Recovery Strategy for the Night Snake (*Hypsiglena torquata*) in British Columbia

Prepared by the Southern Interior Reptile and Amphibian Recovery Team

BRITISH COLUMBIA
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Ministry of Environment

February 2008

About the British Columbia Recovery Strategy Series

This series presents the recovery strategies that are prepared as advice to the Province of British Columbia on the general strategic approach required to recover species at risk. The Province prepares recovery strategies to meet our commitments to recover species at risk under the *Accord for the Protection of Species at Risk in Canada*, and the *Canada – British Columbia Agreement on Species at Risk*.

What is recovery?

Species at risk recovery is the process by which the decline of an endangered, threatened, or extirpated species is arrested or reversed, and threats are removed or reduced to improve the likelihood of a species' persistence in the wild.

What is a recovery strategy?

A recovery strategy represents the best available scientific knowledge on what is required to achieve recovery of a species or ecosystem. A recovery strategy outlines what is and what is not known about a species or ecosystem; it also identifies threats to the species or ecosystem, and what should be done to mitigate those threats. Recovery strategies set recovery goals and objectives, and recommend approaches to recover the species or ecosystem.

Recovery strategies are usually prepared by a recovery team with members from agencies responsible for the management of the species or ecosystem, experts from other agencies, universities, conservation groups, aboriginal groups, and stakeholder groups as appropriate.

What's next?

In most cases, one or more action plan(s) will be developed to define and guide implementation of the recovery strategy. Action plans include more detailed information about what needs to be done to meet the objectives of the recovery strategy. However, the recovery strategy provides valuable information on threats to the species and their recovery needs that may be used by individuals, communities, land users, and conservationists interested in species at risk recovery.

For more information

To learn more about species at risk recovery in British Columbia, please visit the Ministry of Environment Recovery Planning webpage at:

<http://www.env.gov.bc.ca/wld/recoveryplans/rcvry1.htm>

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Disclaimer

This recovery strategy has been prepared by the Southern Interior Reptile and Amphibian Recovery Team, as advice to the responsible jurisdictions and organizations that may be involved in recovering the species. The British Columbia Ministry of Environment has received this advice as part of fulfilling its commitments under the *Accord for the Protection of Species at Risk in Canada*, and the *Canada – British Columbia Agreement on Species at Risk*.

This document identifies the recovery strategies that are deemed necessary, based on the best available scientific and traditional information, to recover Night Snake populations in British Columbia. Recovery actions to achieve the goals and objectives identified herein are subject to the priorities and budgetary constraints of participatory agencies and organizations. These goals, objectives, and recovery approaches may be modified in the future to accommodate new objectives and findings.

The responsible jurisdictions and all members of the recovery team have had an opportunity to review this document. However, this document does not necessarily represent the official positions of the agencies or the personal views of all individuals on the recovery team.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that may be involved in implementing the directions set out in this strategy. The Ministry of Environment encourages all British Columbians to participate in the recovery of the Night Snake.

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The British Columbia Ministry of Environment is responsible for producing a recovery strategy for Night Snake under the *Accord for the Protection of Species at Risk in Canada*. Environment Canada's Canadian Wildlife Service participated in the preparation of this recovery strategy.

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EXECUTIVE SUMMARY

The first recorded sighting of the Night Snake (*Hypsiglena torquata*) in Canada was in 1980. The 36 sightings reported between 1980 and 2004 have occurred only in south-central British Columbia within the hot dry valleys of the South Okanagan and Lower Similkameen drainages. The Night Snake was designated by the Committee on the Status of Endangered Wildlife in Canada as Endangered in 2001 due to small population size, widespread habitat loss, and intense development pressure.

Night Snakes range in total length from 21 to 61 cm. The sides and back have a light brown or grey background with lines of dark brown, paired blotches on the back and two rows of alternating blotches on the sides; the upper row is larger than the lower row. The three distinctive blotches on the back of the neck are sometimes connected. Dark blotches are also present just in front of and behind the eye, which has a vertically elliptical pupil. The belly is whitish or yellowish.

Night Snake habitat includes coniferous forest, shrub-steppe grasslands, and riparian areas, generally below 1000 m in Canada, with talus and rocky outcrops that provide cover.

The goal of this recovery strategy is **to maintain existing populations of Night Snakes in protected[1] habitat that is well distributed throughout the species' range in British Columbia.**

Sufficient information to quantify long-term population and habitat targets is not available. Short-term habitat targets are included in the objectives. Knowledge gaps will be addressed through the objectives and action plan(s) for the species over the next 5 years and a quantified goal will be incorporated into an updated strategy in the future.

Short-term recovery objectives (2008–2012)

I. **To protect a minimum of 1800 ha of occupied Night Snake habitat by 2012.**

II. **To protect a minimum of 6200 ha of suitable Night Snake habitat connecting known sites by 2012.**

III. **Develop and begin implementation of a prioritized research strategy by 2008 to address important knowledge gaps associated with population distribution, ecology, threat clarification and critical habitat by 2012.**

One or more Recovery Action Plans will be completed by 2012.

[1] Protected habitat is Night Snake habitat that is managed to maintain the species over a long time period (> 100 years) including habitat connecting known locations. This may involve protection in any form including following best management practices for maintaining Night Snakes and their habitat, stewardship agreements, conservation covenants, eco-gifts, sale of private lands by willing landowners, land use designations and management of protected habitats.

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BACKGROUND

Species Assessment Information from COSEWIC

Date of Assessment: May 2001
Common Name (population): Night Snake
Scientific Name: *Hypsiglena torquata*
COSEWIC Status: Endangered
Reason for Designation: Only about 20 Night Snakes have been reported in Canada, all from a small region in south-central British Columbia that is under intense development pressure. The combination of small population size, widespread habitat loss, and no possibility of rescue effectively places the Night Snake at imminent risk of extirpation.
Canadian Occurrence: British Columbia
COSEWIC Status History: Designated Endangered in May 2001. Assessment based on a new status report.

Description of the Species

Night Snakes range in total length from 21 to 61 cm (Lacey *et al.* 1996). The sides and back have a light brown or grey background with lines of dark brown blotches and they are shiny compared with other snakes (see cover photo). The back generally has a row of paired blotches. The side has two rows of alternating blotches; the upper row is larger than the lower row. There are three distinctive blotches on the back of the neck, which are sometimes connected. Dark blotches are also present just in front of and behind the eye, which has a vertically elliptical pupil. The belly is whitish or yellowish (Gregory and Campbell 1984).

Populations and Distribution

Night Snake distribution includes Central America and southwestern North America (Figure 1). This species occurs from Costa Rica, throughout much of mainland Mexico and Baja California, north through the western United States to southern British Columbia (COSEWIC 2001). The *deserticola* subspecies is found from southern British Columbia south through central Washington and Oregon to northern Baja California, excluding western California, and in southwestern Idaho, Nevada, western Utah, and northwestern Arizona (Dixon and Dean 1986).

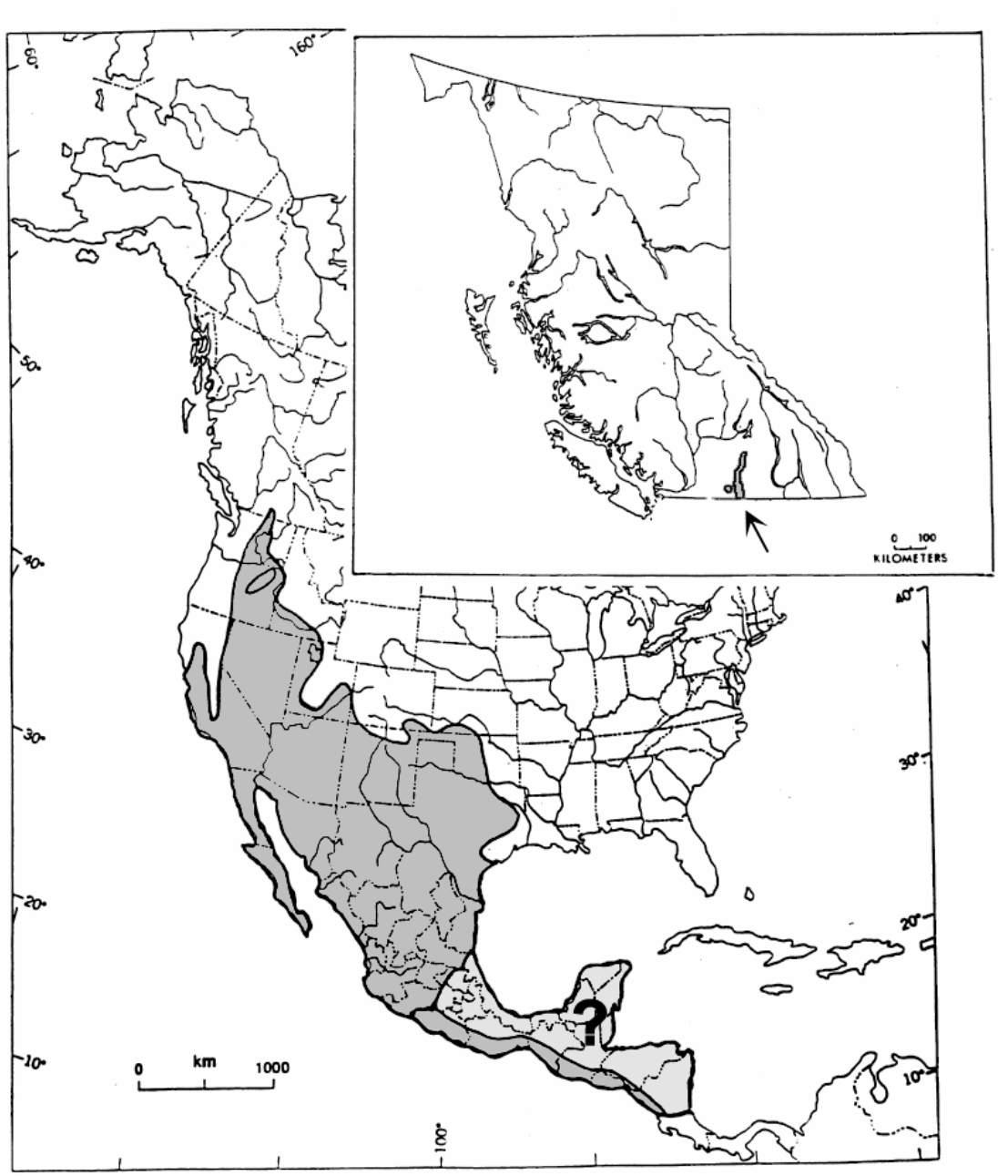

Figure 1. Global distribution of the Night Snake with a B.C. inset (Gregory 2001).

Population estimates are not available. NatureServe assigns the Night Snake a Global Heritage rank of G5, meaning it is globally "common to very common; demonstrably secure and essentially in-eradicable under present conditions." National ranks are N5 in the United States and N1 in Canada. Provincial and state ranks are Arizona (S5), California (S5), Colorado (S3), Idaho (S3), Kansas (S2), Navajo Nation (S4), Nevada (S5), New Mexico (S5), Oklahoma (S3), Oregon (S3), Texas (S5), Utah (S4), Washington (S2), British Columbia (S1) (NatureServe 2004). N1 and S1 ranks, for Canada and British Columbia, respectively, indicate the species is "critically imperilled" within those jurisdictions.

In Canada, the Night Snake is known only from British Columbia in the South Okanagan and Lower Similkameen valleys (Figure 2). However, the species is difficult to detect; the first sighting in Canada was reported in 1980 and the distribution is based on only 36 confirmed sightings from 1980 to 2004, so the range may be more extensive (COSEWIC 2001; M. Sarell unpublished data, 2004). Similar habitats and sympatric reptile species occur well beyond the known range in B.C. A population estimate for the Canadian range is not available (COSEWIC 2001). Canada has less than 1% of the global distribution and world population of Night Snakes.

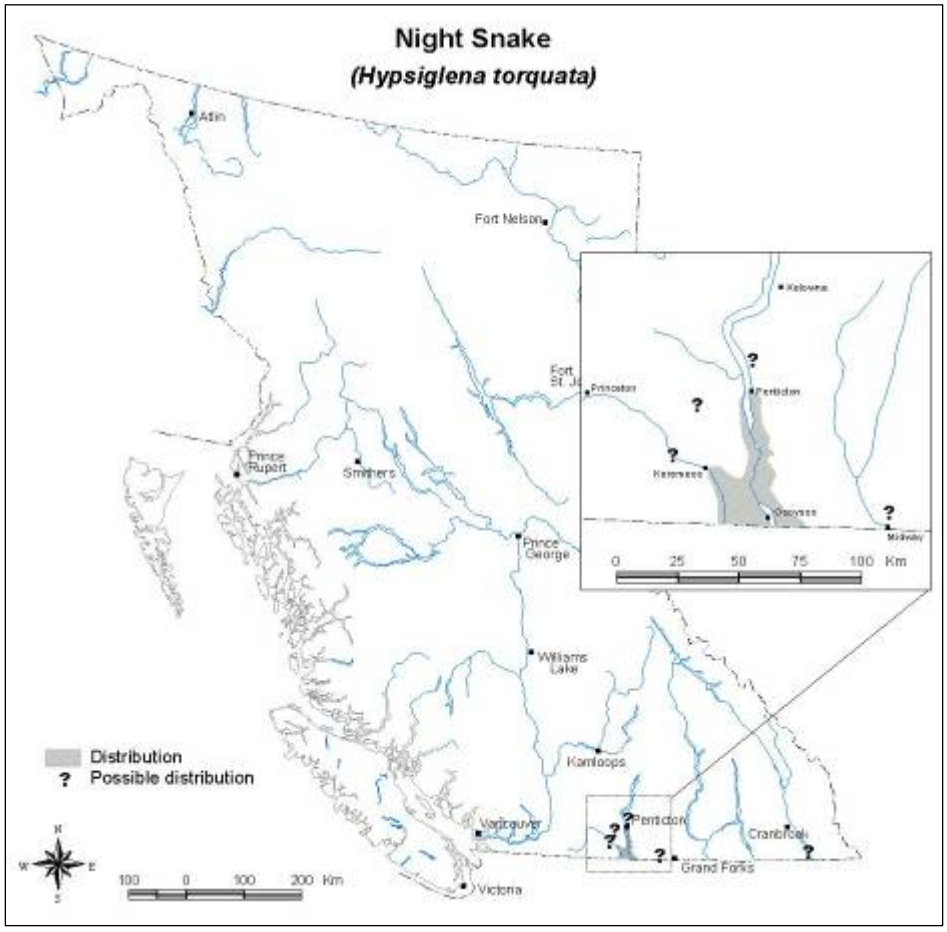

Figure 2. Range of the Night Snake in British Columbia.

Population and distribution trends are not documented but are believed to be declining based on habitat loss and degradation related to extensive agricultural and urban developments within the known range (MELP 1998). Population trends are also assumed to be declining based on direct mortality due to vehicles and feral cats (M. Sarell, pers. comm., 2004).

Needs of the Night Snake

Habitat and biological needs

Little is known about the biological or habitat needs of the Night Snake due to limited occurrence data. Night Snake records in Canada are limited to the very dry, hot, Bunchgrass and Ponderosa Pine biogeoclimatic subzones, mainly below 1000 m in elevation. Habitat must include hibernacula, egg-laying, and foraging sites with suitable cover and prey densities. The species is associated with talus, rock outcrops, sandy areas, shrubs, grassland, riparian areas, and dry forest (Lacey *et al.* 1996; Cannings *et al.* 1999; COSEWIC 2001). Hibernacula, or dens, are not known in B.C. but a den enclosure study in Washington State (Radke 1989) and early spring sightings near Western Rattlesnake (*Crotalus oreganus*) dens in B.C. (M. Sarell, pers. comm., 2004) suggest that Night Snakes and Western Rattlesnakes may use the same hibernacula in talus or rock outcrops. Egg-laying sites are not known but may be similar to Racer (*Coluber constrictor)* sites in sandy soil (COSEWIC 2001). Foraging sites appear to include a number of habitat types but mainly occur in shrub-steppe or open conifer habitat with rock outcrops and talus (Diller and Wallace 1986). Night Snakes eat lizards, skinks and their eggs, frogs and other snakes (COSEWIC 2001). Very little information is available on food preferences in BC, although local biologists speculate that skinks and their eggs are likely very important (M. Sarell, pers. comm., 2004; R. Weaver, pers. comm., 2005). Home range size is not known. Individual home ranges should be connected with suitable habitat to maintain genetic continuity and sizable effective populations.

Ecological role

The Night Snake's ecological role is poorly understood. Night Snakes are predators, primarily of lizards. In turn, they likely are food for a number of other predators including hawks and other snakes (COSEWIC 2001).

Limiting factors

Biologically limiting factors are not known (COSEWIC 2001).

Threats

Description of the threats

Clarification of threats to the Night Snake will be addressed in the action plan for this species (see "the Knowledge Gaps" section below). The following threats are listed in order of severity.

Habitat loss and degradation due to urban and agricultural developments are likely the primary threats to Night Snakes. Habitat is destroyed, degraded, and fragmented through land conversion to housing or agricultural crops, road building, infrastructure to support developments, and other human activities that potentially impede movements and isolate populations. This could affect all aspects of the species' lifecycle; as breeding and hibernation sites are likely lost, prey densities likely decrease, and shelter/cover locations become limited. Rapid decline in habitat quantity and

quality are expected to continue, leading to increased population fragmentation. Gravel extraction and rock quarrying may have significant impacts at some hibernacula.

Accidental mortality caused by vehicles is a significant and widespread threat to ongoing survival of other snake populations and can potentially result in excessive loss of breeding adults where roads or railways intersect seasonal habitats or movement corridors between foraging and hibernation sites (Shewchuk 1996; Bertram *et al.* 2001; Hobbs 2001). Similar to other snakes, Night Snakes sometimes use warm surfaces of paved roads for thermoregulation, making them vulnerable to road mortality (Sullivan 1981; M. Sarell, pers. comm., 2004). Road mortality can substantially reduce snake populations, as documented for other species (Rosen and Lowe 1994). Several road kill records are known for Night Snakes in B.C. but no sites with recurring mortalities have been identified and the degree of impact on the population is unknown. Snake mortality caused by agricultural machinery during haying, tilling, and other crop management activities has been reported from the Thompson and Okanagan regions for other snakes and may also impact Night Snakes. Quarrying, road construction, and utility corridor construction can result in mortality (M. Sarell, pers. comm., 2004).

Disturbance and persecution due to predation by domestic cats have been documented but the degree of impact on the population is not known. Direct persecution by humans, because of similarity to rattlesnakes, may also occur (Cannings *et al.* 1999).

Actions Already Completed or Underway

- Habitat was secured at five suspected dens on land managed by The Nature Trust of British Columbia, Canadian Wildlife Service, and B.C. Parks between 1979 and 2003.
- Best management practices for urban and rural environments were published in 2004.
- Several inventory projects were completed between 1990 and 2004 (Lacey et. Al. 1996; M. Sarell, pers. comm., 2004).
- The South Okanagan–Similkameen Conservation Program was established in 2000 and includes a landowner contact program and has identified known sites as a high priority for contact.

Knowledge Gaps

Biological/ecological research
Specific habitat types such as hibernacula, foraging areas, egg-laying sites, and movement corridors need to be clearly identified and quantified at a detailed scale. Local biology, such as prey preferences, reproduction and survival rates, causes of mortality, and minimum viable populations, are inadequately known and also require investigation. Traditional Ecological Knowledge is not available and is needed to contribute to recovery.

Inventory and monitoring
Population numbers, distribution, and trends are not known; this information is required to determine the rates and areas of population decline, establish population recovery targets, and monitor success of recovery efforts. Detailed inventory and monitoring are required. The general

limits of distribution for the Night Snake in Canada are only roughly known based on limited sighting data. Additional surveys are required within the known range at unsurveyed and historical locations to clarify distribution. In addition, inventory is required at the edges of the known range to clarify the true distribution of this cryptic species. Long-term population monitoring is required to address knowledge gaps regarding population dynamics and ecological requirements. The effect that public outreach activities are having on increasing conservation behaviours must be monitored and evaluated.

Threat clarification

The rate, extent, and specific type of habitat loss should be quantified to direct habitat conservation efforts to the highest risk sites. This should include separate analyses for urban development, agricultural development, and removal of talus and rock. Secondary priorities should also be investigated. These include the relative value, if any, of different agricultural habitats, the significance of direct mortality caused by vehicles and domestic pets, and effective ways to reduce this mortality.

RECOVERY

Recovery Feasibility

Recovery is technically feasible. A breeding population exists throughout most of the known extent of occurrence, based on sightings. A substantial amount (~76,000 ha) of apparently suitable habitat is available, based on habitat modelling by Warman *et al.* (1998). Major threats can be mitigated mainly through conservation of existing habitat, which will be the primary technique for recovering this species. Several sites are already conserved and much of the potential habitat occurs on Crown land. Recovery techniques such as private land habitat acquisition from willing vendors, voluntary private land stewardship, and land use designations on Crown land are available and can be effective.

Table 1. Recovery feasibility

Recovery criteria	Night Snake
1. Are individuals capable of reproduction currently available to improve the population growth rate or population abundance?	Yes.
2. Is sufficient habitat available to support the species or could it be made available through habitat management or restoration?	Yes.
3. Can significant threats to the species or its habitat be avoided or mitigated through recovery actions?	Yes.
4. Do the necessary recovery techniques exist and are they known to be effective?	Yes.

Recovery Goal

To maintain existing populations of Night Snakes in protected[2] habitat that is well distributed throughout the species' range in British Columbia.

Rationale for the Recovery Goal and Objectives

Sufficient information to quantify long-term population and habitat targets is not available. Short-term objectives recommend clarification of this knowledge gap. Knowledge gaps will be addressed through the action plan for this species to clarify recovery goals in the future. It is necessary to maintain the species in the short-term while knowledge gaps are addressed. Short-term habitat protection targets to maintain the species are presented in the objectives below.

The minimum habitat securement target (1800 ha) represents potentially occupied habitat by identifying the "Inferred Minimum Extent of Habitat Use" around known locations. It was calculated using Arcmap GIS by creating a 500m diameter circle around all known sites in suitable habitat. This follows methods suggested by NatureServe (2005), based on similar-sized snakes. Suitable habitat was identified using terrestrial ecosystem mapping to identify rock outcrop and talus. The circles were merged to remove overlaps and the resulting area was calculated. The minimum target for habitat connectivity (6200 ha) was calculated using Arcmap by drawing a corridor, approximately 500 m wide in suitable habitat, between clusters of known sites. These targets are believed to be necessary to support the species in the short-term and achievable in the next 5 years, based on recovery team consensus in absence of strong scientific support. A portion of this area is included in Crown and private protected areas. Portions of the area included in this habitat protection target are likely to overlap with habitat protection targets for several other species at risk including Gopher Snake (*Pituophis catenifer deserticola*) and Western Rattlesnake (*Crotalus oreganus*). Targets are subject to change as more information becomes available.

Recovery Objectives

The recovery objectives for the next 5 years (2008–2012) are to:

I. **Protect a minimum of 1800 ha of occupied Night Snake habitat by 2012.**
II. **Protect a minimum of 6200 ha of suitable Night Snake habitat connecting known sites by 2012.**
III. **Develop and begin implementation of a prioritized research strategy by 2008 to address important knowledge gaps associated with population distribution, ecology, threat clarification and critical habitat by 2012.**

[2] Protected habitat is Night Snake habitat that is managed to maintain the species over a long time period (> 100 years) including habitat connecting known locations. This may involve protection in any form including following best management practices for maintaining Night Snakes and their habitat, stewardship agreements, conservation covenants, eco-gifts, sale of private lands by willing landowners, land use designations and management of protected habitats.

Approaches Recommended to Meet Recovery Objectives

Recovery direction should include a landscape approach to address broad-scale habitat conservation including habitat connectivity and a multi-species approach with other COSEWIC-listed snakes (e.g. Gopher Snake, Western Rattlesnake) or other species that share similar habitat requirements, to address common habitat securement targets, inventory, monitoring, research, and direct mortality mitigation. These approaches must ensure that ecological needs and research topics specific to the Night Snake are explicitly included. Night Snake recovery will be initiated through partnerships coordinated by the South Okanagan–Similkameen Conservation Program.

Recovery planning table

Table 2. Strategies and approaches to achieve recovery objectives

Objectives	Broad strategy/ Approach	Threats or concerns addressed	Priority	Recommended approaches to meet recovery objectives
I, II	Habitat securement	Habitat loss or degradation	Urgent	Prioritize sites for stewardship and securement.
			Urgent	Work with First Nations to identify and implement opportunities for cooperative habitat conservation projects both on and off reserves.
			Urgent	Conserve and manage habitat on Crown land through land use designations and protected areas.
			Necessary	Implement private landowner contact program to increase awareness and develop stewardship practices on occupied habitat or secure habitat through other means.
			Necessary	Work with municipal and regional governments to incorporate habitat stewardship, using best management practices, into planning processes such as Community Plans and bylaws.
I, II, III	Research	Habitat loss or degradation, threats and knowledge gaps	Urgent	Develop and implement a site-specific inventory and monitoring strategy.
		Habitat Loss or Degradation, Disturbance, Persecution, Accidental Mortality and knowledge gaps	Urgent	Develop and begin implementation of a detailed research strategy including prioritized biological and ecological research needs, identification of critical habitat, clarification of threats, and identification of implementation partnerships by 2008. Research will be ongoing. Specific threats include habitat loss and degradation, accidental mortality and persecution.
		Habitat loss or degradation and knowledge gaps	Urgent	Work with Syilx knowledge keepers through the En'owkin Centre, local Indian Bands, and Okanagan Nation Alliance to identify opportunities to include traditional knowledge of the species.
I, II, III	Habitat securement, threats and research	Habitat loss or degradation, disturbance and persecution, and accidental mortality	Necessary	Develop a communications strategy including key audiences, messages, communication material requirements, and community involvement opportunities.

Performance Measures

- Has a prioritized research strategy been developed by 2008?
- Has a communications strategy been developed and initiated by 2009?
- Have high priority research questions, outlined in a Research Strategy, been answered by 2012?
- Have 1800 ha of occupied habitat and 6200 ha of suitable habitat connecting the occupied habitat been protected by 2012? Progress toward these objectives should be documented annually.

Critical Habitat

Identification of the species' critical habitat

No critical habitat, as defined under the federal *Species at Risk Act* [S. 2], is proposed at this time. While some is known about the habitat needs of the Night Snake, more definitive work must be completed before any specific sites can be formally proposed as critical habitat. It is expected that critical habitat for the Night Snake will be identified to the extent possible in the action plan(s) as appropriate. A schedule of studies outlining the work necessary to identify critical habitat is found below.

Recommended schedule of studies to identify critical habitat

Table 3. Schedule of studies to identify critical habitat for the Night Snake in Canada

Description of activity	Outcome/Rationale	Timeline
Inventory and monitor species distribution, abundance, occupied habitat, and potential habitat.	Clarification of population size, distribution, persistence, movement barriers, corridors, land ownership, and site-specific threats, which will facilitate development of quantifiable recovery goals and objectives.	2008–2012
Conduct research to quantify habitat requirements and use for hibernacula, egg-laying, foraging, cover, and movement.	Quantification of hibernacula, egg laying, foraging, cover, home range size, dispersal, and connectivity requirements.	2008–2012
Develop a habitat conservation model and a preliminary population viability model, if possible.	Identification of options for establishing a network of managed sites to support a viable population over a long term (>100 years).	2009–2012

Existing and Recommended Approaches to Habitat Protection

The strategy will be accomplished using a landscape conservation approach mainly through partnerships coordinated by the South Okanagan–Similkameen Conservation Program. A multi-species approach will also be used to conduct research and inventory and to protect habitat for Night Snakes, Western Rattlesnakes, and Gopher Snakes, *deserticola* subspecies.

Some habitat is protected on lands managed by Canadian Wildlife Service, the Nature Trust of BC, The Land Conservancy, and the B.C. Ministry of Environment. The remaining sites occur on various tenures including vacant Crown land, private land, and Indian Reserve land.

There is a strong need to encourage and support the voluntary cooperation of landowners and managers in stewardship activities on a variety of land tenures to make recovery activities successful. This stewardship approach includes different kinds of activities, such as: following guidelines or best management practices, land use designations on Crown lands, conservation agreements, covenants, eco-gifts, or sale of private lands by willing landowners. To be useful, protected habitat needs to be large enough and in adequate condition for this species to carry out its seasonal activities and life history functions.

Effects on Other Species

Negative management impacts on other species are not expected, since habitat conservation actions will target natural conditions and Night Snakes appear to exist at low densities that are not expected to cause significant impacts on prey species. Habitat protection, stewardship, inventory, and research activities for Night Snakes are expected to benefit other COSEWIC-listed species that share its habitat including: Western Rattlesnake, Gopher Snake, *deserticola* subspecies, Racer, Rubber Boa (*Charina bottae*), and Western Skink (*Eumeces skiltonianus*).

Socioeconomic Considerations

Few people are aware that Night Snakes exist in Canada but presentations on its biology and ecology are received with interest. Its cryptic nature precludes regular viewing by the public. It is not harvested socially or commercially for food or natural materials. No information on its significance to aboriginal cultures is currently available.

Recovery of species at risk and restoration of imperilled habitats associated with the South Okanagan–Similkameen landscape will contribute to biodiversity, health, and functioning of the environment. It also will enhance opportunities for appreciation of special spaces and species, thereby contributing to the overall social value of the Southern Interior of British Columbia. The natural beauty of the South Okanagan–Similkameen is an important resource for British Columbians and provides for a robust tourism and recreation industry, which adds value to the local economy. Recovery actions could potentially affect the following socioeconomic sectors: recreation, private land development, and agriculture. The expected magnitude of these effects is unknown and will be clarified in the action plan when a full socioeconomic analysis is completed.

Recommended Approach for Recovery Implementation

Recovery implementation should include habitat conservation at a landscape scale and consider a multi-species approach, incorporating other species dependent on talus, rock outcrops, sandy areas, shrubs, grassland, riparian areas, and dry forest ecosystems in the South Okanagan and Similkameen valleys. These species may include Western Rattlesnake, Gopher Snake, *deserticola* subspecies, Racer, Rubber Boa, Western Skink, and others. A single-species

approach may be required to address some knowledge gaps and threats that may be specific to Night Snakes such as biological/ecological research and threat clarification.

Statement on Action Plans

One ore more action plan(s) will be completed by 2012.

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