

British Columbia Guide to Recovery Planning for Species and Ecosystems

Appendix 5. Guidance for Threat Assessments

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1 THREATS

Threats are defined as the proximate activities or processes that have caused, are causing, or may cause in the future the destruction, degradation, and/or impairment of the entity being assessed (population, species, community, or ecosystem) in the area of interest (global, national, or subnational) (adapted from Salafsky *et al.* 2008). For purposes of threat assessment, only present and future threats are considered.¹ Threats presented here do not include limiting factors.²

For the most part, threats are related to human activities, but they can be natural. The impact of human activity may be direct (e.g., destruction of habitat) or indirect (e.g., introduction of invasive species). Effects of natural phenomena (e.g., fire, flooding) may be especially important when the species or ecosystem is concentrated in one location or has few occurrences, which may be a result of human activity (Master *et al.* 2012). As such, natural phenomena are included in the definition of a threat, though should be applied cautiously. These stochastic events should only be considered a threat if a species or habitat is damaged from other threats and has lost its resilience. In such cases, the effect on the population would be disproportionately large compared to the effect experienced historically (Salafsky *et al.* 2008).

Threat classification used in provincial documents is based on the IUCN-CMP (World Conservation Union–Conservation Measures Partnership) unified threats classification system (Section 1.1). This threats classification system is used by the Province of British Columbia especially within the B.C. Conservation Data Centre and the recovery planning program. For a detailed description of the threat classification system see Salafsky *et al.* (2008) and information on the Open Standards [website](#) (2014). Threats may be observed, inferred, or projected to occur in the near term. Threats are characterized here in terms of scope, severity, and timing. Threat “impact” is calculated from scope and severity (Sections 1.2 to 1.5). Most instructions for assigning threat values come from the threats section in [Master *et al.*](#) (2012).

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.³ As a way to further describe Level 2 threats, categories of “Level 3” threats have been created and are included in Appendix 2 as a reference (International Union for Conservation of Nature and Natural Resources 2014).

¹ Past threats may be recorded but are not used in the calculation of threat impact. Effects of past threats (if not continuing) are taken into consideration when determining long-term and/or short-term trend factors (Master *et al.* 2012).

² It is important to distinguish between limiting factors and threats. Limiting factors are generally not human induced and include characteristics that make the species or ecosystem less likely to respond to recovery/conservation efforts (e.g., inbreeding depression, small population size, and genetic isolation; or likelihood of regeneration or recolonization for ecosystems).

³ 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).

Level 1 threats	Description of Level 1 threats	Level 2 threats	Description of Level 2 threats		
<u>1 Residential & Commercial Development</u>	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		
<u>2 Agriculture & Aquaculture</u>	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		
		<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 and resources		
		4.3 Shipping Lanes	Transport on and in freshwater and ocean waterways		
		4.4 Flight Paths	Air and space transport		

Level 1 threats	Description of Level 1 threats	Level 2 threats	Description of Level 2 threats
5 Biological Resource Use	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 5.2 Gathering Terrestrial Plants 5.3 Logging & Wood Harvesting 5.4 Fishing & Harvesting Aquatic Resources	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 Harvesting plants, fungi, and other non-timber/non-animal products for commercial, recreation, subsistence, research, or cultural purposes, or for control reasons Harvesting trees and other woody vegetation for timber, fibre, or fuel Harvesting aquatic wild animals or plants for commercial, recreation, subsistence, research, or cultural purposes, or for control/persecution reasons; includes accidental mortality/bycatch
6 Human Intrusions & Disturbance	Threats from human activities that alter, destroy, and disturb habitats and species associated with non-consumptive uses of biological resources	6.1 Recreational Activities 6.2 War, Civil Unrest, & Military Exercises 6.3 Work & Other Activities	People spending time in nature or traveling in vehicles outside of established transport corridors, usually for recreational reasons Actions by formal or paramilitary forces without a permanent footprint People spending time in or traveling in natural environments for reasons other than recreation, military activities, or research
7 Natural System Modifications	Threats from actions that convert or degrade habitat in service of “managing” natural or semi-natural systems, often to improve human welfare	7.1 Fire & Fire Suppression 7.2 Dams & Water Management/Use 7.3 Other Ecosystem Modifications	Suppression or increase in fire frequency and/or intensity outside of its natural range of variation Changing water flow patterns from their natural range of variation either deliberately or as a result of other activities Other actions that convert or degrade habitat in service of “managing” natural systems to improve human welfare
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	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

Level 1 threats	Description of Level 1 threats	Level 2 threats	Description of Level 2 threats
		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
		8.4 Problematic Species/Diseases of Unknown Origin	Harmful plants, animals, or pathogens and other microbes of unknown origin. It is not known if they were deliberately or accidentally introduced or if they were originally found within the ecosystem(s) in question.
		8.5 Viral/Prion-Induced Diseases	Viruses are small infectious agents that replicate only inside the living cells of an organism. Although viruses occur universally, each cellular species has its own specific range that often infect only that species. Most viruses co-exist harmlessly in their host and cause no signs or symptoms of disease. However, a number are important pathogens which can result in diseases which significantly reduce reproduction or increase mortality. Prions are infectious agents composed of protein in a misfolded form. They do not contain nucleic acids. All known prion diseases affect the structure of the brain and other neural tissue, they are mainly found in mammals, are currently untreatable and are universally fatal.
		8.6 Diseases of Unknown Cause	Occasionally plants and animals are impacted by diseases of unknown origin and often it may take many years to identify the pathogen responsible.
9 Pollution	Threats from introduction of exotic and/or excess materials or energy from point and nonpoint sources	9.1 Domestic & 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

Level 1 threats	Description of Level 1 threats	Level 2 threats	Description of Level 2 threats
		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
		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
<u>10 Geological Events</u>	Threats from catastrophic geological events	10.1 Volcanoes	Volcanic events
		10.2 Earthquakes / Tsunamis	Earthquakes and associated events
		10.3 Avalanches / Landslides	Avalanches or landslides
<u>11 Climate Change & Severe Weather</u>	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 potentially can wipe out a vulnerable species or habitat	11.1 Habitat Shifting & Alteration	Major changes in habitat composition and location
		11.2 Droughts	Periods in which rainfall is 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
		11.5 Other Impacts	Other impacts of climate change or severe weather events not covered above (list the specific type of impacts)

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

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. Typically assessed within a 10-year timeframe.

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
Negligible	Affects a negligible (< 1%) proportion of the total population or occurrences

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 for species is assessed within a 10-year or 3-generation⁴ timeframe, whichever is longer (up to 100 years). For ecosystems severity of threats is assessed within a 20-year timeframe.

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.

⁴ Generation: Generation length is the average age of parents of a cohort (i.e., newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural (i.e., pre-disturbance) generation length should be used (COSEWIC 2014; see Table 6). Revised guidance on calculating generation length is available in Section 4.4 of IUCN Standards and Petitions Subcommittee (2011).

Table 3. Scoring the severity of a threat (for species within a 10-year or 3-generation timeframe, whichever is longer [up to 100 years]; for ecosystems within a 20-year timeframe).

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%
Negligible	Within the scope, the threat is likely to negligibly degrade/reduce the affected occurrences or habitat or, for species, to reduce the species population by < 1%
Neutral or Potential Benefit ^a	Within the scope, the “threat” is likely to improve or not affect occurrences or habitat or, for species, to be neutral or to improve (a net benefit) the species population by > 0%

^aThreat may have some localized negative effects, but overall is thought to not affect or be a benefit to the species. For example, a forest fire may directly affect some individuals of a browsing ungulate, and produce a short-term loss of habitat. However, over the 3-generation timeframe, there is a benefit to the population as a whole due to regeneration of browse species post-fire.

1.4 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 4, 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%).

For example, if scope is large and severity is serious then the calculated threat impact comes out as high. What this means is that in the next 10 years, we predict that this threat is going to drive a population reduction or ecosystem decline over the next 3 generations by 10-49% (refer to Table 4).

Table 4. 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

It is not always possible to assign an impact category of very high, high, medium, or low to a threat. For a complete list of impact categories, see Table 5. These additional categories include:

- Negligible: when the value for scope or severity is negligible.
- Unknown: used when impact cannot be determined (e.g., if values for either scope or severity are unknown).
- Not a Threat: when severity is scored as neutral or a potential benefit.
- Not Calculated: impact is not calculated if threat is outside the assessment timeframe (e.g., timing is insignificant/negligible or low, as threat is only considered to be in the past).

Table 5. Using scope and severity to derive the impact of a threat.

		Scope					
		Pervasive	Large	Restricted	Small	Negligible	Unknown
Severity	Extreme	Very high	High	Medium	Low	Negligible	Unknown
	Serious	High	High	Medium	Low	Negligible	Unknown
	Moderate	Medium	Medium	Low	Low	Negligible	Unknown
	Slight	Low	Low	Low	Low	Negligible	Unknown
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Unknown
	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
	Neutral or Potential Benefit	Not a threat	Unknown				

Impact: ■ Very high; ■ High; ■ Medium; ■ Low; Negligible/Unknown/Not a threat

1.5 Timing of a Threat

The timing (immediacy) of threats is recorded, but is not used in the calculation of threat impact (i.e., only scope and severity are used to calculate threat impact). Only threats that are continuing, or expected to happen in the short term, are considered in the calculation of threat impact. Threats that have occurred in the past (Insignificant/Negligible) or that are thought to happen only in the long term (Low) are not considered. See Table 6 for guidance on scoring the timing of the threat.

Table 6. Scoring the timing of a threat.

Timing of threats scoring	
High	Continuing
Moderate	Only in the future (could happen in the short term [< 10 years or 3 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

2 COMPLETING THE THREAT CLASSIFICATION TABLE

Using the best available information, populate the threat classification table following the methods outlined below (see Appendix 1). 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 becomes available.

2.1 Threat Assessment Process

1. Obtain any threat assessments that have already been completed for the species of interest by the Conservation Data Centre or in the status report (check with the Recovery Planning Coordinator); and download a [threats calculator](#) (NatureServe 2014) 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 the generation time (for species only) and determine the 3-generation timeframe for use when scoring severity.
4. Record an estimate of the scope (Table 2), severity (Table 3), and timing (Table 6) 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. (*If only Level 1 threat categories are being recorded for the species or ecosystem, skip step 5 below.*)
5. Record a justification for your scoring, include references whenever possible (see Section 2.2). If known, record specific sites (locations) or populations to which the individual threats apply in the comments. Doing this may assist with assigning a scope value.

Note:

- The threat classification is meant to be comprehensive. However, sometimes even after referring to the guidance, there may be uncertainty about how to categorize the threat. In these cases, decide which threat category you will use and document this decision. It is important that threats are not double counted.

- Range values may be used to express uncertainty due to a lack of knowledge in the threat assessment (i.e., not the variability in response to a threat). Range values cannot cover more than two steps on a scale (e.g., scope may be expressed as pervasive-large or 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.
6. 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 threats calculator, this step will be calculated for you.

7. For each threat impact calculated, check that the value assigned is appropriate for that threat. Ask yourself: “In the next 10 years, is the threat going to drive a population reduction or ecosystem decline over the next 3 generations (or 10 years, whichever is longer) by the range of percentages given in Table 4?” If the answer does not ring true/possible, reconsider your scoring for scope and severity.
8. 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.
9. Ensure the threats calculator has been saved after each category has been scored. Saving the file will update the overall impact value assigned by the threat calculator. File naming format: Species_Latin_Name_Threats_Location (e.g., BC)_Date (DDMONYYYY).
10. Review the overall impact value assigned by the threat calculator. Ensure the value assigned seems reasonable/appropriate. A justification must be provided if any adjustments are made.
11. Transfer information from the threat calculator into the threat classification table in the recovery planning document. Delete rows for threats that do not apply to the species. Note

that rows should never be deleted from the Threats Calculator to ensure a record of discussion is maintained.

12. Ensure that a copy of the newly completed or revised threats calculator 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 a narrative to better describe the threats to the species listed in the threat classification table. List the Level 1 threats in the same order as in the table. Include IUCN Level 2 sub-headings as appropriate (if needed for ease of reading). Only include narrative for threat categories with a threat impact value of negligible if it is important to provide an explanation to the reader as to how this outcome was determined.

The narrative should support the values recorded in the threats assessment table and provide context so that readers can understand the reasoning behind the scoring. Where possible, expand on the scope and specify specific areas or populations that are affected. This may include indicating where existing protection mechanisms are in place and to what extent they mitigate the threat (if known). Where available, provide evidence demonstrating the severity of a threat.

For each threat, discuss the effect it has on the **population** (i.e., population-level impact, not impact to individuals). Indicate what life stage(s) of the species it affects and the specific life-cycle process (i.e., function) that is being affected or if the threat results in direct mortality (e.g., roadkill; removal by tilling). Include and provide an explanation for all of the relevant activities within any given threat category.

If the threat affects the species' habitat, explain how it may degrade, either permanently or temporarily, the habitat such that it would not be able to serve its **function**⁵ when needed by the species. Where appropriate and possible, provide thresholds (e.g., draw-down of lake below 2 m or noise above X decibels during breeding season; keep cattle off the site during flowering, seed set, and dispersal time which is from XX month until XX month) beyond which destruction of the habitat would occur; reference best management practices or guidelines as applicable. The risk of the activity continuing at any level may also be estimated if it provides further clarification. When quantitative thresholds cannot be determined based on the best available information, provide qualifiers that describe the timeframe and level of intensity of the activity (e.g., describe as "intensive livestock use" rather than simply "grazing"). Indicate if additional research is required to determine specifically what level of the activity (e.g., livestock use, forest harvesting) would be detrimental to the species.

It is important to be as specific as possible when describing the link between the activity and the impact to the habitat (**Effect-Pathway**). As known, describe the **features**⁶ and **attributes**⁷ of the

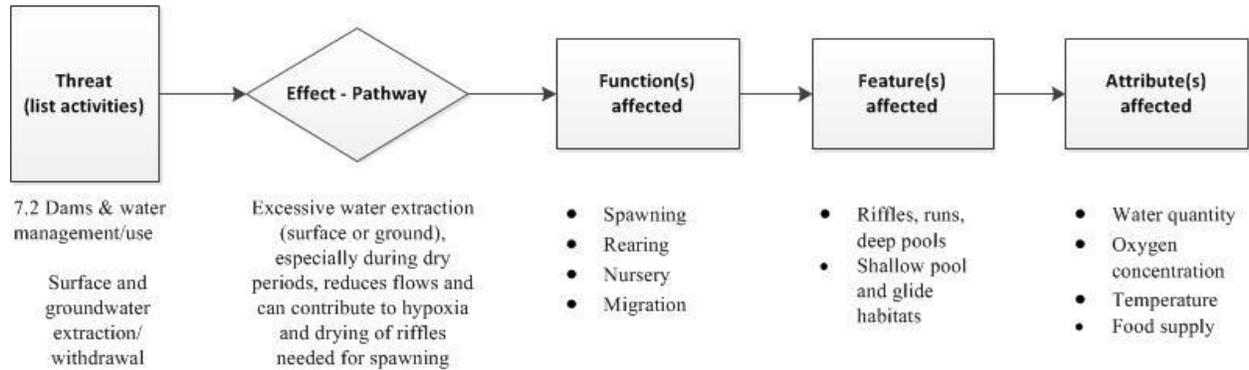
⁵ Function: a life-cycle process of the species (e.g., include either animal or plant examples: spawning, breeding, denning, nursery, rearing, feeding/foraging and migration; flowering, fruiting, seed dispersing, germinating, seedling development).

⁶ Feature: the essential structural components of the habitat required by the species.

⁷ Attribute: the building blocks or measurable characteristics of a feature.

habitat that are affected. For example, instead of “results in habitat loss,” state “intensive use by ATVs results in disturbance and compaction of soil, including the destruction of gopher soil-mounds required for seed germination.”

Below is a schematic to work through when describing threats to a species’ habitat. An example is provided below it.



This section should provide enough detail to help inform the management of these activities to avoid or mitigate the threats identified to the species.

3 REFERENCES

- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2014. COSEWIC's assessment process and criteria. November 2011.
<http://www.cosewic.gc.ca/pdf/Assessment_process_and_criteria_e.pdf> [Accessed August 2014]
- International Union for Conservation of Nature and Natural Resources. 2014. Threats classification scheme (Version 3.2). <<http://www.iucnredlist.org/technical-documents/classification-schemes/threats-classification-scheme>> [Accessed February 2014]
- IUCN Standards and Petitions Subcommittee. 2011. Guidelines for using the IUCN Red List categories and criteria. Version 9.0. Prepared by the Standards and Petitions Subcommittee in September 2011.
<<http://www.iucnredlist.org/documents/RedListGuidelines.pdf>> [Accessed August 2014]
- Master, L.L., D. Faber-Langendoen, R. Bittman, G.A. Hammerson, B. Heidel, L. Ramsay, K. Snow, A. Teucher, and A. Tomaino. 2012. NatureServe conservation status assessments: factors for evaluating species and ecosystems at risk. NatureServe, Arlington, VA.
<http://www.natureserve.org/sites/default/files/publications/files/natureserveconservation_statusfactors_apr12_1.pdf> [Accessed August 2014]
- NatureServe. 2014. Threat assessment calculator *in* NatureServe conservation status assessments: rank calculator Version 3.18. NatureServe, Arlington, VA.
<<http://www.natureserve.org/conservation-tools/conservation-rank-calculator>> [Accessed January 8, 2015]
- Open Standards. 2014. Threats taxonomy. <<http://cmp-openstandards.org/using-os/tools/threats-taxonomy/>> [Accessed August 2014]
- Salafsky, N., D. Salzer, A.J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S.H.M. Butchart, B. Collen, N. Cox, L.L. Master, S. O'Connor, and D. Wilkie. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. *Conserv. Biol.* 22:897–911.

APPENDIX 1. THREAT CLASSIFICATION TABLE.

Table X. Threat classification table for **Species X**. (delete rows not used)

Threat # ^a	Threat description	Impact ^b	Scope ^c	Severity ^d	Timing ^e	Population(s) or location(s) or site(s)
1	Residential & commercial development					
1.1	Housing & urban areas					
1.2	Commercial & industrial areas					
1.3	Tourism & recreation areas					
2	Agriculture & aquaculture					
2.1	Annual & perennial non-timber crops					
2.2	Wood & pulp plantations					
2.3	Livestock farming & ranching					
2.4	Marine & freshwater aquaculture					
3	Energy production & mining					
3.1	Oil & gas drilling					
3.2	Mining & quarrying					
3.3	Renewable energy					
4	Transportation & service corridors					
4.1	Roads & railroads					
4.2	Utility & service lines					
4.3	Shipping lanes					
4.4	Flight paths					
5	Biological resource use					
5.1	Hunting & collecting terrestrial animals					
5.2	Gathering terrestrial plants					
5.3	Logging & wood harvesting					
5.4	Fishing & harvesting aquatic resources					
6	Human intrusions & disturbance					
6.1	Recreational activities					
6.2	War, civil unrest, & military exercises					
6.3	Work & other activities					

Threat # ^a	Threat description	Impact ^b	Scope ^c	Severity ^d	Timing ^e	Population(s) or location(s) or site(s)
7	Natural system modifications					
7.1	Fire & fire suppression					
7.2	Dams & water management/use					
7.3	Other ecosystem modifications					
8	Invasive & other problematic species, genes & diseases					
8.1	Invasive non-native/alien species/diseases					
8.2	Problematic native species/diseases					
8.3	Introduced genetic material					
8.4	Problematic species/diseases of unknown origin					
8.5	Viral/prion-induced diseases					
8.6	Diseases of unknown cause					
9	Pollution					
9.1	Domestic & urban waste water					
9.2	Industrial & military effluents					
9.3	Agricultural & forestry effluents					
9.4	Garbage & solid waste					
9.5	Air-borne pollutants					
9.6	Excess energy					
10	Geological events					
10.1	Volcanoes					
10.2	Earthquakes/tsunamis					
10.3	Avalanches/landslides					
11	Climate change & severe weather					
11.1	Habitat shifting & alteration					
11.2	Droughts					
11.3	Temperature extremes					
11.4	Storms & flooding					
11.5	Other impacts					

^a Threat numbers are provided for Level 1 threats (i.e., whole numbers) and Level 2 threats (i.e., numbers with decimals).

^b **Impact** – The degree to which a species is observed, inferred, or suspected to be directly or indirectly threatened in the area of interest. The impact of each threat is based on severity and scope rating and considers only present and future threats. Threat impact reflects a reduction of a species population or decline/degradation of the area of an ecosystem. 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%). Unknown: used

when impact cannot be determined (e.g., if values for either scope or severity are unknown); Not Calculated: impact not calculated as threat is outside the assessment time (e.g., timing is insignificant/negligible [past threat] or low [possible threat in long term]); Negligible: when scope or severity is negligible; Not a Threat: when severity is scored as neutral or potential benefit.

^c **Scope** – Proportion of the species that can reasonably be expected to be affected by the threat within 10 years. Usually measured as a proportion of the species' population in the area of interest. (Pervasive = 71–100%; Large = 31–70%; Restricted = 11–30%; Small = 1–10%; Negligible < 1%).

^d **Severity** – Within the scope, the level of damage to the species from the threat that can reasonably be expected to be affected by the threat within a 10-year or 3-generation timeframe. For this species a 10-year timeframe was used [OR] generation time of # years ([insert reference if available]) was used resulting in severity being scored over a #-year timeframe. Usually measured as the degree of reduction of the species' population. (Extreme = 71–100%; Serious = 31–70%; Moderate = 11–30%; Slight = 1–10%; Negligible < 1%; Neutral or Potential Benefit ≥ 0%).

^e **Timing** – High = continuing; Moderate = only in the future (could happen in the short term [< 10 years or 3 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.

APPENDIX 2. IUCN THREATS CLASSIFICATION SCHEME WITH THIRD-LEVEL THREATS

In addition to this list below, the International Union for Conservation of Nature and Natural Resources (2014) also has a [working document](#) that provides a list of the threat types with definitions, examples of the threats and guidance notes on using the scheme.

1 Residential & commercial development

- 1.1 Housing & urban areas
- 1.2 Commercial & industrial areas
- 1.3 Tourism & recreation areas

2 Agriculture & aquaculture

- 2.1 Annual & perennial non-timber crops
 - 2.1.1 Shifting agriculture
 - 2.1.2 Small-holder farming
 - 2.1.3 Agro-industry farming
 - 2.1.4 Scale unknown/unrecorded
- 2.2 Wood & pulp plantations
 - 2.2.1 Small-holder plantations
 - 2.2.2 Agro-industry plantations
 - 2.2.3 Scale unknown/unrecorded
- 2.3 Livestock farming & ranching
 - 2.3.1 Nomadic grazing
 - 2.3.2 Small-holder grazing, ranching or farming
 - 2.3.3 Agro-industry grazing, ranching or farming
 - 2.3.4 Scale unknown/unrecorded
- 2.4 Marine & freshwater aquaculture
 - 2.4.1 Subsistence/artisanal aquaculture
 - 2.4.2 Industrial aquaculture
 - 2.4.3 Scale unknown/unrecorded

3 Energy production & mining

- 3.1 Oil & gas drilling
- 3.2 Mining & quarrying
- 3.3 Renewable energy

4 Transportation & service corridors

- 4.1 Roads & railroads
- 4.2 Utility & service lines
- 4.3 Shipping lanes
- 4.4 Flight paths

5 Biological resource use

5.1 Hunting & collecting terrestrial animals

- 5.1.1 Intentional use (species being assessed is the target)
- 5.1.2 Unintentional effects (species being assessed is not the target)
- 5.1.3 Persecution/control
- 5.1.4 Motivation unknown/unrecorded

5.2 Gathering terrestrial plants

- 5.2.1 Intentional use (species being assessed is the target)
- 5.2.2 Unintentional effects (species being assessed is not the target)
- 5.2.3 Persecution/control
- 5.2.4 Motivation unknown/unrecorded

5.3 Logging & wood harvesting

- 5.3.1 Intentional use: subsistence/small scale (species being assessed is the target) [harvest]
- 5.3.2 Intentional use: large scale (species being assessed is the target) [harvest]
- 5.3.3 Unintentional effects: subsistence/small scale (species being assessed is not the target) [harvest]
- 5.3.4 Unintentional effects: large scale (species being assessed is not the target) [harvest]
- 5.3.5 Motivation unknown/unrecorded

5.4 Fishing & harvesting aquatic resources

- 5.4.1 Intentional use: subsistence/small scale (species being assessed is the target) [harvest]
- 5.4.2 Intentional use: large scale (species being assessed is the target) [harvest]
- 5.4.3 Unintentional effects: subsistence/small scale (species being assessed is not the target) [harvest]
- 5.4.4 Unintentional effects: large scale (species being assessed is not the target) [harvest]
- 5.4.5 Persecution/control
- 5.4.6 Motivation unknown/unrecorded

6 Human intrusions & disturbance

- 6.1 Recreational activities
- 6.2 War, civil unrest & military exercises
- 6.3 Work & other activities

7 Natural system modifications

7.1 Fire & fire suppression

- 7.1.1 Increase in fire frequency/intensity
- 7.1.2 Suppression in fire frequency/intensity
- 7.1.3 Trend unknown/unrecorded

7.2 Dams & water management/use

- 7.2.1 Abstraction of surface water (domestic use)
- 7.2.2 Abstraction of surface water (commercial use)
- 7.2.3 Abstraction of surface water (agricultural use)
- 7.2.4 Abstraction of surface water (unknown use)
- 7.2.5 Abstraction of ground water (domestic use)
- 7.2.6 Abstraction of ground water (commercial use)
- 7.2.7 Abstraction of ground water (agricultural use)
- 7.2.8 Abstraction of ground water (unknown use)
- 7.2.9 Small dams
- 7.2.10 Large dams
- 7.2.11 Dams (size unknown)

7.3 Other ecosystem modifications

8 Invasive & other problematic species, genes & diseases

8.1 Invasive non-native/alien species/diseases

- 8.1.1 Unspecified species
- 8.1.2 Named species

8.2 Problematic native species/diseases

- 8.2.1 Unspecified species
- 8.2.2 Named species

8.3 Introduced genetic material

8.4 Problematic species/diseases of unknown origin

- 8.4.1 Unspecified species
- 8.4.2 Named species

8.5 Viral/prion-induced diseases

- 8.5.1 Unspecified “species” (disease)
- 8.5.2 Named “species” (disease)

8.6 Diseases of unknown cause

9 Pollution

9.1 Domestic & urban waste water

- 9.1.1 Sewage
- 9.1.2 Run-off
- 9.1.3 Type unknown/unrecorded

9.2 Industrial & military effluents

- 9.2.1 Oil spills
- 9.2.2 Seepage from mining
- 9.2.3 Type unknown/unrecorded

9.3 Agricultural & forestry effluents

- 9.3.1 Nutrient loads
- 9.3.2 Soil erosion, sedimentation
- 9.3.3 Herbicides and pesticides
- 9.3.4 Type unknown/unrecorded

9.4 Garbage & solid waste

9.5 Air-borne pollutants

- 9.5.1 Acid rain
- 9.5.2 Smog
- 9.5.3 Ozone
- 9.5.4 Type unknown/unrecorded

9.6 Excess energy

- 9.6.1 Light pollution
- 9.6.2 Thermal pollution
- 9.6.3 Noise pollution
- 9.6.4 Type unknown/unrecorded

10 Geological events

- 10.1 Volcanoes
- 10.2 Earthquakes/tsunamis
- 10.3 Avalanches/landslides

11 Climate change & severe weather

- 11.1 Habitat shifting & alteration
- 11.2 Droughts
- 11.3 Temperature extremes
- 11.4 Storms & flooding
- 11.5 Other impacts

12 Other options

- 12.1 Other threat