

Setting Goals, assigning priorities and identifying preliminary conservation actions for species in British Columbia¹

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Goals for species at risk

British Columbia has recently established three conservation goals:

1. To contribute to global efforts for species and ecosystem conservation
2. To prevent species and ecosystems from becoming at risk.
3. To maintain the diversity of native species and ecosystems

1. Assigning Priorities to Each Species

Every species is assigned a priority score under each of the 3 goals. The species is assigned to the goal under which it scores the highest priority. Priorities run from 1 (highest) to 6 (lowest).

Goal 1: Contribute to global efforts for species and ecosystem conservation.

This goal prioritizes globally at risk species and species where British Columbia has a high global responsibility for species. Species represented in British Columbia by disjunct populations and those where their range or population is collapsing towards British Columbia are also given increased priority

Step 1. Using the combined G and S ranks from the Goal 1 matrix in Figure 1, assign the initial priority score. Subspecific or population ranks are indicated by a T rank as part of the G rank; for these, use the T rank in place of the G rank for assigning initial value. For a rank with a range (e.g., S1S2), use the lesser rank (e.g., S1). Note that for some combinations of G and S ranks, two or three priority scores are possible. At this step, retain all possibilities. Treat SH (historic) and SU (status unknown) as S1, and if the species is extirpated, treat SX as S1 as well. Accidental species (SNA) will not be assessed for priority.

Step 2. The initial priority score (from Step 1) may need to be adjusted for feasibility, using the following rules:

¹ Extracted from: Bunnell, F., D.F. Fraser and A. Harcombe. *In review*. Increasing effectiveness of conservation decisions with existing data: a simple system and its application.

- If feasibility = L, and there is a single choice for initial priority, move initial priority down one score (makes number larger)
- If feasibility = L and there are three choices for initial priority, chose lowest priority
- If feasibility = L and there are two choices for initial priority, move to lower priority score
- If feasibility = H and there are choices for initial priority score, move to highest priority score
- If feasibility = M (or is blank/unknown) and there are three choices for initial priority score, chose the medium priority score
- If feasibility = M (or is blank/unknown) and there are two choices for initial priority score, chose the higher priority score
- feasibility = M (or is blank/unknown) and there is only one priority score, chose that priority score
- If feasibility = H and there is a single choice for initial priority score, move initial priority up one score (makes number smaller).

Step 3. The feasibility-adjusted priorities from Step 2 may need to be adjusted for responsibility, isolation (some species in B.C. are disjunct, or if there has been significant range collapse for the species towards British Columbia).

- If the species is designated as D1 or D2², or the species has collapsed or is collapsing towards the province, or if Provincial responsibility = 1, 2, or 3 move the priority up one class. Do not make an adjustment for more than one of these three components.
- If Provincial responsibility is 6 or 7 and it hasn't already been adjusted in Step 3, move down one class (except where value is already priority class 6).



Paxton Lake Benthic and Limnetic Sticklebacks, Goal 1 Priority 1. © Todd Hatfield.

Goal 2: To prevent species and ecosystems from becoming at risk.

This goal focuses on species that are neither secure nor considered to be at risk, but are possibly moving towards an 'at risk' status.

Step 1. Using the combined G and S rank from the Goal 2 matrix in Figure 1, assign the initial priority values. Subspecific or population ranks are indicated by a T rank as part of the G rank; for these, use the T rank in place of the G rank for assigning initial value. For a rank with a range (e.g., S1S2), use the lesser rank (e.g., S1). Note that for some combinations of G and S ranks, two priority classes are possible. At this step, retain all possibilities. Treat SH (historic) and SU (status unknown) as S1, and if the species is extirpated, treat SX as S1 as well. Accidental species (SNA) will not be assessed for priority

Step 2. If the priority values (from Step 1) are 2 or 4, they may be modified based on known, suspected, or potential trend or threat. The database uses threat and trend values inherited from the CDC database, where a significant threat or negative short-term or long-term³ trend is indicated by a value of A, B, C, or D. A stable or increasing trend is indicated by E or F, and if there is no known threat this is indicated by H. A threat value of E, F, or G indicates a low threat. See Appendix II for meanings of these values and how they are derived. Use the following rules, in the following order:

- If Trend (short-term or long-term) or Threat =Yes (i.e., A, B, C, or D according to CDC criteria), choose a priority score of 2.

² D1 refers to a population disjunct from the main range of the species and the population occurring only in British Columbia; D2 to populations disjunct from the major population but occurring in two jurisdictions (e.g. British Columbia and Alberta, or British Columbia and the Yukon).

³short-term trends are typically considered over the period spanning the past 10 years or 3 generations (whichever is longer up to a maximum of 100 years).

- If Trend (short-term or long-term) = Unknown or Threat = Unknown or Low (E, F, or G according to CDC criteria), choose a score of 4
- If Trend (short-term and long-term) = No (E or F according to CDC criteria) and Threat = No (H according to CDC criteria), choose a score of 6

Step 3. If the priority values are 2 or 4, the initial priority value (from Step 2) may need to be adjusted for feasibility, using the following rules:

- If feasibility = L, move initial priority down one priority score
- If feasibility = M (or is blank/unknown), do not adjust the priority score
- If feasibility = H, move initial priority up one priority score

Scores of 6 do not get adjusted for feasibility.



Immaculate Green Hairstreak, Goal 2 Priority 2
© Vicky Young.

Goal 3: To maintain the diversity of native species *and* ecosystems

Step 1. Using the S rank from the Goal 3 matrix in Figure 1, assign the initial priority scores. For a rank with a range (e.g., S1S2), use the lesser rank (e.g., S1). Treat SH (historic) and SU (status unknown) as S1, and if the species is extirpated, treat SX as S1 as well. Accidental species (SNA) will not be assessed for priority.

Step 2. The initial priority value (from Step 1) may need to be adjusted for feasibility, using the following rules:

- If feasibility = L, move initial priority score down one score (unless priority score is 6)
- If feasibility = M (or is blank/unknown), do not adjust the priority score
- If feasibility = H, move initial priority score up one priority score.

Step 3. Priority values from Step 2 may be modified based on known, suspected, or potential trend or threat. The database uses threat and trend values inherited from the CDC database, where a significant threat or negative short-term or long-term⁴ trend is indicated by a value of A, B, C, or D. A stable or increasing trend is indicated by E or F, and if there is no known threat this is indicated by H. A threat value of E, F, or G indicates a low severity or localized threat. See Appendix II for meanings of these values and how they are derived. Use the following rules, in the following order:

- If Trend (short-term or long-term) or Threat = Yes (i.e., A, B, C, or D according to CDC criteria), move the priority score from step 2 up one score.
- If Trend (short-term and long-term) and Threat = Unknown, Low or No, do not adjust the priority score from step 2.

⁴short-term trends are typically considered over a period spanning the past 10 years or 3 generations (whichever is longer up to a maximum of 100 years).

Goal 1

	S1	S2	S3	S4	S5	Initial Score
G1	G1S1	-	-	-	-	2
G2	G2S1	G2S2	-	-	-	2 or 3
G3	G3S1	G3S2	G3S3	-	-	2, 3 or 4
G4	G4S1	G4S2	G4S3	G4S4	-	3,4 or 5
G5	G5S1	G5S2	G5S3	G5S4	G5S5	4 or 5
						4, 5 or 6
						5 or 6
						6

Goal 2

	S1	S2	S3	S4	S5	Initial Score
G1	G1S1	-	-	-	-	2 or 4
G2	G2S1	G2S2	-	-	-	6
G3	G3S1	G3S2	G3S3	-	-	
G4	G4S1	G4S2	G4S3	G4S4	-	
G5	G5S1	G5S2	G5S3	G5S4	G5S5	

Goal 3

	S1	S2	S3	S4	S5	Initial Score
G1	G1S1	-	-	-	-	2
G2	G2S1	G2S2	-	-	-	3
G3	G3S1	G3S2	G3S3	-	-	4
G4	G4S1	G4S2	G4S3	G4S4	-	5
G5	G5S1	G5S2	G5S3	G5S4	G5S5	6

Figure 1: Matrix for setting conservation priorities from global (G) and sub-national (S) ranks. If rank is for a subspecies or population, use the T value instead of G value. A value of '1' is attained when initial ranking is increased by feasibility, responsibility, threat, or decline. The breakpoints for Goal 1 are from an operations manual used by NatureServe and the Nature Conservancy used in assigning conservation priority for their operations (TNC 1988).

2. Assigning Species to Goals

Species are assigned to the Goal where it has the highest priority score. Tied scores result in the species in both Goals.

3. Sorting species into action groups

Sorting is designed to determine what conservation action a particular species requires based on status, present level of knowledge and legal responsibility. Sorting results in the species being assigned an action group. A dichotomous key has been constructed to assign species to groups requiring similar actions to sustain or enhance them. Species within an action group can then be ordered by their conservation priority. Completion of any assigned action for a species may require re-keying the species to assign it to a new group, possibly 'No new action'. The assignment to action groups will be reviewed annually and changes made if the species' status has changed and/or previously-assigned activities are completed.

Table 1. Action groups (and their codes) to which species are assigned to facilitate prompt action.

Action Group	Code (Old Code)	Definition
Assessing		
Review Status Rank	Rev Status (CDC)	Latest trend and threat information may not be incorporated: return to CDC (S-ranks and estimated G Ranks) or NatureServe (G-ranks) for re-evaluation.
Compile Status Report	Status Rpt (DA)	Compile or update a status report. May require research on threats, trends, habitat use, life history or demography.
Inventory	Inventory (IN)	Inventory the species to confirm or determine status rank. May require research on inventory techniques.
Monitor Trends	Monitor Trends (MO)	Monitor the species or its habitat at an interval appropriate to the life history of the organism. May require research on monitoring techniques.
Review Taxonomy	Taxonomy (TS)	Invest in taxonomic studies to determine taxonomic validity.
Planning & Listing		
Planning	Plan (PP)	Determine the type of planning process required. Includes preparing a Management Plan, Recovery Strategy and Action Plan, Land Use Plan, or updating an existing plan. Also includes implementing and monitoring effectiveness of the plan and monitoring trends, habitat or threats. May require research on threats and mitigation, habitat use and recovery techniques.
List under Wildlife Act	Wildlife Act (WA)	List under <i>Wildlife Act</i> as an Extirpated, Endangered or Threatened species. Includes describing residences as per the provisions of the act where warranted.
Send to COSEWIC	COSEWIC (CO)	Send to COSEWIC for assessment as a first step to listing under the federal <i>Species at Risk Act</i> as Extirpated, Endangered, Threatened, or Special Concern, or for re-assessment at a higher or lower risk category.
Acting		
Habitat Protection	Hab Protect (HT)	Use legislation, policies and guidelines to protect the species' habitat. For example, <i>Forest & Range Practices Act</i> , protected areas, stewardship, and best management practices. May require research on habitat needs or inventory to determine suitable areas for protection.
Habitat Restoration	Hab Restore (HT)	Apply management and/or restoration techniques to maintain or restore the species' habitat. Includes invasive plant control, maintaining key structures, fire suppression and prescribed burning. May require research into species' habitat requirements and use.

Action Group	Code (Old Code)	Definition
Private Land Stewardship	Private Land (HT)	This group contains a subset of species from the Habitat Protection and Restoration action groups that are of conservation concern but occur on private land, or crown land with tenure or rights holders, renters or leasers, or in situations outside the scope of more traditional legislation, policies, and formal guidelines.
Species & Population Management	Species Mgmt (NHT)	Assign to appropriate management tools to address non-habitat threats. For example, captive breeding, translocation, disease management, alien predator or competitor control, public education. May require research and monitoring.
Review Resource Use	Review Use (AH)	Adjust harvest levels and/or increase penalties and enforcement.
No New Action	No New Actn (NNA)	Existing management is effective; no additional conservation action is warranted. Assess whether ongoing programs need to be maintained. May require effectiveness evaluation of existing activities and monitoring of the species and habitat.

Sorting decision key (Version 2.11):

Action groups are identified by boldface font (e.g., **Compile Status Report**), and action group codes are enclosed in square parentheses (e.g., **[Status Rpt]**). Extinct taxa (GX) cannot be sorted. Decline = Short-term or long-term trend value of A, B, C, or D, as defined by the CDC (i.e., decline of 10% or greater over 10 years or three generations, whichever is longer; see Appendix II). Generation time = average age of a breeding individual in the population. Threat = threat value of A, B, C, or D as defined by the CDC (see Appendix II). *Residences* are as per the definition in the BC Wildlife Act.

- 1a. CDC/NatureServe rankings have incorporated latest threat and trend information at both the G and S level. Go to **2**.
- 1b. CDC/NatureServe rankings have not incorporated latest threat and trend information, Request CDC and/or NatureServe **Review Status Rank [Rev Status]**. If G Rank needs reviewing but S Rank is okay, continue to **2**. If S Rank needs reviewing, end here.
- 2a. The taxon being assessed is a species or subspecies, variety or form, or an unnamed “species”, that has received sufficient taxonomic work to be considered valid and defensible (hereafter referred to as a “species” in this key). Go to **3**.
- 2b. The taxonomic unit has not had sufficient work to ensure the unit is valid and defensible. **Review Taxonomy [Taxonomy]**. End here.
- 3a. The species has a rank of SU, or is considered to be historic (SH) or the information is very uncertain [range ranks span three or more values (e.g., S1S3), or is followed by a ?]. Go to **4**.
- 3b. Other species. Go to **5**.
- 4a. Uncertainty in rank is caused by lack of recent inventory. **Inventory** the species **[Inventory]**. End here.
- 4b. Uncertainty in rank is caused by unconfirmed trend information or conflicting trend information. **Monitor Trends [Monitor Trends]**. End here.
- 5a. The species is ranked S5, **or** is ranked S2S3, S3, S3S4, S4, S4S5, without a known, inferred, suspected, or potential *decline* or *threat* to the species or its habitat, **or** the species is under federal jurisdiction and found only on federal lands, **or** if the species is not regularly occurring in predictable habitat in BC (usually ranked SNA) such that conservation action is not possible. **No New Action** at this time and assess existing actions **[No New Actn]**. End here.

- 5b. The species is ranked SX, S1, S1S2, S2, or is ranked S2S3, S3, S3S4, S4, S4S5, with a known, inferred, suspected, or potential (current or future) *decline* or *threat* to the species or its habitat. Go to 6.
- 6a. The species is ranked SX, S1, S1S2, or S2. Go to 7.
- 6b. The species is ranked S2S3, S3, S3S4, S4, S4S5. Go to 12.
- 7a. The species is extirpated (SX) in BC. **Compile Status Report** and undertake a management **Planning** process to assess reintroduction potential [**Status Rpt, Plan**] and go to 11.
- 7b. The species is S1, S1S2, or S2. Go to 8.
- 8a. The species is only known from a few sites but there has been no targeted survey or a targeted survey is likely to change the rank. Go to 9.
- 8b. The species is known from many sites and / or there has been a targeted survey, and / or a targeted survey is unlikely to change the rank. Go to 10.
- 9a. Inventory is likely to change the rank of the species, and there are no severe, imminent threats to the species. **Inventory** the species [**Inventory**]. End here.
- 9b. Species is poorly inventoried and there are negative trends or severe, imminent threats facing the species which would likely negate a change in rank due to the discovery of new occurrences. **Inventory** the species [**Inventory**] and go to 11.
- 10a. Threats are well known, but trends are not documented. **Monitor Trends** [**Monitor Trends**] and go to 11.
- 10b. Knowledge of threats or trends is NOT a limiting factor to proceeding with conservation actions. Go to 11.
- 11a. Direct persecution or lack of protection resulting in inadvertent destruction of individuals or loss of *residences* is a factor that puts the species at risk (i.e., species persistence or recovery would be assisted by having prohibitions on killing, and/or by protecting its residence). **Compile Status Report** and **List Under the Wildlife Act** as threatened, endangered or extirpated [**Status Rpt, Wildlife Act**]. If additional activities are required to improve species' status, undertake recovery **Planning** process [**Plan**]. Go to 14.
- 11b. Direct persecution or lack of protection resulting in inadvertent destruction or loss of *residences* is **not** a factor that puts the species at risk. Go to 14.
- 12a. The species has not been the subject of a targeted inventory, or is poorly known, and an inventory has a high probability of changing the rank of the species. **Inventory** the species [**Inventory**]. End here.
- 12b. The species has been adequately inventoried or is well known, and there is a low probability that additional inventory will change the rank of the species. Go to 13.
- 13a. There are documented declines or known current or near-future threats. **Monitor Trends** [**Monitor Trends**] and go to 14.
- 13b. Declines or threats are suspected or inferred (this step may be used to allow monitoring for suspected effects of climate change). **Monitor Trends** [**Monitor Trends**]. End here.
- 14a. Threats to the species are known to exist now or are expected to increase in the near future. Go to 15.

- 14b.** A status report has been completed and is up to date, and no threats to the species are identified. Although it may be rare there is nothing putting it at further risk and therefore **No New Action** is required for conservation [**No New Actn**]. End here.
- 15a.** Threats are imminent or operational, and/or action is necessary immediately. Go to **16**.
- 15b.** Threats are currently minimal but expected to increase. Planning for these future threats is necessary (e.g., requires addressing several factors, research, or considerable stakeholder involvement). **Compile Status Report** (if one doesn't currently exist) and begin a **Planning** process. [**Status Rpt, Plan**]. End here.
- 16a.** If the species is ranked S2S3, S3, or S3S4 and is found nowhere else in Canada or is ranked SX, S1, or S2 and is found on federal lands and/or is under federal jurisdiction, **Compile Status Report** and **Send to COSEWIC** [**Status Rpt, COSEWIC**] and go to **17**.
- 16b.** The species is ranked S4 or S4S5, or is found elsewhere in Canada and is not found on federal lands and/or under federal jurisdiction. Go to **17**.
- 17a.** The species' decline (number of populations, range or number of individuals) is attributable to legal or illegal harvest. **Review Resource Use** or increase enforcement and undertake a management **Planning** process [**Review Use, Plan**]. If additional factors contribute to the decline go to **18**.
- 17b.** Species' decline is not attributable to legal or illegal harvest, go to **18**.
- 18a.** Observed or projected habitat loss is a factor in the species' decline. Go to **19**.
- 18b.** Observed or projected habitat loss is not a factor putting the species at risk. Go to **20**.
- 19a.** Habitat tools are adequate to protect the species and halt or reverse declines, and / or there are no other factors putting the species at risk. Determine land tenure and use **Habitat Protection** tools [**Hab Protect**] and/or **Habitat Restoration** tools [**Hab Restore**]; and if the species occurs on private land, or crown land with tenure or rights holders, renters or leasers, apply **Private Land Stewardship** techniques to manage the habitat [**Private Land**]. If issues cannot be addressed immediately, or if the recovery requires addressing several factors, research, or considerable stakeholder involvement, **Compile Status Report** and undertake management **Planning** process [**Status Rpt, Plan**]. End here.
- 19b.** In addition to habitat loss there are other factors putting the species at risk. Determine land tenure and use **Habitat Protection** tools [**Hab Protect**] and/or **Habitat Restoration** tools [**Hab Restore**]; and if the species occurs on private land, or crown land with tenure or rights holders, renters or leasers, apply **Private Land Stewardship** techniques to manage the habitat [**Private Land**] and go to **20**.
- 20a.** Non-habitat factors (e.g., disease, alien species, hybridization, succession) put the species at risk, and the use of **Species and Population Management** tools is sufficient to address the issue(s) (i.e. secure population or down-list), and multi-stakeholder involvement is not required. [**Species Mgmt**]. End here.
- 20b.** Non-habitat factors (e.g., disease, alien species, hybridization, succession) put the species at risk. Apply **Species and Population Management** tools [**Species Mgmt**]. If issues cannot be addressed immediately, or if the recovery requires addressing several factors, research, or considerable stakeholder involvement, **Compile Status Report** and undertake management **Planning** process [**Status Rpt, Plan**]. End here.

Some action groupings are dependent on another group; for example **Compiling a Status Report** [**Status Rpt**] usually will precede action groups where considerable money or human resources are required such as **Planning** processes [**Plan**] or **Listing under the Wildlife Act** is recommended [**Wildlife Act**] or **Send to COSEWIC** [**COSEWIC**].

Appendix I: Responsibility classes and terms employed during ranking.

Class	Proportion of population or range in British Columbia
1	Endemic: 100% of the range, area or population within the province. Within British Columbia, endemism generally occurs at the subspecific level. Some populations appear to represent incipient endemism
2	very high; 75 to 99% responsibility
3	High; 51 to 74% responsibility
4	moderately high; 30 to 50% responsibility
5	Intermediate; 11 to 29% responsibility
6	low and wide spread; <10% global responsibility but occurs over >30% of the province
7	low and localized; <10% global responsibility and is localized, occurring in <30% of the province

Appendix II: An explanation of NatureServe G and S ranks⁵

Basic Ranks

Rank	Definition
GX	Presumed Extinct (species) — Not located despite intensive searches and virtually no likelihood of rediscovery. Eliminated (ecological communities)—Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic species.
GH	Possibly Extinct (species) — Missing; known from only historical occurrences but still some hope of rediscovery. Presumed Eliminated — (Historic, ecological communities)-Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration, for example, American Chestnut Forest.
G1	Critically Imperiled —At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2	Imperiled —At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3	Vulnerable —At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4	Apparently Secure —Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5	Secure —Common; widespread and abundant.

Variant Ranks

Rank	Definition
G#G#	Range Rank —A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community. A G2G3 rank would indicate that there is a roughly equal chance of G2 or G3 and other ranks are much less likely. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4).
GU	Unrankable —Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. Whenever possible, the most likely rank is assigned and a question mark qualifier may be added (e.g., G2?) to express minor uncertainty, or a range rank (e.g., G2G3) may be used to delineate the limits (range)

⁵ NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: April 23, 2008).

	of uncertainty.
GNR	Unranked —Global rank not yet assessed.
GNA	Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Rank Qualifiers

Rank	Definition
?	Inexact Numeric Rank —Denotes some uncertainty about the numeric rank (e.g. G3? - Believed most likely a G3, but some chance of either G2 or G4).
Q	Questionable taxonomy —Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority.
C	Captive or Cultivated Only —At present extant only in captivity or cultivation, or as a reintroduced population not yet established.

Intraspecific Taxon Conservation Status Ranks

Intraspecific taxa refer to subspecies, varieties and other designations below the level of the species. Intraspecific taxon status ranks (T-ranks) apply to plants and animal species only; these T-ranks do not apply to ecological communities.

Rank	Definition
T#	Intraspecific Taxon (trinomial)—The status of intraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T-rank cannot imply the subspecies or variety is more abundant than the species as a whole—for example, a G1T2 cannot occur. A vertebrate animal population, such as those listed as distinct population segments under the U.S. Endangered Species Act, may be considered an intraspecific taxon and assigned a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status. At this time, the T rank is not used for ecological communities.

National and Subnational Conservation Status Definitions

Listed below are definitions for interpreting NatureServe conservation status ranks at the national (N-rank) and subnational (S-rank) levels. The term "subnational" refers to state or province-level jurisdictions (e.g., California, Ontario).

Assigning national and subnational conservation status ranks for species and ecological communities follows the same general principles as used in assigning global status ranks. A subnational rank, however, cannot imply that the species or community is more secure at the state/province level than it is nationally or globally (i.e., a rank of G1S3 cannot occur), and similarly, a national rank cannot exceed the global rank. Subnational ranks are assigned and maintained by state or provincial natural heritage programs and conservation data centers.

National (N) and Subnational (S) Conservation Status Ranks

Status	Definition
NX SX	Presumed Extirpated —Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
NH SH	Possibly Extirpated (Historical) —Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
N1 S1	Critically Imperiled —Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

N2 S2	Imperiled —Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
N3 S3	Vulnerable —Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
N4 S4	Apparently Secure —Uncommon but not rare; some cause for long-term concern due to declines or other factors.
N5 S5	Secure —Common, widespread, and abundant in the nation or state/province.
NNR SNR	Unranked —Nation or state/province conservation status not yet assessed.
NU SU	Unrankable —Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
NNA SNA	Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
N#N# S#S#	Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
Not Provided	Species is known to occur in this nation or state/province. Contact the relevant natural heritage program for assigned conservation status.

Contact information for individual natural heritage programs is available at <http://www.natureserve.org/visitLocal/index.jsp>.

Breeding Status Qualifiers

Qualifier	Definition
B	Breeding —Conservation status refers to the breeding population of the species in the nation or state/province.
N	Nonbreeding —Conservation status refers to the non-breeding population of the species in the nation or state/province.
M	Migrant —Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the nation or state/province.

Appendix III: NatureServe Trend and Threat Evaluation⁶

Threat:

The threats fields are used to evaluate the impact of extrinsic threats, which typically are anthropogenic but may be natural. The impact of human activity may be direct (e.g., destruction of habitat) or indirect (e.g., invasive species introduction). Effects of natural phenomena (e.g., fire, hurricane, flooding) may be especially important when the Element⁷ is concentrated in one location or has few occurrences, which may be a result of human activity.

Threats can be characterized in terms of scope (what proportion of the area is affected), severity (how badly and irreversibly the area of occupancy of the Element is affected), and immediacy (how likely the threat is and how soon it is expected); the term magnitude is sometimes used to refer to scope and severity together. Threats should be considered collectively, and the foreseeable threat with the greatest magnitude is the one to be considered for the Threats fields. Scope, severity, and immediacy of threat are combined into an overall degree of threat (Table 1).

SCOPE OF THREAT

⁶ Biotics 4 Help version 2007-01-11

⁷ Element refers to a species, subspecies, variety, form, or unnamed “species” that is valid and defensible

Value that indicates, for the threat with the greatest overall impact on the Element, the proportion of the Element that is observed, inferred, or suspected to be directly or indirectly affected by this threat within the specified geographic level (i.e., within BC).

Domain values for Scope of Threat are:

- High** = > 60% of total population, occurrences, or area affected
- Moderate** = 20-60% of total population, occurrences, or area affected
- Low** = 5-20% of total population, occurrences, or area affected
- Insignificant** = < 5% of total population, occurrences, or area affected
- Unknown** = Unknown (proportion of population, occurrences, or area affected is unknown)
- (null)** = Rank factor not assessed.

SEVERITY OF THREAT

Value that indicates, for the threat with the greatest overall impact on the Element, how badly and irreversibly the Element is observed, inferred, or suspected to be directly or indirectly affected by the threat within the specified geographic level (i.e., within BC).

Domain values for Severity of Threat are:

- High** = Loss of species population (all individuals) or destruction of species habitat or ecological community in area affected, with effects essentially irreversible or requiring long-term recovery (>100 years).
- Moderate** = Major reduction of species population or long-term degradation or reduction of species habitat or ecological community in area affected, requiring 50-100 years for recovery
- Low** = Low but nontrivial reduction of species population or reversible degradation or reduction of species habitat or ecological community in area affected, with recovery expected in 10-50 years
- Insignificant** = Essentially no reduction of species population or degradation of species habitat, ecological community or System due to threats, with ability to recover quickly (within 10 years) from minor temporary loss
- Unknown** = Unknown (degree of impact on population, occurrences, or area is unknown)
- (null)** = Rank factor not assessed.

IMMEDIACY OF THREAT

Indicates, for the threat with the greatest overall impact on the Element, the imminence of the threat to the Element (i.e., how likely the threat to the Element is and how soon it is expected to be realized) within the specified geographic level (i.e., within BC).

Domain values for Immediacy of Threat are:

- High** = Threat is operational (happening now) or imminent (within a year)
- Moderate** = Threat is likely to be operational within 2-5 years
- Low** = Threat is likely to be operational within 5-20 years
- Insignificant** = Threat not likely to be operational within 20 years
- Unknown** = Unknown (how soon the threat will likely be realized is unknown)
- (null)** = Rank factor not assessed.

Table 1: Overall degree to which the Element is observed, inferred, or suspected to be directly or indirectly threatened within the specified geographic level (e.g., within BC) by the threat with the greatest overall impact on the Element.

SEVERITY	SCOPE	IMMEDIACY	VALUE	DESCRIPTION
High	High	High	A	Substantial, imminent threat. Threat is moderate to severe and imminent (within 5 years) for most (> 60%) of the population, occurrences, or area. Ecological community or System occurrences are directly impacted over a widespread area, either causing irreversible damage or requiring long-term recovery
High	High	Moderate		
Moderate	High	High		
Moderate	High	Moderate		

High	Moderate	High	B	Moderate and imminent threat. Threat is moderate to severe and imminent (within 5 years) for a significant proportion (20-60%) of the population, occurrences, or area. Ecological community or System occurrences are directly impacted over a moderate area, either causing irreversible damage or requiring a long-term recovery.
High	Moderate	Moderate		
Moderate	Moderate	High		
Moderate	Moderate	Moderate		
High	High	Low	C	Substantial, non-imminent threat. Threat is moderate to severe but not imminent (> 5 years) for most (> 60%) of the population, occurrences, or area.
Moderate	High	Low		
High	Moderate	Low	D	Moderate, non-imminent threat. Threat is moderate to severe but not imminent for a significant portion of the population, occurrences, or area.
Moderate	Moderate	Low		
High	Low	High	E	Localized substantial threat. Threat is moderate to severe for a small but significant proportion of the population, occurrences, or area. Ecological community or System occurrences are directly impacted over a small area, or in a small portion of their range, but threats require a long-term recovery.
High	Low	Moderate		
High	Low	Low		
Moderate	Low	High		
Moderate	Low	Moderate		
Moderate	Low	Low		
Low	High	High	F	Widespread, low-severity threat. Threat is of low severity but affects (or would affect) most or a significant portion of the population, occurrences, or area. Ecological community occurrences are not threatened severely, with changes reversible and recovery moderately rapid.
Low	High	Moderate		
Low	High	Low		
Low	Moderate	High		
Low	Moderate	Moderate		
Low	Moderate	Low		
Low	Low	High	G	Slightly threatened. Threats, while recognizable, are of low severity, or affecting only a small portion of the population, occurrences, or area. Ecological community or System occurrences may be altered in minor parts of range or degree of alteration falls within the natural variation of the type.
Low	Low	Moderate		
Low	Low	Low		

For many Elements, several threats with similar severity and immediacy exist such that more occurrences are threatened collectively (by different threats) than would be threatened by a single threat. In such cases, threats that do exist to the species or community should be described in the Threat Comments field, and then information should be provided in the Scope, Severity and Immediacy fields to represent the overall threat to the Element, taking into account the different threats and their overall scope and their relative severity and immediacy.

If only two of the three parameters are known, the threat value will be calculated by treating the unknown (or not assessed [null]) parameter as **Low**.

If only one of the entries in the three fields is rated (as **High**, **Moderate**, or **Low**), the resulting threat value will be **U = Unknown**.

If any of the three entries is **Insignificant**, the resulting threat value will be **H = Unthreatened**.

Short-term Trend:

Code that best describes the observed, estimated, inferred, suspected, or projected short-term trend in population size, extent of occurrence, area of occupancy, number of occurrences (EOs), and/or viability/ecological integrity of occurrences (whichever most significantly affects the Heritage Conservation

Status Rank) within the specified geographic level (i.e., range-wide for global, within-nation for national, or within-state or province for subnational). Short-term trends may be recent, current, or projected, and a trend may or may not be known to be continuing.

For species, short-term trends are typically considered over the period spanning the past 10 years or 3 generations (whichever is longer up to a maximum of 100 years).

In considering short-term trends, newly discovered but presumably long existing occurrences should not be considered to represent an increasing trend, nor newly discovered individuals in previously little-known occurrences. Also, increases in the number of occurrences due to fragmentation of previously larger occurrences into more but smaller occurrences should not be considered to represent an increasing trend, but instead fragmentation of occurrences should be considered as indicative of a decreasing area of occupancy.

Domain values for Short-Term Trend are:

A = Severely declining (decline of >70% in population size, range, area occupied, and/or number or condition of occurrences)

B = Very rapidly declining (decline of 50-70%)

C = Rapidly declining (decline of 30-50%)

D = Declining (decline of 10-30%)

E = Stable (unchanged or remaining within $\pm 10\%$ fluctuation)

F = Increasing (increase of >10%)

U = Unknown (short-term trend unknown)

(null) = Rank factor not assessed

Long-term Trend:

Code that best describes the observed, estimated, inferred, or suspected degree of change in population size, extent of occurrence, area of occupancy, number of occurrences (EOs), and/or viability/ecological integrity of occurrences over the long-term (ca. the past 200 years) within the specified geographic level (i.e., range-wide for global, within-nation for national, or within-state or province for subnational).

Domain values for Long-Term Trend are

A = Very large decline (decline of >90%, with <10% of population size, range, area occupied, and/or number or condition of occurrences remaining)

B = Large decline (decline of 75-90%)

C = Substantial decline (decline of 50-75%)

D = Moderate decline (decline of 25-50%)

E = Relatively stable ($\pm 25\%$ change)

F = Increasing (increase of >25%)

U = Unknown (long-term trend in population size, range, area occupied, or number or condition of occurrences unknown)

(null) = Rank factor not assessed

Appendix IV: Detailed description of action groups

Below is a list of activities and management actions that may occur under each Action Group (See Table below). Some actions are based on existing programs and processes, others will require further development as the Conservation Framework is implemented. Some action groups are also linked, for example:

- A status report is needed before a species can be considered for listing under the *Wildlife Act*.
- Inventory and monitoring may be required before appropriate on-the-ground conservation tools can be identified and applied.

Action Group	Code	Definition
Assessing		
Review Status Rank	Rev Status	Latest trend and threat information may not be incorporated: return to CDC (S-ranks and estimated G Ranks) or NatureServe (G-ranks) for re-evaluation.
Compile Status Report	Status Rpt	Compile or update a status report. May require research on threats, trends, habitat use, life history or demography.
Inventory	Inventory	Inventory the species to confirm or determine status rank. May require research on inventory techniques.
Monitor Trends	Monitor Trends	Monitor the species or its habitat at an interval appropriate to the life history of the organism. May require research on monitoring techniques.
Review Taxonomy	Taxonomy	Invest in taxonomic studies to determine taxonomic validity.
Planning & Listing		
Planning	Plan	Determine the type of planning process required. Includes preparing a Management Plan, Recovery Strategy and Action Plan, Land Use Plan, or updating an existing plan. Also includes implementing and monitoring effectiveness of the plan and monitoring trends, habitat or threats. May require research on threats and mitigation, habitat use and recovery techniques.
List under Wildlife Act	Wildlife Act	List under <i>Wildlife Act</i> as an Extirpated, Endangered or Threatened species. Includes describing residences as per the provisions of the act where warranted.
Send to COSEWIC	COSEWIC	Send to COSEWIC for assessment as a first step to listing under the federal <i>Species at Risk Act</i> as Extirpated, Endangered, Threatened, or Special Concern, or for re-assessment at a higher or lower risk category.
Acting		
Habitat Protection	Hab Protect	Use legislation, policies and guidelines to protect the species' habitat. For example, <i>Forest & Range Practices Act</i> , protected areas, stewardship, and best management practices. May require research on habitat needs or inventory to determine suitable areas for protection.
Habitat Restoration	Hab Restore	Apply management and/or restoration techniques to maintain or restore the species' habitat. Includes invasive plant control, maintaining key structures, fire suppression and prescribed burning. May require research into species' habitat requirements and use.

Action Group	Code	Definition
Private Land Stewardship	Private Land	This group contains a subset of species from the Habitat Protection and Restoration action groups that are of conservation concern but occur on private land, or crown land with tenure or rights holders, renters or leasers, or in situations outside the scope of more traditional legislation, policies, and formal guidelines.
Species & Population Management	Species Mgmt	Assign to appropriate management tools to address non-habitat threats. For example, captive breeding, translocation, disease management, alien predator or competitor control, public education. May require research and monitoring.
Review Resource Use	Review Use	Adjust harvest levels and/or increase penalties and enforcement.
No New Action	No New Actn	Existing management is effective, no additional conservation action is warranted. Assess whether ongoing programs need to be maintained. May require effectiveness evaluation of existing activities and monitoring of the species and habitat.

Assessing action groups

Review Status Rank (Code: Rev Status)

- Assess trends and threats, ensure information is current. This could involve literature review, or inventory and monitoring.
- Resolve species rank.
 - Ensure provincial S-rank is accurate and current.
 - If G-rank is believed to be inaccurate or out-of-date, send to NatureServe for re-evaluation.

Compile Status Report (Status Rpt)

- Identify existing knowledge gaps, e.g.: status, occurrence, threats.
- Identify the threats or causes of mortality, extirpation, and/or population decrease or loss.
- Identify potential future impacts from climate change.
- Identify habitat threats or impacts.
- May require research to address knowledge gaps
- Prepare a species status report (if no COSEWIC or BC status report exists) or update an existing report with the following information: status summary, occurrence and distribution, biology & habitat, trends, threats, legal protection, management options.
- Identify inventory and monitoring requirements, management actions.

Inventory (Inventory)

- Develop an inventory program to determine species distribution and abundance.
- Identify existing gaps in knowledge e.g. occurrence records are out-of-date, no comprehensive survey information.
- Carry out predictive habitat modeling to determine appropriate inventory sites.
- Inventory the species to confirm or determine status rank. (Inventory to inform habitat tool implementation is a Habitat Protection or Habitat Restoration action).
- Conduct surveys at new or historical sites, areas identified through habitat mapping, or suspected areas.
- Determine population distribution.
- Encourage landowners (public or private) and tenure holders to inventory for the species on their land and report occurrences.
- Identify synergies among inventory needs, e.g., develop an inventory program for several species based on location, methodology and priority.

- Compile data and report results, inform downstream management actions, e.g., species listing and protection measures.
- May require research on inventory methodology or effectiveness.

Monitor Trends (Monitor Trends)

- Population or habitat monitoring to document trends and health of species, habitats, or populations. Does not include effectiveness evaluation. Monitoring to determine the effectiveness of management activities, etc. is a Habitat Protection, Habitat Restoration, or Species and Population Management action.
 - Develop a monitoring protocol (establish advisory team, define objectives, study design, obtain funding).
 - Conduct baseline monitoring, review, implement, report out.
- Species Monitoring
 - Determine population trend over time.
 - Determine minimum viable population size.
 - Develop, test or improve population viability analysis.
 - Mark-recapture studies to determine population trends, migratory paths.
 - Identify dispersal barriers, population bottlenecks, or reasons for loss of species genetic diversity.
- Habitat Monitoring
 - Monitor the species' habitat for changes in suitability, degradation etc.
 - Monitor threats. May include monitoring of threats as an indicator of habitat suitability or population health e.g. toxicity levels in wetlands, pesticide levels.
 - Develop or test habitat suitability model and/or produce habitat maps to guide inventory, monitoring or management directions.
- May require research on monitoring techniques.

Review Taxonomy (Taxonomy)

- Identify and conduct research required to resolve species taxonomy.
- Identify opportunities for collaboration and development of taxonomic research e.g. with universities and/or museums.

Planning & listing action groups

Planning (Plan)

- Determine the most appropriate planning process to use (e.g. recovery plan, management plan, land use plan, greenways plan, municipal zoning).
- Decisions about the type of planning process (single species, landscape, or ecosystem) and the level of planning required (full recovery team, technical advisory group, or species expert) will be informed by factors such as: whether there is an existing planning process in place; primary land tenure; species distribution; the number of species; and the nature of the threats.
- A status report may be prepared for the species prior to initiation of a planning process.
- Convene a recovery team or ecosystem-based management working group or land use plan round table, etc. as appropriate.
- May require cross-jurisdictional management (states, provinces, countries).
- Standardized templates for initiation of planning, including terms of reference for recovery teams, are customized to the planning process.
- Standardized templates for the preparation of recovery strategies, action plans, and management plans are followed.
- Conduct external review and consultation of draft plan.
- Identify timeframe for implementation.
- In most cases, implementation of plans occurs through a shared stewardship approach, involving non-government partners and external funding sources. In some cases, government decisions are required to determine what portions of the plans will be implemented.
- Research needs may be identified in a planning document.
- May require research into species biology & ecology, threats, and recovery techniques.

- May include provision of science advice on habitat needed to meet recovery goals and objectives.
- May require population monitoring, effectiveness evaluation of recommended actions and adaptive management.

Send to COSEWIC (COSEWIC)

- Send to COSEWIC for assessment or re-assessment, as a first step to listing, up-listing, or down-listing under the Federal *Species at Risk Act*.

List under the *Wildlife Act* (Wildlife Act)

- A species must have a detailed status assessment and be considered threatened (S2), endangered (S1) or extirpated within BC in order to be considered for listing under the *Wildlife Act*.
- A species' residence may also be listed and protected under the *Wildlife Act*. A residence description and guidelines for protection will be developed.
- Decision to list a species or residence lies with the cabinet.
- A species may be reassessed over time and subsequently up-listed, down-listed or de-listed, as necessary.

Acting action groups

Habitat Protection (Hab Protect)

- Protect the species' habitat using available legislation, policies or guidelines.
- Identify land or habitat ownership or jurisdiction.
- Types of legal protection include:
 - Parks and protected areas – established through *Park Act*, *Ecological Reserve Act*, *National Parks Act*, Wildlife Management Areas, Municipal Parks, Greenways, Regional Parks, private lands managed for conservation, conservation lands owned, leased or managed by wildlife agencies or conservation groups, biodiversity ranches, conservation easements, agreements, and covenants.
 - Wildlife Habitat Areas, Wildlife Habitat Features, Ungulate Wintering Ranges – Established under the *Forest & Range Practices Act*, applicable only to land under forestry tenure.
 - Establishment of reserves – under the *Mineral Act*, *Land Act*, *Coal Act*, applicable to relevant tenure holders.
 - Wildlife Management Areas – under the *Wildlife Act*, applicable to Crown managed land.
 - Sensitive Streams and Riparian Area Regulation – *Fish Protection Act*.
- May require a stewardship approach to habitat protection, i.e. encourage landowners (public or private) to identify & protect habitat. See *Private Land Stewardship* action group.
- Stewardship programs – predominantly associated with private land tenure, e.g. land covenant.
- Develop or implement Best Management Practices, Memorandum of Understanding – guidelines for habitat protection.
- Incorporate species habitat management into Official Community Plans, Regional Growth Strategies, and First Nation land use plans.
- Identify and/or prioritize sites for conservation and protection.
- Identify and apply tools to protect Critical Habitat, as recommended in a recovery strategy.
- Implement specific programs or regulation or establishing areas for protection of species habitat.
- May require inventory to determine or confirm where species occurs, and to determine appropriate locations for habitat protection measures.
- Will require effectiveness monitoring.

Habitat Restoration (Hab Restore)

- Apply habitat management tools such as fencing or enclosures to exclude domestic animals, people and vehicles; installing nest boxes; fire suppression or prescription burn techniques.
- Control of one or more invasive native or non-native species that are impacting the species' habitat e.g. scotch broom & ivy in a Garry Oak ecosystem. Does not include control of invasive

species that are directly competing with or predated on the target species (see Species & Population Management).

- Maintain or recruit additional key structures (nesting snags, coarse woody debris, water bodies, etc.)
- Restore habitat through a variety of means, including invasive species control, erosion control, re-vegetation, restoring hydrological function.
- May require a stewardship approach to habitat management. See *Private Land Stewardship* action group.
- Research into species' habitat requirements, associations and use.
- May require research on restoration techniques and effectiveness evaluation.

Private Land Stewardship (Private Land)

- Species are assigned to this action group if they appear in either Habitat Protection or Habitat Restoration and the species occurs on private land or crown land with tenure or rights holders, renters or leasers. In these cases a stewardship approach to habitat protection or management may apply.

Species and Population Management (Species Mgmt)

Develop or implement a specific program, strategy or management technique that addresses non-habitat related threats, and does not contribute to habitat protection or restoration. Examples of species and population management tools include:

- Research into causes of non-habitat threats and application of tools.
- Captive breeding and head-starting.
- Translocation and re-introduction.
- Control of invasive native or non-native species that are predated on or competing with the target species e.g., bull frog impacts on native amphibians. Control of invasive species that are impacting the target species' habitat is included in the Habitat Restoration bin.
- Disease control & management.
- Pollution control management strategies.
- Remove or reduce dispersal barriers or manage population bottlenecks.
- Access management.
- Strategies to mitigate the loss of a species' genetic diversity.
- Strategies to mitigate human-caused mortality (e.g., roadkill).
- Investigate or determine socio-economic impacts of species.
- Develop or implement Best Management Practices, Memorandum of Understanding – guidelines for management of non-habitat related threats.
- Public education and outreach.
- May require a stewardship approach.

Review Resource Use (Review Use)

- Request harvest adjustments e.g. shortened seasons, limited entry, adjusting quotas, closing seasons. Harvests adjustments are made by the Fish & Wildlife Branch (MoE), in association with the Provincial Hunting Regulation Advisory Committee, via an Order in Council.
- Penalties can be adjusted through a regulation to change the *Wildlife Act*.
- Increase or target enforcement activities of Conservation Officers (Compliance Division, MoE).

No New Action (No New Actn)

- No action required; or existing management is adequate and should be continued.
- Assess whether existing programs need to be maintained or changed as necessary.
- May require effectiveness evaluation of existing activities and monitoring of the species and habitat.
- Reassess on a regular basis.