

# SPECIES AT RISK PORTFOLIO: MAY 2020

Guidance for Qualified Environmental Professionals (QEP) providing advice on protection of Critical Habitat

## ABSTRACT

This document summarizes recovery strategy direction for nine Species at Risk Act (SARA) species at risk found in the Okanagan. It provides links to detailed information for each species and is intended to support strategies for avoidance and mitigation of impacts associated with land development. The portfolio is intended for a qualified environmental professional audience to support them in completing environmental assessments and provide direction that prevents destruction of Critical Habitat.

Alison Peatt, M.Sc., RPBio, FAPB

## Applying Critical Habitat Protection on the Ground

### Species at Risk Photo Portfolio

These outreach materials were developed to help support identification and protection of Critical Habitat for nine Species at Risk Act (SARA) Schedule 1 listed Endangered and Threatened species found in the Okanagan. Materials are designed to help Qualified Environmental Professionals (QEPs) and others identify Critical Habitat attributes and consider what strategies for avoidance and mitigation of land use impacts will conserve Critical Habitat and prevent its destruction. These materials are intended to help translate direction in recovery strategies into actions on the ground, thereby strengthening protection of Critical Habitat attributes and the species that depend on them. This document is not intended to be a substitute for professional opinion, or to reduce reliance by professionals on the recovery strategy direction.

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**South Okanagan  
Similkameen**  
CONSERVATION  
PROGRAM

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## Branched Phacelia (*Phacelia ramosissima*)

### Photos of Phacelia plants and habitat



Photo credit Eva Antonijevic



Photo credit Eva Antonijevic



Photo credit Eva Antonijevic





Photo credit Alison Peatt



Photo credit Eva Antonijevic



Photo credit Eva Antonijevic

**Weblinks to Additional Photos:**

<http://science.halleyhosting.com/nature/basin/5petal/water/phacelia/ramo.htm>

<http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Phacelia%20ramosissima>

[http://www.sararegistry.gc.ca/virtual\\_sara/files/cosewic/sr\\_branched\\_phacelia\\_e.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_branched_phacelia_e.pdf)

**Occurrence Mapping and Inventory Information:**

Jackett, Nigel, Megan Traicheff, Kersti Vaino and Vicky Young. 2007. Plant Species at Risk Inventory, Okanagan Region, 2007. <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=11032>

McIntosh, Terry and Jamie Leathem. 2014. Results from an At Risk Plant Survey on the Osoyoos West Bench, Osoyoos, BC. <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=43801>

**Critical Habitat Location Maps and Data Files:**

Critical Habitat mapping can be obtained from the following Government of Canada website. <https://open.canada.ca/data/en/dataset/f74fa2b1-6161-476a-ba28-95acb7fcc9fc> ECCC also has a species at risk email address that is intended for qualified professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)).

Critical habitat is also available through the province (Data BC) at: <https://catalogue.data.gov.bc.ca/dataset/critical-habitat-for-federally-listed-species-at-risk-posted-> and can also be viewed on BC IMAP at <http://maps.gov.bc.ca/ess/sv/imapbc/>

**Key information to consider in designing land use to avoid destruction of Critical Habitat:**

- **Occurrence-based Critical Habitat:** Critical Habitat for Branched Phacelia is mapped based on known occurrences of plants and buffer area described by a 50 meter setback or a larger area defined as a *distinct ecological feature*<sup>1</sup> (e.g. talus slope) or habitat required for connectivity of closely associated populations. Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.
- **Habitat Description, Range of Occurrence and Population:** Habitat is highly specialized in Canada, found only in the South Okanagan and there “*only in a narrow band of talus and rock debris below rock outcrops*” COSEWIC 2005; this band is 1-2 m wide. The three existing populations are at the northern extent of their range; they are also found in west coast US states (Washington, Oregon and California) as well as Nevada. Branched Phacelia is found to occur 396-900 m elevation various aspects. Associated with large Douglas fir, Ponderosa pine or Saskatoon, the plant occurs in areas with low rainfall and winter soil moisture recharge. 5 km<sup>2</sup> is the extent of occurrence area; 800 to 1000 m<sup>2</sup> of this is the area of occupancy (p. 36 of recovery strategy). Fewer than 1000 plants in total are known to occur in Canada. Most of this occurs on Crown land.
- **Geographic Location of Critical Habitat in BC:** Mapped Critical Habitat for this species is only found in the extreme south of the Okanagan. All locations are west of Osoyoos, overlapping or between South Okanagan Grasslands Protected Area (Kilpoola Unit) and Osoyoos Lake. Several areas are adjacent to Osoyoos (east and west of the lake), one area immediately north of highway 3 along Swartz Creek and west of Osoyoos near the Canada-US border, within South Okanagan Grasslands Protected Area-Chopaka East Unit.

<sup>1</sup> “Distinct” ecological, or landscape features are here referred to as those that are distinguishable at a landscape scale (through use of detailed ecosystem mapping or aerial photos), which, at that scale, appear as ecologically contiguous features with relatively distinct boundaries (e.g., cliffs, banks, or slopes, drainage basins, seepage plateaus, or distinct vegetation assemblages), and which comprise the context for a species occurrence.



- **Recognizing Critical Habitat:** Since Critical Habitat for this species is based on the occurrence, protection of Critical Habitat is not based on identification of features. The mapped area itself is the area to which protection applies, unless the area is already fully developed (e.g. paved road; well-used trail, rural/residential development, except areas with remaining natural vegetation).
- **Activities likely to cause destruction of Critical Habitat:** Activities of concern include landscape development (i.e. vegetation removal, debris deposition, machinery impacts), mineral exploration, talus removal (i.e. for landscaping purposes), ATV use outside existing trails, introduction of alien/invasive plants. (p. VI of Branched Phacelia Recovery Strategy)
- **Other Considerations:**
  - **Connectivity is Important:** Maintain connectivity between subpopulations (populations are separated by more than 1 km; “subpopulations are records of individuals or patches of individuals within 1 km of each other.
  - **Maintaining a supply of suitable Pollinators:** Bees are major pollinators in California and probably in southern Okanagan.
  - **Understanding Plant Reproduction:** The plant doesn’t reproduce from cuttings or pieces of plant but does produce a lot of seeds. Seeds dormant and require cool/moist period before germinating. Perennials. Unknown longevity and seed dispersal range. Dispersal appears to be short distance, probably by small mammals or birds and in some cases by downslope movement.

**Available advice to support strategies to avoid and mitigate impacts to Critical Habitat:**

1. Recovery Strategy for the Branched Phacelia (*Phacelia ramosissima* var. *ramosissima*) in Canada provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat.  
[http://www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_branched\\_phacelia\\_e\\_final.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_branched_phacelia_e_final.pdf)
2. Information on range, habitat, life history, description, identification tips and general threats and guidance is provided in a two-page Fact Sheet document provided by the Ministry of Forests, Lands and Natural Resource Operations, Thompson Okanagan Region, Resource Management (Ecosystems Section) Penticton, B.C.  
[http://www.elp.gov.bc.ca/okanagan/documents/Plant\\_SAR\\_Fact\\_Sheets/Phacelia\\_ramosissima\\_var.\\_ramosissima.pdf](http://www.elp.gov.bc.ca/okanagan/documents/Plant_SAR_Fact_Sheets/Phacelia_ramosissima_var._ramosissima.pdf)

**Suggested Avoidance and Mitigation Strategies:**

- Avoid development in areas with known occurrences of *Phacelia ramosissima* through project relocation or redesign [see footnote 1 below]
- Protect shrub-steppe and open forest habitats, particularly talus slopes and rocky outcrops, from disturbance and development [see footnote 1 below]
- Follow provincial methods for when and how to conduct plant species at risk surveys [see footnote 1 below]
- Follow provincial policy and guidance on how to avoid, minimize, restore and offset impacts to plant species at risk and their habitats [see footnote 1 below]

- Report any sightings to the B.C. Conservation Data Centre ([cdccdata@gov.bc.ca](mailto:cdccdata@gov.bc.ca)) and FLNR Ecosystems Section<sup>2</sup>
- Do not clear vegetation, develop or disturb areas where the plant is known or observed to occur and also within at least a 50 m buffer surrounding the occurrence, except on existing urban and residential landscapes, existing road surfaces and well-developed trails.
- Plan and implement large-scale management actions, such as invasive species removal or the use of herbicides based on direction from an invasive management plan, developed with the advice of a qualified professional or qualified professional team with substantial experience in invasive management and species at risk. Design actions to prevent loss or damage to Branched Phacelia.
- Do not excavate talus slopes or remove rock from areas where the plant is known or observed to occur and also within at least a 50m buffer surrounding the occurrence.
- Manage recreation to avoid mapped Critical Habitat areas, except on existing road surfaces and well-developed existing trails; prescribe measures to ensure off road/ off trail use does not occur e.g. Develop a recreation management plan that includes direction designed to avoid impacts to Branched Phacelia.
- Conduct targeted outreach to recreation users designed to educate about Branched Phacelia and prevent recreation impacts.
- Install public information signs designed in consultation with Provincial and Federal staff (i.e. recovery planning/species at risk experts) to encourage/inspire avoidance;
- Enact area-based closures, where voluntary compliance is not resulting in protection of Branched Phacelia;
- Require compliance monitoring and where compliance is not occurring, enforce restrictions of recreation use of existing trails;
- Plan fences to prevent encroachment of people into areas occupied by Branched Phacelia, where these are adjacent to recreation trails; include fencing design criteria that incorporates consideration of potential conflicts with other wildlife and human safety hazards;
- Clearly describe trails/roads where use is permitted using maps and signs.

#### References:

BC Species and Ecosystems Explorer <http://a100.gov.bc.ca/pub/eswp/reports.do?elcode=PDHYD0C413>

Conservation Data Centre Occurrence Mapping <http://a100.gov.bc.ca/pub/eswp/eoMap.do?id=24580>

COSEWIC Assessment and Status Report [http://www.sararegistry.gc.ca/virtual\\_sara/files/cosewic/sr\\_branched\\_phacelia\\_e.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_branched_phacelia_e.pdf)

NatureServe Explorer

<http://explorer.natureserve.org/servlet/NatureServe?searchName=Phacelia+ramosissima%20var.%20ramosissima>

In Klinkenberg, Brian. (Editor) 2017. E-Fauna BC: Electronic Atlas of the Fauna of British Columbia [efauna.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. [Accessed: 10/03/2017 11:39:57 AM]

SARA Registry [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=863](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=863)

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<sup>2</sup> The first five strategies listed here and ending with the footnoted strategy are excerpted from the Branched Phacelia Fact Sheet completed by the Province of BC

[http://www.elp.gov.bc.ca/okanagan/documents/Plant\\_SAR\\_Fact\\_Sheets/Phacelia\\_ramosissima\\_var.\\_ramosissima.pdf](http://www.elp.gov.bc.ca/okanagan/documents/Plant_SAR_Fact_Sheets/Phacelia_ramosissima_var._ramosissima.pdf)



## Grand Coulee Owl-clover (*Orthocarpus barbatus*)

Photos of Owl-clover plants and habitat







**Weblinks to Additional Photos:**

<http://www.kelownagardens.com/plants/orthocarpus-barbatus-grand-coulee-owl-clover/>

<http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Orthocarpus%20barbatus>

**Occurrence Mapping and Inventory Information:**

Young, V. and C. Klym. 2007. Grand Coulee Owl-clover Inventory and Monitoring. Min. of Environ. Internal Working Rep. Penticton, BC. 6 pp.

Mapped Known Locations (Conservation Data Centre) for Grand Coulee Owl-Clover

<http://a100.gov.bc.ca/pub/eswp/reports.do?elcode=PDSCR1H020>

**Critical Habitat Location Maps and Data Files:**

Critical Habitat mapping can be obtained from the following Government of Canada website.

<https://open.canada.ca/maps/dataset/8e7d7ede-6702-4f80-b666-6c689db89f0b> ECCCC also has a species at risk email address that is intended for qualified professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)).

Critical Habitat mapping can be obtained from the following Government of Canada website. Critical habitat is also available through the province (Data BC) at:

<https://catalogue.data.gov.bc.ca/dataset/critical-habitat-for-federally-listed-species-at-risk-posted-> and can also be viewed on BC IMAP at <http://maps.gov.bc.ca/ess/sv/imapbc/>

**Key information to consider in designing land use to avoid destruction of Critical Habitat:**

- **Occurrence-based Critical Habitat:** Critical Habitat for Grand Coulee Owl-clover is mapped based on the area occupied by individual plants or patches of plants and buffer area described by a 50 meter setback or a larger area defined as a *distinct ecological feature*<sup>3</sup> (e.g. slope) or habitat required for connectivity of closely associated populations. Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.
- **Habitat Description, Range of Occurrence and Population:** Habitat is generally described as sagebrush slopes and flats. Known only in Washington State and south Okanagan BC and south central BC where it is found in Bunchgrass, Ponderosa Pine and Interior Douglas-fir biogeoclimatic zones, Grand Coulee Owl-Clover occurrences are associated with medium to deep, moderately well drained, fine sediment (loess), sand to gravel soils, very dry areas, typically gentle to moderate south-facing slopes (but can also be found on steeper up to 35% south facing and gentle east facing slopes), elevations between 350-920 m and often Big Sagebrush or Antelope-brush communities. Although the range this species occupies in B.C. is approximately 100 square miles, only an estimated 3.2 ha of the area is occupied by the plant. Inventory of this species indicates a declining trend in the number of plants, with between 5000 and 12,500 plants at a high threat of being permanently lost, of a total population estimated at 6000-13,000 plants. There are only 5 remaining populations known. Occupancy and population size in Canada may account for up to 10% of global amount.
- **Geographic Location of Critical Habitat in BC:** Mapped Critical Habitat for this species is only found in the extreme south of the Okanagan. All locations are south of Oliver. Several areas are adjacent to Osoyoos (east and west of the lake), one area immediately north of highway 3 along Swartz Creek and west of Osoyoos near the Canada-US border, within South Okanagan Grasslands Protected Area-Chopaka East Unit.
- **Recognizing Critical Habitat:** Since Critical Habitat for this species is based on the occurrence, protection of Critical Habitat is not based on identification of features. This species is an annual dependent on a seed bank for continued persistence; plant locations may change somewhat

<sup>3</sup> “Distinct” ecological, or landscape features are here referred to as those that are distinguishable at a landscape scale (through use of detailed ecosystem mapping or aerial photos), which, at that scale, appear as ecologically contiguous features with relatively distinct boundaries (e.g., cliffs, banks, or slopes, drainage basins, seepage plateaus, or distinct vegetation assemblages), and which comprise the context for a species occurrence.



between years, depending on where seeds germinate. The mapped area itself is the area to which protection applies. Plant is found on fire-modified grasslands containing sparse antelope brush and exposed medium to deep, well drained, sandy to gravelly soils. Plants that may be found nearby include: big sagebrush (*Artemisia tridentata*) and three-tip sagebrush (*Artemisia tripartite*), needle-and-thread (*Stipa comata*), Sandberg's bluegrass (*Poa secunda* ssp. *secunda*), and bluebunch wheatgrass (*Pseudorogneria spicata*), cheatgrass (*Bromus tectorum*), Kentucky bluegrass (*Poa pratensis*), bulbous bluegrass (*Poa bulbosa*), and six-weeks fescue (*Vulpia octoflora*), pasture sage (*Artemisia frigida*), woolly plantain (*Plantago patagonica*), long-leaved phlox (*Phlox longifolia*), and thread-leaved fleabane (*Erigeron filifolius* var. *filifolius*).

- **Activities likely to cause destruction of Critical Habitat:** Activities of concern include conversion of natural landscape for human use and development (e.g. residential, recreational, industrial or agricultural development causing vegetation removal/replacement, debris deposition or machinery impact), intensive livestock use, ATV or other vehicle use off existing trails, and deliberate introduction of invasive plants (page VI/VII of Grand Coulee Owl-Clover Recovery Strategy for more detail).
- **Other Considerations:**
  - **Maintaining a supply of suitable Pollinators:** Honey bee and native bee pollinators provide pollination services for Grand Coulee Owl-Clover.
  - **Understanding Plant Reproduction:** Grand Coulee Owl-Clover tends to be found in clusters that can be seen between May and July. Seed dispersal is attributed to wind or perhaps animals. This species is a hemi-parasite, which means that it obtains food by connecting with the roots of other grassland plants. It depends on specific micro-climate conditions for germination and likely needs low intensity disturbance (e.g. wind, surface erosion, frost heaves) to ensure its persistence.
  - **Connectivity between sub-populations is important:** Because ongoing survival of this plant depends on supply of seed and seeds appear to disperse over short distances only, connections between habitats are important to ensure an ongoing supply of seeds throughout the occupied area.
  - **Dependence on surrounding plants:** Grand Coulee Owl-clover is a facultative root parasite that connects with the root systems of other plants and extracts water and nutrients.

**Available advice to support strategies to avoid and mitigate impacts to Critical Habitat:**

1. Recovery Strategy for the Grand Coulee Owl-clover (*Orthocarpus barbatus*) in Canada provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat.  
[http://www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_grand\\_coulee\\_owl\\_clover\\_e\\_final.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_grand_coulee_owl_clover_e_final.pdf)
2. Information on range, habitat, life history, description, identification tips and general threats and guidance is provided in a two-page document provided by the Ministry of Forests, Lands and Natural Resource Operations, Thompson Okanagan Region, Resource Management (Ecosystems Section) Penticton, B.C.  
[http://www.elp.gov.bc.ca/okanagan/documents/Plant\\_SAR\\_Fact\\_Sheets/Orthocarpus\\_barbatus.pdf](http://www.elp.gov.bc.ca/okanagan/documents/Plant_SAR_Fact_Sheets/Orthocarpus_barbatus.pdf)

**Avoidance/Mitigation Strategies:**

- Avoid development in areas with known occurrences of *Orthocarpus barbatus* through project relocation or redesign
- Protect shrub-steppe grassland habitat from disturbance and development and consider restoration (including invasive plant removal) following professional advice;
- Follow provincial methods for when and how to conduct plant species at risk surveys
- Follow provincial policy and guidance on how to avoid, minimize, restore and offset impacts to plant species at risk and their habitats
- Report any sightings to the B.C. Conservation Data Centre ([cdcdata@gov.bc.ca](mailto:cdcdata@gov.bc.ca)) and FLNR Ecosystems Section<sup>4</sup>;
- Do not clear or deposit debris, clear vegetation, develop or disturb areas within areas mapped as Critical Habitat for this species except on existing urban and residential landscapes, existing road surfaces and well-developed trails;
- Recovery strategies advocate learning more about grazing practices and their impact on this species. Some level of grazing may support disturbance conditions/bare soil sufficient to promote seed germination. Too much grazing may cause direct impacts to plants and cause undesirable soil compaction. Monitoring of grazing practices and impacts to populations will help promote development of appropriate strategies to avoid/mitigate impacts. Initial recommended strategies include:
  - Protect plants and seed supply by avoiding livestock grazing within mapped Critical Habitat between April and August and excluding grazing within high quality habitat using fencing.
  - Engage a qualified professional agrologist and registered professional biologist team to monitor population of Grand Coulee Owl-clover to assess effectiveness of results in maintaining viable population(s) and adjust strategies to increase their effectiveness, based on monitoring results.
- Plan and Implement large-scale management actions, such as invasive species removal or the use of herbicides based on direction from an invasive management plan, developed with the advice of a qualified professional or qualified professional team with substantial experience in invasive management and species at risk. Design actions to prevent loss or damage to Grand Coulee Owl-clover.
- Manage recreation to avoid mapped Critical Habitat areas, except on existing road surfaces and well-developed existing trails; prescribe measures to ensure off road/ off trail use does not occur by:
  - Requiring recreation planning including a management plan with direction designed to avoid impacts to Grand Coulee Owl-clover.
  - Providing targeted outreach to recreation users to ensure they understand how to avoid habitat impacts;

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<sup>4</sup> The first five strategies listed here and ending with the footnoted strategy are excerpted from the Grand Coulee Owl-clover Fact Sheet completed by the Province of BC  
[http://www.elp.gov.bc.ca/okanagan/documents/Plant\\_SAR\\_Fact\\_Sheets/Phacelia\\_amosissima\\_var.\\_amosissima.pdf](http://www.elp.gov.bc.ca/okanagan/documents/Plant_SAR_Fact_Sheets/Phacelia_amosissima_var._amosissima.pdf)

- Install public information signs in recreation areas containing this plant. These should be designed in consultation with Provincial and Federal species at risk staff focused on key messages to encourage/inspire avoidance;
- Implement area-based closures, where voluntary compliance is not resulting in protection of Grand Coulee Owl-clover;
- Require compliance monitoring and where compliance is not occurring, enforce restrictions of recreation use of existing trails;
- Plan fences to prevent encroachment of people into areas occupied by Grand Coulee Owl-clover, where these are adjacent to recreation trails; include fencing design criteria that incorporates consideration of potential conflicts with other wildlife and human safety hazards;
- Clearly describe trails/roads where use is permitted using maps and signs.

### References:

BC Species and Ecosystems Explorer <http://a100.gov.bc.ca/pub/eswp/reports.do?elcode=PDSCR1H020>

Conservation Data Centre Occurrence Mapping <http://a100.gov.bc.ca/pub/eswp/eoMap.do?id=18071>

COSEWIC Assessment and Status Report <http://www.sararegistry.gc.ca/default.asp?lang=En&n=4607CED6-1&printfullpage=true>

NatureServe Explorer <http://explorer.natureserve.org/servlet/NatureServe?searchName=Orthocarpus+barbatus>

In Klinkenberg, Brian. (Editor) 2017. E-Fauna BC: Electronic Atlas of the Fauna of British Columbia [efauna.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. [Accessed: 10/03/2017 11:39:57 AM]

Sara Registry [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=862](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=862)



## Lewis's Woodpecker (*Melanerpes lewis*)

### Photos of bird and its habitat



Photo credit Kasey Moran

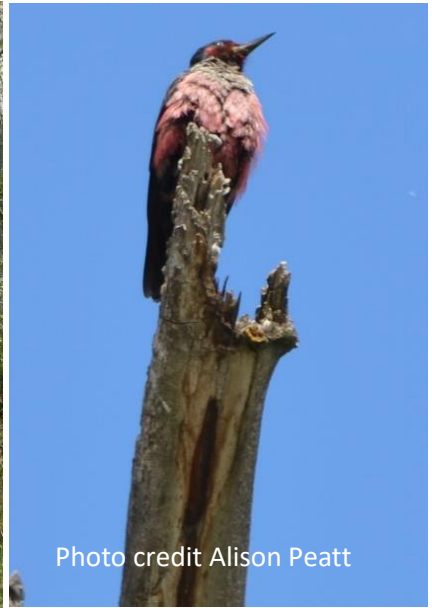


Photo credit Alison Peatt



Photo credit Bob McKay

### Weblinks to Additional Photos:

<http://linnet.geog.ubc.ca/efauna/Atlas/Atlas.aspx?sciname=Melanerpes+lewis>

[https://www.allaboutbirds.org/guide/Lewis\\_Woodpecker/id](https://www.allaboutbirds.org/guide/Lewis_Woodpecker/id)

### Occurrence Mapping and Inventory Information:

Chutter, Myke and John Cooper. 1997-1999 - Lewis' Woodpecker - East Kootenay - Victoria - HCTF MELP

<http://a100.gov.bc.ca/pub/siwe/details.do?id=2605>

Cooper, John M. and Suzanne Beauchesne. 2000. BC Ministry of Environment, Lands and Parks. Wildlife Working Report No. WR-100 (available on EcoCat; search Lewis's Woodpecker)

Dulisse, Jakob. 2016. 2008-ongoing - Lewis's Woodpecker - Pend d'Oreille - Nelson - FWCP-CB. <http://a100.gov.bc.ca/pub/siwe/details.do?id=5116>

Dyer, Orville. 2007. 2007 - Lewis's Woodpecker - Okanagan - Penticton – MOE. <http://a100.gov.bc.ca/pub/siwe/details.do?id=4298>

Gyug, Les. 1997. Forest Development Plan Red- and Blue-listed Species Inventory for Woodpeckers in 1997: <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=34926>

Gyug, Les. 1998. 1998 Forest Development Plan Red- and Blue-listed Species Inventory for Owls and Woodpeckers. BC Government Report. <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=34927>

Gyug, L. 2013. Lewis's Woodpecker species account and habitat suitability model (December 2013) for Interior British Columbia. Prepared by Okanagan Wildlife Consulting for Environment Canada – Canadian Wildlife Service.

Hobbs, Jared. 2002. 2002 - Gopher - Racer - Badger - Lewis's Woodpecker - Okanagan - Penticton – MoE. <http://a100.gov.bc.ca/pub/siwe/details.do?id=4404>

Iredale, Francis. 2007. 2007 - Species at Risk - Incidental Observations - Thompson <http://a100.gov.bc.ca/pub/siwe/details.do?id=4614>

Iredale, Francis. 2009. 2009 - Lewis's Woodpecker - Thompson - MOE Region 3. <http://a100.gov.bc.ca/pub/siwe/details.do?id=4530>

Jackett, Nigel, Megan Traicheff, Kersti Vaino and Vicky Young. 2007. Lewis's Woodpecker (*Melanerpes lewis*) Inventory, Okanagan Regional, 2007. BC Environment Report. [http://www.env.gov.bc.ca/wildlife/wsi/reports/4298\\_WSI\\_4298\\_RPT.PDF](http://www.env.gov.bc.ca/wildlife/wsi/reports/4298_WSI_4298_RPT.PDF)

Luszcz, Tanya. 2006. 2006 - Lewis's Woodpecker (*melanerpes lewis*) - British Columbia - Okanagan – MOE. <http://a100.gov.bc.ca/pub/siwe/details.do?id=4277>

Summerland Agri-Food Research Centre. 2004 -2006 - Species at Risk - Agri - Food Research Center - Summerland - Penticton - Federal Government. <http://a100.gov.bc.ca/pub/siwe/details.do?id=4275>

Surgenor, John. 2007. 2007 - Lewis's Woodpecker - Thompson - Kamloops - MOE <http://a100.gov.bc.ca/pub/siwe/details.do?id=4330>

### **Critical Habitat Location Maps and Data Files**

Open Portal Canada: files available for download

<http://donnees.ec.gc.ca/data/species/developplans/critical-habitat-for-species-at-risk-british-columbia/critical-habitat-for-species-at-risk-british-columbia-lewis-woodpecker-melanerpes-lewis/?lang=en> ECCC also has a species at risk email address that is intended for qualified professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)).

BC IMAP: files can be viewed <http://maps.gov.bc.ca/ess/sv/imapbc/>

**Key information to consider in designing land use to avoid destruction of Critical Habitat:**

- **Attribute-based Critical Habitat:** Critical Habitat is mapped based on habitat suitability and known nesting sites. Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, where attributes are present, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.
- **Habitat Description, Range of Occurrence, and Population:** Only known to breed in western North America (and within Canada, only in B.C.). Over 180,000 ha of Critical Habitat has been mapped across the province, but legal protection applies only to the portion with the specific biophysical attributes as described in the recovery strategy and identified in the field. Breeding habitat is low elevation open forest (Ponderosa Pine, Douglas Fir, Cottonwood stands typically at <950m elevation) near streams, lakeshores and wetlands, as well as conifer forests regenerating after recent fire (<30 years ago) up to 1265m. These birds select areas with large wildlife trees and existing cavities for nesting. Another habitat component is diverse ground cover of low shrubs, grasses and herbaceous plants that produce berries or provide habitat for large numbers of flying insects; wild and cultivated fruit may also form part of the diet. After major population declines over the past century across the continent and BC, there are estimated to be 600 breeding pairs remaining in BC, with significant areas of BC now extirpated (e.g. Coastal BC and North Okanagan).
- **Geographic Location of Critical Habitat in BC:** Critical habitat for the Lewis’s Woodpecker occurs within the Boundary, Okanagan-Similkameen, Thompson-Nicola, East Kootenay and Caribou-Chilcotin regions (listed in the order of importance, based on where largest numbers of breeding birds are found). Collectively, the habitat area predicted to support breeding birds is estimated at 4500 km<sup>2</sup>, less than 10% of the species global range. There is insufficient Critical Habitat identified in the Okanagan-Similkameen and Cariboo-Chilcotin regions to support the population and distribution required. Additional habitat could be created through strategies like restoration/augmentation approaches such as cottonwood habitat restoration, prescribed burning, topping and fungal inoculation to create nest trees.
- **Recognizing Critical Habitat Features:**
  - Nest trees that are known to have been occupied by Lewis’s Woodpecker at any time in the past. This includes some utility poles, though < 2% of known nests are in utility poles.
  - Potential nest trees including Ponderosa Pine, Black Cottonwood, or Douglas-fir (usually burned), but can also include Trembling Aspen, Paper Birch, Western Larch, or (in the West Kootenay) Subalpine Fir. These can be either alive or dead, but are >30 cm diameter at breast height (dbh) in Ponderosa Pine and cottonwood-dominated habitats or >24 cm dbh in areas that have been burned. These are trees that either already contain cavities (naturally occurring or created by other species) with minimum opening of 5 cm in diameter, or of a significantly advanced stage of decay to facilitate excavation by Lewis’s Woodpeckers (decay class ‘2’ or higher).
  - **If known or potential nest trees are present,** Critical Habitat features also include the following within 400m- standing trees not exceeding 35% canopy closure, to provide perching, foraging and food caching opportunities. Also, understory vegetation (grass and shrub layers) to support insects these birds forage for during nesting period and fruit-bearing trees and shrubs which provide food in late and post breeding periods.



- **Activities likely to cause destruction of Critical Habitat:** Activities of concern include removal of any known nest tree or modification of trees (e.g. limbing, topping) such that cavities are no longer accessible, significant removal of potential nest trees<sup>5</sup>, significant removal of standing mature trees within 400m of a known nest tree<sup>6</sup>, replacement of open forest habitats (< 35% canopy closure) with > than 35% canopy closure, and significant destruction of understory vegetation (grass and shrub layers) or fruit-bearing bushes within 400m of known or potential nest tree.
- **Other Considerations-**
  - **Sensitive to Road and Vehicle Collisions:** Avoid construction of access roads that separate nesting and foraging habitats to avoid road collision mortality of woodpeckers and their young.
  - **Broadly retaining standing large diameter Black Cottonwood and Ponderosa Pine:** Although not directly relevant to Critical Habitat, retaining standing trees (e.g. larger diameter Cottonwood, Ponderosa Pine) outside patches like parks or riparian zones have significant potential to enhance and restore habitat for Lewis Woodpeckers. Large cottonwood and ponderosa pine were once common in the Okanagan. Disease, development, danger tree removal, fire and various land use impacts has impacted the supply of these trees. Many bird species depend on the Ponderosa and Cottonwood for nesting. Cost-effective flood mitigation, erosion prevention and maintenance of water quality are all linked to cottonwood trees. Also, cottonwood trees are difficult to re-establish, once lost.
  - **Wintering use:** Records as recent as 2011 document wintering birds in the South Okanagan (Trout Creek/Summerland area), but otherwise Lewis's Woodpecker is not found in BC in the winter.
  - **Poor at cavity excavation:** Unlike typical woodpeckers, Lewis's Woodpecker lacks skull and bill structure needed to easily excavate cavities and thus tends to rely on existing cavities for nesting.
  - **Fire maintains habitat values:** Lewis's Woodpecker habitat is promoted by a continuous supply across time of natural disturbance fires. Fire suppression can reduce or eliminate habitat; fuel management can reduce habitat suitability through impacts to understory vegetation; and hot fires can destroy habitat.
  - **Migratory bird protections under SARA:** individuals and residences (nests, including eggs) are protected anywhere in Canada under SARA (s.32, s.33).

#### Available advice to support strategies to avoid and mitigate impacts to Critical Habitat

1. Recovery Strategy for the Lewis's Woodpecker (*Melanerpes lewis*) in Canada provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat. Note particularly Appendix B: Best Management Practices to Minimize Impacts to Lewis's Woodpecker's Habitat (page 39 and 40)  
[http://www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_lewis%27s\\_woodpecker\\_e\\_proposed.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_lewis%27s_woodpecker_e_proposed.pdf)

<sup>5</sup> Potential nest trees include nest trees not yet recorded/documented by Environment Canada, as well as those that are not yet being used but have the potential for use because they share common attributes with known nest trees. Both are critical for supporting the current nesting population, given that nest trees are a dynamic resource (falling/decaying beyond use and being replaced by new trees over time) and Lewis's Woodpeckers may use different trees within the same area from year to year.

<sup>6</sup> Studies indicate that nesting birds are typically found foraging within 400m of nest tree, although they can be found foraging a km or more away, on occasion.

2. British Columbia's Wildlife at Risk Lewis's Woodpecker (*Melanerpes lewis*)  
[http://www.env.gov.bc.ca/wld/documents/lwoodpecker\\_s.pdf](http://www.env.gov.bc.ca/wld/documents/lwoodpecker_s.pdf)
3. Wildlife Tree Stewardship Program – Okanagan-Similkameen SPECIES FACTSHEET: Lewis's Woodpecker. <http://wildlifetree.org/downloads.htm>

#### Avoidance/Mitigation Strategies:

- Do not remove or modify any known nest tree(s)<sup>7</sup> by topping or limbing such that nesting cavities are no longer accessible<sup>8</sup>;
- Do not remove standing mature trees or potential nest trees within 400m of known nest site; if safety hazard exists that cannot be mitigated, QEP involvement is needed and QEPs should seek advice from Environment and Climate Change Canada;
- Do not clear or remove fruit-bearing trees, bushes or understory vegetation within 400m of a known nest tree of Lewis's Woodpecker;
- Maintain understory vegetation within 400m of a known nest tree, up to 35% canopy closure unless Firesmart management is needed to limit fire risk; where Firesmart management is needed to limit fire risk, maintain clumps of understory in association with attribute trees retained;
- Manage livestock grazing in Critical Habitat for Lewis's Woodpecker using a grazing plan containing measures designed to prevent concentration of livestock within Critical Habitat and maintain high-quality herb and shrub layers for insect production. Prescribe monitoring in the grazing plan to ensure that ongoing supply of Critical Habitat attributes is not reduced by grazing. If impacts are identified, modify the grazing plan to ensure that impacts are prevented;
- Retain a continuous supply of attribute trees across Critical Habitat (i.e. >30cm dbh in ponderosa pine and cottonwood dominated areas or >24 cm dbh in burned areas
- Because Lewis's Woodpeckers are highly susceptible to nest avoidance/abandonment caused even by small disturbances, enact seasonal closures (April-August) to prevent disturbance/noise from off-road recreation vehicles/recreation/development adjacent within 400m of nest sites;
- Route new and existing recreation trails away from occupied nests (e.g. maintain 400 m distance);
- Avoid use of netting in proximity to active nest sites to avoid entanglement; store netting inside buildings to ensure to prevent risks when netting is not in use.
- Prevent firewood cutting of attribute trees;
- Consider signs and seasonal speed reductions in areas where roads are located in proximity to active nest sites.

<sup>7</sup> A known nest tree is a nest identified in inventory available from Environment and Climate Change Canada or other reliable source (e.g. Province of BC, naturalist records, qualified professional inventory or environmental assessment report). The nest does not need to be currently occupied as Lewis's re-use nest sites. If nest is thought to no longer be suitable (e.g. nest tree has been damaged), seek advice from Environment and Climate Change Canada.

<sup>8</sup> QEPs are also encouraged to consult with Environment and Climate Change Canada to ensure that activities associated with nest sites of SARA Threatened and Endangered Species are consistent with federal laws and recovery strategies.

- Do not use chemical pesticides within 400m of known nest trees.
- Protect high quality Critical Habitat e.g. attributes are present: known nest trees or highly suitable attribute trees (e.g. large diameter cottonwood, ponderosa pine, fir with existing excavated cavities/heart rot); suitable understory with berry bushes/robust insect populations.
- Maintain Lewis's Woodpecker Critical Habitat attributes by incorporating wildlife danger tree assessment and suitable vegetation management planning into urban/park planning;
- Establish park management policies in areas of Critical Habitat (attributes present) to ensure potential danger trees within parks/urban areas are assessed by qualified arborist with advice from Registered Professional Biologist (QEP). Every effort should be made to retain attribute trees; where they must be removed due to danger concerns, ensure this removal complies with the Species at Risk Act and Migratory Birds Convention Act;
- Plan all vegetation management/removal activities for outside the nesting season (September – April); for nesting calendars, see <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html> and Okanagan least risk bird windows, see <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/working-around-water/regional-terms-conditions-timing-windows/okanagan-timing-windows>

## References

Identified Wildlife Management Strategy for Lewis's Woodpecker

[http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Birds/b\\_lewisswoodpecker.pdf](http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Birds/b_lewisswoodpecker.pdf)

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Partners in Flight. Species Conservation Profiles: Lewis's Woodpecker.

<https://partnersinflight.org/species/lewiss-woodpecker/> [Accessed: 04/13/2020]



## Behr's Hairstreak (*Satyrium behrii*)

### Photos of butterfly and its habitat



### Weblinks to Additional Photos:

<http://linnet.geog.ubc.ca/efauna/photoGallery/ShowStandard.aspx?index=6623>

<https://www.inaturalist.org/taxa/209725-Satyrium-behrii>

[http://www.sccp.ca/sites/default/files/species-habitat/documents/SARFieldGuide%202016\\_0.pdf](http://www.sccp.ca/sites/default/files/species-habitat/documents/SARFieldGuide%202016_0.pdf)

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[http://www.env.gov.bc.ca/wildlife/wsi/reports/4620\\_WSI\\_4620\\_RPT\\_2007\\_HALFMOONHAIRSTREAK.PDF](http://www.env.gov.bc.ca/wildlife/wsi/reports/4620_WSI_4620_RPT_2007_HALFMOONHAIRSTREAK.PDF)

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 Available: <http://linnet.geog.ubc.ca/efauna/photoGallery/ShowStandard.aspx?index=6623> (accessed 11 November, 2015).

Larrivee M., K. L. Prudic, K. McFarland and J. Kerr. 2014. eButterfly: a citizen-based butterfly database in the biological sciences. Available: <http://www.e-butterfly.org> (accessed 7 November 2015).

Mapped Known Locations (Conservation Data Centre) for Behr's Hairstreak  
<http://a100.gov.bc.ca/pub/eswp/eoMap.do?id=14980>

St. John, D. 1996. 1995 survey of rare Okanagan butterflies. Unpubl. rep. submitted to B.C. Minist. Environ., Lands and Parks, Victoria. 7pp.

### Critical Habitat Location Maps and Data Files

Critical Habitat mapping can be obtained from the following Government of Canada website. <https://open.canada.ca/data/en/dataset?q=Behr%27s+Hairstreak+Critical+Habitat> ECCC also has a species at risk email address that is intended for qualified professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)).

Critical Habitat mapping can be obtained from the following Government of Canada website. Critical habitat is also available through the province (Data BC) at: <https://catalogue.data.gov.bc.ca/dataset/critical-habitat-for-federally-listed-species-at-risk-posted-> and can also be viewed on BC IMAP at <http://maps.gov.bc.ca/ess/sv/imapbc/>

### Key information to consider in designing land use to avoid destruction of Critical Habitat:

- **Attribute-based Critical Habitat:** Critical Habitat is mapped based on documented occurrences and suitable habitat in a surrounding area of 600 meter radius (estimated seasonal dispersal capability of adult Behr’s Hairstreak). Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, where attributes are present, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.
- **Habitat Description, Range of Occurrence, and Population:** Behr’s Hairstreak is found from southern B.C. to southern California and New Mexico. Canada is northern range limit; Canadian range of Behr’s Hairstreak is the south Okanagan valley in B.C. Population distribution is believed to be declining along with available habitat (antelope brush habitat lost at a rate of more than 2% per year (Dyer and Lea, 2003) with more than 68% estimated to be lost to development by 2008 (Lea, 2008).
- **Geographic Location of Critical Habitat in BC:** Range extent of occurrences is estimated at 353 km<sup>2</sup>; area of occupancy is estimated at 184 km<sup>2</sup>, 32 known current and historic occurrences. It occurs in a narrow band of antelope brush habitat that extends east and west from the south half of Skaha Lake continuously through Oliver to the Canada-US border (east and west of Osoyoos Lake).
- **Recognizing Critical Habitat Features:** Critical habitat is identified in seven sites in BC. More may be added and boundaries may be mapped with greater precision in future, if research supports these additions. Important biophysical attributes of critical habitat include:
  - **Larval host plant:** Antelope-brush plants are the only known larval host (possibly 30 year old or older plants preferred). All Antelope-brush plants (regardless of age) found in close proximity (within 5 m) of nectar source plants are essential habitat features.
  - **Nectar source plants:** Common Yarrow (*Achillea millefolium*) is the likely the main nectar plant but others observed to contribute to habitat needs include Smooth Sumac (*Rhus glabra*), Gray Horsebrush (*Tetradymia canescens*), Buckwheat (*Eriogonum* spp.), Creambush Oceanspray (*Holodiscus discolor*), Tall Baby's Breath (*Gypsophila paniculata*), Sweet Clover (*Melilotus* sp.), and Fleabane (Erigeron sp.).
  - **Structure:** Antelope-brush plants, mature Ponderosa Pine (*Pinus ponderosa*) trees and/or other mature trees scattered within Antelope-brush grasslands, and standing water and any associated peripheral wetted areas (puddles and other standing water including wetted areas surrounding them, ephemeral wetlands, non-fish-bearing



wetlands, creeks, streams, springs or other features that may hold water (depressions, draws, gullies).

- **Mapped areas without attributes:** Unsuitable habitats that lack Critical Habitat attributes include: forested areas without Antelope-brush, lakes (below lowest documented water line), anthropogenic features such as active trails, roads, and existing infrastructure (e.g. buildings).
- **Activities likely to cause destruction of Critical Habitat:** habitat loss and fragmentation caused by development of natural landscapes; fire suppression in antelope-brush ecosystems and/or fire that destroys attributes of Critical Habitat; introduced/invasive species (e.g. Cheatgrass), browsing by Mule Deer, California Bighorn, cattle damaging or destroying larval host plants; pesticide for controlling invertebrate pests or invasive plants (not applied consistent with provincial best management practices) applied on site or arriving by drift from adjacent agriculture areas, and intensive grazing/trampling of nectar host plants or soil compaction or creation of disturbed trails/clearings; motorized/non-motorized recreation (ATVs, other vehicles; foot traffic, mountain biking, horse-back riding) causing impacts to larval or nectar host plants, compaction/removal of soils or creation of new roads, trails or clearing.
- **Other Considerations-**
  - **Potential mutualistic associations with ants:** Behr's Hairstreak may also depend on mutualistic associations with ants (potentially Harvester (*Pogonomyrmex* spp.) ants that may protect larvae from parasites and parasitoids while also collecting/dispersing antelope-brush seeds; Behr's larvae apparently provide ants with food.
  - **Limited dispersal capability makes habitat connectivity important:** Behr's Hairstreak are also poor dispersers with typical dispersal being approximately 100m and 1.2 km the maximum known in Okanagan Valley.

#### Available advice to support strategies to avoid and mitigate impacts to Critical Habitat

1. Recovery Strategy for the Behr's Hairstreak (*Satyrium behrii*) in Canada: This document provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat.  
[http://www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_behr%27s%20hairstreak\\_e\\_final.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_behr%27s%20hairstreak_e_final.pdf)
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[http://www.env.gov.bc.ca/wildlife/wsi/reports/4190\\_WSI\\_4190\\_RPT\\_BEHR\\_BIOGEOGRAPHY.PDF](http://www.env.gov.bc.ca/wildlife/wsi/reports/4190_WSI_4190_RPT_BEHR_BIOGEOGRAPHY.PDF)

#### Avoidance/Mitigation Strategies:

- Prevent habitat fragmentation and protect high quality Critical Habitat (i.e. containing attributes<sup>9</sup>);

<sup>9</sup> High quality habitat includes the following attributes: **larval host plant:** greater than 10% plant cover of antelope brush; **structure:** scattered mature Ponderosa Pine trees, topographic diversity, and standing water/wetlands/high soil moisture; **nectar source plants:** Common Yarrow, Smooth Sumac, Grey Horsebrush, Buckwheat, Creambush Oceanspray, Tall Baby's Breath, Sweet Clover, Fleabane).



- Conduct ongoing land management to prevent catastrophic fire and understory tree encroachments, while also maintaining a supply of attributes including structure, larval host plants, and nectar source plants (see previous bullet).
- Do not use chemical pesticides or herbicides within mapped Critical Habitat containing attributes (e.g. areas that contain structure, larval host plant and nectar source plants).
- Require that pesticide use comply with Provincial Best Management Practices in areas adjacent to Behr's Hairstreak Critical Habitat.
- Maintain habitat connectivity between areas of Critical Habitat.
- Within Critical Habitat for this species, do not clear, develop or disturb except on existing urban and residential landscapes, existing road surfaces and well-developed trails;
- Recovery strategies advocate learning more about grazing practices and their impact on this species. Too much grazing may cause direct mortality of Behr's Hairstreak, impacts to nectar or larval host plants and/or cause undesirable soil compaction. Monitoring of grazing practices and impacts to populations will help promote development of appropriate strategies to avoid/mitigate impacts. Initial recommended strategies include:
  - Protect larval host plants (Antelope Brush) from damage, destruction or compaction/removal of soils within 5m of plant;
  - Prevent damage or destruction of nectar host plants;
  - Prevent creation of new exposed/disturbed trails or clearings associated with grazing/agriculture use;
  - Fence wetlands and water features located within Critical Habitat to prevent soil impacts and soil compaction; water sources may be important as moisture and/or mineral resources may also sustain host plants in dry years;
  - Engage a qualified professional agrologist and registered professional biologist team to monitor population of Behr's Hairstreak to assess effectiveness of results in maintaining viable population(s) and adjust strategies to increase their effectiveness, based on monitoring results.
- Plan and Implement large-scale management actions, such as invasive species removal or the use of herbicides based on direction from an invasive management plan, developed with the advice of a qualified professional or qualified professional team with substantial experience in invasive management and species at risk. Design actions to prevent loss or damage to Behr's Hairstreak.
- Manage recreation to avoid mapped Critical Habitat areas, except on existing road surfaces and well-developed existing trails; prescribe measures to ensure off road/ off trail use does not occur by:
  - Requiring recreation planning including a management plan with direction designed to avoid impacts to Behr's Hairstreak.
  - Providing targeted outreach to recreation users to ensure they understand how to avoid habitat impacts;
  - Install public information signs in recreation areas containing Critical Habitat. These should be designed in consultation with Provincial and Federal species at risk staff focused on key messages to encourage/inspire impact avoidance;
  - Implement area-based closures, where voluntary compliance is not resulting in protection of Behr's Hairstreak;

- Require compliance monitoring and where compliance is not occurring, enforce restrictions of recreation use of existing trails;
- Plan fences to prevent encroachment of people into areas occupied by Behr's Hairstreak adjacent to recreation trails; include fencing design criteria that incorporates consideration of potential conflicts with other wildlife and human safety hazards;
- Clearly describe trails/roads where use is permitted using maps and signs.

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## Halfmoon Hairstreak (*Satyrium semiluna*)

### Photos of butterfly and its habitat

Photo credit Allison Haney



Photo credit Allison Haney

### Weblinks to Additional Photos:

[https://www.flickr.com/photos/johns\\_pics/7795907182/](https://www.flickr.com/photos/johns_pics/7795907182/)

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**Critical Habitat Location Maps and Data Files**

Critical Habitat mapping can be obtained from the following Government of Canada website:

<http://open.canada.ca/data/en/dataset/d1b9d2ba-2d96-45d4-bf7a-a81611fb1376> ECCC also has a species at risk email address that is intended for qualified professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)).

Critical Habitat mapping can be obtained from the following Government of Canada website. Critical habitat is also available through the province (Data BC) at:

<https://catalogue.data.gov.bc.ca/dataset/critical-habitat-for-federally-listed-species-at-risk-posted-> and can also be viewed on BC IMAP at <http://maps.gov.bc.ca/ess/sv/imapbc/>

**Key information to consider in designing land use to avoid destruction of Critical Habitat:**

- **Attribute-based Critical Habitat:** Critical Habitat is mapped based on documented occurrences and suitable habitat in a surrounding area of 600 meter radius (estimated seasonal dispersal capability of adult Half-moon Hairstreak). Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, where attributes are present, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.



- **Habitat Description, Range of Occurrence, and Population:** Half-moon Hairstreak is known to occur in Canada in both southern B.C. and Alberta, although the Alberta population is considered isolated from other populations. They are also known to occur in Washington, Oregon, Idaho, California, Nevada, Montana, Wyoming, and Colorado. Within B.C., this species is found in the southern Okanagan Valley, as well as the Similkameen Valley in grassland habitats. Populations tend to be small; when adults are seen, the numbers observed are generally small (fewer than Behr's). Population size and trends are currently unknown. Habitat includes slopes containing sagebrush, and open dry meadows in areas of pine forest.
- **Geographic Location of Critical Habitat in BC:** The total area of range and area of occupancy are uncertain, but the BC Recovery Strategy estimated the known area of occurrence to be 341 km<sup>2</sup> within the southern Okanagan River Valley, based on Conservation Data Centre mapping. There are 8 known current and historic occurrences including one in Alberta and 7 in BC (Anarchist Mountain, White Lake, Richter Pass, Kilpoola, Mt. Kobau, Blind Creek, Kilpoola Lake, near Keremeos Columns and Chopaka East).
- **Recognizing Critical Habitat Features:** Critical habitat is identified in eight sites in BC. More may be added and boundaries may be mapped with greater precision in future, if research supports these additions. Important biophysical attributes of critical habitat include:
  - **Larval host plant:** Lupines are the apparent larval foodplant; sulfur lupine (*Lupinus sulphureus*) and silky lupine (*Lupinus sericeus*) are known to be used in BC.
  - **Nectar source plants:** Known nectar host plants are Common Yarrow (*Achillea millefolium*), Parsnip-flowered Buckwheat (*Eriogonum heracleoides*), and Grey Horsebrush (*Tetradymia canescens*). Missouri goldenrod (*Solidago missouriensis*) is also mentioned as a potential nectar host in the Province of BC Recovery strategy. Nectar host plants selected are possibly more extensive than what has been identified to date and may depend on what is available; plants flowering during the flight period could be potential nectar sources.
  - **Structure:** Big Sagebrush, Three-tip Sagebrush (*Artemisia tripartita*), Arrow-leaved Balsamorhiza (*Balsamorhiza sagittata*), and Prairie Sagebrush (*Artemisia frigida*) are species known to be present in areas occupied by this species. Sagebrush particularly appear to be important to habitat suitability in BC sites.
  - **Mapped areas without attributes:** Unsuitable habitats that lack Critical Habitat attributes include: forested areas, lakes, permanent standing water below the lowest documented water line, and permanent anthropogenic features (including existing infrastructure – buildings, telescopes, and running surfaces of roads).
- **Activities likely to cause destruction of Critical Habitat:** livestock grazing practices and/or motorized recreational activities that damage or destroy larval host plants or nectar host plants, or cause compaction of soils, or structural elements or cause new exposed/disturbed trails or clearings; pesticide drift and/or pesticide application not consistent with provincial best management practices and resulting in damage to larval and nectar food plants or habitat structure; forest encroachment and/or fire suppression in grassland or sagebrush communities causing destruction of attributes; habitat loss from agricultural, residential, commercial and/or industrial development; natural processes such as wild fire; climatic change and variability; land use activities directly or indirectly promoting invasive species and causing displacement of larval and nectar food plants (e.g. cheatgrass (*Bromus tectorum*), sulphur cinquefoil (*Potentilla recta*),

Dalmatian toadflax (*Linaria vulgaris*), and diffuse knapweed (*Centaurea diffusa*)); introduced tachinid flies (family Tachinidae) used for Gypsy Moth control which may cause unintended impacts to hairstreak populations.

- **Other Considerations-**

- **Active flight period:** late May to early July; this is a very short period to be actively flying when compared to other Hairstreaks. Flight is correlated with the timing of nectar host plant flowering.
- **Potential mutualistic associations with ants:** Half-moon Hairstreak also appear to be associated with ants (species unknown but Wood Ants (*Formica* spp.) and Carpenter Ants (*Camponotus* spp.) may be involved); the nature of this relationship is unknown but may provide mutual benefits, or involve provision of sugar packets to ants, as a strategy to distract them from preying upon hairstreak larva.
- **Habitat connectivity important:** Required to move between habitats and ensure survival of population given apparent limitation resulting from short dispersal distances, short adult lifespan and impact of weather on timing of adult flight.
- **Natural history:** Life span of Half-moon Hairstreak adults likely less than 2 weeks, with one generation per year. Eggs are laid at on or at the base of larval host plants,
- **Elevation:** This species known elevation range is 600-1100m

#### Available advice to support strategies to avoid and mitigate impacts to Critical Habitat

1. Recovery Strategy for the Half-moon Hairstreak (*Satyrium semiluna*) in Canada: This document provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat. <https://species-registry.canada.ca/index-en.html#/consultations/2663>
2. James, D. and D. Nunnallee. 2011. Life Histories of Cascadia Butterflies. Oregon State University Press. Corvallis, OR. 448pp.
3. Knopp, D., L. Larkin, J. Heron and O. Dyer. 2009. 2008 Surveys for Half-moon Hairstreak, *Satyrium semiluna*, in the Southern Okanagan, British Columbia. British Columbia Ministry of Environment, Ecosystem Branch, Vancouver, BC.
4. Cannings, R.J. 2004. Sooty Hairstreak (*Satyrium fuliginosum*). Accounts and Measures for Managing Identified Wildlife – Accounts V. 2004. 5 pp. [http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Invertebrates/i\\_sootyhairstreak.pdf](http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Invertebrates/i_sootyhairstreak.pdf)

#### Avoidance/Mitigation Strategies:

- Prevent habitat fragmentation and protect high quality Critical Habitat (i.e. containing attributes<sup>10</sup>);

<sup>10</sup> High quality habitat includes the following attributes: **larval host plant:** lupines: sulfur lupine (*Lupinus sulphureus*) and silky lupine (*Lupinus sericeus*) are known from BC; **structure:** Big Sagebrush, Three-tip Sagebrush (*Artemisia tripartita*), Arrow-leaved Balsamorhiza (*Balsamorhiza sagittata*), and Prairie Sagebrush (*Artemisia frigida*) are known from areas occupied by this species, but sagebrush is especially important in BC; **nectar source plants:** Common Yarrow (*Achillea millefolium*), Parsnip-flowered Buckwheat (*Eriogonum heracleoides*), Grey Horsebrush (*Tetradymia canescens*) and possibly Missouri goldenrod (*Solidago missouriensis*); other plants that are flowering during flight period may also be used.

- Conduct ongoing land management to prevent catastrophic fire and understory tree encroachments, while also maintaining a supply of attributes including structure, larval host plants, and nectar source plants (see first bullet).
- Do not use chemical pesticides or herbicides within mapped Critical Habitat containing attributes (e.g. areas that contain structure, larval host plant and nectar source plants).
- Require that pesticide use comply with Provincial Best Management Practices in areas adjacent to Halfmoon Hairstreak Critical Habitat.
- Maintain habitat connectivity between areas of Critical Habitat.
- Within Critical Habitat for this species, do not clear, develop or disturb except on existing urban and residential landscapes, existing road surfaces and well-developed trails;
- Recovery strategies advocate learning more about grazing practices and their impact on this species. Too much grazing may cause direct mortality of Halfmoon Hairstreak, impacts to nectar or larval host plants and/or cause undesirable soil compaction. Monitoring of grazing practices and impacts to populations will help promote development of appropriate strategies to avoid/mitigate impacts. Initial recommended strategies include:
  - Protect larval host plants (lupines: sulfur lupine (*Lupinus sulphureus*) and silky lupine (*Lupinus sericeus*) are known from BC) from damage, destruction or compaction/removal of soils within 5m of plant;
  - Prevent damage or destruction of nectar host plants;
  - Prevent creation of new exposed/disturbed trails or clearings associated with grazing/agriculture use;
  - Fence wetlands and water features located within Critical Habitat to prevent soil impacts and soil compaction;
  - Engage a qualified professional agrologist and registered professional biologist team to monitor population of Halfmoon Hairstreak to assess effectiveness of results in maintaining viable population(s) and adjust strategies to increase their effectiveness, based on monitoring results.
- Plan and Implement large-scale management actions, such as invasive species removal or the use of herbicides based on direction from an invasive management plan, developed with the advice of a qualified professional or qualified professional team with substantial experience in invasive management and species at risk. Design actions to prevent loss or damage to Halfmoon Hairstreak.
- Manage recreation to avoid mapped Critical Habitat areas, except on existing road surfaces and well-developed existing trails; prescribe measures to ensure off road/ off trail use does not occur by:
  - Requiring recreation planning including a management plan with direction designed to avoid impacts to Halfmoon Hairstreak.
  - Providing targeted outreach to recreation users to ensure they understand how to avoid habitat impacts;
  - Install public information signs in recreation areas containing Critical Habitat. These should be designed in consultation with Provincial and Federal species at risk staff focused on key messages to encourage/inspire impact avoidance;
  - Implement area-based closures, where voluntary compliance is not resulting in protection of Halfmoon Hairstreak;

- Require compliance monitoring and where compliance is not occurring, enforce restrictions of recreation use of existing trails;
- Plan fences to prevent encroachment of people into areas occupied by Halfmoon Hairstreak, where these are adjacent to recreation trails; include fencing design criteria that incorporates consideration of potential conflicts with other wildlife and human safety hazards;
- Clearly describe trails/roads where use is permitted using maps and signs.

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[http://www.sfu.ca/biology2/esbc/boreus/boreus23\\_2.pdf](http://www.sfu.ca/biology2/esbc/boreus/boreus23_2.pdf)



## Yellow-breasted Chat (*Icteria virens*)

Photos of bird and its habitat







**Weblinks to Additional Photos:**

<http://www.birdatlas.bc.ca/accounts/speciesaccount.jsp?sp=YBCH&lang=en>

<http://www.birding.bc.ca/community/viewtopic.php?f=2&t=15783&p=85922>

<https://royalbcmuseum.bc.ca/exhibits/living-landscapes/cbasin/history/songbirds.htm>

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Dulisse, J., S.R. Ogle, and M.M Machmer. 2005b. First Nest Record for Yellow-breasted Chat (*Icteria virens auricollis*) in Southeastern BC. *Northwestern Naturalist* 86(3):160-162.

Gibbard and Gibbard Environmental Consultants. 1992. *Yellow Breasted Chat Inventory: South Okanagan and Similkameen Valleys*. 10 pp.

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McKibbin, R., and C.A. Bishop. 2012a. Site fidelity and annual survival of the Western Yellow-breasted Chat (*Icteria virens auricollis*) at the northern edge of its range. *Canadian Field-Naturalist* 126(2): 135–142.

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Mino, C.I., I. Pollet, C.A. Bishop, and M.A. Russello. Unpublished manuscript. Genetic mating system and population history of an endangered population of the Western Yellow-breasted Chat (*Icteria virens auricollis*) in British Columbia.



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Warman, L., and M. Sarell. 1998. Yellow-breasted Chat (*Icteria virens*) South Okanagan and Similkameen habitat capability and suitability values, 1:20 000 scale terrestrial ecosystem mapping. British Columbia Ministry of Environment, Lands and Parks, Wildlife Branch, Victoria, British Columbia.

### Critical Habitat Location Maps and Data Files

Critical Habitat mapping can be obtained from the following Government of Canada website: <https://open.canada.ca/data/en/dataset?q=yellow+breasted+chat+Critical+Habitat> ECCC also has a species at risk email address that is intended for qualified professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)).

Critical Habitat mapping can be obtained from the following Government of Canada website. Critical habitat is also available through the province (Data BC) at: <https://catalogue.data.gov.bc.ca/dataset/critical-habitat-for-federally-listed-species-at-risk-posted-> and can also be viewed on BC IMAP at <http://maps.gov.bc.ca/ess/sv/imapbc/>

### Key information to consider in designing land use to avoid destruction of Critical Habitat:

- **Occurrence-based Critical Habitat:** Critical Habitat for Yellow-breasted Chat is mapped based on the “confirmed occupied habitat” areas known to be occupied by nesting pairs (known nest site or singing males detected since 2001), together with areas mapped as “suitable habitat”. Suitable habitat included TEM mapped areas of three different types: Floodplains with a Black Cottonwood overstory and shrub understory (Red-osier Dogwood, Wild Rose, Poison Ivy, Common Snowberry, Water Birch, or Mountain Alder), Moist gullies and floodplains with a Trembling Aspen (*Populus tremuloides*) overstory and shrub understory (Wild Rose, Common Snowberry, Saskatoon, Red-osier Dogwood, or Poison Ivy, and swampy areas characterized by Water Birch and Red-osier Dogwood, but also possibly including wild rose, Poison Ivy, Willow, or Mountain Alder. Critical Habitat is mapped based on both habitat suitability and known nesting sites. Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas where patch size of suitable habitat is greater than 1 ha, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.
- **Habitat Description, Range of Occurrence, and Population:** habitat includes areas of dense thickets of riparian shrubs; there is an estimated 170 breeding pairs in BC, fewer than the 200 breeding pair recovery target; modelling indicates that 2620 ha of habitat will be required to support the population goal; Yellow-breasted Chat breeds in North America (southern Canada, the United States and northern Mexico), and winters in North and Central America; In

Canada, the western subspecies (*auricollis*) includes the “not at risk” prairie population breeding in southeastern Alberta and southern Saskatchewan and the endangered Southern Mountain population breeding in the Okanagan and Similkameen Valleys, together with a small area of south-eastern BC (south of Trail).

- **Geographic Location of Critical Habitat in BC:** 524 ha within the Okanagan and Similkameen Valleys, and a small area of South-eastern BC. Modelling indicates that 2620 ha of habitat will be required to support the population goal. An estimated 63-92% of suitable habitat has already been lost.
- **Recognizing Critical Habitat Features:** includes dense riparian thickets along streams, oxbows, and wetlands in areas usually under 500 m; nesting habitat is dense thickets of wild rose (*Rosa* spp.) and other native shrubs with a mid-successional overstory of Water Birch (*Betula occidentalis*) or Black Cottonwood (*Populus trichocarpa*);
- **Activities likely to cause destruction of Critical Habitat:** Critical habitat is likely to be destroyed by any activity that results in loss of dense thickets of riparian shrubs. This includes: development; construction of roads, access trails or roadside clearing, burning, herbicide spraying and/or other activities resulting in fragmentation (reduction of suitable habitat to areas less than 2 ha); livestock grazing; and activities that alter the hydrological regime.
- **Other Considerations-**
  - **Site fidelity:** High return rate of singing males and banded fledglings in subsequent years.
  - **Territory size:** Areas used by males were an average of 1.16 ha, but foraging occurs well beyond areas defended by them.
  - **Migratory bird protections under SARA:** individuals and residences (nests, including eggs) are protected anywhere in Canada under SARA (s.32, s.33).

#### Available advice to support strategies to avoid and mitigate impacts to Critical Habitat

1. Recovery Strategy for the Yellow-breasted Chat *auricollis* subspecies (*Icteria virens auricollis*) (Southern Mountain population) in Canada: This document provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat. [https://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_yellow-breasted\\_chat\\_auricollis\\_southern\\_mountain\\_pop\\_e\\_final.pdf](https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/rs_yellow-breasted_chat_auricollis_southern_mountain_pop_e_final.pdf)
2. British Columbia Ministry of Water, Land and Air Protection. 2004. Yellow-breasted Chat *in* Accounts and measures for managing identified wildlife. British Columbia Ministry of Water, Land and Air Protection, Victoria, BC. 52pp. [http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Birds/b\\_yellowbreastedchat.pdf](http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Birds/b_yellowbreastedchat.pdf)
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4. Zevit, Pamela. 2010. BC's Coast Region: Species and Ecosystems of Conservation Concern Yellow-breasted Chat (*Icteria virens*) [http://ibis.geog.ubc.ca/biodiversity/factsheets/pdf/Icteria\\_virens.pdf](http://ibis.geog.ubc.ca/biodiversity/factsheets/pdf/Icteria_virens.pdf)

**Avoidance/Mitigation Strategies:**

- Maintain and enhance attributes within Critical Habitat;
- Do not thin, clear or burn riparian vegetation within Critical Habitat; this includes roadside areas;
- Maintain Yellow-breasted Chat habitat in areas of at least 2 ha in size;
- Do not build new roads, trails and stream crossings unless there is no practicable option;
- Do not use pesticides or herbicides within Critical Habitat;
- Provide alternate water, forage, and salt licks for livestock to reduce impacts to wetland and riparian habitats;
- Exclude cattle from Critical Habitat and revegetate cleared areas;
- Avoid building roads or stream crossings within Critical Habitat.
- Ensure consistent hydrological regime to support riparian vegetation in Critical Habitat areas.

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Campbell, R.W., N.K. Dawe, I.McT.-Cowan, J.M. Cooper, G. Kaiser, A.C. Stewart, and M.C.E. McNall. 2001. The Birds of British Columbia, Vol. 4, Passerines: Wood-Warblers through Old World Sparrows. UBC Press, in cooperation with Environ. Can., Can. Wildl. Serv., and B.C. Minist. Environ., Lands and Parks, Wildl. Branch and Resour. Inventory Branch, and Royal B.C. Mus. 744pp.

## Western Rattlesnake (*Crotalus Oreganus*)







**Weblinks to Additional Photos:**

<http://www.bcwildlife.org/snakes.htm>

<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/implementation/conservation-projects-partnerships/western-rattlesnake>

**Occurrence Mapping and Inventory Information:**

Hobbs, Jared. 2013. Den Survey and Population Assessment of the Northern Pacific Rattlesnake in BC. Unpublished report for BC Ministry of Environment. 40 pp.

Hobbs, Jared. 2013. Species Account and Population Assessment for the Northern Pacific Rattlesnake in Canada. Friends of Ecological Reserves [accessed June 2, 2019]

<http://ecoreserves.bc.ca/2013/08/15/species-account-and-population-assessment-for-the-northern-pacific-rattlesnake-in-canada/>

**Critical Habitat Location Maps and Data Files:**

Critical Habitat for this species is publicly available as provided in the recovery strategy (10x10 km standardized UTM grid squares within which Critical Habitat is found). Owing to identified risk of persecution or harm as assessed by the province of B.C. and COSEWIC, more detailed information may be requested<sup>11</sup>, on a need-to-know basis, by contacting Environment and Climate Change Canada's (ECCC) Recovery Planning section. Federal Government contact for the Okanagan is Jared Maida [jared.maida@canada.ca](mailto:jared.maida@canada.ca). ECCC also has a species at risk email address that is intended for qualified

<sup>11</sup> Detailed Critical Habitat access requires a data sharing agreement.

professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)). Contact for the province is Conservation Data Centre: Phone: 250-356-0928; Email: [cdccdata@gov.bc.ca](mailto:cdccdata@gov.bc.ca)

**Key information to consider in designing land use to avoid destruction of Critical Habitat:**

- **Attribute-based Critical Habitat:** Critical Habitat is only partially identified. Mapped based on sequential application of 2.8 km radial distance surrounding documented hibernacula to represent the essential terrestrial areas required for life history function, together with minimum convex polygons surrounding overlapping groups of essential terrestrial areas and exclusion of areas above 1850m in elevation. Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, where attributes are present, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.
- **Habitat Description, Range of Occurrence, and Population:**
  - Occurs in the dry hot Bunchgrass, Ponderosa Pine, and Interior Douglas-fir biogeoclimatic zones, mostly at elevations less than 1430m; strongly associated with rock outcrops, talus slopes, shrub–steppe, grassland, riparian, and open ponderosa pine and Rocky Mountain Douglas- forest habitats, but can also occur in urban and agricultural areas, where mortality risk is higher.
  - Known dens in the province occur at 400–800 m elevation, with a maximum reported den elevation of approximately 1200 m; typically at southeast to southwest aspect, variable slope; suitable humidity (details not known, but sufficient to prevent desiccation); limited shade; temperature 3-9 °C during hibernation Oct-Mar; high den site fidelity and may be used continuously by species for more than a century; used communally with multiple snakes including other snake species (Great Basin Gophersnake, Western Yellow-bellied Racer, Desert Nightsnake, Common Gartersnake and Western Terrestrial Garter Snake).
  - Population estimate vary; more than 10,000 likely occur in the Province; population trends are not well known but presumed to be declining based on understanding of threats and research associated with monitored dens where estimated 75% have declining trend in numbers.
  - 171.3–310.9 km<sup>2</sup> habitat is available in Province
  - Occurs in western North America, from south-central British Columbia to California and New Mexico, and east to the Rocky Mountains; *Oreganus* subspecies occurs in BC, Washington, Idaho, Oregon, and northern California. BC has less than 5% of the global distribution
- **Geographic Location of Critical Habitat in BC:** Rattlesnakes Critical Habitat is described in the Thompson-Nicola, Vernon, Okanagan – Similkameen, Midway and Grand Forks areas.
- **Recognizing Critical Habitat Features:**
  - **Overwintering: (Denning, Hibernation by all life stages):** Cliff, talus, rock outcrop, or earth covered rock outcrop with cracks or fissures to provide access to areas below frost line; utilized September-March, typically the same individuals use the same dens throughout the course of an individual snake’s life.

- **Forage, mating, shedding, refuge, basking by all life stages:** Grassland, shrub-steppe, open coniferous forest, rock outcrop, cliff, talus, riparian, wetland; used March to October; need available retreat structures including: rock outcrops, large rocks, rock piles, talus, bluffs, live and dead shrubs, grass and forbs, live and dead trees (for shade and cover), fallen trees, coarse woody debris, rodent burrows, and some concrete structures; need available prey items including: small mammals (primary food source), birds and other snakes.
- **Gestation by adults:** Cliff, talus, rock outcrop, rock piles or large rocks; used April to October; located up to 400m from den.
- **Mapped areas without attributes:** These include clearly unsuitable areas that do not support the species in any life history stage. Unsuitable areas do not contain any of the biophysical features and attributes required by the species at any time and are not identified as Critical Habitat. For example, existing permanent infrastructures such as running surface of paved roads and/or artificial surfaces, buildings, parts of water bodies that are > 1 km from the closest shoreline, and portions of described habitat located above 1850m in elevation.)
- **Activities likely to cause destruction of Critical Habitat:**
  - Land conversion for human development (e.g., housing and urban areas; agriculture-e.g. vineyards and orchards) causing loss or degradation of habitat including: destruction of suitable den sites, vegetation changes impacting availability of prey, soil compaction and/or reduction of cover objects.
  - Development and/or maintenance or modification of transportation and service corridor infrastructure, including: road building, expansion, upgrading, or installation of other types of barriers to snake movement, without installation of mitigations such as safe movement passages and fencing. This activity is linked to urban and rural development and associated increases in road density/habitat fragmentation. Concerns are for direct loss of Critical Habitat and direct loss/degradation of areas need to provide options for dispersal within and between occupied areas.
  - Inappropriate level and concentration of livestock use resulting in significant adverse effects, including loss of suitable habitat through disruption or alteration of features and attributes required for life history functions. This may occur through soil compaction, disruption or dislodging of rock and other cover objects, or vegetation changes impacting availability of prey. Ranching occurs throughout their ranges, and impacts may be variable depending on the location of grazing (e.g., upland or riparian), terrain features, and localized grazing intensity. Additional research is required to determine what level of livestock use is considered destructive, i.e. the level at which the features and attributes necessary for long-term persistence are destroyed. However, it is clear that intensive stocking rates are most likely to result in destruction of critical habitat.
  - High-use recreational activity, e.g., off-road vehicle tracks, mountain biking and/or hiking trails, rock climbing routes; and/or alteration of natural habitats for recreational purposes may cause direct impacts to biophysical attributes (i.e., collapsing of earthen burrows (PICA), damaging retreat locations), and/or may indirectly cause habitat features to be unsuitable (i.e., snakes will not use these areas for foraging and/or basking; disturbance may influence availability of local prey items). Recreation activities are prevalent within the species range. Destructive impacts within critical habitat may happen at any time of year.

- Fire suppression and/or human-caused high-intensity fire resulting in destruction to biophysical features and attributes of Critical Habitat. Fire suppression can create ecosystem-level threats to persistence of grasslands and shrub steppe, increasing shrub and tree cover. Fuel build up can lead to hot-burning and catastrophic wildfires. Vegetation changes can alter important habitat features including thermal properties, availability of earthen denning and/or foraging, prey type and abundance.
- **Other Considerations-**
  - Primary threats include direct harm from road mortality and persecution. Lower-ranked threats include habitat loss and fragmentation from housing and agricultural development, recreation, fire suppression, and potential diseases from invasive non-native/alien species.
  - Inventory requires specialized skills and the investment of significant time. In one study, researchers reported that it took an average of more than 8 hours of searching to find a single rattlesnake (Bertram et al., 2001). Best management practice is to assume they are present within mapped Critical Habitat and plan accordingly.
  - There is uncertainty about location of dens and occurrence records, area of occupancy and dispersal habitat requirements.
  - Longest recorded movement in BC is 4 km, but scientists believe longer movements occur during dispersal and conclude that Critical Habitat is not fully identified.
  - Protected from capture/kill under Wildlife Act; other provisions (listed as species requiring management attention) under Forest and Range Practices Act and Oil and Gas Activities Act
  - 368 known dens plus 12 extirpated; all den sites are not known, particularly those located on private land.
  - Movement from denning sites may be either upward or downward in elevation
  - Cover objects are important during shedding, may be used communally, and can sometimes be identified by a concentration of sheds in an area. Rattlesnakes are known to have high fidelity to both shedding sites and areas where they seek cover.
  - Most feeding occurs June-Aug; gravid females seldom feed before or after parturition<sup>12</sup> and remain within 300 m of den until young are born in September or October; 2-8 per litter; females breed every three years typically, but some breed every two years, depending on fat reserves/food availability
  - Nature reserve uses 5km in suitable habitat as a separation distance between populations and 1 km in unsuitable habitat.
  - Individual snakes have high fidelity to travel corridors, summer foraging sites, hibernacula; movement patterns may be predictable from one year to the next; home range measurements are variable (<1 to 195 ha), but generally smaller in open habitat (e.g. grasslands) than in forested habitats, where snakes tend to travel further.
  - Rattlesnakes need dispersal habitat, but attributes have yet to be formally described, based on sufficient research. The Provincial recovery strategy directs that similar areas are used for dispersal as are described as for foraging habitat, up to an elevation of

<sup>12</sup> New research suggest that gravid females feed opportunistically but do not actively hunt away from rookery or gestation sites (Jared Maida, pers. comm.).



1430m. Restoring connectivity lost to human caused fragmentation will be important in sustaining populations in the future.

- This species may not have the capacity to modify behaviour in response to habitat degradation and thus development in occupied habitat is likely to impact snake directly.
- More information is needed to determine what is biologically and technically feasible for recovery, however, if additional naturally occurring populations are discovered, they should be maintained.

#### **Available advice to support strategies to avoid and mitigate impacts to Critical Habitat**

1. Recovery Strategy for the Western Rattlesnake (*Crotalus oreganus*), the Great Basin Gophersnake (*Pituophis catenifer deserticola*) and the Desert Nightsnake (*Hypsiglena chlorophaea*) in Canada: This document provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat.  
[https://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_south\\_interior\\_snakes\\_e\\_proposed.pdf](https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/rs_south_interior_snakes_e_proposed.pdf)
2. Managing Identified Wildlife Account for Western Rattlesnake  
[http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Reptiles/r\\_westernrattlesnake.pdf](http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Reptiles/r_westernrattlesnake.pdf)
3. Develop with Care: Guidelines for Amphibian and Reptile Conservation (2014) p. 19-33; 101-103  
[https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/herptilebmp\\_complete.pdf](https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/herptilebmp_complete.pdf)
4. Best Management Practices for Amphibian and Reptile Salvage in BC  
<https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/best-management-practices>

#### **Avoidance/Mitigation Strategies:**

- Protect den sites from development with a no disturbance buffer of up to 1 km
- Consider protecting suitable habitat for dens (e.g. south-facing talus and rocky outcrops) and associated natural habitats within 1 km of dens (e.g. coniferous forest, shrub-steppe grasslands and riparian areas);
- Limit access, reduce disturbance and do not construct roads near dens.
- Avoid rock climbing, hiking, ATV or bike use near dens.
- For least risk, apply timing restrictions for construction to avoid April-October, when snakes are active. Otherwise, utilize fencing to exclude snakes from work area and prescribe measures to direct identification and salvage of snakes in the work area, consistent with the Best Management Practices for Amphibians and Reptile Salvage in BC.
- Mesh fencing constructed out of plastic or other materials has been associated with entanglement and mortality of snakes and other species. Consider best available information in

the design of snake fencing and address storage requirements for mesh products that may be utilized as part of development or land use.<sup>13</sup>

- Where snake mortality is significant: For least risk, consider application of seasonal restrictions for road use (April-October). Otherwise, consider the use of snake drift fences<sup>14</sup> and crossings at road intersections, and snake travel routes (as demonstrated by road kill data and/or inventory).
- Avoid disturbance to rock or talus.
- Do not conduct forest harvest activities within 200 m of den sites (Managing Identified Wildlife Account for Western Rattlesnake).
- Retain coarse woody debris.
- Do not use pesticides within areas of Critical Habitat.
- 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). [from Managing Identified Wildlife Strategy, Gophersnake Account]
- Do not place livestock attractants, construct trails or build corrals within 200 m of den site during spring (Managing Identified Wildlife Account for Western Rattlesnake);
- Avoid hay cutting or prescribed burning except when snakes are residing within dens (i.e. Nov.-March);
- Do not concentrate or move livestock on trails within 200 m of den site during spring dispersal (April) and fall (September/October) aggregations (Managing Identified Wildlife Account for Western Rattlesnake);
- Manage grazing to maintain a variety of habitat types (e.g. shrubs, grassland, riparian areas, rocky outcrops and dry forest) and good range condition in grasslands, to provide cover and habitat for prey species;
- Maintain coarse woody debris in forested areas and cover objects in grassland- shrub-steppe habitats (e.g. rocks, large woody debris); manage cover object adjacent to roads to reduce potential for road mortality (e.g. plug holes in no post barriers along roads; manage cover structures to limit snake use in proximity to roads);
- Integrate Critical Habitat conservation objectives into Environmental Farm Plans.
- Maintain habitat connectivity between areas of Critical Habitat.
- Where development is unavoidable, zone for minimum density (as low as possible); consider using drift fences to keep snakes out of residential areas and off roads;
- Avoid locating buildings or roads near potential denning areas such as south-facing talus slopes.

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<sup>13</sup> Kapker, Joshua M. and Rori A. Paloski. 2011. On the Threat to Snakes of Mesh Deployed for Erosion Control and Wildlife Exclusion. *Herpetological Conservation and Biology* 6(1):1–9. [http://www.herpconbio.org/Volume\\_6/Issue\\_1/Kapfer\\_Paloski\\_2011.pdf](http://www.herpconbio.org/Volume_6/Issue_1/Kapfer_Paloski_2011.pdf) ).

<sup>14</sup> Design of snake fencing is a rapidly evolving area of research. Consult with provincial experts, prior to designing and installing a snake fence.

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*Great Basin Gophersnake*





**Weblinks to Additional Photos:**

<http://www.bcreptiles.ca/snakes/grtbasingopher.htm>

<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/great-basin-gophersnake-2013.html>

**Occurrence Mapping and Inventory Information:**

Bertram, Nadine, Carl Larsen and John Surgenor. 2001. Identification of critical habitats and conservation issues for the Western Rattlesnake and Great Basin Gopher Snake within the Thompson-Nicola region of British Columbia. Final Report for the British Columbia Ministry of Water, Land and Air Protection and the Habitat Conservation Trust Fund of British Columbia. 11pp.

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**Critical Habitat Location Maps and Data Files**

Critical Habitat for this species is publicly available as provided in the recovery strategy (10x10 km standardized UTM grid squares within which Critical Habitat is found). Owing to identified risk of persecution or harm as assessed by the province of B.C. and COSEWIC, more detailed information may be requested<sup>15</sup>, on a need-to-know basis, by contacting Environment and Climate Change Canada's Recovery Planning section. Federal Government contact for the Okanagan is Jared Maida [jared.maida@canada.ca](mailto:jared.maida@canada.ca). ECCC also has a species at risk email address that is intended for qualified

<sup>15</sup> Detailed Critical Habitat access requires a data sharing agreement.

professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)). Contact for the province is Conservation Data Centre: Phone: 250-356-0928; Email: [cdccdata@gov.bc.ca](mailto:cdccdata@gov.bc.ca)

**Key information to consider in designing land use to avoid destruction of Critical Habitat:**

- **Attribute-based Critical Habitat:** Critical Habitat is only partially identified. 10x10 km squares are provided in the recovery plan. More detailed Critical Habitat mapping is available on a “need to know basis” from Environment and Climate Change Canada, after signing a confidentiality agreement. Critical Habitat is divided into two categories including Core and Connective:
  - *Core Critical Habitat:* mapped based on sequential application of 520 m radial distance around all available verified occurrence records to represent the essential terrestrial areas required by the species for life history functions, together with minimum convex polygons around groups of overlapping essential terrestrial areas to create “core” critical habitat (areas above 1700m elevation excluded);
  - *Connective Critical Habitat:* include area between any occurrence record within 2.4 km of another occurrence record where not within Core area and identify additional “connective” critical habitat between essential terrestrial areas (Core CH) with areas about 1700m excluded.

Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, where attributes are present, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.

- **Habitat Description, Range of Occurrence, and Population:**
  - Found in grasslands and surrounding dry forests of the southern interior of BC up to 1700m, but mostly below 1000m. Associated with rodent burrows (may use them as overwintering dens), gophersnakes can also swim and climb trees. Known rock dens in the province occur usually on warm aspects (southwest to southeast) in crevices, or talus slopes, up to approximately 873 m elevation; may share these dens with other snake species (Great Basin Gophersnake, Western Yellow-bellied Racer, Desert Nightsnake, Common Gartersnake and Western Terrestrial Garter Snake).
  - Population estimate vary between 2500- 10,000 in the Province; population trends are unknown.
  - Range of extent is 46,900 km<sup>2</sup>; 2,144 km<sup>2</sup> is the estimated area of occupancy for this species;
  - Great Basin Gophersnake occurs in Southern BC, Washington, Oregon, California, Arizona, Colorado, Nevada, New Mexico, Idaho, Utah, and Wyoming, although there is some uncertainty with taxonomic changes about where the subspecies found in BC shifts to others in the US states. Gophersnakes are found in 19 US states as well as BC, Alberta and Saskatchewan in Canada.
- **Geographic Location of Critical Habitat in BC:** Gophersnake Critical Habitat is described in the Fraser - Thompson – Nicola, Okanagan – Similkameen, Midway and Grand Forks areas.

- **Recognizing Critical Habitat Features:**
  - **Core- Overwintering (Denning, Hibernation by all life stages):** Cliff, talus, rock outcrop, or earth covered rock outcrop with cracks or fissures to provide access to areas below frost line; used Sept to March; , typically the same individuals use the same dens throughout the course of an individual snake's life.
  - **Core- Overwintering (Denning, Hibernation by all life stages):** Grassland or open shrub-steppe; used October to March; need soils deep enough for earthen dens or rodent burrows
  - **Core- Forage, mating, shedding, refuge, basking by all life stages:** Grassland, shrub-steppe, open coniferous forest, rock outcrop, cliff, talus, riparian, wetland; used March to October; need available retreat structures including: rock outcrops, large rocks, rock piles, talus, bluffs, live and dead shrubs, grass and forbs, live and dead trees (for shade and cover), fallen trees, coarse woody debris, rodent burrows, and some concrete structures; need available prey items including: small mammals, birds and other snakes.
  - **Egg laying by adults:** Grassland or open shrub-steppe; used June to Sept; associated features include presence of rodent burrows, talus slopes, rock fissures, and/or decaying wood
  - **Connective- Dispersal by adults and juveniles:** Grassland, shrub-steppe, open coniferous forest, rock outcrop, cliff, talus, riparian, wetland; used April to October; need available retreat structures including: rock outcrops, large rocks, rock piles, talus, bluffs, live and dead shrubs, fallen trees, coarse woody debris, rodent burrows, and some concrete structures; need available prey including: small mammals, birds, and other snakes
- **Mapped areas without attributes:** These include clearly unsuitable areas that do not support the species in any life history stage (i.e., do not contain any of the biophysical features and attributes required by the species at any time are not identified as critical habitat. For example, existing permanent infrastructure (running surface of paved roads and/or artificial surfaces, buildings), parts of water bodies that are > 1 km from the closest shoreline, and portions of described habitat located above 1700m in elevation.
- **Activities likely to cause destruction of Critical Habitat:**
  - Land conversion for human development (e.g., housing and urban areas; agriculture- e.g. vineyards and orchards) causing loss or degradation of core and/or connective Critical Habitat including: destruction of suitable den sites, vegetation changes impacting availability of prey, soil compaction and/or reduction of cover objects.
  - Development and/or maintenance or modification of transportation and service corridor infrastructure, including: road building, expansion, upgrading, or installation of other types of barriers to snake movement, without installation of mitigations such as safe movement passages and fencing. This activity is linked to urban and rural development and associated increases in road density/habitat fragmentation. Concerns are for direct loss of Core and Connective Critical Habitat and direct loss/degradation of areas need to provide options for dispersal within and between occupied areas.
  - Inappropriate level and concentration of livestock use resulting in significant adverse effects, including loss of suitable Core Critical Habitat through disruption or alteration of features and attributes required for life history functions. This may occur through soil



compaction, collapsing of soil burrows, disruption or dislodging of rock and other cover objects, or vegetation changes impacting availability of prey. Ranching occurs throughout their range, and impacts may be variable depending on the location of grazing (e.g., upland or riparian), terrain features, and localized grazing intensity.

- High-use recreational activity, e.g., off-road vehicle tracks, mountain biking and/or hiking trails, rock climbing routes; and/or alteration of natural habitats for recreational purposes may cause direct impacts to biophysical attributes (i.e., collapsing of earthen burrows (PICA), damaging retreat locations), and/or may indirectly cause habitat features to be unsuitable (i.e., snakes will not use these areas for foraging and/or basking; disturbance may influence availability of local prey items). Recreation activities are prevalent within the species range. Destructive impacts within core critical habitat may happen at any time of year.
- Fire suppression and/or human-caused high-intensity fire resulting in destruction to biophysical features and attributes of Core and Connective Critical Habitat. Fire suppression can create ecosystem-level threats to persistence of grasslands and shrub steppe, increasing shrub and tree cover. Fuel build up can lead to hot-burning and catastrophic wildfires. Vegetation changes can alter important habitat features including thermal properties, availability of earthen denning and/or foraging, prey type and abundance.
- **Other Considerations-**
  - Longest recorded movement within a home range in BC is 2.4 km,
  - Terrestrial habitat used in spring-fall active season is estimated at 520 m distance (approx.) around over-wintering sites
  - There is uncertainty about location of dens and occurrence records, and area of occupancy.

#### **Available advice to support strategies to avoid and mitigate impacts to Critical Habitat**

1. Recovery Strategy for the Western Rattlesnake (*Crotalus oreganus*), the Great Basin Gophersnake (*Pituophis catenifer deserticola*) and the Desert Nightsnake (*Hypsiglena chlorophaea*) in Canada: This document provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat. [https://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_south\\_interior\\_snakes\\_e\\_proposed.pdf](https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/rs_south_interior_snakes_e_proposed.pdf)
2. Managing Identified Wildlife Account for Great Basin Gophersnake [http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Reptiles/r\\_greatbasingophersnake.pdf](http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Reptiles/r_greatbasingophersnake.pdf)
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- Consider protecting suitable habitat for dens (e.g. south-facing talus and rocky outcrops) and associated natural habitats within 1 km of dens (e.g. coniferous forest, shrub-steppe grasslands and riparian areas);
- Limit access, reduce disturbance and do not construct roads near dens.
- Avoid rock climbing, hiking, ATV or bike use near dens.
- For least risk, apply timing restrictions for construction to avoid April-October, when snakes are active. Otherwise, utilize fencing to exclude snakes from work area and prescribe measures to direct identification and salvage of snakes in the work area, consistent with the Best Management Practices for Amphibians and Reptile Salvage in BC. Within the range of this species, gopher dens may contain gophersnakes even when habitat appears marginal. Precautionary approaches are vital when gopher dens are present.
- Mesh fencing constructed out of plastic or other materials has been associated with entanglement and mortality of snakes and other species. Consider best available information in the design of snake fencing and address storage requirements for mesh products that may be utilized as part of development or land use.<sup>16</sup>
- Where snake mortality is significant- For least risk, consider application of seasonal restrictions for road use (April-October). Otherwise, consider the use of snake drift fences<sup>17</sup> and crossings at road intersections, and snake travel routes (as demonstrated by road kill data and/or inventory).
- Avoid disturbance to rock or talus.
- Do not conduct forest harvest activities within 200 m of den sites. (Managing Identified Wildlife Account for Great Basin Gophersnake).
- Retain coarse woody debris.
- Do not use pesticides within areas of Critical Habitat.
- 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). [from Managing Identified Wildlife Strategy, Gophersnake Account]
- Do not place livestock attractants, construct trails or build corrals within 200 m of den site during spring;
- Avoid hay cutting or prescribed burning except when snakes are residing within dens (i.e. Nov.- March);
- Do not concentrate or move livestock on trails within 200 m of den site during spring dispersal (April) and fall (September/October) aggregations (from Managing Identified Wildlife Strategy for Great Basin Gophersnake).
- Manage grazing to maintain a variety of habitat types (e.g. shrubs, grassland, riparian areas, rocky outcrops and dry forest) and good range condition in grasslands, to provide cover and habitat for prey species;
- Maintain coarse woody debris in forested areas and cover objects in grassland- shrub-steppe habitats (e.g. rocks, large woody debris); manage cover object adjacent to roads to reduce

<sup>16</sup> Kapfer, Joshua M. and Rori A. Paloski. 2011. On the Threat to Snakes of Mesh Deployed for Erosion Control and Wildlife Exclusion. *Herpetological Conservation and Biology* 6(1):1–9. [http://www.herpconbio.org/Volume\\_6/Issue\\_1/Kapfer\\_Paloski\\_2011.pdf](http://www.herpconbio.org/Volume_6/Issue_1/Kapfer_Paloski_2011.pdf) ).

<sup>17</sup> Design of snake fencing is a rapidly evolving area of research. Consult with provincial experts, prior to designing and installing a snake fence.

potential for road mortality (e.g. plug holes in no post barriers along roads; manage cover structures to limit snake use in proximity to roads);

- Integrate Critical Habitat conservation objectives into Environmental Farm Plans.
- Maintain habitat connectivity between areas of Critical Habitat.
- Where development is unavoidable, zone for minimum density (as low as possible); consider using drift fences to keep snakes out of residential areas and off roads;
- Avoid locating buildings or roads near potential denning areas such as south-facing talus slopes.

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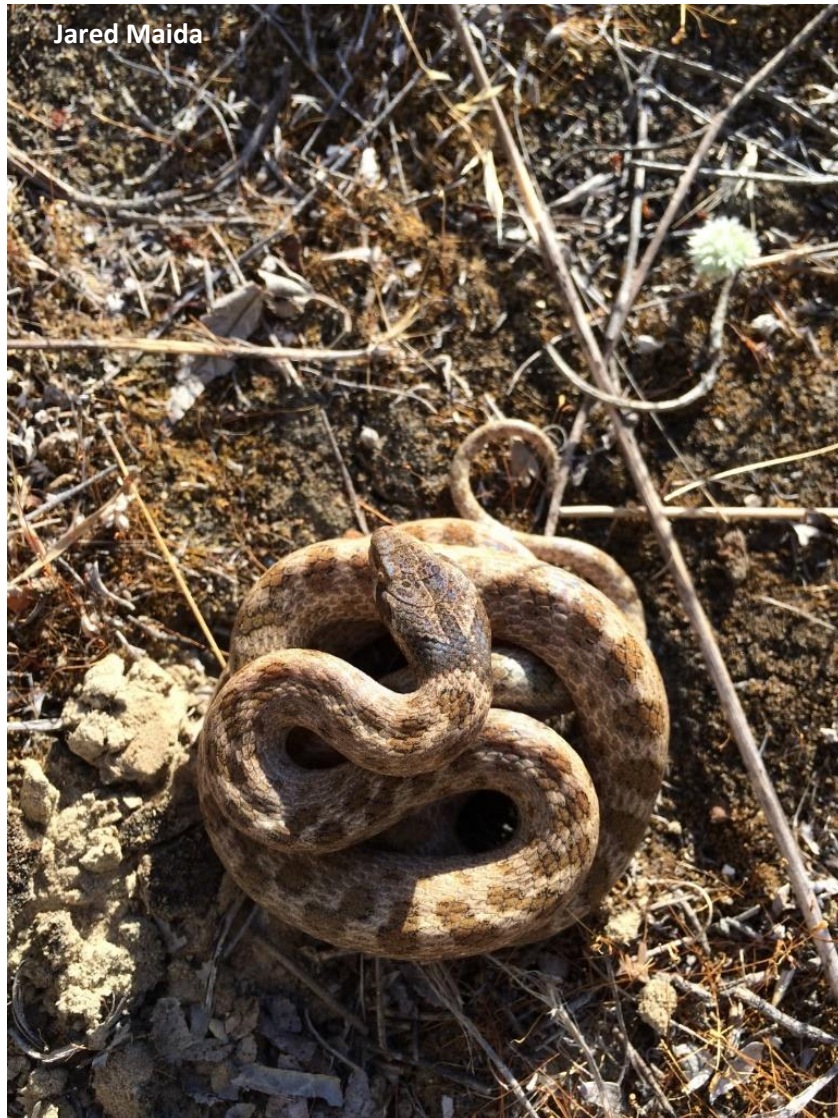
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*Desert Nightsnake*







**Weblinks to Additional Photos:**

<https://www.bcreptiles.ca/snakes/night.htm>

[http://www.env.gov.bc.ca/okanagan/esd/atlas/species/night\\_snake.html](http://www.env.gov.bc.ca/okanagan/esd/atlas/species/night_snake.html)

<https://www.burkemuseum.org/blog/desert-nightsnake>

**Occurrence Mapping and Inventory Information:**

Sarell, M.J., S. Robertson, and A. Haney. 1997. Inventory of Red and Blue-listed wildlife within the Southern Boundary Forest District: amphibians, snakes, birds, bats and small mammals. Year One. Unpubl. report prepared for BC Ministry of Environment and Forest Renewal BC, Penticton, British Columbia.

Sarell, M.J., S. Robertson, and A. Haney. 1998. Inventory of Red and Blue-listed wildlife within the Southern Boundary Forest District: Amphibians, snakes, birds, bats and small mammals. Year Two.

Unpubl. report prepared for BC Ministry of Environment and Forest Renewal BC, Penticton, British Columbia.

Sarell, M.J., S. Robertson, and L. Scott. 1996. Skaha Bluffs wildlife inventory: amphibians, snakes and bats. Unpubl. report prepared for BC Environment, Penticton, British Columbia.

### Critical Habitat Location Maps and Data Files

Critical Habitat for this species is publicly available as provided in the recovery strategies (10x10 km standardized UTM grid squares within which Critical Habitat is found). Owing to identified risk of persecution or harm as assessed by the province of B.C. and COSEWIC, more detailed information may be requested<sup>18</sup>, on a need-to-know basis, by contacting Environment and Climate Change Canada's Recovery Planning section. Federal Government contact for the Okanagan is Jared Maida [jared.maida@canada.ca](mailto:jared.maida@canada.ca). ECCC also has a species at risk email address that is intended for qualified professionals to use as a point of contact for SAR related inquiries ([ec.ep.rpy-sar.pyr.ec@canada.ca](mailto:ec.ep.rpy-sar.pyr.ec@canada.ca)). Contact for the province is Conservation Data Centre: Phone: 250-356-0928; Email: [cdccdata@gov.bc.ca](mailto:cdccdata@gov.bc.ca).

### Key information to consider in designing land use to avoid destruction of Critical Habitat:

- **Attribute-based Critical Habitat**: Critical Habitat is only partially identified. Critical Habitat is mapped based on sequential application of a 500 m distance around all available verified occurrence records, to represent the essential terrestrial areas required by the species for life history functions; and minimum convex polygons around groups of overlapping essential terrestrial areas. Critical Habitat protections (sec. 58 and sec. 61 of SARA) are applicable to mapped areas, where attributes are present, and activities are those described in the recovery strategy as “activities likely to result in destruction of Critical Habitat”.
- **Habitat Description, Range of Occurrence, and Population:**
  - Occurs in the lower Similkameen and South Okanagan Valleys bounded by Keremeos, Penticton and the Canada-U.S. border south of Osoyoos;
  - Associated with hot desert, grassland, shrubland, savanna, or woodland areas. Known to den in rocky talus slopes; areas with sand or gravel soils; generally found in plains, canyons, and hillside areas.
  - 853 km<sup>2</sup> range extent; 26-125 km<sup>2</sup> is the estimated area of occupancy; population is estimated to be 50-250 individuals. There has been a total of 72 confirmed observations of this species in the region.
  - Occurs in western North America, extreme southern British Columbia, Washington,
- **Geographic Location of Critical Habitat in BC:** Desert Nightsnake Critical Habitat is described in the Okanagan – Similkameen area only.
- **Recognizing Critical Habitat Features:**
  - **Overwintering: (Denning, Hibernation-all life stages):** Cliff, talus, rock outcrop, or earth covered rock outcrop with cracks or fissures to provide access to areas below frost line; used Sept to March
  - **Forage, mating, shedding, refuge by all life stages:** Grassland, shrub-steppe, open coniferous forest, rock outcrop, cliff, talus; used March to October; need available

<sup>18</sup> Detailed Critical Habitat access requires a data sharing agreement.

retreat structures including: rock outcrops, large rocks, rock piles, talus, bluffs, live and dead shrubs, grass and forbs, live and dead trees (for shade and cover), fallen trees, coarse woody debris; need available prey items including: lizards and their eggs, other snakes, amphibians and insects

- **Egg laying by adults:** Grassland or open shrub-steppe; used June to Sept; associated features unknown
- **Mapped areas without attributes:** clearly unsuitable areas that do not support the species in any life history stage (i.e., do not contain any of the biophysical features and attributes required by the species at any time are not identified as critical habitat. For example, existing permanent infrastructure (running surface of paved roads and/or artificial surfaces, buildings) and parts of water bodies that are > 1 km from the closest shoreline.
- **Activities likely to cause destruction of Critical Habitat:**
  - Land conversion for human development (e.g., housing and urban areas; agriculture-e.g. vineyards and orchards) causing loss or degradation of Critical Habitat including: destruction of suitable den sites, vegetation changes impacting availability of prey, soil compaction and/or reduction of cover objects.
  - Development and/or maintenance or modification of transportation and service corridor infrastructure, including: road building, expansion, upgrading, or installation of other types of barriers to snake movement, without installation of mitigations such as safe movement passages and fencing. This activity is linked to urban and rural development and associated increases in road density/habitat fragmentation. Concerns are for direct loss of Critical Habitat and direct loss/degradation of areas needed to provide options for dispersal within and between occupied areas.
  - Fire suppression and/or human-caused high-intensity fire resulting in destruction to biophysical features and attributes of Critical Habitat. Fire suppression can create ecosystem-level threats to persistence of grasslands and shrub steppe, increasing shrub and tree cover. Fuel build up can lead to hot-burning and catastrophic wildfires. Vegetation changes can alter important habitat features including thermal properties, availability of earthen denning and/or foraging, prey type and abundance.
  - Inappropriate level and concentration of livestock use resulting in significant adverse effects, including loss of suitable habitat through disruption or alteration of features and attributes required for life history functions. This may occur through soil compaction, disruption or dislodging of rock and other cover objects, or vegetation changes impacting availability of prey. Ranching impacts may be variable depending on the location of grazing (e.g., upland or riparian), terrain features, and localized grazing intensity.
  - Mining and quarrying resulting in direct loss of hibernacula or reduction/loss of suitability of other habitat features and attributes required. Harvesting talus for landscaping, road beds, rip-rap and fill for construction in locations where roads provide access.
- **Other Considerations-**
  - There is uncertainty about location of dens and occurrence records, area of occupancy and dispersal habitat requirements.
  - Longest recorded movement within a home range in BC is 2.4 km.

- Terrestrial habitat used in spring-fall active season is estimated at 520 m distance (approx.) around over-wintering sites.

#### **Available advice to support strategies to avoid and mitigate impacts to Critical Habitat**

1. Recovery Strategy for the Western Rattlesnake (*Crotalus oreganus*), the Great Basin Gophersnake (*Pituophis catenifer deserticola*) and the Desert Nightsnake (*Hypsiglena chlorophaea*) in Canada: This document provides detailed direction on identification of species Critical Habitat and examples of activities likely to result in destruction of Critical Habitat. [https://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_south\\_interior\\_snakes\\_e\\_proposed.pdf](https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/rs_south_interior_snakes_e_proposed.pdf)
2. Okanagan Similkameen Conservation Alliance. No date. Spotlight on Species: Desert Nightsnake. [https://osca.org/wp-content/uploads/2017/08/desert\\_nightsnake.pdf](https://osca.org/wp-content/uploads/2017/08/desert_nightsnake.pdf)
3. Province of BC. 2014. Guidelines for Amphibian and Reptile Conservation during Rural and Urban Land Development. [https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/herptilebmp\\_complete.pdf](https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/herptilebmp_complete.pdf)

#### **Avoidance/Mitigation Strategies:**

- Protect den sites from development with a no disturbance buffer of up to 1 km;
- Consider protecting suitable habitat for dens (e.g. south-facing talus and rocky outcrops) and associated natural habitats within 1 km of dens (e.g. coniferous forest, shrub-steppe grasslands and riparian areas);
- Maintain coarse woody debris in forested areas and cover objects in grassland- shrub-steppe habitats (e.g. rocks, large woody debris); manage cover object adjacent to roads to reduce potential for road mortality (e.g. plug holes in no post barriers along roads; manage cover structures to limit snake use in proximity to roads;
- Avoid excavating talus slopes or remove rock in areas of Critical Habitat;
- Avoid road construction near talus slopes;
- Complete surveys to locate den sites before surface disturbances are planned in Critical Habitat; protect dens, rookeries from disturbance with a no disturbance buffer;
- Where development is unavoidable, zone for minimum density (as low as possible); consider using drift fences to keep snakes out of residential areas and off roads;
- For least risk, apply timing restrictions for construction to avoid April-October, when snakes are active. Otherwise, utilize fencing to exclude snakes from work area and prescribe measures to direct identification and salvage of snakes in the work area, consistent with the Best Management Practices for Amphibians and Reptile Salvage in BC.
- Mesh fencing constructed out of plastic or other materials has been associated with entanglement and mortality of snakes and other species. Consider best available information in the design of snake fencing and address storage requirements for mesh products that may be utilized as part of development or land use.<sup>19</sup>
- Manage grazing to maintain good range condition in grasslands, to provide cover and habitat for prey species;

<sup>19</sup> Kapfer, Joshua M. and Rori A. Paloski. 2011. On the Threat to Snakes of Mesh Deployed for Erosion Control and Wildlife Exclusion. *Herpetological Conservation and Biology* 6(1):1–9. [http://www.herpconbio.org/Volume\\_6/Issue\\_1/Kapfer\\_Paloski\\_2011.pdf](http://www.herpconbio.org/Volume_6/Issue_1/Kapfer_Paloski_2011.pdf) ).



- Consider measures to discourage or limit pet access to snake habitat (e.g. fencing; dogs on leashes; public education).
- Avoid locating buildings or roads near potential denning areas such as south-facing talus slopes.

### References

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