game 2023). There are no reports of maternity roosts within the Tongass.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G3G4, Alaska State Rank S4 <i>Lasionycteris noctivagans</i> are thought to be widely distributed throughout southeastern Alaska, though there are only four confirmed specimens collected in the region (Alaska Department of Fish and Game 2023). There are seven unverified specimens reported from areas within and adjacent to the Tongass National Forest (Arctos Database accessed on 11/29/2023). Blejwas et al. (2014) detected 3,075 bat calls that were determined to be <i>Lasionycteris noctivagans</i> at multiple sites near Juneau and Sitka. Outside of Alaska, <i>Lasionycteris noctivagans</i> is distributed widely throughout North America (North American Bat Monitoring Program 2023).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. <i>Lasionycteris noctivagans</i> tend to migrate to milder climates before hibernation. Roosting areas between and during migration are transient, allowing individuals to choose appropriate habitat from what is available. A study by Blejwas et al. (2014) detected <i>Lasionycteris noctivagans</i> in summer and winter months, suggesting that at least some individuals in southeastern Alaska may remain in the area year-round. There is little known of the dispersal range of this species.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Abundance on the Tongass is not well documented, though there have been confirmed specimens found on or near the Tongass.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information available for the population trend on the Tongass National Forest. The Alaska Center for Conservation Science estimates a state-wide population size 3,001 to 10,000 individuals (Alaska Center for Conservation Science 2017).
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. <i>Lasionycteris noctivagans</i> frequently uses tree cavities for roosting, nursery sites, and hibernacula. They are most frequently found in forested areas near water (Alaska Department of Fish and Game 2023). It has been observed that <i>Lasionycteris noctivagans</i> show a preference for forest areas with a relatively high number of snags (Campbell et al. 1996).
7 Habitat vulnerability	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 would likely be the greatest concern for the Silver-haired bat. Harvest of mature cavity trees would lead to loss of roosting, hibernating, and maternity habitat. Changes in vegetation profile can also impact foraging of forest

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
or modification; other threats		bat species. Habitat fragmentation may pose challenges during migration (Parker et al. 1996). Areas of the Tongass used for harvesting activities may serve as important habitat. <i>Lasionycteris noctivagans</i> made up 18% of bat mortalities caused by wind turbines between 2000 and 2011 across the United States and Canada (Arnett and Baerwald 2013), however it is unknown whether this is a threat on the Tongass NF. Though white nose syndrome (WNS) has been detected in the species elsewhere in its range, the <i>Pd</i> -positive individuals did not exhibit symptoms (White-nose Syndrome Response Team 2023).
8 Life history and demographic s	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. <i>Lasionycteris noctivagans</i> are solitary outside of mating, which occurs during migration, and maternity colonies. Breeding occurs in the early fall followed by a delayed fertilization in the spring (Kunz 1982). Females will congregate in tree cavities to form maternity roosts of less than 20 individuals, though aggregations of up to 55 have been reported (Mattson et al. 1994; Parsons et al. 1986). Each female will produce a litter of 1-2 young which will remain dependent on the mother for about three weeks. Young reach sexual maturity by the end of their first summer, however maturity may be delayed in colder climates (Cryan et al. 2012; Nagorsen and Brigham 1993). Current demographics 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

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

- **Significant threats** – Timber harvest may lead to habitat fragmentation and loss of roosting, hibernating, and maternity habitat. While white nose syndrome has been detected in silver-haired bats elsewhere in its range, infected individuals did not exhibit symptoms.
- **Declining populations or habitat trends** – There is no information available for population or habitat trends on the Tongass National Forest.
- **Restricted range** – *Lasionycteris noctivagans* are thought to be widely distributed throughout southeastern Alaska, though there are only four confirmed specimens collected in the region. Outside of Alaska, *Lasionycteris noctivagans* is distributed widely throughout North America.
- **Low populations or restricted ecological conditions** – Abundance on the Tongass National Forest is not well documented, though there have been confirmed specimens found on or near the Tongass. In 2014, 3,075 bat calls were determined to be *Lasionycteris noctivagans* at multiple sites near Juneau and Sitka. The Alaska Center for Conservation Science estimates a state-wide population size 3,001 to 10,000 individuals. Silver-haired bats rely on mature cavity trees and snags for roosting, nursery sites, and hibernacula. There is no information available on the continuity or density of suitable cavity trees to determine if suitable trees are limited 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 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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Lontra canadensis mira

Lontra canadensis mira Hall
 Prince of Wales river otter

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



photo: Matt Goff © Matt Goff www.sitkainature.org

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. Disjunct patches of habitat are typically large enough and close enough together to other patches to permit dispersal among patches and to allow species to interact as a metapopulation. Little information is available on the subspecies Prince of Wales River Otter. Prince of Wales River Otter is identified as a subspecies due to its large size relative to other river otters. However, no research has confirmed this subspecies genetically (Melquist, 2003). All information included in this assessment is on the parent species of river otter in Southeast Alaska, unless noted otherwise. The Tongass National Forest makes up most (78%) of Game Management Unit 2, which encompasses Prince of Wales Island (Dorendorf, 2019). Distribution is unknown but river otters use freshwater habitat and the coastline (Larsen, 1984). Most river otters in Southeast Alaska are harvested along saltwater shoreline areas (Harper and McCarthy, 2013). It is assumed that river otter habitat usage is mostly contiguous but gaps may occur, particularly in recent clearcut areas (see Criteria 6).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
2 Distribution in surrounding geographic area	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics) Global Rank G5T3, Alaska State Rank S3 Although this subspecies is not confirmed genetically, Prince of Wales river otter is only known to occur on Prince of Wales Island. However, the parent species of river otter is widely distributed.
3 Dispersal capability	B	B = Disperses only through suitable habitat. River otter remains recovered from caves of Prince of Wales Island suggest this species was abundant in the late Pleistocene to early Holocene age (Heaton and Grady, 2003). Dispersal between islands may be limited to winter when ice bridges form. Although dispersal to new islands may not occur frequently, river otters disperse readily where habitat is available.
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. River otter is a managed furbearer species and in the Southeast Alaska region were considered common during regulatory year 2020 (Bogle, 2021).
5 Population trend on Tongass NF	B	B = Stable population. Otter populations are believed to fluctuate in line with trapper effort (Harper and McCarthy, 2013). In Game Management Unit 2, the average harvest was higher in regulatory years 2012 to 2017 compared to the 10-year average (Dorendorf, 2019). Southeast Alaska trappers considered river otter populations to have no change in trend during the 2020 regulatory year (Bogle, 2021).
6 Habitat trend	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. A study on Prince of Wales Island found that river otters used old growth high volume, old growth low volume, 60 to 70-year-old second growth, residual beach fringe, and island habitats in proportion to their availability (Larsen 1983).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
on Tongass NF		Otter usage in clearcut habitat (5 to 20-year-old) was observed less frequently than forested habitats, usually within 1-4 m of the beach (Larsen 1983). Larsen (1983) hypothesized that clearcuts may be avoided because it is difficult to catch prey in areas with heavy logging slash and dense shrub thickets.
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. Alaska Department of Fish and Game (Harper and McCarthy, 2013) reports that Southeast Alaska provides excellent habitat for river otters and a variety of forage that supports plentiful harvest (Larsen 1984), evidenced by exceptionally large body sized and high-quality fur (Larsen, 1984; Ben-David et al, 1996). Otters are especially sensitive to pollutants. River otters were killed by direct effects of the Exxon Valdez oil spill. Food quantity and prey species richness were also adversely affected, resulting in lower body mass of river otters captured in oiled areas for at least two years after the oil spill (Faro et. al, 1994). Mortality causes including predators, ectoparasites, endoparasites, infection, and disease exist but are not known to have severe impacts on otter populations (Melquist, 2003). Ectoparasites including fleas, lice, ticks, and others can affect individuals and family groups. Trappers reported scarce fleas and no other ectoparasites observed on river otter in Southeast Alaska in the 2020 trapping season (Bogle, 2021). Human-caused impacts including trapping/harvest and habitat modification or destruction impact greater numbers of river otters than natural causes (Melquist, 2003).
8 Life history and demographic s	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. Female river otters breed beginning at 1 year old and males first produce sperm at an estimated age of 8 to 20 months. Litter sizes range from one to six pups and produce one litter every 1 to 2 years (Melquist, 2003).

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:** Alaska Department of Fish and Game reports that Southeast Alaska provides excellent habitat for river otters as evidenced by exceptionally large body sized and high-quality fur. Otters are especially sensitive to pollutants and have been known to face temporary population and health-related setbacks as a result of oil spills. Other general threats include predators, ectoparasites, endoparasites, infection, and disease, but these are not known to have severe impacts on otter populations. Human-caused impacts including trapping/harvest and habitat modification or destruction impact greater numbers of river otters than natural causes.
- **Declining populations or habitat trends:** Otter populations appear to be stable in the TNF, as documented by trapping statistics in Game Management Unit 2. Otters can occupy a range of habitat types and can disperse readily through suitable habitat. They are observed less frequently in clearcuts, but can be found in old-growth, second growth, beach fringe and island habitats.
- **Restricted range:** The Prince of Wales river otter is a narrow endemic, restricted to Prince of Whales Island. However, genetic analysis has not been completed, so it's status as a true subspecies has not been confirmed. River otters are otherwise common and widely distributed in the area.
- **Low populations or restricted ecological conditions:** A Population assessment of the Prince of Wales river otter subspecies has not been completed. But river otter populations in its range appear to have remained stable for at least the past decade. This potential subspecies could be at greater risk due to its restricted range.
- **Other factors:** Genetic analysis has not been completed, so the Prince of Wales river otter's status as a true subspecies has not been confirmed. If confirmed, the restricted range of this subspecies may put it at greater risk in the face of a stochastic event.

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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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Marmota caligata vigilis*Marmota caligata vigilis* Heller, 1909

Glacier Bay hoary marmot

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

photo: ADFG

**Species Assessment**

Criteria	Rank	Rationale
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterium. This subspecies is recorded only from the type specimen collected in 1907 from the west shore of Glacier Bay, Alaska (administered by the National Park Service) at a feature then known as Coppermine Cove in what is now Glacier Bay National Park (Howell 1915, MacDonald and Cook 2007, Braun et al. 2011, ARCTOS 2025). <i>Marmota caligata vigilis</i> was distinguished as a subspecies based upon morphological characteristics (Hafner et al. 1998). The taxon has not been re-evaluated since the early 20th century (NatureServe 2025, Hafner et al. 1998, Androski et al. 2024). The Alaska Department of Fish and Game has stated that additional specimens are needed from Glacier Bay to review subspecies designations (ADFG 2018), however this taxon is recognized as a valid subspecies by many (MacDonald and Cook 2007, NatureServe 2025). As the taxon is confirmed only from Glacier Bay National Park (Hafner et al. 1998), however, it cannot be confirmed to occur on the TNF.
2 Distribution in surrounding geographic	B	B = Limited distribution outside the Tongass National Forest. Global Rank G5T3, Alaska State Rank S3 This taxon is known definitively only to its type location, described by collectors as “Coppermine Cove” on the west shore of Glacier Bay, Alaska (Howell 1915, ARCTOS 2025), although marmots have been observed in Glacier Bay National Park in subsequent years (Hafner et al. 1998). The parent species <i>Marmota caligata</i> is widespread in the in Northwest United States (Alaska, Washington, Idaho, and Montana) and parts of Canada (Alberta, British Colombia, Northwest

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
area		Territories, and Yukon Territory) but absent from nearly all islands in southeast Alaska (ADFG 2018, MacDonald and Cook 2007).
3 Dispersal capability	B	B = Disperses only through suitable habitat. No information specific to the dispersal capabilities of <i>Marmota caligata vigilis</i> was found, however some information can be inferred from related marmot taxa. <i>Marmota caligata</i> is colonial; colonies cover from 1.1 to 12 ha and densities range from 0.6 to 7.8 animals/ha; mean home range is 13.8 ha and mean foraging area is 9.2 ha. <i>Marmota caligata</i> disperses or moves to the periphery of their natal colony when 2 years of age (43% dispersed), although 3-year-olds or older individuals (5-year-olds) also may disperse. Dispersal is correlated with the presence of new litters in a colony (86% of dispersers resided in colonies with new litters), is sex biased (68% males and 25% females) and is related to winter mortality (2-year-olds are less likely to disperse if mortality is high). Transients may comprise about 2% of a resident population (Braun et al. 2009). In other marmot species (<i>Marmota vancouverensis</i>), juvenile dispersal is generally less than 5 kilometers in suitable habitat but can be much more. In <i>M. flaviventris</i>, virtually all males and slightly less than half the females disperse from the natal colony, typically as yearlings and regardless of population density in males; dispersal distance usually is less than 4 km but up to 15.5 km for males and 6.4 km for females in western. Separation distance is set at 5 km, although some locations farther apart than this may be part of the same metapopulation (Bryant 1998 and Armitage 1991 in NatureServe 2025).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. This taxon is not confirmed to occur on the TNF.
5 Population trend on	D	D = Insufficient information to draw inferences about criterion. This taxon is not confirmed to occur on the TNF.

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
Tongass NF		
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. No habitat information specific to <i>Marmota caligata vigilis</i> was found, but habitat can be reasonably inferred from descriptions of habitat for the parent species, <i>Marmota caligata</i>. Habitat for <i>Marmota caligata</i> is described as is alpine areas across most of Alaska south of the Yukon River and along areas of the coast. <i>Marmota caligulata</i> are found on talus slopes, boulder fields, and rock outcrops, or burrowing into the soil under rocks. Dens are often located near an observation post such as a tall rock, berm or cliff edge. Most marmot dens have a main entrance with a mound of dirt near the hole and a number of concealed entrances, entrances are often lined with grass. Rocks must be large enough and accumulated to a depth sufficient to give subsurface protection, as predators such as wolves, bears and coyotes will dig out marmots if they can (ADFG 2018).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Due to the limited data on <i>Marmota caligata vigilis</i> The Forest Service is unable to determine habitat vulnerability or modification, or other threats specific to this taxon. Threats to the parent species, <i>Marmota caligata</i>, were noted in a statewide assessment (ADFG 2018), <i>Marmota caligata</i> may be sensitive to the effects of climate change on their alpine habitat in more northerly areas of its habitat (Johnston et al. 2012; Hope et al. 2015), with a predicted decrease in suitable habitat across Alaska is expected to decrease by the end of this century (Hope et al. 2015).
8 Life history and demographic s	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 only data found on this species refers to articles written in 1909 and 1915. No recent data has been collected, therefore there is insufficient information to draw inferences about life history and demographics. <i>Marmota caligata</i> reach reproductive maturity at 3 years of age and mate in April or May and have a litter size of 3 to 8 offspring after about a 5-week gestation period. Offspring live and hibernate with their parents for two years before dispersing (ADFG

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		2018; Braun et.al, 2009). They are a non-migrant and generally disperse less than 5 kilometers in suitable habitat (Nature Serve Explorer 2025).

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

This taxon is not currently confirmed to occur on the Tongass NF, and therefore cannot be considered for recommendation as a 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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Megascops kennicottii

Megascops kennicottii Howell
Western Screech Owl

Global Rank: **G4G5**

Alaska State Rank: **S2**



photo: Tania Simpson

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	C	C = Habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species, little or no limitation on interaction among populations. There is no population data for <i>Megascops kennicottii</i> on the Tongass NF in NRM. There is spatial data collected on eBird but it can only be filtered by month and year and the layer is not able to be exported for further analysis. Range maps for the species show it distributed across SE Alaska with some sightings along the coast south of Anchorage, Alaska (eBird, 2021).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4G5, Alaska State Rank S2 Washington S4, Montana S3S4, Oregon S4? British Columbia S4, Canada: Threatened On the <i>Megascops kennicottii</i> species page in eBird it shows number of observations in Alaska at 336 in data ranging from the 1900s to present. Range maps for the species show it distributed across SE Alaska into British Columbia. It is found in appropriate habitat in part or all the following American states: Alaska, Washington, Idaho, Montana, Oregon, Wyoming, California, Nevada, Utah, Colorado, Arizona, New Mexico and Texas. Within Mexico, it is found in Baja

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		California and Sonora, as well as southward through the center of Mexico from Chihuahua to Mexico City (COSEWIC, 2012). The species is considered Threatened in British Columbia.
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. The western screech-owl nests in tree cavities and hunts along larger river corridors and in the conifer forests in Southeast Alaska (Alaska Department of Fish and Game). They remain in their breeding site throughout the year (Cannings et. al, 2020). In a study performed in southwestern Idaho fledged young were found to disperse 1 to 36 km from their natal area, with females averaging 16.4 km and males averaging 5.1 km (Ellsworth and Belthoff, 1997).
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 is no abundance data on the Tongass NF of <i>Megascops kennicottii</i> in the NRM database. The data on eBird shows the mean relative abundance at 0.0001. Alaska is estimated to have 0.3% of the Western Screech-owl population with 4% of the range falling within Alaska (eBird, 2021). This species may be more common than records indicate due to contiguous habitat and lack of data. Sightings recorded on eBird show the number of observations in Alaska at 336 in data ranging from the 1900s to present with most sightings occurring in or around the Tongass NF area (eBird, 2021).
5 Population trend on Tongass NF	A	A = Significant downward or suspected downward population trend. There is limited information on population trends for <i>Megascops kennicottii</i> on the Tongass NF. Although a study of occupancy in southeast Alaska estimated a 35% increase between "historical" (1986-1992) and "current" (2005-2008) time periods, this estimate was not statistically significant. This study additionally found that <i>Megascops kennicottii</i> were absent from two of the three study areas over the same time period (Kissing et al. 2009). The study author believes that the species has almost surely declined in numbers in southeast Alaska over that twenty year period (Kissling in COSEWIC 2012).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Breeding Bird Survey information throughout the range of western screech owls suggest declines from 1968 to 2015 (eBird, 2021). On a regional scale, Western Screech-Owl populations in coastal British Columbia are clearly in decline, e.g. from 1988 to 2004, Christmas Bird Count data indicated a mean annual decline of 32% in coastal mainland areas of British Columbia (Elliott 2006).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. On the Pacific coast in Washington, British Columbia, and Alaska <i>Megascops kennicottii</i> is found in mixed conifer forests of Big-leaf maple (<i>Acer macrophyllum</i>), red alder (<i>Alnus rubra</i>), Douglas fir, western hemlock (<i>Tsuga heterophylla</i>), and western red cedar (<i>Thuja plicata</i>) (Cannings et al., 2020). The species is closely linked to riparian habitats over much of its range. Loss of riparian forest in the past associated with timber harvest and current increases in barred owls may have led to recent declines in abundance and distribution in British Columbia (COSEWIC, 2012; Elliott, 2006). Large-scale timber harvest on the Tongass NF initiated in the mid-20th century resulted in a decreasing trend in riparian forest habitat (Ross et al. 2019). Habitat on the Tongass NF (reserves in conservation strategy, wilderness areas, riparian areas intact because of management practices) has been subsequently protected under the current Forest Plan and the 2001 Roadless Rule, which prohibits road construction, reconstruction, and timber harvest in inventoried roadless areas, with limited exceptions (USFS, 2023). Measures in the current Forest Plan also protect active raptor nests, both from habitat modification and from disturbance during breeding (Bennetsen, 2020). Western screech-owls on Mitkof Island nest in natural cavities in dead or dead portions of live western hemlocks that average 27 inches DBH, often the largest trees in the stand (Kissling and Lewis 2009). Forested habitat within valley bottoms near large streams are particularly important for some species (Johnson et al. 2008, Kissling and Lewis 2009). Young-growth management that accelerates large tree and snag development will benefit habitat components for these species over the long term. Treatments that promote hawk and owl prey, such as small mammals, birds, small vertebrates, and insects are also likely to benefit these raptor species (Bennetsen, 2020).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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 (barred owl). Legislation signed in January 2023 reinstated the 2001 Roadless rule, which prohibited road construction, reconstruction, and timber harvest in inventoried roadless areas, with limited exceptions. This protected 9.37 million acres of roadless areas on the Tongass NF. Under the current Forest Plan, management activities have been permitted in riparian areas if they would have a neutral or beneficial impact on water quality, fish habitat, and riparian resources (USFS 2001; USFS 2006). Climate change may benefit the Western screech-owl with changes in winter food availability. Kissling and Lewis (2009) document the importance of unfrozen freshwater streams to western screech-owl and their invertebrate prey during winter/early spring territory establishment, and found greater occupancy of this species in areas with these characteristics. Warming winters and early ice melt will therefore likely benefit this species. These benefits, however, are expected to be substantially offset by continued barred owl expansion into Southeast Alaska. Barred owls are known predators and competitors of western screech owls and may be narrowing the distribution of western screech owls in southern portions of the Tongass NF (Kissling and Lewis 2009, Bennetsen et al. 2023). Barred owl occupancy was estimated to have doubled between 1986-1992 and 2005-2008 (Kissling and Lewis 2009).
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. <i>Megascops kennicottii</i> begin breeding at 1 year old. Clutches typically have 3-5 eggs but can range from 2-7, with one brood per season. Lifespan has been documented on banded birds in Idaho with females having an average lifespan of 1.73 years and males averaging 1.83 years. The longest lifespan recorded on a banded, wild western screech owl was 13 years old from Claremont, CA. Starvation is likely the most common cause of death for nestlings; few nests have been recorded as depredated, although hard data are lacking. Fledglings, particularly individuals that are poorly fed or weakened by cold, wet weather, are easily caught by ground predators such as dogs (<i>Canis lupus familiaris</i>) and cats

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		(Cannings et.al, 2020). Barred owls are the likely cause of population decline in British Columbia due to habitat competition with and predation of the western screech owl (Elliott, 2006).

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:** Barred owl competition and predation and loss of riparian habitat to timber harvest are the most significant threats facing the western screech owl on the Tongass NF. It was estimated that barred owl occupancy had doubled in Southeast Alaska between 1986-1992 and 2005-2008, suggesting an increased and significant threat from this species.
- **Declining populations or habitat trends:** Breeding Bird Survey information throughout the range of western screech owls suggest declines from 1968 to 2015. A declining population trend on the Tongass NF is suspected from occupancy study results. Although large-scale timber harvest on the Tongass NF initiated in the mid-20th century resulted in a decreasing trend in riparian forest habitat, subsequent protections under the Roadless Rule and current Forest Plan stabilized this declining trend in riparian forest through restrictions on timber harvest in riparian areas and in old-growth Forest Reserves.
- **Restricted range:** The western screech owl is broadly distributed in Southeast Alaska, where it is associated primarily with riparian forest. Outside the Tongass National Forest it is found throughout southeast Alaska, and the western United States and Mexico.
- **Low populations or restricted ecological conditions:** There is a lack of population data for this species in Alaska and on the Tongass NF. Riparian habitat is widespread across the Tongass NF.
- **Other factors:** The increased abundance of barred owl contributed to a Threatened listing for this species in Canada, and is suspected to be a substantial threat to western screech owl 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 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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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DRAFT

Microtus longicaudus coronarius*Microtus longicaudus coronarius* [Swarth, 1911]

Coronation Island vole

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

photo: Lynn Armstrong

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	B/D	B = Patchy OR gaps./D = Insufficient information to draw inferences about criterion. The range extent of the Coronation Island vole is described as limited to Coronation, Warren and Forrester islands in the Alexander Archipelago, Southeast Alaska (McDonald and Cook 2007). However, Cook et al. (2001) reported that only two deep lineages occur within southeast Alaska, with <i>Microtus longicaudus coronarius</i> in the same (coastal) clade as <i>M. l. littoralis</i> and <i>M. l. vellerosus</i>. Therefore, the range does not correspond to the original subspecies descriptions for the region and more studies are needed in order to disentangle the phylogenetic relationships of <i>Microtus longicaudus</i> voles in southeast Alaska.
2 Distribution in surrounding geographic	A	A: Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank G5T3, Alaska State Rank S3 The Coronation Island vole is one of various subspecies of Long-tailed voles (<i>Microtus longicaudus</i> Merriam, 1888) that are restricted within the boundaries of the Tongass National Forest (Cook et al. 2001; McDonald and Cook 2007; see

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
area		above). The species as a whole occurs on islands and the north coast of Southeast Alaska (close to Haines), extending to the Wrangell Mountains, to south along the mainland and to the eastern slope of the coast ranges from central Alaska through British Columbia reaching Washington in the south (McDonald and Cook 2007).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information specific to the dispersal capability of the Coronation Island vole. According to information from NatureServe (2024), the subspecies is considered non-migrant. Van Horne (1982) reported that some marked individuals of <i>Microtus longicaudus</i> spp. in the east side of Prince of Wales Island moved between 0.5-1.1 km, but that populations were not highly fluid (no movement detected in some years).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on abundance in the Tongass NF specific to the Coronation Island vole. According to NatureServe (2024), the global population is unknown, but the global abundance of the subspecies is estimated between 10,000 to >1,000,000 individuals. Moreover, according to Van Horne (1982), who sampled populations of <i>Microtus longicaudus</i> spp. in the east side of Prince of Wales Island, reported that 10-14 animals/ha was typical for Alaskan populations, with 53 animals/ha as the maximum.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. No information on the population trends of the Coronation Island vole is available, so it is not possible to draw inferences about this criterion.
6 Habitat trend on Tongass	D	D = Insufficient information to draw inferences about criterion. No information on the habitat preferences specific to the Coronation Island vole was found, so it is not possible to draw inferences about this criterion.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
NF		However, Smolen and Barry (1987) summarized what is known about the species as a whole, the long-tailed vole (<i>Microtus longicaudus</i>) throughout its range (see references therein) and Van Horne (1982) provides information about Alaskan populations in east Prince of Wales Island. Long-tailed voles occupy a variety of habitats, including spruce-fir forests, thickets, forest-meadow ecotones, riparian zones and grassy or sagebrush areas. In Montana, long-tailed voles are not found associated to old-growth forests. Clear cuttings apparently create favorable conditions in Alaska, and clear cuttings from 7 to 10 years of age that contained open areas and shrub and sapling cover are near optimum for the species. Higher densities were associated to high productivity in the herbaceous and shrub flora, and densities were lower in habitats with thicker canopies and less ground herbaceous and shrub cover in the later stages of the community in Alaska. Assuming the same habitat preferences as the parent species, we can infer that the Coronation Island vole may occupy a wide range of ecosystems, including well drained, poorly drained and riparian forests, shrublands and meadows. The ecological integrity of these ecosystems is generally high (lowering to moderate or low in forested ecosystems that have been logged) (Turner and Mallott 2025).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. No information on the habitat preference specific to Coronation Island voles was found, so it is not possible to draw inferences about this criterion. However, if we assume the same habitat preferences as those of the parent species (see Criterion 6), climate change may influence the potential habitat of the Coronation Island vole (Halofsky et al. 2025), but whether these changes are negative or positive remains to be studied. For example, projected increases in temperature and soil moisture deficits will alter species composition and structure of forests. Western hemlock is expected to expand, while Sitka spruce may decline due to drought stress (Baer et al. 2025). These changes could affect vole habitat by altering understory vegetation and canopy density. Moreover, increased landslides, windthrow, and insect outbreaks may create more early-successional habitats, similar to clearcuts (Baer et al. 2025), which may favor voles. In addition, drying of freshwater bodies and encroachment of forests into wetlands may reduce some open habitats, while glacial recession may create new areas for colonization (Baer et al. 2025).
8	D	D = Insufficient information to draw inferences about criterion.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
Life history and demographics		The Coronation Island vole is considered an endemic subspecies restricted to three islands in the Alexander Archipelago, Southeast Alaska. However, Cook et al. (2001) reported that only two deep lineages occur within southeast Alaska, with <i>Microtus longicaudus coronarius</i> in the same (coastal) clade as <i>M. l. littoralis</i> and <i>M. l. vellerosus</i>. There is no information on the life history and demographics of the Coronation Island vole. However, Smolen and Barry (1987) summarized what is known about the species as a whole, the long-tailed vole (<i>Microtus longicaudus</i>) throughout its range (see references therein) and Van Horne (1982) provides information about Alaskan populations in east Prince of Wales Island (possibly within the same clade as the Coronation Island vole). Populations in Alaska breed from mid-May to mid-September, with a mean litter size of 5.0 young (ranges from 4.7 to 6.0 throughout its range). In Alaska, females produce up to two litters in their life, and no voles were observed to survive the second reproductive season in 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)	☐	☐	☒

Conclusion Rationale

The Coronation Island vole is considered an endemic subspecies of long-tailed voles that is confined to three islands in the Alexander Archipelago, southeast Alaska, including Coronation, Warren and Forrester islands. However, genetic data suggests that this subspecies is part of a distinct coastal clade, together with two other recognized subspecies, so their range may be larger. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** No specific threats have been identified at present in the planning area. The three islands where the species is found have been designated as Wilderness Areas. Information on the parent species in other areas suggests they are resilient to disturbances like clear-cutting, which can create favorable open conditions.
- **Declining trends:** There is no information available regarding either population trends or habitat trends specific to the Coronation Island vole, making it impossible to draw inferences about this criterion.
- **Restricted ranges:** The species has conflicting range; it has been considered an endemic subspecies limited to Coronation, Warren, and Forrester islands within the boundaries of the Tongass National Forest. However, new genetic data suggests a broader range on the Tongass.
- **Low population numbers or restricted ecological conditions:** There is insufficient information available on the specific abundance of the subspecies within the Tongass National Forest. While a global abundance range is estimated, local data is missing.
- **Other factors:** The subspecies may be part of a distinct evolutionary lineage or clade, but more genetic studies are needed to clarify its phylogenetic relationships.

Given that the three islands have been designated Wilderness Areas, no threats have been identified, and that there is a lack of information on several criteria to determine their status, we conclude that it is not possible to determine that there is substantial concern for the long-term persistence of the subspecies in the planning area, and therefore we are not recommending it as a 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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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Alexandromys oeconomus sitkensis

Alexandromys (Mocrotus) oeconomus sitkensis [Merriam, 1897]

Sitka tundra vole

Global Rank: **G5T2**

Alaska State Rank: **S2**



photo: Alan Schmierer

Species Assessment

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The Sitka tundra vole (<i>Microtus oeconomus sitkensis</i>; <i>sensu</i> MacDonald and Cook 2007) is reported to occupy the northern outer islands of the Alexander Archipelago in southeast Alaska, including Baranof and Chichagof islands (Manville and Young 1965; MacDonald and Cook 2007). However, tundra vole (<i>Microtus oeconomus</i>) taxonomy has undergone several revisions throughout the years (Paradiso and Manville 1961; Antell 1987; as cited in MacDonald and Cook 1996), and recently, Liu et al. (2016) found support for reclassifying the genus of <i>Microtus oeconomus</i> to <i>Alexandromys oeconomus</i> based on phylogenetic and morphological data. Therefore, the Sitka tundra vole is now recognized as <i>Alexandromys oeconomus sitkensis</i>. However, it should be noted that mitochondrial DNA sequence variation of <i>A. [M.] oeconomus</i> populations in southeast Alaska, including samples from <i>A. [M.] o. sitkensis</i>, is minimal when compared to Beringian populations and suggests colonization from the north during the Holocene (Galbreath and Cook 2004). Moreover, Chichagof and Baranof samples do not form a monophyletic group in the phylogeny (Brunhoff et al. 2003; Galbreath and Cook 2004), indicating that the Sitka tundra vole is either more widespread or not an endemic subspecies to these islands. Therefore, until more studies are conducted to disentangle the phylogenetic relationships of tundra voles in Alaska, it is not possible to determine the range of this presumed subspecies.

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
2 Distribution in surrounding geographic area	D	D = Insufficient information to draw inferences about criterion. Global Rank G5T2, Alaska State Rank S2 Sitka tundra vole samples from Chichagof and Baranof do not form a monophyletic group in the phylogeny (Brunhoff et al. 2003; Galbreath and Cook 2004; see above for discussion), indicating that the Sitka tundra vole is either more widespread or not an endemic subspecies to these islands. Therefore, until more studies are conducted, it is not possible to determine the exact range of this presumed subspecies.
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information on the dispersal capabilities specific to Sitka tundra voles, nor for wild individuals of <i>A.[M.] oeconomus</i> in the range of the Beringian clade.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the abundance specific to Sitka tundra voles, nor for wild individuals of <i>A.[M.] oeconomus</i> in Alaska.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the population trends specific to Sitka tundra voles, nor for wild individuals of <i>A.[M.] oeconomus</i> in Alaska.
6	D	D = Insufficient information to draw inferences about criterion.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
Habitat trend on Tongass NF		There is no information on the habitat preferences specific to Sitka tundra voles, but according to Manville and Young (1965), tundra voles (<i>A. [M.] oeconomus</i>) prefer grassy or sedgy areas in tundra that may be damp or dry, and in wet brushy areas in the northeastern Brooks Range (north-central Alaska), and are found in many different habitats in Cape Thompson (north-western Alaska). Moreover, according to Bennetsen et al. (2025), <i>A. [M.] oeconomus</i> is also found in alpine, meadow and muskeg habitats.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. There is no information on the habitat preferences specific to Sitka tundra voles, but according to Bennetsen et al. (2025), <i>A. [M.] oeconomus</i> is found in alpine, meadow and muskeg habitats, which are considered vulnerable to climate change in the Tongass NF. For example, the alpine environment is suffering losses from advancing shrubline and treeline elevation and its associated conversion of the alpine upslope of the shrub and tree ecotone (Baer et al. 2025). Although these alpine habitat losses are countered by alpine habitat creation from retreating glaciers and snowpack decrease, areas like this without the appropriate substrate and soil development may not necessarily develop the characteristic vegetation of alpine habitat needed by wildlife (Halofsky et al. 2011; Bennetsen et al. 2025). Moreover, evergreen trees are encroaching and converting meadow and muskeg vegetation at all latitudes of the Tongass NF (Buma and Barrett 2015; Baer et al. 2025; Bennetsen et al. 2025). In addition, <i>A. [M.] oeconomus</i> may be potentially affected by changes in biological processes like reduced snow persistence as a result of climate change (Bennetsen et al. 2025). Because of these climate-caused biome changes, the distribution of <i>A. [M.] oeconomus</i> in southeast Alaska is expected to be significantly reduce and even extirpated (Baltensperger and Huettmann 2015).
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. There is no information on the life history and demographics specific to Sitka tundra voles, nor for wild individuals of <i>A.[M.] oeconomus</i> in 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)	☐	☐	☒

Conclusion Rationale

The Sitka tundra vole is reported to occupy the northern outer islands of the Alexander Archipelago in southeast Alaska, including Baranof and Chichagof islands. However, current phylogenetic information indicates that the Sitka tundra vole is either more widespread or not an endemic subspecies to these islands. Although the parent species, the tundra vole, has been identified as occupying vulnerable habitats to climate change in the Tongass NF, and is projected to dramatically reduce its distribution in southeast Alaska, there is a lack of basic information about the biology, ecology and life history of both the Sitka tundra vole, and tundra voles in Alaska to support this. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** There is a lack of information on specific threats to the subspecies. While the general habitats it uses (alpine, meadow, muskeg) are considered vulnerable to climate change impacts like advancing treelines, and a dramatic reduction in distribution in Southeast Alaska is projected in one study, there is insufficient data specific to this subspecies to confirm substantial concern.
- **Declining trends:** There is insufficient information available regarding both population trends and habitat trends for the Sitka tundra vole on the Tongass National Forest.
- **Restricted ranges:** The range of this presumed subspecies is currently uncertain due to conflicts in taxonomic and phylogenetic information. It is reported to be on the northern outer islands of the Alexander Archipelago, but studies suggest it might be more widespread or not a distinct endemic subspecies to these islands.
- **Low population numbers or restricted ecological conditions:** There is no information available regarding the abundance of the subspecies. Habitats like alpine, meadow, and muskeg are considered vulnerable to climate change in the region.
- **Other factors:** A key issue is the high uncertainty around the taxonomic placement of this presumed subspecies, which prevents a clear assessment of its conservation status. There is a general lack of basic information about the biology, ecology, and life history specific to the Sitka tundra vole.

Given the uncertainty around the taxonomic placement of this presumed subspecies and the lack of information to draw inferences about most of the evaluated criteria, we find that there is lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Therefore, we are not recommending the Sitka tundra vole 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 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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DRAFT

Alexandromys oeconomus yakutatensis

Alexandromys (Microtus) oeconomus yakutatensis [Merriam, 1900]

Yakutat root vole

Global Rank: **G5T3**

Alaska State Rank: **S3**

photo: Alan Schmierer



Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The Sitka tundra vole (<i>Microtus oeconomus yakutatensis</i>; <i>sensu</i> MacDonald and Cook 2007) is reported to occupy the northern coast of southeast Alaska (Manville and Young 1965; MacDonald and Cook 2007). However, tundra vole (<i>Microtus oeconomus</i>) taxonomy has undergone several revisions throughout the years (Paradiso and Manville 1961; Antell 1987; as cited in MacDonald and Cook 1996), and recently, Liu et al. (2016) found support for reclassifying the genus of <i>Microtus oeconomus</i> to <i>Alexandromys oeconomus</i> based on phylogenetic and morphological data. Therefore, the Yakutat root vole is now recognized as <i>Alexandromys oeconomus yakutatensis</i>. However, it should be noted that mitochondrial DNA sequence variation of <i>A. [M.] oeconomus</i> populations in southeast Alaska, including samples from <i>A. [M.] o. yakutatensis</i>, is minimal when compared to Beringian populations and suggests colonization from the north during the Holocene (Galbreath and Cook 2004). Moreover, they are within the Beringian clade that contains samples from Chichagof and Baranof islands (where the Sitka tundra vole, <i>Alexandromys oeconomus sitkensis</i>, is presumed to be endemic to), which do not form a monophyletic group in the phylogeny (Brunnhoff et al. 2003; Galbreath and Cook 2004), indicating that the Yakutat root vole is either more widespread or not an endemic subspecies to these areas.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Therefore, until more studies are conducted to disentangle the phylogenetic relationships of tundra voles in Alaska, it is not possible to determine the range of this presumed subspecies.
2 Distribution in surrounding geographic area	D	D = Insufficient information to draw inferences about criterion. Global Rank G5T3, Alaska State Rank S3 Yakutat root vole samples from the northern coast of southeast Alaska are embedded in the Beringian clade, along with other presumed subspecies, and exhibit little differentiation (Brunhoff et al. 2003; Galbreath and Cook 2004; see above for discussion), indicating that the Yakutat root vole is either more widespread or not an endemic subspecies to these islands. Therefore, until more studies are conducted, it is not possible to determine the exact range of this presumed subspecies.
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information on the dispersal capabilities specific to Yakutat root voles, nor for wild individuals of <i>A.[M.] oeconomus</i> in the range of the Beringian clade.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the abundance specific to Yakutat root voles, nor for wild individuals of <i>A.[M.] oeconomus</i> in Alaska.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the population trends specific to Yakutat root voles, nor for wild individuals of <i>A. [M.] oeconomus</i> in Alaska.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the habitat preferences specific to Yakutat root voles, but according to Manville and Young (1965), tundra voles (<i>A. [M.] oeconomus</i>) prefer grassy or sedgy areas in tundra that may be damp or dry, and in wet brushy areas in the northeastern Brooks Range (north-central Alaska), and are found in many different habitats in Cape Thompson (north-western Alaska). Moreover, according to Bennetsen et al. (2025), <i>A. [M.] oeconomus</i> is also found in alpine, meadow and muskeg habitats.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. There is no information on the habitat preferences specific to Yakutat root voles, but according to Bennetsen et al. (2025), <i>A. [M.] oeconomus</i> is found in alpine, meadow and muskeg habitats, which are considered vulnerable to climate change in the Tongass NF. For example, the alpine environment is suffering losses from advancing shrubline and treeline elevation and its associated conversion of the alpine upslope of the shrub and tree ecotone (Baer et al. 2025). Although these alpine habitat losses are countered by alpine habitat creation from retreating glaciers and snowpack decrease, areas like this without the appropriate substrate and soil development may not necessarily develop the characteristic vegetation of alpine habitat needed by wildlife (Halofsky et al. 2011; Bennetsen et al. 2025). Moreover, evergreen trees are encroaching and converting meadow and muskeg vegetation at all latitudes of the Tongass NF (Buma and Barrett 2015; Baer et al. 2025; Bennetsen et al. 2025). In addition, <i>A. [M.] oeconomus</i> may be potentially affected by changes in biological processes like reduced snow persistence as a result of climate change (Bennetsen et al. 2025). Because of these climate-caused biome changes, the distribution of <i>A. [M.] oeconomus</i> in southeast Alaska is expected to be significantly reduce and even extirpated (Baltensperger and Huettmann 2015).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
8 Life history and demographic s	D	D = Insufficient information to draw inferences about criterion. There is no information on the life history and demographics specific to Yakutat root voles, nor for wild individuals of <i>A.[M.] oeconomus</i> in 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)	☐	☐	☒

Conclusion Rationale

The Yakutat root vole is reported to occupy the northern coast of southeast Alaska. However, current phylogenetic information indicates that the Yakutat root vole is either more widespread or not an endemic subspecies to these areas. Although the parent species, the tundra vole, has been identified as occupying vulnerable habitats to climate change in the Tongass NF, and is projected to dramatically reduce its distribution in southeast Alaska, there is a lack of basic information about the biology, ecology and life history of the both the Yakutat root vole, and tundra voles in Alaska to support this. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** There is a lack of information on specific threats to this subspecies. However, the parent species is associated with alpine, meadow, and muskeg habitats, which are considered vulnerable to climate change impacts in the Tongass National Forest, such as advancing shrub- and treelines and reduced snow persistence. Because of these potential climate-caused biome changes, the distribution of the parent species in southeast Alaska is expected to be significantly reduced.
- **Declining trends:** There is insufficient information available regarding both population trends and habitat trends specific to the Yakutat root vole on the Tongass National Forest.

- **Restricted ranges:** The range of this presumed subspecies is highly uncertain due to conflicts in taxonomic and phylogenetic information. Current data suggests it might be more widespread than the northern coast of southeast Alaska or not a valid endemic subspecies to these areas.
- **Low population numbers or restricted ecological conditions:** There is no information available regarding the abundance or dispersal capabilities of the subspecies on the Tongass National Forest. While the habitats it might use (alpine, meadow, muskeg) are vulnerable to climate change, specific data for the subspecies is missing.
- **Other factors:** A primary concern is the high uncertainty around the taxonomic placement of this presumed subspecies, which prevents a clear assessment of its conservation status. There is a general lack of basic information about the biology, ecology, life history, and demographics specific to the Yakutat root vole.

Overall, we find that there is lack of scientific information to determine that there is substantial concern for long-term persistence of the species in the plan area. Therefore, we are not recommending the Yakutat root vole 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 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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Microtus pennsylvanicus admiraltiae*Microtus pennsylvanicus admiraltiae* [Heller, 1909]

Admiralty Island vole

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

photo: Alaska Department of Fish and Game

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	A	A: Scarce or isolated. The range extent of the Admiralty Island vole is limited to Admiralty Island on the Alexander Archipelago, southeast Alaska (Manville and Young 1965; McDonald and Cook 2007).
2 Distribution in surrounding geographic area	A	A: Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank G5T3, Alaska State Rank S3 The Admiralty Island vole is a subspecies of Meadow voles (<i>Microtus pennsylvanicus</i> Ord, 1815) and is restricted within the boundaries of the Tongass National Forest to Admiralty Island (Manville and Young 1965; McDonald and Cook 2007). The species as a whole (<i>M. pennsylvanicus</i>) occurs along the mainland valleys of Chilkat, Taku and Stikine rivers, and in the Alexander Archipelago on Admiralty, Mitkof, Wrangell and near the delta of the Stikine River on Kadin, Sergief and

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Vank islands in Alaska (McDonald and Cook 2007). Moreover, it occurs throughout Canada and the northern and eastern regions of the continental United States and into Mexico (Reich 1981).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information available on the dispersal capabilities of the Admiralty Island vole. Information from the parent species, <i>Microtus pennsylvanicus</i>, in the core of its continental range indicate that there are distinct dispersing and resident morphs with distinct genetic signatures, and that there are seasonally related size differences in dispersers and residents as well as sex differences where males disperse more during the winter whereas females disperse more during the summer (Reich 1981, and references therein). Moreover, it has been reported that meadow voles have home ranges that vary between 405-3,480 m² for males and 160-3,115 m² for females, and the size depends on season (summer > winter), habitat (marshes > meadows) and population density (low > high) (Reich 1981, and references therein).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information available on the abundance on the Tongass NF about the Admiralty Island vole. According to the Alaska Department of Fish and Game (ADFG 2024), <i>Microtus</i> voles live in small colonies of a few to 300 individuals in grass meadows in Alaska.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information available on the population trends on the Tongass NF about the Admiralty Island vole.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Information specific to the habitat preferences of Admiralty Island voles is scarce, but Manville and Young (1965) indicate that they typically occupy grassy areas, inhabiting narrow surface runways at any elevation. This is consistent with what is described for the parent species, the meadow vole (<i>Microtus pennsylvanicus</i>), which is most commonly found in grasslands and grass meadows, and prefers moister areas, but may also be found in woodlands (Burt and Grossenheider 1976; ADFG 2024). They appear to eat the most available species of grasses, sedges and herbaceous plants, but do include fungi, insects and carrion (Reich 1981; and references therein). They dig underground burrows where they build food and nesting chambers (ADFG 2024). During the winter, voles remain active and make runways beneath the snow and feed on the snow-flattened grasses (ADFG 2024). Habitat selection may be influenced by relative ground cover of grasses and herbs, soil moisture, soil sodium levels, soil pH in combination with potassium levels, surface temperature and humidity, and inter-specific competition (Reich 1981, and references therein). According to Turner and Mallott (2025), well drained meadows are considered to have a high ecological integrity (i.e., the dominant ecological characteristics occur within the natural range of variation and can withstand and recover from most perturbations).
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 Admiralty Island vole is associated with grass meadow habitat (Manville and Young 1965; Burt and Grossenheider 1976; ADFG 2024), and there is uncertainty regarding the effects of climate change on this ecosystem (Turner and Mallott 2025). For example, meadow habitat is considered a vulnerable habitat type due to climate change (Bennetsen et al. 2025), where evergreen trees could encroach and convert these habitats into woodlands in southeast Alaska (Buma and Barret 2015). Moreover, reduced snow persistence and reduced subnivean refugia have been identified as biological processes that may potentially affect the Admiralty Island vole as a result of climate change (Bennetsen et al. 2025). However, meadow habitat is currently considered to have a high ecological integrity (see above; Turner and Mallott 2025) and it should be noted that under current management, 90% of Admiralty Island is legislatively protected (under the Admiralty Island National Monument and the Kootznoowoo Wilderness), and only 4% of the island is managed in

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		development status (Schoen and Albert 2016). Moreover, 30% of the island (329,635 acres) is considered wetlands (Smith 2016), with which meadows are associated.
8 Life history and demographic s	D	D = Insufficient information to draw inferences about criterion. Based on newly available genetic information, the species complex of <i>Microtus pennsylvanicus</i> is likely to be divided into three to four distinct species in the near future, with <i>M. p. admiraltiae</i> proposed to be renamed as a subspecies under <i>M. drummondii</i> (Audubon and Bachman 1853), which occurs in the northwestern and central part of the species complex range (Jackson and Cook 2020). According to Jackson and Cook (2020), the peripheric and insular Alaska populations of what is now <i>M. pennsylvanicus</i> likely reflect the dynamic geographic history of the North Pacific, where <i>M. p. admiraltiae</i> appears as a distinctive subgroup of the Northwestern clade potentially reflecting divergence due to both their current insular isolation and potentially longer-term persistence in coastal refugia through one or more of the Late Pleistocene advances. As such, the Admiralty Island vole represents a distinct evolutionary lineage with unique haplotypes found nowhere else, which raises conservation concerns. For example, peripheral-isolated populations are frequently differentiated by distinctive morphology, behavior and life history (Fisler 1961; Anderson and Hubbard 1971; Snyder and Peterson 1999; Jackson and Cook 2020). Unfortunately, there are no studies on the life history and demographics of the Admiralty Island vole in particular, and most studies on this come from what is now considered <i>M. pennsylvanicus</i> in their core continental range (i.e., not in the peripheries). Reich (1981) summarizes aspects of the meadow vole's (<i>M. pennsylvanicus</i>) biology and ecology based on information from other studies (see references therein). Meadow voles reproduce throughout the year, and litter size ranges from 1-11 young, with a mean litter size range of 4.0-6.2. Weaning takes place between 12-14 days after birth, and an average of 2.6 young per litter (63%) is successfully weaned. However, during the first 30 days after birth, mortality rates can reach 88%. Moreover, woodland populations have been reported to have a lower reproductive success and adult survival than grassland populations. Mean longevity has been estimated from 2-3 months to 10-16 months. Meadow voles serve as prey for many species of birds, mammals and reptiles. Their populations are characterized by cyclic

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		fluctuations in density with a period of 2-5 years, with several factors such as food quality, lag in nutrient-recovery time, predation, population density, dispersal and climatic conditions influencing these cycles.

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

The Admiralty Island vole is an endemic subspecies of meadow voles with a distinct evolutionary lineage that occurs in the periphery of the parent species' range and is restricted to an insular setting. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** There is insufficient information to determine current significant threats. However, the primary future concern is climate change, which is poised to alter the presumed grass meadow habitats that the species occupies via encroachment and conversion to woodlands. Reduced snow persistence and subnivean refugia have also been identified as potential stressors related to climate change. It is noted that meadow habitat is currently considered to have a high ecological integrity and 90% of Admiralty Island is legislatively protected from development.
- **Declining trends:** There is insufficient information available regarding population trends on the Tongass National Forest. The current habitat trend is ranked as stable amounts of suitable habitat, relatively unchanged in quality.
- **Restricted ranges:** The species has a restricted range, which is marked as a basis for concern. The Admiralty Island vole is an endemic subspecies restricted within the boundaries of the Tongass National Forest to Admiralty Island, making it a local endemic.
- **Low population numbers or restricted ecological conditions:** There is insufficient information available on the abundance of the subspecies on the Tongass National Forest. While the parent species lives in small colonies and populations are characterized by cyclic fluctuations, the specific status of the Admiralty Island vole is unknown. The ecological conditions needed (grass meadows) are a vulnerable habitat type due to climate change impacts.

- **Other factors:** The subspecies represents a distinct evolutionary lineage and a distinctive subgroup of the Northwestern clade, with unique haplotypes found nowhere else. Peripheral-isolated populations are frequently differentiated by distinctive morphology, behavior, and life history. The lack of specific studies on the life history and demographics of this particular subspecies is also a key concern.

The availability of scientific information is limited to a few criteria, and there is lack of information on significant threats, current population and habitat trends, and the abundance or habitat limitations of the species. Therefore, we conclude that there is lack of scientific information to determine that there is substantial concern for the long-term persistence of the Admiralty Island vole and are thus not recommending the species 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 potential Species of Conservation Concern.

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Mictomys borealis wrangeli

photo: Marco Valentini

Mictomys (Synaptomys) borealis wrangeli [J. Richardson, 1828]

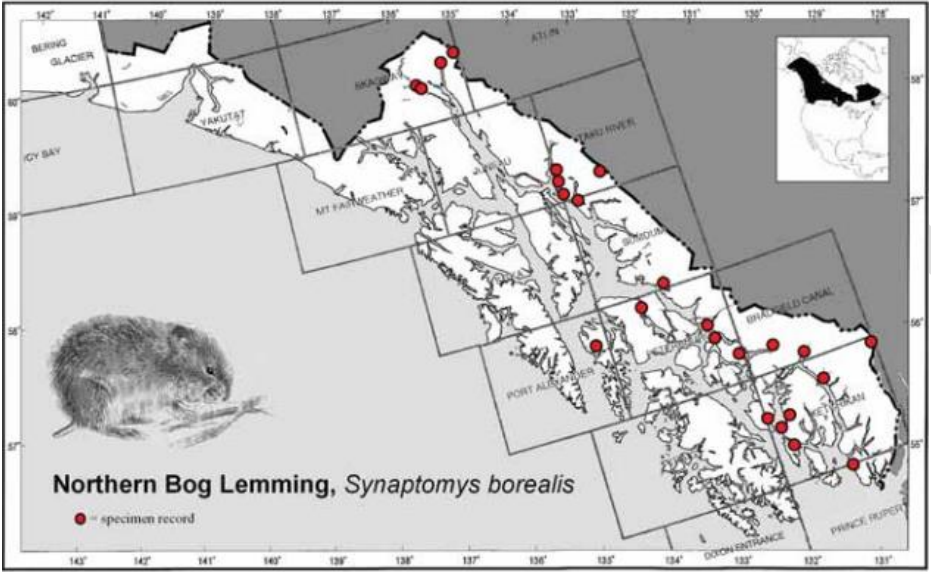
Wrangell (Northern) bog lemming

Global Rank: **G5**

Alaska State Rank: **S5**

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	B	B = Patchy OR gaps. <i>Mictomys (Synaptomys) borealis wrangeli</i> is a recently genetically confirmed subspecies of northern bog lemming in southeast Alaska (Hope et al. 2023). In the past, the subspecies <i>M. b. truei</i> (type locality: Skagit Valley Co., Washington [USNM 3798/12101]), which included <i>M. b. wrangeli</i> (type locality: Wrangell Island, Alexander Archipelago, southeast Alaska [USNM 74720]), was used to designate the northern bog lemmings found in southeast Alaska (MacDonald and Cook 2007), but a recent study by Hope et al. (2023) confirmed that lemmings from insular and coastal mainland southeast Alaska represent a distinct genetic group and proposed the use of <i>Mictomys borealis wrangeli</i> as the correct subspecies designation, which we adopt, with Wrangell bog lemming as its common name (we use northern bog lemming to designate the parent species as a whole). In general, <i>M. b. wrangeli</i> are distinct from <i>M. b. dalli</i>, which inhabits the rest of Alaska and British Columbia, although genetic signals from the only specimen analyzed from continental coastal southeast Alaska suggests that there is some degree of intermixing between both subspecies (not the case with insular samples in southeast Alaska) (Hope et al. 2023). Despite these taxonomic advances, the distribution of Wrangell bog lemming in southeast Alaska remains poorly understood because of the limited number of specimens collected and studies (MacDonald and Cook 2007). Specimen records are scattered throughout the mainland of southeast Alaska from the head of Portland Canal northward to White Pass and the upper Lynn Canal, and island records include Back, Betton, Gravina, Revillagigedo, Kuiu, Kupreanof and

Criteria	Rank	Rationale
		Wrangell islands (MacDonald and Cook 2007; Fig. 1). Other records from the Global Biodiversity Information Facility (www.gbif.org) report occurrences on Mitkof Island (UAM:Mamm:102575).  Northern Bog Lemming, <i>Synaptomys borealis</i> ● specimen record Figure 1: Distribution of specimen records for the Wrangell (northern) bog lemming in southeast Alaska. From MacDonald and Cook (2007). In terms of habitat, northern bog lemmings in Alaska inhabit wet tundra and sphagnum bogs, and occasionally dry or moist meadows (Manville and Young 1965), and is generally associated with low-lying cool and mesic bog-like habitats (Hope et al. 2023). According to the Alaska Department of Fish and Game, the northern bog lemming in Alaska occupies the following habitats in boreal forested wetlands: tall and low shrubs; maritime tundra; grass-sedge, bog and marsh wetlands; and freshwater rivers, stream and riparian habitats (see ADF&G 2015, for habitat definitions). Moreover, a recent study by Baltensperger et al. (2022) suggests that the northern bog lemming in Alaska (inclusive of <i>M. b. wrangeli</i> and <i>M. b. dalli</i>) is a generalist species at the landscape scale, capable of occurring in different boreal land cover types at low densities. Notably, northern bog lemming exhibited disproportionate use of open water and woody wetlands, as

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		well as upland forest and alpine shrub classes (Baltensperger et al. 2022). There is no specific information on the habitat use by the Wrangell bog lemming in southeast Alaska.
2 Distribution in surrounding geographic area	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics). The northern bog lemming, as a whole (<i>Mictomys borealis</i>), has a Global Rank G5, and an Alaska State Rank S5. Moreover, the species is considered by the Alaska Department of Fish and Game as a Species of Greatest Conservation Need in Alaska (ADF&G 2015). In addition, in a 90-day petition finding to list the species under the ESA, the U.S. Fish and Wildlife Service found the petition may be warranted and are initiating a status review (ongoing). Furthermore, according to the Alaska Species Ranking System, northern bog lemmings have a moderate conservation priority in Alaska because its distribution is thought to be expanding (Droghini et al. 2021) The Wrangell Island subspecies (<i>M. b. wrangeli</i>) has not been ranked specifically by NatureServe or any other institution. The northern bog lemming (<i>Mictomys borealis</i>), as a whole, is broadly distributed across mid-to-high latitudes of North America from northwestern Alaska, northernmost Quebec and Newfoundland and Labrador in the north to fragmented pockets of the boreal zone within the northernmost contiguous United States (Hope et al. 2023). The Wrangell Island subspecies (<i>M. b. wrangeli</i>) is confined to southeast Alaska (Hope et al. 2023).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. The northern bog lemming maintains a home range of probably <1 acre (NatureServe 2025).
4 Abundance on Tongass	D	D = Insufficient information to draw inferences about criterion. Population densities of the northern bog lemming throughout their range may range up to 3 dozen lemmings per acre, and they may be found in small colonies (NatureServe 2025). There is no information on the abundance of Wrangell bog

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
NF		lemming in southeast Alaska, except that genomic heterozygosity among insular samples of <i>M. b. wrangeli</i> shows very low diversity and this is likely associated with small population sizes (Hope et al. 2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on population size or population trends of the Wrangell bog lemming on the Tongass.
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. According to Tuner and Mallott (2014) riparian forests on the Tongass exhibit high overall ecological integrity and are highly adaptive and resilient. The same is true for forested and non-forested wetlands due to their wide distribution across latitude, landforms, geology, parent material and elevation, but there is uncertainty on how climate change will affect them (Turner and Mallott 2025). Logging on the Tongass has negatively affected forested wetland habitats, but only about 4% of the total forested acres of the forest have been logged and timber harvest has been greatly reduced since the early 2000s (Engelmann 2024). As a consequence, we expect that Wrangell bog lemmings have had stable amounts of suitable habitat and relatively unchanged habitat quality in the past 20 years.
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. According to the petition for listing the northern bog lemming under the Endangered Species Act, suitable cold bog habitats used by the species are relictual, increasingly disconnected and under threat from both anthropogenic-mediated climate change trends and local disturbances, especially at the southern distribution of the species (Jones and Melton, 2014; Hope et al. 2023). In Alaska, species experts agreed that climate-induced vegetation change was an important threat for the northern bog lemming (Droghini et al. 2021), but note that this encompasses the whole state. On the Tongass, freshwater habitats as well as wetland, meadow and muskeg habitats are considered vulnerable to climate change, and the northern bog lemming is associated with these (Bennetsen et al. 2025). There are opportunities for both expansion and losses of forested and non-forested wetlands habitats (Baer et al. 2025). Moreover, climate

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		change-induced reduced snow persistence and subnivean refugia are expected to negatively affect the northern bog lemming on the Tongass (Bennetsen et al. 2025). However, species distribution changes projected on the Tongass by Baltensperger and Huettmann (2015) predict suitable conditions for the northern bog lemming, but it is believed that these projections overestimate likely occurrence of the species on the islands of southeast Alaska (Bennetsen et al. 2025). Taking all this into account, we expect that habitat modification is likely to result in ecological patterns similar to the range of historical conditions, albeit with a different spatial configuration, but is being impacted by modern stressors that include climate-induced vegetation changes. More modelling and studies are needed, especially on the delineation of wetlands and wetland vegetation on the Tongass in order to predict more accurately the response of the Wrangell bog lemming habitat to modern stressors.
8 Life history and demographic s	D	D = Insufficient information to draw inferences about criterion. The northern bog lemming and associated subspecies, including the Wrangell bog lemming of southeast Alaska, is one of the most poorly studied species of small mammals in North America, and consequently, there is no knowledge of many aspects of their natural history (Hope et al. 2003). From the little we know, throughout its range, the northern bog lemming (<i>M. borealis</i>) breeds from May-August, their gestation lasts approximately three weeks, their litter size is 2-8 (with an average of 4) and they can have several litters per year (NatureServe 2025). There is no information on the life history and demographics available specifically for the Wrangell bog lemming.

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

The Wrangell bog lemming is not recommended to be considered as a Species of Conservation Concern. There is no substantial concern for the persistence of the subspecies within the plan area based on the following:

- **Significant threats**- No significant threats were identified in the planning area. Although past logging practices may have altered the habitat of the Wrangell bog lemming on the Tongass, these activities have been greatly reduced since the early 2000s and wetland areas are protected, and expected to be protected in the future, by forest plan standards and guidelines that require buffers to protect these areas from logging. Moreover, although climate-mediated vegetation change is identified as a threat to the species in Alaska, on the Tongass, there is uncertainty about the direction of projected changes, with both gains and losses projected for wetland habitats and species-specific models predict an expansion of suitable habitats for the northern bog lemming in southeast Alaska, which we expect to also benefit the Wrangell bog lemming.
- **Declining trends**- Currently, there is no information on the population trends of the Wrangell bog lemming in southeast Alaska, and the habitat of the species is expected to have remained stable in the past 20 years. There is mixed evidence on the future habitat trends, so it is uncertain how this will affect the Wrangell bog lemming in the future.
- **Restricted ranges**- The Wrangell bog lemming is a genetically confirmed endemic subspecies to southeast Alaska and is probably restricted to the Tongass National Forest. As a subspecies of the northern bog lemming, it is at the edge of the species' range, and the fact that it is found in some islands as well as in the mainland coastal areas of southeast Alaska makes their populations disjunct.
- **Low population numbers (vulnerable to extirpation by stochastic events) or restricted ecological conditions**- There is no information on the population numbers or abundance of the Wrangell bog lemming in southeast Alaska and although reliant on wetland habitats, these are readily available throughout the Tongass.
- **Other factors**- The Wrangell bog lemming is a genetically distinct subspecies of northern bog lemming that is restricted to southeast Alaska a probably to the Tongass National Forest. As such, it represents a distinct evolutionary lineage of high conservation interest.

Taken together, the lack of basic scientific information on the species and subspecies does not allow us to make a clear decision on whether there is substantial concern over the long-term persistence of the Wrangell bog lemming on the Tongass or if the species is secure. Therefore, we are not recommending the Wrangell bog lemming 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 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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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Mustela richardsonii initisphoto: <https://alaska.guide/mammal/mustela-erminea/ermine>*Mustela richardsonii initis* Hall, 1944**Baranof Island Ermine**Global Rank: **G5T3**Alaska State Rank: **S3****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. <i>Mustela richardsonii initis</i> is endemic to Baranof and Chichagof Islands, Alaska (NatureServe 2025; Alaska Department of Fish and Game, 2006), and is a subspecies of the most widespread continental North American ermine species. This taxon, also known as <i>Mustela erminea initis</i>, is a subspecies of <i>Mustela richardsonii</i>, a placement confirmed by recent phylogenetic and morphometric analysis (Colella et al. 2021, Androski et al. 2024, Fleming and Cook 2002). <i>Mustela richardsonii</i> is thought to have diverged from the <i>Mustela erminea</i> clade approximately 4.5 million years ago (Colella et al. 2021) and may have colonized Baranof and Chichagof Islands after the glaciers that covered most of southeastern Alaska during the Wisconsin glaciation maximum 26,000 to 20,000 years ago began to recede (Colella et al. 2021, Fleming and Cook 2002, Kaufman and Manley 2004). The <i>Mustela richardsonii initis</i> clade is therefore considered a neoendemic to the coastal region, and not a paleoendemic as with subspecies of <i>Mustela haidarum</i> (Fleming and Cook 2002, Androski et al. 2024). Island-wide population surveys are needed to determine the distribution of this species on Baranof and Chichagof Islands (USDA FS 2016b, USDA FS 2016c).
2 Distribution in	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank G5T3, Alaska State Rank S3

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
surrounding geographic area		This taxon is endemic to Baranof and Chichagof Islands (ADFG 2006; Hall 1945), which together have an area of 3,650 square miles (9,460 square kilometers).
3 Dispersal capability	B	B = Disperses only through suitable habitat. <i>Mustela richardsonii initis</i> is restricted to Baranof and Chichigof Islands (ADFG 2006), however these islands total 3,650 square miles (9,460 square kilometers) in area, and are respectively the tenth and fifth largest islands in the United States, representing a large quantity of available habitat for dispersal. No information specific to <i>Mustela richardsonii initis</i> dispersal within Baranof and Chichigof Islands is available. Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2004). Ermine offspring generally leave parental care after about 3-4 months and typically disperse from the natal range in autumn. The density of territorial adult males likely influences how far a juvenile will travel to find an available territory (King and Powell 2007). In southern Ontario, home ranges for <i>Mustela erminea</i> averaged 20-25 hectares for males, and 10-15 hectares for females (Simms 1979).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Island-wide population surveys are needed to determine distribution and population abundance (USDA FS 2016c). In the 2021 Alaska Trapper report, ermine was listed as scarce in region I (Southeast region). Only 2 were captured in region I with none being reported in Game Management Unit 4 (that unit includes Baranof and Chichagof Islands) (Bogle 2022). Ermine is not a target species for trappers and is taken incidentally during trapping for other target species (Bethune 2023). Population densities of related ermine species range from 4 adults/km² in northern Alberta (Soper 1919) to 11 adults/km² in Ontario (Simms 1979b in ADFG 2006). Given the large size of Admiralty Island, abundance may be high, although this is unknown.
5 Population	D	D = Insufficient information to draw inferences about criterion. Island-wide population surveys are needed to determine distribution and population abundance.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
trend on Tongass NF		
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2014). Patterns of habitat use by ermines are greatly influenced by prey abundance and predation risk. In general, ermine are likely to prefer habitats with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Doyle 1990, Samson and Raymond 1998 in Suring 2014). Evaluation of habitat use by ermine in British Columbia showed similar use in regenerating clearcuts and in old forests (Suring 2014)), however clear-cut logging has also been described as a threat to this species in Alaska, especially in unproductive, mid-successional regrowth forests which may be favored habitat (ADFG 2006). Ermine species on the Tongass NF are not thought to be strict old growth associates (Suring 2014). An analysis of habitat quality for ermine on the Tongass NF found that habitat quality increased with forb, shrub, down wood and large tree density. Habitat quality decreased, however, once canopy closure began to shade out the understory. Quality ermine habitat was also associated with proximity to streams, and with early forest regeneration and old forests with canopy breaks (Suring 2014). Baranof and Chichagof Islands have some history of timber harvest, however between 84% and 100% of its old-growth forests remain intact (USDA FS 2016a p. 3-196). These islands include the South Baranof Wilderness and the West Chichagof-Yakobi Wilderness, which together total 1,075 square miles (2,784 square kilometers). The Suring analysis of ermine habitat quality found moderate to high habitat quality for ermine across 77% of East Chichagof Island, 79% of East Baranof Island, and 67% of West Baranof Island (see Figure 6-3 in Suring 2014). This suggests a stable habitat trend.
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. Because <i>Mustela richardsonii initis</i> utilizes a broad range of habitat types, habitat vulnerability may be less of a concern than for old-growth-dependent endemic mammals. More information on habitat vulnerability and modification is needed to fully understand potential threats due to habitat. (NatureServe, 2023).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
other threats		Threats related to highly restricted range are not well-described for this specific taxon, but can be described generally. These include reduced genetic integrity, limited dispersal capabilities, susceptibility to disease, local habitat disturbance, extreme weather events, and high reliance on variable prey populations (Suring 2014, ADFG 2006), all of which would constitute potential threats to the persistence of <i>Mustela erminea salva</i> . Vulnerabilities to pathogens (distemper, SARS-CoV-2) from humans or their pets (Androski et al. 2024) have also been noted for endemic ermine taxa in southeast Alaska.
8 Life history and demographic s	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. Little information is available on this sub-species' life history and demographics. Ermine usually produce no more than one litter of about six young per summer. Annual survival is only about 40%, rendering populations are vulnerable to stochastic events (Suring 2014). All ermine taxa have a polygamous mating system, with several exclusive female home ranges occurring within the male's home range (Erlinge 1977) Adult size is reached at 4 - 6 months and 10 months for females and males, respectively. Ermine breed early, have short lifespans, and their populations change dramatically on an annual basis because of fluctuating food supply (King and Powell 2007). They breed once per year and litter size range is 4 to 13 kits and is strongly dependent on prey abundance. At very low prey densities, no young are produced (Erlinge 1983, ADFG 2006). The rapid change from positive to negative growth rates over one to two year periods means that local ermine populations are considered unstable (King and Powell 2007).

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

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

- **Significant threats** – The primary threats to *Mustela richardsonii initis* are general threats for endemic mammal taxa that are associated with their restricted distributions. These include potential threats to genetic integrity and stochastic events such as pathogen exposure, local habitat disturbance, extreme weather events, or its high reliance on variable prey populations. Low annual survival rates for ermine further contribute to the taxon's vulnerability to stochastic events. There is insufficient evidence, however, to establish these particular factors as significant threats to *Mustela richardsonii initis*.
- **Declining populations or habitat trends** – Population sizes and trends for *Mustela richardsonii initis* on the Tongass National Forest are unknown. Both Baranof and Chichagof Islands are large, and intact habitat maintained on those islands suggest the potential for a larger population relative to ermine taxa that are endemic to smaller islands (moderate to high habitat quality for ermine across 77% of East Chichagof Island, 79% of East Baranof Island, and 67% of West Baranof Island). This taxon is not old-growth-dependent, and is associated with a diverse range of forest structure attributes. There is insufficient evidence to establish a declining trend in habitat.
- **Restricted range** – This taxon is endemic to and restricted to Baranof and Chichagof Islands. Although it has a restricted range, the total area of Baranof and Chichagof Islands totals 3,650 square miles (9,460 square kilometers).
- **Low population numbers or restricted ecological conditions** – Population numbers for *Mustela richardsonii initis* are unknown. Ermine taxa have been documented in varied habitat including old-growth and successional forests, brush, alpine meadows, marshes, and riparian areas, habitat types that are not restricted on Baranof and Chichagof Islands.

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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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Mustela erminea salvaphoto: <https://alaska.guide/mammal/mustela-erminea/ermine>*Mustela erminea salva* [Hall, 1944]

Admiralty Island Ermine

Global Rank: **GNRT2T3**Alaska State Rank: **S3****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. <i>Mustela erminea salva</i> is endemic to Admiralty Island, Alaska (NatureServe, 2025, ADFG 2006). This taxon has previously been known as <i>Mustela richardsonii salva</i>, a subspecies of the most widespread continental North American ermine species. Recent taxonomic revision grounded in phylogenetic and morphometric analysis, however, has placed Admiralty Island ermine instead in the Beringia clade (<i>Mustela erminea</i>), which ranges across Eurasia (Japan, Russia, Ireland) and extends into Alaska (Colella et al. 2021, Androski et al. 2024, Fleming and Cook 2002). <i>Mustela erminea</i> is thought to have diverged from the <i>Mustela richardsonii</i> clade approximately 4.5 million years ago (Colella et al. 2021) and may have colonized Admiralty Island after the glaciers that covered most of southeastern Alaska during the Wisconsin glaciation maximum 26,000 to 20,000 years ago began to recede (Colella et al. 2021, Fleming and Cook 2002, Kaufman and Manley 2004). The <i>Mustela erminea salva</i> clade is therefore considered a neoendemic to the coastal region, and not a paleoendemic as with subspecies of <i>Mustela haidarum</i> (Fleming and Cook 2002, Androski et al. 2024). Island-wide population surveys are needed to determine the distribution of this species on Admiralty Island.
2 Distribution in surrounding	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank GNRT2T3, Alaska State Rank S3 This taxon is endemic to Admiralty Island (ADFG 2006; Hall 1945), which has an area of 1,600 square miles (4,200 square kilometers).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
geographic area		
3 Dispersal capability	B	B = Disperses only through suitable habitat. <i>Mustela erminea salva</i> is restricted to Admiralty Island (ADFG 2006), however this island has an area of 1,600 square miles (4,200 square kilometers) and is the seventh largest island in the United States, representing a large quantity of potential habitat for dispersal. No information specific to <i>Mustela erminea salva</i> dispersal within Admiralty Island is available. Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2004). Ermine offspring generally leave parental care after about 3-4 months and typically disperse from the natal range in autumn. The density of territorial adult males likely influences how far a juvenile will travel to find an available territory (King and Powell 2007). In southern Ontario, home ranges for <i>Mustela erminea</i> averaged 20-25 hectares for males, and 10-15 hectares for females (Simms 1979).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. No population data has been collected by the forest on this subspecies. Population densities of related ermine species range from 4 adults/km² in northern Alberta (Soper 1919) to 11 adults/km² in Ontario (Simms 1979b in ADFG 2006). Given the large size of Admiralty Island, abundance may be high, although this is unknown. In the 2021 Alaska Trapper report, ermine was listed as scarce in region I (Southeast region). Only 2 were captured in region I with none being reported in Game Management Unit 4 (that unit includes Admiralty Island) (Bogle, 2022). Ermine is not a target species for trappers and is taken incidentally during trapping for other target species (Bethune, 2023).
5 Population trend on	D	D = Insufficient information to draw inferences about criterion. Island-wide population surveys are needed (USDA FS 2016c) to determine distribution and population abundance.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
Tongass NF		
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2014). Patterns of habitat use by ermines are greatly influenced by prey abundance and predation risk. In general, ermine are likely to prefer habitats with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Doyle 1990, Samson and Raymond 1998 in Suring 2014). Evaluation of habitat use by ermine in British Columbia showed similar use in regenerating clearcuts and in old forests (Suring 2014)), however clear-cut logging has also been described as a threat to this species in Alaska, especially in unproductive, mid-successional regrowth forests which may be favored habitat (ADFG 2006). Ermine species on the Tongass NF are not thought to be strict old growth associates (Suring 2014). An analysis of habitat quality for ermine on the Tongass NF found that habitat quality increased with forb, shrub, down wood and large tree density. Habitat quality decreased, however, once canopy closure began to shade out the understory. Quality ermine habitat was also associated with proximity to streams, and with early forest regeneration and old forests with canopy breaks (Suring 2014). Admiralty Island has little to no history of timber harvest, with 99% of its old-growth forests remaining intact (USDA FS 2016a p. 3-196). On Admiralty Island, 93% of the island is within the Admiralty Island National Monument, which includes the Kutznoowoo Wilderness. The Suring analysis of ermine habitat quality found moderate to high habitat quality for ermine across 73% of Admiralty Island (see Figure 6-3 in Suring 2014). This suggests a stable habitat trend.
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 <i>Mustela erminea salva</i> utilizes a broad range of habitat types, habitat vulnerability may be less of a concern than for old-growth-dependent endemic mammals. More information on habitat vulnerability and modification is needed to fully understand potential threats due to habitat. (NatureServe, 2023). Mineral production in Southeast Alaska in recent years has been dominated by the Greens Creek Mine at the north end of Admiralty Island. Greens Creek is an underground mining operation that opened in 1989 and produces silver, zinc,

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		lead, and gold. Mining activities are expected to expand at this site, as well as possible future sites (USDA, 2016a). Most of the island, however, is within a National Monument, some of which is additionally wilderness. Threats related to highly restricted range are not well-described for this specific taxon, but can be described generally. These include reduced genetic integrity, limited dispersal capabilities, susceptibility to disease, local habitat disturbance, extreme weather events, and high reliance on variable prey populations (Suring 2014, ADFG 2006), all of which would constitute potential threats to the persistence of <i>Mustela erminea salva</i>. Vulnerabilities to pathogens (distemper, SARS-CoV-2) from humans or their pets (Androski et al. 2024) have also been noted for endemic ermine taxa in southeast Alaska.
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. Little information is available on this sub-species' life history and demographics. Ermine usually produce no more than one litter of about six young per summer. Annual survival is only about 40%, rendering populations are vulnerable to stochastic events (Suring 2014). All ermine taxa have a polygamous mating system, with several exclusive female home ranges occurring within the male's home range (Erlinge 1977) Adult size is reached at 4 - 6 months and 10 months for females and males, respectively. Ermine breed early, have short lifespans, and their populations change dramatically on an annual basis because of fluctuating food supply (King and Powell 2007). They breed once per year and litter size range is 4 to 13 kits and is strongly dependent on prey abundance. At very low prey densities, no young are produced (Erlinge 1983, Alaska Department of Fish and Game, 2006). The rapid change from positive to negative growth rates over one to two year periods means that local ermine populations are considered unstable (King and Powell 2007).

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

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

- **Significant threats** – The primary threats to *Mustela erminea salva* are general threats for endemic mammal taxa that are associated with a restricted distribution. These include potential threats to genetic integrity and stochastic events such as pathogen exposure, local habitat disturbance, extreme weather events, or its high reliance on variable prey populations. Low annual survival rates for ermine further contribute to the taxon's vulnerability to stochastic events. There is insufficient evidence, however, to establish these particular factors as significant threats to *Mustela erminea salva*.
- **Declining populations or habitat trends** – Population sizes and trends for *Mustela erminea salva* on the Tongass National Forest are unknown. The large size of Admiralty Island and intact habitat suggest the potential for a larger population relative to ermine taxa that are endemic to smaller islands. Across Admiralty Island, most of which occurs within the Admiralty Island National Monument, 73% is assessed as moderate to high quality ermine habitat. Admiralty Island has a limited history of timber harvest activities. This taxon is not old-growth-dependent, and is associated with a diverse range of forest structure attributes. There is insufficient evidence to establish a declining trend in habitat.
- **Restricted range** – This taxon is endemic to and restricted to Admiralty Island. Although it has a restricted range, Admiralty Island is large (1,200 square miles).
- **Low population numbers or restricted ecological conditions** – Population numbers for *Mustela erminea salva* are unknown. Ermine taxa have been documented in varied habitat including old-growth and successional forests, brush, alpine meadows, marshes, and riparian areas, habitat types that are not restricted on Admiralty Island.

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.
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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

☒	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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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Mustela haidarum seclusaphoto: <https://alaska.guide/mammal/mustela-erminea/ermine>*Mustela haidarum seclusa* Hall, 1944

Suemez Island ermine

Global Rank: **GNRT3**Alaska State Rank: **S3****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. The taxon is endemic to Suemez Island, Alaska. (ADFG 2006, Hall 1945). Previously known as <i>Mustela erminea seclusa</i>, it is now considered a subspecies of Haida ermine (<i>Mustela haidarum</i>), the only mammal species endemic to the Alexander Archipelago/ Haida Gwaii Region (Androski et al. 2024, Colella et al. 2021). The genetic divergence of the Suemez Island ermine from other ermine populations supports the existence of North Pacific glacial refugia in the Alexander Archipelago. This taxon is considered a paleoendemic, with an estimated divergence of <i>Mustela haidarum</i> from other ermine taxa approximately two million years ago (Colella et al. 2021). Phylogenetic and morphometric analyses indicate that this taxon persisted in a coastal refugium in the Outer Islands during the Wisconsin glaciation that covered much of southeastern Alaska at its maximum extent 26,000 to 20,000 years ago (COSEWIC 2015, Androski et al. 2024, Colella et al. 2021, Fleming and Cook 2002, Kaufman and Manley 2004). Island-wide population surveys are needed to determine the distribution of this species on Suemez Island. Inventories of adjacent islands are needed in concert with morphometric and DNA studies of Suemez Island ermine to confirm the taxonomic validity of this subspecies (NatureServe 2025). A recent study suggests a classification as <i>Mustela haidarum seclusa</i>, but states that further examination is required due to low sample size (Colella et al. 2021). Taxonomic status for <i>Mustela erminea seclusa</i> was based upon a single specimen (ADFG 2006).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
2 Distribution in surrounding geographic area	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank GNRT3, Alaska State Rank S3 This taxon is endemic to Suemez Island (ADFG 2006, Hall 1945), which has an area of 59 square miles (152 square kilometers). Its sister taxon, <i>Mustela haidarum haidarum</i> (formerly <i>Mustela erminea haidarum</i>), is listed as Threatened in Canada, with an estimated population size of fewer than 1,000 mature individuals. A population decline for that taxon since the 1950s is inferred based on decreased capture success and future declines are predicted because of ongoing threats (COSEWIC 2015).
3 Dispersal capability	A	A = Very limited dispersal ability. <i>Mustela haidarum seclusa</i> is restricted to Suemez Island (ADFG 2006), an area of just 59 square miles (152 square kilometers), without the ability to disperse to other islands. Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2004). No information specific to <i>Mustela haidarum seclusa</i> dispersal within Suemez Island is available. Ermine offspring generally leave parental care after about 3-4 months and typically disperse from the natal range in autumn. The density of territorial adult males likely influences how far a juvenile will travel to find an available territory (COSEWIC, 2015, King and Powell 2007).
4 Abundance on Tongass NF	A	A = Rare. Current abundance is low enough that stochastic and other factors could lead to potential imperilment. Island-wide population surveys are needed to determine distribution and population abundance, however population sizes are suspected to be low (ADFG 2006). Inventories of Suemez Island and adjacent islands are needed to determine the abundance of this subspecies (USDA FS 2016c, NatureServe 2025). In the 2021 Alaska Trapper report, ermine were listed as scarce in region I (Southeast region). Only 2 were captured in region I with none being reported in Game Management Unit 2 (that unit includes Suemez Island) (Bogle 2022). Ermine is not a target species for trappers and is taken incidentally during trapping for other target species (Bethune 2023).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Population densities of related ermine species range from 4 adults/km ² in northern Alberta (Soper 1919) to 11 adults/km ² in Ontario (Simms 1979b in ADFG 2006). Given the small size of Suemez Island (159 square kilometers), this population density range further suggests a small population size for <i>Mustela haidarum seclusa</i> .
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Island-wide population surveys are needed to determine distribution and population abundance. Inventories of adjacent islands are needed in concert with morphometric and DNA studies of Suemez Island ermine to confirm the taxonomic validity of this subspecies (NatureServe 2025).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2014). Patterns of habitat use by ermines are greatly influenced by prey abundance and predation risk. In general, ermine are likely to prefer habitats with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Doyle 1990, Samson and Raymond 1998 in Suring et al. 2014). Evaluation of habitat use by ermine in British Columbia showed similar use in regenerating clearcuts and in old forests (Suring 2014), however clear-cut logging has also been described as a threat to this species in Alaska, especially in unproductive, mid-successional regrowth forests which may be favored habitat (ADFG 2006). Ermine species on the Tongass NF are not thought to be strict old growth associates (Suring 2014). An analysis of habitat quality for ermine on the Tongass NF found that habitat quality increased with forb, shrub, down wood and large tree density. Habitat quality decreased, however, once canopy closure began to shade out the understory. Quality ermine habitat was also associated with proximity to streams, and with early forest regeneration and old forests with canopy breaks (Suring 2014). Suemez Island has a history of timber harvest, and while some portions of the island were excluded from timber harvest under the 2001 Roadless Rule (19,862 acres) or within old growth forest reserves (11,244 acres), other portions of the island have continued to be managed for timber harvest (USDA FS 2007, 2016a, 2016b, 2016c, 2023). The Suring analysis of ermine habitat quality found moderate to high habitat quality for ermine across 76% of the Southern Outer Islands, which include Suemez Island (see Figure 6-3 in Suring et al. 2014). This suggests a stable habitat trend.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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 <i>Mustela haidarum seclusa</i> utilizes a broad range of habitat types, habitat vulnerability may be less of a concern than for old-growth-dependent endemic mammals. More information on habitat vulnerability and modification is needed to fully understand potential threats due to habitat. (NatureServe 2025). The sister taxon, <i>Mustela haidarum haidarum</i>, is thought to be declining in Canada because of over-browsing caused by the introduction of black-tailed deer to Haida Gwaii, and competition with Pacific marten for food resources. The threat due to mortality from accidental trapping in traps set for Pacific marten is less well understood, but may be considerable as well given the small population size of that taxon (estimated at 1,000 individuals) (COSEWIC 2015). It is unknown to what degree these threats to the sister taxon may be similar for <i>Mustela haidarum seclusa</i>. Given that deer populations on Suemez Island declined from 1954 to 2007 (USDA FS 2016c), and that moderate to high ermine habitat quality was found across most of Suemez Island (Suring 2014), there is insufficient evidence to establish deer browse as a threat to <i>Mustela haidarum seclusa</i>. In addition, potential threats from competition with the American marten that occur on Suemez Island are not described in the literature. Threats related to small population sizes and highly restricted range are not well-described for this specific taxon, but can be described generally and are substantial. These include reduced genetic integrity, limited dispersal capabilities, susceptibility to disease, local habitat disturbance, extreme weather events, and high reliance on variable prey populations (Suring 2014, ADFG 2006), all of which would constitute potential threats to the persistence of <i>Mustela haidarum seclusa</i>. Vulnerabilities to pathogens (distemper, SARS-CoV-2) from humans or their pets (Androski et al. 2024) have also been noted for this taxon.
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. Little information is available on this sub-species' life history and demographics. Ermine usually produce no more than one litter of about six young per summer. Annual survival is only about 40%, rendering populations are vulnerable to stochastic events (Suring 2014).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		All ermine subspecies have a polygamous mating system, with several exclusive female home ranges occurring within the male's home range (Erlinge 1977) Adult size is reached at 4 - 6 months and 10 months for females and males, respectively. Ermine breed early, have short lifespans, and their populations change dramatically on an annual basis because of fluctuating food supply (King and Powell 2007). They breed once per year and litter size range is 4 to 13 kits and is strongly dependent on prey abundance. At very low prey densities, no young are produced (Erlinge 1983, ADFG 2006). The rapid change from positive to negative growth rates over 1 - 2-year periods means that local ermine populations are considered unstable (King and Powell 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

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

- **Significant threats** – The primary threats to *Mustela haidarum seclusa* are due to its suspected low population size, and resulting implications for genetic integrity and stochastic events such as pathogen exposure, local habitat disturbance, extreme weather events, or its high reliance on variable prey populations. Low annual survival rates further contribute to the taxon's vulnerability to stochastic events. While the sister taxon, *Mustela haidarum haidarum*, is documented as declining due to over-browse by introduced deer, competition with marten, and mortality from accidental trapping, there is insufficient evidence to establish these particular factors as a threat to *Mustela haidarum seclusa*.
- **Declining populations or habitat trends** – Population sizes and trends for *Mustela haidarum seclusa* on the Tongass National Forest are unknown, but population sizes are suspected to be low. Most of Suemez Island was assessed as having moderate to high habitat quality

for ermine. This taxon is not old-growth-dependent, and is associated with a diverse range of forest structure attributes. There is insufficient evidence to establish a declining trend in habitat.

- **Restricted range** – This taxon is a highly restricted paleoendemic whose lineage persisted within the glacial refugia of the Outer Islands. It is endemic to Suemez Island, which has an area of 59 square miles (152 square kilometers), and a subspecies of *Mustela haidarum*, the only mammal species endemic to the Alexander Archipelago and Haida Gwaii Region.
- **Low population numbers or restricted ecological conditions** – Population numbers are unknown but suspected to be low. Ermine taxa have been documented in varied habitat including old-growth and successional forests, brush, alpine meadows, marshes, and riparian areas, habitat types that are not restricted on Suemez Island.

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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Mustela haidarum celendaphoto: <https://alaska.guide/mammal/mustela-erminea/ermine>*Mustela haidarum celenda* Hall, 1944

Prince of Wales Island Ermine

Global Rank: **GNRT3**Alaska State Rank: **S3****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 NF, this taxon occurs on Prince of Wales Island, Dall Island, and Long Island (ADFG 2006, Androski et al. 2024, Hall 1945). Previously known as <i>Mustela erminea celenda</i>, it is now considered a subspecies of Haida ermine (<i>Mustela haidarum</i>), the only mammal species endemic to the Alexander Archipelago/ Haida Gwaii Region (Androski et al. 2024, Colella et al. 2021). The genetic divergence of the Prince of Wales Island ermine from other ermine populations supports the existence of North Pacific glacial refugia in the Alexander Archipelago. This taxon is considered a paleoendemic, with an estimated divergence of <i>Mustela haidarum</i> from other ermine taxa approximately two million years ago (Colella et al. 2021). Phylogenetic and morphometric analyses indicate that this taxon persisted in a coastal refugium in the Outer Islands during the Wisconsin glaciation that covered much of southeastern Alaska at its maximum extent 26,000 to 20,000 years ago (COSEWIC 2015, Androski et al. 2024, Colella et al. 2021, Fleming and Cook 2002, Kaufman and Manley 2004). Island-wide population surveys are needed to determine the distribution of this species on Prince of Wales Island, Dall Island, and Long Island.
2 Distribution in	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank GNRT3, Alaska State Rank S3 This taxon is endemic to Prince of Wales Island (ADFG 2006, Hall 1945), which has an area of 2,577 square miles (6,670 square kilometers) and is the fourth largest island in the United States, as well as Dall Island (254 square miles, 658

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
surrounding geographic area		square kilometers) and Long Island (45 square miles, 115 square kilometers), islands on which 51% of lands are administered by the Tongass NF (Schoen and Dovichin 2007). One of this taxon's sister taxa, <i>Mustela haidarum haidarum</i> (formerly <i>Mustela erminea haidarum</i>), is listed as Threatened in Canada, with an estimated population size of fewer than 1,000 mature individuals. A population decline for that taxon since the 1950s is inferred based on decreased capture success and future declines are predicted because of ongoing threats (COSEWIC 2015). The other subspecies of <i>Mustela haidarum</i>, <i>Mustela haidarum seclusa</i> (Suemez Island ermine) is also under review as a potential Species of Conservation Concern on the Tongass NF.
3 Dispersal capability	B	B = Disperses only through suitable habitat. Although <i>Mustela haidarum seclusa</i> is restricted to Prince of Wales Island, Dall Island, and Long Island (ADFG 2006) without the ability to disperse to other islands, these islands total 2,876 square miles (7,443 square kilometers). Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2004). No information specific to <i>Mustela haidarum celenda</i> dispersal within Prince of Wales Island is available. Ermine offspring generally leave parental care after about 3-4 months and typically disperse from the natal range in autumn. The density of territorial adult males likely influences how far a juvenile will travel to find an available territory (COSEWIC, 2015, King and Powell 2007).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Island-wide population surveys are needed to determine distribution and population abundance (USDA FS 2016c). In the 2021 Alaska Trapper report, ermine were listed as scarce in region I (Southeast region). Only 2 were captured in region I with none being reported in Game Management Unit 2 (that unit includes Prince of Wales Island) (Bogle 2022). Ermine is not a target species for trappers and is taken incidentally during trapping for other target species (Bethune 2023). Population densities of related ermine species range from 4 adults/km² in northern Alberta (Soper 1919) to 11 adults/km² in Ontario (Simms 1979b in ADFG 2006), however population densities on Prince of Wales Island, Dall Island, and Long Island are unknown.
5	D	D = Insufficient information to draw inferences about criterion.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
Population trend on Tongass NF		Island-wide population surveys are needed to determine distribution and population abundance (USDA FS 2016c).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Preferred ermine habitat in southeast Alaska is described as areas with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Suring and Cook 2014). Patterns of habitat use by ermines are greatly influenced by prey abundance and predation risk. In general, ermine are likely to prefer habitats with relatively heavy ground cover of down wood, herbaceous vegetation, and shrub cover (Doyle 1990, Samson and Raymond 1998 in Suring et al. 2014). Evaluation of habitat use by ermine in British Columbia showed similar use in regenerating clearcuts and in old forests (Suring 2014), however clear-cut logging has also been described as a threat to this species in Alaska, especially in unproductive, mid-successional regrowth forests which may be favored habitat (ADFG 2006). Ermine species on the Tongass NF are not thought to be strict old growth associates (Suring 2014). An analysis of habitat quality for ermine on the Tongass NF found that habitat quality increased with forb, shrub, down wood and large tree density. Habitat quality decreased, however, once canopy closure began to shade out the understory. Quality ermine habitat was also associated with proximity to streams, and with early forest regeneration and old forests with canopy breaks (Suring 2014). Prince of Wales Island has a considerable history of timber harvest, however approximately 74% of old-growth forest on NFS ownership in North Central Prince of Wales Island, 97% on South Prince of Wales Island, and 98% of Dall Island and vicinity remains intact (USDA FS 2016a page 3-196). Prince of Wales Island includes the Karta River Wilderness and South Prince of Wales Wilderness, which together total 200 square miles (520 square kilometers). Areas not administered by the TNF on these islands, however, have been extensively logged (Schoen and Dovichin 2007). The Suring analysis of ermine habitat quality across all ownerships found moderate to high habitat quality for ermine across 74% of North Central Prince of Wales Island, 64% of South Prince of Wales Island, and 94% of Dall Island and vicinity (Figure 6-3 in Suring 2014). This suggests a stable habitat trend.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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 <i>Mustela haidarum celenda</i> utilizes a broad range of habitat types, habitat vulnerability may be less of a concern than for old-growth-dependent endemic mammals. More information on habitat vulnerability and modification is needed to fully understand potential threats due to habitat. Threats related to highly restricted range are not well-described for this specific taxon, but can be described generally. These include reduced genetic integrity, limited dispersal capabilities, susceptibility to disease, local habitat disturbance, extreme weather events, and high reliance on variable prey populations (Suring 2014, ADFG 2006), all of which would constitute potential threats to the persistence of <i>Mustela haidarum celenda</i>. Vulnerabilities to pathogens (distemper, SARS-CoV-2) from humans or their pets (Androski et al. 2024) have also been noted for endemic ermine taxa in southeast Alaska.
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. Little information is available on this subspecies' life history and demographics. Ermine usually produce no more than one litter of about six young per summer. Annual survival is only about 40%, rendering populations are vulnerable to stochastic events (Suring 2014). All ermine subspecies have a polygamous mating system, with several exclusive female home ranges occurring within the male's home range (Erlinge 1977) Adult size is reached at 4 to 6 months and 10 months for females and males, respectively. Ermine breed early, have short lifespans, and their populations change dramatically on an annual basis because of fluctuating food supply (King and Powell 2007). They breed once per year and litter size range is 4 to 13 kits and is strongly dependent on prey abundance. At very low prey densities, no young are produced (Erlinge 1983, ADFG 2006). The rapid change from positive to negative growth rates over 1 - 2-year periods means that local ermine populations are considered unstable (King and Powell 2007).

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

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

- Significant threats** – The primary threats to *Mustela haidarum celenda* are general threats for endemic mammal taxa that are associated with their restricted distributions. These include potential threats to genetic integrity and stochastic events such as pathogen exposure, local habitat disturbance, extreme weather events, or its high reliance on variable prey populations. Low annual survival rates for ermine further contribute to the taxon's vulnerability to stochastic events. There is insufficient evidence, however, to establish these particular factors as significant threats to *Mustela haidarum celenda*.
- Declining populations or habitat trends** – Population sizes and trends for *Mustela haidarum celenda* on the Tongass National Forest are unknown. Prince of Wales Island is large, and intact habitat maintained on this island suggests the potential for a larger population relative to ermine taxa that are endemic to smaller islands (moderate to high habitat quality for ermine across 74% of North Central Prince of Wales Island, 64% of South Prince of Wales Island, and 94% of Dall Island). This taxon is not old-growth-dependent, and is associated with a diverse range of forest structure attributes. There is insufficient evidence to establish a declining trend in habitat.
- Restricted range** – This taxon is endemic to and restricted to Prince of Wales, Dall, and Long Islands. Although it has a restricted range, the total area of these islands total 2,876 square miles (7,443 square kilometers).
- Low population numbers or restricted ecological conditions** – Population numbers for *Mustela haidarum celenda* are unknown. Ermine taxa have been documented in varied habitat including old-growth and successional forests, brush, alpine meadows, marshes, and riparian areas, habitat types that are not restricted on Prince of Wales and Dall Islands.

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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

U.S. Department of Agriculture Forest Service (USDA FS). 2016c. Tongass Land and Resource Management Plan R10-MB-769j. Tongass National Forest, Ketchikan, Alaska.

DRAFT

Myotis evotis*Myotis evotis* H. Allen, 1864

Long-eared myotis

Global Rank: **G5**Alaska State Rank: **S3S4**photo: Alaska
Department of
Game and Fish**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Limited information on distribution of this bat in Southeast Alaska or on the Tongass National Forest. Prior to 2005, only three specimens had been collected for the species. From 2005-2022 known distribution expanded with range of the species extending as far north as Skagway (Arctos Consortium 2022). Associated with coastal forest habitats. Hibernacula are known to include mid-elevation caves (Boland 2007, Alaska Center for Conservation Science 2017). The Alaska population of <i>M. evotis</i> was previously considered as Keen's myotis (<i>Myotis keenii</i>). Recent genetic analyses suggest that <i>M. keenii</i> and <i>M. evotis</i> are the same species (Lausen et al. 2019, 2021).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S3S4 Washington State Rank S1, British Columbia Provincial Rank SNR Range for the long-eared myotis includes western North America, from central British Columbia, southern Alberta, and southern Saskatchewan south along the Pacific Coast to Baja California, east through Montana and Idaho to the western Dakotas, and from Nevada, Utah, Wyoming and Colorado to New Mexico and Arizona (Manning and Jones 1989; Reid 2006).

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		This species has been reported from several locations in southeast Alaska (Boland 2009a; Arctos Consortium 2022). A recent survey in Skagway extended the known distribution of this species in Alaska, indicating the need for additional surveys to determine northern range limits (Olson and Fiely 2014). Foraging and roost habitats have been studied (Boland et al. 2009b; Olson and Fiely 2014), but further research is needed on habitat characteristics of hibernacula and maternity colonies.
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). These bats are slow flyers but thought to migrate short distances between summer and winter ranges (Waldien et al. 2000). Parker (1996) documented low levels of bat activity in clearcuts and second-growth forests of southeast Alaska, which could impact dispersal.
4 Abundance on Tongass NF	A	A = Rare. Current abundance is low enough that stochastic and other factors could lead to potential imperilment. Unknown, but considered rare. In 2005, <i>Myotis keensi</i> (<i>Myotis evotis</i>) were found in all localities where surveyed except Chichagof Island and Yakutat, yet they comprised less than 6% of mist net captures. On Prince of Wales Island, <i>Myotis keensi</i> (<i>Myotis evotis</i>) comprised approximately 13% of mist net captures in 2005 and 23% of mist net captures in 2006 (Boland 2009).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Trend in mean occupancy of species in Alaska from 2016-2019 does not appear to be negative or positive – credible intervals overlap zero (Udell 2022). Long-term trend unknown, but species is strongly associated with forest habitat. It could be assumed that populations declined when industrial scale logging and forest removal began in 1954. However, limiting factors are unknown. Impact of forest harvest particularly difficult to assess because it is unknown whether roosting sites, maternal sites, and hibernacula are limiting, and little is known about foraging habitat. Therefore, consequences of the loss of old forest are difficult to assess but can be assumed to be negative (Alaska Department of Fish and Game 2023).
6 Habitat trend on Tongass	D	D = Insufficient information to draw inferences about criterion. Too little is known about habitat associations to make strong statements regarding habitat trend (see <i>Criteria 5: population trend on Tongass NF</i>). <i>M. evotis</i> prefer to roost under loose bark or other structure of cedar and hemlock trees that have various degrees of decay and defects. Female long-eared bats on Prince of Wales Island appear to be

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
NF		primarily associated with old-growth forests for day roosting (Boland 2007, Boland 2009). The reduction of coastal rain forest, therefore, can be assumed to have reduced the extent and quality of habitat (Alaska Department of Fish and Game 2023). This bat species likely uses karst formations for hibernation and potentially other periods of rest. The influence of karst exploration (recreation) and modification as a result of forest management activities is unknown. Extensive karst and crevice formations occur in Southeast Alaska (approximately 1,760 km²) (Alaska Department of Fish and Game 2023).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Forty-two percent of the most productive forests in southeast Alaska were harvested by 1990, including more than seventy percent of the karstland forests on Prince of Wales and neighboring islands. Current levels of timber harvest could have a detrimental effect on the Alaska population by altering forest structure important to bats. Bat activity is rare in clearcuts and second-growth forests of Southeast Alaska. Destruction of karst by recreationalists or mineral extraction may be a threat, as these areas are critical hibernacula. A single <i>Myotis evotis</i> was found dead with white-nose syndrome (WNS) in Washington State (Washington Department of Fish and Wildlife 2019). At present, this threat is considered low but could increase if the disease spreads more widely in the west. WNS represents the most profound, potential vulnerability for <i>M. evotis</i> and other bats in Southeast Alaska. The fungus <i>Pseudogymnoascus destructans</i> (Pd), the causative agent of WNS in bats, persists in soil and on rock surfaces of bat hibernacula affected by this disease.
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. Bats are long-lived and have low reproductive rates. Consequently, population recovery after severe declines will be slow.

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 sufficient evidence to assess concern for the persistence of the long-eared myotis (*Myotis evotis*) within the plan area, based on the following:

- **Significant threats:** There is insufficient information to determine specific stressors on and off the plan area to this species, including climate change. It is possible that the species may be affected by white-nosed syndrome in Washington and other part of its range, but there is no survey data available for Alaska.
- **Declining populations or habitat trends:** There is not sufficient information to assess population or abundance on this species in the plan area, or to determine trends in habitat.
- **Restricted range:** This species is widely distributed outside of the Tongass National Forest.
- **Low populations or restricted ecological conditions:** Abundance is unknown, but likely to be rare relative to other bat species. There is insufficient population data for this species in the plan area. This species may be vulnerable to changing habitat conditions as a result of timber harvest, but the specific impacts of harvesting actions are poorly understood for this species. Impact of forest harvest particularly difficult to assess because it is unknown whether roosting sites, maternal sites, and hibernacula are limiting, and little is known about foraging habitat

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.
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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

☒	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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Myotis lucifugus*Myotis lucifugus* [Le Conte, 1831]

Little brown myotis

Global Rank: **G3G4**Alaska State Rank: **S3**

photo: Alaska Department of Fish and Game

**Species Assessment**

Criteria	Rank	Rationale
1 Distribution on Tongass NF	B	B = Patchy OR gaps. Five previously recognized species of Little brown bats (<i>Myotis lucifugus</i>), including <i>M. l. alascensis</i>, have been recognized as distinct species by Morales and Carstens (2018). However, and although this has been accepted by the American Society of Mammalogists, NatureServe will continue to recognize the broader concept of <i>M. lucifugus</i> pending additional input from taxonomic experts (NatureServe 2025). Because Little brown bats from southeast Alaska are treated as <i>M. lucifugus</i>, we adopt NatureServe's approach. The little brown myotis is perhaps the most numerous and widely distributed bat in southeast Alaska, and its range encompasses both the continental coast and most major islands of the Tongass NF in Southeast Alaska, including from Hyder to Yakutat along the mainland, and Admiralty, Baranof, Chichagof, Dall, Grant, Mitkof, Prince of Wales, Revillagigedo, Ring and Wrangell islands (Parker et al. 1997; MacDonald and Cook 2007; Boland et al. 2009). The species occurs in southeast Alaska all year-round (Parker 1996). Little brown myotis has been documented in temperate rainforests in southeast Alaska (ADF&G 2025a). The majority of captures in a study using mist nets took place over creeks (55%) and over rivers (29%) indicating that they use open habitat near bodies of water in forested areas (Boland et al. 2009), which they use for foraging (NatureServe 2025). A study in the Kenai Peninsula, Alaska, found that Little brown bats forage in areas close to freshwater bodies with moderately sloped terrain ≤ 50 m from conifer forests, and > 150 m from the coastline at elevations < 200 m (Mullet and

Criteria	Rank	Rationale
		Burger 2023). However, it should be noted that Little brown bats are also associated to old-growth forests, which provide roosting and foraging habitat- conditions that are not provided by second-growth forests or clearcut habitat (Parker 1996; Parker et al. 1996). Little brown bats roost under loose bark in trees or in snags and hollow trees (Parker 1996). Throughout their range, they are known to use caves, tunnels, abandoned mines and similar sites with relatively stable temperatures of 2-12°C for winter hibernation Kunz and Reichard 2010), and maternity colonies commonly are in warm sites in buildings and other structures, and also infrequently in hollow trees (NatureServe 20205). In southeast Alaska, radiotelemetry studies suggest that little brown myotis overwinter in small numbers in holes in scree fields and root wads of trees or stumps, and maternity colonies have been found almost exclusively in buildings (K. Blejwas, unpub. data cited in ACCS 2017).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G3G4, Alaska State Rank S3 The little brown myotis is the most common and widely distributed bat in Alaska, and the northern- and western-most specimens have been collected from Minto and Sleetmute, respectively, while the southernmost specimen has been collected from Essowah Lake on Dall Island (Alexander Archipelago) (Parker 1996; Parker et al. 1997). Outside Alaska, <i>Myotis lucifugus</i> extends across Canada, through most of the continental United States and into the central highlands of Mexico (Fenton and Barclay 1980).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). We found no studies on the dispersal capabilities of Little brown myotis in southeast Alaska. However, because they are volant, Little brown myotis are capable of long-distance dispersal with seasonal movements from hibernacula or swarms to summer colonies ranging from 10 to 647 km, and a median relocation distance of 315 km with over 20% of individual movements exceeding 500 km when individuals switched sites in northwestern Ontario (Canada) (Norquay et al. 2013). Moreover, as noted above, they tend to be captured more frequently along bodies of water, suggesting that they disperse through suitable habitat.

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. Little brown myotis is likely the most abundant species of bat in southeast Alaska, accounting for 87% of bat mistnet captures in the region in 2005 (Boland et al. 2009). Moreover, multiple counts in 2013 and 2014 documented more than 1,000 breeding females in Juneau alone (K. Blejwas, ADF&G, unpub. data cited in ACCS 2017). However, the climatic factors associated to high latitudes in southeast Alaska likely impose energetic constraints that keep bat populations naturally low in the region (Boland et al. 2009).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. In Alaska, based on the number of known maternity colonies and assuming an average roost size of 150 females, it is estimated that there are over 25,000 bats in the state (much less compared to numbers reached in the eastern portion of their range) (ACCS 2017). However, there is no information available on the population trends of the little brown myotis in the planning area, or Alaska (ACCS 2017), and experts agree that more efforts should be put towards monitoring of the species (Droghini et al. 2022). It should be noted that although the little brown myotis has been considered one of the most common and widespread bats species in North America, the appearance of white-nose syndrome (WNS) in 2006 in the eastern portion of their range dramatically altered the population balance and has resulted in population declines in this part of their range (Kunz and Reichard 2010). However, and although it is present in the west coast of continental US, WNS has not yet been detected in or near southeast Alaska (see Criterion 7).
6 Habitat trend on Tongass NF	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Based on their habitat requirements, little brown bats may be restricted to old-growth forest and to forests with medium to large-diameter trees, and forage on forested and riparian areas (see Distribution on the Tongass NF). According to Turner and Mallott (2025), on the Tongass, unharvested well drained and poorly drained forests as well as unharvested riparian forests have high ecological integrity. Ecological integrity drops to moderate or low and vulnerability to stressors is moderate to low when young growth forests of the different types are considered.

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. Based on their habitat requirements, little brown bats may be restricted to old-growth forests and to forests with medium to large-diameter trees, and forage on forested and riparian areas (see Distribution on the Tongass NF). According to Turner and Mallott (2025), on the Tongass, unharvested well drained and poorly drained forests as well as unharvested riparian forests have moderate vulnerability to stressors. Vulnerability to stressors is moderate to low when young growth forests of the different types are considered. We found no current significant threats for the little brown myotis in the planning area. However, future conditions are prone to change, and several factors should be considered. For example, habitat destruction due to logging is a possible stressor that could limit the little brown bat in southeast Alaska as bat activity levels are low or very low in second-growth and clear cut forests (Parker 1996; Parker et al. 1996). Experts have recommended changing forestry practices and protecting known habitat of little brown myotis as conservation actions (Droghini et al. 2022). However, although it was prevalent in the past in some parts of the Tongass (4% of the forested acres), timber harvest has declined substantially since 1997 with the last Forest Plan revision, and the buffers established on fish-bearing streams as well as the protections to old-growth forest (Engelmann 2024) are expected to conserve the required habitat by the little brown bats. Disease prevention and treatment was identified as an important conservation action for little brown myotis (Droghini et al. 2022). White-nose syndrome (WNS) is undoubtedly the most pressing threat that little brown myotis are facing in some parts of their range (Kunz and Reichard 2010). For example, mortality of little brown myotis due to WNS in affected caves is 73% with many hibernacula reaching 99% mortality or total extirpation in the eastern part of their range (Frick et al. 2010a). Although WNS has affected eastern populations of little brown myotis more heavily, the disease has spread to the west of North America, and it has recently been detected in the State of Washington and southern British Columbia (White-Nose Syndrome Response Team, www.whitenosesyndrome.org). However, samples collected within 400 km of the US-Canada border in southwestern British Columbia between 2016-2021 all tested negative (Blejwas et al. 2023), and there are no reports in or near southeast Alaska. While WNS has not yet been confirmed in Southeast Alaska, experts acknowledge that its arrival is possible, and there is monitoring in place (ADF&G 2025a, 2025b).

Criteria	Rank	Rationale
		There is high uncertainty among experts about the possible effects of climate change on the little brown myotis (Droghini et al. 2022). For example, ambient temperatures are projected to increase on the Tongass due to climate change (Littell and Johnson 2025), and thermal stress can cause indirect negative impacts to little brown myotis: six bats were found dead at a maternity colony in a Wrangell Island warehouse during a summer heat wave in 2019 (Bennetsen et al. 2025). However, at the same time, little brown myotis is expected to expand northward in Alaska within the next 50-80 years as winter temperatures, along with shorter winters, shift to conditions ideal for hibernation (Humphries et al. 2002; Droghini et al. 2022; Bennetsen et al. 2025).
8 Life history and demographic s	D	D = Insufficient information to draw inferences about criterion. Little is known about the life history and demographics of little brown myotis in the plan area, but, in general, all bat species have naturally low reproductive rates, and this is especially so in temperate climates with high precipitation and low ambient temperatures because of unsuccessful pregnancies and mating avoidance (Grindal et al. 1992; Lewis 1993). Indeed, the reproduction rate of little brown bats is low, with females having one pup per year, however, individuals are presumed to be long-lived (Humphrey and Cope 1976). Females can potentially give birth the first year if in good body conditions, but reproduction can be delayed until the second year in colder climates (Nagorsen and Brigham 1993; Frick et al. 2010b). In southeast Alaska, pregnant females were collected in June, and lactating females were collected in June and August (Parker 1996). Moreover, a juvenile was collected in August suggesting that young bats fledge by mid-August (Parker 1996). Population age structure and survival of little brown myotis are not clearly defined throughout their range (Fenton and Barclay 1980), except for mortality information from WNS in the eastern part of their range, and there is no information on this in the planning area for little brown myotis. Moreover, it should be noted that differences in diet and reproduction to that found in lower latitudes compared to those in southeast Alaska indicate that the ecology of little brown bats in southeast Alaska should not be extrapolated from studies of the species in lower latitudes (Parker 1997). Therefore, there is no sufficient information from the planning area to make inferences about this criterion.

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

Although the little brown myotis is regarded as the most common and abundant of the bats species in southeast Alaska, compared to other parts of its range, the information on its biology and ecology is limited. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** Overall, the major threat known for the species is white-nose syndrome, but although it is possible for the disease to reach southeast Alaska, it has not been detected there yet. No threats were identified in the planning area.
- **Declining trends:** There is no information on population trends on the Tongass; habitat seems to be stable, but no detailed studies on their habitat preferences in southeast Alaska are available.
- **Restricted ranges:** The species occurs throughout Alaska (except for the northern-most latitudes), little brown bats have an extensive range in North America and are considered one of the most common bats in the continent. They are therefore not range-restricted.
- **Low population numbers or restricted ecological conditions:** Although they are considered the most relatively abundant and widespread bat in Alaska, there is little information on the abundance or population numbers of the little brown myotis and the ecology of the species is poorly studied in southeast Alaska. Because of the temperate climate of southeast Alaska, the species seems to be naturally low in numbers when compared to other parts of their range.
- **Other factors:** We found no other current significant factors affecting the little brown myotis. However, increasing temperatures, logging and white-nose syndrome may affect little brown myotis in southeast Alaska in the future.

Moreover, because of differences in diet and reproduction to that found in lower latitudes compared to those in southeast Alaska, researchers have indicated that the ecology of little brown bats in southeast Alaska should not be extrapolated from studies of the species in lower latitudes. We therefore conclude that there is lack of sufficient scientific information to determine that there is substantial concern for long-term 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 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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TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

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Myotis volans*Myotis volans* [H. Allen, 1866]

Long-legged myotis

Global Rank: **G4G5**Alaska State Rank: **S3S4**Photo: J.N. Stuart via [Flickr](#)**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. According to Warner and Czaplewski (1984), there are four sub-species of Long-legged myotis (<i>Myotis volans</i>), and the subspecies present on the Tongass is <i>M. v. longicrus</i>. However, the taxonomic status of the subspecies is unclear (NatureServe 2025), and in the literature it is treated as <i>M. volans</i> in Alaska, so we adopt the latter. Information about the distribution of the Long-legged myotis on the Tongass is limited. McDonald and Cook (2007) indicate that specimens have been collected at Mole Harbor, Admiralty Island, Wrangell Island, and Prince of Whales Island. Data from the Global Biodiversity Information Facility (www.gbif.org) provided by the University of Alaska Museum of the North rendered seven observations with occurrence locations: Big Creek and Polk Inlet in Prince of Whales Island (2), Mt. Dewey and Upper Salamander in Wrangell Island (3) and Ward Lake and Ward Lake Inlet in Ketchikan (2). In general, the Long-legged myotis is primarily a coniferous montane forest bat (Warner and Czaplewski 1984, and references therein; NatureServe 2005), but Parker (1996) indicates that although they are regular part of the southeast Alaska fauna, it is not possible to identify the habitat used there because of the few known occurrences and no studies. However, the availability of appropriate roosting habitat likely restricts Long-legged myotis to areas associated with old-growth forest or forest with medium to large-diameter trees and large snags (Johnson et al. 2007; Hayes and Wiles 2013; ACCS 2017). Roosting and maternity colonies habitat consists of crevices under the bark of trees and snags, and rock crevices (Vonhof and Barclay 1996; Baker and Lacki 2006; Johnson et al. 2007). When foraging, they may use

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		forested habitat (Warner and Czaplewski 1984) as well as open habitats such as creeks, ponds and along cliffs (Saunders and Barclay 1992; Boland et al. 2009). No hibernacula have been found in Alaska (ACCS 2017), but they have been found hibernating in caves elsewhere (Hayes and Wiles 2013).
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4S5, Alaska State Rank S3S4, classified by the Alaska Department of Fish and Game as a species of greatest conservation need. The Long-legged myotis is found through Western North America, from southeast Alaska and western Canada to central Mexico (Warner and Czaplewski 1984). Southeast Alaska is the north-western limit of the range of Long-legged myotis (Parker et al. 1997).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information on the dispersal capabilities of the Long-legged myotis in southeast Alaska, or elsewhere throughout their range. Genetic studies suggest that migratory <i>Myotis</i> species tend to have less structured populations due to long-distance movements and mating outside breeding areas, while sedentary species show stronger genetic differentiation at smaller scales (Moussy et al. 2013). The Long-legged myotis has a large range, and intra-specific variation is possible, but whether this species is sedentary or migratory and the dispersal patterns on the Tongass remain to be studied.
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information about the abundance of the Long-legged myotis on the Tongass.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information about the population trends of the Long-legged myotis on the Tongass.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is little information about the habitat preferences of Long-legged myotis on the Tongass, but based on their preferences elsewhere throughout their range, these bats may be restricted to old-growth forest and to forests with medium to large-diameter trees, and forage on forested and riparian areas (see Distribution on the Tongass NF). According to Turner and Mallott (2025), on the Tongass, unharvested well drained and poorly drained forests as well as unharvested riparian forests have high ecological integrity. Ecological integrity drops to moderate or low and vulnerability to stressors is moderate to low when young growth forests of the different types are considered (Turner and Mallott 2025).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. There is no information about the habitat preferences of Long-legged myotis on the Tongass. However, based on their preferences elsewhere throughout their range, they may be restricted to old-growth forests and to forests with medium to large-diameter trees, and forage on forested and riparian areas (see Distribution on the Tongass NF). According to Turner and Mallott (2025), on the Tongass, unharvested well drained and poorly drained forests as well as unharvested riparian forests have moderate vulnerability to stressors. Vulnerability to stressors is moderate to low when young growth forests of the different types are considered. Assuming they occupy the same habitats as they do elsewhere, we can expect that climate change will influence habitat characteristics of long-legged myotis on the Tongass NF (Halofsky et al. 2025). For example, projected increases in temperature and soil moisture deficits will alter forest composition and structure. Western hemlock is expected to expand, while Sitka spruce may decline due to drought stress (Baer et al. 2025). These changes could affect roosting habitat availability if old-growth stands decline or are replaced by younger forests. Increased landslides, windthrow, and insect outbreaks may create canopy gaps (Baer et al. 2025), but loss of large snags and old-growth features could

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		reduce roosting sites. In addition, drying of wetlands and changes in riparian zones (D'Amore et al. 2025) may reduce foraging opportunities near water bodies.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. In general, all bat species have naturally low reproductive rates, and this is especially so in temperate climates with high precipitation and low ambient temperatures because of unsuccessful pregnancies and mating avoidance (Grindal et al. 1992; Lewis 1993). However, the life history and demographics of the Long-legged myotis has not been studied on the Tongass. The little information we have on the Tongass comes from Parker (1996) and Parker and Cook (1997). These studies confirmed the presence of the Long-legged myotis in southeast Alaska, they note that they are probably residents in the region and include some dietary information. Elsewhere throughout their range, Warner and Czaplewski (1984, and references therein) summarize what is known about the Long-legged myotis. However, the information provided is not sufficient to make inferences about this criterion.

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

The Long-legged myotis is a poorly studied species. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** Overall, no major threats are known for the species (NatureServe 2025), and no threats were identified in the planning area.
- **Declining trends:** There is no information on population or habitat trends on the Tongass; habitat preferences are unknown in the planning area.
- **Restricted ranges:** The species occur in the periphery of its range and the planning area is the north-western limit of its range. However, Long-legged myotis have an extensive range in western North America and are thus not restricted.
- **Low population numbers or restricted ecological conditions:** There is no information on the abundance or population numbers of the Long-legged myotis and the ecology of the species is poorly studied.
- **Other factors:** We found no other significant factors affecting the Long-legged myotis.

Overall, unclear taxonomic status and the lack of basic information on their biology and ecology leads us to conclude that there is lack of scientific information to determine that there is substantial concern for long-term persistence of the Long-legged myotis in the plan area. Therefore, we are not recommending the species 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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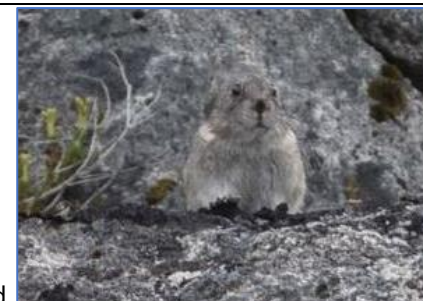
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Ochotona collaris*Ochotona collaris* [Nelson, 1893]

Collared Pika

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

photo: Paul Norwood

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	A	A = Scarce or isolated. The range extent of the Collared pika is thought to be limited to White Pass in the Tongass National Forest, at the border of Alaska and British Columbia, which is in the periphery of their range (McDonald and Cook 2007). However, according to MacDonald and Cook (2009) and H. Lanier (pers. comm., in ACCS 2018) their distribution is uncertain in southeast Alaska, including the Tongass. Information from the Global Biodiversity Information System (www.gbif.org) indicates that there is only one observation of Collared pikas in southeast Alaska, near Skagway, just inside the boundaries of the Tongass National Forest between Devils Punch Bowl and Snyder Creek, which was recorded in iNaturalist in 2017 (https://www.inaturalist.org/observations/7671018). According to Lanier and Olson (2013), phylogeographical-level relationships of <i>Ochotona collaris</i> lacked broad-scale resolution for much of its range (i.e., has reduced phylogeographical structure), but samples from the Coast Mountains (to which presumably collared pikas from the Tongass NF belong to, if present) form a circumscribed clade with the Wrangell-St. Elias range.
2 Distribution in	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S3

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
surrounding geographic area		The Collared pika occurs in the mountains of central and southeastern Alaska, from the Yukon-Tanana uplands and the Chigmit Mountains, west of Cook Inlet, to the head of Lynn Canal near Skagway, and in Canada from the Ricardson Mountains in Yukon and the District of Mackenzie, south into British Columbia and west to near the Mackenzie River in Northwest Territories (MacDonald and Jones 1987, and references therein).
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). No information on the dispersal capabilities specific to collared pikas in the Tongass NF is available, but <i>Ochotona collaris</i> have been reported to have a relatively small home range of approximately 30 m in diameter on average (700 m ²) elsewhere, which is comparable to the home ranges of similar species including <i>O. princeps</i> and <i>O. hyperborea</i> (Broadbooks 1965; MacDonald and Jones 1987). Hay piles distance from dens ranged from 30 to 70 m (Broadbooks 1965). In Yukon, Canada, the mean dispersal distance for juvenile collared pikas (from their haypiles to the genotyped mother's haypiles) was 536 m (± 548 m), exhibiting high variation (Zgurski and Hik 2012). However, and although there were low average dispersal distances, dispersal from other populations into the study population was strong enough for immigrants to survive and breed according to genetic signatures (Zgurski and Hik 2014). Therefore, dispersal can occur through suitable habitats between populations, and even across glaciers (Zgurski and Hik 2014; Lanier and Olson 2013).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the abundance of collared pikas in the Tongass NF. However, population densities have been estimated to range from 6.4 to 7.2 animals/ha (Broadbooks 1965).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the population trends of collared pikas in the Tongass NF. In Yukon, Canada, collared pikas exhibited a complex decline-recovery dynamics with local extinctions of some subpopulations and subsequent colonization, which were associated with environmental variation (Morrison and Hik 2007). According to Lanier and Olson (2013), samples from the Coast Mountains (to which presumably collared pikas from the Tongass NF belong to) and other groups present demographic stability at the population level.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
6 Habitat trend on Tongass NF	A	A = Decline in habitat quality or quantity. Collared pikas form colonies in mountainous terrain, and they live mostly in rocks slides, talus slopes and among large boulders usually near meadows or patches of vegetation, with most records in Alaska above the timber lines (Manville and Young 1965; MacDonald and Jones 1987), in alpine habitat, which is considered vulnerable to climate change (Bennetsen et al. 2025). Throughout their range, they are commonly found in early successional habitats (rocky substrates with herbaceous plants and reduced woody vegetation) along glacial margins (Lanier and Olson 2013). Key losses in alpine habitats have been described recently, with the conversion of alpine upslope of the shrub and tree ecotone from advancing shrub- and tree-lines elevation in the Tongass National Forest (Baer et al. 2025). However, as glaciers retreat and with decreased snowpack, alpine areas are being created (Baer et al. 2025), albeit not necessarily with the habitat (vegetation) characteristics needed by some wildlife if the right substrate and soils are not present (Halofsky et al. 2011; Bennetsen et al. 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. Rank A when occurrences are few and there are documented specific localized threats (e.g., herbicide, weeds, recreation sites); or when a specific habitat type has clear imminent threats documented. Climate change is expected to result in habitat conditions departing from expectations based on NVR for collared pikas, where alpine and sub-alpine habitats are lost due to increasing shrub- and treeline (Bennetsen et al. 2025), snow depth is increased due to higher frequency and magnitude of winter storms (Littell and Johnson 2025), thus increasing vulnerability to harsh winter conditions (Bennetsen et al. 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. There is no information specific to collared pikas on the Tongass National Forest, however, MacDonald and Jones (1987, and references therein) summarized what is known about <i>Ochotona collaris</i> throughout their range. The peak of the breeding season occurs in May and early June, with lactating females reported in June-July. Litters size ranges from two to six young, they reach adult size in 40-50 days after birth and can breed at about one year of age. In Yukon, Canada, earlier spring conditions and plant phenology was associated with subsequent winter survival of adults and population

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		growth (Morrison and Hik 2007). Moreover, according to Lanier and Olson (2013), samples from the Coast Mountains (to which presumably collared pikas from the Tongass NF belong to) present demographic stability at the population level. In addition, collared pikas in Yukon, Canada show metapopulation dynamics, with decline-recovery and extinction-recolonization dynamics associated with environmental variation that indicate that <i>O. collaris</i> can readily recover from population declines (Morrison and Hik 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

Collared pikas in the Tongass National Forest are found in the periphery of their range, and there is lack of studies on these particular populations. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** No current threats were found in the plan area. The primary anticipated threat is climate change, which is expected to substantially modify alpine and sub-alpine habitats. Anticipated changes include the loss of habitat due to advancing shrub- and tree-lines, as well as increased snow depth resulting from more frequent and intense winter storms, which increases vulnerability to harsh winter conditions.
- **Declining trends:** The habitat trend is ranked as declining in quality or quantity. Key losses in alpine habitats have been observed recently, with the conversion of alpine upslope areas from advancing shrub- and tree-lines. There is insufficient information on specific population trends within the Tongass National Forest.
- **Restricted ranges:** The species has a restricted and isolated distribution within the Tongass National Forest, it seems to be limited to the White Pass and Skagway areas at the periphery of its overall range.

- **Low population numbers or restricted ecological conditions:** There is insufficient information available regarding the abundance of collared pikas on the forest. However, their reliance on specific alpine habitat types (rock slides and talus slopes near meadows) which are vulnerable to climate change is a concern.
- **Other factors:** A general lack of specific studies on the life history, demographics, abundance, and population trends for these particular peripheral populations in the Tongass National Forest is a major concern that prevents a definitive conclusion about their long-term persistence risk.

Taken together, and although there is concern over the effects that climate change may have on the populations of collared pikas on the Tongass National Forest in the future, without information on their abundance and population trends in the forest we find that there is lack of scientific information to determine that there is substantial concern over the long-term persistence of the species in the plan area. Therefore, we are not recommending *O. collaris* as a 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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*Urile penicillatus**Urile penicillatus* Brandt, 1837

Brandt's cormorant

Global Rank: **G5**Alaska State Rank: **S1B**

photo: Matt Davis

**Species Assessment**

Criteria	Rank	Rationale
1 Distribution on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Records suggest this cormorant is a rare, casual breeder in Alaska. There are no known breeding sites on the Tongass National Forest. A colony at Lazaria Island was known to be occupied in only one year (1984) and has been abandoned since at least 1994 (area observed yearly since 1994). The only current colony in Alaska is Hazy Island, which is not part of the Tongass National Forest. There have been observations of Brandt's cormorant also on Forrester Island and Lowrie Island, two small islands west of Dall Island on the Tongass NF (Arctos Consortium 2004). Winter records (November – April) in the Ketchikan area are uncommon but regular and recurring.
2 Distribution in surrounding geographic area	C	C = Wide distribution outside the Tongass National Forest. Global Rank G5, Alaska State Rank S1B Washington State Rank S3B, S4N, Oregon State Rank S4, California State Rank SNR The core breeding range for Brandt's cormorant occurs along coast of California and Oregon (Wallace and Wallace 2021). This species is generally non-migratory, but Alaska individuals appear to winter to the south. Alaska is the northern extent of this species. The British Columbia population was considered to be in preliminary phase of colonization in 1980s with only a few known breeding sites around Vancouver Island and Mandarte Island in the southern Gulf Islands (Hipfner 2015). The breeding population in British Columbia is currently considered very small and ephemeral (Hipfner 2015, Environment and Climate Change Canada 2019). The species is an uncommon winter visitant in waters around the Ketchikan area (Heinl 2007). Hazy Island, which is not part of the Tongass National Forest, is where

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		Brandt's cormorants were first observed in 1982, and a site visited in 2000 had 57 adults and 40 nests. Irregular visits to the Hazy Island area documented birds and nests in the 1990s and each year from 2001-2005, with nesting observed in 2014. Additionally, due to habitat being made available by 1964 earthquake, the Prince William Sound area was occupied by 1972, but abandoned by 1978 (Seal Rocks and Hinchinbrook Entrance). All individuals in Alaska (both on- and off-Forest) and British Columbia have been considered a result of post-breeding dispersal during periods of strong production in the main part of breeding range (Wallace and Wallace 2021).
3 Dispersal capability	C	C = Readily disperses across landscapes with few habitat-related limitations. Brandt's cormorant exhibits extensive winter movements but is not considered migratory. This species shifts regularly with food availability. Brandt's cormorants generally display northward movement in autumn and southern movements in spring. These movements likely provide opportunities for colonization of new habitat when it becomes available, as apparently occurred following the 1964 earthquake (Heinl 2007, Wallace and Wallace 2021, USDI NPS 2021).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. This cormorant is rare in Alaska, with fewer than 50 breeding pairs estimated (NatureServe 2023). There are no breeding records on the Tongass National Forest, and abundance of this cormorant on the Forest is not well understood. Winter records (November – April) in the Ketchikan area are uncommon but regular and recurring, suggesting the Brandt's cormorant is at least a transient visitor to the area. This species is considered critically impaired in the state of Alaska (NatureServe 2023).
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Populations of Brandt's cormorant in Alaska (Tongass National Forest) are considered "rare, casual breeder[s]" with occasional sightings during the breeding season, mostly attributed to the Ketchikan area. There are no records of breeding on the Tongass National Forest. Breeding records near the Tongass National Forest reviewed above (see 2 – <i>Distribution in surrounding geographic area</i>). Brandt's cormorants on the Tongass National Forest are all transient and vary by season and year, so no specific population trend determinations can be made.
6 Habitat trend	B	B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
on Tongass NF		Brandt's cormorant, though transient on the Tongass National Forest, is typically found mainly in the inshore coastal zone, especially in areas having kelp beds and around offshore islands (NatureServe 2023). Marine waters and associated habitats in Alaska are generally healthy (AKFG 2015, pg. 79).
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Limited breeding in Alaska makes it difficult to evaluate vulnerability of habitat on the TNF. Throughout its range, threats to Brandt's cormorant include disturbance at nesting and roosting sites, recreational use of habitats, pollutants such as oil, commercial fisheries, and reduced forage availability during and after periods of ENSO—which may be influenced by climatic changes (USDI FWS 2006, USDI FWS 2009, Wallace and Wallace 2021, NatureServe 2023). Threats specific to coastal habitat where transient Brandt's cormorant have occurred on the TNF, however, are unknown.
8 Life history and demographic s	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. Like other marine-oriented birds, life history and demography are well-suited to boom and bust of marine forage fish (Ainley et al. 2018) resulting from ENSO and other marine current patterns. Long-lived adults provide buffer to variable annual reproduction. Winter movements provide opportunity to colonize new habitat (Wallace and Wallace 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

There is a lack of information to determine substantial concern for the persistence of the Brandt's cormorant (*Urile penicillatus*) within the plan area based upon the following:

- **Significant threats:** The mobility and dispersal capability of this species mitigate potential significant threats to their persistence as transients in Alaska. General threats across the species' range include pollution (e.g. oil), commercial fishing and recreation disruption to nesting habitat, and reduction in foraging potential as a result of changing oceanic conditions. Threats specific to Brandt's cormorant on the Tongass NF, however, are unknown.
- **Declining populations or habitat trends:** The coastal marine habitat of this species is generally healthy in Alaska. There is insufficient evidence to determine if the habitat is trending downward on the Tongass NF. There is no population or abundance information on the Tongass NF aside from uncommon but recurrent sightings of the species in the area of Ketchikan, AK.
- **Restricted range:** Alaska is the northern extent of the Brandt's cormorant's range. While considered critically imperiled in Alaska, this species is ranked overall as one of Least Concern by IUCN. The core population of this species is centered farther south in its range with transient/visiting individuals coming north to Alaska only in the summer months.
- **Low populations or restricted ecological conditions:** While this is no population information for this species on the Forest, Brandt's cormorant has high dispersal potential and is only a transient resident of Alaska, overwintering farther south.

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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DRAFT

Rana luteiventris*Rana luteiventris* Thompson, 1913

Columbia Spotted Frog

Global Rank: **G4**Alaska State Rank: **S2**photo: Alaska Department
of Fish and Game**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. Disjunct patches of habitat are typically large enough and close enough together to other patches to permit dispersal among patches and to allow species to interact as a metapopulation. Columbia spotted frogs are present in coastal forests of Southeast Alaska, habitat associations and distribution are somewhat known, although the northern limit of their range is not well understood (Ream 2013). Their present distribution appears to be confined to coastal transboundary river corridors of continental mainland in Southeast, such as Salmon, Taku, Stikine and Unuk rivers and the Agassiz Peninsula (U of AK 2003, 2018). Highly aquatic; closely associated with permanent water. Found predominantly in outwash ponds and backwater lakes, beaver ponds, muskeg ponds, river channels, and streams. Populations along major river systems likely well connected (based on synthesis of connectivity in Patla and Keinath 2005) while frog population units in higher elevations (if they occur at higher elevations) likely less connected.
2 Distribution in surrounding geographic	C	C = Wide distribution outside the Tongass National Forest. Global Rank G4, Alaska State Rank S2 Broad distribution in western North America from northern Wyoming and Utah north through Alberta and British Columbia to the Yukon. Disjunct populations occur south of the continuous distribution. Northern distribution less well defined but a significant portion of species range occurs east of the Tongass in Canada. In the heart of the range in Montana and Idaho, Columbia spotted frog was considered common and abundant prior to discovery of Bd or

TONGASS NF SCC: DRAFT SPECIES EVALUATION, 2026

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
area		Ranavirus (Worthing 1993). The Tongass (along with neighboring Canada) represents the northern portion of the species range. A broad distribution and connection between Tongass and Canada afforded by major river corridors, especially in the southern Tongass, but less connection to the north.
3 Dispersal capability	B	B = Disperses only through suitable habitat (dispersal areas may or may not be corridors). There has been documented movement between breeding and overwinter sites of around ½ km with similar movements possible from breeding to summer foraging and back to overwinter sites. Petla and Keinath (2005) suggest the frogs have relatively good dispersal capabilities with some individuals documented moving 0up to 6.5 km in a year. In the Rockies, low elevation, riverine associated populations demonstrate high connectivity (based on genetics) suggesting high dispersal among pond clusters. High elevation sites, on the other hand, showed low connectivity suggesting dispersal barriers. (Synthesized in Petla and Keinath 2005).
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Current population size unknown. Population studies conducted at isolated ponds in the Taku, Stikine and Unuk River corridors estimated local populations ranged from 7 to 594 Columbia spotted frogs per pond and densities ranging from 0.07 to 1.49 spotted frogs per m² of pond habitat (Lindell and Grossman 1998). In southeast Alaska, described as "fairly common along mainland river valleys" by Carstensen et al. (2003). Field surveys in the Stikine River area, which covered only a small portion of its statewide range, detected nearly 500 individuals (Ream 2016). Ream (2019) confirmed frogs on Wrangell Island.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Statewide trend is unknown (U of AK 2018). May be declining on the northern end of Mitkof Island (Ream 2016). Trend presumed downward due to recent disease agents – Chytrid fungus (<i>Batrachochytrium dendrobatidis</i>) or Bd and Ranavirus. The poor understanding of distribution on the Tongass contributes to poor understanding of population trend but an informed ecological argument for a declining population is supported by the understanding that Bd has been documented in SE Alaska and the general understanding of the effects of the fungus support the perspective that the abundance of frogs on the Tongass has likely declined (Lips et al. 2006, Adams et al. 2007).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. Overall, the extent of potential habitat on the Tongass has varied over the past couple thousand years as the region transitioned from the last glacial maximum and vegetation, ponds, riparian conditions have changed dramatically. Furthermore, the medieval warm period and the little ice age would have strongly influenced the availability of habitat. We only mention this because the Alaska species ranking system report on the frog notes that “Existing wetlands in the Taku and Stikine River corridors may be significantly reduced as postglacial rebound continues (Lindell and Grossman 1998). Over the coming decades the availability of habitat is likely to change locally but remain relatively constant at the scale of the Tongass given the interacting patterns of postglacial rebound, glacier retreat, hydrologic processes along major and minor river corridors. The quality of habitat may improve as regional temperatures warm resulting in more productive pond environments. Very little direct evaluation of habitat trend has occurred (see Lindell and Grossman 1998) – hence, there is insufficient information to draw a strong conclusion.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. Chytridiomycosis, parasitic fungus (<i>Batrachochytrium dendrobatidis</i>) – Bd - that attacks the keratin in the skin of metamorphosed amphibians and ranavirus are both important in amphibian declines that have been observed in Columbia spotted frogs throughout their range including Alaska. In Oregon spotted frogs (<i>Rana pretiosa</i>) populations are currently persisting with relatively high Bd prevalence in adult frogs (Pearl et al 2009). The consequences of these diseases represent the most direct recognized threat to Columbia spotted frogs in Alaska. Human-caused direct impacts are low due to protection throughout a large part of its range in the Tongass National Forest and Misty Fiords National Monument. Introduction of fish, particularly resident trout, to systems not previously occupied results in threats due to predation. Introduction of fish was more common in the past but is uncommon on the Tongass at this time. Existing wetlands in the Taku and Stikine River corridors may be significantly reduced as postglacial rebound continues. Populations associated with mainland river systems of Southeast Alaska have likely declined, but they still occupy their former range. Filling or draining of wetland habitat and alterations to ground or surface water flow from development are potential hazards. Chronic or acute water contamination from existing and proposed mining activities on the Canadian reaches of the Taku and Stikine Rivers may be of concern. Climate change is unlikely a direct threat for Alaska populations given potential to improve productivity of pond environments (through warming) and maintenance of relatively high precipitation in region.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
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. Demography which generally fits a K-selected life history, suggests relatively slow potential population growth rates: four to six years to reach sexual maturity. Although capable of a large reproductive effort (e.g., several hundred eggs per clutch), reproduction is limited by the inability of females to breed every year (sometimes only once in 3 years), the occasional total loss of embryos due to freezing or desiccation, and the high variability of larval survival due to the interaction of many factors at the breeding site (e.g., rainfall, evaporation, food, predation, crowding, disease, and pollution). Adults may live 10 to 12 years (Patla and Keinath 2005). This understanding of life-history and demography all come from studies south of Alaska. Life history analysis (using matrix models) suggests population growth is most sensitive to changes in reproduction and first year survival (Patla and Keinath 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

There is a lack of scientific information to suggest concern for the persistence of the Columbia spotted frog (*Rana luteiventris*) within the plan area, based upon the following:

- **Significant threats:** The observed occurrence of Bd and *Ranavirus* in Columbia spotted frog populations in SE Alaska represent the most important concern for populations. Based on the lack of direct evidence for population declines, the recognized broad distribution of the species, and the understanding that the related Oregon spotted frog persists despite very high rates of Bd infection in adult frogs, there is insufficient information to indicate whether Bd infection is a substantial concern to the capability of Columbia spotted frogs to persist over the long-term in the Tongass NF plan area. If evidence emerges indicating that Chytrid fungus or Ranavirus is leading to substantial, multi-year declines in Columbia spotted frogs, the status of the frog should be reconsidered.
- **Declining populations or habitat trends:** There is insufficient evidence to assess population or habitat trends on the Tongass National Forest.
- **Restricted range:** The Columbia spotted frog is widely distributed outside the Tongass National Forest.
- **Low populations or restriction ecological conditions:** While there is insufficient information available to assess populations on the Tongass National Forest, reproduction by this species is relatively understood to be influenced by many factors at the breeding site (e.g., rainfall, evaporation, food, predation, crowding, disease, and pollution). Adults are long-lived according to available studies from outside of Alaska. This species is relatively good at dispersing throughout suitable habitat and may be most vulnerable to threats in the first several months of life.

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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DRAFT

Sorex monticolus malitiosus

Sorex monticolus (pacificus) malitiosus
[Jackson, 1919]

Warren Island dusky shrew

Global Rank: **G5T2Q**

Alaska State Rank: **S3**

photo: eli Knapp via iNaturalist

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	A/D	A = Scarce or isolated./D = Insufficient information to draw inferences about criterion. The Warren Island dusky shrew was originally described as <i>Sorex obscurus malitiosus</i> (Jackson 1919), and since has been reclassified to <i>Sorex monticolus malitiosus</i>, which is the current accepted name (Integrated Taxonomic Information System; www.its.gov). However, NatureServe (2024) follows the name concept of <i>Sorex pacificus malitiosus</i> by Woodman (2018) and considers its taxonomy questionable and requiring clarification. It should be noted that genetic studies have identified two main clades in southeast Alaska and adjacent regions: a coastal clade distributed along the coast and islands of southeast Alaska (which groups with <i>S. pacificus</i>), and a continental clade, distributed in the interior of Alaska and British Columbia (Demboski 1999; Demboski and Cook 2001). The members of the coastal clade, to which the Warren Island dusky shrew belongs, are minimally differentiated in the mtDNA trees and are sympatric in many areas, but appear to be ecologically separated at the microhabitat level (Carraway 1990; Demboski 1999). For example, samples of Warren Island dusky shrews from Coronation Island group together with samples of dusky shrews from other parts in southeast Alaska (Stikine River mouth and Gustavus) and British Columbia (Nass River and Stewart) based on the combined cytochrome b/ND4 genetic data (Demboski 1999). Consequently, although the range extent of the presumed endemic Warren Island dusky shrew is described to be limited to Warren and Coronation islands in the Alexander Archipelago, Southeast Alaska (Manville and Young 1965;

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
		MacDonald and Cook 2007; Woodman 2018), which are designated Wilderness Areas, comparative molecular studies are needed to assess the levels of endemism in the region (Demboski 1999), and there is the possibility that the Warren Island dusky shrew is either more widespread or not an endemic species to Warren and Coronation Islands.
2 Distribution in surrounding geographic area	A/D	A = Only within the boundaries of the Tongass National Forest (local or regional endemics)./D = Insufficient information to draw inferences about criterion. Global Rank G5T2Q, Alaska State Rank S3 The Warren Island dusky shrew is one of five subspecies of dusky shrews (<i>Sorex monticolus</i> spp.) in southeast Alaska, and this presumed subspecies is thought to be restricted within the boundaries of the Tongass National Forest (Manville and Young 1965; MacDonald and Cook 2007; Woodman 2018; but see above for discussion). The coastal clade as a whole occurs throughout southeast Alaska, except on Baranof and Chichagof Islands (McDonald and Cook 2007), and in the interior of Alaska and British Columbia (coast and interior; Demboski 1999; Demboski and Cook 2001).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information on the dispersal capabilities of the Warren Island dusky shrew in the Tongass NF. However, Smith and Belk (1996) summarized what is known about the dusky shrew (<i>Sorex monticolus</i>) and its presumed subspecies (including the Warren Island dusky shrew). The home range size of non-breeding dusky shrews in southern British Columbia averaged 1,227 m² (± 300 m² SD) whereas that of breeding individuals was larger and averaging 4,020 m² ($\pm 1,200$ m² SD), with males having larger home ranges than females (Smith and Belk 1996). Females are thought to remain on their original home range during their entire life, whereas males tend to abandon their original home range and wander widely after the onset of breeding (Smith and Belk 1996).

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the abundance of the Warren Island dusky shrew on the Tongass NF. However, Smith and Belk (1996) summarized what is known about the dusky shrew (<i>Sorex monticolus</i>) and its presumed subspecies (including the Warren Island dusky shrew), and indicates densities of 12 animals/ha during periods of high abundance.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the population trends of the Warren Island dusky shrew on the Tongass NF.
6 Habitat trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. The only habitat description for the Warren Island dusky shrew comes from Manville and Young (1965), who describe their habitat as moist shaded areas. No additional information on their habitats is available, but Smith and Belk (1996, and references therein) described the habitat of <i>Sorex monticolus</i> as montane and boreal, with dense understory ground cover as the main component of suitable microhabitat. They indicate that dusky shrews are found more often in deadwood debris areas and clearcuts that have 85-90% herbaceous coverage when compared to forested areas with less herbaceous cover, and can be found in both riparian and upland areas.
7 Habitat vulnerability or modification; other threats	D	D = Insufficient information to draw inferences about criterion. There is insufficient information on the habitat preferences of the Warren Island dusky shrew to draw inferences about this criterion. According to NatureServe (2024) there are no imminent threats to the Warren Island dusky shrew as both Coronation and Warren islands, where this presumed subspecies is found, are designated Wilderness Areas. However, they indicate that populations are vulnerable to significant declines if rats are introduced into their habitats.

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
8 Life history and demographics	C/D	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./D = Insufficient information to draw inferences about criterion. According to NatureServe (2024), there are no known threats to the Warren Island dusky shrew, and their reproductive capacity is generally high allowing them to recover rapidly from short-term impacts (van Zyll de Jong 1983, as cited in NatureServe 2024). Smith and Belk (1996, and references therein) summarized what is known about the dusky shrew (<i>Sorex monticolus</i>) and its presumed subspecies (including the Warren Island dusky shrew), and indicates that males show signs of reproductive activity in winter, whereas females become receptive in March, however, the precise timing of reproduction varies with locality. Females may exhibit postpartum estrous and may have three to four litters. Collected females had 2-7 embryos, with average litter size of 6.5 (± 1.1 SD), and the life expectancy of the species is about 16 months.

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

The Warren Island dusky shrew is a presumed endemic subspecies to Warren and Coronation islands in the Tongass National Forest, however, its taxonomic position is uncertain, and genetic data indicates that it could be more widespread as part of a coastal clade in southeast Alaska and British Columbia and that it may not be an endemic species to these islands. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** No significant threats are known within the planning area. The islands where the species is presumed to be found are designated Wilderness Areas, conferring protection. A potential future vulnerability is a significant population decline if rats were to be introduced to the islands.

- **Declining trends:** There is insufficient information available regarding both population trends and habitat trends for this subspecies on the Tongass National Forest.
- **Restricted ranges:** The range is restricted within the boundaries of the Tongass National Forest, thought to be limited to Warren and Coronation islands. However, the taxonomic position is uncertain, and genetic data suggests that the species might be more widespread as part of a larger coastal clade, so range information is inconclusive.
- **Low population numbers or restricted ecological conditions:** There is no information available regarding the abundance of the subspecies on the Tongass National Forest. Its habitat preferences are also insufficiently known, though related species utilize moist, shaded areas with dense ground cover.
- **Other factors:** A key issue is the high uncertainty around the taxonomic placement of this presumed subspecies, which prevents a clear assessment of its conservation status. There is a general lack of basic information about the biology, ecology, and life history specific to the Warren Island dusky shrew. The parent species is noted as having a high reproductive rate, which generally allows for rapid recovery from short-term impacts.

Overall, we find that there is lack of scientific information to determine that there is substantial concern for the long-term persistence of the Warren Island dusky shrew in the plan area, and are thus not recommending it 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 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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Tamiasciurus hudsonicus picatus*Tamiasciurus hudsonicus picatus* [Swarth, 1921]**Kupreanof red squirrel**Global Rank: **G5T3**Alaska State Rank: **S3**

photo: Teri Franzen

**Species Assessment**

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
1 Distribution on Tongass NF	A/D	A = Scarce or isolated./ Insufficient information to draw inferences about criterion. The range extent of the Kupreanof red squirrel subspecies (<i>Tamiasciurus hudsonicus picatus</i>) is described as limited to Kupreanof and Kulu islands in the Alexander Archipelago, Southeast Alaska (Manville and Young 1965; McDonald and Cook 2007). However, and although no samples were assessed from Kupreanof Island, genetic analyses on samples from the Alexander Archipelago, including the nearby islands of Kuiu and Mitkof, among others, show that there is a distinct lineage called the North Pacific Coast lineage that is also present on Betton, Grant, Gravina, Revillagigedo and Zarembo islands (Hope et al. 2016). Therefore, it could be the case that the subspecies of Kupreanof red squirrel is more widespread than previously reported, but still confined to islands of the Alexander Archipelago. More information is needed.
2 Distribution in	A	A = Only within the boundaries of the Tongass National Forest (local or regional endemics). Global Rank G5T3, Alaska State Rank S3

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
surrounding geographic area		The Kupreanof red squirrel is restricted within the boundaries of the Tongass National Forest (McDonald and Cook 2007). The species as a whole, the pine squirrel (<i>T. hudsonicus</i>), occurs throughout North America, from New Mexico and Arizona northwards to the Rockies and into Oregon-Washington and British Columbia and Alaska, and from the north, eastward through Canada to the Great Lakes and eastern United states (Steele 1998; Hope et al. 2016).
3 Dispersal capability	D	D = Insufficient information to draw inferences about criterion. There is no information on the dispersal capabilities specific to the subspecies of Kupreanof red squirrel, but Steele (1998; and references therein) summarized what is known about the parent species (<i>T. hudsonicus</i>) and reports that mean territory size varies with habitat and location, but are usually 0.24-0.98 ha and circular in shape, but in Alaska, larger territory sizes of 1.6-4.8 ha have been reported after mast failure. Territory overturn is relatively common and squirrels may occupy a different territory each year. Prior to dispersal and territory establishment, young may move up to 900 m (mean of 126 m) from the nest until they eventually settle in or adjacent to their natal territory (<323 m)
4 Abundance on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the abundance specific to the subspecies of Kupreanof red squirrel, but Steele (1998; and references therein) summarized what is known about the parent species (<i>T. hudsonicus</i>) and reported densities of 0.3-2.0 squirrels/ha and that population may be limited by food availability. Moreover, drops in density of 1.2-1.5 squirrels/ha has been reported in Alaska after selective cutting of commercial forests.
5 Population trend on Tongass NF	D	D = Insufficient information to draw inferences about criterion. There is no information on the population trends specific to the subspecies of Kupreanof red squirrel in the Tongass NF.
6 Habitat trend on Tongass	C	C = Improving habitat quality or increasing amounts of suitable or potential habitat. There is no information on the habitat preferences specific to the subspecies of Kupreanof red squirrel, other than they occur principally in coniferous forests (Manville and Young 1965). Similarly, Steele (1998, and references therein) summarized what is known about the parent species (<i>T. hudsonicus</i>) and describe them as preferring boreal coniferous

<i>Criteria</i>	<i>Rank</i>	<i>Rationale</i>
NF		forests that provide abundant conifer seeds, fungi, and interlocking canopies for efficient foraging and escape from predators. Coniferous forests are dominant terrestrial habitats of the Tongass NF, and although large tree forests have been reduced by 28% across southeast Alaska, evidence indicates that coniferous forests are growing and shifting in distribution and density in ways that will likely continue to support many Tongass NF species in the long term (Baer et al. 2025; Bennetsen et al. 2025; Buma and Barrett 2015).
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. There is no information on the habitat preferences specific to the subspecies of Kupreanof red squirrel, but the parent species (<i>T. hudsonicus</i>) prefers boreal coniferous forests (Manville and Young 1965; Steele 1998, and references therein). Evidence indicates that coniferous forests are growing and shifting in distribution and density in ways that will likely continue to support many Tongass NF species in the long term (Baer et al. 2025; Bennetsen et al. 2025; Buma and Barrett 2015). In addition, according to CCVA Chapter 6 (2024), the pine squirrel (<i>T. hudsonicus</i>) is not associated to vulnerable habitats to climate change and was not identified as being vulnerable to climate change.
8 Life history and demographics	D	D = Insufficient information to draw inferences about criterion. There is no information on the life history and demographics specific to the subspecies of Kupreanof red squirrel, but Steele (1998; and references therein) summarized what is known about the parent species pine squirrels (<i>T. hudsonicus</i>). Pine squirrels have a promiscuous mating system and females may mate with more than one male. Mean gestation is 33 days, mean litter sizes vary from 3.2-5.4 and they typically produce one litter per year. In terms of survival, they have been shown to exhibit a Type III survivorship curve, where most of the mortality occurs in the first year of life, >80% by the second and a plateau in mortality by the third year (>90%). Maximum longevity in the wild is 10 years, although most squirrels rarely live >5 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

In general, there is a lack of information regarding the biology and ecology of the Kupreanof red squirrel subspecies (*Tamiasciurus hudsonicus picatus*), and most information found belongs to the parent species in its continental range. We used the following factors to determine whether there is substantial concern over their long-term persistence in the planning area:

- **Significant threats:** No significant threats were identified within the planning area. The parent species is not expected to be negatively affected by climate change, and its preferred coniferous forest habitats are generally considered resilient.
- **Declining trends:** There is insufficient information available regarding specific population trends for this subspecies on the Tongass National Forest. The general habitat trend for coniferous forests, where the species occurs, is considered stable or improving across Southeast Alaska.
- **Restricted ranges:** The species has a restricted range, which is marked as a basis for concern. It is a subspecies confined to islands of the Alexander Archipelago and is restricted within the boundaries of the Tongass National Forest. Its range may be wider than initially thought (Kupreanof and Kulu islands) to include several other nearby islands, but it remains a local endemic.
- **Low population numbers or restricted ecological conditions:** There is insufficient information available regarding the abundance of this subspecies. While densities for the parent species are known, specific local data is missing.
- **Other factors:** There is a general lack of information regarding the biology and ecology specific to this subspecies.

Therefore, we conclude that there is a lack of scientific information to determine that there is substantial concern for the long-term persistence of the Kupreanof red squirrel subspecies in the plan area and are thus not recommending it as a potential species of conservation concern. More information on the taxonomic position of this presumed subspecies is needed.

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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