
Appendix 5.4.7A Western Toad Species Account

WESTERN TOAD

Project Name: *Blackwater*
Scientific Name: *Anaxyrus boreas*
Species Code: A_ANBO
Status: Blue-listed by British Columbia Conservation Data Centre, and listed as Special Concern by COSEWIC and under SARA.

1.0 DISTRIBUTION

Provincial Range

Western toads are found throughout British Columbia, with the exception of the extreme northeastern corner.

Elevation Range

Sea-Level to 3,600 m elevation.

Provincial Context

This is the only amphibian species native to Haida Gwaii, and has been regarded as one of the most common amphibians across parts of its provincial range. This species is absent from extreme northeastern British Columbia, and across the northern part of the province it is limited to permafrost free valleys with receive early high accumulations of snow.

No population estimates exist provincially for this species, however, reported declines and extirpations exist for southern British Columbia, typically in populated areas. In particular areas on Vancouver Island, Gulf Islands, and Lower Mainland have seen extirpation of local populations, thought to be related to habitat loss, Chytrid fungus and predation by introduced species such as bullfrogs and carp. Populations in other areas may be cyclical as demonstrated in the Blackwater Creek drainage near Pemberton.

Project Area:

Ecoprovince: *Central Interior*
Ecoregions: *Fraser Plateau*
Ecosections: *Nazko Upland*
Biogeoclimatic Zones: *Sub-Boreal Spruce*
Sub-Boreal Pine – Spruce
Englemann Spruce-Subalpine Fir
Boreal Altai Fescue Alpine

Project Map Scale: *project specific*

2.0 ECOLOGY AND KEY HABITAT REQUIREMENTS

Western toads are resident across most of British Columbia, except the far northeastern corner and high elevation alpine areas. Western toads are only active for a portion of the year, typically during the growing season from May through September, when weather conditions are favourable for breeding and feeding. There are three distinct parts to its life cycle, egg and larvae (tadpole), which both require water, and adult, which is typically terrestrial, but also utilizes water periodically.

For reproduction, western toads gather in waterbodies, typically small, shallow, warm and fish-free, frequently with emergent vegetation and woody debris, in the late spring and summer to breed and lay eggs. Eggs have been laid in water anywhere from 5 cm to 2 m, but typically are laid in water less than 1 m, and while fish may not always act as predators of eggs and tadpoles, they do transmit infectious diseases, which can reduce survival rates. The egg stage may last from three to twelve days and the larval stage lasts from six to eight weeks; the length of both stages are dependent on water temperatures. Waterbodies in clearcuts have been hypothesized to act as population sinks, as they are attractive shallow, warm, and fish-free waterbodies in spring during breeding, however, many frequently dry-out prior to metamorphosis.

Adult western toad habitat typically includes a mix of terrestrial and aquatic features. Toads have a dry warty skin, which protects against desiccation and allows for use of drier habitats than many other amphibian species. Western toads prefer areas with higher amounts of shrub cover and complex ground cover to provide a more humid environment, which prevents against desiccation and predation, and may have higher prey densities. Toads are frequently found in areas lacking forest cover, such as clearcuts and burns that are typically warmer than surrounding forested areas. Toads have been found better able to maintain higher body temperature in these areas during spring and fall, and may seek these areas during these times of the year. Toads must also rehydrate daily, and any habitat must have at least microsites that provide this ability.

Hibernation habitat is required for overwintering of adult western toads. These habitats consist of thick surficial materials that are suitable for burrowing below the frost line. Old seral stage forests with coarse woody debris may also serve this function.

3.0 HABITAT USE: LIFE REQUISITES

Living (LI)

The Living life requisite for western toads are satisfied by the presence of suitable reproductive, feeding, hibernation and security/thermal habitat, which are described in detail below.

Reproducing (eggs)

Reproductive habitat provides western toads the ability to find a mate, lay eggs, and have the eggs hatch in safety from predators, desiccation, and weather variables. Waterbodies used for reproduction are typically shallow (<1m), warm, and fish-free; anthropogenically created waterbodies found in clearcuts may not provide adequate habitat for reproduction (e.g., dry up too quickly) and can act as population sinks.

Feeding

Feeding habitat provides adult western toads the ability to forage for invertebrates. Optimal habitat is provided by terrestrial habitats, typically mature forests (structural stage 6 or 7) or recently cleared or burned areas (structural stage <4), that have dense shrub cover, complex ground cover, and moderate to high ground humidity levels.

Security/Thermal

Security and thermal habitat provides adult western toads protection from predators and harsh weather conditions. Optimal habitat is provided by terrestrial habitats, typically mature forests (structural stage 6 or 7) or recently cleared or burned areas (structural stage <4), that have dense shrub cover, complex ground cover, and moderate to high ground humidity levels.

Hibernation

Hibernation habitat permits western toad adults to overwinter and survive to breed. Optimal habitat includes thick soils that are easily dug, often with existing squirrel or ground squirrel burrows that extend below the frost line. Old seral stage forest also serve this purpose if large coarse woody debris is available.

4.0 TERRITORIALITY

Western toad males may be territorial in areas where breeding sites are limited; however, overall they are not known to be territorial. Home ranges are small, with toads on Vancouver Island found to be as small as 0.1 ha, however, in Colorado they were found to average 0.5 ha. Breeding sites are not always found within the home range and toads may commute over 7 km to a site.

5.0 SEASON OF USE

Western toads are resident in project area, however, due to most of their activity taking place during the growing season (spring, summer, and fall), and based on the habitat requirements identified in this species account and the location of the project, the growing season will be rated (**Table 1**). The thick till soils and surficial materials in the LSA and RSA provide excellent potential habitat for winter hibernation.

Table 1: Monthly Life Requisites for Western Toad

Month	Season*	Life Requisites
January	Winter	Hibernation
February	Winter	Hibernation
March	Winter	Hibernation
April	Early Spring	Hibernation
May	Late Spring	Reproductive/Feeding/Security and Thermal
June	Summer	Reproductive/Feeding/Security and Thermal
July	Summer	Reproductive/Feeding/Security and Thermal
August	Summer	Reproductive/Feeding/Security and Thermal
September	Fall	Reproductive/Feeding/Security and Thermal
October	Fall	Hibernation
November	Winter	Hibernation
December	Winter	Hibernation

6.0 HABITAT USE AND ECOSYSTEM ATTRIBUTES

Table 2 outlines how each life requisite relates to specific ecosystem attributes (e.g., site series/ecosystem unit, plant species, canopy closure, age structure, slope, aspect, terrain).

Table 2: Relationship between Terrestrial Ecosystem Mapping (TEM) Attributes and the Life Requisite for Western Toad

Life Requisite	TEM Attribute
Living (reproduction, feeding, security/thermal)	<ul style="list-style-type: none"> • Site – site series, site disturbance, elevation, structural stage • Vegetation – % cover by layer, species list by layer, structural stage modifier, stand composition modifier • Moisture regime mesic to sub hydric
Hibernation	<ul style="list-style-type: none"> • Thick soils with coarse woody debris that allow adults to burrow below the frost line

7.0 RATINGS

There is an intermediate level of knowledge of the habitat requirements of western toad in British Columbia and therefore, a 4-class rating scheme is used, however modelling used a suitable / not suitable classification to reflect the known broad distribution in the area.

Table 3: Habitat Suitability Rating Scheme used for Western Toad

% of Provincial Best	Rating	Code
100% to 25%	High	H
50% to 25%	Moderate	M
25% to 1%	Low	L
0%	Nil	N

Habitat Suitability Ratings

Habitat Suitability is defined as the ability of the habitat in its current condition, to provide the life requisites of a species (RISC Habitat Rating Standards 1999). In assigning a suitability rating for western toad to a particular habitat that habitat is assessed for its potential to support the species for a specified season and life requisite compared to the best habitat in the province (i.e. the provincial benchmark) for the same season and life requisite. Each Biogeoclimatic zone, Site Series and Structural Stage (stages 1-7) is evaluated and assigned a Suitability Rating Class based on its ability to provide the life requisites for western toad for the growing season (spring, summer, and fall). As the species is found in a variety of habitats in the Regional Study Area, suitability modelling was broadened to reflect suitable habitat (breeding and living) and non-suitable habitat.

Provincial Benchmark

Ecosection: Unknown

Biogeoclimatic Zone: Unknown

Habitats: Wetlands (fens, bogs, and marshes), upland areas with high shrub cover (mature forest and recent clearcuts).

Ratings Assumptions

1. Units with structural stages of 0 will be rated nil.
2. Units with wetlands (fens, bogs and marshes) and within 30 m of riparian/wetlands will be rated suitable.
3. Units with structural stages of 2 to 7 and high shrub cover will be rated suitable.
4. Units with moisture regimes that are mesic to sub hydric will be rated suitable.

Table 4: Summary of General Habitat Attributes for Western Toad

Season	Life Requisite	Structural Stage	Requirements
Summer	Living (Reproduction, Feeding, Thermal/Security)	2-7	Mature forest (high shrub cover <50%), clearings, wetlands, burns or clearcuts
Winter	Hibernation	5-7	Thick soils with coarse woody debris or other cavities that allow burrowing below frost

8.0 RATINGS ADJUSTMENTS

Mapping adjustments to habitat ratings are suggested to reflect the extent of suitable habitat, and to reflect individuals detected during field surveys and areas where habitats have been rated.

9.0 REFERENCES AND BIBLIOGRAPHY

- AMEC, 2013. Blackwater Gold Project Baseline Report: Wildlife and Wildlife Habitat. prepared for New Gold. 172 pp.
- Bartelt, P.E. and C.R. Peterson. 1994. *Riparian habitat utilization by western toads (Bufo boreas) and spotted frogs (Rana pretiosa) on the Targee National Forest*. USDA Forest Service Contract #INT-93780-CCSA Final Report.
- BC Conservation Data Centre (CDC). 2013. Species Summary: *Anaxyrus boreas*. BC Ministry of Environment. Available at <http://a100.gov.bc.ca/pub/eswp/>. Accessed 8 October 2013.
- BC MWLAP. 2013. Fact sheets for Western Toads in British Columbia. Available at <http://www.env.gov.bc.ca/wld/frogwatch/publications/factsheets/frogs/western-toad.htm>. Accessed 2013.
- Black, J.H. and J.N. Black. 1969. Postmetamorphic basking aggregations of the boreal toad, *Bufo boreas boreas*. *The Canadian Field Naturalist*, 83: 155-156.
- Campbell, J.B. 1970. Life history of *Bufo boreas boreas* on the Colorado Front Range PhD. Dissertation. University of Colorado, Boulder, CO.
- COSEWIC. 2002. COSEWIC assessment and status report on the western toad *Bufo boreas* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON.
- Davis, T.M. 2000. Ecology of the western toad (*Bufo boreas*) in forested areas on Vancouver Island. Final Report. Forest Renewal BC Ministry of Forests, Victoria, BC.

BLACKWATER GOLD PROJECT

APPLICATION FOR AN
ENVIRONMENTAL ASSESSMENT CERTIFICATE /
ENVIRONMENTAL IMPACT STATEMENT
ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS



- Davis, T.M. 2002. *Research Priorities for the Management of the Western Toad, Bufo boreas, in British Columbia*. Wildlife Working Report No. WR-106. BC Ministry of Water, Land and Air Protection, Government of British Columbia, Victoria, BC.
- Gregory, P.T. and R.W. Campbell. 1984. The reptiles of British Columbia. Handbook 44, British Columbia Provincial Museum, Victoria, BC. 103 pp.
- Gyug, L. 1996. Part IV Amphibians. In *Timber Harvesting Effects on Riparian Wildlife and Vegetation in the Okanagan Highlands of British Columbia*. BC Environment, Penticton, BC.
- Jones, M.S. 1999. Preface. In, Jones, M.S. (ed.). *Boreal toad research progress report 1998*. Colorado Division of Wildlife, Fort Collins, CO.
- Kinsey, S.J. and L.E. Law. 1998. Inventory of amphibians and reptiles in the Prince George Forest District. Report for BC Environment, Ministry of Environment, Lands and Parks, Prince George, BC. FRBC Project No. OP96 223.
- Klinkenberg, B. (Editor) 2012. *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, BC. Accessed 8 October 2013.
- Leonard, B.P., K.R. McAllister, L. Jones, H. Brown, and R. M. Storm. 1993. *Amphibians of Washington and Oregon*. Seattle: Seattle Audubon Society.
- Matsuda, B.M., D.M. Green, and P.T. Gregory. 2006. *Amphibians and Reptiles of British Columbia*. Royal BC Museum Handbook. Victoria, BC.
- NatureServe. 2012. NatureServe explorer. Available at <http://www.natureserve.org/explorer/servlet/NatureServe?init=Species>. Accessed 2013.
- Richter, K. 1997. Criteria for the Restoration and Creation of Wetland Habitats of Lentic-breeding Amphibians of the Pacific Northwest. In, Macdonald, K.B., and F. Weinmann. (eds.). *Wetland and Riparian Restoration: Taking a Broader View*. Contributed Papers and Selected Abstracts, Society for Ecological Restoration, 1995 International Conference, September 14-16, 1995, University of Seattle, WA. Publication EPA 910-R-97-007, USEPA, Region 10, Seattle, WA.
- RISC. 1998. Inventory methods for pond-breeding amphibians and painted turtle. Prepared by BC Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee (Version 2.0).

- Stebbins, R.C. 1985. *Western Reptiles and Amphibians*. 2nd Ed. The Peterson Field Guide Series National Audubon Society and National Wildlife Federation. Houghton Mifflin Co, Boston, MA.
- Stevens, V. 1995. *Wildlife diversity in British Columbia: distribution and habitat use of amphibians, reptiles, birds, and mammals in biogeoclimatic zones*. Research Branch, BC Ministry of Forests, Wildlife Branch, BC Ministry of Environment Lands and parks, Victoria, BC, Working Paper 04/1995.
- Sullivan, J. 1994. *Bufo boreas*. In, Fischer, W.C. (compiler). *The Fire Effects Information System (Data base)*. Intermountain Fire Sciences Laboratory, Intermountain Research Station. U.S. Department of Agriculture, Forest Service, Missoula, MT.
- Verner, J. and A.S. Boss. 1980. *California Wildlife and their Habitats: Western Sierra Nevada*. U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station.
- Wind, E.I. and L.A. Dupuis. 2002. *COSEWIC Status Report on the Western Toad Bufo boreas in Canada*. COSEWIC assessment and status report on the western toad *Bufo boreas* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON.