

This document includes species evaluations for 16 plant and three lichen species according to the definition of Species of Conservation Concern from the 2012 Planning Rule, newly published planning directives (1909.12 Chapters 10 and 20), and past experience.



Species Evaluations for 16 Plants and 3 Lichens on the Tongass National Forest

An Evaluation for Species of Conservation Concern

USDA Forest Service, Tongass N.F.
March 2015

Contributors:

This document is compiled upon the individual works and research of several ecological and botanical resource specialists who evaluated the species found here in. Each species evaluation was reviewed by a Tongass team of botanical experts (see list of personnel below). Some species evaluations were reviewed by species subject matter experts internally as well as outside the agency on a case by case basis. Further, all evaluations were forwarded to the Alaska Natural Heritage Program for their review and comment in January of 2015. Initial work provided by the individual resource assessments was edited based on the comments and critique of the reviewers. In most cases, the individual evaluator made the edits to the evaluation; however in some cases they did not. Additional edits were provided by the Tongass Ecology and Botany Program Leader in consultation with the Regional Botanist. The following personnel contributed to this work:

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Abstract

This document includes species evaluations for 16 plant and three lichen species according to the definition of Species of Conservation Concern from the 2012 Planning Rule, newly published planning directives (1909.12 Chapters 10 and 20), and past experience. The basic approach outlined below (see *Choosing Species of Conservation Concern*) was used to guide the science evaluation and the dialogue between the Tongass N.F. the Alaska Region to evaluate potential SCC.

A species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area (36 CFR 219.9). Criteria for selecting which species to evaluate were based on the criteria established in FSH 1909.12.52c and include the following:

- The species is native to, and known to occur in, the plan area; and
- The best available scientific information about the species indicates substantial concern about the species' capability to persist over the long term in the plan area.

The Tongass N.F. selected species for evaluation based on the criteria established for “must be considered” as well as several “should be considered (see *Choosing Species of Conservation Concern*). We evaluated 16 plant species: 13 of these species are currently listed as “sensitive”

(USDA 2009); two species evaluated include those that were recently highlighted by the Alaska Natural Heritage Program (*Micranthes nelsoniana* and *Piperia candida*) as potential concern; and one species was evaluated because of its current proposed listing status under the Federal Register (*Callitropsis nootkatensis*). The only sensitive plant species not evaluated in this assessment were those that are “suspected” to occur on the Tongass N.F. (*Aphragmus eschscholtzianus* and *Papaver alboroseum*), since SCC definitions do not include species that are not known to occur in a plan area. Further, three lichen species were evaluated, one of which is currently on the Alaska Region’s sensitive species list.

Recommendations for listing a species as SCC were provided by individual evaluators, typically Tongass N.F. botanists and ecologists (see list of contributors above). Initial recommendations on potential SCC status were forwarded to the Tongass Forest Supervisor in January of 2015 with rationale for the recommendations provided in the species evaluation summaries. Final recommendations provided in this document reflect discussions between program leaders, including Tongass N.F. Ecology and Botany Program Manager, Regional Wildlife Ecologists, Forest Supervisor, Regional Director of Botany, Regional Botanists and Regional TES Program Leader.

The information provided in the species evaluations reflects the most current knowledge and science for each species.

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Choosing Species of Conservation Concern

A process to identify Species of Conservation Concern (hereafter, SCC) is outlined below and is based on a combination of the 2012 Rule, newly published planning directives (1909.12 Chapters 10 and 20), and past experience. The basic approach outlined here will guide the science evaluation and the dialogue as the Alaska Region evaluates potential SCC.

The 2012 Rule establishes SCC as part of a broader category of “at-risk” species:

In the assessment for plan development or revision, the responsible official shall identify and evaluate existing information relevant to the plan area for the following. . .

(5) Threatened, endangered, proposed and candidate species, and potential species of conservation concern present in the plan area. . .

(36 CFR 219.6)

As part of the at-risk species, SCC motivates attention on particular taxa that warrant conservation consideration and therefore will require resources. Choosing these taxa represents a complex and important task.

Identifying Species of Conservation Concern

The definition for SCC in the 2012 Rule provides important direction for identifying SCC:

***Species of conservation concern.* A species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area. (36 CFR 219.9)**

As suggested by FSH (1909.12.52b) the Tongass NF and the Regional Office will jointly develop a tentative list of SCC, initially referenced as ‘potential’ SCC.

the Responsible Official shall:

- 1. Coordinate with the Regional Forester when identifying the potential species of conservation concern.**

Criteria for identifying SCC differ from the criteria for Sensitive Species although there are important similarities. As with Sensitive Species, the intent is to identify those species whose conservation status suggests that long-term viability is in question. However, the spatial scale of interest, the level of scientific certainty, and the definition of viability all differ for SCC and Sensitive Species.

The process of identifying potential SCC for the Tongass will require considering:

- (a) two critical criteria,
- (b) a list of species that warrant consideration as SCC, and
- (c) documentation of the process.

Critical Criteria (FSH 1909.12.52c): The rule and directives establish two critical criteria for SCC.

1. The species is native to, and known to occur in, the plan area.

A species is known to occur in a plan area if, at the time of plan development, the best available scientific information indicates that a species is established or is becoming established in the plan area. A species with an individual occurrences in a plan area that are merely “accidental” or “transient,” or are well outside the species’ existing range at the time of plan development, is not established or becoming established in the plan area. If the range of a species is changing so that what is becoming its "normal" range includes the plan area, an individual occurrence should not be considered transient or accidental.

2. The best available scientific information about the species indicates substantial concern about the species’ capability to persist over the long term in the plan area. See FSH 1909.12, zero code, section 07, for guidance on best available scientific information.

If there is insufficient scientific information available to conclude there is a substantial concern about a species’ capability to persist in the plan area over the long term that species cannot be identified as a species of conservation concern.

If 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 persistence, trends in habitat, and responses to management that species cannot be identified as a species of conservation concern.

Species to Consider (FSH 1909.12.52d): As a consequence of biogeography, the Tongass occurs in a location where the number of at-risk species is relatively low. Hence, few species will be evaluated compared to other Forest Service Regions (the number of species reviewed has an ecological basis).The list of species is based on criteria outlined in the newly published Directives: In addition to the species being native to, and known to occur in the plan area,

2. Species in the following categories must be considered:

a. Species with status ranks of G/T1 or G/T2 on the NatureServe ranking system.

Note: Species with NatureServe G/T1 or G/T2 status ranks are expected to be included unless it can be demonstrated and documented that known threats for these species, such as those threats listed for the species by NatureServe, are not currently present or relevant in the plan area.

b. Species that were removed within the past 5 years from the Federal list of threatened or endangered species, and other delisted species that the regulatory agency still monitors.

3. Species in the following categories ‘should’ be considered (paraphrased):

- a. G/T3 or S1 or S2 on the NatureServe ranking system.
- b. State of Alaska, federally recognized Tribes, or Alaska Native Corporations listed threatened or endangered.
- c. Federal, State, federally recognized Tribes, or Alaska Native Corporations ‘ high priority for conservation’.
- d. Species identified as SCC in adjoining National Forest System plan areas.
- e. Petitioned for Federal listing and for which a positive “90-day finding” has been made.
- f. Those that best available scientific information indicates there is local conservation concern about the species' capability to persist over the long term in the plan area that are not TEPC under ESA.

Documentation – It will be important to document, even if briefly, how decisions were made for each species evaluated. We prepared a spreadsheet listing each species evaluated, the determination, and a very brief explanation for the determination (see [Tongass_Deliberative_Record_SCC_all_taxa_March2015.xlsx](#)). This spreadsheet delineates those species requiring consideration (Criteria 2 - “must be considered”) as well as many species that are not required for consideration (Criteria 3 - “should be considered”). . In-depth evaluations for a subset of all species considered under Criteria 2 and 3 are consistent with the 13 evaluation elements identified in FSH 1909.12.53.

Proposed Approach

In this section we outline an approach to evaluate species as instructed by the 2012 Rule and the newly published Directives. The Alaska Region revised the R10 Sensitive Species list in 2009. The analysis behind this list was comprehensive and provides a starting point for considering SCC. Each species on the current Sensitive Species list was reviewed to determine if it meets the established criteria as potential SCC. Additional species were evaluated based on direction in the Directives (FSH 1909.12 Ch10 12.52d).

We use an 8-step process to evaluate species and determine their status as a species to recommend as SCC to the Regional Forester. See Exhibit 1 for a simplified flow-charts of the evaluation process. [Note the following text is written in past tense to facilitate including in the record to

document the process]. These 8 steps provide a framework to evaluate the status of species based on science as outlined in the Directives (FSH 1909.12 Ch10 12.53).

8-STEPS TO SCC

Step 1: Assembled lists of species to evaluate relying strongly on Alaska Natural Heritage data base.

List included all current Sensitive Species identified for the Tongass. Also included species identified from the Alaska Natural Heritage Program records. The Directives emphasize NatureServe G/T ranks (assembled G/T1 thru G/T 3) and state ranks (assembled S1, S2). Species on other lists, as outlined in Directives were reviewed. We relied on engagement with public and other agencies to highlight additional species to examine. Those nominating species were asked to provide an evaluation using the rigorous evaluation process described below in steps 4 and 5.

Step 2: Remove any species not native or not occurring on NFS lands on the Tongass.

The initial list was inspected to identify any species that are obviously not likely to occur [as part of the native flora or fauna] on NFS lands on the Tongass. This criterion excluded accidentals, transients, and other taxa that might have been observed in the past but do not represent taxon which occurs on the Forest. Evaluation took the approach of weighing the strength of evidence (documented in the deliberative record) for occurrence on the Tongass.

Step 3. Develop criteria for species evaluations with peer review (See Appendix A).

To develop a set of evaluation criteria, we adopted a process used successfully in the past by two Regions to evaluate conservation status as well as the most current R10 directives (R10 2600-2005-1, FSM 2672.11, Exhibit 02). Development of that process relied on standard science practice to assess viability risk. Internal and external peer reviews were solicited, and a final set of eight criteria were established. These eight criteria echo the newly published 13 factors outlined in FSH 1909.12.53 (pg 40 of 71).

Step 4: Conduct expert evaluation based on the eight criteria, documenting rankings, information sources, and rationale. Include final narrative indicating recommendation for or against recommending the species as an SCC.

Each species identified by pre-screening was evaluated by Forest Service professionals and offered for review by non-Forest Service experts. The species evaluation form (see Appendix B) was used to document the rankings for each criterion, certainty of the ranking, a list of references used or individuals consulted, the signature and title of the evaluator, and the date completed.

Step 5: Tongass Biologist/Botanist develop draft recommendations.

Tongass biologists, botanists and ecologists reviewed the species evaluations and prepared a recommendation for status of each species. The combination of all eight factors (which themselves include the 13 factors identified in FSH 1909.12.53), supporting rationale and references, and the evaluator's uncertainty rankings, were considered and synthesized in formulating the recommendation for or against proposed SCC. [This process avoided a mechanical summing of the rankings but instead examined the 'weight of evidence' for-or-against SCC status]. Instructions were provided as follows:

- a) The null hypothesis is that the species is not an SCC; it will be placed on the list only if information demonstrates substantial science concern for persistence on the Tongass in the long term.
- b) One or two Forest Service specialists (biologists, botanists, ecologists, etc.) are to review the evaluation(s) for each species, formulate a recommendation, and then (depending on team size) discuss and reconcile differences to arrive at a joint recommendation. Species can be recommended for one of the following categories:
 - Not recommended as potential SCC
 - Recommended as potential SCC
- c) In formulating a recommendation, consider the information provided for all 8 criteria (see Appendix A), and the evaluator's confidence in each rank. Threats to species persistence may interact in a non-linear way, and therefore the combination of factors influencing species should be reviewed and considered. Although it is possible that any one factor could justify SCC status, the information should provide a compelling argument for substantial scientific concern regarding persistence on the Tongass for the long term.
- d) Do not rely merely on the rankings, but consider the basis and rationale provided by the evaluator(s). (If more than one evaluator addressed the species, it is very possible that their rankings and rationales will not agree; try to resolve discrepancies through discussion.) If you are aware of other information that apparently was not considered, document it in your rationale.
- e) A ranking of "D" (insufficient information to draw inferences about criterion) should have been assigned by an evaluator only when extreme paucity of information prevents inferences regarding a particular criterion. The relative importance of the specific criterion receiving a "D" rank will be evaluated in the overall persistence concern determination. Whenever possible, a determination will be made without the information from that criterion; however, if that information is deemed crucial in making a persistence determination, the species will be categorized as not recommended as an SCC (as established by the Rule and Directives).

Step 6: Internal and partner agency reviews of draft recommendations and supporting documentation.

The draft recommendations were distributed for review by the public and partner agencies. Input was evaluated by Forest Service staff and revisions to the recommendations drafted as appropriate. Comments were received from the Alaska Natural Heritage Program (for plants and lichens), the Alaska Department of Fish and Game and the US Fish and Wildlife Service (for terrestrial vertebrates and aquatics). Non-

government subject matter experts for several taxa were solicited and received for several plant and lichen species.

Step 7: Tongass recommendations and supporting material provided to Regional Office for consideration and tentative decision on potential SCC.

After considering and responding to external comments, the Tongass submitted initial recommendations with documentation to the Regional Office for consideration.

Step 8: Following dialogue between the Regional Office and the Tongass, in consideration of outside input, the Regional Forester issued a list of proposed SCC.

The Regional Forester has the responsibility and authority to establish the proposed and the final list of SCC.

Application of the critical criteria (substantial scientific concern for persistence) requires considerable ecological judgment. Appendix A, which follows the most current Regional and National directives (FSM 2670.11 and 1909.12.53, respectively) was developed through a peer review process in Region 2, and provides a structured way to exercise the ecological judgment. The process described in Appendix A represents the integration of criteria used in several national and international processes to evaluate species status.

<p>Species: <i>Acrosyphus sphaerophoroides</i> Leveille Crab-eye lichen</p>  <p>Photo by Brad Kriekhaus</p>			
<p>Global Rank: GNR State Rank: S1</p>			
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>B</p>	<p>Habitat patchy or gaps on the Tongass. High elevation glacial refugia are present on the archipelago of the Tongass and the mainland, separated by forests, saltwater, and ice. Ranked S1 in Alaska-critically imperiled.</p> <p>Location: North Admiralty Island, Greens Creek mine</p> <p>Glacial refugia are documented to exist in the region (1). Known refugia on the forest have not been specifically surveyed for this lichen, however, several known refugia have been botanically surveyed. It is not a cryptic species and would be noted if encountered in other alpine areas surveyed.</p> <p>Confidence in Rank call: High</p>	<p>1. Carrara et al 2007, Anderson, 2012, ANHP, NRIS</p>
<p>2</p> <p>Distribution in surrounding geographic area</p>	<p>B limited</p>	<p>Global Rank GNR, State Rank S1</p> <p>Distribution is limited in North America (4 known sites including AK) and global distribution is in high elevation areas. Grows in cold temperate regions, but is known from tropical latitudes where mountain ranges rise above the continent. (2) (3)</p> <p>Widespread global distribution in high elevation areas of S. Africa, Japan, S. China, Bhutan, Patagonia, and Peru. (4)</p>	<p>2. Sato 1967; 3. Tibell 2001; 4. Consortium of PNW Herbaria; BC Conservation Data Centre, Goward et al 1994; Joneson & Glew 2003, NatureServe</p>

<p>Species: <i>Acrosyphus sphaerophoroides</i> Leveille Crab-eye lichen</p>  <p>Photo by Brad Kriekhaus</p>			
<p>Global Rank: GNR State Rank: S1</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>In North America besides AK, it occurs in the boreal forests of Veracruz, Mexico, and alpine of British Columbia and Washington (1 location in each)</p> <p>Ranking BC = S1, BC Red List, on rock at 900m, WA = S1, an epiphyte in the forest at 1000m along a recreation trail in Forest Service wilderness area. (4)</p> <p>Pacific Northwest has a Lichen Society with surveys all over the PNW region, FIA program on federal lands that includes lichens, and USFS lichen-air program that surveys for lichens. BC has resident lichenologists and conduct surveys province wide on private and crown lands</p> <p>Confidence in Rank: High.</p>	
<p>3</p> <p>Dispersal Capability</p>	<p>A_{very} limited</p>	<p>Fungal spores are expected to disperse passively, as they are heavy and unornamented. Expected to be dispersed only by animals and birds. Dispersal depends on birds perching upon the thallus on the rocks. The body of the lichen of the AK populations is very tough and can withstand birds perching on it (5) (6).</p> <p>Evidence on the lichens being dispersed by birds is that the lichens themselves are located on prominent rock outcrops where a bird of prey would perch to eat its prey and have a lookout. Guano present on the lichens</p>	<p>5. Tibell 1994; 6. Anderson 2011, 2012;</p>

<p>Species: <i>Acrosyphus sphaerophoroides</i> Leveille Crab-eye lichen</p>			
			<p>Photo by Brad Kriekhaus</p>
<p>Global Rank: GNR State Rank: S1</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>in several of the sites suggests that large raptors have perched upon them.</p> <p>Confidence in Rank call High</p>	
<p>4</p> <p>Abundance on Tongass</p>	<p>A rare</p>	<p>Two populations on Admiralty Island in the Greens Creek Exploration area, consisting of 7 individual thalli each at 795 m and 964 m elevation. Over 600 lichen surveys and 2700 botanical surveys have not detected this lichen in other locations on the Tongass.</p> <p>Confidence in Rank call High</p>	<p>6. Anderson 2011, 2012</p>
<p>5</p> <p>Population Trend on Tongass</p>	<p>A suspected downward</p>	<p>Suspected downward trend as this location is within the Greens Creek exploration area; however specific monitoring of the species at this site over time has not occurred (6).</p> <p>Confidence in Rank call Low</p>	<p>6. Anderson 2011, 2012</p>

			
<p>Species: <i>Acrosyphus sphaerophoroides</i> Leveille Crab-eye lichen</p>			
<p>Global Rank: GNR State Rank: S1</p>			
<p>Criteria</p>	<p>Rank</p>	<p>Rationale</p>	<p>Literature Citations</p>
<p>6 Habitat Trend on Tongass</p>	<p>B</p>	<p>Stable amount of suitable habitat or potential habitat in the alpine where this lichen is found (6).</p> <p>The Greens Creek Exploration area is about 5,000 acres, of which close to 600 acres is alpine habitat, indicating that 12% of the potential suitable habitat may be affected.</p> <p>Habitat modification is occurring in alpine areas on the Tongass such as other mine explorations (e.g. Bokan, Niblack), communication sites (ATT, APT, FAA, and FS) and energy development of hydroelectric dams. However, alpine areas as a whole on the Tongass are not decreasing to a substantial level as a result of these impacts.</p> <p>Confidence in Rank call: High</p>	<p>6. Anderson 2011</p>
<p>7 Habitat Vulnerability or Modification or other threats</p>	<p>B. Habitat modificati on is likely to result in ecological patterns similar to the range of</p>	<p>Alpine habitat at the Greens Creek mine is currently open for drilling exploration. The exploration area is about 5,000 acres, of which close to 600 acres is alpine habitat where this lichen was found (12% of the minerals claim area).</p> <p>Alpine areas in some areas on the Tongass are vulnerable to region-wide energy development due to hydro-electric projects and communication sites establishment for commercial enterprises, past, present and future.</p> <p>Climate change (with decreasing alpine habitat from predicted increase in</p>	<p>6. Anderson 2011</p>

<p>Species: <i>Acrosyphus sphaerophoroides</i> Leveille Crab-eye lichen</p>			
			<p>Photo by Brad Kriekhaus</p>
<p>Global Rank: GNR State Rank: S1</p>			
Criteria	Rank	Rationale	Literature Citations
	<p>historical conditions, but is being impacted by modern stressors.</p>	<p>trees and shrubs) growing in more open areas which is its preferred habitat. This may be a slow process, but the lichen has nowhere to go on the alpine ridges. It is epiphytic in WA, and BC, so there is a chance it could grow on wood in the subalpine of the Tongass.</p> <p>Areas in PNW and Mexico where this lichen is found outside AK are threatened by forest fires.</p> <p>Confidence in Rank call: High</p>	
<p>8</p> <p>Life History and Demographics</p>	<p>B low reproductive rate or high mortality</p>	<p>Perennial Fungus: Photobiont <i>Trebouxia</i></p> <p>This lichen is separated from other members of Caliciaceae and Caliciales by its dactyliform thallus, immersed ascocarps on podetia, and yellow to orange medulla. The lichen has a cushion-like appearance made up of fertile and sterile podetia with a gray to orange cast. The podetia branch as the thallus matures and the ascospores are smooth and unornamented, which is rare for Caliciales. <i>Acrosyphus</i> has a diverse secondary chemistry and contains substances not found in other genera of Caliciales such as chloro-atranorin, rugulosin, zeorin, and chrysophanic acid (7) (8) (5).</p> <p>Demographics include fruiting individuals in both locations on Admiralty. The growth rate is unknown.</p>	<p>7. Joneson & Glew 2003 8. Tibell 1984 5. Tibell 1994.</p>

<p>Species: <i>Acrosyphus sphaerophoroides</i> Leveille Crab-eye lichen</p>			<p>Photo by Brad Kriekhaus</p>
<p>Global Rank: GNR State Rank: S1</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>Confidence in Rank call: High</p>	
<p>Summary: Reasons provided for the decision to consider are: 1) it is very rare across its range in the PNW (only one location each in AK, WA and BC); 2) Habitat is stable on the Tongass, but continually at risk across its global range due to logging, forest fires, climate change and other human developments; 3) the only occurrence in Alaska is in the Greens Creek mining exploration territory on Admiralty Island and has a possible chance at being disturbed or removed with mining operations; 4) Dispersal capabilities are very limited. The spores are not wind dispersed, so species relies on animals or birds to perch on the rocks to move spores or propagules. Spores need to land and germinate in the preferred habitat along with the algal partner to create the lichen; 5) It is not a cryptic species and botanical surveys on the Tongass would have documented this lichen if it were present in sites surveyed; and 6) The Tongass populations are important for the global conservation of this species as it is rare in N.Am. and elsewhere within its range (only on high mountain tops in Asia, Africa and S. America). It could be a relic species from past climate and continental history.</p> <p>We conclude that current science evidence does indicate a substantial concern for the capability of <i>Acrosyphus sphaerophoroides</i> to persist over the long-term in the Tongass plan area. We recommend that the lichen <i>Acrosyphus sphaerophoroides</i> be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Karen Dillman, Ecologist, Tongass National Forest with edits by Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Brad Kriekhaus, Kristen Lease, Rick Turner</p>			<p>Date: November 6, 2014</p>

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<p>Species: <i>Botrychium spathulatum</i> W.H. Wagner Spathulate Botrychium</p> <p>Global Rank: G3 State Rank: S1</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; padding: 2px; font-size: small;">Photo from USDA PLANTS database</div> </div>			
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>B</p>	<p>Only one small population is known from a calcareous subalpine ridge on the Tongass. A much larger second population is known from a beach meadow on land managed by the state of Alaska, but which is surrounded by the Tongass National Forest. (1) The presence of these two populations suggests a high probability that more will be found.</p> <p>Confidence in Rank call: Medium</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
<p>2</p> <p>Distribution in surrounding geographic area</p>	<p>C</p>	<p>In Alaska, <i>B. spathulatum</i> is known from the Wrangell-St. Elias mountains. It has also been documented in British Columbia and the Yukon Territory. This species was first identified from Alaska in 2003. It is easily confused with <i>B. minganense</i> and <i>B. ascendens</i>, which are more widely documented. <i>B. spathulatum</i> also occurs in the northeastern U.S., from the Great Lakes region into Ontario and Quebec. (2)</p> <p>Confidence in Rank call: Medium</p>	<p>2. Farrar. 2011.</p>

<p>Species: <i>Botrychium spathulatum</i> W.H. Wagner Spathulate Botrychium</p> <p>Global Rank: G3 State Rank: S1</p> <div style="text-align: center;">  <p>Photo from USDA PLANTS database</p> </div>			
Criteria	Rank	Rationale	Literature Citations
3 Dispersal Capability	B	<p>Disperses through localized suitable habitat with potential for occasional long distance dispersal by wind or birds.</p> <p>Confidence in Rank call: High</p>	<p>Photo from Google images</p>
4 Abundance on Tongass	D	<p>High probability that this species has been overlooked or misidentified.</p> <p>This species is only known from two locations in the Tongass area (the larger population occurs on land managed by Alaska State Parks). More populations are expected to occur in subalpine or beach habitats. The only known population on the Tongass National Forest, found near Whitestripe Mountain, consisted of fewer than 30 individuals. (1)</p> <p>Confidence in Rank call: Medium</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
5 Population Trend on Tongass	D	<p>No monitoring has occurred for this species.</p> <p>Confidence in Rank call: Medium</p>	

<p>Species: <i>Botrychium spathulatum</i> W.H. Wagner Spathulate Botrychium</p> <p>Global Rank: G3 State Rank: S1</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; padding: 2px; font-size: small;">Photo from USDA PLANTS database</div> </div>			
Criteria	Rank	Rationale	Literature Citations
6 Habitat Trend on Tongass	B/A	<p>Subalpine and alpine habitats for this species are stable, while there has been some decline in potential beach meadow habitat. Calcareous habitat (karst features) are often protected by Forest-wide standards and guidelines.</p> <p>Confidence in Rank call: High</p>	
7 Habitat Vulnerability or Modification or other threats	B	<p>Large areas of potential subalpine and alpine habitat are likely to fall within the natural range of variation (NRV). Beach meadow habitats are being impacted by modern stressors, such as recreation and invasive species. This population occurs in the West Chichagof/Yakobi Wilderness area in a place that receives very little recreation pressure.</p> <p>Confidence in Rank call: High</p>	
8 Life History and Demographics	B	<p>Moonworts typically have a low reproductive rate, especially where suitable habitat is patchy. Some beach meadow habitats may create ideal conditions for a relatively high reproductive rate, but these areas are also more vulnerable to disturbance.</p> <p>Confidence in Rank call: High</p>	

				
<p>Species: <i>Botrychium spathulatum</i> W.H. Wagner Spathulate Botrychium</p>		<div style="border: 1px solid black; padding: 2px; display: inline-block;">Photo from USDA PLANTS database</div>		
<p>Global Rank: G3 State Rank: S1</p>				
Criteria	Rank	Rationale	Literature Citations	
<p>Summary: <i>B. spathulatum</i> was first identified from Alaska in 2003. It has an ANHP ranking of G3S1. Only one small subalpine population is known on the Tongass, however, most botanists speculate that this species has been overlooked or misidentified. This population occurs in the West Chichagof/Yakobi Wilderness area in a place that receives very little recreation pressure. It is expected that more populations will be found in subalpine and beach habitats.</p> <p>There is insufficient evidence to suggest a “substantial” concern exists for this species’ ability to persist in the plan area.</p> <p>Initial Evaluator(s): Brad Kriekhaus with edits by Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Kristen Lease, Rick Turner</p>			<p>Date: November 6, 2014</p>	

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<p>Species: <i>Botrychium tunux</i> Stensvold and Farrar Moosewort or Grapefern</p> <p>Global Rank: G3? State Rank: S2 (2014)</p>		<div style="border: 1px solid black; padding: 2px; display: inline-block;">Photo from Google Images</div>	
Criteria	Rank	Rationale	Literature Citations
1 Distribution on Tongass	A	<p><i>B. tunux</i> is known from Admiralty, Hoonah, Sitka, Wrangell and Yakutat RD's. (1) Typical habitat is subalpine and alpine rocky slopes, often associated with calcareous substrates. The other habitat is sandy beach meadows, where it has been found in the Yakutat area.</p> <p>Confidence in Rank call: High</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
2 Distribution in surrounding geographic area	C	<p><i>B. tunux</i> is found commonly in Wrangell-St. Elias National Park in Alaska and in adjacent Kluane National Park in Yukon Territory. It has also been found in British Columbia. It is also known from widely separated high elevation sites in Montana, Idaho, Colorado, New Mexico, Nevada and California.</p> <p>Confidence in Rank call: High</p>	
3 Dispersal	B	<p>Moonworts disperse through wind-born spores, which most commonly germinate within a short distance of the parent plant. Plants are easily broken by human, animal or vehicular traffic, which prevents spore production for a year. Successful reproduction requires the right soil type and other factors to</p>	

<p>Species: <i>Botrychium tunux</i> Stensvold and Farrar Moosewort or Grapefern</p>  <p>Global Rank: G3? State Rank: S2 (2014)</p> <p style="text-align: right; border: 1px solid black; padding: 2px;">Photo from Google Images</p>			
Criteria	Rank	Rationale	Literature Citations
Capability		<p>complete its life cycle.</p> <p>Confidence in Rank call: High</p>	
4 Abundance on Tongass	B	<p>This species is known from at least 6 widespread locations in the subalpine and from at least 8 populations found on beach meadows in Yakutat. Given the small and elusive nature of this species, it is almost certainly more common than currently known.</p> <p>Confidence in Rank call: Medium</p>	
5 Population Trend on Tongass	B/D	<p>The subalpine populations of this species were recently found and no population monitoring has occurred. There is insufficient information to suspect a downward population trend for these populations.</p> <p>The beach populations, especially in Yakutat, are suspected to be declining from increased OHV riding and general recreation within the beach meadows. The significance of this impact is not currently known.</p> <p>Confidence in Rank call: Medium</p>	

<p>Species: <i>Botrychium tunux</i> Stensvold and Farrar Moosewort or Grapefern</p>  <p>Global Rank: G3? State Rank: S2 (2014)</p> <p style="text-align: center; border: 1px solid black; padding: 2px;">Photo from Google Images</p>			
Criteria	Rank	Rationale	Literature Citations
<p>6</p> <p>Habitat Trend on Tongass</p>	<p>A/B</p>	<p>Alpine and subalpine habitats are stable. Some beach habitats have been impacted from OHV riding and invasive species. The significance of these impacts is high in some areas and negligible in others.</p> <p>Confidence in Rank call High</p>	
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>B</p>	<p>The alpine and subalpine habitats are largely intact and not vulnerable to modern stressors, with the exception of possible telecommunication sites or other special uses. Overall, these impacts would be negligible relative to the amount of similar habitat in the plan area.</p> <p>Upper beach meadow habitat is vulnerable to modification by OHV traffic and other recreation, including outfitting and guiding. While these impacts can be regulated, current management practices have allowed significant damage to the beach meadows in the Yakutat forelands. Invasive species pose a long term threat to habitat; at present their impact appears to be minimal in most areas and through active weed prevention and treatment programs on the Yakutat district, the impacts to the beach habitat is expected to remain low.</p>	

<p>Species: <i>Botrychium tunux</i> Stensvold and Farrar Moosewort or Grapefern</p>  <p>Global Rank: G3? State Rank: S2 (2014)</p> <p style="text-align: center; border: 1px solid black; padding: 2px;">Photo from Google Images</p>			
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: High	
8 Life History and Demographics	B	<p>The reproductive rate of moonworts is thought to be low but should vary according to the suitability of available habitat. Beach meadow habitat sometimes supports dense populations of moonworts in relatively small areas. These populations are extremely vulnerable to trampling or destruction by OHV traffic. Beaches are a dynamic habitat and so moonwort populations must continually spread to colonize the best available habitat. Beach populations of moonworts will need frequent monitoring to ensure that impacts from recreation are not causing a significant decline in moonwort populations.</p> <p>Confidence in Rank call: High</p>	
<p>Summary: <i>B. tunux</i> was first described as a species in 2002. This diminutive fern has an average height of about 4 inches and can only reliably be identified by a moonwort specialist or DNA analysis. It is often</p>			



Species: *Botrychium tunux* Stensvold and Farrar Moosewort or Grapefern

Global Rank: G3? State Rank: S2 (2014)

Photo from Google Images

Criteria	Rank	Rationale	Literature Citations
		<p>overlooked by the casual or even trained observer. The ANHP ranking for <i>B. tunux</i> was G1S1 in 2007. In 2014 the ranking was updated to G3?S2. This change in ranking reflects a considerable amount of survey work and the discovery of many new populations in Alaska and surrounding areas. <i>B. tunux</i> occurs in beach meadow habitat and subalpine and alpine meadows and populations are known from widespread areas of the Tongass. Populations of this species are often small, making them even harder to detect. Beach populations of <i>B. tunux</i> are most likely declining due to human caused disturbance. The beach habitat is also vulnerable to invasive species occupying it habitat although currently, there is no indication that this is a concern. It will be important to monitor the beach habitat, especially in Yakutat, where OHV riding on the beaches has increased dramatically in the last 15 years. In future years it may be necessary to better regulate OHV use on vegetated portions of the beaches, which are officially closed to OHV riding.</p> <p>Due to the relatively stable populations and habitat in the subalpine and alpine on the Tongass, information suggests that there is no substantial concern about <i>B. tunux</i> ability to persist over the long term in the plan area. Therefore, at present we do not recommend <i>B. tunux</i> as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Brad Kriekhaus with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Kristen Lease and Rick Turner</p>	

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<p>Species: <i>Botrychium yaaxudakeit</i> Stensvold & Farrar grapefern</p> <p>Global Rank: G3G4 State Rank: S2</p>				
				
		<p>Photo taken from Google Images</p>		
Criteria	Rank	Rationale	Literature Citations	
1 Distribution on Tongass	B	<p>This species has only been found on beach meadows on the Tongass, primarily in the Yakutat area. A single collection of <i>B. yaaxudakeit</i> was documented from Inian Island on the Hoonah Ranger District. (1)</p> <p>Confidence in Rank call: High</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>	
2 Distribution in surrounding geographic area	B	<p><i>B. yaaxudakeit</i> has been reported from Glacier Bay, near Haines and from the Wrangell-St. Elias mountains of Alaska, southwestern Yukon territory and northwestern British Columbia. It has also been found in central British Columbia, Alberta, and from disjunct locations in the mountains of northwestern Montana, northeastern Oregon and east-central California. (2)</p> <p>Confidence in Rank call: High</p>	<p>2. Farrar, Donald R. December 2011. <i>Botrychium yaaxudakeit</i> fact sheet. Ada Hayden Herbarium (ISC). Iowa State University, Ames, Iowa. Online. Available: http://www.public.iastate.edu/~herbarium/botrychium.html. Accessed November, 2014.</p>	

<p>Species: <i>Botrychium yaaxudakeit</i> Stensvold & Farrar grapefern</p> <p>Global Rank: G3G4 State Rank: S2</p>				
				
		<p>Photo taken from Google Images</p>		
Criteria	Rank	Rationale	Literature Citations	
<p>3</p> <p>Dispersal Capability</p>	B	<p>Disperses through suitable habitat, most successfully within distances of less than a mile. Long distance dispersal happens occasionally as evidenced by widely disjunct mountain populations. There is also evidence that moonworts are dispersed by birds, such as the arctic tern, which nests in moonwort habitat in Yakutat. (3)</p> <p>Confidence in Rank call: High</p>	<p>3. Stensvold. Personal communication</p>	
<p>4</p> <p>Abundance on Tongass</p>	A	<p>Five small beach meadow populations have been mapped on the Yakutat RD, with a total area of less than 1/10th acre. Less than half of the available beach meadow habitat on the Yakutat Ranger District has been surveyed. Very little survey work has occurred in subalpine and alpine habitats near Yakutat, which could provide large areas of suitable habitat for this species. (1)</p> <p>Confidence in Rank call: Medium</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>	

<div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p>Species: <i>Botrychium yaaxudakeit</i> Stensvold & Farrar grapefern</p> <p>Global Rank: G3G4 State Rank: S2</p> </div> <div style="flex: 0.5; text-align: center;">  <p style="font-size: small;">Photo taken from Google Images</p> </div> </div>			
Criteria	Rank	Rationale	Literature Citations
<p>5</p> <p>Population Trend on Tongass</p>	<p>D</p>	<p>All of the populations were found in the last 20 years and no population trends have been reported. The known use of OHV's near at least one of the populations, and increased beach recreation in general suggest a possible downward population trend; however there is insufficient information to suggest any trends in populations.</p> <p><i>Confidence in Rank call: Low</i></p>	
<p>6</p> <p>Habitat Trend on Tongass</p>	<p>B</p>	<p>This species has only been found on beaches within the Tongass but is expected to also occur in subalpine and alpine habitats. Beach habitats are subject to modern stressors such as OHV traffic, invasive species and other recreation activities, such as outfitting and guiding. In Yakutat, the vegetated portion of the beaches is mostly protected from OHV riding by the recent Yakutat Access and Travel Management Plan. For example, 3 riding trails are permitted in the Blacksand spit area, where 2 of the five known <i>B. yaaxudakeit</i> populations are documented. Otherwise, the vegetated portions of the beaches are closed to OHV riding. Yakutat has approximately 50 miles of beaches and much of the beach meadow habitat is not disturbed by humans.</p>	<p>Personal communication with Nate Catterson, YRD Fisheries Biologist</p>

<p>Species: <i>Botrychium yaaxudakeit</i> Stensvold & Farrar grapefern</p> <p>Global Rank: G3G4 State Rank: S2</p>				
				
		<p>Photo taken from Google Images</p>		
Criteria	Rank	Rationale	Literature Citations	
		Confidence in Rank call: High		
7 Habitat Vulnerability or Modification or other threats	B	Habitat modification is likely to fall within the range of natural variation (NRV) but is being impacted by modern stressors. Beaches in Yakutat are naturally shifting and changing quite dramatically. OHV traffic is causing significant damage to beach meadows near town, but most of the remote beaches are relatively unaltered by humans. Confidence in Rank call : Medium		
8 Life History and Demographics	B	At least 7 species of moonworts occur on the expansive beaches of Yakutat. The dynamic beach environment provides a continuing cycle of habitat destruction and renewal. <i>B. yaaxudakeit</i> is currently only known from a few small, widely scattered locations on the Yakutat beaches. But there are many miles of beach which have not been surveyed. More survey work is needed to determine if <i>B. yaaxudakeit</i> is truly rare on the Yakutat beaches. As with many of the other moonworts, <i>B. yaaxudakeit</i> is known to have alternative habitats in the mountains summits. However, no mountain populations of <i>B. yaaxudakeit</i> have been found in the Tongass. (1)	1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.	

			
<p>Species: <i>Botrychium yaaxudakeit</i> Stensvold & Farrar grapefern</p> <p>Global Rank: G3G4 State Rank: S2</p>			
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">Photo taken from Google Images</div>			
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: Medium	
<p>Summary: This species has an ANHP rank of G3G4 S2. This species was first described in 2002 from specimens collected in Yakutat , the location which continues to be the core of the known range in the Tongass. Only 5 small, widely dispersed populations have been documented on Yakutat beaches, while at least one other population is known from tribal lands near the community of Yakutat. Not enough information is available to project long term population trends. However, the small size of the documented populations does warrant substantial concern for the long term persistence of this species, considering the potential impacts from OHV's and general recreation on the beach meadow habitat.</p> <p>We recommend that <i>B. yaaxudakeit</i> be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Brad Kriekhaus with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, and Rick Turner</p>			<p>Date: November 7, 2014</p>

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Photo taken from Hennon et. al. 2015

SCC EVALUATION FORM

Species: *Callitropsis nootkatensis* (D. Don) D.P. Little.

Yellow-cedar (yellow cypress, Nootka cypress)

Note: The content herein is taken entirely from a comprehensive DRAFT yellow-cedar adaptation strategy conducted by Hennon and others with the Pacific Northwest Research Station of the USFS. See Hennon et. al. 2015 for a full list of citations related to the information provided here.

Global Rank: GNR State Rank: SNR

Criteria	Rank	Rationale
<p>1</p> <p>Distribution on Tongass</p>	<p>C</p>	<p>Within southeast Alaska, habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species, with little or no limitation on interaction among populations. The tree is well distributed in most areas of the panhandle, except to the northeast around Hoonah, Admiralty Island, the Juneau area, and Lynn Canal. Yellow-cedar occurs sparingly in these areas, but is absent or rare over large portions of the landscape that appear to represent suitable habitat. Hennon hypothesizes that this incomplete colonization is attributed to the past and current yellow-cedar migration from the outer coastal Pleistocene refugia towards the northeast. The rarity of yellow-cedar in the Juneau area may indicate that yellow-cedar is just now arriving via this easterly or northeasterly migration. Several locations with very small populations, including a few lone yellow-cedar trees occur on Douglas Island. The unique stand of yellow-cedar near Haines may be an example of a founder population that is ahead of the main migration.</p> <p>Confidence in Rank call: High</p>
<p>2</p>		<p>Ranking: NR –widely distributed outside Alaska.</p>

Species: *Callitropsis nootkatensis* (D. Don) D.P. Little.

Yellow-cedar (yellow cypress, Nootka cypress)

Note: The content herein is taken entirely from a comprehensive DRAFT yellow-cedar adaptation strategy conducted by Hennon and others with the Pacific Northwest Research Station of the USFS. See Hennon et. al. 2015 for a full list of citations related to the information provided here.

Global Rank: GNR State Rank: SNR

Criteria	Rank	Rationale
Distribution in surrounding geographic area	C	<p>The distribution of yellow-cedar in other areas of Alaska includes Glacier Bay National Park where few reported observations and inventory plots are known. This is an important area, as it marks the northwest extent of the main yellow-cedar range in southeast Alaska. Yellow-cedar is abundant along the west coast of Glacier Bay extending to an area just northwest of Cape Fairweather. Another small population of yellow-cedar was known near Icy Bay just west of Lawrence Creek (Icy Bay is in the large expanse between Glacier Bay and Prince William Sound), but was harvested in 2002, and it is not clear if any yellow-cedar seedlings might be present among the natural regeneration growing after the harvest. The occurrence of yellow-cedar in Prince William Sound has been described as a phytogeographical problem because the origins of these populations are unclear owing to their considerable geographic isolation from the more contiguous range farther south. Populations also occur around the Cordova-Hawkins Island area of the eastern sound and the Cedar Bay-Unakwik Inlet area of the western sound.</p> <p>Yellow-cedar is known to occur from the northern tip of California (Griffin and Critchfield 1972), through the Siskiyou and Cascade Mountains in Oregon and Washington, and north into coastal areas of British Columbia and Alaska to Prince William Sound (Little 1971). Two well-known small, disjunct populations of yellow-cedar occur further east in the Aldrich Mountains of Oregon (Frenkel 1974) and near Slocan Lake and Evans Lake, north of Nelson in interior British Columbia (Perry 1954). Yellow-cedar is more widespread and abundant in British Columbia compared to parts of its range farther south.</p> <p>Confidence in Rank call: High</p>

<p>Species: <i>Callitropsis nootkatensis</i> (D. Don) D.P. Little.</p> <p>Yellow-cedar (yellow cypress, Nootka cypress)</p> <p>Note: The content herein is taken entirely from a comprehensive DRAFT yellow-cedar adaptation strategy conducted by Hennon and others with the Pacific Northwest Research Station of the USFS. See Hennon et. al. 2015 for a full list of citations related to the information provided here.</p> <p>Global Rank: GNR State Rank: SNR</p>		
Criteria	Rank	Rationale
<p>3</p> <p>Dispersal Capability</p>	<p>C</p>	<p>Yellow-cedar reproduces sexually by seed and asexually by layering. Regeneration is non-uniform and does not occur on all sites. The reproductive capacity of yellow-cedar is considered to be low, but some seed is produced every year. Some of the key factors limiting natural regeneration include irregular seed crops, limited cone production, low rates of seed viability and germination, reduced seed source in areas of forest decline, competition with other species, seedling vulnerability to spring root and foliar freezing injury, and preferential deer browsing.</p> <p>Yellow-cedar begins to produce pollen and seed cones at an early age, often by the time seedlings reach seven to eight years old. Flowering (cone initiation) takes place from April to May, depending on latitude. Cones form on previously vegetative shoots that are 1 to 2 years old. Pollination takes place during a two-week period in late spring or early summer approximately one year after flower initiation. Pollen is wind-dispersed.</p> <p>Seed cones take two full years to mature, or 28 months across three growing seasons from the time of cone initiation to seed maturity. There is evidence that cones can develop in one year on sites with longer growing seasons. Seed dispersal takes place from fall to spring, primarily during periods of dry weather. Dispersed seeds overwinter in the snowbank over much of the range of yellow-cedar. Empty cones persist on trees for a year or more after seed dispersal.</p> <p>On average, cones produce seven seeds, but seed viability is generally low and highly variable. In British Columbia, only 29 percent of seeds were viable. Highest germination rates are achieved on bare mineral soil; however, alder and spruce tend to have a competitive advantage on bare microsites. Yellow-cedar, like many species, requires stratification, exposure to temperature conditions that break the dormancy of the seed</p>

<p>Species: <i>Callitropsis nootkatensis</i> (D. Don) D.P. Little.</p> <p>Yellow-cedar (yellow cypress, Nootka cypress)</p> <p>Note: The content herein is taken entirely from a comprehensive DRAFT yellow-cedar adaptation strategy conducted by Hennon and others with the Pacific Northwest Research Station of the USFS. See Hennon et. al. 2015 for a full list of citations related to the information provided here.</p> <p>Global Rank: GNR State Rank: SNR</p>		
Criteria	Rank	Rationale
		<p>embryo. Warm stratification followed by cold stratification has been shown to dramatically improve germination rates for many conifers. Large seed crops are produced every 4 to 7 years, but seed production is never known to be abundant compared to associated conifers, whose seeds readily germinate with little or no stratification. New quantitative genetic research findings show that seed can be moved great distances from source areas without expressing maladaptive traits.</p> <p>Yellow-cedar also reproduces asexually by layering, as an aerial stem (i.e., lower branch) can develop root while still attached to the parent plant, and later detach to form an independent clone (ramet) of the parent (genet) plant. For yellow-cedar, layering is most common on open, bog sites, where live lower branches are retained and are in direct contact with the ground.</p> <p>Confidence in Rank call: High</p>
4 Abundance on Tongass	B	<p>Currently, yellow-cedar 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 to species abundance, in particular with regard to the correlation between warming climate and yellow-cedar decline. This is currently being evaluated by the Federal petition for listing this species as threatened by the US Fish and Wildlife Service.</p> <p>Yellow-cedar was found to have peak abundance at middle elevations, while western redcedar preferred lower elevations and mountain hemlock preferred higher elevations. Yellow-cedar is not present in any</p>

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Criteria	Rank	Rationale
		<p>abundance on high productivity sites, where it is generally outcompeted by western hemlock and Sitka spruce. On average, yellow-cedar represents approximately ten percent of the estimated net volume of growing stock on timberland in southeast Alaska.</p> <p>Confidence in Rank call: Medium</p>
<p>5</p> <p>Population Trend on Tongass</p>	<p>A/B/ C</p>	<p>Population trends for yellow-cedar are variable across southeast Alaska, ranging from no risk to high risk depending on location and elevation. A detailed risk assessment for 33 geographic units in coastal Alaska on the extent of a) yellow-cedar populations, b) forests with current and expected future mortality, and c) current and expected future risk to yellow-cedar decline has been conducted by Hennon (see Appendix 1 of draft report). Geographic zones range from the northern extent of its range at Seward to the southern Tongass near Duke and Annette Islands. Population trends for yellow-cedar range from no risk to high risk depending on location and elevation.</p> <p>Confidence in Rank call: High</p>
<p>6</p> <p>Habitat Trend on the Tongass</p>		<p>Yellow-cedar is a major component of the landscape in the northwestern portion of the panhandle. Chichagof South, Kruzof Island, and Baranof Island have 21, 35, and 35% of the forested area as yellow-cedar, respectively. There is a relatively high proportion of yellow-cedar southward on Kuiu Island and Western Kupreanof with 36 and 31% of the forested area with yellow-cedar, respectively. The concentration of yellow-cedar fluctuates in the remaining areas of central and southwestern areas and ranges from 12- 29% of the forested area.</p>

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Yellow-cedar (yellow cypress, Nootka cypress)

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Global Rank: GNR State Rank: SNR

Criteria	Rank	Rationale
		<p>Overall habitat of yellow-cedar is stable and in some cases may be increasing as we move toward an adaptive management strategy for favoring yellow-cedar in harvest areas through pre-commercial thinning and planting in zones that have a moderate to low vulnerability to yellow-cedar decline (see section 4 of Hennon 2014). Yellow-cedar grows from low elevation to near tree line in the northern extent of its range, and is limited to progressively higher elevations in the southern portion of its range. The composition of the plant community associated with yellow-cedar in a given latitude zone is largely controlled by soil drainage, climate, elevation, and aspect.</p> <p>It is important to note that yellow-cedar is not limited to a single plant association. Yellow-cedar is a common component of western hemlock-yellow-cedar series across these three Areas of the Tongass National Forest, but can also occur as a component of mixed-conifer, mountain hemlock, western hemlock, shore pine, and other series. Drainage is the most important environmental factor affecting series and association distributions in southeast Alaska. The open, poorly-drained sites on which yellow-cedar has a competitive advantage over western hemlock are also the sites where it is most vulnerable to root freezing injury due to its shallow rooting habit and exposure to dramatic fluctuation in soil temperature. Furthermore, yellow-cedar is most competitive on nutrient poor sites with wet soils</p> <p>Confidence in Rank call: Moderate</p>
<p>7</p> <p>Habitat Vulnerability</p>	<p>B</p>	<p>Habitat vulnerably and trends are variable across the landscape and are comprised of a complex array of natural and human caused impacts. Habitat modification is likely to result in ecological patterns similar to the range of historical conditions, but is being impacted by modern stressors such as climate change and timber harvest.</p>

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Criteria	Rank	Rationale
<p>or Modification or other threats</p>		<p>Climate exerts long-term influence over vegetation patterns, hydrology, and soil development, and relatively shorter-term influence over seasonal precipitation, temperature, and acute weather events. The widespread mortality of yellow-cedar in Alaska and British Columbia, yellow-cedar decline, is associated with freezing injury to fine roots that occurs where snowpack in early spring is insufficient to protect roots from late-season cold events. Yellow-cedar trees appear to be protected from spring freezing injury where snow is present in spring and able to insulate tree roots and prevent premature de-hardening and freezing. Freezing sensitivity has been identified as a key vulnerability of yellow-cedar on sites with poor drainage and nutrient availability, yellow-cedar is adapted to root shallowly, exposing roots to greater fluctuations in air and soil temperature. Therefore, throughout much of its range, yellow-cedar is most vulnerable to yellow-cedar decline on low-productivity sites on which it previously had a competitive advantage.</p> <p>There are strong geographic patterns of near-term and longer-term (2020 to 2080) future risk of yellow-cedar decline that are expected to impact the health of yellow-cedar forests in Alaska. These general patterns include: 1) low snow regions where yellow-cedar previously experienced mortality and risk increases only marginally, 2) transitional regions that were previously protected by snow but warming in the next century is expected to trigger mortality, and 3) high snowfall areas where yellow-cedar forests remain intact due to sufficient snow cover to protect yellow-cedar by the year 2080 even with warming. These three general patterns, described below, are arrayed broadly from south to north, coastal to interior mainland, and more locally by elevation.</p> <p>The southern coastal management zones are expected to experience only a modest increased risk to yellow-cedar decline in the future. Most of the vulnerable yellow-cedar stands in these areas have already been impacted in areas such as Gravina Island, Prince of Wales South, Prince of Wales North, and Heceta where only 10-20% of yellow-cedar is expected to be at low risk by 2080. Thus, the high risk continues, but it does increase dramatically. Therefore, there</p>

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Global Rank: GNR State Rank: SNR

Criteria	Rank	Rationale
		<p>will be fewer yellow-cedar trees that could succumb and die in these high risk areas in the future. Mortality may continue but probably at a lower rate in the previously impacted forests. The modest increases in risk to yellow-cedar decline are generally at higher elevations where existing snow cover is predicted to be reduced. In addition, the favorable habitat driven by soil drainage does not vary through time maintaining the lower and moderate risk acreage at local scales in these management zones.</p> <p>The management zones of Admiralty, Kuiu, and Kupreanof Island West contain approximately 15% of the yellow-cedar acreage in Alaska, and also have a relatively high percentage of high risk to yellow-cedar decline. These zones appear particularly vulnerable in the future projections. These areas combined with Prince of Wales Island have an aggregated total of 30% of the yellow-cedar acreage, which is at or above a risk value of approximately 30% in the future high risk category. The high risk increases to 51% on Kruzof and Baranof Islands.</p> <p>The most dynamic change to yellow-cedar forests in the next century may be in areas of the northern panhandle, just beyond the current distribution of yellow-cedar decline. Yellow-cedar forests in Chichagof North, Admiralty, Glacier Bay, Juneau, and Haines have only small acreages of existing yellow-cedar decline. While these areas show small amounts of high risk to yellow-cedar decline in 2020 (e.g., very low values 0 and 3% in Haines and Glacier Bay), the risk increases in most of these areas to about 30% high risk by 2080. Glacier Bay, Haines, Chichagof North and Chichagof South all have approximately 30% of the yellow-cedar forest at high risk in 2080 projections. These management zones with anticipated dynamic change represent yellow-cedar forests that were previously protected by snow but become impacted as snow accumulation is reduced through warming.</p> <p>Finally, there are regions of Alaska with yellow-cedar forests that have little to no existing yellow-cedar decline now, and risk is expected to remain relatively low by 2080. The most extremes example are the small populations of yellow-cedar in Prince William Sound West and Icy Bay, which are outside the Tongass N.F.</p>

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Criteria	Rank	Rationale
		<p>Yellow-cedar forests along the mainland adjacent to the border with British Columbia are expected to remain relatively healthy into the future. Yellow-cedar is abundant in the Tracy Arm, Stikine, and Misty Fiords; currently there are only small amounts of yellow-cedar decline now, all in the coastal regions of these management zones. The Misty Fiords and Revillagigedo Island East and West management zones have approximately 30% of the yellow-cedar acreage in Alaska, but the acreage at high risk does not rise appreciably by 2080 (e.g., not above 20%) and approximately one half or more of these forests are expected to remain at low risk by 2080.</p> <p>Other damaging agents to yellow-cedar include wind, however, yellow-cedars' heartwood chemical extractives would appear to make it less prone to bole breakage from internal decay compared to associated conifers, but internal defect is relatively high in old yellow-cedar trees. Yellow-cedar snags commonly remain standing 80 years or more after tree death from yellow-cedar decline due their exceptional retention of strength and decay.</p> <p>Yellow-cedar has fewer problems with insects and pathogens than most other conifers. However, a shoot blight fungus (<i>Kabatina thujae</i>) causes significant disease of yellow-cedar seedlings and saplings.</p> <p>Brown bear (<i>Ursus arctos</i>) and Sitka black-tailed deer (<i>Odocoileus hemionus sitkensis</i>) are the primary animal damage agents of yellow-cedar in southeast Alaska. Brown bears typically cause damage to mature trees, whereas deer typically browse juvenile foliage of seedlings and saplings.</p> <p>Yellow-cedar is seldom found in pure single-species stands in southeast Alaska, and its commercial value has fluctuated from being non-commercial to the most valuable wood in the region. On average, yellow-cedar represents approximately ten percent of the estimated net volume of growing stock on timberland in southeast Alaska. There is considerable variation in actual cedar volume harvested among sale areas, based on site productivity and the local</p>

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Global Rank: GNR State Rank: SNR

Criteria	Rank	Rationale
		<p>abundance of cedar. As a result of the Tongass Timber Reform Act of 1990, more yellow-cedar was harvested because yellow-cedar abundance was greater on poorly- and moderately-drained sites. Additionally, the utilization of yellow-cedar increased due to heightened market demand in Asian countries.</p> <p>Confidence in Rank call: High</p>

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Global Rank: GNR State Rank: SNR

Criteria	Rank	Rationale
<p>8</p> <p>Life History and Demographics</p>	<p>B/C</p>	<p>This criteria is difficult to assess, given the reproductive capacity of yellow-cedar is considered to be low in addition to its susceptibility to mortality due to freezing sensitivity on sites with poor drainage and nutrient availability. In addition, browsing damage from deer to seedlings further impact the reproductive capacity of this species. Clearly there are abundance distributions of yellow-cedar across its range in the Tongass N.F.; however based on the results of risk assessments by Hennon, future demographics may be impacted in certain locations.</p> <p>The matter is complicated by harvest history and future trends, as we shift into an adaptive management strategy to ensure the persistence of this species across its range in Alaska. Those management strategies, including favoring yellow-cedar in silvicultural treatments or by planting in areas where no cedar previous occurred, cannot with certainty predict how this species will persist through time. Active forest management offers the most direct opportunity for adapting to climate change and responding to yellow-cedar decline. Forest management practices can be used to increase the abundance of yellow-cedar in habitats that are expected to be favorable into the future, and other approaches can be used to restore some ecosystem functions in decline-impacted forests. Our extensive knowledge of this species and its history as an important commercial timber product suggest populations have an intermediate ability to recover from disturbance events; however other demographic risk factors are known. Climate is just one of the factors that can lead to injury of a forest tree species but it interacts with soils and a unique vulnerability of yellow-cedar to explain stress and death.</p> <p>Confidence in Rank call: Moderate</p>

<p>Summary:</p> <p>Yellow-cedar is well distributed in most areas of southeast Alaska, and within the Tongass NF. Its</p>	<p>Date: March 5, 2015</p>
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Global Rank: GNR State Rank: SNR

Criteria	Rank	Rationale
		<p>reproductive capacity is considered to be low; however it is considered abundant at middle elevations. On average, yellow-cedar represents approximately ten percent of the estimated net volume of growing stock on timberland in southeast Alaska. It is a component of many habitat types, including productive forest, unproductive forest and wetlands, including muskegs where it grows as a shrubby component of the plant community.</p> <p>Population trends for yellow-cedar range from no risk to high risk depending on location and elevation. While timber harvest in productive old-growth habitat types is occurring, the overall habitat of yellow-cedar is stable and in some cases may be increasing as we move toward an adaptive management strategy for favoring yellow-cedar in harvest areas through pre-commercial thinning and planting in zones that have a moderate to low vulnerability to yellow-cedar decline</p> <p>There are strong geographic patterns of near-term and longer-term (2020 to 2080) future risk of yellow-cedar decline that are expected to impact the health of yellow-cedar forests in Alaska. By favoring yellow-cedar over other species, precommercial thinning can increase the relative abundance of this species within stands and across landscapes.</p> <p>There is no imminent threat for yellow-cedar’s survival or persistence in AK over the planning period, or the next century. Extirpation or extinction is very highly unlikely. However, this tree has suffered big losses in the 1900s in some areas of Southeast Alaska and it is expected to have further reductions in the future. While this species is common enough and is widely distributed, we do have a concern for overall reductions across the Forest. This is an important consideration</p>

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Criteria	Rank	Rationale
		<p>for this tree which is so culturally and economically valuable. Reductions in a very highly valuable species are reason for concern.</p> <p>However given the definition of SCC we conclude that due to an active and on-going conservation strategy based on best available science that this species will be managed for its long-term persistence for many years ahead. We therefore conclude that this species should not be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Patricia Krosse</p> <p>Review Team: Paul Hennon (March 2015)</p>



Photo by Leslie Koepke
(PLANTS DATABASE)

Species: *Cirsium edule* Nutt. Edible thistle

Global Rank: G4, State Rank: currently an SU (uncertainty in S rank), was an S1 in 2009

Criteria	Rank	Rationale	Literature Citations
<p style="text-align: center;">1</p> <p>Distribution on Tongass</p>	<p>B</p>	<p>Habitat patchy or gaps on the Tongass, Misty Fiords mainland and Revillagigedo Is only. Locations: S. Tongass, Ketchikan/Misty Fiords RD only, Carroll Inlet on Revilla Island east to mainland to Blossom River, 10 locations, such as Nuya Lake, LeDuc Lake, Hidden Lake, Punchbowl Lake, Shoal Cove on Revilla, and Blossom River(all in NRIS-TESP). Huelten has one location in Misty Fiords (4). Delapp (3) identified a single population along a glacial stream. Welsh reported a population near Hyder (5). No Alaska vouchers in PNW herbaria, including ALA. PNW Herbaria Consortia) (2). There is some question as to the identity of the Tongass <i>C.edule</i>. <i>Cirsium edule</i> and <i>C. brevistylum</i> are very similar, and it may be possible that the Tongass has both species. Without flowering individuals from Alaska available in herbaria, it cannot be determined with certainty that <i>C. edule</i> is in all locations that have been documented as <i>C. edule</i> on the Tongass.</p> <p>Confidence in Rank call: Medium to low due to low number of surveys in the mainland boundary area compared to land base and lack of verified vouchers from AK</p>	<ol style="list-style-type: none"> 1. NRIS-TESP 2. PNW Herbarium Consortia and ALA 3. DeLapp 1992 4. Huelten 1968 5. Welsh 1974



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Criteria	Rank	Rationale	Literature Citations
<p>2</p> <p>Distribution in surrounding geographic area</p>	<p>B</p>	<p>Global rank: G4, State Rank: currently an SU (uncertainty in S rank), was an S1 in 2009. BC, ID, OR, WA BC is S4 Main populations outside Tongass are in WA, OR, one location in ID, and across BC. Considered frequent in BC (7) and is an S4 (9).</p> <p><i>Cirsium edule</i> is a polymorphic species much in need of an in-depth field-based investigation. R. J. Moore and C. Frankton (1962) noted that in the northern part of its range, <i>C. edule</i> occurs mostly at elevations from 300 to over 2100 m. However, along the Oregon coast the species occurs on sea bluffs a few meters above the surf. Populations from montane sites are often rather different in appearance from those of lowland areas, and coastal plants differ from those of nearby more interior areas. Both montane and strictly coastal plants tend to be compact with heads tightly crowded and usually with very densely arachnoid involucre. Plants of non-montane interior sites tend to be taller and more openly branched. Plants of interior sites in southern Washington and Oregon have smaller heads with less densely arachnoid involucre than those farther to the north or along the seashore. The spiny tips of the phyllaries may be ascending or may radiate from the head forming a dense, spiny ball (8).</p>	<p>6. PLANTS database 1. PNW herbaria consortium 7. BC Conservation Data Centre, 8. Keil 2006 9. Douglas et al 1998</p>



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Criteria	Rank	Rationale	Literature Citations
		<p>Hybridization may have played a role in the diversification of <i>Cirsium edule</i>. Hybrids between <i>C. edule</i> var. <i>macounii</i> and <i>C. brevistylum</i> in southern Canada have been named as <i>C. ×vancouveriense</i> R. J. Moore & C. Frankton. <i>Cirsium edule</i> and <i>C. brevistylum</i> overlap extensively in parts of their ranges and hybrids may occur throughout their area of sympatry. Some of the variation in the southern part of the range of <i>C. edule</i> may be a result of past introgression with various forms of <i>C. remotifolium</i>.</p> <p>The distribution of <i>C. brevistylum</i> is Vancouver Island, Haida Gwaii, and SE portion of the Province (9). <i>C. edule</i> occurs in the same locations (minus SE BC) yet also occurs north to near 56° latitude. It does not occur in Haida Gwaii.</p> <p>Confidence in Rank High</p>	
3 Dispersal Capability	C	<p>A composite, seeds readily disperse with wind, disperses in suitable and unsuitable habitat, may or may not have corridors between suitable habitats, it is a biannual and/or perennial plant, doesn't flower every year, some known individuals are basal portions without inflorescence. Repro biology: Low fecundity due to the biannual nature, has 50% germination rate, and flowers the second year.</p>	<p>6. PLANTS database, Plant Data Sheet UW http://depts.washington.edu/proplnt/Plants/cirsium_edule.htm</p>



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Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call High	
4 Abundance on Tongass	A	10 occurrences total (103 known individuals) (1); it is unknown as to how many are flowering individuals. Not known if other sightings are on NFS lands (3, 4, 5). Low number of populations (10) is at risk due to stochastic events and could impact a portion of its known occurrences. Some populations have only one individual so technically are not considered a population. Confidence in Rank call: Medium	1. NRIS-TESP 3. DeLapp 1992 4. Huelten 1968 5. Welsh 1974
5 Population Trend on Tongass	D	Insufficient evidence due to little or no monitoring. LeDuc lake population is still there, visited twice but no count of plants made, just presence/absence. Confidence in Rank call: High	1. NRIS-TESP



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Criteria	Rank	Rationale	Literature Citations
<p>6</p> <p>Habitat Trend on Tongass</p>	<p>B/D</p>	<p>In BC the habitat is moist to mesic meadows, avalanche tracks, open forests in upper montane to lower alpine zone (9). On the Tongass, we assume the habitat is similar.</p> <p>Stable habitat due to most populations in designated Wilderness areas (8 of 10 populations. None of the sites have been monitored to see if habitat is intact i.e. if stochastic events have taken place, except LeDuc lake, where population was still present in 2011.</p> <p>Confidence in Rank call: Low</p>	<p>1. NRIS-TESP 9. Douglas et al 1998.</p>
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>B/D</p>	<p>No or little expected changes to habitat-except for energy projects in high elevation, but projects may have relatively low footprint compared to the total available habitat in southern Tongass wilderness area. Susceptible to misidentification as invasive thistle (bull or Canada thistle) causing people to pull it. High elevation sites considered more protected than those locations located on roads. Two of the 10 are in human disturbed habitats, but comprise over half the known individuals in the plan area.</p> <p>Climate change may affect suitable habitat in time as warming trends decrease alpine habitat. Open areas is its preferred habitat. This may be a slow process.</p>	



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Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call High	
<p style="text-align: center;">8</p> <p>Life History and Demographics</p>	B	<p>Colonizer, It is <u>monocarpic</u>, growing as a low rosette of leaves for a number of years, then sending up the tall flowering stem in spring, with the plant dying after seed maturation. Perennial growing to 2m, grows in colonies, 3-4 years (10).</p> <p>The flowers are hermaphrodite (have both male and female organs) and are pollinated by Bees, flies, Lepidoptera (Moths & Butterflies) and beetles. The plant is self-fertile. http://plants.for9.net/edible-and-medicinal-plants/.</p> <p>Plant has a 50% germination rate. Prefers light (sandy), medium (loamy) and heavy (clay) soils, prefers acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It requires moist soil, SMR 4 – 7 (range 1-8). (12)</p> <p>Do not have info on demographics info for Alaska.</p> <p>Confidence in Rank call: High</p>	<p>10. Klinkenberg 2013 11. Plants.for9.net 12. Plant Data Sheet UW http://depts.washington.edu/propplnt/Plants/cirsium_edule.htm 9. Douglas et al 1998, 8. Keil 2006.</p>



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Criteria	Rank	Rationale	Literature Citations
		<p>Summary: State rank S1, Global G4. Range is PNW: WA, OR, ID, BC and AK. <i>Cirsium edule</i> is a Composite and produces windblown seeds. It is documented to have a 50% germination rate under controlled conditions. It is a biennial which means a plant generally lives only two years, flowering in the second year. However, we are not confident that the known individuals from at least two of the sites (which are human disturbed) are actually <i>C. edule</i>. Thistle (genus <i>Cirsium</i>) is also an invasive plant and few vouchers are verified as <i>C. edule</i> from the Tongass locations.</p> <p>There is insufficient information on this species population trend (item 5) to conclude that there is a concern for its persistence in the plan area. Furthermore, those isolated populations and their associated habitat trend is assumed stable due to their occurrence in congressionally designated wilderness areas; however there exists some level of uncertainty on population trend due to lack of monitoring for this species. There are reasonably known threats to habitat, such as hydro-energy development in alpine lake habitats; however none are currently proposed in any of the known locations. Climate change is another potential stressor, in particular for the future, as alpine habitat may change with predicting warming trend, converting habitat from open areas to more shaded or closed canopy environments. Sufficient scientific information exists about its life history from elsewhere but not from Alaska. Overall there is a lack of information about this species demographics in Alaska and uncertainty in the identity of some populations currently documented as this species.</p> <p>We conclude that current scientific evidence does not indicate a substantial concern for the capability of <i>Cirsium edule</i> to persist over the long-term in the Tongass plan area. We do not recommend that <i>Cirsium</i></p>	<p>Date: 11/13/2014</p>



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Global Rank: G4, State Rank: currently an SU (uncertainty in S rank), was an S1 in 2009

Criteria	Rank	Rationale	Literature Citations
<p><i>edule</i> be considered as a Species of Conservation Concern.</p> <p>However, should energy development in the form of hydro-power in the lakes where this plant currently occurs (Misty Fiord Wilderness Area), it is recommended that an analysis of the persistence of this plant in the project area be re-examined.</p> <p>Initial Evaluator(s): Karen Dillman, Kristin Lease, Rick Turner and Patricia Krosse</p> <p>Review Team: Patricia Krosse, Mary Stensvold, Brad Kriekhaus, Kristin Lease, and Rick Turner</p>			

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Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
<p>1 Distribution on Tongass</p>	<p>A</p>	<p>On the Tongass, this species is only known from one location on Etolin Island near Kindergarten Bay (1, 2, 3). One historic occurrence from the Stikine River, was revisited in FY14, and no plants were found (4). Confidence in Rank call: High</p>	<ol style="list-style-type: none"> 1. NRIS-TESP 2. ALA 3. Conservation Assessment 4. Personal communication (K. Dillman)
<p>2 Distribution in surrounding geographic area</p>	<p>B</p>	<p>Known from California north through British Columbia and Southeastern Alaska, and east to Saskatchewan, Wyoming and Idaho. Populations in Southeast Alaska are fairly disjunct from the majority of the other known populations. Near the Tongass, but on non-NFS lands, there are two populations known near Haines, as well as in Glacier National Park, and up the Stikine River near Telegraph Creek. There are thousands of occurrences known in the western US, but most with few plants. (California S4, Idaho NR, Montana S3S4, Oregon S3S4, Washington NR, Wyoming S2, Alberta S2, British Columbia S3S4,</p>	<ol style="list-style-type: none"> 5. Conservation Assessment 6. NatureServe



Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
		Saskatchewan S1) Confidence in Rank call: High	
3 Dispersal Capability	B/D	<p>Rhizomatous perennials reproduce clonally and sexually. For sexual reproduction it requires self-pollinating insect, small generalist bees.</p> <p>While there is little information on the seeds of <i>Cypripedium montanum</i>, similar <i>Cypripedium</i> species have dust-like seeds, that are very light and disperse easily by wind or water. However, they are lacking an endosperm that requires symbiotic mycorrhizal relationship for the germination and growth. While they may readily disperse, suitable habitats with the mycorrhizal fungi present may be rarer. Given the wide distribution of the known populations, it is likely that <i>Cypripedium montanum</i> is easily dispersed as well, and the mycorrhizal interaction may be the component limiting its presence.</p> <p>Confidence in Rank call: Low</p>	5. Conservation Assessment (Knecht 1996, Cribb 1997, Case 1987, Arditti 1967, Rasmussen 1995)



Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
4 Abundance on Tongass	A	<p>One known/confirmed population on the Tongass. This site has been revisited several years and the numbers have ranged from an estimated 75 individuals to a count of 412. This range could be due to the timing of surveys, dormancy periods, and efforts to complete a full census in 2012.</p> <p>Confidence in Rank call: High</p>	<p>1. NRIS-TESP 6. Unpublished FY12 Monitoring Report (R. Turner)</p>
5 Population Trend on Tongass	B/D	<p>The one known population does not appear to be increasing or decreasing for the dates that it was visited. It was initially found in 2006 and revisited in 2011 and 2012. This population appears to be stable, but there is insufficient evidence to establish population trends given dormancy periods with the limited visits we have had.</p> <p>Each year has shown some signs of herbivory damage, some of the worst being reported in 2006 and 2007. During the site visit in 2012, several well-traveled wildlife trails were noted throughout the site, as well as deer scat and daybeds. No sign of elk scat or tracks were observed in the area. 8 percent of the total number of stems showed some sign of browse or damage, some appeared to be signs of ungulate herbivory, some trampling, and others from</p>	<p>1. NRIS -TESP 7. 2009 Alaska Region Sensitive Species Report 6. Unpublished FY12 Monitoring Report (R. Turner)</p>



Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
		<p>insect damage. However, this site visit did occur early in the season, near the end of the flowering period, so later season impacts would be possible.</p> <p>During the review and evaluation for the Sensitive Species list in 2008, the population trend was suspected to be downward, given the past know impacts and documented herbivory. While it is difficult to tell with dormancy periods for this species and the timing of the site visits, the Etolin population appears to be somewhat stable from recent site visits, but vulnerable to potential impacts.</p> <p>The second population that had been reported from NFS lands up the Stikine River was revisited in FY14, and Forest Ecologist, Karen Dillman, was unable to relocate the population. It is uncertain whether this was because there was not specific enough information to accurately relocate the population, or if there has been a change in that population since it was originally located.</p> <p>Confidence in Rank call: Low</p>	



Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
<p>6</p> <p>Habitat Trend on Tongass</p>	<p>A/B</p>	<p>Overall, there may be some decline in habitat quality and quantity with the management activities that have occurred throughout the Tongass, however there is likely a stable amount of suitable habitat available in our non-development LUDs</p> <p>Confidence in Rank call: Medium</p>	<p>8. 1997 and 2008 Forest Plan, Conservation Strategy</p>
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>A</p>	<p>Habitat modification adjacent to the only known population has occurred with the construction of the existing road, changing the hydrology at the site. Possible threats from additional timber harvest and road building and maintenance, as well as possible plant collecting, trampling, impacts from off-road vehicles, and herbivory are possible.</p> <p>Confidence in Rank call: Medium</p>	<p>7. 2009 Alaska Region Sensitive Species List</p> <p>4. Personal Communication (K. Dillman)</p>



Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
<p>8</p> <p>Life History and Demographics</p>	<p>A/B</p>	<p>The species can reproduce clonally to increase the size and density of existing populations, but depends on sexual reproduction for long-distance dispersal. Pollination may be an infrequent event, with low rates of fruit production.</p> <p>Mycorrhizal interaction is required for successful establishment of a population; availability of that fungus may determine and limit the available suitable habitat. Orchids with a specific mycorrhizal association may be more vulnerable to environmental changes than a generalist species. A long-term demographic study in Oregon indicated that seedling recruitment was very low, and that individuals can be dormant for one or more years.</p> <p>Confidence in Rank call: Medium</p>	<p>5. Conservation Assessment (Correll 1978, Case 1987, Arditti 1967, Rasmussen 1995, Kaye 1999)</p>
<p>Summary: <i>Cypripedium montanum</i> (G4, S2) is known across the northwestern US and western Canada, reaching as far north as Southeast Alaska and British Columbia. Globally it is ranked as a G4 (secure), but in Alaska it is ranked as an S2 (imperiled). On the Tongass, there have only been two reported sightings of this species. One is known on Etolin Island, and the other report from the Stikine could not be relocated when visited in 2014.</p>			<p>Date: 11/4/2014</p>



Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
		<p>Questions concerning this species occurrence on the Tongass are met with differing opinions between botanists and ecologists. Some believe the population to be disjunct, while others believe the population is “accidental” or “transient”. However, with the body of evidence that two other populations occur within Southeast Alaska (non-NFS lands at Glacier Bay and Haines), this supports the finding that it is truly rare and not accidental or transient. The island biography of SE Alaska may also be responsible for the large gap in occurrences relative to its overall distribution from California to northern BC and eastward.</p> <p>The known population on Etolin Island has been impacted by road building, and has shown signs of herbivory. The number of individuals at that site fluctuates annually, which is consistent with the dormancy periods known for this species. And while dispersal is generally long range given the small seeds, the mycorrhizal interaction required for establishment and success, and can greatly limit the suitable habitat available.</p> <p>Based on the limited number of populations on the Tongass plan area, the past impacts to habitat at the only known site, the ongoing vulnerability of that site, and the limitations of the species success with the required mycorrhizal interaction, we conclude that current science evidence does indicate a substantial concern for the capability of <i>Cypripedium montanum</i> to persist over the long-term in the Tongass plan area. We recommend that it be considered as a Species of Conservation Concern.</p>	



Photo by Susan McDougal
(PLANTS database)

Species: *Cypripedium montanum* Mountain Lady's Slipper

Global Rank: G4 State Rank: S2

Criteria	Rank	Rationale	Literature Citations
<p>Initial Evaluator(s): Karen Dillman, Kristen Lease, Rick Turner with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Brad Kriekhaus</p>			

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Species: *Cypripedium parviflorum* var. *pubescens* Yellow Lady's Slipper



Global Rank: G5T5 State Rank: S1

Photo by Thomas Barnes (PLANTS database)

Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>A</p>	<p>Five populations are known on the Tongass. All of them are on northern Prince of Wales Island (1). One population has not been revisited since it was found, and it is the location with the most natural setting. The other four known locations are in close proximity to the mainline road to the north end of the Island (2).</p> <p>Also, one of the sites was found late in the growing season in 2014. It was a single plant. It was clearly a <i>Cypripedium</i>, but since it was not flowering, its species could not be verified. Given its growing site and proximity to other known populations, it is currently being assumed to be <i>Cypripedium parviflorum</i> var. <i>pubescens</i> (2). A site visit is planned early in the next growing season to verify. Ideal flowering period will likely be early to mid-June.</p> <p>Surveys of suitable habitat have been contracted at the north end of Prince of Wales and adjacent island in recent years, and no other populations have been found. Given this plants showy flower, it is not likely that trained botanists would have overlooked it.</p>	<ol style="list-style-type: none"> 1. NRIS-TESP 2. Tongass FY14 Rare Plant Monitoring Information (K. Lease)

			
<p>Species: <i>Cypripedium parviflorum</i> var. <i>pubescens</i> Yellow Lady's Slipper</p> <p>Global Rank: G5T5 State Rank: S1</p>		<p>Photo by Thomas Barnes (PLANTS database)</p>	
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: High	
<p style="text-align: center;">2</p> <p>Distribution in surrounding geographic area</p>	B	<p>Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass.</p> <p>While <i>Cypripedium parviflorum</i> does range across the US and Canada, however the other known populations of the variety <i>pubescens</i> are quite disjunct from Southeast Alaska (3). There are a handful of known locations in interior British Columbia, west of Fort Nelson (approximately 350 miles from the known sites on the Tongass) and southeast of Kamloops (approximately 750 miles from the known sites on the Tongass) (4).</p> <p>Even with the large range, there are very few reports of large, demonstrably secure populations. All reported populations contain less than 400 individuals, and most contain less than 30 plants. Typically small populations can make species more vulnerable to extirpation.</p> <p>Confidence in Rank call: Medium</p>	<p>3. NatureServe</p> <p>4. E-Flora BC</p>

Species: *Cypripedium parviflorum* var. *pubescens* Yellow Lady's Slipper



Global Rank: G5T5 State Rank: S1

Photo by Thomas Barnes (PLANTS database)

Criteria	Rank	Rationale	Literature Citations
<p>3</p> <p>Dispersal Capability</p>	<p>B/D</p>	<p><i>Cypripedium</i> is a rhizomatous perennial that reproduce clonally and sexually. Seeds of this orchid are tiny and could be transported by wind (5).</p> <p>Similar <i>Cypripedium</i> species have dust-like seeds, that are very light and disperse easily by wind or water. However, they are lacking an endosperm that requires symbiotic mycorrhizal relationship for the germination and growth. While they may readily disperse, suitable habitats with the mycorrhizal fungi present may be rarer. Given the wide distribution of the known populations, it is likely that <i>Cypripedium montanum</i> is easily dispersed as well, and the mycorrhizal interaction may be the component limiting its presence.</p> <p>Confidence in Rank call: Low</p>	<p>5. Mergen 2006</p>
<p>4</p> <p>Abundance on Tongass</p>	<p>A</p>	<p>Five populations are known on the Tongass. All of them are on northern Prince of Wales Island. One population has not been revisited since it was found, and it is the location with the most natural setting. The other four known locations are in close proximity to the mainline road to the north end of the island. The four locations near the existing road were visited in 2014. Populations had 1, 17, 13 and 7 stems. The fifth site was found in 2006, by an</p>	<p>1. NRIS-TESP</p> <p>2. Tongass FY14 Rare Plant Monitoring Information (K. Lease)</p>

Species: *Cypripedium parviflorum* var. *pubescens* Yellow Lady's Slipper



Global Rank: G5T5 State Rank: S1

Photo by Thomas Barnes (PLANTS database)

Criteria	Rank	Rationale	Literature Citations
		<p>untrained seasonal employee and reported to the district botanist. It had been documented as having 20 stems all flowering, but on the photos provided of the site, it looks like there was only 10 flowering stems, and no vegetative stems are visible.</p> <p>Confidence in Rank call: High</p>	<p>6. Sensitive Plant Sighting Form (E. Uloth)</p>
<p>5</p> <p>Population Trend on Tongass</p>	<p>A/B</p> <p>/D</p>	<p>Of the known sites, two were found in 2014, and two have been revisited several years as a part of the Tongass Rare Plant Monitoring pilot project. For those two populations, numbers have fluctuated from 13 and 14 plants to 20 and 16 (2).</p> <p>Overall, there is little information available about population trend on the Tongass, it appears in the time that the two populations have been revisited that they have fluctuated some, but overall seem stable.</p> <p>NatureServe estimates short-term trends national at a decline of 10-30% In addition, outside of the Tongass, NatureServe notes (3): <i>Although there may be far more than a thousand populations of this species throughout its extensive range, most are small, and Cypripedium parviflorum var. pubescens (Cypripedium pubescens), when treated taxonomically to exclude the</i></p>	<p>1. NRIS-TESP</p> <p>7. 2009 Alaska Region Sensitive Species Report</p> <p>2. Tongass FY14 Rare Plant Monitoring Information (K. Lease)</p> <p>3. NatureServe</p>

			
<p>Species: <i>Cypripedium parviflorum</i> var. <i>pubescens</i> Yellow Lady's Slipper</p> <p>Global Rank: G5T5 State Rank: S1</p>		<p>Photo by Thomas Barnes (PLANTS database)</p>	
Criteria	Rank	Rationale	Literature Citations
		<p><i>more widespread var. makasin (as by Kartesz, 1999) is clearly vulnerable to habitat loss, horticultural collecting, and medicinal collecting rangewide. There are very few reports of large, demonstrably secure populations anywhere in North America. All reported populations contain less than 400 individuals, and most contain less than 30. There are numerous threats to this species and its habitats, and the typically small populations of this species are highly vulnerable to extirpation. Extirpation of two populations has been documented in Arizona, and it is likely that many others have been recently extirpated. Despite efforts to protect this species from collectors, it continues to be impacted by this practice. Though quantitative data is not available at this time, available information suggests that this species is still in decline, and further measures to protect it should be implemented.</i></p> <p>Confidence in Rank call: Low</p>	
<p>6</p> <p>Habitat Trend on Tongass</p>	A/B	<p>Overall, there may be some decline in habitat quality and quantity with the management activities that have occurred throughout the Tongass, especially given the locations of the known populations and their proximity to existing roads. However there is likely a stable amount of suitable habitat available in our non-development LUDs.</p> <p>Confidence in Rank call Medium</p>	<p>8. Forest Plan, Conservation Strategy</p>

Species: *Cypripedium parviflorum* var. *pubescens* Yellow Lady's Slipper



Global Rank: G5T5 State Rank: S1

Photo by Thomas Barnes (PLANTS database)

Criteria	Rank	Rationale	Literature Citations
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>A/B</p>	<p>While the habitats where this species is suspected to grow are generally not vulnerable to substantial modification, based on the locations of the 4 known sites, those sites are very vulnerable to modification. Two of the sites are along a stretch of road that is currently proposed for widening and paving, which would eliminate these populations. One other population is also within the road edge, and is vulnerable to traffic, brushing, and invasive species competition. This year the area was hand-brushed by district personnel to eliminate competition, and avoid the need for mechanical brushing. Finally, these four sites are all within easy site distance from the road, and may be targeted by enthusiastic gardeners and flower pickers.</p> <p>Confidence in Rank call: Medium</p>	<p>1. NRIS- TESP</p> <p>9. Personal Information (K. Lease)</p>
<p>8</p> <p>Life History and Demographics</p>	<p>A/B</p>	<p>The species can reproduce clonally to increase the size and density of existing populations, but depends on sexual reproduction for long-distance dispersal. Pollination may be an infrequent event, with low rates of fruit production.</p> <p>Mycorrhizal interaction is required for successful establishment of a population; availability of that fungus may determine and limit the available suitable habitat. Orchids with a specific mycorrhizal association may be more vulnerable to</p>	<p>3. NatureServe</p> <p>4. E-Flora BC</p>



Photo by Thomas Barnes
(PLANTS database)

Species: *Cypripedium parviflorum* var. *pubescens* Yellow Lady's Slipper

Global Rank: G5T5 State Rank: S1

Criteria	Rank	Rationale	Literature Citations
		environmental changes than a generalist species. Confidence in Rank call: Medium	
<p>Summary: <i>Cypripedium parviflorum</i> var. <i>pubescens</i> (G5T5, S1) is known the US and Canada. Globally it is ranked as a G5T5 (secure), but in Alaska it is ranked as an S1 (critically imperiled). There are currently five documented locations within the Tongass plan area. Of those known sites, four are within close proximity to the existing road, and two of them are within a section of road that is currently under analysis for widening and paving. Another is vulnerable to brushing, and all four of the populations in close proximity to the road are vulnerable to human interest for transplanting. The fifth location has not been visited and verified by a Tongass botanist or Ecologist. The site was found and reported by an untrained seasonal employee and needs to be visited to verify the occurrence and accurate location. While this species does range across North America, nearly all populations are small and are threatened by habitat loss and plant collectors, using the roots for herbal medicines and remedies. The closest documented populations of this variety outside of the Tongass Plan Area are in interior British Columbia over 100 miles from any of the known sites in Southeast Alaska.</p> <p>We conclude that current science evidence does indicate a substantial concern for the capability of <i>Cypripedium parviflorum</i> var. <i>pubescens</i> to persist over the long-term in the Tongass plan area. We recommend that <i>Cypripedium parviflorum</i> var. <i>pubescens</i> be considered as a Species of Conservation Concern.</p>			Date: 11/4/2014



Photo by Thomas Barnes
(PLANTS database)

Species: *Cypripedium parviflorum* var. *pubescens* Yellow Lady's Slipper

Global Rank: G5T5 State Rank: S1

Criteria	Rank	Rationale	Literature Citations
		<p>This rating is based on: 1) the rarity within the Tongass Plan Area (<i>Cypripedium parviflorum</i> var. <i>pubescens</i> is ranked state-wide as S1, critically imperiled), and there are few populations (five) and those populations have few individuals (20 or less) 2) the populations within the Plan Area are disjunct from known populations outside of the Plan Area (by well over 350 miles) 3) the vulnerability of the known locations along the existing roads, and the use and management of those roads and 4) while in general it seems that sufficient habitat likely exists, the mycorrhizal interaction necessary for plant establishment and success greatly limits its available habitat.</p> <p>Initial Evaluator(s): Kristen Lease with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Brad Kriekhaus and Rick Turner</p>	

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<p>Species: <i>Ligusticum calderi</i> Calder's Lovage</p> <p>Global Rank: G3G4 State Rank: N1 S2</p>			<p>Photo from USDA Forest Service (2002)</p>
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>A</p>	<p>Habitat is naturally distributed as isolated patches, with limited opportunity for dispersal among patches.</p> <p>Known from southern Southeast Alaska. 24 locations documented in NRIS, one location was entered by contractors, but is not believed to be <i>Ligusticum calderi</i>, leaving 23 mapped element occurrences. These are concentrated on Prince of Wales Island primarily near Bokan Mountain and one location near Gardner Bay. There are also two general areas known from Suemez Island, and one mapped location on Dall Island in the subalpine south of Windy Cove.</p> <p>Confidence in Rank call: High</p>	<ol style="list-style-type: none"> 1. NRIS-TESP 2. AKNHP 3. Nawrocki 2013 4. ALA
<p>2</p> <p>Distribution in surrounding geographic area</p>	<p>B</p>	<p>Ranking: G3G4, N1, S2</p> <p>Limited distribution outside the Tongass National Forest</p> <p>In the US, only known from southern Southeast Alaska. (Previous report from Kodiak Island is a mis-identification.) Also known from the Queen Charlotte Islands and coastal British Columbia south to northern Vancouver Island.</p> <p>Confidence in Rank call: High</p>	<ol style="list-style-type: none"> 5. NatureServe, 6. Flora of the Queen Charlotte Islands, Flora of British Columbia 7. BC Conservation Data Center

			
<p>Species: <i>Ligusticum calderi</i> Calder's Lovage</p> <p>Global Rank: G3G4 State Rank: N1 S2</p>		<div style="border: 1px solid black; padding: 2px;">Photo from USDA Forest Service (2002)</div>	
Criteria	Rank	Rationale	Literature Citations
3 Dispersal Capability	B/D	Believed to disperse only through suitable habitat Confidence in Rank call: Low	8. R10 Sensitive species report/evaluation criteria
4 Abundance on Tongass	A/B	Rare to Uncommon on the Tongass. The current abundance is large enough that demographic stochasticity is not likely to lead to rapid extinction, but in combination with highly variable environmental factors, could pose a threat. Plant count information was not readily available in NRIS Confidence in Rank call: Medium	9. R10 Sensitive species report/evaluation criteria, 1. NRIS -TESP
5 Population Trend on Tongass	D	There is insufficient information to draw inferences about this criterion for the Tongass. None of the known populations have been revisited. Confidence in Rank call: Low	8. R10 Sensitive species report/evaluation criteria
6 Habitat Trend	B	Stable amounts of suitable or potential habitat, relatively unchanged habitat quality. Confidence in Rank call: Medium	

<p>Species: <i>Ligusticum calderi</i> Calder's Lovage</p> <p>Global Rank: G3G4 State Rank: N1 S2</p>			<p>Photo from USDA Forest Service (2002)</p>
Criteria	Rank	Rationale	Literature Citations
on Tongass			
7 Habitat Vulnerability or Modification or other threats	B	<p>Habitat modification is likely to result in ecological patterns similar to the range of historical conditions, but is being impacted by modern stressors.</p> <p>Given the known concentration of plants in the Bokan area, minerals exploration and activities could be threatening <i>Ligusticum calderi</i> and its suitable habitat. Other habitats and areas may be vulnerable to other management, recreation and subsistence activities.</p> <p>Confidence in Rank call: Medium</p>	
8 Life History and Demographics	D	<p>Insufficient information to draw inferences about criterion.</p> <p>Since this plant is so rare throughout its known range, little is known about its life history and demographics.</p> <p>Confidence in Rank call: Low</p>	9. R10 Sensitive species report/evaluation criteria

<p>Species: <i>Ligusticum calderi</i> Calder's Lovage</p> <p>Global Rank: G3G4 State Rank: N1 S2</p>			<p>Photo from USDA Forest Service (2002)</p>
Criteria	Rank	Rationale	Literature Citations
<p>Summary: <i>Ligusticum calderi</i> is a rare plant known from southern Southeast Alaska, through coastal British Columbia. Globally it is ranked as a G3G4, and in Alaska it is ranked as an S2. In British Columbia it is ranked as a S3S4 or a “yellow” species, meaning that it is apparently secure. On the Tongass, <i>Ligusticum calderi</i> has been documented in 5 primary areas on Prince of Wales, Suemez, and Dall Island. The highest concentration of known plants is in the Bokan Mountain area. Of the known element occurrences, none have been revisited since they were found. Given its rarity and limited distribution, little is known about the plants population trends, dispersal, life history and demographics.</p> <p><i>Ligusticum calderi</i> has been found near sea level north of Bokan Mountain and as high as alpine on Dall island. Overall, there appears to be stable amounts of habitat present on the Tongass, but plants and habitat may be vulnerable due to proposed mineral activity in the Bokan area. Of the known locations in the general area of proposed mineral exploration, only one population is within the vicinity of where mineral exploration has occurred in the past. The main concentration of known populations, north of Bokan, is not being targeted for minerals exploration.</p> <p>We conclude that current science evidence does not indicate a substantial concern for the capability of <i>Ligusticum calderi</i> to persist over the long-term in the Tongass plan area. We do not recommend <i>Ligusticum calderi</i> to be considered as a Species of Conservation Concern.</p> <p>This rating is based on: 1) a lack of scientific evidence to show a decline in populations 2) a lack of evidence to show substantial modification or decline in habitat and 3) a wide range of known suitable habitats, from muskegs near sea level to high alpine limestone.</p>		<p>Date: 11/3/2014</p>	

<p>Species: <i>Ligusticum calderi</i> Calder's Lovage</p> <p>Global Rank: G3G4 State Rank: N1 S2</p>			<p>Photo from USDA Forest Service (2002)</p>
Criteria	Rank	Rationale	Literature Citations
<p>However given its limited range globally and on the Tongass, in addition to the proposed minerals projects in the general area of the known populations, it would still remain a rare species on the Tongass and be a target for surveys and analysis as future management projects are proposed in areas of suitable habitat.</p> <p>Initial Evaluator(s): Kristen Lease with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Brad Kriekhaus and Rick Turner</p>			

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<p>Species: <i>Micranthes nelsoniana</i> (D. Don) Small var. <i>carlottae</i> (Calder & Savile) Gornall & H. Ohba [NO PHOTO]</p> <p><i>Saxifraga nelsoniana</i> D. Don ssp. <i>carlottae</i> (Calder & Savile) Hultén</p> <p>dotted or heartleaf saxifrage</p> <p>Global Rank: GNR State Rank: S2, (S3 in British Columbia)</p>			
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	B	<p>Populations are patchy across the forest and habitat is broadly distributed.</p> <p>Known from five locations on the Tongass National Forest.</p> <p>Mainland, Stanton Lake, N of Farragut River, East of Sandborn Canal, West ridge above lake to Granit Peak, common (ARCTOS 2014).</p> <p>Mainland, South of Bradfield Canal, Cleveland Peninsula, East of Hoya Creek, West of Anan Creek. Common on alpine lake margin (ARCTOS 2014).</p> <p>A plant intermediate between var. <i>carlottae</i> and var. <i>porsildiana</i>. Taku Inlet Taku Inlet, Sheep Fork of Carlson Creek (ARCTOS 2014).</p> <p>Alpine of Etolin Island. Growing along a streamlet (AKNHP 2014).</p> <p>(Assuming) alpine on Deer Mountain, Ketchikan. The specimen is at DAO collected by Walkers, collection number is 979B. This is the collection shown on the range map in Hultén's Flora of Alaska (Hultén 1968).</p> <p>Habitat includes open alpine, alpine heath, rocky streamsides, gravel bars, rocky areas, crevices in rock cliffs, talus/scree slopes.</p> <p>Confidence in Rank: High</p>	

<p>Species: <i>Micranthes nelsoniana</i> (D. Don) Small var. <i>carlottae</i> (Calder & Savile) Gornall & H. Ohba [NO PHOTO]</p> <p><i>Saxifraga nelsoniana</i> D. Don ssp. <i>carlottae</i> (Calder & Savile) Hultén</p> <p>dotted or heartleaf saxifrage</p> <p>Global Rank: GNR State Rank: S2, (S3 in British Columbia)</p>			
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: High	
2 Distribution in surrounding geographic area	B	<p>Limited distribution outside the Forest.</p> <p>Alaska: Northwest shore of Yakutat Bay, Between Cape Suckling and Icy Bay, Togiak NWR (AKNHP 2014).</p> <p>Between Cape Yakataga and Cape Suckling in a large subalpine meadow on a broad ridge crest (AKNHP 2014).</p> <p>SW Alaska, Togiak NWR (ARCTOS 2014). St. Lawrence Island, Gambell area.</p> <p>Canada: Throughout Haida Gwaii (Queen Charlotte Islands), adjacent British Columbia (Brouillet & Elvander 2009), northern alpine British Columbia (B.C. Conservation Data Centre, 2015).</p> <p>Confidence in Rank: High</p>	

<p>Species: <i>Micranthes nelsoniana</i> (D. Don) Small var. <i>carlottae</i> (Calder & Savile) Gornall & H. Ohba [NO PHOTO]</p> <p><i>Saxifraga nelsoniana</i> D. Don ssp. <i>carlottae</i> (Calder & Savile) Hultén</p> <p>dotted or heartleaf saxifrage</p> <p>Global Rank: GNR State Rank: S2, (S3 in British Columbia)</p>			
Criteria	Rank	Rationale	Literature Citations
3	B/D	<p>Insufficient information to draw inferences about criterion.</p> <p>Disperses only through suitable habitat (dispersal areas may or may not be corridors).</p> <p>Confidence in Rank: Medium</p>	
4	B	<p>Known from five sites on the Tongass, number of individuals unknown.</p> <p>Uncommon - current distribution is broad 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.</p> <p>Some herbarium labels indicate the plant is common in the collection area.</p> <p>This plant could be overlooked or confused with other, more common, varieties of <i>M. nelsoniana</i></p> <p>Confidence in Rank: Medium</p>	

<p>Species: <i>Micranthes nelsoniana</i> (D. Don) Small var. <i>carlottae</i> (Calder & Savile) Gornall & H. Ohba [NO PHOTO]</p> <p><i>Saxifraga nelsoniana</i> D. Don ssp. <i>carlottae</i> (Calder & Savile) Hultén</p> <p>dotted or heartleaf saxifrage</p> <p>Global Rank: GNR State Rank: S2, (S3 in British Columbia)</p>			
Criteria	Rank	Rationale	Literature Citations
5 Population Trend on Tongass	B	Stable populations. Confidence in Rank: Medium	
6 Habitat Trend on Tongass	B	The plant grows in an array of habitats in remote areas that are not likely to be affected by human activities. Stable amounts of suitable and potential habitat, with relatively unchanged habitat quality Confidence in Rank: Medium	
7 Habitat Vulnerability or Modification or other threats	C	Habitat resilient, changes are within HRV, and modern stressors not significant. Confidence in Rank: Medium	

<p>Species: <i>Micranthes nelsoniana</i> (D. Don) Small var. <i>carlottae</i> (Calder & Savile) Gornall & H. Ohba [NO PHOTO]</p> <p><i>Saxifraga nelsoniana</i> D. Don ssp. <i>carlottae</i> (Calder & Savile) Hultén</p> <p>dotted or heartleaf saxifrage</p> <p>Global Rank: GNR State Rank: S2, (S3 in British Columbia)</p>			
Criteria	Rank	Rationale	Literature Citations
8 Life History and Demographics	D	<p>Insufficient information to draw inferences about criterion.</p> <p>Studies are needed to understand more about this plant's distribution, life history and demographics.</p> <p>Confidence in Rank: High</p>	
<p>Summary: The plant was named <i>Saxifraga punctata</i> L. subsp. <i>carlottae</i> Calder & Savile in 1960 by Calder and Savile. Hultén (1968) followed that taxonomy; however, in 1973 he made a new combination: <i>Saxifraga nelsoniana</i> D. Don subsp. <i>carlottae</i> (Calder & Savile) Hultén. The change in the species name resulted from the discovery that the type specimen for <i>Saxifraga punctata</i> is not that taxon; the correct species name was changed to <i>Saxifraga nelsoniana</i> (Hultén, 1973). Welsh (1974) appeared to agree with Hultén's analysis of the plant's name, but retained the name <i>S. punctata</i> in his Flora; additionally he felt the segregates were based on minor characters. Subsequent genetic and morphological analysis led to Brouillet & Gornall (2007) renaming the plant as <i>Micranthes nelsoniana</i> (D. Don) Small var. <i>carlottae</i> (Calder & Savile) Gornall & Ohba.</p> <p>USDA Plants recognizes the plant as <i>Saxifraga nelsoniana</i> D. Don subsp. <i>carlottae</i> (Calder & Savile) Hultén (USDA, NRCS. 2014). The Plant List (2014) accepts the name <i>Saxifraga nelsoniana</i> var. <i>carlottae</i> (Calder & Savile) H. Ohba. For the purposes of this document we follow Brouillet & Gornall (2007) because this is the name used in Flora of North America (Brouillet & Elvander 2009).</p>			Date: January 2015

Species: <i>Micranthes nelsoniana</i> (D. Don) Small var. <i>carlottae</i> (Calder & Savile) Gornall & H. Ohba [NO PHOTO]			
<i>Saxifraga nelsoniana</i> D. Don ssp. <i>carlottae</i> (Calder & Savile) Hultén			
dotted or heartleaf saxifrage			
Global Rank: GNR State Rank: S2, (S3 in British Columbia)			
Criteria	Rank	Rationale	Literature Citations
<p>We conclude that current scientific evidence do not indicate a substantial concern for the capability of <i>Micranthes nelsoniana</i> var. <i>carlottae</i> to persist over the long-term in the Tongass plan area. We recommend that <i>Micranthes nelsoniana</i> var. <i>carlottae</i> not be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Mary Stensvold, Regional Botanist</p> <p>Review Team:</p>			

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<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>			
			
<p>Photo from COSEWIC. 2013</p>			
Criteria	Rank	Rationale	Literature Citations
1 Distribution on Tongass	B	<p>Populations patchy or gaps</p> <p>Locations: Thunder Mountain on mainland of Wrangell RD, and Kupreanof Island, Petersburg RD. (These two locations are documented from over 600 lichen surveys on the Tongass. The Kupreanof population was discovered during a rare plant survey but not entered in NRIS and the Thunder Mt site is near a lichen air quality biomonitoring site). Not a cryptic species</p> <p>Confidence in Rank: High</p>	<ol style="list-style-type: none"> 1. USDA FS National Lichens and Air Quality Database and Clearinghouse 2. USDA Forest Service NRIS-TESP
2 Distribution in surrounding geographic area	B	<p>Global rank: G3/G4 in 2013, but global rank will be revised due to recent genetic studies restricting the range, State Rank: S1-pending ANHP.</p> <p>MT, WA, BC and AK This lichen is known from BC in 6 locations (3), two of which have been extirpated (5) for an estimated total of 727 individuals (4). One location in WA (S1) and one in MT with unknown number of individuals confirmed with molecular techniques (5). It is also known from one location in a stream in Denali National Park (6).</p> <p>Confidence in Rank: High</p>	<ol style="list-style-type: none"> 3. BC Conservation Data Centre 4. COSEWIC 2013 5. Miadlikowska <i>et al</i> 2014 6. Arctos (UAF)

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>				
				
		<p>Photo from COSEWIC. 2013</p>		
Criteria	Rank	Rationale	Literature Citations	
<p>3</p> <p>Dispersal Capability</p>	<p>A</p>	<p>This aquatic lichen needs water to remain photosynthetically active and to reproduce. It produces spores and the fungal partner is <i>Nostoc</i> genus which may be free-living on rocks in in the streams. This lichens lives attached to rocks, and can withstand water turbulence, but has little tolerance of desiccation (7). Assumed that the spores travel downstream in water. Little is known as to its dispersal potential between watersheds or riparian areas. Presumably spores could be carried by animals (see below) crossing the stream and depositing propagules to another stream where <i>Nostoc</i> is present.</p> <p><i>An animal can help with dispersal even if it carries no propagules away. That furry mammal might walk across a lichen colony and break up many thalli, fail to pick up anything but leave behind numerous small fragments each of which could be dispersed by agents such as wind, water or other animals. An insectivorous bird, pecking around a lichen thallus in search of food might break off isidia or dislodge soredia and release them into the surrounding air. Some lichenivorous invertebrates are messy eaters and leave 'crumbs' (ie, potential propagules) scattered about (8).</i></p> <p>Needs water to reproduce but dispersal between water systems is unknown.</p> <p>Confidence in Rank call: High</p>	<p>7. Brodo et al 2001 8. Bailey 1976</p>	

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>				
		 <p>Photo from COSEWIC. 2013</p>		
Criteria	Rank	Rationale	Literature Citations	
4 Abundance on Tongass	A	<p>2 occurrences with approx. 100 individual thalli.</p> <p>Confidence in Rank call Medium, to High. Over 600 lichen surveys and thousands of rare plant surveys on the Tongass. One population was discovered during a rare plant survey and the other during a lichen survey.</p>	2. USDA Forest Service databases	
5 Population Trend on Tongass	A/D	<p>Glavich (2009) found that the similar species <i>P. aquatica</i> is significantly associated with both older forests and non-key watersheds, indicating that conservation/management of this species will not be effective if only key watersheds are considered. Although the species is found on all sizes of rocks it was most frequently encountered on large rocks and bedrock in shade approximately 0-2 cm above water level. This habitat requirement for the <i>P. aquatica</i> can be inferred for the <i>P. gowardii</i> on the Tongass.</p> <p>We have two populations on the Tongass: one in a timber unit and another in the alpine in wilderness. The wilderness site was monitored in 2013, and contained fewer individuals and less percent cover in the stream than the 2005 time period. The summer of 2013 was very dry, and perhaps fluctuations in water levels and snowfall have altered the number of thalli in this location. Therefore, overall, it is assumed that 50% of the known populations on the Forest are in decline. This includes the population in a timber unit on Kupranof Island. It has not been monitored however.</p>	9. Glavich 2009	

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>			
			
		<p>Photo from COSEWIC. 2013</p>	
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: Medium	
6 Habitat Trend on Tongass	B	<p>the habitat for all the aquatic <i>Peltigera's</i> contain a certain level of year-round humidity, stream-water flow, generally low water temperature, pH close to neutral, and a lack of silt (5).</p> <p>There are 900 watersheds in the Tongass NF (6th level Hydrologic Unit Code or HUC according to national mapping standards). An estimate of 35% of the watersheds have roads and timber units (11). All Class I and II streams (fish) and Class III streams (fishless v-notches) require buffers in the Forest Plan (USDA FS 2008). Class IV streams do not have buffers but cannot be used as corridors to drag logs downslope. Class IV streams are generally less than 1.5 meters wide, steep and not incised into the hillslope. The wilderness site where this lichen is found is a Class IV stream.</p> <p>Therefore, it is possible that over 50% of the 900 watersheds that may contain preferred habitat of this aquatic lichen are <i>not modified with roads and timber harvest</i>. For the portion that has received road building and timber harvest, past practices have impacted riparian corridors of all stream classes. However, current fish stream and watershed standards and</p>	<p>5. Miadlikowska <i>et al</i> 2014</p> <p>10. USDA Forest Service 2008</p> <p>11. Julianne Thompson, Personal Communication</p>

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>			
			
		<p>Photo from COSEWIC. 2013</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>guidelines protect fish habitat and watershed quality, which in turn protects the habitat of this aquatic lichen.</p> <p>Habitat is also being modified across all districts due to hydro-electric projects, building dams on lakes and changing the flow of the streams. More hydro-electric projects are expected to increase on the Tongass.</p> <p>Confidence in Rank call: High</p>	
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>B</p>	<p>In BC the habitat is aquatic; in cold, clean mountain and meadow streams, elevations vary, near sea level to 800 m elevation (4). This is similar to the Tongass population's habitat: clear, clean, cold mountain streams from 300 m to 800 m elevation. Across its range the habitat is threatened by mining, roads, hydro-energy development, timber harvest, forest fires (except SE AK for the latter), and climate change.</p> <p>Although this aquatic habitat in streams is abundant across the Tongass, habitat modifications have occurred over the years in approximately 40% of those landscapes due to timber harvest, roads, mining and energy projects. Harvest methods included taking trees from all stream classes in the past, and logging across and down water channels. Today, with timber harvest standards and guidelines for water quality due to fish habitat concerns, the degree of habitat modification is substantially less. However, this lichen</p>	<p>4. COSEWIC 2013</p>

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>				
				
		<p>Photo from COSEWIC. 2013</p>		
Criteria	Rank	Rationale	Literature Citations	
		<p>may occur in streams not inhabited by fish, therefore, some streams are still vulnerable to siltation and canopy removal and disturbance during timber harvest projects (Class IV-cannot yard logs down the channel but can harvest up to the stream bank). Road building activities also have standard and guidelines in place to reduce siltation (silt is documented as a threat to all aquatic lichens). Additionally, hydro-electric power projects occur across the Tongass and more are scheduled. This activity will change the flow of the water in this lichen's habitat. However, <i>no hydro-power projects are planned</i> in the two locations where this lichen is documented.</p> <p>Another threat to this aquatic lichen is climate change. Models predict our area to become wetter and warmer. This can mean two things for this lichen. 1) Precipitation as rainfall instead of snow. This will reduce the snowpack, so that the temperature of the water will rise over the course of the summer as less snow melts faster, and drought conditions could occur in the upper elevations. This lichen is sensitive to water temperature and desiccation, preferring cold, snow melt or spring water. Similar concerns are for fish populations in the lower reaches of fish bearing streams; and 2) the increase of precipitation during SE storms may also begin to dislodge the lichen from its holdfast if turbulence is extreme over periods of time, i.e. over its ability to hold onto the substrate and withstand turbulence. If thalli become dislodged and travel downstream, some may not become fixed again to a</p>		

<p>Species: <i>Peltigera gowardii</i> Lendemer & O’Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>			
			
		<p>Photo from COSEWIC. 2013</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>similar substrate to survive and reproduce. These climate change scenarios may occur over a long period of time, and may be slow to occur.</p> <p>Confidence in Rank call: High</p>	
<p>8</p> <p>Life History and Demographics</p>		<p>Perennial. Fungul partner reproduces by spores. Photobiont <i>Nostoc</i> cyanobacteria (12).</p> <p><i>Peltigera gowardii</i> is closely related to <i>P. hydrothyria</i>. The latter was placed in a genus of its own, <i>Hydrothyria</i>, by Russell (1853). <i>Hydrothyria</i> was transferred to and included within the genus <i>Peltigera</i> by Miadlikowska & Lutzoni (2000). Recently, Lendemer & O’Brien (2011) separated <i>P. gowardii</i> from <i>P. hydrothyria</i>. A specimen of what is now known as <i>P. gowardii</i> was collected as early as 1866 (as <i>Hydrothyria venosa</i>, specimen in CANL). The photosynthetic partner of <i>Peltigera gowardii</i>, a cyanobacterium, is reported to be <i>Nostoc</i> cyanobacterium, but may be <i>Capsosira</i>, which recently has been identified in the closely related <i>P. hydrothyria</i> (12, 15). Recent molecular work by Miadlikowska et al 2014 has now placed <i>P. gowardii</i> as separate from its southern PNW counterpart, a new species called <i>P. aquatica</i> which occurs from WA to CA. Therefore three waterfans occur in NA: two in the PNW (one in AK), and one in the eastern US.</p>	<p>12. Lendemer & H. O’Brian 2011</p> <p>4. COSEWIC 2013</p> <p>13. Davis et al 2003</p> <p>14. Honegger 2008</p> <p>5. Miadlikowska et al 2014</p> <p>15. Casamatta et al 2006</p>

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>			
			
		<p>Photo from COSEWIC. 2013</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>Sexual reproductive structures (apothecia) are common in <i>P. gowardii</i>. It is suspected that when thalli are at or above water level, their asci eject ascospores into the air. Some thalli can be found as much as one metre below the water level (13). From what is known about other foliose lichens, it seems unlikely that the asci in the apothecia of <i>P. gowardii</i> are able to discharge their spores when the thalli are under water. Ascospores of thalli growing at water level can be discharged into the air and when they land on a rock in a stream with appropriate water quality, it is presumed that they germinate and grow toward nearby cyanobacteria. If the latter are compatible, the cyanobacteria become enveloped by the fungal strands and together they grow to become a visible thallus (14). Under favorable conditions, thalli can develop into large colonies, 10 cm or more in diameter.</p> <p>Demographics in Alaska: both populations contained thalli with apothecia so the fungal partner is reproducing. Generation time is uncertain, but estimated at 17 years (COSWIC 2013).</p> <p>Confidence in Rank call: High</p>	

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>		 <p>Photo from COSEWIC. 2013</p>	
Criteria	Rank	Rationale	Literature Citations
<p>Summary: Only a few macrolichens worldwide have adapted to grow successfully below water in rivers and streams. <i>Peltigera gowardii</i> is endemic to western North America (from N WA to AK) and is renowned for its ability to colonize this unusual habitat for a macrolichen. It has a narrow habitat requirement which is on rocks in cold, clear mountain streams. It is very rare across its range, with three known locations within Alaska, two being on the Tongass National Forest and one in Denali National Park. In British Columbia, surveys targeting this species have occurred throughout the province, with 6 known locations. Therefore, dispersal may be a limiting factor in the life history of this lichen, as abundant habitat is present. Similarly, the Tongass National Forest contains abundant habitat for this lichen. Although surveys to specifically target this lichen have not occurred forest-wide, over 600 lichen surveys have been conducted in relation to air quality biomonitoring as well as over 2700 botanical surveys which focus on all habitats. It is possible that this lichen is overlooked if a surveyor does not know it exists. However, the first discovery of this lichen was in 1997 by a Tongass botanist doing rare plant surveys. All Alaska botanists would be able to recognize this lichen as something unusual in a stream if present. Therefore, it is likely that this lichen is inherently rare within the Tongass National Forest, and not expected to be readily encountered.</p> <p>The two locations for this lichen have opposite land use designations. One is in wilderness (Stikine-LeConte) and the other is in a timber LUD on Kupreanof Island. The fate of the latter is suspected to be in decline as it was discovered during botany surveys in a timber unit. The wilderness site has been monitored as recently as 2013 and appears to be in decline in the Class IV stream. This could be due to changes in water levels during the low-rainfall that year. The Denali population is the 3rd in the state and considered stable, but forest fires and climate change are considered threats. Therefore, over 50% of the Alaska populations of this lichen are considered unstable.</p>			<p>Date: November 4, 2014</p>

			
<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>		<p>Photo from COSEWIC. 2013</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>The Tongass National Forest has 900 watersheds that contain habitat for this lichen. Although habitat modifications have occurred in the past in nearly 40% of the watersheds, Forest Plan protections on fish-bearing streams will continue to protect the remaining habitat. The Class IV streams have yarding restrictions down channel, but can be harvested along the edges.</p> <p>This lichen is a PNW endemic with a G3/G4 rating from 9/2013 and is likely to change due to recent molecular evidence of narrower species range published in 7/2014. Very few known locations in areas that receive substantial lichen surveys (BC and WA particularly) and is designated as a COSEWIC Special Concern Species in Canada, has a BC Provincial rating of S1/S2 and is on the Red list for BC. The two populations on the Tongass appear to be in decline due to management activities and possibly annual variation in precipitation. Sufficient habitat exists on the Tongass, but dispersal is very limited due to its aquatic habitat and movement between watersheds is highly unlikely. Past hydro-projects, timber sales and road building have modified some of the habitat of this lichen across its range in the PNW and on the Tongass (near to 40% of the watersheds have had impacts). More hydro-projects are expected in the future, although none are proposed for the two locations this lichen occurs on the Tongass. Climate change is a threat with predictions for warmer wetter winters, which decrease the amount of snowpack and stream temperatures rise (cold water is a necessary habitat feature of this lichen).</p> <p>We conclude that current science evidence does indicate a substantial concern for the capability of <i>Peltigera gowardii</i> to persist over the long-term in the Tongass plan area. We recommend that <i>Peltigera gowardii</i> be considered as a Species of Conservation Concern.</p>	

<p>Species: <i>Peltigera gowardii</i> Lendemer & O'Brian. Waterfan</p> <p>Global rank: G3G4 (2013) State Rank: S1 (pending ANHP)</p>		 <p>Photo from COSEWIC. 2013</p>	
Criteria	Rank	Rationale	Literature Citations
<p>Initial Evaluator(s): Karen L. Dillman, Ecologist, Tongass National Forest with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Brad Kriekhaus, Rick Turner</p>			

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MARCH 22, 2015

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<p>Species: <i>Piperia candida</i> whiteflower rein orchid [NO PHOTO]</p> <p>Global Rank: G3 State Rank: SNR</p>			
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	B	<p>There are 38 known element occurrences documented in NRIS for Southeast Alaska. 37 of those are on the Tongass plan area. The other population is in the community of Thorne Bay, in a small patch of timber between the school parking lot and the main road. The majority of the populations known on the Tongass are within the central portion of Prince of Wales Island. There are also populations known on Kosciusko Island, Kuiu, Revillagigedo, and Etolin Island.</p> <p>Confidence in Rank call: High</p>	<p>1. NRIS-TESP</p>
<p>2</p> <p>Distribution in surrounding geographic area</p>	B	<p>Limited distribution outside of the Tongass. Known in British Columbia (S2), Washington (SNR), Oregon (SNR), south to central California (S2).</p> <p>Confidence in Rank call: High</p>	<p>2. NatureServe</p> <p>3. Calflora</p> <p>4. USDA Plants Database</p>
<p>3</p> <p>Dispersal Capability</p>	B/C	<p><i>Piperia candida</i> has typically has many flowers per plant (up to 100), and very small seeds. Given the size of the seeds, they are likely wind dispersed, making the dispersal capability relatively high. Plants within the <i>Piperia</i> genus lack an endosperm, which is why the seeds can be so small and light. However, the lack of endosperm means that the seed requires a mycorrhizal interaction for establishment, which can greatly limit the success at a site.</p> <p>While the plant might readily disperse across the landscape, there are habitat-related limitations</p>	<p>5. eFloras</p> <p>6. 2009 Alaska Region Sensitive Species Report</p>

<p>Species: <i>Piperia candida</i> whiteflower rein orchid [NO PHOTO]</p> <p>Global Rank: G3 State Rank: SNR</p>			
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: Medium	
4 Abundance on Tongass	B	<p>On the Tongass, populations known in natural habitats are generally small, with fewer individuals. The populations with larger numbers (over 100 plants) tend to occur along the road corridors and right-of-ways. Over 1,000 individuals are estimated in Southeast Alaska, and over 700 of those are known on NFS lands. However, over half of the known populations on the Tongass have less than 10 plants, and all of those are in natural settings.</p> <p>Confidence in Rank call: Medium</p>	1. NRIS-TESP
5 Population Trend on Tongass	D	<p>Several populations on the Tongass have been visited annually since 2011 as a part of the Tongass Rare Plant Monitoring project. A plot for one of the large roadside populations recorded 226 plants in 2011 and 171 plants in 2012. In 2013, this site was revisited, and there was evidence of some road work in the area, and only 12 plants were found. In 2014, the numbers were a little higher at 46. While the road work likely lead to some of the damage at this site, there are also dormancy periods common in orchids that could be a factor in the fluctuation between years. Also, this species seems to begin dying back earlier in the season than most flowering plants. The leaves generally die-back before the flowering stems do, by later in the season, some vegetative plants that were out in May might not be visible in August. Those times seem to fluctuate depending on the spring and summer weather.</p>	7. FY11-14 Tongass Rare Plant Monitoring Data

<p>Species: <i>Piperia candida</i> whiteflower rein orchid [NO PHOTO]</p> <p>Global Rank: G3 State Rank: SNR</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>For the other populations monitored, the numbers also fluctuated between years; the higher numbers were in 2011 and 2012 versus 2013 and 2014. One population only had 1 plant in 2014, but had 78 in 2012.</p> <p>Knowing the dormancy periods that orchids have, this information likely covers too short of a time frame and too few samples to really have a full understanding of the populations trends on the Forest, but we do know that there is fluctuation from year to year, making it difficult to have accurate population information for just one season of survey in areas.</p> <p>Confidence in Rank call: Low</p>	
6 Habitat Trend on Tongass	B	<p><i>Piperia candida</i> has primarily been found on the Tongass along the edge of the forest and muskeg, just inside the protected timbered edge or under scrub cedar or pine in the muskegs. It is generally found along the edges of muskegs with a fair <i>Rubus chamaemorus</i> component. It has also been found in somewhat open, lower productivity timbered stands, as well as along the edges of trails and roads.</p> <p>Given the range of habitats this plant is known, there is a significant amount of this habitat throughout the plan area, however within management land-use designations (LUDs) there is likely some decline in available habitat with timber harvest and other management activities, but in general, it would be limited to populations along forest edges and road right-of-ways. Other populations within the management LUDs have been found well within the</p>	

<p>Species: <i>Piperia candida</i> whiteflower rein orchid [NO PHOTO]</p> <p>Global Rank: G3 State Rank: SNR</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>muskeg, under patches of scrub, and would not likely be impacted by management activities.</p> <p>Also, within non-management land use designations, there are stable amounts of suitable habitat or potential habitat.</p> <p>Confidence in Rank call: Medium</p>	
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>B</p>	<p>Known suitable habitat for <i>Piperia candida</i> can be vulnerable to timber harvest, road building, and road maintenance. Twenty-one of the known 38 element occurrences in Southeast Alaska are within Management LUDs.</p> <p>The majority of the known populations are within the central portion of Prince of Wales Island. These populations were found during surveys for a large timber sale. Many of the populations were at the edges of muskegs, and some overlap with planned areas for timber harvest or are at the edges of planned timber harvest. Other populations within the management LUDs are well within the muskegs, under patches of scrub, generally less than waist high, and not directly impacted by a commercial timber sale.</p> <p>The known habitats of lower productivity timber and muskeg edges in management LUDs can be vulnerable to timber management activities. Populations along the roadside can be vulnerable to management and maintenance of those roads, recreational and subsistence use, and competition from invasive species.</p> <p>Some impacts to existing populations along the roads have already been</p>	

<p>Species: <i>Piperia candida</i> whiteflower rein orchid [NO PHOTO]</p> <p>Global Rank: G3 State Rank: SNR</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>observed within one of the few monitoring plots established on the Tongass (see population trend above). However, the roadside populations have likely been impacted by brushing, ditching and other road maintenance, and the known populations along roadsides generally have a higher number of individuals than the natural setting locations.</p> <p>Confidence in Rank call: Medium</p>	
<p>8</p> <p>Life History and Demographics</p>	B	<p><i>Piperia candida</i> was first described as a new species in 1990 by Morgan and Ackerman. Until then it was included with <i>Piperia unalascensis</i>. On the Tongass, several original documentations of <i>Piperia candida</i> were also identified as <i>Piperia unalascensis</i>. Several specimens from the Tongass have been sent to orchid expert Robert Lauri, and he has verified all of them as <i>Piperia candida</i>. On Prince of Wales, all <i>Piperia</i> that have been revisited and found during flowering periods have been determined to be <i>Piperia candida</i> and not <i>unalascensis</i>. The Element Occurrences from Prince of Wales in the NRIS database as <i>Piperia unalascensis</i> have not been verified as <i>unalascensis</i>. They are populations that not been revisited or were not visited while flowering, so they have been left in the database as <i>unalascensis</i>, but are suspected could be <i>Piperia candida</i>. This would increase the number of <i>Piperia candida</i> populations known.</p> <p><i>Piperia candida</i> is a difficult to species to identify during surveys; it can require separating the scrub timber to find the plants. In many circumstances, this species can be easily overlooked, and since the plants do not flower</p>	<p>8. California Native Plant Society</p> <p>9. Lauri, R.</p> <p>10. Morgan, R. and Ackerman, J.D.</p>

<p>Species: <i>Piperia candida</i> whiteflower rein orchid [NO PHOTO]</p> <p>Global Rank: G3 State Rank: SNR</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>annually, identification can be difficult. It may be confused with a more common <i>Platanthera</i> species when only single leaves are visible. In addition, this plant is known to have dormancy periods, where no above ground growth would be visible during a survey.</p> <p>In addition, even though the chances for dispersal seem high for <i>Piperia</i>, with many flowers and very small seeds, the required mycorrhizal interactions necessary for successful establishment make suitable habitat more limited than what is readily identifiable as muskeg edge and low productivity timber.</p> <p>Populations do seem to have some ability to recover from disturbance events, given their ability to inhabit the road right-of-way and trail edges.</p> <p>Confidence in Rank call: Medium</p>	
<p>Summary: <i>Piperia candida</i> is a rare plant known from Southeast Alaska to central California. Globally it is ranked as a G3, and it has not been ranked in Alaska due to its recent confirmation. In British Columbia and California, at the edges of its range, it is ranked as an S2, but it is not ranked in Washington and Oregon. On the Tongass, <i>Piperia candida</i> has only been confirmed recently (2011) as a different species than <i>Piperia unalascensis</i>. The highest concentration of known plants is in the central portion of Prince of Wales Island, where the highest density of surveys has been completed since the Sensitive Species List was revised in 2009. <i>Piperia unalascensis</i> was added to the Regional Forester's sensitive species list at that time, and was made a higher priority species to target. It was after this revision that <i>Piperia candida</i> was found, and thought to be <i>Piperia unalascensis</i>.</p>			Date: 11/3/2014

<p>Species: <i>Piperia candida</i> whiteflower rein orchid [NO PHOTO]</p> <p>Global Rank: G3 State Rank: SNR</p>			
Criteria	Rank	Rationale	Literature Citations
<p>This rating is based on a lack of scientific evidence to show a decline in populations over the long term. <i>Piperia candida</i> seems to have a fairly wide range of suitable habitats in the Plan area and while some of the habitats may be vulnerable to management activities, it seems to be stable or succeeding in some of the potentially vulnerable habitat as well. For example, even though timber harvest may impact some populations along forest edges. Many populations were found under small scrub patches in the middle of muskegs that would not be impacted by timber harvest. In addition, the roadside populations have likely been impacted by brushing, ditching and other maintenance activities, and still consistently have numbers higher than the known sites in natural conditions. In addition, at least 38 element occurrences are documented in the Plan area, and that includes somewhat limited surveys targeting this difficult to identify species.</p> <p>However, given its limited range globally and on the Tongass, and the questions about population trend, it would still remain important to maintain as a rare species on the Tongass. It should continue to be targeted for surveys, conservation, and analysis as future management projects are proposed in areas of suitable habitat. In addition, revisiting previously identified <i>Piperia unalascensis</i> populations would be essential to ensure correct identification during the flowering period for the management of both of these <i>Piperia</i> species.</p> <p>We conclude that current science evidence does not indicate a substantial concern for the capability of <i>Piperia candida</i> to persist over the long-term in the Tongass plan area. We do not recommend <i>Piperia candida</i> to be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Kristen Lease with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Brad Kriekhaus and Rick Turner</p>			

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Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>A</p>	<p>This species occurs as isolated patches scattered across the southern half of the Tongass. Seventeen occurrences are located on National Forest Systems land, including Duke, Gravina, Prince of Wales, Kosciusko, and Kruzof Islands (1). Eight of the occurrences (47%) are located entirely or partially in development land-use designations (LUDs), and nine occurrences (53%) are located entirely or partially in non-development LUDs (2). One additional occurrence on Chichagof Island is within the southeast Alaska, but is located on non-national forest land. An unverified specimen was collected at Red Bluff Bay on the eastern coast of Baranof Island in 1984 (3).</p> <p>There is some uncertainty regarding identification of this species on the Tongass. Some occurrences that were previously identified as Alaska rein orchid have been confirmed to be whiteflower rein orchid (<i>Piperia candida</i>), which has whiter flowers but has a similar growth habit and occupies similar habitats (4). It is possible that other occurrences of this species may actually be whiteflower rein orchid, but revisits will be required to collect voucher specimens for identification. One occurrence containing 300 individuals on Prince of Wales near Rio Roberts that was previously identified as Alaska rein orchid has recently been</p>	<ol style="list-style-type: none"> 1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database. 2. USFS. 2008. Tongass Land and Resource Management Plan. Publication R10-MB-603c, Ketchikan, AK. 3. University of Alaska Museum. 2014. Arctos Database. http://www.uaf.edu/museum/herb/index.html. 4. Dillman, K. 2011. Conservation Assessment of <i>Piperia unalascensis</i> (Spreng.) Rydb.: Region 10 Sensitive Species. Unpublished report. U.S. Forest Service, Tongass National Forest. 5. Lease, K. 2014. Personal communication.



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
		verified as whiteflower rein orchid (5). Confidence in Rank call: Medium	
2 Distribution in surrounding geographic area	B	Herbarium records for this species in Alaska include locations in areas north of the Tongass populations, including Glacier Bay National Park, Takhin River, and Haines Highway, and Unalaska Island in the Aleutian Islands (1). A few records south of the Tongass are located in areas near Prince Rupert, Queen Charlotte Islands, and Smithers, British Columbia. One record is located at the Iskut River approximately 150 km northeast of Wrangell (2). The main distribution in the surrounding geographic area is disjunct by a significant distance from the Tongass and are located from the southern half of British Columbia south to Washington, Idaho and Oregon (2, 3). Confidence in Rank call: High	<ol style="list-style-type: none"> 1. University of Alaska Museum. 2014. Arctos Database. http://www.uaf.edu/museum/herb/index.html. 2. Klinkenberg, Brian. (Editor) 2014. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. 3. Douglas, G., G. Straley, D. Meidinger, and J. Pojar (eds.). 1999. Illustrated Flora of British Columbia. British Columbia Ministry of Environment, Lands and Parks and Ministry of Forests.



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
3 Dispersal Capability	B	<p>Terrestrial orchids produce an abundance of tiny seeds which are generally thought to be dispersed by wind. The seeds require an association with a mycorrhizal fungus for germination and plant establishment, and it is essential for successful development and competition of orchids in their natural environments (1). The specific mycorrhizal association of this orchid is unknown (2). The limited distribution of orchids may be due at least in part from the rarity of their mycorrhizal symbiont (3). Thus, the ability of this species to disperse to other areas could be limited by the absence of its specific mycorrhizal fungus.</p> <p>Confidence in Rank call: Medium</p>	<ol style="list-style-type: none"> 1. Clements, M.A. 1988. Orchid mycorrhizal associations. <i>Lindleyana</i> 3: 73-86. 2. Dillman, K. 2011. Conservation Assessment of <i>Piperia unalascensis</i> (Spreng.) Rydb.: Region 10 Sensitive Species. Unpublished report. U.S. Forest Service, Tongass National Forest. 3. Bothe, H., K. Turnau, and M. Regvar. 2010. The potential role of arbuscular mycorrhizal fungi in protecting endangered plants and habitats. <i>Mycorrhiza</i> 20:445–457.
4 Abundance on Tongass	A	<p>Database records show a total of 155 individuals on the Tongass (1). Of the 17 occurrences on the Tongass, 13 have 10 or fewer individuals and 5 occurrences have only one individual. The largest occurrence contains 40 individuals and is located on Kruzof Island near Sitka. The current abundance is low enough that arguably stochastic and other factors could lead to potential imperilment.</p>	<ol style="list-style-type: none"> 1. USFS Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database. 2. Dillman, K. 2011. Conservation Assessment of <i>Piperia unalascensis</i> (Spreng.) Rydb.: Region 10 Sensitive Species. Unpublished report. U.S.



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
		<p>There is some uncertainty regarding identification of this species on the Tongass. Some occurrences that were previously identified as Alaska rein orchid have been confirmed to be whiteflower rein orchid (<i>Piperia candida</i>), which has whiter flowers but has a similar growth habit and occupies similar habitats (2). It is possible that all recorded occurrences of this species on Prince of Wales Island are actually whiteflower rein orchid (3).</p> <p>Confidence in Rank call: Medium</p>	<p>Forest Service, Tongass National Forest.</p> <p>3. Lease, K. 2014. Personal communication.</p>
5 Population Trend on Tongass	D	<p>There is insufficient information to make inferences regarding population trend of this species on the Tongass.</p> <p>Confidence in Rank call: High</p>	
6 Habitat Trend on Tongass	A	<p>On the Tongass, this species is generally found in low productivity forests at lower elevations in poorly drained soils (1). It often grows at the ecotone between forested and muskeg habitats. Some of the forest stands where the species is found are managed for timber production. Almost half of the occurrences are located in development LUDs. Substantial timber harvest and road</p>	<p>1. Dillman, K. 2011. Conservation Assessment of <i>Piperia unalascensis</i> (Spreng.) Rydb.: Region 10 Sensitive Species. Unpublished report. U.S. Forest Service, Tongass National Forest.</p>

 <p>Species: <i>Piperia unalascensis</i> Spreng. (Rydb.) Alaska rein orchid</p> <p>Global Rank: GNR State Rank: SNR</p> <p style="text-align: center; border: 1px solid black; padding: 2px;">Image from USDA-NRCS PLANTS</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>construction has occurred in the past within the general range of this species on the Tongass. This has likely resulted in a long-term downward trend in quantity and quality of habitat, including fragmentation into smaller and more isolated parcels. A few occurrences are located in the rights-of-way of forest roads (2). It is not known if they are remnants that have survived the disturbance, or if they have colonized the areas due to modification of habitat.</p> <p>Confidence in Rank call: Medium</p>	<p>2. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
<p style="text-align: center;">7</p> <p>Habitat Vulnerability or Modification or other threats</p>	A	<p>Threats to this species and its habitat on the Tongass include impacts from timber harvest and road construction (1). These activities can result in direct or indirect damage to individuals and long-term modification of habitat. Of the 17 known occurrences on the Tongass, 8 are located in development LUDs that could be affected by future timber harvest and road construction. To a lesser degree, recreational activities are a threat where trails are constructed through the habitat. Trails can provide access to an area where orchids may be trampled on or collected by the public. Past and present mining exploration and extraction in this orchid’s habitat is also a potential threat (1).</p> <p>Global climate change may be the most pervasive threat to future</p>	<p>1. Dillman, K. 2011. Conservation Assessment of <i>Piperia unalascensis</i> (Spreng.) Rydb.: Region 10 Sensitive Species. Unpublished report. U.S. Forest Service, Tongass National Forest.</p> <p>2. Swarts, N.D., & K.W. Dixon 2009. Terrestrial orchid conservation in the age of extinction. <i>Ann Bot.</i> 104(3): 543–556.</p> <p>3. Haufler, J.B., C.A. Mehl, and S. Yeats. 2010. Climate change: anticipated effects on ecosystem services and</p>



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
		<p>long-term persistence of rare orchids (2). Predicted climate changes for southeast Alaska include higher summer and winter temperatures, increased length of growing seasons and frost free days, increased precipitation with more falling as rain rather than snow, increased evapotranspiration rates, and increased storm intensities (3). The long-term effects of these changes on habitat for this species, its pollinators, and its mycorrhizal symbiont are uncertain. However, fragmentation of habitat due to past and potential future management activities could inhibit the ability of this species to adapt or migrate, potentially resulting in local extinctions.</p> <p>To address the potential management concerns of plants which are associated with old growth habitat, such as this one, we evaluated the 2008 Old Growth Conservation Strategy as well as the PLANTs standards and guides. Both components in the Forest Plan provide protection measures for this species when warranted. With over ½ of the known populations already existing in protected landscapes (Non-development LUDs) and implementain of avoidance and protection measures provided for in the Forest Plan PLANTs standards and guides, the question for concern may be most relevant with respect to the overall number of occurrences and how</p>	<p>potential actions by the Alaska Region, U.S. Forest Service. Ecosystem Management Research Institute, Seeley Lake, Montana, USA.</p>



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
		<p>they are distributed on the Tongass in order to be resilient to stochastic and/or human impacts. With predictions of increased rain into the future, it seems unlikely that the wet forest conditions this species prefers will be a limiting factor.</p> <p>Confidence in Rank call: Medium</p>	
<p>8 Life History and Demographics</p>	<p>B</p>	<p>The pollinator of this species on the Tongass is currently not known. A related orchid, <i>Platanthera obtusata</i>, is pollinated by the male mosquito in Alaska (1). In Washington state it is known to be pollinated by the plum or pyralid moth (2).</p> <p>Terrestrial orchids require an association with a mycorrhizal fungus for germination and plant establishment, and it is essential for successful development and competition of orchids in their natural environments (3). The specific mycorrhizal association of this orchid is unknown (1). The limited distribution of orchids may be due at least in part from the rarity of their mycorrhizal symbiont.</p> <p>Confidence in Rank call: Medium</p>	<ol style="list-style-type: none"> 1. Dillman, K. 2011. Conservation Assessment of <i>Piperia unalascensis</i> (Spreng.) Rydb.: Region 10 Sensitive Species. Unpublished report. U.S. Forest Service, Tongass National Forest. 2. Washington Native Orchid Society. 2014. The genus <i>Piperia</i>. http://www.wanativeorchids.com/Piperia/index.html 3. Clements, M.A. 1988. Orchid mycorrhizal associations. <i>Lindleyana</i> 3:73-86.



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
		<p>Summary: This species occurs as isolated patches scattered across the southern half of the Tongass. Seventeen occurrences are located on national forest land, with eight of the occurrences located entirely or partially in development LUDs. In other words, 47% of the known occurrences are within areas where timber harvest, road construction and other management activities have or may occur, while 53% of the known occurrences are within landscapes that receive little or no management activities, other than minor recreational activities or special uses. Substantial timber harvest and road construction has occurred in the past within the general range of this species on the Tongass. This has likely resulted in a long-term downward trend in quantity and quality of habitat, including fragmentation into smaller and more isolated parcels. To a lesser degree, recreational activities are a threat where trails are constructed through the habitat. Past and present mining exploration and extraction in this orchid’s habitat is also a potential threat.</p> <p>There is some uncertainty regarding identification of this species on the Tongass. Some occurrences that were previously identified as Alaska rein orchid have been confirmed to be whiteflower rein orchid (<i>Piperia candida</i>), which has a similar growth habit and occupies similar habitats. Seeds require an association with a mycorrhizal fungus for germination and plant establishment, and it is essential for successful development and competition of orchids in their natural environments. The specific mycorrhizal association of this orchid is unknown. The ability of this species to disperse to other areas could be limited by the absence of its specific mycorrhizal fungus.</p> <p>There are 155 individuals on the Tongass. Of the 17 occurrences on the Tongass, 13 have 10 or fewer individuals, five occurrences have only one individual, and the largest occurrence contains 40</p>	<p>Date: 11/7/2014</p>



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
		<p>individuals. There is insufficient information to make inferences regarding population trend of this species on the Tongass. A few occurrences are located in the rights-of-way of forest roads. It is not known if they are remnants that have survived the disturbance, or if they have colonized the areas due to modification of habitat. Of the 17 known occurrences on the Tongass, 8 are located in development LUDs that could be affected by future timber harvest and road construction. The long-term effects of climate change on habitat for this species, its pollinators, and its mycorrhizal symbiont is uncertain, but considering this species prefers wet forest transition areas it seems unlikely that this type of habitat will be limiting according to the most recent climate change scenarios which predict increased precipitation. However, terrestrial orchids are among the most vulnerable species to climate change. Fragmentation of habitat due to past and potential future management activities could inhibit the ability of this species to adapt or migrate, potentially resulting in local extinctions. The ability of this species to be resilient to ecological and/or environmental change in the long term is unknown.</p> <p>Given that over 50% of the known occurrences are currently in protected landscapes (Non-development LUDs), and that another 50% of the known occurrences (and any future sightings) are subject to avoidance and/or potential protection measures as defined in the PLANTS standards and guidelines (pg, 4-41), coupled with an overall lack of understanding of the future effect of climate change on this species and its ability to be resilient to ecological changes, we conclude that current science evidence does not indicate a substantial concern for the capability of Alaska rein orchid to persist over the long-term in the Tongass plan area. We recommend that this species not be considered as a Species of Conservation Concern at this time.</p>	



Species: *Piperia unalascensis* Spreng. (Rydb.) Alaska rein orchid

Global Rank: GNR State Rank: SNR

Image from USDA-NRCS PLANTS

Criteria	Rank	Rationale	Literature Citations
Initial Evaluator(s): Rick Turner with edits from Patti Krosse (March 2019)		Review Team: Patti Krosse, Mary Stensvold, Karen Dillman and Brad Kreickhaus	

			
<p>Species: <i>Platanthera orbiculata</i> (Pursh) Lindl. Lesser round-leaved orchid</p> <p>Global Rank: G5 State Rank: S3S4</p>		<p>Photo taken from Dillman 2008</p>	
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	B	<p>This species and its habitat occur generally in patches across the southern third of the Tongass. There are 269 occurrences currently located at least partially on national forest land. The largest occurrences are concentrated in east-central Prince of Wales Island near Thorne Bay. Other concentrations are on western Revillagigedo Island, Gravina Island, and southern Etolin Island. The northern limit of known occurrences is on the Tongass is on Wrangell Island. Recent population mapping of all occurrences by the ANHP (3) based on the national standards resulted in 61 distinct populations. Of the 61 populations, the total area occupied by the known populations, 44% are located within non-development LUDs and 56% are located within Development LUDs.</p> <p>Confidence in Rank call: High</p>	<ol style="list-style-type: none"> 1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database. 2. USFS. 2008. Tongass Land and Resource Management Plan. Publication R10-MB-603c, Ketchikan, AK. 3. Fulkerson, Justin. DRAFT Species Assessment for <i>Platanthera orbiculata</i>. ANHP 2015.
<p>2</p> <p>Distribution in surrounding geographic</p>	B	<p>Thirty-one occurrences are located on non-national forest land but within southeastern Alaska. The main distribution of this species in the surrounding geographic area is a significant distance from the Tongass population, with the distribution in southeastern British Columbia and northern Washington state (1). It occurs infrequently in southern BC, except it occurs rarely on the coast</p>	<ol style="list-style-type: none"> 1. Klinkenberg, Brian. (Editor) 2014. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British

<p>Species: <i>Platanthera orbiculata</i> (Pursh) Lindl. Lesser round-leaved orchid</p> <p>Global Rank: G5 State Rank: S3S4</p>		 <p>Photo taken from Dillman 2008</p>	
Criteria	Rank	Rationale	Literature Citations
area		<p>(2). A few isolated occurrences are located in northern BC and the extreme southeast corner of Yukon Territory. The closest occurrences in the surrounding geographic area are about 200 km away from the Tongass population.</p> <p>This species overall distribution in the Pacific Northwest and inner mountain west includes Idaho, Montana, Oregon, and Washington states (3).</p> <p>Confidence in Rank call: High</p>	<p>Columbia, Vancouver.</p> <p>2. Douglas, G., G. Straley, D. Meidinger, and J. Pojar (eds.). 1999. Illustrated Flora of British Columbia. British Columbia Ministry of Environment, Lands and Parks and Ministry of Forests.</p> <p>3. NatureServe 2014</p>
3 Dispersal Capability	B	<p>This species produces an abundance of tiny seeds which are generally thought to be dispersed by wind (1). Terrestrial orchids require an association with a mycorrhizal fungus for seed germination and plant establishment, and it is essential for successful development and competition of orchids in their natural environments (2). In germination experiments, few seeds of this species germinated in any of the treatments. It had the poorest germination success of the three species of <i>Platanthera</i> in the study, and the seeds germinated in association with only one species of fungus (3). This suggests that the ability of this species to disperse to other areas could be limited by the absence of a</p>	<p>1. Leshner, R. D. and Henderson, J. A. 1998. Management recommendations for large round-leaf orchid (<i>Platanthera orbiculata</i> [Pursh] Lindl.) USDA Forest Service and USDI Bureau of Land Management, Portland, OR.</p> <p>2. Currah, R. S., E. A. Smrecui, and S. Hambleton. 1990. Mycorrhizae and mycorrhizal fungi of boreal species of <i>Platanthera</i> and <i>Coeloglossum</i></p>

<p>Species: <i>Platanthera orbiculata</i> (Pursh) Lindl. Lesser round-leaved orchid</p> <p>Global Rank: G5 State Rank: S3S4</p>		 <p>Photo taken from Dillman 2008</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>specific mycorrhizal fungus.</p> <p>Confidence in Rank call: Medium</p>	<p>(Orchidaceae). Can. J. Bot. 68:1171-1181.</p> <p>3. Smreciu, E. A. and R. S. Currah. 1989. Symbiotic germination of seeds of terrestrial orchids of North America and Europe. Lindleyana 4(1):6-15.</p>
<p>4</p> <p>Abundance on Tongass</p>	B	<p>Database records show a total of 5,825 individuals of this species on the Tongass (1). Of the 269 occurrences on NF lands, 48 percent have 10 or fewer individuals, and 17 percent have only one individual. Thirteen occurrences (about 5 percent of the total) have greater than 100 individuals, with largest having 845 individuals.</p> <p>Confidence in Rank call: High</p>	<p>1. USFS Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
<p>5</p> <p>Population Trend on Tongass</p>	A	<p>In a pilot study, quantitative monitoring of population trend for this species has been implemented on Prince of Wales Island, where a large portion of occurrences on the Tongass is located. Monitoring of sample plots was initiated in 2011, with annual re-measurements. Results indicate a statistically decrease in population density (individuals/ha) of 42 percent between 2011</p>	<p>1. USFS. 2013. Tongass National Forest FY2012 monitoring and evaluation report.</p> <p>2. USFS. 2014. Tongass National Forest FY2013 monitoring and evaluation report.</p>

Species: *Platanthera orbiculata* (Pursh) Lindl. Lesser round-leaved orchid

Global Rank: G5 State Rank: S3S4



Photo taken from Dillman 2008

Criteria	Rank	Rationale	Literature Citations
		<p>and 2012, and a further decrease of 26 percent between 2012 and 2013, for an overall decrease of 57 percent in the two-year monitoring period (1, 2). <u>The cause of this decrease is not known.</u> It could be related to the natural periodic dormancy of this species in response to climate variation. Substantial numbers of individuals can become dormant for one or more years, and then continue growth in subsequent years (3). At least one monitoring plot was directly impacted by timber harvest activities (1). Although the time period currently covered by this monitoring is only three years, the severity of the downward trend (loss of over half the population density) is a potential cause for concern for about the long-term persistence of this species. That said, the three year monitoring period does not sufficiently address this species' natural dormancy periods and therefore it is likely premature to draw any final conclusions related to concern for persistence over the long term.</p> <p>Confidence in Rank call: Low</p>	<p>3. Hornbeck, J., C. Sieg, D. Reyer, and D. Bacon. 2003. Conservation assessment for the large round-leaved orchid in the Black Hills National Forest, South Dakota and Wyoming. USDA Forest Service, Rocky Mountain Region, Black Hills National Forest, Custer, SD.</p>
<p>6 Habitat Trend</p>	<p>A</p>	<p>The general habitat of this species is damp rich humus in the deep shade of heavily forested areas (1). Its distribution on the Tongass appears to be strongly correlated with the warmer mean annual</p>	<p>1. Luer, C. A. 1975. The Native Orchids of the United States and Canada excluding Florida. New York</p>

Species: *Platanthera orbiculata* (Pursh) Lindl. Lesser round-leaved orchid

Global Rank: G5 State Rank: S3S4



Photo taken from Dillman 2008

Criteria	Rank	Rationale	Literature Citations
on Tongass		<p>temperatures of the southern portion of the Tongass (2). <u>Primary habitat for this species on the Tongass includes low-elevation, mature to old-growth hemlock forests, often with a western red cedar component</u> (3). It often occurs near edges or gaps in otherwise shady forests, usually adjacent to non-forested muskegs or open water. Slopes are low to moderately steep, and soils are generally mesic with a deep humus layer. The understory vegetation is relatively sparse, with substantial litter and/or moss ground cover (3).</p> <p>Forest stands where the species is found are often suitable for timber production (3). Of the 61 populations, the total area occupied by the known populations, 44% are located within non-development LUDs and 56% are located within Development LUDs. Substantial timber harvest and road construction has occurred in the past within the general range of this species on the Tongass within the Development LUDs. This has likely resulted in a long-term downward trend in habitat quantity and quality of habitat, including fragmentation into smaller and more isolated parcels.</p>	<p>Botanical Garden.</p> <p>2. Turner, R. 2012. Habitat suitability models for five sensitive vascular plant and lichen species on the Tongass National Forest. Unpublished report (In Review), USDA Forest Service, Tongass National Forest.</p> <p>3. Dillman, K. 2008. Conservation Assessment for the Large Round-leaved Orchid (<i>Platanthera orbiculata</i> (Pursh.) Lindl.) on the Tongass National Forest. Unpublished report. U.S. Forest Service, Tongass National Forest.</p> <p>4. Fulkerson, Justin. 2015. <i>Platanthera orbiculata</i> mapped populations overlay with TNF LUDs.</p>

Species: *Platanthera orbiculata* (Pursh) Lindl. Lesser round-leaved orchid

Global Rank: G5 State Rank: S3S4



Photo taken from Dillman 2008

Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: Medium	
7 Habitat Vulnerability or Modification or other threats	A	<p>Key threats to this species and its habitat on the Tongass include impacts from timber harvest and road construction (1). These activities can result in direct or indirect damage to individuals and long-term modification of habitat. Of the 61 populations 56% are located within Development LUDs that have been and continue to be planned for future timber harvest and road construction. However, current Forest Plan components under the PLANTS standards and guidelines (pg 4-41) provide for avoidance and protection of known occurrences when appropriate.</p> <p>Several large-scale harvests of mostly mature to old-growth timber are currently being planned within the range of this species within the Development LUDs. If implemented, these projects could impact <u>at most</u> 56% of the known populations of this species. Although Forest Plan standards and guidelines include recommendations for protection around known occurrences of sensitive and rare plant species, implementation of this protection is not a requirement (2). That said, recent NEPA analysis has provided for protection of several PLOR4 populations by buffering and avoiding populations during timber layout for</p>	<ol style="list-style-type: none"> 1. Dillman, K. 2008. Conservation Assessment for the Large Round-leaved Orchid (<i>Platanthera orbiculata</i> (Pursh.) Lindl.) on the Tongass National Forest. Unpublished report. U.S. Forest Service, Tongass National Forest. 2. USFS. 2008. Tongass Land and Resource Management Plan. Publication R10-MB-603c, Ketchikan, AK. 3. Swarts, N.D., & K.W. Dixon 2009. Terrestrial orchid conservation in the age of extinction. Ann Bot. 104(3): 543–556.3.Haufler, J.B., C.A. Mehl, and 4. Turner, R. 2012. Habitat suitability models for five sensitive vascular plant and lichen species on the Tongass National Forest. Unpublished report (In Review), USDA Forest Service,

Species: *Platanthera orbiculata* (Pursh) Lindl. Lesser round-leaved orchid

Global Rank: G5 State Rank: S3S4



Photo taken from Dillman 2008

Criteria	Rank	Rationale	Literature Citations
		<p>several timber sale areas currently being planned, illustrating an concerted effort to avoid and minimize impacts to populations from timber harvest and road construction (6).</p> <p>The remaining 44% of the known populations occur within Non-development LUDS of similar forest habitat and have limited potential threats related to TNF management actions. The Old Growth Conservation Strategy provides for large reserves of old-growth habitat, in particular within the Non-development LUDs, this resulting is conserving at least 40% of the known populations across the Forest.</p> <p>Periodic dormancy is a natural feature of this species’ life history; however, this could increase the risk of inadvertent impacts from management activities. Plants may be present in habitat but dormant and so might not be observed during field surveys in a particular year. If that habitat is then cleared for management activities, damage or loss of those individuals could result (1).</p> <p>Global climate change may be the most pervasive threat to future long-term persistence of rare orchids (3). Predicted climate changes for southeast Alaska include higher summer and winter</p>	<p>Tongass National Forest.</p> <p>5. Leshner, R. D. and Henderson, J. A. 1998. Management recommendations for large round-leaf orchid (<i>Platanthera orbiculata</i> [Pursh] Lindl.) USDA Forest Service and USDI Bureau of Land Management, Portland, OR.</p> <p>6. Krosse 2015. Pers. Comm. – Results of timber layout and road layout on known population of PLO4 within the Big Thorne and Saddle Lakes timber sale areas.</p>

Species: *Platanthera orbiculata* (Pursh) Lindl. Lesser round-leaved orchid

Global Rank: G5 State Rank: S3S4



Photo taken from Dillman 2008

Criteria	Rank	Rationale	Literature Citations
		<p>temperatures, increased length of growing seasons and frost free days, increased precipitation with more falling as rain rather than snow, increased evapotranspiration rates, and increased storm intensities (4). Increasing annual temperatures could theoretically expand the range of this species northward on the Tongass, since its distribution on the Tongass is strongly correlated with mean annual temperature (5). However, increasing temperatures alone may not necessarily convert currently unsuitable areas into habitat for this species. The other characteristics of this species' habitat, such as high-volume, old-growth trees, sparse understory vegetation, and deep soil humus layer with required fungal biota, require long-time scales to develop. Habitat with these characteristics may not migrate at the same rate as the change in temperature. In addition, other aspects of climate change, such as increasing precipitation, reduced winter snow cover, and increased storm severity, may negatively impact habitats. Fragmentation of habitat due to past and potential future management activities could also inhibit the ability of occurrences of this species to adapt or migrate, potentially resulting in local extinctions.</p> <p>This species may be subject to browsing or grazing by a number of herbivores. Suspected herbivores include mammals such as</p>	

Species: *Platanthera orbiculata* (Pursh) Lindl. Lesser round-leaved orchid

Global Rank: G5 State Rank: S3S4



Photo taken from Dillman 2008

Criteria	Rank	Rationale	Literature Citations
		<p>deer and elk, mollusks such as banana slugs, and various invertebrates (6). Continual heavy browsing of individuals could inhibit reproduction or increase mortality. The effects of herbivory on the Tongass population is currently not known.</p> <p>Some occurrences of this species are located in or near recreation areas, including along nature trails. These plants could potentially be vulnerable to collection or trampling by recreationists (1). However, this is likely only a minor threat, since the flowers are small and the plant can be difficult to see in its shady forest habitat.</p> <p>Confidence in Rank call: High</p>	
<p>8</p> <p>Life History and Demographics</p>		<p>Little is currently known about the pollinators of this species in Alaska and the Pacific Northwest (1). However, the complex flower structure indicates a high degree of pollinator specificity. Pollinator-limited seed production has been reported for several species of <i>Platanthera</i> (2). The rarity of this species across its range may be at least partially due to the rarity of its pollinators. Pollinators of the genus <i>Platanthera</i> in other regions of North America are nocturnal moths (3). A subfamily of noctuid moths is known from southeast Alaska (4).</p>	<ol style="list-style-type: none"> 1. Lesher, R. D. and Henderson, J. A. 1998. Management recommendations for large round-leaf orchid (<i>Platanthera orbiculata</i> [Pursh] Lindl.) USDA Forest Service and USDI Bureau of Land Management, Portland, OR. 2. Catling, P. M. and V. R. Catling. 1991. A synopsis of breeding systems and

Species: *Platanthera orbiculata* (Pursh) Lindl. Lesser round-leaved orchid

Global Rank: G5 State Rank: S3S4



Photo taken from Dillman 2008

Criteria	Rank	Rationale	Literature Citations
		<p>Terrestrial orchids require an association with a fungus for seed germination and plant establishment. These mycorrhizal associations consist of endophytic fungus that penetrates the cortical cells of the roots, and this association is essential for successful development and competition of orchids in their natural environments (5). This species produces an abundance of tiny seeds which are generally thought to be dispersed by wind (1). In germination experiments, few seeds of this species germinated in any of the treatments. It had the poorest germination success of the three species of <i>Platanthera</i> in the study, and the seeds germinated in association with only one species of fungus (6).</p> <p>The tuberous root system is regenerated annually, and this requires considerable energy which presumably is fueled by the carbohydrates produced by the single pair of leaves and contributed by the mycorrhizal fungus. Browsing or fungal infestation of leaves, or other loss of photosynthetic tissue, may impact the development of the underground structures and may result in decreased viability or vigor of the individual (1).</p>	<p>pollination in North American orchids. <i>Lindleyana</i> 6(4):187-210.</p> <p>3. Reddoch, A.H. and J.M. Reddoch. 1993. The species pair <i>Platanthera orbiculata</i> and <i>P. macrophylla</i> (Orchidaceae). <i>Lindleyana</i> 8(4):171-187.</p> <p>4. Dillman, K. 2008. Conservation Assessment for the Large Round-leaved Orchid (<i>Platanthera orbiculata</i> (Pursh.) Lindl.) on the Tongass National Forest. Unpublished report. U.S. Forest Service, Tongass National Forest.</p> <p>5. Currah, R. S., E. A. Smrecui, and S. Hambleton. 1990. Mycorrhizae and mycorrhizal fungi of boreal species of <i>Platanthera</i> and <i>Coeloglossum</i> (Orchidaceae). <i>Can. J. Bot.</i> 68:1171-1181.</p>

<p>Species: <i>Platanthera orbiculata</i> (Pursh) Lindl. Lesser round-leaved orchid</p> <p>Global Rank: G5 State Rank: S3S4</p>		 <p>Photo taken from Dillman 2008</p>	
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: High	
<p>Summary: There are currently 269 documented occurrences located at least partially on national forest land. Of the 61 populations mapped by the ANHP (2015), 44% occur within Non-development LUDs and 56% occur within Development LUDs. Substantial timber harvest and road construction has occurred in the past within the general range of this species on the Tongass within the Development LUDs. The O-G conservation strategy provides for large reserves of old-growth habitat, in particular within the Non-development LUDs; resulting in conserving at least 40% of the known populations across the Forest.</p> <p>A recent pilot monitoring of population trend for this species on Prince of Wales Island indicates an overall decrease in population density of 57 percent in the two-year monitoring period. The severity of the downward trend is a potential cause for concern about the long-term persistence of this species. However, an understanding of the natural range of variation due to inherent dormancy for this species is unknown. Thus, a complete understanding of the monitoring results is not currently possible.</p> <p>Key threats to this species and its habitat in the Development LUDs continue to be impacts from</p>			<p>Date: 11/7/2014</p>

<p>Species: <i>Platanthera orbiculata</i> (Pursh) Lindl. Lesser round-leaved orchid</p> <p>Global Rank: G5 State Rank: S3S4</p>		 <p>Photo taken from Dillman 2008</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>timber harvest and road construction. Several large-scale harvests of mostly mature to old-growth timber are currently being planned within the range of this species. If implemented, these projects could impact a substantial amount of habitat and occurrences. However, recent NEPA analysis has provided for protection of several PLOR4 populations by buffering and avoiding populations during timber layout for several timber sale areas currently being planned, illustrating a concerted effort to avoid and minimize impacts to populations from timber harvest and road construction.</p> <p>Predicted increase in average temperatures in southeast Alaska due to climate change could theoretically expand the range of this species northward on the Tongass. Fragmentation of habitat due to past and potential future management activities could also inhibit the ability of this species and its habitat to adapt or migrate. This species may be subject to browsing or grazing by a number of herbivores, but the effects of herbivory on the Tongass population is currently not known. Collection or trampling by recreationists is likely only a minor threat, since the flowers are small and the plant can be difficult to see in its shady forest habitat. The rarity of this species across its range may be at least partially due to the rarity of its pollinators.</p> <p>The conclusion for this species was initially based on its patchy distribution on a limited portion of the Tongass; disjunct location from the nearest main geographic distribution; restricted dispersal capability due to pollinator limitations and requirement for a specific mycorrhizal symbiont; possible downward trend in population density in one of the largest concentrations of occurrences on the Tongass; downward trend in quantity and quality of habitat due to past management activities within its current distribution on the Tongass; vulnerability of habitat due to climate change and</p>	

<p>Species: <i>Platanthera orbiculata</i> (Pursh) Lindl. Lesser round-leaved orchid</p> <p>Global Rank: G5 State Rank: S3S4</p>		 <p>Photo taken from Dillman 2008</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>management activities such as timber production and road construction; inadvertent impacts of management due to periodic dormancy; and poor germination success rate.</p> <p>Upon further evaluation of the TNF Old-growth conservation strategy and more recent information on the numbers of occurrences within the plan area, we conclude that with 44% of their population areas occurring within Non-development LUDs, combined with the on-gong and active implementation of Forest Plan components (2008) for avoiding and minimizing impacts to populations, that current science evidence does not indicate a substantial concern for the capability of lesser round-leaved orchid to persist over the long-term in the Tongass plan area. We recommend that this species be not considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Rick Turner with additions by Patti Krosse (March 2015)</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Kristen Lease and Brad Kriekhaus</p>	

<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg's holly fern</p> <p>Global Rank: G4 State Rank: S1</p>		 <p>Photo taken from USDA PLANTS database</p>	
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>A/D</p>	<p>Population status and trends are unknown, but suspected to be rare. Within Alaska, distribution of this plant is restricted to southeastern Alaska; only 9 known occurrence from two main locations on the Tongass N.F. Of these, 5 of them are on Gold Mountain on Cleveland Peninsula and the other 4 are above Red Bluff Bay on the eastern side of Baranof Island (1). There is incomplete information on the number of individual plants in each population, with the exception of one occurrence that cites 15 plants. The small number of total SE Alaska observations (about 9) suggests species is probably rare in the state, nearing the northern extent of this species range (there are more known locations north of the Tongass N.F. in British Columbia) (3). However, surveys have been limited.</p> <p>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. Because this species is highly associated with rock outcrops which are high in Mg and Fe (classified as "ultramafic), these formations naturally occur as isolated rock bodies in Southeast Alaska. As such, the distribution of the species is as isolated patches (2).</p>	<ol style="list-style-type: none"> 1. NRIS- TESP database (USFS 2014) 2. Gehrels & Berg (1992) 3. CPNWH database (2014)

			
<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg’s holly fern</p>			
<p>Global Rank: G4 State Rank: S1</p>		<div style="border: 1px solid black; padding: 2px; display: inline-block;"> Photo taken from USDA PLANTS database </div>	
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: Low	
<p style="text-align: center;">2</p> <p style="text-align: center;">Distribution in surrounding geographic area</p>	<p style="font-size: 24pt; font-weight: bold;">B</p>	<p>One known population within southeast Alaska, but on non-NFS lands on Annette Island in southern southeast Alaska. CPNWH cites 10 individual plants in this population (3).</p> <p>Elsewhere, outside the Alaska Region, distribution is greater, but limited, occurring as isolated patches, due to presence of ultramafic rock formations from northern California (where rock formation are more broadly distributed and contiguous in the California Coast Range) to just east of the Coast Range in BC (5, 6, 7). The main distribution is a significant distance from the Tongass N.F. According to the Consortium of the Pacific Northwest Herbaria the nearest known location for <i>P. kruckebergii</i> outside Alaska is east of the Coast Range in the Cassiar Mountains of BC (3).</p> <p>118 specimens are documented in CPNWH from Northern British Columbia, south in the Cascades, Sierra Nevada Mountains in California, and in the Rockies, centered on Idaho (8). Rare in the mountains of northern California (7).</p> <p>The fern is of S2/S3 -Special Concern (Blue-listed) in British Columbia</p>	<p>3. CPNWH database (2014)</p> <p>4. PLANTS database (2014)</p> <p>5. NatureServe (2014)</p> <p>6. B.C. Conservation Data Centre. (2014).</p> <p>7. Calflora 2014. http://www.calflora.org/</p> <p>8. Wagner 1993</p>

<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg's holly fern</p> <p>Global Rank: G4 State Rank: S1</p>			
			
		<p>Photo taken from USDA PLANTS database</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>(6). Taxa of Special Concern have characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Blue-listed taxa are at risk, but are not Extirpated, Endangered or Threatened.</p> <p>NatureServe identifies this plant as S1 in Alaska, MT and UT; S2 in BC and ID; S3 is CA and S4 is OR. Not ranked in WA or NV. Only know from Western North America (PNW endemic). Ranked globally G4 in 2011 (5).</p> <p>Confidence in Rank call: High</p>	
<p>3</p> <p>Dispersal Capability</p>	<p>B</p>	<p>Disperses via spores, through wind and water. Appears to germinate only in suitable habitat (i.e. ultramafic rock types).</p> <p>In mid-summer releases spores; most are shed in the vicinity of the plant, although some may be dispersed via wind and some dispersed by animals. Spores will only germinate and grow to mature plants in appropriate habitat.</p> <p>Confidence in Rank call: Medium</p>	<p>9. Peck et al. (1990)</p>

<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg's holly fern</p> <p>Global Rank: G4 State Rank: S1</p>		 <p>Photo taken from USDA PLANTS database</p>	
Criteria	Rank	Rationale	Literature Citations
<p>4</p> <p>Abundance on Tongass</p>	<p>A/D</p>	<p>The Tongass is nearing the northern edge of this species range, with only 9 occurrences from 2 locations noted in the planning area. The species appears to be rare to common in remainder of range. Surveys have not been conducted on most of the ultramafic outcrops; therefore insufficient information exists to draw conclusions on abundance.</p> <p>Based on current survey data, abundance on the Tongass appears to be rare, where current abundance is low enough that stochastic and other factors could lead to potential imperilment.</p> <p>Confidence in Rank call: Low</p>	
<p>5</p> <p>Population Trend on Tongass</p>	<p>D</p>	<p>Insufficient information to draw inferences about criterion. No monitoring has been conducted.</p> <p>Confidence in Rank call: High</p>	
<p>6</p> <p>Habitat Trend on Tongass</p>	<p>B</p>	<p>Habitat is comprised of rock outcrops of ultramafic rock formations (high in Mg and Fe). On South Baranof Island and Cleveland Peninsula, these areas in in high elevation, alpine areas. Habitat is typically non-forested. Habitat on Annette Island (non-NFS lands) is not alpine, nor is it forested, indicating elevation is not an environmental constraint</p>	<p>2. Gehrels & Berg (1992) 10. Tongass GIS layers (2014)</p>

<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg’s holly fern</p>  <p>Global Rank: G4 State Rank: S1</p> <p style="border: 1px solid black; padding: 2px; display: inline-block;">Photo taken from USDA PLANTS database</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>regarding habitat type.</p> <p>About 25 mafic/ultramafic bodies are known in southeastern Alaska. Most of these small rock outcrops are located between the Klukwan/Haines and Duke Island. There is no indication that the habitat for <i>P.kruckebergii</i> is decreasing to any significant level, even considering the existence of one minerals claim area on Duke Island. Therefore, there is relatively stable amounts of suitable or potential habitat and relatively unchanged habitat quality.</p> <p>Confidence in Rank call: Medium</p>	
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>C</p>	<p>Populations and habitat on South Baranof Island are within the South Baranof Wilderness area. Some possible threats include telecommunication site development and minerals development. Impacts to populations would be avoided with project mitigation measures.</p> <p>Populations on Cleveland Peninsula are within Timber Management LUD, albeit Phase 3 (2008 Forest Plan) and within mapped roadless areas. Phase 3 timber harvest is unlikely in the near term since Phase I and II areas would be harvested first (11). Currently, we are in the Phase I level of timber harvest. According to current the 2012 Roadless Rule preamble, only “valid” mineral claims (e.g. identified on Tongass</p>	<p>11. Tongass Forest Plan (2008)</p> <p>12. 2012 Roadless Rule</p> <p>13. Matt Reese, Personal communication (2014)</p>

<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg's holly fern</p> <p>Global Rank: G4 State Rank: S1</p>	 <p style="font-size: small; border: 1px solid black; padding: 2px; display: inline-block;">Photo taken from USDA PLANTS database</p>
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Criteria	Rank	Rationale	Literature Citations
		<p>Locatable Minerals data layer) are permitted for development and those that currently are not in development cannot include road construction for access (12). Existing mining claims and associated roads do not fall under this constraint. Kane peak has a minerals claim identified, however no surveys have currently taken place there.</p> <p>According to Tongass Geology and Mineral specialists (13) no minerals activities are currently being planned in the areas where this species is known in the plan area. Several commercial minerals could potentially occur, including nickel, gold, silver, zinc, etc. The method of extraction would likely depend on how far below the surface the minerals are located.</p> <p>Climate change may be a stressor to this species. However current survey data suggest wide amplitude in elevation gradients associated with occurrence (50 to 2000 feet elevation), coupled with wider distribution in the Pacific Northwest indicated that warming trends may increase species range in Alaska.</p> <p>Therefore, habitat is resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors are not significant. No major threats to this species are apparent at this time due</p>	

			
<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg's holly fern</p>			
<p>Global Rank: G4 State Rank: S1</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>to Forest Plan plant protection measures (PLANTS Standards and Guidelines). Some habitat modification has occurred from minerals exploration and telecommunication sites, with conditions departed from NRV. However, new disturbance are assumed to be minimal.</p> <p>Confidence in Rank call: Medium</p>	
<p>8</p> <p>Life History and Demographics</p>	<p>D</p>	<p>Insufficient information to draw inferences about criterion.</p> <p>Confidence in Rank call: High</p>	
<p>Summary: Southeast Alaska is approaching the northern edge of the range for the Kruckeberg's holly fern and this species has been identified only in nine sites within two main locations on the Tongass. Due to the paucity of information on this species distribution and abundance, its status within the Tongass plan area is difficult to assess. The habitat known to be used by this species elsewhere and where it is known to occur in the plan area is a somewhat rare geologic type relative to other geologies on the Tongass N.F. Occurrences of ultramafic terrains on the Tongass are isolated and include only 25 small areas. Much of the habitat is not forested, so stressors due to timber and road construction are not a concern. The only major management stressor is current and potential mining claims areas and telecommunications sites. The Roadless Rule and current Land Use Designations (known occurrences are in wilderness areas) provide for much of the protection measures to conclude that some habitat modification has occurred from minerals exploration and telecommunication sites;</p>			<p>Date: November 14, 2014</p>

<p>Species: <i>Polystichum kruckebergii</i> W. Wagner Kruckeberg's holly fern</p> <p>Global Rank: G4 State Rank: S1</p>		 <p>Photo taken from USDA PLANTS database</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>however, new disturbances are assumed to be minimal. Climate change scenarios likely will result in increased range as long as the habitat exists (i.e. ultramafic rock types).</p> <p>There is some disagreement among botanists and ecologists to the final evaluation of this species. With the uncertainty of potential mining claims in this rock type that is highly affiliated with mineral extraction, the threat to mining impacts is real. Because of the unknown nature of how mining claims are staked and the process for doing so is constantly changing, many botanist believe a conservative approach to this species is warranted.</p> <p>However, given the relative lack of management stressors as well as insufficient scientific information available for this species to conclude there is a substantial concern for the capability the Kruckeberg's holly fern to persist over the long-term in the Tongass plan area, we recommend that the Kruckeberg's holly fern not be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Patti Krosse</p> <p>Review Team: Mary Stensvold, Karen Dillman, Brad Kriekhaus and Rick Turner</p>	

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<p>Species: <i>Ricasolia amplissima</i> (Scop) DeNot. No common name. [NO PHOTO]</p> <p>Global Rank: NGR State Rank: S2S3</p>			
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	B	<p>R10 Sensitive. Populations patchy or gaps, beach fringe broadly exists across the planning area, but with gaps in the distribution of this lichen. It prefers beaches with exposure to open ocean and fog.</p> <p>Locations: On the Tongass, there are 35 populations, from the S. Tongass to central Tongass near Petersburg, and a disjunct population in Yakutat (1, 2). It has not been found on Hoonah, Admiralty or Juneau RDs, but is known from all other districts. Many of the Tongass locations contain one tree with one lichen thalli, while others have several to many trees with abundant thalli covering the bole and branches. It was first reported in the literature (3) from Baranof Island. However, it was first discovered in Alaska by Chiska Derr, Tongass ecologist in the early 1990's on a small island in Frederick Sound, but never published.</p> <p>The 35 locations on the Tongass are the green algal morph, which is large and not cryptic. The cyanomorph (the fungus with a cyanobacterium partner) of this lichen can either be attached to the green algal form (never seen in AK), or be free-living. This free-living form is more cryptic called <i>Dendriscocaulon</i>, and the identity of the samples collected can more confidently be determined by molecular techniques. Several other species also make this shrubby form with the cyanobacterim partner, so one is never certain if it is <i>Ricasolia amplissima</i> or a <i>Dendriscosticta</i> s.stricta. unless it is physically attached (3, 4). The two forms (green algal and cyanobacterium) of <i>Ricasolia</i> have not been found growing physically together in the Alaska collections.</p>	<ol style="list-style-type: none"> 1. USDA FS National Lichens and Air Quality Database and Clearinghouse, 2. USDA Forest Service NRIS-TESP 3. Tonsberg & Goward 2001 4. McCune & Geiser 2009 5. Dillman 2004, 2010

<p>Species: <i>Ricasolia amplissima</i> (Scop) DeNot. No common name. [NO PHOTO]</p> <p>Global Rank: NGR State Rank: S2S3</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>Botanical surveys do include this lichen in its preferred habitat since 2009. This is not a cryptic species. Over 600 lichen surveys and 2750 botanical surveys on Tongass have documented most of the locations. Additional locations were documented by Dillman 2004.</p> <p>Confidence in Rank: High</p>	
<p>2</p> <p>Distribution in surrounding geographic area</p>	B	<p>Currently R10 Sensitive. Global rank: No global rank State Rank: S2/S3. The range of this lichen in NA is from Alaska, BC, and disjunct to CA. It also is known from Europe in certain areas of high humidity and hardwood forests (6).</p> <p>The BC populations are the cyanomorphs (described above), with no green algal morphs known. The CA sample is from one location, and it includes the cyanomorph and green algal form growing together. Alaska is the only location in NA where the green algal form is found abundance.</p> <p>British Columbia has several lichenologists and many lichen surveys, particularly the Haida Gwaii area, where this lichen has not been found. California has an active Lichen Society and many lichenologists. OR and WA are full of lichenologists and thousands of lichen surveys, this lichen has not been detected.</p> <p>Confidence in Rank: High.</p>	<p>6. Purvis et al 1992 3. Tonsberg & Goward 2001 4. McCune & Geiser 2009 1. USDA FS National Lichens and Air Quality Database and Clearinghouse</p>

<p>Species: <i>Ricasolia amplissima</i> (Scop) DeNot. No common name. [NO PHOTO]</p> <p>Global Rank: NGR State Rank: S2S3</p>			
Criteria	Rank	Rationale	Literature Citations
3 Dispersal Capability	B	<p>This lichen reproduces by spores, and the spores can travel with the wind to other locations close by. This is assumed because some very exposed places have numerous trees with this lichen.</p> <p>However, few apothecia have been found on the Alaska material. Attempts have been made in the past to locate spores from some of the herbarium samples, but none have been found in the apothecia dissected.</p> <p>Habitats can be very isolated, with large stretches of beach fringe of preferred habitat without the presence of this lichen. Therefore, it is assumed that it is not a good disperser for long distances, but could within a short distance.</p> <p>Confidence in Rank call: High</p>	
4 Abundance on Tongass	A	<p>35 occurrences with estimated. 300-400 individual thalli on the Tongass. Not all thalli have been individually counted.</p> <p>Confidence in Rank call: Medium - High</p>	1. USDA Forest Service databases
5 Population Trend on Tongass	B	<p>Populations are mainly in wilderness areas which are considered protected and relatively stable. Natural alteration of habitat at the beach fringe is wind and storm surges. One population at Coronation Island is threatened due to the unraveling of the beach fringe due to roots being undermined by waves, and then the trees blow over. This could occur in many of the locations as the exposed beach fringes are susceptible to blowdown. The non-wilderness locations include Kadin Island (RNA), Cooney Cove (proposed LTF site), and the Yamani island site discovered by Tor Tonsberg. These populations</p>	7. USDA FS 2008.

<p>Species: <i>Ricasolia amplissima</i> (Scop) DeNot. No common name. [NO PHOTO]</p> <p>Global Rank: NGR State Rank: S2S3</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>are assumed to be stable. The Cooney Cove site could incur human disturbance in the future.</p> <p>Beach fringe habitat is excluded from large scale timber harvest (7). It is assumed that the locations are also stable due to this protection.</p> <p>Confidence in Rank call: High</p>	
6 Habitat Trend on Tongass	B	<p>Assumed to be stable (7)</p> <p>Confidence in Rank call: High</p>	7. USDA Forest Service 2008.
7 Habitat Vulnerability or Modification or other threats	C	<p>Habitat resilient, changes are similar in frequency and intensity to those expected from natural variation (i.e. blow down, wave action), and modern stressors are not significant.</p> <p>However, there is the additional possibility of human- caused threats that include communication tower lines running from terrestrial habitats to the ocean, crossing the beach fringe, and thinning or other harvesting such as free-use trees from the beach fringe. Large scale harvest is not planned in this habitat but unscheduled salvage logging is. No projects are known to be planned at this time where this lichen is found (7).</p> <p>Confidence in Rank call: High</p>	7. USDA FS 2008

<p>Species: <i>Ricasolia amplissima</i> (Scop) DeNot. No common name. [NO PHOTO]</p> <p>Global Rank: NGR State Rank: S2S3</p>			
Criteria	Rank	Rationale	Literature Citations
<p>8</p> <p>Life History and Demographics</p>	B	<p>Perennial. Fungal partner reproduces by spores. Photobiont in the genus <i>Lobaria</i> are <i>Myrmecia</i> or <i>Trebouxia</i> and the Cyanobacterium <i>Nostoc</i> or <i>Scytonema</i> (6). Recent molecular work has put this lichen in the genus <i>Ricasolia</i> from <i>Lobaria</i>. (8). Assumed to have a low reproductive rate. Propagules may travel with invertebrates, wind, or birds. Most of the Alaska populations are not fertile, meaning very few apothecia were found. (5).</p> <p>Confidence in Rank call High</p>	<p>8. Moncada et al 2013. 5. Dillman 2010. 6. Purvis 1992.</p>
<p>Summary: Since this lichen was placed in the R10 sensitive list, more populations have been discovered (roughly 15 new locations). Although salvage and free-use cutting can occur on the beach fringe, the habitat is protected at this time from large scale timber harvest. Close to 75% of the populations are in wilderness and considered protected from management actions. The habitat is resilient but specialized (exposed beach fringe) and large amounts of beach forest is available on the Tongass for colonization. Dispersal is limited, but evidence shows it can disperse locally, occurring on more than one tree in a location. This provides some protection from stochastic events such as windthrow due to beach erosion.</p> <p>It is important to mention here that this species represents close to 100% of the North American populations of the green algal form of this lichen. Therefore the persistence of this lichen on the Tongass National Forest is important for this species globally, as well as nationally. If the Tongass National Forest Plan Amendment changes management direction for beach fringe buffer timber management, such as logging in beach fringe, then this lichen will need to be reevaluated. It is not known to occur in interior forests of the planning area.</p>			<p>Date: November 5, 2014</p>

Species: <i>Ricasolia amplissima</i> (Scop) DeNot. No common name. [NO PHOTO]			
Global Rank: NGR State Rank: S2S3			
Criteria	Rank	Rationale	Literature Citations
<p>We conclude that current science evidence does not indicate a substantial concern for the capability of the lichen <i>Ricasolia amplissima</i> to persist over the long-term in the Tongass plan area. We do not recommend that <i>Ricasolia amplissima</i> be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Karen L. Dillman, Ecologist, Tongass National Forest with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Brad Kriekhaus and Rick Turner</p>			

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<p>Species: Unalaska mist-maid (<i>Romanzoffia unalascensis</i> Cham.)</p> <p>Global Rank: G3 State Rank: S3S4</p>			
			
<p>Photo taken from USDA 2002</p>			
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	B	<p>Two occurrences are located on the Tongass. These occurrences are located approximately 1 km apart on Bald Mountain on Heceta Island (1), which is in a non-development land-use designation (LUD) on the Tongass.</p> <p>The plant grows in gravelly areas along streams, and on ledges and crevices in rock outcrops, often along the coast (1). This habitat has a patchy distribution across the Tongass.</p> <p>Confidence in Rank call: Medium</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
<p>2</p> <p>Distribution in surrounding geographic area</p>	A	<p>This species is endemic to Alaska and populations are distributed sporadically from the eastern Aleutians across the south coast to southeastern Alaska, where the eastern edge of the plant's range is in the Tongass National Forest (1). Twenty-three occurrences are located from Kodiak Island west to the Aleutians. Two occurrences are located on the Chugach National Forest at Cape St. Elias on Kayak Island and at Hawkens Creek on Hawkens Island. The closest occurrence to The Tongass is located in the Grindle Hills near Bering Glacier in Wrangell-St. Elias National Park.</p>	<p>1. USFS. 2009. Alaska Region sensitive species list: assessment and proposed revisions to the 2002 List. Unpublished report, USDA Forest Service, Alaska Region, Juneau, AK.</p> <p>2. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>

			
<p>Species: Unalaska mist-maid (<i>Romanzoffia unalascensis</i> Cham.)</p> <p>Global Rank: G3 State Rank: S3S4</p>		<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">Photo taken from USDA 2002</div>	
Criteria	Rank	Rationale	Literature Citations
		Confidence in Rank call: High	
3 Dispersal Capability	D	<p>Little is known about the dispersal capability of this species.</p> <p>Confidence in Rank call: High</p>	<p>1. Goldstein, M., D. Martin, and M. Stensvold. 2009. Alaska Region sensitive species list: assessment and proposed revisions to the 2002 List. Unpublished report, USDA Forest Service, Alaska Region, Juneau, AK.</p>
4 Abundance on Tongass	A	<p>The two occurrences on Heceta Island consist of 65 individuals occupying relatively small areas on Bald Mountain (1). The low number of individuals and area of distribution of occurrences increases the risk of imperilment due to stochastic or environmental factors.</p> <p>Confidence in Rank call: High</p>	<p>1. USFS Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>

Species: Unalaska mist-maid (*Romanzoffia unalascensis* Cham.)



Global Rank: G3 State Rank: S3S4

Photo taken from USDA 2002

Criteria	Rank	Rationale	Literature Citations
5 Population Trend on Tongass	A	Two occurrences on Bald Mountain were recorded in 2010 but have not been revisited (1). An occurrence documented in 1982 on Baranof Island near Sitka was apparently destroyed by road construction (2). The loss of the Baranof Island population is a reasonable cause for concern for a suspected downward population trend. Confidence in Rank call: Medium	1. USFS Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database. 2. Goldstein, M., D. Martin, and M. Stensvold. 2009. Alaska Region sensitive species list: assessment and proposed revisions to the 2002 List. Unpublished report, USDA Forest Service, Alaska Region, Juneau, AK.
6 Habitat Trend on Tongass	B	Streams, coastal ledges, and rock outcrops are generally not subject to human disturbance, so the quantity and quality of suitable habitat is likely to be stable. Confidence in Rank call: Medium	
7 Habitat Vulnerability or	B	There is a potential for decline in habitat quality and quantity due to road construction, hydroelectric projects, minerals activities, stream restoration projects, and fisheries projects (1). These activities are subject to review and implementation of forest-wide standards and guidelines and BMPs which are may mitigate any	1. Goldstein, M., D. Martin, and M. Stensvold. 2009. Alaska Region sensitive species list: assessment and proposed revisions to the 2002 List. Unpublished report, USDA Forest

			
<p>Species: Unalaska mist-maid (<i>Romanzoffia unalascensis</i> Cham.)</p> <p>Global Rank: G3 State Rank: S3S4</p>			
<div style="border: 1px solid black; padding: 2px; display: inline-block;">Photo taken from USDA 2002</div>			
Criteria	Rank	Rationale	Literature Citations
Modification or other threats		negative effects to these management stressors. Confidence in Rank call: Medium	Service, Alaska Region, Juneau, AK.
8 Life History and Demographics	D	Little is known about the life history and demographics of this species (1). Confidence in Rank call: High	1. Goldstein, M., D. Martin, and M. Stensvold. 2009. Alaska Region sensitive species list: assessment and proposed revisions to the 2002 List. Unpublished report, USDA Forest Service, Alaska Region, Juneau, AK.
<p>Summary: Two occurrences of Unalaska mist-maid are located on the Tongass. These occurrences are located approximately 1 km apart on Bald Mountain on Heceta Island, which is in a non-development LUD. This species grows in gravelly areas along streams, and on ledges and crevices in rock outcrops, often along the coast. This habitat has a patchy distribution across the Tongass, but is abundant overall. This species is endemic to Alaska and populations are distributed sporadically from the eastern Aleutians across the south coast to southeastern Alaska, where the eastern edge of the plant's range is in the Tongass National Forest. The closest occurrence to The Tongass is located in the Grindle Hills near Bering Glacier in Wrangell-St. Elias National Park. Little is known about the dispersal capability of this species. The two occurrences on the Tongass consist of 65 individuals occupying relatively small areas the summit of Bald Mountain. The low number of individuals and</p>			<p>Date: 11/7/2014</p>

<p>Species: Unalaska mist-maid (<i>Romanzoffia unalascensis</i> Cham.)</p> <p>Global Rank: G3 State Rank: S3S4</p>	 <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;"> <p>Photo taken from USDA 2002</p> </div>
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Criteria	Rank	Rationale	Literature Citations
		<p>area of distribution of occurrences increases the risk of imperilment due to stochastic or environmental factors</p> <p>A documented occurrence on Baranof Island was apparently destroyed by road construction. The loss of the Baranof Island population is a reasonable cause for concern for a suspected downward population trend. Streams, coastal ledges, and rock outcrops are generally not subject to human disturbance, so the quantity and quality of suitable habitat is likely to be stable. However, there is a potential for decline in habitat quality and quantity due to road construction, hydroelectric projects, minerals activities, stream restoration projects, and fisheries projects. Little is known about the life history and demographics of this species.</p> <p>This conclusion for this species is based on its low number and limited distribution of occurrences on the Tongass; disjunct location by a significant distance from the nearest geographic distribution outside the Tongass; low abundance which could lead to potential imperilment due to stochastic and environmental factors; reasonable concern for a downward population trend leading to imperilment; and vulnerability of habitat to decline in quantity and quality due to road construction, hydroelectric projects, minerals activities, stream restoration projects, and fisheries projects.</p> <p>We conclude that current science evidence indicates a substantial concern for the capability of Unalaska mist-maid to persist over the long-term in the Tongass plan area. We recommend that this species be considered as a Species of Conservation Concern.</p>	

<p>Species: Unalaska mist-maid (<i>Romanzoffia unalascensis</i> Cham.)</p> <p>Global Rank: G3 State Rank: S3S4</p>			<div data-bbox="1041 483 1339 548" style="border: 1px solid black; padding: 2px; width: fit-content; margin: auto;"> Photo taken from USDA 2002 </div>
Criteria	Rank	Rationale	Literature Citations
<p>Initial Evaluator(s): Rick Turner with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Brad Krieckhaus</p>			

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson’s checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>		 <p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>A</p>	<p>One population of three plants is known at Howard Bay on the southern Chilkat Peninsula (1). This is the only known occurrence of this plant in Alaska (2). In 2013 the site was revisited and the plant was not re-located. This occurrence is located in a non-development land-use designation (LUD) on the Tongass.</p> <p>Potential habitat for this species includes wet meadows, estuaries, and tidal flats in the lowland zone (3). The population at Howard Bay is located near an upper intertidal area above mean high water in a grassland at the edge of hemlock and spruce forest (4). This habitat is distributed throughout the Tongass as isolated patches, usually at the mouth of large streams and rivers.</p> <p>Confidence in Rank call: High</p>	<ol style="list-style-type: none"> 1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database. 2. Gisler and Love. 2005. Henderson’s checkermallow: the natural, botanical, and conservation history of a rare estuarine species. <i>Kalmiopsis</i>, Vol. 12. Native Plant Society of Oregon. 3. Douglas, G., G. Straley, D. Meidinger, and J. Pojar (eds.). 1999. Illustrated Flora of British Columbia, Vol. 3: Dicotyledons (Diapensiaceae through Onagraceae). Victoria, British Columbia: British Columbia Ministry of Environment, Lands and Parks and Ministry of Forests. 4. Tongass NF Cover Type and Intertidal GIS layers.

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson's checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>		 <p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
<p>2</p> <p>Distribution in surrounding geographic area</p>	A	<p>Occurrences are distributed sporadically along the Pacific coast from Douglas County, Oregon northward to Vancouver Island, British Columbia (1). Only a few populations are reported from Oregon and British Columbia. The bulk of the populations are centered along the Washington coastline, including the inner Puget Sound region (2). The main distribution is disjunct by 1200 km from the Tongass.</p> <p>Confidence in Rank call: High</p>	<ol style="list-style-type: none"> 1. USFWS. 2006. Ninety-day finding on a petition to list <i>Sidalcea hendersonii</i> (Henderson's checkermallow) as threatened or endangered. Federal Register 71(32): 8252-8257. 2. NatureServe Explorer. 2014. http://explorer.natureserve.org/servlet/NatureServe?searchName=Sidalcea+hendersonii
<p>3</p> <p>Dispersal Capability</p>	B	<p>The plant can reproduce vegetatively by rhizomes and produces seeds that drop near the parent plant (1). Seeds are about 4 mm long, and each flower produces 5-10 seeds (2). Successful dispersal from small populations is likely to be limited due to the relatively low number of seeds produced per plant and the long distances between suitable habitat patches.</p> <p>Confidence in Rank call: Medium</p>	<ol style="list-style-type: none"> 1. USFWS. 2006. Ninety-day finding on a petition to list <i>Sidalcea hendersonii</i> (Henderson's checkermallow) as threatened or endangered. Federal Register 71(32): 8252-8257. 2. Douglas, G., G. Straley, D. Meidinger, and J. Pojar (eds.). 1999. Illustrated Flora of British Columbia, Vol. 3: Dicotyledons (Diapensiaceae through Onagraceae). Victoria, British Columbia: British Columbia Ministry of Environment, Lands and Parks and Ministry of Forests.

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson’s checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>		 <p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
<p>4</p> <p>Abundance on Tongass</p>	<p>A</p>	<p>One population consisting of three individuals is known to occur on the Tongass (1). Abundance is low enough that there is a high risk of potential imperilment due stochastic and environmental factors.</p> <p>Confidence in Rank call: High</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
<p>5</p> <p>Population Trend on Tongass</p>	<p>A</p>	<p>The Tongass population was initially found in 2003, and revisited in 2005 (1). Two individuals were recorded in 2003, and the plant count in 2005 was three individuals. The new individual was located among the first two plants seen and was probably overlooked due to being in a non-flowering state and in amongst dense vegetation (2). During the 2012 visit, the individuals could not be relocated (3). The inability to relocate the population is a reasonable cause for concern that a downward trend leading to imperilment or extinction could be occurring. Additional surveys are planned in 2014 to confirm the presence or absence of the species in the planning area.</p> <p>Confidence in Rank call: Medium</p>	<p>1. USFWS. 2006. Endangered and threatened wildlife and plants: ninety-day finding on a petition to list <i>Sidalcea hendersonii</i> (Henderson’s checkermallow) as threatened or endangered. Federal Register 71:32 (16 February 2006): pp. 8252-8257.</p> <p>2. Stensvold, M. C. and E. Anderson. 2005. Unpublished report. Henderson’s checkerbloom (<i>Sidalcea hendersonii</i>) newly discovered in Alaska. USDA Forest Service, Alaska Region.</p> <p>3. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>

		 <p>© G.A. Cooper</p>	
<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson's checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>		<p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
6 Habitat Trend on Tongass	B	<p>There is no apparent evidence of destruction or modification of habitat occurring in the immediate vicinity of the population at Howard Bay (1). The quantity and quality of estuarine habitats on the Tongass is generally considered to have remained stable over time. However, some damage of beach meadow habitat due to recreational activities such as ATV use has occurred on the Tongass. Some long-term changes in habitat have also likely occurred through natural processes such as sediment deposition, erosion, tectonic uplift, and vegetation succession.</p> <p>Confidence in Rank call: Medium</p>	<p>1. USFWS. 2006. Endangered and threatened wildlife and plants: ninety-day finding on a petition to list <i>Sidalcea hendersonii</i> (Henderson's checkermallow) as threatened or endangered. Federal Register 71:32 (16 February 2006): pp. 8252-8257.</p>
7 Habitat Vulnerability or Modification or other threats	B	<p>Forest Plan standards and guidelines currently restrict timber harvest in the Beach and Estuary Fringe (1). The habitat may be susceptible to water/marine pollution from mining, road construction, or sewage discharge, but it is not clear how it would affect this species (2), nor the degree to which these stressors would occur. Invasive weeds could pose a threat to populations and habitat (3). However no invasive weeds are currently documented in the immediate vicinity of the population in Howard Bay. Habitat near the population is apparently undergoing natural succession from coastal wet meadow to forest. Spruce saplings directly adjacent to the population are growing rapidly, which could negatively impact habitat quality for</p>	<p>1. USFS. 2008. Tongass Land and Resource Management Plan Final Environmental Impact Statement, Plan Amendment. Publication R10-MB-603c, Ketchikan, AK.</p> <p>2. NatureServe Explorer. 2014. http://explorer.natureserve.org/servlet/NatureServe?searchName=Sidalcea+hendersonii</p> <p>3. USFWS. 2006. Endangered and threatened wildlife and plants: ninety-</p>

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson’s checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>		 <p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>this shade-intolerant species (4).</p> <p>Increased recreational use has resulted in habitat damage of upper beach meadows on the Tongass, which could pose a risk affecting the persistence of this species (5). Isostatic rebound and tectonic uplift may result in this and other estuaries succeeding into forests over the long-term. The ability of this species to persist may depend upon its ability to either migrate as habitat moves seaward, or colonize other suitable habitats. Because this plant is large and the flowers are showy, it is vulnerable to flower pickers, plant collectors, and people who dig wild plants for transplanting (5).</p> <p>Confidence in Rank call: Medium</p>	<p>day finding on a petition to list <i>Sidalcea hendersonii</i> (Henderson’s checkermallow) as threatened or endangered. Federal Register 71:32 (16 February 2006): pp. 8252-8257.</p> <p>4. Stensvold, M. C. and E. Anderson. 2005. Unpublished report. Henderson’s checkerbloom (<i>Sidalcea hendersonii</i>) newly discovered in Alaska. USDA Forest Service, Alaska Region.</p> <p>5. Goldstein, M., D. Martin, and M. Stensvold. 2009. Forest Service Alaska Region Sensitive Species List Assessment and Proposed Revisions to the 2002 List. Unpublished report. U.S. Forest Service, Alaska Region.</p>
<p>8</p> <p>Life History and Demographics</p>	<p>B</p>	<p>Seed viability of natural populations is relatively low, at about 44 percent survival rate (1). Inbreeding depression is high, and a high percentage of the offspring of inbred plants do not reproduce (1). Since the Alaska population is so small, the lack of genetic variability is an issue. With so few plants known in one location, it is questionable that the current population is viable. Without this</p>	<p>1. Marshall, M, and F Ganders. 2001. Sex-biased seed predation and the maintenance of females in a gynodioecious plant. American Journal of Botany 88(8):1437-1443.</p> <p>2. Goldstein, M., D. Martin, and M.</p>

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson’s checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>		 <p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>genetic variability the plants are less likely to adapt to environmental changes (2).</p> <p>Individual plants produce either female flowers only or both male and female flowers (hermaphrodites). Female plants appear to have a reproductive disadvantage relative to hermaphrodites, since they do not contribute genes through pollen; however, this loss of genetic mixing may be compensated either by producing more seeds or higher quality seeds than hermaphrodites, which may reduce effects of seed predators. Two species of beetles are known to parasitize and cause seed death of this species (1).</p> <p>Confidence in Rank call: High</p>	<p>Stensvold. 2009. Forest Service Alaska Region Sensitive Species List Assessment and Proposed Revisions to the 2002 List. Unpublished report. U.S. Forest Service, Alaska Region.</p>
<p>Summary: The only population of Henderson’s checkermallow on the Tongass is located at Howard Bay on the southern Chilkat Peninsula and is the only known occurrence of this species in Alaska. This occurrence is located in a Non-development LUD on the Tongass. Potential habitat for this species includes wet meadows, estuaries, and tidal flats in the lowland zone. This habitat is distributed throughout the Tongass as isolated patches, usually at the mouth of large streams and rivers. Occurrences of this species are distributed sporadically along the Pacific coast from Oregon northward to Vancouver Island, British Columbia. The bulk of the populations are centered along the Washington coastline. The main distribution is disjunct from the Tongass by 1200 km.</p>			<p>Date: 11/7/2014</p>

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson’s checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>			<p>Photo from USDA PLANTS database by G.A Cooper</p>
Criteria	Rank	Rationale	Literature Citations
		<p>A question concerning this species occurrence on the Tongass was discussed by professional botanists within and outside the agency to evaluate whether this species’ distribution is disjunct, accidental, or transient. The concensus of this group of professionals is that it is not accidental, however, it may be transient since recent evidence indicates that it may well be on its way out as a result of natural succession of surrounding vegetation. Only with continued monitoring will we be able to explore this further.</p> <p>Abundance is low enough that there is a high risk of imperilment due stochastic and environmental factors. The plant count in 2005 was three individuals, but during the 2013 visit, the individuals could not be relocated. The inability to relocate the population is a reasonable cause for concern that a downward trend leading to imperilment or extinction could be occurring.</p> <p>There is no apparent evidence of destruction or modification of habitat occurring in the immediate vicinity of the population. The quantity and quality of estuarine habitats on the Tongass is generally considered to have remained stable over time. However, some damage of beach meadow habitat due to recreational activities such as ATV use elsewhere has occurred on the Tongass. Some long-term changes in habitat have also likely occurred through natural processes such as sediment deposition, erosion, tectonic uplift, and vegetation succession. Habitat near the population is apparently undergoing natural succession from coastal wet meadow to forest, which could negatively impact habitat quality for this shade-intolerant species. Increased recreational use has resulted in habitat damage in upper beach meadows elsewhere on the Tongass, which could pose a risk affecting the persistence of this species. Isostatic rebound and tectonic uplift may result in this and other estuaries</p>	

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson’s checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>			
		<p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
		<p>succeeding into forests over the long-term. The ability of this species to persist may depend upon its ability to either migrate as habitat moves seaward, or colonize other suitable habitats. Because this plant is large and the flowers are showy, it is vulnerable to removal by collectors. Seed viability of this species is relatively low and the risk of inbreeding depression is high in small populations. Loss of genetic variability would reduce this species ability to adapt to environmental changes. Individual plants produce either female flowers only or both male and female flowers (hermaphrodites). Female plants do not contribute genes through pollen, but this loss of genetic mixing could be compensated either by producing more seeds or higher quality seeds than hermaphrodites, which may reduce effects of seed predators. Two species of beetles are known to parasitize and cause seed death in this species.</p> <p>In summary, although there is only a single, isolated occurrence on the Tongass considered disjunct by many professional botanists, it may indeed be transient. Its location is a significant distance from the nearest main geographic distribution outside the Tongass. It has restricted dispersal capability due to limited seed production, low seed mobility, and low seed viability. However, there is no apparent evidence of destruction or modification of habitat occurring in the immediate vicinity of the population. The quantity and quality of estuarine habitats on the Tongass is generally considered to have remained stable over time and is currently protected with beach and estuary standards and guides in the Forest Plan. That said, habitat near the population is apparently undergoing natural succession from coastal wet meadow to forest, which could negatively impact habitat quality for this shade-intolerant species.</p>	

<p>Species: <i>Sidalcea hendersonii</i> S. Watson Henderson’s checkermallow</p> <p>Global Rank: G3 State Rank: S1</p>		 <p>Photo from USDA PLANTS database by G.A Cooper</p>	
Criteria	Rank	Rationale	Literature Citations
<p>Our original recommendation was based on a reasonable concern that a downward population trend leading to imperilment or extinction of the only occurrence on the Tongass is occurring; that there is a potential loss of individuals due to plant collectors; that this population’s habitat is vulnerable due to increased recreational use and associated damage of upper beach meadows; that natural succession of habitat is currently occurring; and that there is potential for inbreeding depression resulting in a lack of genetic variability resulting in less capability to adapt to environmental changes.</p> <p>Based on rarity coupled with the unknown status of this population, we conclude that current science evidence indicates a substantial concern for the capability of Henderson’s checkermallow to persist over the long-term in the Tongass plan area. We recommend that this species be considered as a Species of Conservation Concern.</p> <p>Initial Evaluator(s): Rick Turner with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman and Brad Kriekhaus</p>			



Photo by Brad Kriekhaus (2014)

Species: *Tanacetum bipinnatum* (L.) (Sch. Bip.) dune tansy

Global Rank: NGR State Rank: NSR (removed from list)

Criteria	Rank	Rationale	Literature Citations
<p>1</p> <p>Distribution on Tongass</p>	<p>A</p>	<p>One small population on the Tongass National Forest, found at North Beach, Kruzof Island. Suitable upper beach meadow or sand dune habitat is relatively rare in Southeastern Alaska. Beaches are separated/isolated by miles of rocky shoreline, interior forested habitats, or open ocean between neighboring islands. (1)</p> <p>Confidence in Rank call: High</p>	<p>1. USFS. 2014. Natural Resource Manager-Threatened, Endangered and Sensitive Plants (NRM-TESP) database.</p>
<p>2</p> <p>Distribution in surrounding geographic area</p>	<p>C</p>	<p>This species is well distributed in Alaska (except for SE Alaska) and across the Canadian providences and territories. (1) It is also found along the coast of Washington, Oregon, and California and has limited distribution in Wisconsin, Michigan and Maine. (2) The circumscription adopted by Watson (3) has expanded the range of <i>T. bipinnatum</i> by subsuming <i>T. huronense</i>, <i>T. camphoratum</i> and <i>T. douglasii</i> as well as <i>T. bipinnatum</i> subsp. <i>huronense</i>.</p> <p>Confidence in Rank call: High</p>	<p>1. University of Alaska, Fairbanks. 2014. Arctos Database.</p> <p>2. USDA. NRCS Plants Database. 2014.</p> <p>3. Watson, L. E. 2006. <i>Tanacetum</i>. . Pp. 489-491 in <i>Flora of North America Editorial Committee, eds. Flora of North America, north of Mexico, Part 19:</i></p>

			
<p>Species: <i>Tanacetum bipinnatum</i> (L.) (Sch. Bip.) dune tansy</p> <p>Global Rank: NGR State Rank: NSR (removed from list)</p> <p style="text-align: right; border: 1px solid black; padding: 2px;">Photo by Brad Kriekhaus (2014)</p>			
Criteria	Rank	Rationale	Literature Citations
			<p><i>Magnoliophyta:</i> <i>Asteridae (in part):</i> <i>Asteraceae, part 1.</i> Oxford University Press, New YorkUSFS. 2014.</p>
<p style="text-align: center;">3</p> <p>Dispersal Capability</p>	A	<p>The single population being considered is believed to be clonal and only capable of spreading by rhizome. No viable seed production has been observed. In SE Alaska, viable habitat for this species includes sandy upper beach meadows and dunes. (1) These habitats are limited in extent and separated by rocky shoreline or the distances between islands. Dispersal capability (to new beach habitat) is limited to the random chance of a viable rhizome being transported by ocean current to a new beach.</p> <p>Confidence in Rank call: High</p>	<p>1. Kriekhaus, B. 2014. USDA Forest Service. Conservation Report for Dune Tansy. (Unpublished) Sitka Ranger District, Tongass National Forest.</p>
<p style="text-align: center;">4</p> <p>Abundance on</p>	A	<p>Only one small population has been found on the Tongass NF. The population at North Beach is decreasing rapidly due to habitat loss from beach erosion. Less than 700 stems were present in 2014, occupying an area of about 800 square feet. (1)</p>	<p>1. USDA Forest Service. Conservation Report for Dune Tansy (Unpublished) Alaska</p>

<p>Species: <i>Tanacetum bipinnatum</i> (L.) (Sch. Bip.) dune tansy</p> <p>Global Rank: NGR State Rank: NSR (removed from list)</p>			
			
<p>Photo by Brad Kriekhaus (2014)</p>			
Criteria	Rank	Rationale	Literature Citations
Tongass		Confidence in Rank call: High	Region. 2014.
5 Population Trend on Tongass	A	Localized population in rapid decline due to habitat loss. Evidence suggests that the beach meadow habitat at North Beach was recently formed and may be ephemeral or cyclical in nature. This suggests that dune tansy may have only recently colonized the beach. In this scenario of a ruderal species recently colonizing an ephemeral habitat, no general population trend can be concluded. Confidence in Rank call: High	
6 Habitat Trend on Tongass	A	Habitat quantity is expected to be stable; however some habitat is being lost by wave-cut erosion processes. Habitat quality is declining due to OHV riding on beaches, introduction and spread of invasive species. Confidence in Rank call Medium	



Photo by Brad Kriekhaus (2014)

Species: *Tanacetum bipinnatum* (L.) (Sch. Bip.) dune tansy

Global Rank: NGR State Rank: NSR (removed from list)

Criteria	Rank	Rationale	Literature Citations
<p>7</p> <p>Habitat Vulnerability or Modification or other threats</p>	<p>A</p>	<p>The beach habitat associated with the dune tansy population has been severely impacted by beach erosion, which was triggered by a migrating stream. OHV riding has also degraded beach habitat associated with the dune tansy. (1) Beach habitat in general is vulnerable to severe erosion caused by winter storms or natural geomorphic processes. Beaches are also being impacted by unrestricted OHV riding, general recreation, and invasive species. Some disturbance is required to sustain beach meadow habitat, otherwise succession will favor shrubs and trees.</p> <p>Confidence in Rank call High</p>	<p>1. Kriekhaus, B. 2014. USDA Forest Service. Conservation Report for Dune Tansy. (Unpublished) Sitka Ranger District, Tongass National Forest.</p>
<p>8</p> <p>Life History and Demographics</p>	<p>A</p>	<p>Dune tansy is a perennial species which typically reproduces by seed and by vegetative growth. The disjunct population found on Kruzof Island appears to be clonal and does not produce viable seeds. This single mode of reproduction limits the potential for this population to spread and occupy available habitat. Available habitat for the existing population at North Beach has decreased rapidly from natural erosion, and also by OHV trails. (1) The lack of connectivity of suitable habitat and limited reproductive potential suggest that the existing population of dune tansy may</p>	<p>1. Kriekhaus, B. 2014. USDA Forest Service. Conservation Report for Dune Tansy. (Unpublished) Sitka Ranger District, Tongass National Forest.</p>

			
<p>Species: <i>Tanacetum bipinnatum</i> (L.) (Sch. Bip.) dune tansy</p> <p>Global Rank: NGR State Rank: NSR (removed from list)</p>			
<p>Photo by Brad Kriekhaus (2014)</p>			
Criteria	Rank	Rationale	Literature Citations
		<p>not persist over the long term.</p> <p>Confidence in Rank call: High</p>	
<p>Summary: Dune tansy was added to the Region 10 Sensitive Species list in 2009 because only one population was known from FS lands in Alaska, and because of concerns about the viability of this population on a beach designated for OHV riding. Dune tansy was removed from the ANHP rare plant tracking list in 2012, with a conservation status of G5S4 due to its relative common occurrence elsewhere in Alaska and globally. Natural beach erosion has recently destroyed about half of the only known population of dune tansy on the Tongass. The future viability of this population is uncertain because its entire habitat is vulnerable to continued beach erosion. Low reproductive potential and lack of connectivity to other potential habitats are other factors weighing against this population. OHV's did some damage to the population in 2013, but a fence was constructed to keep them away. The population continues to be undercut by a migrating stream and by waves generated by winter storms.</p> <p>The dune tansy population at North Beach was discovered in 2003 and was spreading as a clonal patch until beach erosion began destroying habitat under the population in 2013. The maximum extent of the population was about 2000 square feet in 2012. Because of the isolation of this population, the lack of sexual reproduction, the lack of connectivity to other potential habitat, and the dynamic nature of beach habitat, the</p>			<p>Date: 11/4/2014</p>



Photo by Brad Kriekhaus (2014)

Species: *Tanacetum bipinnatum* (L.) (Sch. Bip.) dune tansy

Global Rank: NGR State Rank: NSR (removed from list)

Criteria	Rank	Rationale	Literature Citations
		<p>viability of this population of dune tansy is in question.</p> <p>Consultation amongst professionals both within and outside the agency concludes that as the only known location of this plant in the region it makes a significant contribution to the biodiversity of the Tongass. While <i>T. huronense</i> has a broad range, its distribution is indeed very spotty and with such large gaps among populations it is likely that each population is on its own and independent evolutionary trajectory. The more opportunities for maintaining ecological and evolutionary potential the better.</p> <p>Due to the downward trend of the only known location of this species in the plan area, we conclude that all available information indicates a substantial concern about the ability of <i>Tanacetum bipinnatum</i> to persist over the long term in the plan area.</p> <p>Initial Evaluator(s): Brad Kriekhaus with edits from Patti Krosse</p> <p>Review Team: Patti Krosse, Mary Stensvold, Karen Dillman, Kristen Lease, Rick Turner</p>	

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