

## BC's Coast Region: Species & Ecosystems of Conservation Concern Northern Red-legged Frog (*Rana aurora*)

Global: G4 Provincial S3S4: COSEWIC: SC BC List: Blue Identified Wildlife



Dorsal colouration



Ventral colouration (adult)

Notes on *Rana aurora*: A member of the family Ranidae (“true frogs”), which has the widest distribution of any frog family. Most members of this family have smooth, moist skin, large, powerful legs and extensively webbed feet. Endemic to the Pacific Northwest, Red-legged Frog are divided into two species - “Northern” and “California”. Red-legged Frog are known for their leaping ability. The California species was the source for Mark Twain’s famous story of the “Jumping Frog of Calaveras County.” Both species were once so abundant that they were harvested in the tens of thousands as a food source in the US Pacific Northwest until the late 1800’s. Habitat destruction, pollution, logging, the introduction of invasive Bullfrog and disease have contributed to the decline of this species in a number of areas across its range, including BC.

### Description

Snout to vent length 4-8 cm, females up to 10 cm.

Colouration and patterning is designed to provide camouflage for both aquatic and terrestrial activities and is extremely variable. Time of year, age and geographic location all contribute to local variations. Dorsal colours range from tan, olive, and grey to a rich reddish-brown. The back and sides can have varying levels of dark flecking, with small spots on the flanks and groin area. Hind legs have dark mottled banding (more so on the lower portion of the leg). The upper and lower lip, chin, chest and belly have various levels of mottling which becomes reduced and replaced by varying levels of red (especially on the groin and hind legs) as the frog matures. A dark eye-mask extends from the snout to around the eye and tympanum (eardrum) to the shoulder. Two light brown “dorsolateral” folds of skin run along the back from behind the eye to the groin area. Males develop a “nuptial pad” on each thumb to assist in gripping females (“amplexus”) during breeding. Tadpoles reach 2-7 cm before metamorphosing and are tan to brown with degrees of mottling and gold flecking throughout. The tail is at least as long as the body and the tailfin extends onto the back.



Tadpole

### Diet

An opportunistic feeder, this species consumes a wide variety of insects and invertebrates (mainly through terrestrial foraging, but aquatic organisms are also exploited). Tadpoles mainly consume filamentous green algae.

### Look's Like?

This species is most likely to be confused with other Ranid frogs of the Coast Region, especially Oregon Spotted Frog<sup>1</sup>, or in juvenile phases with introduced juvenile Green Frog, or possibly Western Toad. Range overlap with Oregon Spotted Frog is limited however and the two species have key morphological differences. Eyes of Oregon Spotted Frog turn laterally upward (pupils can be seen from above), and hind feet are completely webbed to tips of the toes. Northern Red-legged Frog eyes face laterally (to the side) and pupils cannot be seen from above and hind foot webbing does not extend to toe tips. The ventral



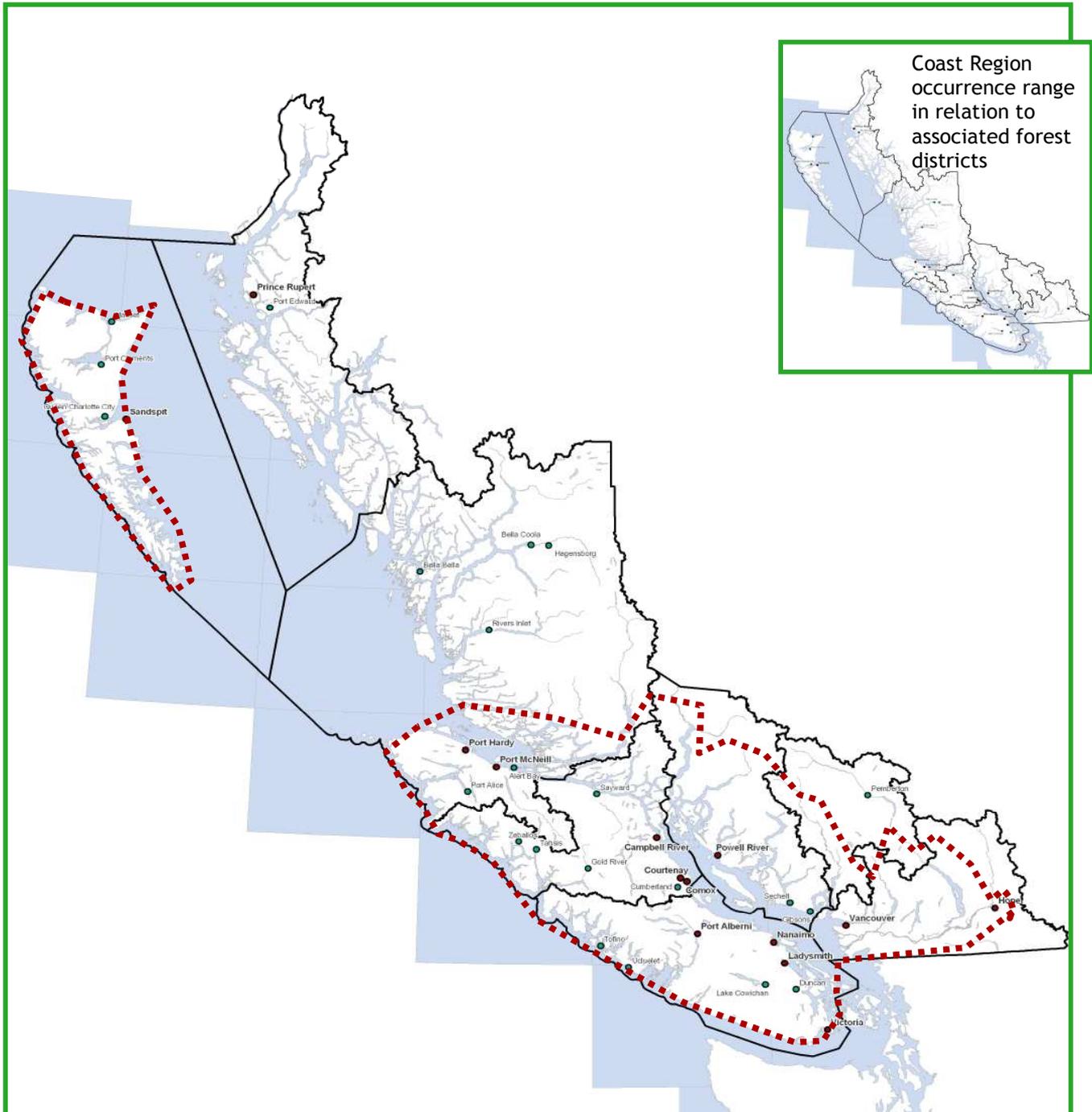
Green Frog (“Bronze Frog”)

<sup>1</sup> See Oregon Spotted Frog factsheet.

colouration on mature individuals is an intense red on Northern Red-legged Frog versus a deep orange on Oregon Spotted Frog. Juvenile Green Frog tend to be a uniform olive colour with a pronounced tympanum and a bright green line extending along the upper lip to the shoulder.

**Distribution**

*Elevation: 0-1400 m, typically <500m on the Coast Region.* Northern Red-legged Frog are distributed throughout the Pacific Northwest from northern California following the eastern crest of the Cascades north to BC's Coast Region and west to the coast of Oregon, Washington State. Coast Region distribution includes the South Coast up to the southern portion of the Central Coast (Cape Caution). Vancouver Island comprises 50% of the Canadian population. Other populations occur on coastal islands in the Salish Sea as well as Haida Gwaii (likely introduced)<sup>2</sup>. One of the highest densities of terrestrial adults and juveniles known in Canada was located just south of Whistler in the Pinecrest area.



Northern Red-legged Frog (*Rana aurora*), known occurrence range for the Coast Region.

<sup>2</sup> Given this species overland migratory capabilities, populations may occur farther east and north on the Coast Region mainland than presently known.

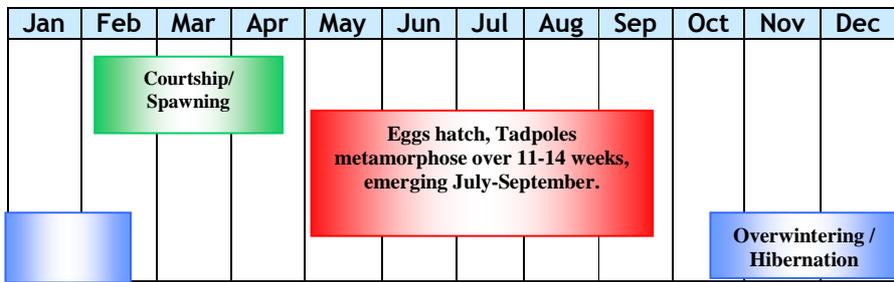
**Habitat Preferences** Often found in and around shallow ponds, lake margins, slow-flowing streams and wetlands, especially with intact mixed or coniferous forest communities. This species tends to avoid deep open water, areas with lack of shade or cover. Adults can be highly terrestrial and found well into adjacent forested areas as long as sufficient ground cover and moist micro-habitats exist. Like Western Toad, this species displays high fidelity to breeding sites and many individuals may utilize the same migration pathways. Northern Red-legged Frog will utilize constructed wetlands such as stormwater ponds as well as drainage ditches.



Key features for Northern Red-legged Frog are structurally complex wetlands and slow moving waters relatively free of urban and agricultural runoff, with a balance of open water and native vegetation.

**Critical Features** Northern Red-legged Frog prefer a complex mosaic of aquatic and terrestrial habitat features. Breeding ponds may be permanent or temporary and include ponds, lake verges, slow moving streams or river systems (3 meters wide or greater). Egg-masses were most numerous in ponds with over 30% forest cover within 200 m from the shore. Breeding, overwintering and foraging sites can overlap; as some frogs hibernate in water others in surrounding forests. Proximity of breeding, foraging, and overwintering sites to each other varies, but at most locations are likely contiguous to some degree. Dispersal distances of several kilometres from aquatic environments into adjacent riparian and upland forests have been observed.

**Seasonal Life Cycle**



The lower lethal temperature for eggs is around 4° C, whereas the upper limit is around 21° C; these upper and lower thermal tolerance limits are the lowest for North American Ranid species. The 20-30 cm, gelatinous egg masses are submerged 30-90 cm to protect from direct sunlight and thermal extremes. Adult females reproduce each year, both sexes reach maturity by at three or more years of age.

**Threats**

- ◆ Distribution coincides with areas undergoing significant urbanization and natural habitat loss including draining and infilling of wetlands and hydrological disruption to surface and groundwater from adjacent development and land use.
- ◆ 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.
- ◆ The wetland habitats preferred by this species may be subject to vegetation and hydrology shifts from climate change.
- ◆ Roads that fragment occupied habitat or migration routes can cause high rates of mortality from vehicle collisions, as well as habitat degradation and population isolation. Studies indicate that it is not possible to fully mitigate these impacts with amphibian fencing and wildlife passages.
- ◆ Predation by introduced Bullfrog and potential competition from introduced Green Frog.
- ◆ 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.

- ◆ Infilling of wetlands and reduction in native plant complexity by non-native plant species (e.g. species of reed canary grass).
- ◆ Cumulative impacts from disease. 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 in many Northern Red-legged Frog populations. Impacts and risks to the species as a whole from this fungus are unknown.
- ◆ As with most amphibians, Northern Red-legged Frog easily absorbs contaminants through their skin. Direct mortality or sub-lethal impacts throughout all life history phases can occur from fertilizer and pesticide applications in urban and agricultural areas as well as for silviculture management.

### Conservation & Management Objectives

- ◆ Apply conservation and management objectives as set out in “COSEWIC assessment and update status report on the Northern Red-legged Frog *Rana aurora* in Canada and the “BMP for Amphibians and Reptiles in Urban and Rural Environments in British Columbia.”. Integrate complimentary objectives found in “Accounts and Measures for Managing Identified Wildlife - Accounts V.2 Red-legged Frog *Rana aurora aurora*.”
- ◆ Inventory and monitor using standardized methods (Resource Information Standards Committee) # 37 Inventory Methods for Pond-breeding Amphibians and Painted Turtle (Version 2.0)<sup>3</sup>.

### Specific activities should include:

- ◆ Protect existing native emergent marsh vegetation complexes in presently occupied sites and restore plant communities impacted by non-native plant species.
- ◆ Monitor Northern Red-legged Frog population responses to various management regimes as well as changes to land use and land cover in areas adjacent to occupied sites.
- ◆ Monitor and manage for impacts from Bullfrog predation and assess potential long-term competitive interactions with Green Frog.
- ◆ Maintain necessary habitat features and habitat types needed to provide optimal connectivity and reduce isolation between breeding sites and other seasonal uses.
- ◆ 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 populations<sup>4</sup>.
- ◆ Maintain permanent buffers of intact, mature forested communities in riparian and upland areas around occupied sites (a minimum of 30 meters wide from the outer highest seasonal wetted perimeter of small wetlands). Riparian buffers used to protect fisheries values will likely be inadequate. An additional “management zone” buffer, potentially greater than 100m and up to several kilometres may be needed to adequately protect wetland hydrology and maintain adequate connectivity for this species.
- ◆ 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.
- ◆ Encourage landowners to create conservation covenants to buffer wetlands (permanent and seasonal) and riparian habitat on their property.
- ◆ 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.

This species is listed under the Federal Species At Risk Act (SARA) and is Identified Wildlife in BC and is 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.

<sup>3</sup> 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.

<sup>4</sup> Relocation and translocation should not be a first choice mitigation or compensation option to avoid land use impacts.

Content for this Factsheet has been derived from the following sources

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