

Recovery Strategy for the Pacific Gophersnake (*Pituophis catenifer catenifer*) in Canada

Pacific Gophersnake



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For copies of the recovery strategy, or for additional information on species at risk, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the [Species at Risk \(SAR\) Public Registry](http://www.registrelep-sararegistry.gc.ca)¹.

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¹ <http://www.registrelep-sararegistry.gc.ca>

Preface

The federal, provincial, and territorial government signatories under the [Accord for the Protection of Species at Risk \(1996\)](#)² agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of recovery strategies for listed Extirpated, Endangered, and Threatened species and are required to report on progress within five years after the publication of the final document on the SAR Public Registry.

The Minister of Environment and Climate Change is the competent minister under SARA for the Pacific Gophersnake and has prepared this strategy, as per section 37 of SARA. To the extent possible, it has been prepared in cooperation with the Province of British Columbia as per section 39(1) of SARA.

It was determined that the recovery of the Pacific Gophersnake in Canada is not technically or biologically feasible. The species still may benefit from general conservation programs in the same geographic area and will receive protection through SARA and other federal, and provincial or territorial, legislation, policies, and programs.

The feasibility determination will be re-evaluated as part of the report on implementation of the recovery strategy, or as warranted in response to changing conditions and/or knowledge.

The recovery strategy sets the strategic direction to arrest or reverse the decline of the species, including identification of critical habitat to the extent possible. It provides all Canadians with information to help take action on species conservation. When critical habitat is identified, either in a recovery strategy or an action plan, there may be future regulatory implications, depending on where the critical habitat is identified. SARA requires that critical habitat identified within a national park named and described in Schedule 1 to the *Canada National Parks Act*, the Rouge National Urban Park established by the *Rouge National Urban Park Act*, a marine protected area under the *Oceans Act*, a migratory bird sanctuary under the *Migratory Birds Convention Act, 1994* or a national wildlife area under the *Canada Wildlife Act* be described in the *Canada Gazette*, after which prohibitions against its destruction will apply. For critical habitat located on other federal lands, the competent minister must either make a statement on existing legal protection or make an order so that the prohibition against destruction of critical habitat applies. For any part of critical habitat located on non-federal lands, if the competent minister forms the opinion that any portion of critical habitat is not protected by provisions in or measures under SARA or other Acts of Parliament, or the laws of the province or territory, SARA requires that the Minister recommend that the Governor in Council make an order to prohibit destruction of critical habitat. The discretion to protect critical habitat on non-federal lands that is not otherwise protected rests with the Governor in Council.

² <http://registrelep-sararegistry.gc.ca/default.asp?lang=en&n=6B319869-1#2>

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Executive Summary

The Pacific Gophersnake (*Pituophis catenifer catenifer*) is a relatively large, non-venomous, yellow or cream coloured snake, with dark spots and a dark line across the face, from the eye to the jaw. Pacific Gophersnakes inhabit grassland, open forests, and semi-arid habitats in areas where they still occur.

The last sighting of the Pacific Gophersnake in Canada was on the Gulf Islands in British Columbia, in 1957. The species was designated as Extirpated in 2002 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and it was listed as Extirpated on Schedule 1 of the federal *Species at Risk Act* in 2005. Likewise, the species is ranked SX (extirpated) by the British Columbia Conservation Data Centre, and it is protected from capture and killing under the B.C. *Wildlife Act*. Globally, the Pacific Gophersnake is considered to be secure. In the United States, the Pacific Gophersnake is most likely extirpated from Washington State. Its current range includes Oregon and California.

Recovery in Canada is not considered to be biologically and technically feasible at this time. There is a large geographical gap between the species' historical range in B.C. and the next closest extant population in northwest Oregon and there is a lack of data to inform reintroduction efforts (e.g., population biology, suitability of remaining habitat in Canada). Recovery feasibility determination may be revisited if relict populations are discovered, and/or if translocation and reintroduction of Pacific Gophersnake from external sources in the U.S.A. becomes feasible.

Recovery Feasibility Summary

Based on the following four criteria that Environment and Climate Change Canada uses to establish recovery feasibility, recovery of the Pacific Gophersnake has been determined not to be biologically or technically feasible. Recovery is considered not feasible when the answer to any of the following questions is “no”.

1. Individuals of the wildlife species that are capable of reproduction are available now or in the foreseeable future to sustain the population or improve its abundance.

Unknown. There are no known individuals capable of reproduction in Canada. The Pacific Gophersnake is deemed extirpated from its only known historical range in B.C. The Pacific Gophersnake is most likely extirpated from Washington state and is currently only known to be extant in Oregon and California, U.S.A. Little is known of the population biology of the Pacific Gophersnake and the large geographical gap between the species' historical range in B.C. and the next closest extant population in northwest Oregon may be too distant to allow for connectivity needed to ensure survival of the species in Canada.

2. Sufficient suitable habitat is available to support the species or could be made available through habitat management or restoration.

Unknown. The habitat requirements of the Pacific Gophersnake in Canada are poorly understood, as only two verified occurrences have ever been recorded (the most recent in 1957). Since habitat requirements cannot be identified, it is unknown whether sufficient suitable habitat is available to the species, or could be made available in Canada through habitat management or restoration. Native grasslands in the lower Fraser Valley and Gulf Islands have largely been developed for urbanization and agriculture and there is a great degree of uncertainty over how much habitat is needed to sustain a minimum population if recovery effort options were made available. The majority of this habitat loss is very likely irreversible.

3. The primary threats to the species or its habitat (including threats outside Canada) can be avoided or mitigated.

No. As no locations are known for this species, threats cannot be scored for scope or severity to determine individual threat impacts (i.e., current primary threats), nor is it possible to calculate the overall threat impact for Pacific Gophersnake at this time. Since current threats cannot be identified, they cannot be avoided or mitigated. It is likely that the primary historical threat was habitat loss due to land use and development.

4. Recovery techniques exist to achieve the population and distribution objectives or can be expected to be developed within a reasonable timeframe.

No. Owing to the lack of individuals, and lack of adequate information to identify specific habitat requirements, or current threats, there are no population and

distribution objectives identified in this document. A conservation approach has been outlined. Recovery efforts for the related Great Basin Gophersnake subspecies (*Pituophis catenifer deserticola*) are ongoing in the southern interior of British Columbia, providing some framework for possible recovery of the Pacific subspecies should a relict population be discovered in Canada.

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1. COSEWIC* Species Assessment Information

Assessment Summary: May 2012

Common Name: Pacific Gophersnake

Scientific Name: *Pituophis catenifer catenifer*

COSEWIC Status: Extirpated

Reason for Designation:

This large snake, found in extreme southwestern British Columbia, has not been observed in the Canadian wild in more than 50 years.

Canadian Occurrence: British Columbia

COSEWIC Status History:

Designated Extirpated in May 2002. Status re-examined and confirmed in May 2012.

* COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

2. Species Status Information

Legal Status: SARA Schedule 1 (Extirpated) (2005).

Table 1. Conservation Status of Pacific Gophersnake (NatureServe 2015, B.C. Conservation Data Center 2015, B.C. Conservation Framework 2015, Wayne and Shewchuk 2002).

Global (G) Rank*	National (N) Rank*	Sub-national (S) Rank*	COSEWIC Designation	B.C. List	B.C. Conservation Framework
G5T5**	Canada (NX); United States (N5)	Canada: British Columbia (SX); United States: Washington (SH), Oregon (SNR), California (SNR)	Extirpated (2012)	Red	Highest priority: 6 under goal 1,2,3***

*Rank 1– critically imperiled; 2– imperiled; 3– vulnerable to extirpation or extinction; 4– apparently secure; 5– secure; H– possibly extirpated; X– extirpated; NR – status not ranked

**T-rank indicates the status of infraspecific taxa (i.e. the *catenifer* subspecies).

*** The three goals of the B.C. Conservation Framework are: 1. Contribute to global efforts for species and ecosystem conservation; 2. Prevent species and ecosystems from becoming at risk; 3. Maintain the diversity of native species and ecosystems

Three subspecies of gophersnake have been observed in Canada: the Pacific Gophersnake (*Pituophis catenifer catenifer*) (SARA S.1 Extirpated), known from southwestern B.C.; the Great Basin Gophersnake (*P. c. deserticola*) (SARA S.1 Threatened), known from the southern interior B.C., and the Bullsnae (*P. c. sayi*) (COSEWIC Data Deficient), known from southern Alberta and southwestern Saskatchewan.

3. Species Information

3.1 Species Description

The Pacific Gophersnake is a relatively large (up to 1.8 m), non-venomous snake. The background colour is yellowish, with black, brown, or red-brown dorsal blotches that are usually more widely spaced on the tail than the body. A dark line runs across the head in front of the eyes. The dorsal scales are ridged, while those on the sides and undersurface are smooth. The blotches on the back of the Pacific Gophersnake are separated from each other toward the front of the body (in contrast with the Great Basin Gophersnake, where they are connected). The belly and the spots on the sides of the body are grey. Males and females are not significantly different in size, and the young resemble the adults in colouration.

As a species, gophersnakes are active in the daytime but in the heat of the summer become more nocturnal in their hunting patterns (COSEWIC 2013). They actively hunt for their prey, both on the ground and in shrubs and trees. Their prey is varied but consists mostly of small mammals, which they incapacitate and suffocate by constricting, as well as birds, bird eggs, and other snakes.

3.2 Population and Distribution

Currently, extant populations of Pacific Gophersnake are found only in Oregon and California (Waye and Shewchuk 2002) (Figure 1). The subspecies is most likely extirpated in Washington (Washington Herp Atlas 2015). Its former known distribution in Washington was in the south Puget Sound prairies (Nature Conservancy of Washington 2014). There are no known extant occurrences of the Pacific Gophersnake in Canada. The historic distribution of Pacific Gophersnake in Canada is known only from two observations in British Columbia: one specimen from Galiano Island in 1957 (Clifford 1963), and another near the British Columbia – Washington state border at Sumas, before 1866 (Logier and Toner 1961).

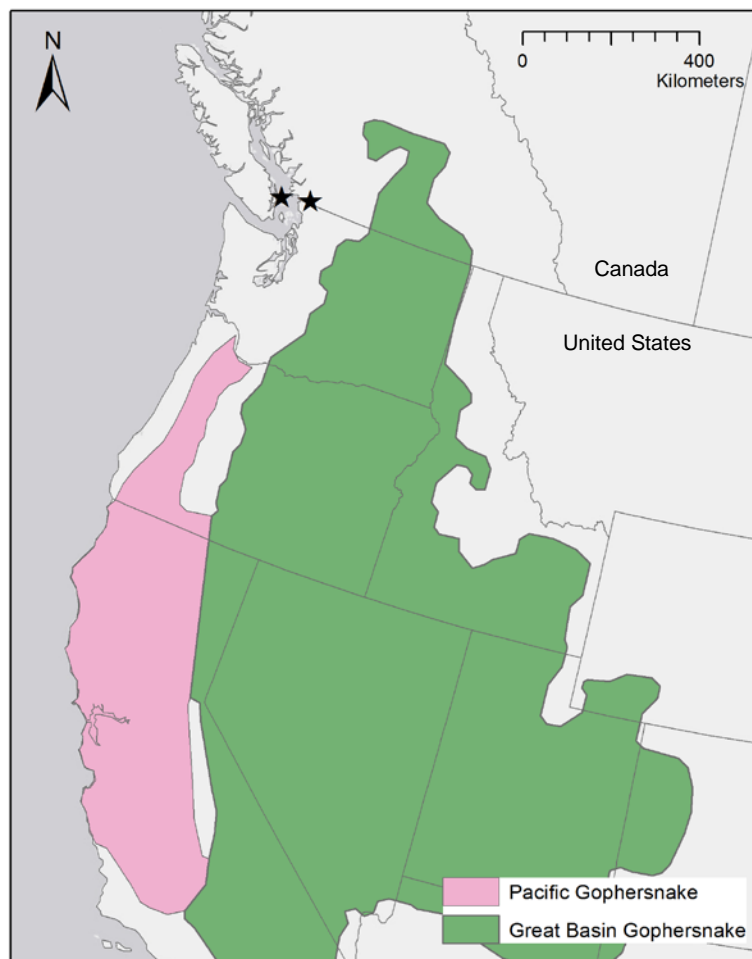


Figure 1. Approximate current range of the Pacific Gophersnake (pink), and the Great Basin Gophersnake (green). Black stars mark the two known historic occurrences of Pacific Gophersnake in Canada.

3.3 Needs of the Pacific Gophersnake

Habitat Needs

Throughout its current range in the United States, the Pacific Gophersnake is most common in grassland, open forests, and semi-arid habitats, and it is usually absent from dense forests and high elevations (Waye and Shewchuk 2002). In Washington, Pacific Gophersnake once inhabited prairie and dry woodland habitat in the south Puget Sound area (Nature Conservancy of Washington 2014). In British Columbia, the only two historical observations of Pacific Gophersnake were likely within coastal prairie habitat consisting of Garry Oak savannahs and lower Fraser Valley grasslands.

Owing to the lack of observation and/or occurrence information, very little is known of the historical habitat needs of Pacific Gophersnake in Canada. As a species, gophersnakes require different habitats for hibernation, foraging, egg-laying, and connectivity between these seasonal habitats as migration habitat. In California, where

the Pacific Gophersnake is still relatively common, gophersnakes seek cover in rodent burrows and under cover objects such as flat rocks or coarse woody debris and at higher elevations hibernate in rodent burrows and deep rock fissures, often with other snake species (Morey 2000). Similarly, the Great Basin Gophersnake subspecies in British Columbia (Pacific Gophersnake's closest living relative in Canada) is known to use two types of overwintering habitat: (1) crevices or fissures in rock outcrops and talus slopes, and (2) earthen dens, such as rodent burrows, on hillsides and gentler slopes. Great Basin Gophersnakes move from hibernation sites to summer foraging areas in the spring (generally April). Foraging habitats are comprised of grasslands, shrub-steppe, riparian areas, or open forests, where they feed primarily on small mammals but also lizards, birds and bird eggs (COSEWIC 2013). It is presumed that Pacific Gophersnake similarly would have overwintered in rocky sites or rodent burrows, and that it would have been most active in spring/summer, foraging primarily in native coastal and Fraser Valley grasslands and Garry Oak Meadows.

Rodent burrows and thick vegetation are important features of foraging habitat for Great Basin Gophersnakes, as they provide retreat sites where snakes can digest prey, thermoregulate, and avoid predation. Great Basin Gophersnakes lay eggs in summer and early fall (generally June to September), in rodent burrows, on talus slopes, in rock fissures, under decaying wood, or in other sheltered features. The egg-laying sites themselves are often located in open areas exposed to the sun and lacking in vegetation. In the spring (generally April) and autumn (generally October), Great Basin Gophersnakes undertake relatively rapid, directional movements (completed within 1–2 days) between hibernation sites and spring/summer foraging areas (COSEWIC 2013). It is presumed that Pacific Gophersnake similarly would have used rodent burrows and thick vegetation as foraging retreat sites, that they would have used similar types of sheltered attributes and open habitats for egg-laying, and that they would have required migration habitat between hibernating sites and foraging areas in spring and fall.

Limiting Factors

If Pacific Gophersnake is rediscovered and/or if reintroduction efforts are attempted, recovery of the subspecies would have limitations associated with small populations such as inbreeding and genetic drift, and increases the population's susceptibility to stochastic³ events (Caughley 1994). Canadian populations would be geographically isolated from the species' current range in Oregon and California, U.S.A, which prevents any possibility of a natural rescue effect via migration. Further, all Gophersnake subspecies in Canada are at the northern limits of their range. The active season is apparently not long enough for females to reproduce every year, and may not always be long and warm enough for eggs to complete incubation (Shewchuk 1997). Great Basin Gophersnakes and Bullsnares take longer to mature in Canada than in more southerly populations (Waye and Shewchuk 2002); likewise, it is presumed that Pacific Gophersnake would take longer to mature in Canada than at existing

³ Unpredictability due to random chance

populations in Oregon and California, and that recovery efforts (if attempted) would progress slowly.

4. 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) (Salafsky et al. 2008). For the purpose of threat assessment, only present and future threats are considered. Threats presented here do not include biological features of the species or population which are considered limiting factors.

The threat classification used in this document is based on the IUCN-CMP (World Conservation Union–Conservation Measures Partnership) unified threats classification system and is consistent with methods used by the B.C. Conservation Data Centre and the B.C. Conservation Framework. For a detailed description of the threat classification system, see the [Conservation Measures Partnership website](#) (CMP 2010).

A threat assessment was not completed for Pacific Gophersnake as no extant locations are known for this species in Canada and therefore threats cannot be scored for scope⁴ or severity⁵ to determine individual threat impacts⁶, nor is it possible to calculate the overall threat impact⁷ for this species at this time.

Historical threats, indirect or cumulative effects of the threats, or any other relevant information that would help understand the nature of the threats are presented in the Description of Threats section.

⁴ 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%)

⁵ 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 three-generation 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%)

⁶ 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 timeframe (e.g., timing is insignificant/negligible or low as threat is only considered to be in the past); Negligible: when scope or severity is negligible; Not a Threat: when severity is scored as neutral or potential benefit.

⁷ The overall threat impact is calculated following Master et al. (2012) using the number of Level 1 Threats assigned to this species. The overall threat considers the cumulative impacts of multiple threats.

4.1 Description of Threats

Threats to Pacific Gophersnake in Canada are presented using the IUCN-CMP Threat Level 1 headings (Threat Level 2 headings provided in brackets). Some of these threats (particularly habitat loss, road mortality, and persecution) may be ongoing should a relict population be discovered in Canada, and/or become relevant if reintroduced populations are established in the future.

IUCN-CMP Threat 1 – Residential & commercial development

[1.1 Housing & urban areas; 1.2 Commercial & industrial areas]

Historically, habitat loss was likely the primary threat to Pacific Gophersnake. In the lower Fraser Valley and the Gulf Islands, where the Pacific Gophersnake was found, most native grassland habitat has been converted to urban areas or farmland (see IUCN-CMP Threat 2 below). Much of the Garry Oak meadow habitat that the Pacific Gophersnake likely inhabited on the Gulf Islands has been lost to development as well. Over the last 150 years, since European settlement on southern Vancouver Island and the adjacent Gulf islands, it is estimated that only ~10% of the original Garry Oak meadow habitat remains (Lea 2006). The majority of this habitat loss is very likely irreversible.

IUCN-CMP Threat 2 – Agriculture and aquaculture

[2.1 Annual & perennial non-timber crops; 2.3 Livestock farming & ranching]

This threat likely impacted Pacific Gophersnake populations in the Fraser River Valley of B.C. between the early 1800s and late 1900s, when vast areas of the lower Fraser River Valley were converted to agricultural lands. The native grasslands of the lower Fraser Valley, comprised of Langley, Chilliwack and Matsqui prairies, have long since been lost to development (Federation of BC Naturalists 2000; Wayne and Shewchuk 2002) and are nearly non-existent at present. This habitat loss is very likely irreversible. Ongoing agriculture in the potential habitat of the Pacific Gophersnake will continue to limit habitat availability, should a relict population be discovered or if a reintroduced population is established in B.C. in the future.

IUCN-CMP Threat 4 – Transportation and service corridors

[4.1 Roads & railroads]

Gophersnakes are prone to being killed on roads as they tend to use road surfaces to thermoregulate (Sullivan 1981); the Great Basin Gophersnake is generally the most common snake species found as roadkill in the South Okanagan (COSEWIC 2013). The extent to which road-related mortality impacted the Pacific Gophersnake in B.C. remains unknown. It was likely a serious historical threat, since the creation of dense road networks in the Fraser River Valley was concurrent with urban and agricultural development. This threat would/will continue, should a relict population be discovered or if a reintroduced population is established in B.C. in the future.

IUCN-CMP Threat 5 – Biological resource use**[5.1 Hunting & collecting terrestrial animals]**

Gophersnakes may be deliberately killed due to their superficial resemblance to rattlesnakes, and by a general intolerance many people have for all large snakes. The extent to which this threat contributed to the historical decline of the Pacific Gophersnake is not known. This threat will likely continue, should a relict population be discovered or if a reintroduced population is established in B.C. in the future.

IUCN-CMP Threat 8 - Invasive & other problematic species & genes**[8.1 Invasive non-native/alien species]**

Scotch Broom (*Cytisus scoparius*) has taken over much of the native grassland on the Gulf Islands, eliminating and out-competing native plant communities that Pacific Gophersnake may have relied on for habitat (Waye and Shewchuk 2002). It is likely that this threat is greater in present day than it was historically. Should a relict population be discovered or if a reintroduced population is established in B.C. in the future, it is likely that ongoing habitat creation and/or restoration would/will be necessary to mitigate this threat.

5. Critical Habitat

Section 41(2) of SARA requires that if the recovery of a listed wildlife species is not feasible, the recovery strategy must include an identification of the species' critical habitat to the extent possible. Critical habitat identification for the Pacific Gophersnake is not possible at this time. The former distribution of the species in British Columbia is virtually unknown, and the confirmed historical records are from areas that have suffered extensive habitat modification from human activities over the past century. The identification of critical habitat may be added if new information suggests that recovery is technically and biologically feasible, in a revised recovery strategy.

6. Conservation Approach

The recovery of the Pacific Gophersnake is not considered technically and biologically feasible at the present time. It is unlikely that reintroduction will be attempted in the near future. There is a large geographical gap between the species' historical range in B.C. and the next closest extant population in northwest Oregon (Rodriguez-Robles and de Jesus-Escobar 2000); also there is a lack of data to inform reintroduction efforts (e.g., population biology, suitability of remaining habitat in Canada). Recovery of the species may become biologically and technically feasible if relict populations are discovered in Canada, or if/when translocation from external sources in the United States is deemed feasible and appropriate. Should recovery become biologically and technically feasible, recovery efforts for the related Great Basin Gophersnake

subspecies (*Pituophis catenifer deserticola*) in the southern interior of British Columbia could provide some framework.

Any discovered or reintroduced Pacific Gophersnake populations in Canada likely would face several threats and limiting factors, as outlined previously in this document. Direct anthropogenic threats would need to be identified and addressed for Pacific Gophersnake through habitat protection, restoration, and management. Continued management intervention would likely be required over the long term.

7. Effects on the Environment and Other Species

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the [Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals](#)⁸. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or any of the [Federal Sustainable Development Strategy](#)'s⁹ (FSDS) goals and targets.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below in this statement.

The historic range of Pacific Gophersnake overlaps with that of several other rare species occurring in the lower mainland and Gulf Islands of B.C. If a relictual population of Pacific Gophersnake is discovered and/or if reintroduction of the species is considered, its effects on non-target recovery species in British Columbia will need to be taken into account. The Sharp-tailed Snake (*Contia tenuis*; Endangered in Canada) inhabits areas where the Pacific Gophersnake was historically found on the Gulf Islands, B.C. and gophersnakes have been known to prey on other snakes species. Any recovery planning activities for the Pacific Gophersnake will be implemented with consideration of all co-occurring species at risk, such that there are no negative impacts to these species or their habitats.

⁸ <http://www.ceaa.gc.ca/default.asp?lang=En&n=B3186435-1>

⁹ <http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1>

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