SPECIES ACCOUNT

Species Data

Common Name:	Gopher Snake
Scientific Name:	*Pituophis catenifer deserticola*
Species Code:	R-PICA
BC Status:	Blue
Identified Wildlife Status:	V2004
COSEWIC Status:	Threatened

Project Data

Project Name:	Vernon Commonage Sensitive Ecosystems Inventory
Project Type:	Terrestrial Ecosystem Mapping
Area:	Central Okanagan
Ecoprovince:	Southern Interior
Ecoregions:	Thompson-Okanagan Plateau
Ecosections:	Northern Okanagan Basin (NOB)
BGC Units:	IDFxh1
Map Scale:	1:15 000

Distribution

Provincial Range

Gopher Snakes occur in a patchy distribution throughout the hot, dry southern interior including the South Thompson, Okanagan, Lower Nicola, Lower Similkameen, Kettle and Coldstream valleys, and the Fraser Valley from Lillooet to Churn Creek (Gregory and Campbell 1984, Sarell et al. 1997a, Hobbs and Sarell 2001). They appear to be more abundant in the southern Okanagan (Shewchuk and Waye 1995). The bulk of their habitat lies in the Ponderosa Pine and Bunchgrass biogeoclimatic zones, and they may be found at low elevations in the Interior Douglas Fir zone (Orchard 1984, Nelson and Gregory 1992, Shewchuk and Waye 1995).

Elevation Range

Gopher Snakes usually inhabit valley bottoms and grassland slopes, sometimes extending above 800 m elevation.

Distribution in the Project Area

Numerous records exist for the Commonage study area, mostly on or near the Vernon Military Camp. They are known to occur as far north as Goose Lake west of Vernon (Ministry of Environment 2005), and may possibly occur at the Enderby Cliffs.

Ecology and Habitat Requirements

Gopher Snakes inhabit the hot, arid valleys of south-central British Columbia (Hobbs and Sarell 2001). Most of their range consists of grasslands or open ponderosa pine forests. Riparian, wetland, and rocky habitats are also used within these areas. Dense coniferous forests and high elevations are typically avoided throughout their range (Nussbaum et al. 1983).

Gopher Snakes are active from spring through fall. Most of the time is spent underground in rodent burrows. Above ground activities consist of periodic traveling, mating, and seeking new rodent burrows. Underground, Gopher Snakes forage, digest, and thermoregulate. Mating occurs in spring and egg deposition occurs in late summer. Eggs are laid in burrows in warm-aspect slopes. Adult females probably breed every three years (Shewchuk 1996).

Hibernacula are sought as the temperatures become cooler in fall. Two types of hibernacula are used: semi-permanent dens in rock outcroppings; and short-lived dens in deep burrows (Bertram et al. 2001). There is a moderately strong fidelity to den sites.

In British Columbia, habitats occupied by the Gopher Snake are quickly being lost to agriculture and residential developments. Snakes in agricultural areas are prone to tilling, mowing, baling and traffic mortalities. Snakes in residential areas are prone to predation by pets, persecution, and traffic mortality. Traffic mortality is probably the largest cause of mortality due to increasing roadedness and traffic volumes. Road mortality is exacerbated by snakes being attracted to the warm road surfaces to thermoregulate and gopher snakes use very slow rectilinear movement when in the open, such as on roads, increasing the likelihood of being run over. Populations are especially prone to human impacts as most of their range is at lower elevations where most settlement has occurred. In addition, the non-venomous Gopher Snake is at risk of illegal persecution due to its resemblance to the Western Rattlesnake (BC Southern Interior Reptile and Amphibian Recovery Team 2005).

General Living – Winter (Security/Thermal Habitat)

Snakes usually enter hibernation in mid to late October (although active individuals have been seen in early November) in the South Okanagan. Dates may be earlier in cooler parts of their range. Males tend to enter hibernation earlier while females and young maximize their active period. Emergence from hibernation and dispersal happens relatively quickly in late March or April (Sarell 1993, Shewchuk and Waye 1995).

Hibernating occurs in two distinct, warm-aspect ecosystems; both provide thermal characteristics that prevent freezing. Bedrock fractures provide long-term denning opportunities for many individuals, including other species of snakes (Sarell 1993, Shewchuk 1996, Hobbs and Sarell 2001). It is assumed that these hibernacula provide the optimum conditions for population survival. Dens in burrows of rodents, bank swallows, and other animals, in deep-soiled ecosystems, are probably used by less of the population and it is unlikely that the burrow will retain its structure for many years. Dens in these deep-soiled ecosystems have been poorly described (Bertram et al. 2001) and therefore cannot be confidently predicted. Dens in bedrock have been described in more detail and are easier to predict.

Dens site fidelity is not as high as some other temperate snake species (Shewchuk 1996).

General Living – Growing Season (Food and Security/Thermal Habitat)

Gopher Snakes are active and away from the den from April through October. Their main life requisites during the growing season consist of foraging and security/thermal. These habitat requirements do not always occur in the same ecosystem. Deep-soiled grasslands and open coniferous woodlands provide both food and security/thermal habitats, but periodic foraging forays to areas of very high rodent productivity (e.g., wet meadows) may occur. Snakes must return to warmer, drier areas to quicken digestion, especially during cool weather.

Gopher Snakes remain in rodent burrows for much of the time although other security cover may be used, including rock and coarse woody debris, or dense shrubby cover. Activity above ground usually happens in the evening, except in the spring and fall when nights are too cool for the snakes to remain warm.

Their diet consists primarily of small and medium sized rodents and other small mammals including cottontail rabbits, but they will also eat birds, eggs, reptiles and insects (Gregory and Campbell 1984, Nelson and Gregory 1992, Shewchuk and Waye 1995).

In the South Okanagan the average summer range of Gopher Snakes is 1.15 ha for males, 1.8 ha for gravid (pregnant) females and 2.4 ha for non-gravid females (Shewchuk and Waye 1995). In the Thompson home ranges varied from 5.7 ha for males and up to 12.5 ha for gravid females (Bertram et al. 2001). Densities in Utah ranged from 0.11 to 0.33 snakes/ha and in southwestern Idaho densities ranged from 0.1 to 1.9 snakes/ha (Shewchuk and Waye 1995). It is not known whether these densities are representative of other BC populations.

Foraging and thermal values will be rated together, with equal weighting.

Reproducing (Security/Thermal Habitat)

Mating occurs in May and egg deposition occurs in late June or early July. Gopher Snakes lay from two to eight eggs that hatch in late August or early September (Shewchuk and Waye 1995). Eggs usually are laid in abandoned rodent burrows that provide adequate warmth and humidity for incubation. Sometimes nests are deposited in fine (e.g., 5 cm diameter) talus. Nests often contain eggs of several females including eggs of other species, such as the Racer (Shewchuk and Waye 1995). The burrows used for egg laying do not have to be very deep. Gravid females may travel distances of greater than 1 km to locate suitable nesting sites (Shewchuk 1996).

Ratings

This model employs a 4-class rating scheme because there is insufficient knowledge of habitat requirements to use a 6-Class scheme yet there is sufficient knowledge to go beyond a 2-class rating scheme. This complies with the recommended rating scheme in the RIC (1999) standards manual.

Provincial Benchmark

Ecosection	Southern Okanagan Basin (SOB)
Biogeoclimatic Units	BGxh1, PPxh1, IDFxh1
Habitats	Grassland or open forest, and rocky areas for denning

Map Themes

Habitat Use	Life Requisite	Season	Rating Code	Ecosystem Attributes
General Living	Security/ Thermal	Winter	LIW	• rock outcroppings on hot or warm slopes (deep soiled dens not modeled); R-CROR LIA ratings used for this theme
General Living	Security, Thermal, Food	Growing	LIG	• deep-soiled grasslands and parklands, meadows and wetlands, riparian areas and gulleys
Reproducing	Security/ Thermal	Summer	RE	• warm-aspect slopes with friable soils

Ratings Assumptions

General Living, Winter – Security/Thermal (LIW)	
	See Northern Pacific Rattlesnake account (uses R-CROR_LIA ratings)
General Living, Growing Season – Security/Thermal, Food (LIG)	
Site Series	• Site series that can support high fossorial rodent populations (e.g., grassland units) rated High • Floodplains rated up to High • Gullied riparian units rated up to Moderate
Structural Stage	• No effect
Shrub Density	• No effect
Range Condition	• Effect unknown
Aspect	• Cool aspect rated down 1
Slope	• Steep slopes rated down 1
Soil Texture	• Medium texture rated up to High
Soil Depth	• Deep and shallow soils (>20cm) rated up to High • Very shallow soils rated up to Low (few rodent burrows available)
Reproducing – Security/Thermal (RE)	
Site Series	• Shrub/Grassland rated High • Dry, moisture shedding sites rated up to High • Wet sites (subhygric to hydric) rated Nil
Structural Stage	• No effect
Shrub Density	• Dense rated down
Range Condition	• Effect unknown
Aspect	• Cool aspects rated up to Low • Warm aspects rated up to High
Slope	• Gentle slopes and flat areas rated up to Moderate
Soil Texture	• Medium-textured soils (loamy) rated up to High
Soil Depth	• Deep soils rated up to High • Shallow soils (up to 1m) rated up to High • Very shallow soils rated Nil

Map Interpretation

The suitability model for Gopher Snake generates three map themes: general living during winter (LIW), which consists of denning/basking habitat (excluding deep-soiled dens in rodent burrows); general living during the growing season (LIS), which includes foraging areas; and reproducing (RE) or egg-laying sites. The denning map theme is generated from the ratings for rattlesnake denning (R-CROR_LIA). Denning overlays egg-laying, which in turn overlays foraging on the map.

All map themes are displayed using the highest-value method, which shows the highest rating of all ecosystem units occurring in a polygon.

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Gopher Snake Suitability - Vernon Commonage