



Species of Conservation Concern Identification Process for Land Management Plan Revision

**Tongass National Forest
Alaska Region**

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Introduction

The 2012 Planning Rule implements the requirement of the National Forest Management Act of 1976 (NFMA) that National Forest System (NFS) lands “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.” The 2012 Planning Rule requires Regional Foresters to identify Species of Conservation Concern (SCC) and planners to develop plan content intended to support the ecological conditions needed to ensure species’ persistence in the plan area.

During the planning process, the Forest Supervisor for the Tongass National Forest will provide a list of **Proposed SCC**¹ to the Alaska Regional Forester, who may concur or request modifications. The Regional Forester will then share the list of **Proposed SCC** with the public, Tribes, Alaska Native Corporations and Cooperating Agencies for input. After considering input, the Regional Forester will approve a final list of SCC, known as the **Regional Forester’s SCC List**, to be addressed during revision of the Tongass National Forest Land Management Plan.

This paper describes the process for identifying SCC to ensure that all species are considered consistently. 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 a Regional Forester determines the best available scientific information indicates substantial concern about the species’ capability to persist over the long-term in the plan area. The definition of SCC is found at 36 CFR 219.9(c), and the criteria for identifying them are outlined in the Forest Service Handbook FSH 1909.12 Chapter 10, Section 12.52c.

This process paper specifies how the Regional Forester will identify SCC for the Tongass National Forest, including opportunities for engagement (see Figure 1 for a graphic depiction of the general process). In addition, this paper describes how plan components that provide for the ecological conditions for long-term persistence of SCC in the plan area will be developed and how these plan components will be evaluated in the environmental impact statement.

¹ Note that terms in bold are defined in the Glossary, which can be found in Appendix A.

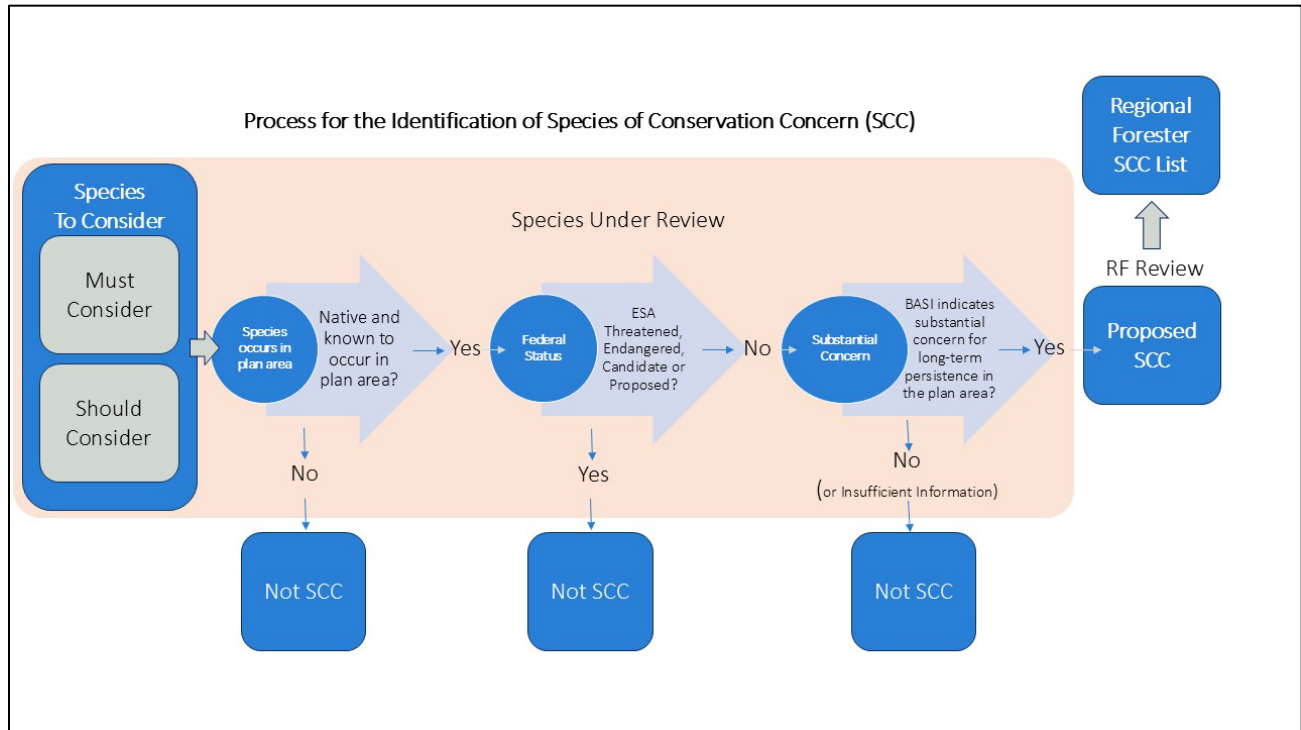


Figure 1: Simplified graphic summary of the process used for the identification of Species of Conservation Concern (SCC).

General SCC Steps by Phase of Plan Revision

The plan revision process can be divided into the following phases for purposes of describing the SCC identification process: pre-assessment, assessment, plan content development, environmental analysis (per the National Environmental Policy Act, NEPA) and objections (Fig. 2). Note that opportunities for public, tribal, and other government engagement may be provided during all phases.

Pre-Assessment

The pre-assessment phase is a functional phase, not specified in the 2012 Planning Rule or Directives, that includes organization and preparation for the assessment. The **List of Species to Consider** as SCC is developed during this phase using an information gathering and screening process. The initial search for best available scientific information (BASI), application of BASI during screening, and preliminary evaluation occurs during this pre-assessment because of the significant amount of time needed to gather the information. Continued refinement of the BASI, development of species evaluations, and other supporting information will support the identification of SCC. The planning team will screen the **List of Species to Consider**, removing species that are not native or known to occur in the plan area; those that are threatened, endangered, proposed or candidate species per the Endangered Species Act; and those that are found to have healthy populations in the plan area. The remaining **List of Species Under Review** will be evaluated in detail.

4 Stages of SCC (Species of Conservation Concern)

SPECIES CONSIDERED

FSH 1909.12, chap. 10 sec. 12.52d – Nature Serve Ranks G(T)1,2, or 3, or S1 or 2; current RFSS; ESA de-listed or 90-day findings; State or Tribal T&E or Tier 1 SWAP; current SCC or RFSS or BLM sensitive on adjoining lands.

SPECIES UNDER REVIEW

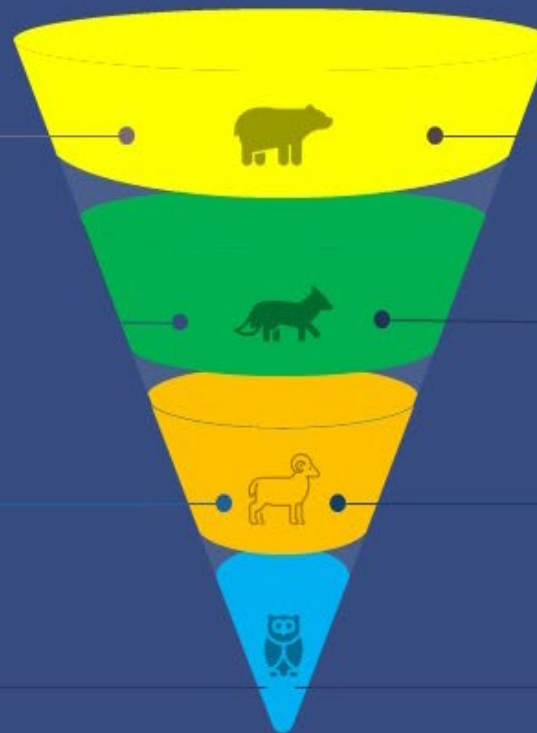
FSH 1909.12, chap. 10, sec. 12.52c.1 – Species considered (above) and confirmed to be native and known to occur from list above.

PROPOSED SCC

FSH 1909.12, chap. 10, sec. 12.52c.2 – BASI about the species indicates substantial concern about the species' capability to persist over the long term in the plan area.

REGIONAL FORESTER SCC

36 CFR 219.9(c) & FSH 1909.12, chap. 20, sec. 21.22a – Regional Forester (RF) reviews rationale and documentation provided by the Responsible Official (MPSG and Unit) and applies further assessment as deemed necessary by RF.



PRE-ASSESSMENT

Internal processing by PSG with Unit check-ins to review results and provide additional data and information. Species overviews with BASI drafted for species determined to be native and known to occur.

ASSESSMENT

Unit and Regional Office review of the Potential SCC list for release with the Draft Assessment. Tribal, partner and public engagement. Species overviews and BASI references provided with Assessment.

PROPOSED ACTION

Substantial Concern determinations finalized by Regional Forester incorporating Assessment inputs and other RF considerations. Species Overviews and Rationales finalized for Proposed Action and Draft Plan.

DRAFT & FINAL PLAN

Plan component crosswalk for SCC viability. Draft Plan includes the Proposed SCC list for the second and final public engagement. Final Plan includes finalized SCC.

Figure 2: Species of Conservation Concern (SCC) tasks associated with each phase of plan revision.

Assessment

Assessments are developed to “rapidly evaluate existing information about relevant ecological, economic, and social conditions, trends, and sustainability and their relationship to the land management plan within the context of the broader landscape” (36 CFR 219.5(a)(1)). The assessment phase formally initiates the forest plan revision. During the assessment phase, the **List of Species Under Review** is shared, and the public and tribes have an opportunity to give feedback on this list and may provide additional information on species being reviewed or identify additional species recommended for review.

The planning team will complete evaluations of the **List of Species Under Review** to identify species for which there is a substantial concern about their ability to persist over time. This list of **Proposed SCC**, along with evaluations, will be shared with the public, tribes and other governments for review. The Regional Forester will affirm a final list of SCC, known as the **Regional Forester’s SCC List**, after considering any feedback. The Regional Forester may identify additional SCC during the planning phase, based on new information (FSH 1909.12 § 21.22b).

Plan Development

The 2012 Planning Rule requires that land management plans meet the National Forest Management Act (NFMA) biodiversity requirement by planning for ecological conditions that will maintain botanical and animal ecological biodiversity and integrity.

When initiating the planning phase, the planning team will share with the public, Tribes and other governments a preliminary “need for change” statement that is intended to give focus to the planning phase. The preliminary “need for change” identifies gaps in the existing plan and reflects an evaluation of the needs of species and any groups identified on the SCC list to determine if the existing plan content provides those needs. The planning team will develop plan components that address gaps in the existing plan and address at-risk species, including SCC, in the proposed plan.

Environmental Analysis

The 2012 Planning Rule requires that an Environmental Impact Statement (EIS) be prepared for a plan revision. The EIS will include a detailed analysis of the environmental impact of the proposed plan, as well as alternatives. The long-term persistence of SCC is evaluated based on the predicted effects of the proposed plan and alternatives and documented in the EIS. It is important to note that the SCC List will not vary by alternative in the EIS. However, the plan components that provide for what SCC need to persist may vary by alternative.

Administrative Review/Objections

The Regional Forester’s decision finalizing the SCC list is subject to administrative review through an “objections” process. The final plan is subject to a separate objection process, which can include many other issues as well. Finally, the Regional Forester’s identification of SCC for the Tongass National Forest is completed concurrently with the Forest Supervisor’s signing of the final forest plan decision. This concludes the plan revision process.

Methods for the Identification of SCC

This section describes the processes and steps related to SCC during each phase of the planning process in greater detail, including public engagement opportunities.

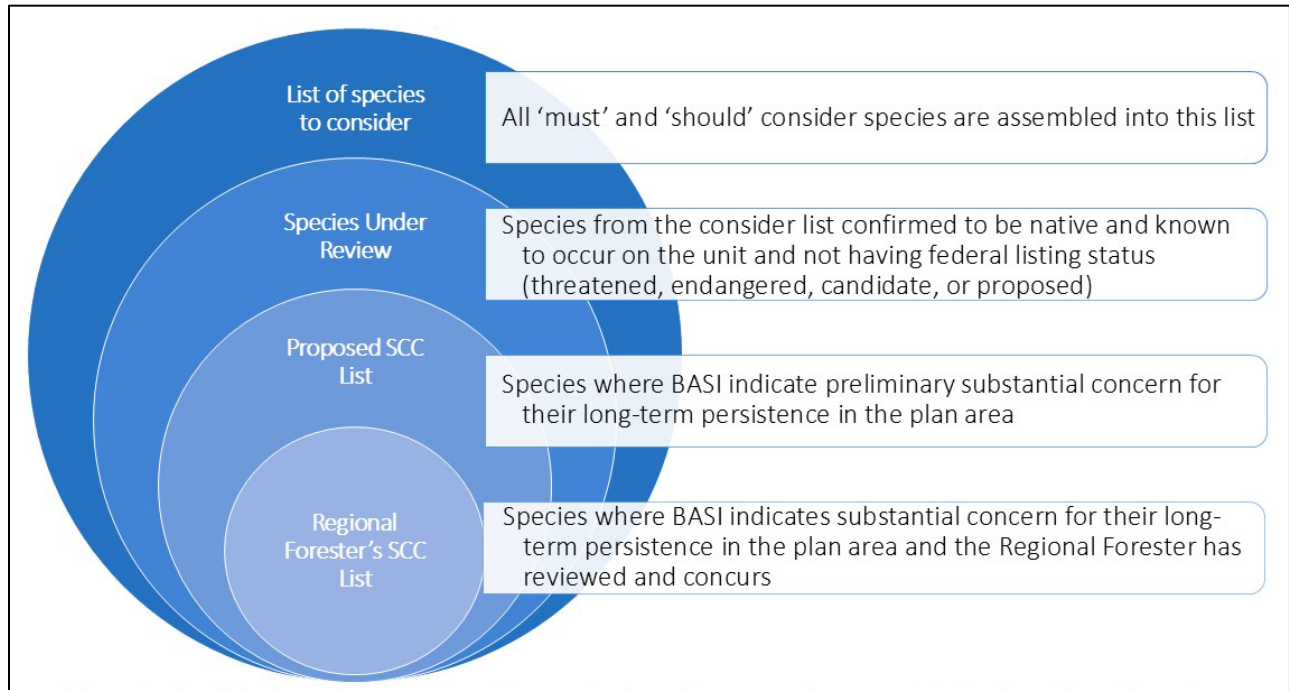


Figure 3: Simplified graphic summary of the methods and steps used to assemble the lists of species to be considered as Species of Conservation Concern (SCC) at different stages (see text for details).

The first step in the SCC process is to research and identify the species to consider for SCC identification by the Regional Forester. This work will be used to inform the **Species Under Review List** for this Plan revision.

The following steps will be followed to generate the SCC lists. Figure 3 summarizes the process from assembling the **List of Species to Consider** to identification of the **Regional Forester's SCC List**.

Assemble the List of Species to Consider

The **List of Species to Consider** will include all species, as described in the Planning Directives (FSH 1909.12 § 12.52d) that “must” or “should” be considered.

1. Species that **must** be considered (FSH 1909.12 § 12.52d, #1 & #2), in particular, include species with status ranks of G/T1 or G/T2 on the NatureServe ranking system.
2. Species that **should** be considered (summarized from FSH 1909.12 § 12.52d, #3) include:
 - a. G/T3 or S1 or S2 on NatureServe
 - b. State, Tribe, or Alaska Native Corporation threatened or endangered (*pending engagement*)
 - c. State, Tribe, or Alaska Native Corporation high priority for conservation (*pending engagement*)
 - d. SCC on adjacent Forest (the Chugach National Forest is considered adjacent)
 - e. Species with a positive 90-day finding for Federal listing
 - f. Local conservation concern about species' capability to persist due to:
 - (1) Significant threats to population or habitat, including climate change.
 - (2) Declining trends in population or habitat
 - (3) Restricted ranges, with corresponding narrow endemism, disjunct populations, or at the edge of their range

(4) Low population numbers or restricted habitat

*The Tongass has included all species listed by the Alaska Natural Heritage Program as rare (which includes NatureServe rankings S1, S2 and S3) in the list of species to consider to identify species for which there may be local concern.

Apply Screening Criteria to Identify the **Species Under Review List**

First, the **Species to Consider List** will be screened to remove species that are not native to or not known to occur as part of the flora or fauna on NFS lands of the Tongass. This screening process will remove accidentals, transients, and taxa known from historical records for which the strength of evidence suggests that the species does not or no longer occur on the Tongass.

Species occurrence data that inform the determination that a species is known to occur within a plan area will be compiled from multiple data sources considered the best available scientific information, including:

- Natural Resource Manager (NRM)
- Natural Resources Information System (NRIS)
- Alaska Natural Heritage Program
- Consortium of Pacific Northwest Herbaria
- Other herbaria records
- Interagency Special Status/Sensitive Species Program
- e-Bird
- GBIF

The directives explain that 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 naturally established in the plan area. Species that are merely “accidental” or “transient,” or are well outside the species existing range at the time of plan development, are 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.

When evaluating potential species to determine if they are known to occur within a planning boundary, occurrence of some species may be well established in the planning area due to having ample available data related to the species in the plan area. Other species may be exceedingly rare or have less data related to their presence in the forest. For the species with ample available data, it is reasonable to conclude that they are known to occur in the planning area. However, for the rarer species and those species where occurrence data is limited, the following dichotomous key is used to determine if the documentation is sufficient to support a determination that the species is known to occur in the planning area:

1 The location documentation of the occurrence(s) is not specific enough to determine that it was found in the planning area, and/or none of the locations are documented by a reliable reporter:
insufficient information to determine known to occur.

1' Location documentation of the occurrence(s) is within the planning area:

2 The plan area is not within the known species range, and it is likely that it is transient or accidental: **not known to occur.**

2' The plan area is within the known species range, and it is not likely that it is transient or accidental in the plan area;

3 The area of the documented occurrence(s) has been converted to a different habitat type since the species was detected: **insufficient information to determine that it is known to occur.**

3' The area of the documented occurrence has not been converted to a different habitat type; **evaluate the following criteria to determine if the occurrence is likely to remain extant:**

- Length of time since the species was detected.
- Survey effort since last detected.
- Species detection probability.

Specificity of the documentation for an occurrence is relevant when the location is not specific enough to determine whether it is within the planning area or not. An example of lack of specificity would be a species with a single occurrence that is documented as being within a section, where the section is half in and half out of the planning area. Combined with scarce data, that level of specificity is not specific enough to determine if it was within the plan area.

Second, the **List of Species to Consider** is evaluated to screen out species that are federally listed or under consideration under the Endangered Species Act (ESA). ESA-related species are subject to different management requirements so, while they are considered “at-risk species,” for purposes of forest plan revision, they are not identified as SCC.

Species that are not screened out during this step constitute the **List of Species Under Review**, which is shared with the public, Tribes and other governments as part of the draft assessment.

Apply Evaluation Criteria for Inclusion in the **Proposed SCC List**

The planning team must assemble and consider available information on each species and the ecological conditions necessary to sustain the species being evaluated, including identifying scientific information gaps. A species will be recommended for inclusion in the **Proposed SCC List** only if BASI demonstrates substantial scientific concern for persistence on the Tongass in the long term.

Formal species evaluations will be prepared for each species on the **List of Species Under Review** to provide the scientific basis for substantial concern conclusions and ultimately whether a species is identified by the Regional Forester as SCC. Information from a variety of sources will be considered in the species evaluations: Federal and State agencies, indigenous knowledge, literature, local information on occurrence and population status, sub-basin analyses, broad-scale assessments, and information available from local species experts and other organizations (FSH 1909.12 § 12.53). Species evaluations will be made consistent through the use of an evaluation template (Appendix B).

A final set of eight evaluation criteria was identified for inclusion in the template following internal and external peer review of the process (see next section for details). These 8 criteria echo the 13 factors outlined in FSH 1909.12 § 12.53 and are displayed in Appendix B – Species Evaluation Template and Appendix C – Rank Definitions for Species Evaluations.

Note that a species will be placed in the **Proposed SCC List** only if BASI demonstrates there may be substantial concern over their long-term persistence on the Tongass. Once the evaluation is complete, including the determination of substantial concern rationale (see below), the Forest Supervisor will review the **Proposed List of SCC** and share it with the Regional Forester.

Draft of the Substantial Concern Rationale and Recommendation

Forest Service specialists in their respective fields including subject matter experts on the Tongass National Forest will review the species evaluations and prepare a recommendation regarding substantial concern for long term persistence using the corresponding section in the evaluation form in Appendix B. The combination of all eight factors (which themselves include the 13 factors identified in FSH 1909.12 § 12.53), and supporting rationale and references, will be synthesized in formulating the substantial concern recommendation. This process avoids a mechanical summing of the rankings but instead examines the ‘weight of evidence’ regarding substantial concern.

The species evaluations include the eight criteria mentioned above, with four different rankings to choose from and a rationale that supports the rank that was determined for each criterion (see Appendices B & C). These eight criteria include:

1. Distribution on the Tongass National Forest
2. Distribution in the surrounding geographic area
3. Dispersal capability
4. Abundance on the Tongass National Forest
5. Population trend on the Tongass National Forest
6. Habitat trend on the Tongass National Forest
7. Habitat vulnerability or modification; other threats
8. Life history and demographics

Conclusion rationales will be made by evaluating the BASI documented in the species evaluation for each of the eight criteria and organizing that information according to the following five factors, which integrate the requirements of the Directives (FSH 1909.12 §§ 12.52d & 12.53):

- A. Significant threats
 - I. Stressors on and off the plan area to populations and habitat (7)
 - II. Includes climate change (7)
- B. Declining trends
 - I. Declining trends in population (3, 5)
 - II. Declining trends in habitat (6, 7)
- C. Restricted ranges
 - I. Narrow endemics (1, 2)
 - II. Disjunct populations (1, 2)
 - III. Species at the edge of their range (1, 2)
- D. Low population numbers
 - I. Vulnerable to extirpation due to stochastic events (3, 4, 5)
 - II. Restricted ecological conditions (1, 3, 8)
- E. Other factors: taxonomy, diversity, and important ecological functions of the species, where any of these factors are of importance in determining the likelihood of long-term persistence of the species in the plan area (any of the eight criteria, 1-8, may be used)

How these five factors crosswalk to the eight species evaluation criteria is denoted by the corresponding numbers in parenthesis next to the items listed in roman numbers above. *All factors do not have to apply for a species to have an overall substantial concern.* Rather, it’s possible for only one factor to apply, if the science indicates the conditions related to that factor pose a condition that could lead to the species not persisting in the long term in the planning area; therefore, the conclusion of whether a species qualifies as

an SCC is based on professional judgement concerning the weight of evidence found in the best available scientific information.

Substantial concern rationale statements will have three possible outcomes documented in the evaluation form template:

- The science indicates substantial concern for the long-term persistence of the species within the plan area.
- The science indicates that 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, or responses to management.
- There is insufficient information to determine substantial concern for the long-term persistence of the species in the plan area.

The following sequence will be used to develop draft substantial concern recommendations:

A. In formulating a recommendation, specialists will consider the information provided for all eight evaluation criteria. Threats to species persistence may interact synergistically, 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 solid scientific justification for substantial scientific concern regarding the long-term persistence on the Tongass National Forest.

B. The specialists will not rely merely on the criteria rankings but will consider the basis and rationale provided in the evaluation for each criterion. Additional information that was not previously considered can still be introduced at this time and will be documented in the evaluation.

C. A determination that there was insufficient information to draw inferences about a criterion will only apply when paucity of information prevents inferences regarding a particular criterion. The relative importance of the specific criterion will be evaluated in the overall persistence concern evaluation. Whenever possible, a recommendation will be made without the information from that criterion; however, if that information is deemed crucial, the species will be categorized as not recommended as an SCC (as established by the Rule and Directives). In other words, the rationale will document the reason(s) why the lack of information from a given criterion is crucial for not being able to make a determination of substantial concern over the long-term persistence of the species.

D. Forest Service specialists (biologists, botanists, ecologists, etc.) will review the evaluation for each species including draft recommendations, and then discuss and reconcile differences (if any) to arrive at a final recommendation through consensus.

Develop Species Groups

SCC groups (e.g., guilds) may be created after identification of the **Proposed SCC List**. Species groups will facilitate the efficient development of plan content by analyzing common ecological conditions, including common habitats or threats. A species can belong to more than one group. A template has been developed to facilitate the documentation of species groups and is provided in Appendix D. The groups will be used to inform the development of plan content in subsequent phases.

Finalize the List of SCC for Plan Revision

After considering input on the **Proposed List of SCC**, the Regional Forest will publish the **Regional Forester's**

SCC List to be considered during plan development. Note that additional information can be considered during the planning process and the Regional Forester may update the Final List of SCC, if needed.

Developing Plan Content to Provide for the Long-term Persistence of SCC

The fundamental premise of the 2012 Planning Rule for meeting the National Forest Management Act (NFMA) diversity requirement is that plan components for ecosystem integrity and diversity will provide the ecological conditions to maintain biodiversity and integrity. These ecological conditions will support the persistence of most native species in a plan area or contribute to the recovery of native species within the plan area, including at-risk species identified in the assessment. The ecological conditions needed for SCC and SCC groups will inform the development of plan components - desired conditions, objectives, standards and guidelines - that provide necessary ecological conditions for the SCC and/or SCC group(s). Where plan components intended to maintain or restore ecosystem integrity and ecosystem diversity do not provide sufficient ecological conditions for a particular SCC, plan components directed toward providing specific conditions required by such species must be developed.

Need for Change

Development of all plan content starts with the preliminary “need for change” statement. The preliminary “need for change” helps focus the development of plan components, and those developed for ecosystem integrity and ecosystem diversity are expected to provide for ecological conditions necessary to maintain the persistence or contribute to the recovery of native species within the plan area, including the **Regional Forester’s SCC List**.

The need for change, including the need for change related to SCC, will be released to the Tribes, other government agencies, and the public. Input will be incorporated into the final need for change.

Development of Plan Content

Starting with the development of the **Proposed SCC List**, species of conservation concern will be integrated into the draft revised forest plan through the development of plan components that may include desired conditions, objectives, standards and guidelines, the suitability of lands, and goals (optional). Plan components need to provide ecological conditions necessary to maintain a **viable population** of each SCC in the plan area. The ecological conditions may be those provided at the ecosystem scale (coarse filter approach) or through plan components that address species-specific needs (fine filter approach). Initially, plan content is developed at the ecosystem level. Once that is completed, the ecosystem-level plan content is evaluated to determine whether it provides for the persistence of all at-risk species. Species-specific plan content is developed only when the ecosystem-level plan contents are not sufficient to provide for persistence of one or more at-risk species.

The number and scale of plan components varies across the forests that have completed forest plan revision under the 2012 Planning Rule and adopted Species of Conservation Concern. For example, the forests for which we already have Regional Forester’s SCC Lists have an average of approximately 64 species. Some, like the Nantahala and Pisgah National Forests (plan revision completed in 2021) have a list as long as 339 species, while others, like the Chugach National Forest (plan revision completed in 2016), have as few as two species in their SCC list. In terms of plan components, land management plans generally address most of the needs of SCCs with plan components at the ecosystem scale (which may also serve other purposes) in comparison with the use of species-specific components. For example, the Nantahala and Pisgah National Forests have approximately 487 ecosystem-level plan components and approximately

57 species-specific plan components that address the needs of their 339 SCCs while the Chugach National Forest has approximately 23 ecosystem-level plan components and approximately 6 species-specific components that address their two SCCs.

Ultimately, the planning team will evaluate current plan components that may apply to the SCCs that will be identified for the Tongass, and develop plan components that address gaps in the existing plan to support at-risk species, including SCC.

SCC Analysis in the Environmental Impact Assessment (EIS)

The draft EIS includes the draft plan and several alternatives, along with an analysis of the impacts of each, including impacts on SCC. The Planning Rule requires that the Forest Supervisor, through a persistence assessment, determine whether the plan components provide the ecological conditions necessary to “maintain a viable population of each species of conservation concern within the plan area,” and this persistence assessment is included in the EIS. The SCC persistence assessment contains a species-specific analysis of the sufficiency of the plan components to meet this requirement. The 2012 Planning Rule provides three possible determinations for the analysis of plan components with respect to SCC:

1. The responsible official may find that the proposed plan components are sufficient to provide the ecological conditions necessary to maintain a viable population of each species of conservation concern within the planning area.
2. The responsible official may determine that the proposed plan components are insufficient to provide the ecological conditions necessary to maintain a viable population of each species of conservation concern within the planning area, and that “additional, species-specific plan components, including standards or guidelines, must be included in the plan to provide such ecological conditions in the plan area.” 36 CFR 219.9(b)(1).
3. The responsible official may determine “that it is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of a species of conservation concern in the plan area.” If the responsible official makes this determination, it shall: (1) document the basis for the determination; and (2) “[i]nclude plan components, including standards and guidelines, to maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range,” in coordination with other Federal, State, tribal, and private land managers (36 CFR 219.9(b)(2)).

It should be noted that the SCC list does not vary between alternatives.

Engagement with the Public, Tribes and Other Government Agencies

Opportunities for engagement will be provided at each stage of development and planning for the SCC process. This engagement will allow public input on the identified potential species of conservation concern, and is intended to leverage expertise of the public, including local, state, tribal and other federal natural resource agencies relevant for identifying species of conservation concern. The draft list of **Species to Consider** will be released simultaneously with the draft list of **Species Under Evaluation** in the Draft Assessment report and may be modified after receiving comments from the public, Tribes and Alaska Native Corporations, and cooperating agencies. Because identifying SCCs is a process that runs in parallel with the development of the Land Management Plan Revision, the **Proposed SCC List** is expected to be released between the time the final Assessment report and the Preliminary Draft Plan are released. Consistent with NEPA, the Planning Phase begins with the publication of a notice of intent in the *Federal Register* to develop an EIS for the Tongass Land Management Plan. This notice initiates a public comment period, referred to as

the “scoping period,” which is an opportunity for the public to provide feedback on the need to change and the proposed action, including the proposed action for SCC. The **Regional Forester’s SCC List** is expected to be released along with the draft EIS for a 90-day public comment period. Comments will be solicited on the draft EIS, including the SCC persistence assessment. Input received will be incorporated into the final EIS, persistence assessment, and the final Record of Decision.

These documents can be found in the Tongass Plan Revision Library and Supplemental Information website located at: <https://www.fs.usda.gov/detail/tongass/landmanagement/planning/?cid=fseprd1163514>.

Draft Record of Decision and Administrative Review Opportunity (Objection)

A final opportunity for input into the SCC list, plan content and analysis is provided by the administrative review process known as the objection process, which occurs after release of the final plan, EIS and draft Record of Decision and prior to the publication of the final Record of Decision and final revised Land Management Plan. The Chief or Associate Chief serves as the Reviewing Officer for objections specific to the identification of species of conservation concern (36 CFR 219.56, FSM 1921.04a). This authority may be delegated to an individual Deputy Chief or Associate Deputy Chief for the National Forest system or to a Regional Forester from another region.

APPENDICES

APPENDIX A. GLOSSARY

At-risk species: federal Endangered Species Act (ESA) species that are endangered, threatened, proposed, and candidate, and species of conservation concern (see below). FSH 1909.12, Chapter 10, Section 12.5.

Best available scientific information (BASI): the most accurate, reliable, and relevant scientific information to the issues being considered. FSH 1909.12 zero code, section 07.

Species groups: this term is meant to indicate a group of species that have common ecological conditions or habitat requirements (e.g., guilds), and/or have common threats. The intent is to develop these groups to inform the need to change process, and plan content development.

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 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. FSH 1909.12, Chapter 10, Section 12.52c

Native species: An organism that was historically or is present in a particular ecosystem because of natural migratory or evolutionary processes; and not as a result of an accidental or deliberate introduction into that ecosystem. An organism's presence and evolution (adaptation) in an area are determined by climate, soil, and other biotic and abiotic factors. 36 CFR 219.19

NatureServe Global (G) and State (S) ranks: These ranks apply at the global or state rank. Sometimes the state rank and the global rank are different from one another depending on more local factors.

G1 or S1	Critically imperiled – at very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
G2 or S2	Imperiled – At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3 or S3	Vulnerable — At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
G4 or S4	Apparently Secure — At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
G5 or S5	Secure — At very low risk of extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

Need for change: In the context of at-risk species, the need to change the plan is identified where current plan content is found to be insufficient to maintain a viable population of each species of conservation concern within the plan area, except where the responsible official determines that it is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population. 36 CFR 219.9(b)

Persistence: Continued existence. 36 CFR 219.19

Proposed SCC List: species that preliminary analysis shows are native, known to occur, and evaluations show that there may be substantial concern regarding the species ability to persist in the long term in the planning area. It is not the Regional Forester's SCC list.

Regional Forester's SCC list: Species identified by the Regional Forester that are native, known to occur and found to have substantial concern for long-term persistence in the plan area (see definition of SCC below). Also known as the Final List of SCC.

Species to Consider List: all species that meet the "must" and "should" consider categories in FSH 1909.12, Chpt. 10 § 12.52d.

Species in the following categories **must** be considered:

a. Species with status ranks of G/T1 or G/T2 on the NatureServe ranking system. See Exhibit 01 for the definition of NatureServe Conservation Status Ranks.

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.

Species in the following categories **should** be considered:

a. Species with status ranks of G/T3 or S1 or S2 on the NatureServe ranking system (includes species listed by the Alaska Natural Heritage Program as rare, equivalent to NatureServe rankings S1, S2 and S3). Tongass will also include S3 species for initial consideration, based on vulnerable status.

b. Species listed as threatened or endangered by relevant States, federally recognized Tribes, or Alaska Native Corporations.

c. Species identified by Federal, State, federally recognized Tribes, or Alaska Native Corporations as a high priority for conservation.

d. Species identified as species of conservation concern in adjoining National Forest System plan areas (including plan areas across regional boundaries).

e. Species that have been petitioned for Federal listing and for which a positive "90-day finding" has been made.

f. Species for which the best available scientific information indicates there is local conservation concern about the species' capability to persist over the long-term in the plan area due to:

(1) Significant threats, caused by stressors on and off the plan area, to populations or the ecological conditions they depend upon (habitat). These threats include climate change.

(2) Declining trends in populations or habitat in the plan area.

(3) Restricted ranges (with corresponding narrow endemics, disjunct populations, or species at the edge of their range).

(4) Low population numbers or restricted ecological conditions (habitat) within the plan area.

Species Evaluations: Detailed synthesis of BASI and analysis of the 8 evaluation criteria as well including substantial concern rationales and recommendation determinations.

Species Under Review List: species from the species to consider as potential SCC list that remain after screening out organisms that are not native and known to occur in the plan area or that are native and known to occur in the plan area but that are federally listed under the Endangered Species Act (ESA; e.g., Threatened or Endangered). Substantial concern criteria will be applied to this initial list to generate the potential SCC list.

Species of Conservation Concern (SCC): 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(c).

Viable population: A population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments. 36 CFR 219.19

APPENDIX B. SPECIES EVALUATION TEMPLATE

[Scientific Name]

[Scientific Name] [Authority]

[common name]

Global Rank: **[global rank]**

Alaska State Rank: [AK state rank]



photo: [photo credit]

Species Assessment

Criteria	Rank	Rationale
1 Distribution on Tongass NF	[X]	[Rank]: [Definition of rank as described here .] [Rationale that supports the rank that was determined for this criterium (Citation Year).]
2 Distribution in surrounding geographic area	[X]	[Rank]: [Definition of rank as described here .] Global Rank [global rank], Alaska State Rank [state rank] [List other relevant state or province rankings here] [Rationale that supports the rank that was determined for this criterium (Citation Year).]
3 Dispersal capability	[X]	[Rank]: [Definition of rank as described here .] [Rationale that supports the rank that was determined for this criterium (Citation Year).]

Criteria	Rank	Rationale
4 Abundance on Tongass NF	[X]	[Rank]: [Definition of rank as described here .] [Rationale that supports the rank that was determined for this criterium (Citation Year).]
5 Population trend on Tongass NF	[X]	[Rank]: [Definition of rank as described here .] [Rationale that supports the rank that was determined for this criterium (Citation Year).]
6 Habitat trend on Tongass NF	[X]	[Rank]: [Definition of rank as described here .] [Rationale that supports the rank that was determined for this criterium (Citation Year).]
7 Habitat vulnerability or modification; other threats	[X]	[Rank]: [Definition of rank as described here .] [Rationale that supports the rank that was determined for this criterium (Citation Year).]
8 Life history and demographics	[X]	[Rank]: [Definition of rank as described here .] [Rationale that supports the rank that was determined for this criterium (Citation Year).]

Substantial Concern Determination Table

Basis of substantial concern	Yes	No	Insufficient information
Significant threats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Declining populations or habitat trends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restricted range	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low populations or restricted ecological conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other factors (see conclusion rationale)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Conclusion Rationale

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

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

1. Significant threats
 - a. Stressors on and off the plan area to populations and habitat (7)
 - b. Includes climate change (7)
2. Declining trends
 - a. Declining trends in population (3,5)
 - b. Declining trends in habitat (6,7)
3. Restricted ranges
 - a. Narrow endemics (2)
 - b. Disjunct populations (2)
 - c. Species at the edge of their range (2)
4. Low population numbers
 - a. Vulnerable to extirpation due to stochastic events (3,4)
 - b. Restricted ecological conditions (1,3,8)
5. Other factors: taxonomy, diversity, and important ecological functions of the species, where any of these factors are of importance in determining the likelihood of long-term persistence of the species in the plan area (any of the eight criteria may be used)]

Conclusion

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

2024 Evaluator(s): [list Species Evaluation authors]

2024 Reviewer(s): [list all who reviewed draft Species Evaluations]

Rationale Date: [date that final recommendation from review team prepared]

Literature Cited:

[Example formats:

Alaska Center for Conservation Science (ACCS). 2023. Rare Lichen Species List. Available: <https://accs.uaa.alaska.edu/vegetation/rare-lichen-list/>. Accessed 13 March 2023.

Anderson, E. 2011 Botany Resource Report. Greens Creek General Alpine and Subalpine Rare Plant Surveys from 2009-2010. Unpublished document. U.S. Department of Agriculture Forest Service, Tongass National Forest.

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British Columbia Conservation Data Centre (BCCDC). 2023. BC Species and Ecosystems Explorer. B.C. Ministry of Environ. Victoria, B.C. Available: <http://a100.gov.bc.ca/pub/eswp/>. Accessed 13 March 2023.

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- Carrara P.E., Ager T.A., and Baichtal J.F. 2007. Possible refugia in the Alexander Archipelago of southeastern Alaska during the late Wisconsin glaciation. *Canadian Journal of Earth Sciences*. 44:229-244.
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- Tibell L. 1994. Distribution patterns and dispersal strategies of Caliciales. *Botanical Journal of the Linnean Society* 116: 159-202.
- Tibell, L 1998: Crustose Mazaediate Lichens and the Mycocaliciaceae in temperate South America. *Bibliotheca Lichenologica*, 71, J. Cramer, Stuttgart. 107 pages [RLL List # 173 / Rec.# 18633].
- Tibell, L. 2001. A synopsis of crustose calicioid lichens and fungi from mainland Africa and Madagascar. *Nordic Journal of Botany* 20 (6): 717-720.
- U.S. Department of Agriculture Forest Service (USDA FS). 2023. Natural Resource Manager, Threatened, Endangered and Sensitive Plant Species database. Accessed online 3 March 2023.]

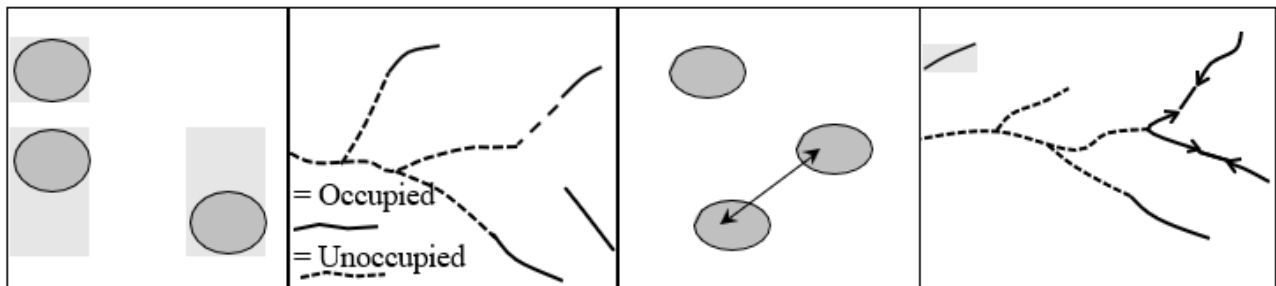
APPENDIX C. RANK DEFINITIONS FOR SPECIES EVALUATIONS

- 1. Geographic distribution within the Tongass.** Species that are present in only a few locations within the Tongass may have a higher risk of extirpation, than those that have a broad distribution. Species with restricted distribution and limited interchange of individuals between populations may be more vulnerable to events (such as: disease, storms) that cause extirpation. Similarly, species associated with geographically limited habitats may be more extinction prone. If the current distribution pattern differs significantly from historical distribution, this change should be considered in evaluating the influence of geographic distribution on species persistence.

Rankings for geographic distribution:

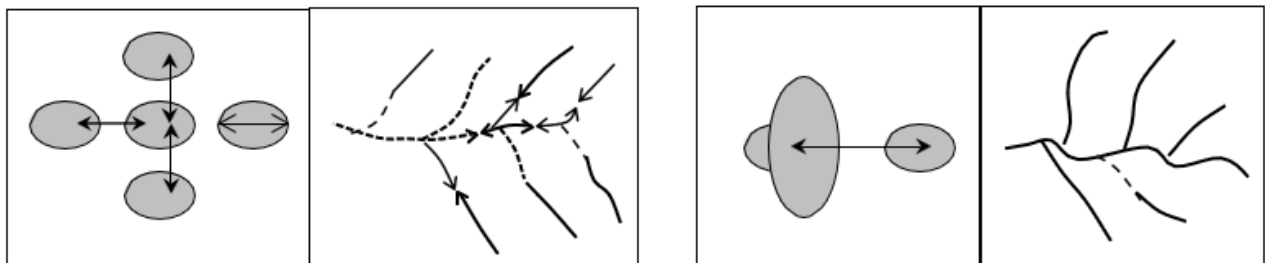
A = Scarce OR isolated. If a population or habitat meets any of the following conditions:

- Habitat is scarce throughout the Forest, indicating strong potential for extirpations, and little likelihood of recolonization. or,
- Habitat or population connectivity is limited due to factors such as environmental gradients, introduced species, disease, habitat loss, or habitat degradation. Dispersal among patches is limited or not possible. or,
- 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. or,
- Pictorially if populations or habitat look like any of the following:



B = Patchy OR gaps. If a population or habitat meets any of the following conditions:

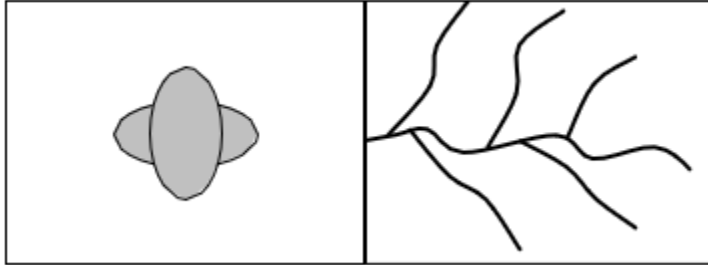
- Habitat exists primarily as patches, some of which are small or isolated to the degree that species interactions are limited by movements between patches. Local sub-populations in most of the species' range interact as a metapopulation¹⁰ or patchy population, but some patches are so disjunct that sub-populations in those patches are essentially isolated from other populations, or,
- Habitat is broadly distributed across the planning area, but gaps exist within this distribution. Disjunct patches of habitat are typically large enough and close enough together to other patches to permit dispersal among patches and to allow species to interact as a metapopulation, or pictorially if populations or habitat look like any of the following:



¹⁰ Many spatially structured populations will not function as metapopulations. (The degree to which a particular species occurs as a metapopulation, or several, in the Forest will be unknown for most taxa).

C = Contiguous. If a population or habitat meets the following conditions:

1. Habitat is broadly distributed across the Forest with opportunity for continuous or nearly continuous occupation by species, little or no limitation on interaction among populations, or,
2. Pictorially if populations or habitat look like either of the following:



D = Insufficient information to draw inferences about criterion.

Use five occurrences as a baseline to determine between A and B. Potentially additional considerations specific to species can be discussed if they come up. For example, if there are >5 occurrences but a specific habitat is scarce and isolated on TNF, may consider A.

Disclose all source records and occurrences known in the forest, the records are a reference for the occurrence within 1 km distance. Each record contains important information to be gleaned, as one or more records make an occurrence. All information is needed when ranking geographic distribution and understanding the subcolonies or populations in the forest. The type and number can be described thoroughly and lumped together into one occurrence within the 1 km distance threshold and or into separate occurrences if over 1 km which is used by the Alaska Heritage Program. Lastly, look at topography and habitat (i.e., dispersal boundaries). When localities are ambiguous with >1 km uncertainty, discuss with local botanists to determine if occurrences should be separated or lumped.

2. **Geographic distribution outside of the Tongass National Forest.** Species (or subspecies/varieties) that occur only in the Tongass National Forest warrant a higher level of concern. A species (or subspecies/variety) that is mostly restricted to the Tongass with a limited distribution outside of the unit would have a moderate level of concern. The risk of extinction associated with activities in the Tongass can be moderated by the potential for recolonization from populations existing elsewhere, although low recruitment from outside populations would reduce effectiveness of the rescue effect. A species with wide distribution outside the Tongass National Forest would generally have a substantially reduced risk as a result of activities in the Tongass. It is important to keep in mind that the Tongass is a large (16.7 million acres) National Forest and therefore this criterion is less important than in some other National Forest System lands with more limited habitat availability and increased social and economic pressures.

Rankings for geographic distribution outside the Tongass National Forest:

A = Only within the boundaries of the Tongass National Forest (local or regional endemics).

B = Limited distribution outside the Tongass National Forest, or widely disjunct taxa for which the main distribution is a significant distance from the Tongass National Forest.

C = Wide distribution outside the Tongass National Forest.

D = Insufficient information to draw inferences about criterion.

3. Capability of the species to disperse. Dispersal of individuals from a population may be limited because a species has low mobility or because barriers to dispersal exist. Species that do not disperse readily across large areas of unsuitable habitat may be at greater risk of extinction than species that disperse readily across a variety of habitats. Movements of aquatic species may be limited by barriers such as malfunctioning culverts, impoundments, or discontinuous stream networks. The ability of plants to disperse can depend on propagule dispersal agents and reproductive biology. Species that are mobile and for which dispersal is not limited will be assigned a value of no concern. Species that are able to disperse only within suitable habitat will be assigned a moderate level of concern. Species for which dispersal is limited by behavioral patterns or physical capability will be assigned a high level of concern.

In evaluating this criterion, the importance of dispersal to the life history of the species will be considered. For instance, dispersal is a critical characteristic of the life history of species that occupy ephemeral habitats or that occur early in succession after disturbance. In contrast, dispersal plays a less significant role in the population dynamics of some species that occupy stable habitats (such as cave-dwelling insects).

Rankings for capability to disperse:

A = Very limited dispersal ability (restricted dispersal capability coupled with ephemeral habitats).

B = Disperses only through suitable habitat (dispersal areas may or may not be corridors).

C = Readily disperses across landscapes with few habitat-related limitations.

D = Insufficient information to draw inferences about criterion.

4. Abundance (estimated number of individuals or populations) of the species on the Tongass. Population density or abundance is a primary factor in determining whether a species will persist following habitat loss. Generally, a lower abundance or density may increase the risk of extinction. Rankings will be based on categorical estimates of abundance relative to the expected abundance of that species in good habitat. This approach avoids problems associated with using population estimates or abundance estimates for widely diverse species. Base ranking on overall condition, but rationale should draw any contrasts between abundance on NFS lands vs. other ownerships.

Rankings for abundance:

A = Rare - current abundance is low enough that stochastic and other factors could lead to potential imperilment. In the absence of population numbers, give an A rank when one or two occurrences are on the forest. When there is more than two occurrences, take into consideration their life span (annuals vs. perennials) and distribution (i.e., spread across a forest unit, or one area with a cluster of several occurrences that could be more susceptible to a stochastic event impacting all of them) and any other factors that could lead to local extinction (e.g., insects across a larger landscape).

B = Uncommon - current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.

C = Common – current abundance is large enough that species persistence is not threatened by demographic stochasticity in combination with environmental variation.

D = Insufficient information to draw inferences about criterion.

- 5. Population trend** Another primary factor indicating that persistence may be a concern is a long-term downward trend in population size. A consistently declining population is of concern even if the current population size is large, although short-term declines should be interpreted cautiously due to inherent variability in populations and population structure.

An example may be snowshoe hares which have population highs and lows over about a 10 - 15 year period. For species with cyclic or irruptive population patterns three or more cycles may need to be considered before a population trend can be established. Results of local and national monitoring programs may be used to assign values for this criterion.

Rankings for population trend:

A = Significant downward or suspected downward population trend.

B = Stable population.

C = Upward population trend.

D = Insufficient information to draw inferences about criterion.

- 6. Habitat trend on the Tongass National Forest.** Another primary factor indicating that viability may be at risk is a persistent downward trend in habitat quality or quantity. Trends in quantity and/or quality of a species' habitat can often be indicative of population trends if actual species trend data are unavailable. Base ranking on overall condition, but rationale should draw any contrasts between abundance on NFS lands vs. other ownerships. Terrestrial, aquatic, wetland, and riparian ecosystem assessments may provide insights into habitat trends.

Rankings for habitat trend

A = Decline in habitat quality or quantity.

B = Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.

C = Improving habitat quality or increasing amounts of suitable or potential habitat.

D = Insufficient information to draw inferences about criterion.

Consider that despite a habitat type being common, there may be known and unknown abiotic and/or biotic factors that may contribute to the rarity of the species on the forest.

- 7. Vulnerability of habitats and populations on the Tongass National Forest.** Human-caused modifications of habitat in the Tongass National Forest. include energy development, recreation management, vegetation management, mining, water diversions, road construction, and other stressors. Ecosystem assessments may be useful in providing insights into natural patterns and dynamics of ecosystems, the processes that influence current habitat conditions, and the degree to which management actions result in patterns similar to natural disturbances and how those patterns relate to the natural range of variation (NRV). This criterion will evaluate recent and potential effects of habitat modification (in the broadest sense of all environmental conditions) on wildlife and plant species. In addition, this criterion will consider vulnerabilities that do not relate directly to 'habitat' but could become a limiting factor, stressor, or threat to the population, such as harvest or direct mortality of individuals. Base ranking on overall extent of habitat modifications and resiliency to modification AND on the spatial and temporal extent of any threat to the population.

Rankings for vulnerability of habitats in the Tongass National Forest.:

A = Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as herbicides, nonnative invasive species, water diversions, recreation, etc. Rank A when occurrences are few and there are documented specific localized threats (e.g., herbicide, weeds, recreation sites); or when a specific habitat type has clear imminent threats documented.

B = Habitat modification is likely to result in ecological patterns similar to the range of historical conditions but is being impacted by modern stressors. Rank B when no localized threats are documented, but there are general threats and stressors.

C = Habitat resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors not significant.

D = Insufficient information to draw inferences about criterion.

- 8. Life history and demographic characteristics of the species.** Life history factors such as reproductive rate, relationship with disease organisms, interaction with mutualists or symbionts, food web dynamics, relationship with predators, or relationship with competitors, can affect population size and ability to rebound from stochastic or human-caused population reductions.

For vertebrates, examples of characteristics that might affect viability risk include: number of reproductive cycles/year, average number of young produced/breeding cycle, minimum age of first reproduction, age specific survival rates, and social organization.

Life history characteristics that affect viability in plants include lifespan and variation in life span of individuals (such as: annual vs. perennial), seed dispersal strategy, variation in germination rates, relationship with pollination agents, and susceptibility to herbivory. Annual variation in vital rates can also be important.

Species with strong mutualistic relationships, with low reproductive rates and which are highly susceptible to negative effects of disease, predation, or competition may have less ability to recover from population declines. Those species will be assigned a high level of concern. Species with higher reproductive rates have a greater ability to recover from losses caused by predation, disease, or competition however life-cycle analysis may be necessary to evaluate the extent to which reproduction vs. age-specific mortality influences population growth. Viability risk is also higher for populations depressed by introduced diseases or competitors, or that are susceptible to genetic introgression or inbreeding.

Rankings for life history and demographic characteristics:

A = Low reproductive rate and high mortality (such as: susceptible to disease, predation, or competition); OR life history characteristics that suggest populations may not recover rapidly from disturbance events or other demographic risk factors are of concern.

B = Low reproductive rate or high mortality (e.g., susceptible to disease, predation, or competition), but not both; OR life history characteristics that suggest populations have an intermediate ability to recover from disturbance events and no other demographic risk factors are known. Temper conclusions based on life-cycle considerations and whether population growth is likely to be more sensitive to changes in reproduction or age-specific mortality.

C = High reproductive rate and not especially susceptible to disease, predation, or competition; OR species has life history characteristics that suggest populations will have a high ability to recover from disturbance events and no other demographic risk factors are known.

D = Insufficient information to draw inferences about criterion

APPENDIX D. EXAMPLE SPECIES GROUP TEMPLATE

Group Name: <Fill in>

Assumptions made for including species in the group and why assumptions are reasonable: <Fill in>

Uncertainties associated with including a species in the group and why it remains reasonable to do so:

<Fill in>

Species included in group: <Fill in>

Key ecosystem conditions necessary to maintain viability used by each member of the group: <Fill in>

Ecological function of the species in this group: <Fill in>

Important biological interactions and ecological processes: <Fill in>

Ecological conditions that are threats or limiting factors to persistence: <Fill in> Influence and occurrence of uncharacteristic natural events: <Fill in>

Effects of climate change and susceptibility to stressors caused by human disturbance or activities: <Fill in>

Example

1. Group Name: Species impacted by a change in natural fire regime

- a. Assumptions made for grouping or for including species in the group and why assumptions are reasonable:** By including species in this group, we are assuming that these species are being impacted by the ecosystem changes that result from fire suppression. We are also assuming that these species are being negatively impacted *overall* by the impacts of fire suppression, it is possible that fire suppression has prevented the death or damage to individuals while resulting in a net negative for the species because of habitat alteration. We are also assuming that the species in the group won't adapt to the sometimes novel ecosystem conditions created by fire suppression (denser vegetation and higher intensity fires when they do burn).
- b. Uncertainties associated with including a species in the group and why it remains reasonable to do so.** We could not identify any uncertainties associated with including these species in this group.

2. Species included in group:

- a. Anisocarpus scabridus*
- b. Arabis oregana*

- c. *Boechera serpicicola*
- d. *Erigeron nivalis*

3. **Key ecosystem conditions necessary to maintain viability used by each member of the group:** Species in this group are impacted by the knock-on effects of suppressing naturally occurring fires in fire adapted ecosystems. The indirect impacts of fire suppression include the encroachment of overstory vegetation that alters the physical growing conditions for understory plants and the buildup of fuels which result in fire intensities beyond the evolutionary history of the species which can fundamentally alter ecosystem processes and damage individuals. Some species require disturbance from fire to complete their lifecycle and the suppression of fire can inhibit or stop reproduction.
4. **Ecological function of the species in this group:** Some species in this group are among the first or only species to colonize after a fire which then provide stabilized conditions for other species. Some species in this group likely contribute to the health of invertebrate pollinators when nectar resources are scarce post-fire. The species completing their lifecycle will contribute organic matter to the soil.
5. **Important biological interactions and ecological processes.** The species in this guild appear to rely on the ecological conditions created by a natural fire regime (fire frequency and intensity) and are potentially directly threatened by unnatural fire regimes and indirectly threatened by the alteration in habitat from an unnatural fire.
6. **Ecological conditions that are threats or limiting factors to persistence.** The disruption or cessation of natural disturbance is a threat to species that are adapted to that disturbance or benefit from the habitat conditions that disturbance creates. Many fire adapted species are well adapted to deal with the more harsh conditions that remain after fire. Such adaptations often come with a tradeoff where they are susceptible to being out competed for light and nutrients once other vegetation becomes established. This is particularly true once woody shrubs and trees encroach into open areas.
7. **Influence and occurrence of uncharacteristic natural events.** These species are grouped by their reliance on characteristic natural events.
8. **Effects of climate change and susceptibility to stressors caused by human disturbance or activities.** Changes in temperature and precipitation regime will likely alter what is considered to be a “natural fire regime”. Since the species in this group are impacted by a change in natural fire regimes it stands to reason that climate change will most likely exacerbate the negative impacts of an altered fire regime by altering the timing and intensity of fires when they do occur. Having said that it is possible that changes in fire regimes from climate change could push the current fire regime back to what it was before fire suppression.