

BC's Coast Region: Species & Ecosystems of Conservation Concern Western Toad (*Anaxyrus boreas*)

Global: G4 Provincial S4: COSEWIC: SC BC List: Yellow



Notes on *Anaxyrus boreas*: A member of the family Bufonidae (“true toads”), this species is also referred to as “Boreal Toad”. True toads are toothless and generally “warty” in appearance and have a “parotoid” gland that excretes an alkaloid poison “bufotoxin” when the animal is stressed. All male toads possess a “Bidder’s organ”. Under the right conditions the organ becomes an active ovary and the toad, in effect, becomes female. In North America toads are grouped into seven species, with *A. boreas* and its subspecies *A. b. boreas* being the main form in the Pacific Northwest. The BCCDC only recognizes the species form in BC.

Description

Length (snout to vent): Males 6-11 cm, Females 12.5 cm. Unlike most frogs, toads have soft, somewhat dry, bumpy skin. Adult Western Toads tend to be stout with thick forelimbs. Colour ranges from tan to light brown, grey, or greenish on top. Markings are a few dark spots to extensive mottling, warts may be reddish. A thin, cream coloured dorsal stripe runs down the centre of the back (most prominent in mature females; may be absent or inconspicuous in juveniles), which may have reddish warts). The oval-shaped parotoid glands behind the eyes are discernable, even in recently metamorphosed toads (“toadlets”). The glands excrete a mildly toxic substance used to ward off would be predators. The hind feet have horny tubercles used for burrowing and are yellowish or orange in juveniles. Males are more accurately distinguished by their smaller size, narrower head, longer forearms and dark nuptial pads on thumbs. The nuptial pads are used while grasping females during breeding in a position known as “amplexus”. Males lack vocal sacs but may produce repeated chirping sounds if grasped by hand (females usually are silent or emit few chirps). Tadpoles are black or dark brown and relatively small (1.2 - 3 cm, 2.5-3 cm total length prior to metamorphosis). The snout is square and the eyes are set about midway between the dorsal midline and edge of the head. The tailfin is narrow compared to tadpoles of species like Northern Red-legged Frog and may be heavily speckled with gray or black.

Diet

Western Toad juveniles and adults are opportunistic predators exploiting a range of invertebrates including annelids (worms), terrestrial and aquatic insects and spiders. Small crayfish and mollusks may also be consumed. Tadpoles are herbivores, feeding on aquatic plants, detritus and algae.

Look's Like?

The dry, warty skin and highly terrestrial existence make it difficult to misidentify Western Toad, especially at higher elevations. Juvenile toads (“toadlets”) could be confused with the juvenile Northern Red-legged Frog (another highly terrestrial amphibian) or Pacific Tailed Frog, especially where distribution of these species overlaps. Western Toad tadpoles have been found associated with fast flowing streams similar to those utilized by Pacific Tailed Frog tadpoles, which can also be black and similar in size in early stages of growth¹.

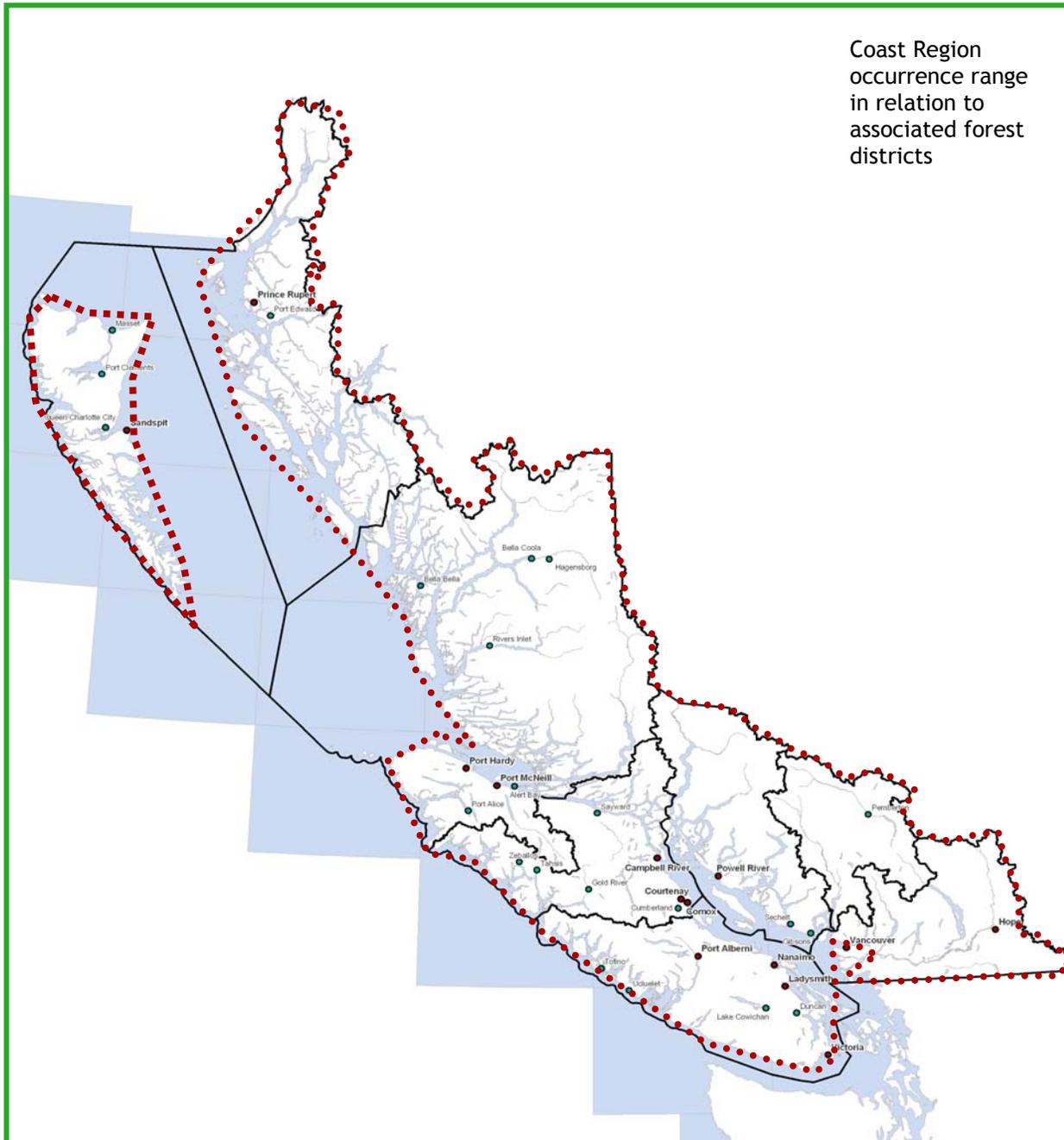


Northern Red-legged Frog (juvenile)

¹ Rearing in flowing water habitats, while unusual, may reflect localized adaptations by some Western Toad populations.

Distribution

Elevation: Sea level up to 3660 m. Western Toad is found from the east slope of the Rocky Mountains to the Pacific Ocean and from northern Baja California to Alaska and the Yukon. This species is widely distributed throughout the Coast Region including coastal islands. While many frog species are confined to lower elevations, Western Toad can be found at elevations above the snow line. Several major toad migration events (usually juveniles in conjunction with road conflicts), have been documented in the Fraser Lowlands of the South Coast (Ryder Lake area in Chilliwack, Stokkes Pitt in Surrey/Langley) as well as on Vancouver Island (Pup Creek north of Courtenay on the Island Highway). Historically this species was much more common throughout the Lower Mainland's Metro Vancouver Region as well as the Capital Regional District on Southeast Vancouver Island. Recent declines may also be occurring on Haida Gwaii.



Western Toad (*Anaxyrus boreas*), potential occurrence range for the Coast Region.

Habitat Preferences

As with other amphibians this species is vulnerable to moisture and temperature changes. Western Toad tends to avoid open water outside of the breeding season. Adults are highly adaptable and utilize a wide variety of habitats, including wet and dry forest types, fields and meadows, clearcuts and aquatic sites. Roads, dikes and ditches are utilized as movement corridors.



Critical Features

This species is capable of significant overland movement between breeding ponds, upland summer (post breeding) ranges, and overwintering areas. Adults have been found one to two kilometers away from breeding sites during the spring and summer. However distances of 5 km between breeding sites have been identified in some populations, with some toads moving as much as 7.2 km. Open water, often vernal pools are used for breeding. Female Western Toads tend to move farther upland than males after breeding (400 to 600+ m away from breeding sites). All breeding members of a local population tend to lay their eggs in the same location, which is used repeatedly from year to year. Little is known about toadlet dispersal distances, but they have been found hundreds of metres away from breeding sites. Toadlets disperse from aquatic breeding sites en mass, forming large, post-metamorphic aggregations. Hibernacula can be communal, but are often individual dens dug in streambanks, under downed wood, or using burrows of other animals (e.g. rodents and moles).



This species is often found in and around shallow ponds, lake margins, slow-flowing streams, marshes, bogs or fens, with adequate riparian communities.

Seasonal Life Cycle

Sexually mature between 2-6 years; females may reproduce only every 1-3 years, possibly only once in their lifetime, males may breed more than once per year. Females lay up to 12,000 eggs, usually in shallow water typically 15 cm deep, usually no deeper than 30 cm. The warmth of shallow water increases the rate at which eggs develop. Spawning in shallow water with vegetative matter may also reduce potential predation on eggs by fish. Eggs are black, about 1.5 to 1.8 millimeters diameter, and are laid in long strings of “jelly” in rows of two (sometimes three). Adult Western Toads can live 9 to 11 years (up to 35 years recorded in captivity).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		Courtship /Spawning (varies with elevation).				Tadpoles emerge as juveniles (toadlets). 1-3 months for metamorphosis.			Young of the year, juveniles and adults overwinter / hibernate.		

Threats

- ◆ Distribution (i.e. Areas of the South Coast and Southeastern Vancouver Island) coincides with areas undergoing rapid development and habitat loss/alteration.
- ◆ Breeding, egg-laying, tadpole development, and toadlet metamorphosis and dispersal can all be highly communal compared to other native amphibian species. Subsequently any impacts can effect an entire breeding cohort.
- ◆ Extirpation of local populations is likely to occur where connectivity between breeding areas and upland seasonal non-breeding habitat becomes significantly fragmented or altered.
- ◆ Forestry activities fragment connectivity corridors and alter microclimate regimes in riparian and upland forest areas used for dispersal, foraging and overwintering as well effecting hydrological regimes.

- ◆ Roadways that cut through core habitat areas or migration corridors and lack appropriately sighted exclusion fencing and amphibian or wildlife passage structures increase vehicle mortality impacts and population fragmentation.
- ◆ Increased predation and competition through augmentation or stocking of sport fish (e.g. trout), and introduction of non-native fish species, especially into non-fish bearing amphibian breeding sites.
- ◆ Cumulative impacts from disease. In particular Chytridiomycosis, caused by the chytrid fungus *Batrachochytrium dendrobatidis*, has been linked to dramatic population declines or even extinctions of amphibian species in western North America and has been found to occur widely in Coast Region amphibian populations including Western Toad.
- ◆ As with most amphibians, Western Toad easily absorbs contaminants through their skin. Direct mortality or sub-lethal impacts can occur throughout all life-history phases from fertilizer and pesticide applications in urban and agricultural areas as well as for silviculture management.

Conservation & Management Objectives

- ◆ Apply conservation and management recommendations as set out in “Best Management Practices for Amphibians and Reptiles in Urban and Rural Environments in British Columbia.” Integrate complimentary objectives identified in the “COSEWIC assessment and status report on the western toad *Bufo boreas* in Canada” and “Research Priorities for the Management of the Western Toad, *Bufo boreas* in British Columbia.”
- ◆ Inventory and monitor using Resource Inventory Standards Committee methodology # 37 Inventory Methods for Pond-breeding Amphibians and Painted Turtle (Version 2.0)². Western Toad breeding sites are relatively rare compared to other amphibian species and may be harder to identify. As well this species tends to aggregate en masse in localized areas at similar times for many aspects of their life history. As such, populations can easily be missed during surveys of large aquatic sites or during inventories where the survey areas or timing windows are limited.

Specific activities should include:

- ◆ Maintain connectivity and reconnect fragmented segments of riparian forests and isolated wetlands with forested corridors to reduce migration and dispersal barriers that may contribute to local population extirpations.
- ◆ Ensure adequate buffers are applied to protect the broadest range of habitat features and functions. Riparian buffers imposed to protect fish habitat are likely insufficient for connecting and protecting the complete range of migration and dispersal requirements for this species.
- ◆ Maintain permanent buffers (where breeding sites have been confirmed), of intact mature vegetation communities around core habitat (a minimum of 30 meters wide from the outer highest seasonal wetted perimeter of small wetlands). Access and disturbance to this “core zone” should be limited. Riparian buffers used to protect fisheries values have been found to be inadequate to protect the full range of critical features and seasonal habitat uses for Western Toad. An additional “management zone” buffer, potentially greater than 100m and up to several hectares may be needed to adequately protect wetland hydrology and maintain adequate connectivity for this species.
- ◆ Collect information on population trends, including a monitoring plan for individual sites and watersheds and studies to monitor population responses to habitat restoration, reintroductions, and the impacts of translocation on populations³.
- ◆ Successful rebound of Western Toad populations at sites in Oregon provides some evidence that this species can recover after years of depression.
- ◆ Restore plant communities in suitable breeding sites impacted by non-native plant species.
- ◆ Avoid stocking of sport fish or transplanting of fish species to breeding sites utilized by native amphibian species, especially those sites previously non-fish bearing.
- ◆ Encourage landowners to create conservation covenants to buffer wetlands (permanent and seasonal) and riparian habitat on their property.
- ◆ Employ digital mapping of seasonal overland migration routes to sight exclusion fencing, wildlife underpasses or amphibian tunnels and culvert locations and for monitoring of population responses to development. Ensure size (diameter) and length of underpasses and materials used are appropriate for amphibian species. Culverts crossing streams should be a minimum of 2 meters in diameter, preferably open bottomed with a bottom layer of natural substrate.
- ◆ Urban and agricultural runoff should be appropriately managed to reduce contaminants enter receiving waters. Maintain septic fields and any other potential sources of contamination to surface and ground water that may be sustaining local wetland systems.
- ◆ Employ integrated pest management approaches that reduce the need for chemical applications in urban, agricultural and silviculture practices.

² Though developed for Alberta populations, investigate recommendations found in “Hibernation Sites of Western Toads (*Anaxyrus boreas*): Characterization and Management Implications” for hibernacula inventory and conservation approaches. Other approaches to inventorying and monitoring such as those found in “Measuring and Monitoring Biological Diversity - Standard Methods for Amphibians”, “Suitability of Amphibians and Reptiles for Translocation” and amphibian survey methodologies developed for the “Wetlandkeepers Handbook” are recommended.

³ Relocation and translocation should not be a first choice mitigation or compensation option to avoid land use impacts.

This species is listed under the Federal Species At Risk Act (SARA) and may be subject to protections and prohibitions under the BC Wildlife Act. Habitat for this species may also be governed under provincial and federal regulations including the Fish Protection Act and Federal Fisheries Act as well as Regional and local municipal bylaws.

Content for this Factsheet has been derived from the following sources

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