

WESTERN RATTLESNAKE

Crotalus oreganus

Original¹ prepared by Mike Sarell

Species Information

Taxonomy

The taxonomy of this species is currently under review (Douglas et al. 2003) and taxonomic changes will be made in the winter of 2002–2003. Genetic analysis, coupled with geographic isolation, has prompted the investigators to recognize the Western Rattlesnake, *Crotalus oreganus*, as its own distinct species. The Western Rattlesnake is the only rattlesnake species found in British Columbia (Gregory and Gregory 1999).

Description

The Western Rattlesnake exhibits a high degree of colour and pattern variation within its range in British Columbia. Juvenile rattlesnakes have distinct dark brown dorsal markings edged with pale margins on a base colour of light grey or beige. As rattlesnakes mature the dorsal markings become less distinct and the base colour darkens to a dull shade of green. Black and white bands, typically beginning posterior to the vent, encircle the tail anterior to the conspicuous rattle. A brown horizontal stripe, bordered in white, runs from outside corner of the eye to the corner of the mouth. In both juveniles and adults the dorsal scales are heavily keeled giving the snakes a dull or dirty appearance. This moderate-sized snake grows to a maximum length of 1.2 m but large individuals of this size are rarely encountered.

Distribution

Global

The Western Rattlesnake occurs in northwestern North America. It extends from western and northern Oregon, into west-central Idaho, Washington east of the Cascade Mountains, and as

far north as south-central British Columbia (Nussbaum et al. 1983).

British Columbia

The Western Rattlesnake is restricted to the very dry B.C. interior. It is known from the Similkameen, Okanagan, Kettle, Lower Nicola, South Thompson, and Fraser valleys (Hobbs and Sarell 2001). Klauber (1972) acknowledged that they may extend into the extreme south Columbia near Trail and there is one record for Castlegar (Royal B.C. Museum record). Rattlesnakes appear to be locally distributed within the hot and dry subzones of the Bunchgrass, Ponderosa Pine, and Interior Douglas-fir (IDF) biogeoclimatic zones within their known range. They may also occur in restricted portions of the Montane Spruce and Engelmann Spruce—Subalpine Fir biogeoclimatic zones (e.g., Mt. Kobau). The Thompson/Fraser population appears to be geographically disjunct from all other populations. This separation was probably formed sometime since the hypsithermal period of about 8000 years ago. The original path of expansion into the province, following the last ice age, was probably up through southern main valleys of the province (e.g., Similkameen, Okanagan, Kettle, Columbia) with the Okanagan continuing into the Thompson, through the Falkland area. From there, expansion continued along the Fraser River Valley. The Thompson population also may have bridged into the Similkameen via the Summers, Allison, and Otter drainages, through the IDFdk biogeoclimatic subzone. Climate and availability of denning habitats appear to be the primary constraint to their distribution in British Columbia. Habitats with suitable foraging habitat and prey base, as well as conspecifics (e.g., Racer, *Coluber constrictor*, and

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Western Rattlesnake (*Crotalus oreganus*)



Note: This map represents a broad view of the distribution of potential habitat used by this species. The map is based on several ecosystem classifications (Ecoregion, Biogeoclimatic and Broad Ecosystem Inventory) as well as current knowledge of the species' habitat preferences. This species may or may not occur in all areas indicated.

“Great Basin” Gopher Snake, *Pituophis catenifer deserticola*), extend beyond their current distribution.

Forest region and districts

Southern Interior: Arrow Boundary, Cascades, Kamloops, Okanagan Shuswap

Ecoprovinces and ecosections

SIM: SFH

SOI: GUU, NIB, NOB, NOH, NTU (?), OKR, PAR, SOB, SOH, STU(?), THB, TRU

Biogeoclimatic units

BG: xh, xw(?)

ESSF: xc (one location?), xcp (one location)

ICH: dw(?), mk (infrequently), xw(?)

IDF: dk (several locations), dm (infrequently), mw(?), ww(?), xh, xw

MS: dm (one location), xk

PP: dh, xh

Broad ecosystem units

Hibernacula:

AB, BS, CL, DE, DP, PP, RO, SS, TA

Foraging:

AB, AC, BS, CF, CR, DE, DP, IN, LL, LS, ME, MR, MS, OV, OW, PP, RO, SP, SS, TA, WL

Elevation

In British Columbia, rattlesnakes typically occur along valley bottoms and adjacent slopes, typically at elevations below 800 m, although there are anecdotal sightings (unconfirmed) of rattlesnakes as high as 1400 m.

Life History

Diet and foraging behaviour

The Western Rattlesnake primarily hunts small mammals in British Columbia. Most of its prey consists of voles and mice (Macartney 1989), although marmots, shrews, squirrels, chipmunks, pocket gophers, rabbits, and birds are also consumed. Other snakes are also occasionally eaten.

Reproduction

Females mate in late summer while still in summer foraging territories. This increases the likelihood of exchanging genetic material between neighbouring dens. Fertilization is delayed until early the following spring. Females remain near their dens during which an average of five embryos develop internally. Gravid females do not feed for the duration of their pregnancy (Macartney and Gregory 1988). Females appear to only breed every third year in British Columbia (Macartney 1985). Young are born live in late August and early September. Mortality of neonates through their first winter period ranges widely (24–100%) and can be quite high (Macartney 1985; Charland 1989).

Site fidelity

Western Rattlesnakes exhibit strong fidelity to hibernacula and seasonal foraging areas (Macartney 1985; Charland et al. 1993). It appears that when areas are developed near hibernacula, most perish in these areas but individuals that have territories away from the development persist. If hibernacula are destroyed when snakes are not present, it is generally believed that most individuals will be unable to find suitable hibernacula elsewhere and perish as winter approaches.

Home range

Western Rattlesnakes establish home ranges that are re-used in subsequent years (Macartney 1985). In British Columbia females are known to typically have smaller home ranges than males. Females typically remain within 500–1000 m of the den. Males have slightly larger home ranges and will move 1000–1500 m from the den (J. Hobbs, pers. comm.)

Movements and dispersal

Rattlesnakes spend winters (about 180 days, or more in cooler parts of their range) in hibernacula (dens) that have been used for generations. Rattlesnakes emerge from dens in March through April. A considerable amount of time is spent basking at den entrances prior to dispersal. The remainder of spring

is spent on warm aspect slopes, due to thermo-regulatory requirements. As the weather warms, rattlesnakes will move to more densely vegetated areas such as riparian habitats, to avoid excessive heat. Travel corridors are often followed when moving between dens and adjacent foraging areas. These usually consist of vegetated gullies, ravines, and similar terrain features that are suspected to provide enhanced cover opportunities for dispersing snakes (J. Hobbs, pers. comm.). Individuals seek cover objects throughout the active season. Fall retreat to dens is rapid at the onset of cooler temperatures. Virtually all of the snakes have returned to the hibernacula by mid-October. Seasonal movements seldom exceed 1.5 km from hibernacula in British Columbia (see “Home range” above) (Macartney 1985; Bertram et al. 2001).

Habitat

Structural stage

There are no structural stage preferences known for this species. Any influence of structural stage on foraging may be subtle and related to the production of prey.

Important habitats and habitat features

Hibernacula

Hibernacula are the most critical habitat features for Western Rattlesnakes. Hibernacula provide refugia from the extreme cold of winters. Hibernacula are used by many individuals and for many generations. Hibernacula are most commonly found near the base of rock outcroppings within large areas of coarse talus, usually in very deep fissures. Occasionally talus slopes or very coarse glaciofluvial material are used for denning (Sarell 1993). Warm aspects are usually used (e.g., east through northwest), as they provide longer solar exposure (relative to cool aspects). Prolonged exposure to the sun enhances heat absorption within the denning material; for similar reasons, exposed slope positions may also be preferred. The distribution of suitable hibernacula probably influences the distribution and viability of local populations.

Foraging

Grassland, parkland forest, wetland, and riparian areas provide foraging habitat for Western Rattlesnakes. Foraging habitats must also provide suitable cover, in the form of vegetation and coarse woody debris, to provide protection from predation and to enable the snakes to forage successfully by using cover for concealment.

Conservation and Management

Status

The Western Rattlesnake is on the provincial *Blue List* in British Columbia. Its status in Canada has not been determined by COSEWIC but will be considered during the winter of 2002–2003 (COSEWIC 2002). The NatureServe currently only ranks the Western Rattlesnake at the species level as *Crotalus viridis*; thus, the NatureServe ranks may not adequately reflect the level of risk of *Crotalus oreganus*.

Summary of status for *Crotalus viridis* in BC and adjacent jurisdictions (NatureServe Explorer 2002)

BC	ID	WA	OR	Canada	Global
S3	S5	S5	S4	N3N4	G5

Trends

Population trends

Population trends have not been studied in the province; however, extirpation of populations has been documented (Sarell 1993). All researchers strongly suspect that populations are declining rapidly throughout the settled portions of their range, although, declines have been greatest in the Okanagan and Kamloops areas.

Habitat trends

Western Rattlesnakes generally hibernate and forage in the lower portions of the main valleys in the southern interior of the province. These areas are also under the greatest threat from urban, industrial, and agricultural development. Road construction and expanded traffic may be the greatest intrusion into habitats throughout their range. Talus extraction also significantly impacts habitats. In the late 1980s it was calculated that about 10% of ecosystems in the south Okanagan remained relatively undisturbed (Redpath 1990). Most of this area would have at one time provided suitable habitat for Western Rattlesnakes. Some populations are protected on conservation holdings of the federal, provincial, and non-government agencies. Many other dens occur on Indian Reserves, provincial forests, and private lands.

Threats

Population threats

Roadway mortality is probably the leading cause of ongoing mortality in rattlesnakes. Entire populations can be extirpated if the den is destroyed. Localized land developments and linear corridor construction can decimate local populations. Mortality also occurs from domestic animals (e.g., cats, dogs), livestock, and direct persecution by humans. Klauber (1972) reported that cattle inadvertently trample rattlesnakes and that there are at least several reliable observations of cattle deliberately stomping on rattlesnakes until the rattlesnake was dead. Domestic animals that have frequent encounters with rattlesnakes are much more likely to kill snakes than those that are unfamiliar with them (Klauber 1972).

Habitat threats

The greatest threats to habitats are from the conversion of natural lands (Cannings et al. 1999) for agricultural or residential developments and from quarrying/mining and the construction of linear corridors. Roadways may disturb narrow corridors but create lethal obstructions for travelling snakes in otherwise suitable habitat. Heavy livestock

use likely effects the survivorship and density of rattlesnakes through the loss of cover. Heavy livestock use may also influence the abundance of suitable prey (MELP 1998). Reduction of available cover from heavy grazing within the summer range or near the den could potentially affect mortality rates within the population by increasing their exposure to predators (Hobbs and Sarell 2000, 2001; Hobbs 2001; G. Schuett, pers. comm.; A. Didiuk, pers. comm.; K. Larsen, pers. comm.).

Legal Protection and Habitat Conservation

The Western Rattlesnake is protected in that it cannot be killed, collected, or held in captivity without special permits, under the provincial *Wildlife Act*.

A number of dens occur within protected areas including Okanagan Mountain Provincial Park, Kalamalka Provincial Park, Haynes Lease Ecological Reserve, White Lake Protected Area, Kobau Provincial Park, as well as other areas managed for conservation (e.g., Nature Trust of BC). However, much of the range of this species occurs on Crown land, private land, or Indian Reserves.

This species' habitat requirements may be partially addressed by the results based code riparian and range recommendations.

Identified Wildlife Provisions

Sustainable resource management and planning recommendations

- ❖ Maintain and maximize connectivity between hibernacula and foraging habitats.

Wildlife habitat area

Goal

Maintain and link denning and foraging habitat, travel corridors, and egg-laying sites within and between adjacent populations.

Feature

Establish WHAs at communal dens, especially for multi-species dens, and talus slopes, rock outcrops,

or cliff habitats identified to be important for the conservation of this species.

Size

Approximately 200–300 ha but will depend on site specific factors such as area of suitable habitat, nearness to foraging areas and egg-laying sites.

Design

The boundaries of the WHA should be designed to include and connect den sites, travel corridors, egg-laying sites, and important foraging areas.

General wildlife measures

Goals

1. Minimize disturbance and mortality, particularly road mortality.
2. Maintain critical structural elements such as rock outcrops, talus slopes, friable soils, coarse woody debris, friable soils, concentrations of boulders, or other unconsolidated materials and vegetative cover.
3. Maintain microclimatic conditions of hibernacula.
4. Maintain moderate to dense cover to conceal snakes and maintain foraging opportunities.
5. Maintain riparian areas in a properly functioning condition.

Measures

Access

- Place roads as far as practicable from hibernacula and known snake travel corridors. Avoid construction between April and October when snakes are active. When recommended by MWLAP, rehabilitate temporary access roads immediately after use or gate less temporary roads to reduce traffic.
- Where determined to be necessary by MWLAP, use snake drift fences and drainage culverts at intersections of roads and known travel corridors. Drift fences should be ≥ 75 cm high. Length will vary by site depending on area used by snakes. Consult MWLAP for more information. Seasonal use restrictions may be appropriate for some roads.
- Do not remove or disturb rock or talus.

Pesticides

- Do not use pesticides.

Range

- Plan livestock grazing (e.g., timing, distribution, and level of use) to prevent trampling and maintain suitable vegetative cover (i.e., >15 cm height in upland areas; >10 cm height in riparian areas).
- Do not concentrate livestock within 200 m of den site during spring dispersal (March/April) and fall (September/October) aggregations. Do not place livestock attractants or corrals within 200 m of den site. Do not trail livestock within 200 m of den site during spring and fall aggregations. When hay cutting or prescribed burning is planned, consult with MWLAP for the preferable times (i.e., after snakes have returned to dens).

Recreation

- Do not establish recreation sites within WHA.

Additional Management Considerations

Use the maximum cut height when hay cutting. Check cut hay for snakes prior to baling.

Where migration routes from denning locations to summer habitats have been transected by roads, use methods such as drift fences, culverts, or seasonal road restrictions to allow the safe passage of snakes.

Rock climbing should be considered a disturbance at sensitive sites.

Riparian areas adjacent to WHAs should be managed or restored to ensure foraging habitat is maintained.

Avoid converting areas adjacent to WHA to an early seral grassland condition. Early seral stages may have less cover for concealing snakes from predators and they may experience greater threats from trampling due to higher livestock pressures.

Information Needs

1. Identification of hibernacula and their characteristics.
2. Dispersal behaviour (e.g., travel corridors) from dens.
3. Influence of grazing and cover reduction on predation levels.

Cross References

Bighorn Sheep, Fringed Myotis, "Great Basin"
Gopher Snake, Prairie Falcon, Racer, White-headed Woodpecker

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