

**British Columbia Guide to Recovery Planning
for Species and Ecosystems**

Appendix 5. Guidance for Threat Assessments

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**Ministry of
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1 THREATS

Threat classification for provincial recovery documents is based on the IUCN-CMP (World Conservation Union–Conservation Measures Partnership) unified threats classification system. This threats classification system is used by the B.C. Conservation Framework and the Conservation Data Centre. For a detailed description of the threat classification system, see Salafsky *et al.* (2008), and information on the [IUCN-CMP: The Conservation Measures Partnership website](#). The majority of the instructions for assigning threat values come from the threats section in [Master *et al.* \(2009\)](#).

1.1 Classification of Threats

Observed, inferred, or suspected threats are classified using the threats presented in Table 1. There are 11 broad (“Level 1”) categories of threats, and each of these Level 1 threats includes more specific, finer (“Level 2”) threats. For each identified threat the scope, severity, timing, and impact are determined. (See Section 2 on how to complete the threat classification table provided in the recovery document templates.)

Table 1. Classification of direct threats to biodiversity (adapted from Table 1 in Salafsky *et al.* 2008).

Note: Level 1 and 2 threats are linked to additional supporting information on the [IUCN-CMP website](#).

| Level 1 threats | Description of Level 1 threats | Level 2 threats | Description of Level 2 threats |
|--|---|--|---|
| 1 Residential & Commercial Development | Threats from human settlements or other non-agricultural land uses with a substantial footprint | 1.1 Housing & Urban Areas | Human cities, towns, and settlements including non-housing development typically integrated with housing |
| | | 1.2 Commercial & Industrial Areas | Factories and other commercial centres |
| | | 1.3 Tourism & Recreation Areas | Tourism and recreation sites with a substantial footprint |
| 2 Agriculture & Aquaculture | Threats from farming and ranching as a result of agricultural expansion and intensification, including silviculture, mariculture, and aquaculture | 2.1 Annual & Perennial Non-Timber Crops | Crops planted for food, fodder, fibre, fuel, or other uses |
| | | 2.2 Wood & Pulp Plantations | Stands of trees planted for timber or fibre outside of natural forests, often with non-native species |
| | | 2.3 Livestock Farming & Ranching | Domestic terrestrial animals raised in one location on farmed or non-local resources (farming); also domestic or semi-domesticated animals allowed to roam in the wild and supported by natural habitats (ranching) |
| | | 2.4 Marine & Freshwater Aquaculture | Aquatic animals raised in one location on farmed or non-local resources; also hatchery fish allowed to roam in the wild |

| Level 1 threats | Description of Level 1 threats | Level 2 threats | Description of Level 2 threats |
|---|---|---|--|
| <u>3 Energy Production & Mining</u> | Threats from production of non-biological resources | 3.1 Oil & Gas Drilling | Exploring for, developing, and producing petroleum and other liquid hydrocarbons |
| | | 3.2 Mining & Quarrying | Exploring for, developing, and producing minerals and rocks |
| | | 3.3 Renewable Energy | Exploring, developing, and producing renewable energy |
| <u>4 Transportation & Service Corridors</u> | Threats from long, narrow transport corridors and the vehicles that use them including associated wildlife mortality | 4.1 Roads & Railroads | Surface transport on roadways and dedicated tracks |
| | | 4.2 Utility & Service Lines | Transport of energy & resources |
| | | 4.3 Shipping Lanes | Transport on and in freshwater and ocean waterways |
| | | 4.4 Flight Paths | Air and space transport |
| <u>5 Biological Resource Use</u> | Threats from consumptive use of “wild” biological resources including both deliberate and unintentional harvesting effects; also persecution or control of specific species | 5.1 Hunting & Collecting Terrestrial Animals | Killing or trapping terrestrial wild animals or animal products for commercial, recreation, subsistence, research, or cultural purposes, or for control/persecution reasons; includes accidental mortality/bycatch |
| | | 5.2 Gathering Terrestrial Plants | Harvesting plants, fungi, and other non-timber/non-animal products for commercial, recreation, subsistence, research, or cultural purposes, or for control reasons |
| | | 5.3 Logging & Wood Harvesting | Harvesting trees and other woody vegetation for timber, fibre, or fuel |
| | | 5.4 Fishing & Harvesting Aquatic Resources | Harvesting aquatic wild animals or plants for commercial, recreation, subsistence, research, or cultural purposes, or for control/persecution reasons; includes accidental mortality/bycatch |
| | | 6.1 Recreational Activities | People spending time in nature or traveling in vehicles outside of established transport corridors, usually for recreational reasons |
| | | 6.2 War, Civil Unrest, & Military Exercises | Actions by formal or paramilitary forces without a permanent footprint |
| <u>6 Human Intrusions & Disturbance</u> | Threats from human activities that alter, destroy, and disturb habitats and species associated with non-consumptive uses of biological resources | 6.3 Work & Other Activities | People spending time in or traveling in natural environments for reasons other than recreation, military activities, or research |
| | | 7.1 Fire & Fire Suppression | Suppression or increase in fire frequency and/or intensity outside of its natural range of variation |
| | | 7.2 Dams & Water Management/Use | Changing water flow patterns from their natural range of variation either deliberately or as a result of other activities |
| <u>7 Natural System Modifications</u> | Threats from actions that convert or degrade habitat in service of “managing” natural or semi-natural systems, often to improve human welfare | | |

| Level 1 threats | Description of Level 1 threats | Level 2 threats | Description of Level 2 threats |
|--|---|---|---|
| 8 Invasive & Other Problematic Species & Genes | Threats from non-native and native plants, animals, pathogens/microbes, or genetic materials that have or are predicted to have harmful effects on biodiversity following their introduction, spread and/or increase in abundance | 7.3 Other Ecosystem Modifications | Other actions that convert or degrade habitat in service of “managing” natural systems to improve human welfare |
| | | 8.1 Invasive Non-Native/Alien Species | Harmful plants, animals, pathogens, and other microbes not originally found within the ecosystem(s) in question and directly or indirectly introduced and spread into it by human activities |
| 9 Pollution | Threats from introduction of exotic and/or excess materials or energy from point and nonpoint sources | 8.2 Problematic Native Species | Harmful plants, animals, or pathogens and other microbes that are originally found within the ecosystem(s) in question, but have become “out-of-balance” or “released” directly or indirectly due to human activities |
| | | 8.3 Introduced Genetic Material | Human altered or transported organisms or genes |
| | | 9.1 Household Sewage & Urban Waste Water | Water-borne sewage and non-point runoff from housing and urban areas that include nutrients, toxic chemicals, and/or sediments |
| | | 9.2 Industrial & Military Effluents | Water-borne pollutants from industrial and military sources including mining, energy production, and other resource extraction industries that include nutrients, toxic chemicals, and/or sediments |
| | | 9.3 Agricultural & Forestry Effluents | Water-borne pollutants from agricultural, silvicultural, and aquaculture systems that include nutrients, toxic chemicals, and/or sediments including the effects of these pollutants on the site where they are applied |
| | | 9.4 Garbage & Solid Waste | Rubbish and other solid materials including those that entangle wildlife |
| 10 Geological Events | Threats from catastrophic geological events | 9.5 Air-Borne Pollutants | Atmospheric pollutants from point and nonpoint sources |
| | | 9.6 Excess Energy | Inputs of heat, sound, or light that disturb wildlife or ecosystems |
| | | 10.1 Volcanoes | Volcanic events |
| | | 10.2 Earthquakes / Tsunamis | Earthquakes and associated events |
| 11 Climate Change & Severe Weather | Threats from long-term climatic changes that may be linked to global warming and other severe climatic/weather events that are outside of the natural range of variation, or | 10.3 Avalanches / Landslides | Avalanches or landslides |
| | | 11.1 Habitat Shifting & Alteration | Major changes in habitat composition and location |

| Level 1 threats | Description of Level 1 threats | Level 2 threats | Description of Level 2 threats |
|-----------------|--|-----------------------------------|--|
| | potentially can wipe out a vulnerable species or habitat | 11.2 Droughts | Periods in which rainfall falls below the normal range of variation |
| | | 11.3 Temperature Extremes | Periods in which temperatures exceed or go below the normal range of variation |
| | | 11.4 Storms & Flooding | Extreme precipitation and/or wind events |

1.2 Scope of a Threat

Scope is defined herein as the proportion of the species or ecosystem that can reasonably be expected to be affected by the threat within 10 years with continuation of current circumstances and trends (Table 2). Current circumstances and trends include both existing as well as potential new threats. The 10-year timeframe can be extended for some longer-term threats, such as global warming, that need to be addressed today. For species, scope is measured as the proportion of the species' population in the area of interest affected by the Threat. For ecosystems, scope is measured as the proportion of the occupied area of interest affected by the Threat. If a species or ecosystem is evenly distributed, then the proportion of the population or area affected is equivalent to the proportion of the range extent affected by the threat; however, if the population or area is patchily distributed, then the proportion differs from that of range extent.

Table 2. Scoring the scope of identified threats.

| Scope of threats scoring | |
|--------------------------|---|
| Pervasive | Affects all or most (71–100%) of the total population or occurrences |
| Large | Affects much (31–70%) of the total population or occurrences |
| Restricted | Affects some (11–30%) of the total population or occurrences |
| Small | Affects a small (1–10%) proportion of the total population or occurrences |

Note: Scope is typically assessed within a 10-year timeframe.

1.3 Severity of a Threat

Within the scope of the threat, severity is the level of damage to the species or ecosystem from the threat that can reasonably be expected with continuation of current circumstances and trends (including potential new threats) (Table 3). Note that severity of threats is assessed within a 10-year or three-generation timeframe, whichever is longer (up to 100 years).

For species, severity is usually measured as the degree of reduction of the species' population. Surrogates for adult population size (e.g., area) should be used with caution, as occupied areas, for example, will have uneven habitat suitability and uneven population density. For ecosystems, severity is typically measured as the degree of degradation or decline in integrity (of one or more key characteristics).

Table 3. Scoring the severity of a threat.

| Severity of threats scoring | |
|------------------------------------|--|
| Extreme | Within the scope, the threat is likely to destroy or eliminate the occurrences of an ecological community, system, or species, or reduce the species population by 71–100% |
| Serious | Within the scope, the threat is likely to seriously degrade/reduce the affected occurrences or habitat or, for species, to reduce the species population by 31–70% |
| Moderate | Within the scope, the threat is likely to moderately degrade/reduce the affected occurrences or habitat or, for species, to reduce the species population by 11–30% |
| Slight | Within the scope, the threat is likely to only slightly degrade/reduce the affected occurrences or habitat or, for species, to reduce the species population by 1–10% |

Note: Severity is assessed within a 10-year or three-generation timeframe, whichever is longer (up to 100 years).

1.4 Timing of a Threat

Although timing (immediacy) is recorded for threats to the area of interest, it is not used in the calculation of threat impact. See Table 4 for guidance on determining the timing of the threat.

Table 4. Scoring the timing of a threat.

| Timing of threats scoring | |
|----------------------------------|---|
| High | Continuing |
| Moderate | Only in the future (could happen in the short term [less than 10 years or three generations]), or now suspended (could come back in the short term) |
| Low | Only in the future (could happen in the long term), or now suspended (could come back in the long term) |
| Insignificant/ Negligible | Only in the past and unlikely to return, or no direct effect but limiting |

1.5 Impact of a Threat

Threat impact (or magnitude) is the degree to which a species or ecosystem is observed, inferred, or suspected to be directly or indirectly threatened in the area of interest. The impact of a threat is based on the interaction between assigned scope and severity values, and includes categories of very high, high, medium, and low.

Threat impact reflects a reduction of a species population or decline/degradation of the area of an ecosystem. As shown in Table 5, the median rate of population reduction or area decline for each combination of scope and severity corresponds to the following classes of threat impact: very high (75% declines), high (40%), medium (15%), and low (3%).

Table 5. The relationship of threat impact and population reduction or ecosystem decline or degradation.

| | | Scope | | | |
|----------|----------|-----------|-------|------------|-------|
| | | Pervasive | Large | Restricted | Small |
| Severity | Extreme | 50–100 | 22–70 | 8–30 | 1–10 |
| | Serious | 22–70 | 10–49 | 3–21 | 1–7 |
| | Moderate | 8–30 | 3–21 | 1–9 | 0.1–3 |
| | Slight | 1–10 | 0–7 | 1–3 | < 1 |

■ Very High;
 ■ High;
 ■ Medium;
 ■ Low

1.6 Stress

The IUCN-CMP threats classification system distinguishes between the stress on the target and the direct threat (i.e., the source of the stress). A stress is not a threat in and of itself, but rather it is the condition or aspect (key ecological, demographic, or individual attribute) of the conservation target that is impaired or reduced by the threat. Stresses are not captured explicitly in the IUCN-CMP process, but they are useful for management planning, so a column to capture information on stresses has been included in the threats table found in the template. Examples of stresses include indirect or accidental mortality; reduced productivity; reduced fitness; increased incidence of disease or parasitism; and loss of pollinator or host species.

2 COMPLETING THE THREAT CLASSIFICATION TABLE

Using the best available information populate the threat classification table following the methods outlined below. Include all observed, inferred, or suspected threats to the species or ecosystem. Be sure to address all threats discussed in the COSEWIC status report but do not hesitate to re-evaluate or add to the list of threats if new information is available.

2.1 Threat Assessment Process

1. Check with the Recovery Planning Coordinator to obtain (1) any threat assessments already completed for the species of interest by the Conservation Data Centre, and (2) a threats calculator spreadsheet to assist with completion of the threats assessment.
2. Starting with any existing threat assessment information (e.g., done by the Conservation Data Centre or the species status report), identify observed, inferred, and suspected threats to the species. Threat identification should be based on the best available evidence. Therefore, authors may update existing threat assessments based on new or more up to date information.

Review the threat categories provided in Table 1 and determine which threat classifications apply to your species/ecosystem.

3. Record an estimate of the scope (Table 2), severity (Table 3), and timing (Table 4) in the threat calculator or threat classification table for each applicable individual threat to the species or ecosystem (see methods outlined in Section 1 of this document). These threats will either be recorded as:
 - Level 2 threats; or

- Level 1 threat categories for which Level 2 threats will not be recorded.

Note: If only Level 1 threat categories are being recorded for the species or ecosystem, skip step 5 below.

Range values may be used to express uncertainty in the threat assessment. Range values should not cover more than two steps on a scale (e.g., scope may be expressed as pervasive, large and pervasive, restricted but not pervasive, small). Range values may be appropriate for a Level 1 threat category when one or more of the Level 2 threats contained within have an assigned range value.

4. Apply the scope and severity values recorded in step 1 to the matrix (Table 6) to calculate the impact (i.e., magnitude) for each assessed threat and record the value in the threats classification table. If the assigned scope or severity value is a range, evaluate the highest values in the range for scope with the highest for severity and then evaluate the pair of lowest values to determine the range of threat impact.

Note: If you are using the threat calculator, this step will be calculated for you.

Table 6. Using scope and severity to derive the impact of a threat.

| | | Scope | | | |
|----------|----------|-----------|--------|------------|-------|
| | | Pervasive | Large | Restricted | Small |
| Severity | Extreme | Very high | High | Medium | Low |
| | Serious | High | High | Medium | Low |
| | Moderate | Medium | Medium | Low | Low |
| | Slight | Low | Low | Low | Low |

5. Record an estimate of scope, severity, and impact for each Level 1 threat category that contains one or more assessed Level 2 threats, based on the values of these Level 2 threats as follows:
 - If there is only one Level 2 threat recorded in the Level 1 category, assign the scope, severity, impact, and timing values of this Level 2 threat to the Level 1 threat in which it is included;
 - If there are multiple Level 2 threats recorded in the Level 1 category, evaluate their degree of overlap:
 - a. If the Level 2 threats overlap, identify which of them has the highest impact and assign the scope, severity, and impact values of this Level 2 threat to the Level 1 category in which it is included;
 - b. If the Level 2 threats are substantially non-overlapping, then higher scope and severity values may be justified for the Level 1 category in which they are included, and best professional judgment should be used to assign scope, severity, impact, and timing values to that Level 1 threat.
6. Record the stress (see Section 1.6) that the threat may cause/exert on the population into the threat classification table.
7. If known, record specific sites (locations) or populations to which the individual threats apply into the threat classification table. In addition to the planning value of this information, doing this may assist with assigning a scope value.

8. If using the threat calculator, copy and paste the information into the threat classification table.
9. Ensure that a copy of the newly completed or revised threats calculator and/or table is submitted to the Recovery Planning Coordinator so that updates or changes to existing threat assessments can be provided to the Conservation Data Centre.

2.2 Description of the Threats

Provide narrative, as necessary, to better describe the scope, severity, timing, and impact of the threats listed in the threat classification table. List the Level 1 threats in the same order as in the table. Where possible, expand on the scope and specify specific areas or populations that are affected. Where available, provide evidence demonstrating the severity of a threat. Discuss the effects of the threat in terms of the stress to the population.

3 REFERENCES

- International Union for Conservation of Nature and Conservation Measures Partnership (IUCN and CMP). 2006. IUCN – CMP unified classification of direct threats, ver. 1.0 – June 2006. Gland, Switzerland. 17 pp.
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