

A Guide to Amphibians

Frogs, Toads, Salamanders

of British Columbia **North** of 50°

HOW TO USE THIS GUIDE

This brochure provides a quick and easy identification key to adult amphibians in northern B.C., with separate keys for salamanders and for frogs and toads.

- Read the statements in the boxes at the top of the page as questions.
- If your answer to **all questions** is **yes**, proceed to read down the page to learn more about the species.
- If the answer is **no**, proceed to the next page and onwards, until you reach a box where you answer **yes** to all the questions.
- Refrain from handling amphibians unless absolutely necessary. Amphibian skin is very sensitive to contaminants, such as sunscreen or insect repellent on our hands.
- If in doubt, take photographs and confirm with BC Frogwatch contact.

Nearly one third (32%) of the approximately 5,750 amphibian species are at risk worldwide. The situation in British Columbia is equally bleak: 30% of the salamanders and 64% of the frogs and toads are listed as species of concern either federally, provincially, or both. Even common and widespread species such as the Western Toad and Columbia Spotted Frog are showing signs of decline in parts of the province.

Northern B.C. is especially important for the conservation of amphibians as it is not under the same development pressures as southern regions. Northern areas may form strongholds for amphibians that are declining farther south. This role is expected to increase in importance in the face of climate change, as warmer and drier conditions in the south may result in northward range shifts for many amphibians. We need improved monitoring of amphibians of northern B.C. both for management and for conservation planning.

- Orange underside, **and**
- No distinct rib-like folds and grooves on side of body (costal grooves)

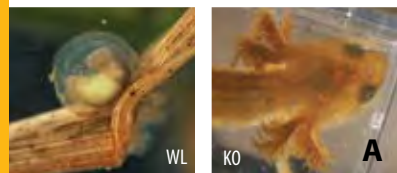
NO

YES

Roughskin Newt *Taricha granulosa*

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Robust body; skin rough and dry, but smooth and slippery in breeding adults; back and sides solid brown with no stripes or markings; total length up to 185 mm; adult body length up to 80 mm.



NATURAL HISTORY This species ranges far north along the Pacific Coast and inland along major river valleys. The newts inhabit wetlands and adjacent forests. They breed in ditches, marshes, ponds, and shallow lakes and undertake mass migrations to these sites in early spring. Females attach their eggs singly on thin-stemmed submerged plants; eggs are usually well hidden. Larvae are translucent tan, and the underside has an orange tint; older larvae have 2-3 distinct rows of yellow dots on the sides. The snout is pointed with eyes on the sides of the head (top view photo A). Larvae usually metamorphose in late summer of the same year but may overwinter at higher altitudes or latitudes. When not breeding, newts can be found in the forest, often far from water. Some individuals, particularly males, may remain in the aquatic habitat throughout the year.

VULNERABILITY AND THREATS Little is known of the status of populations, and even basic information on distributions and life history in northern B.C. is lacking. Fragmentation of habitat due to resource extraction and other human activities is of concern. Newts are vulnerable to road-mortality during mass migrations to and from breeding sites.

REMARKS Newts are extremely poisonous if ingested, and most potential predators avoid them. The newts are otherwise docile and harmless to humans.

- Small and slender, **and**
- Constriction at the base of the tail

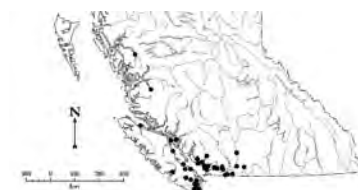
NO

YES

Common Ensatina *Ensatina eschscholtzii*

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Eyes large; limbs relatively long; tail rounded rather than keeled (without a ridge) as in semi-aquatic salamanders; colour usually uniform, translucent pinkish brown; small juveniles are mottled black or dark grey with lighter flecking (photo A), and the base of each leg is bright yellow; total length up to 125 mm; adult body length up to 50-60 mm.



NATURAL HISTORY North of the Sunshine Coast, this species is known from only a few isolated locations. Ensatinas inhabit a broad range of forest types, where they spend their entire life from egg to adult on the forest floor. They shelter under or within decaying logs, stumps, or piles of sloughed-off bark, in rodent burrows, or in other moist crevices. The female lays 8-10 eggs in a moist location on the forest floor in the spring and remains with them until they hatch in the autumn. Eggs are well hidden and seldom found. There is no aquatic larval stage, and newly hatched young resemble miniature adults in body form. Ensatinas take 3-4 years to mature and may live 15 years or more.

VULNERABILITY AND THREATS Northern distributional limits of this species are very poorly known, and virtually nothing is known of the status of populations in B.C. These salamanders are vulnerable to changes to their forest habitat from logging or other human activities. However, they can tolerate some habitat disturbance, provided that moist forest floor conditions and coarse woody debris are retained.

- Large and robust, **and**
- Distinct rib-like folds (costal grooves) on side of body

NO

YES

Northwestern Salamander *Ambystoma gracile*

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Tail keeled (with a ridge) rather than rounded; back and sides solid dark brown, occasionally with lighter, yellowish specks; poison glands located on cheeks, folds along the sides, and tail ridge are lighter in colour; total length up to 250 mm; adult body length up to 105 mm.



NATURAL HISTORY This species ranges far north along the Pacific Coast and inland along major river valleys. The salamanders occupy wetlands and adjacent moist forest habitats, especially old-growth forest. They breed in permanent ponds, slow-moving portions of creeks or rivers, or shallow lakes adjacent to the forest. The female lays a firm, globular cluster of about 50 eggs in early spring but later at high latitudes or altitudes. Often, symbiotic algae will grow in the jelly layer giving each egg a greenish tint. Larvae are olive brown with large dark spots and have bushy, plume-like gills and a blunt snout. Yellowish poison glands are evident in larger individuals. Larvae usually overwinter before metamorphosis. When not breeding, the salamanders can be found in moist forest habitats, where they forage. They are secretive and shelter under decaying logs or in piles of bark, rodent burrows, or other moist hollows or crevices on the forest floor. At some localities, the salamanders retain larval characteristics into adulthood (neotenic populations) and never leave water.

VULNERABILITY AND THREATS The distribution and status of populations in northern B.C. are poorly known. In particular, more information is required on the location and status of neotenic populations. Habitat loss and fragmentation due to resource extraction or development can threaten local populations. These salamanders are vulnerable to road-mortality during migrations to and from breeding sites.

- Yellowish or greenish stripe along mid-back and tail, **and**
- Stripe often with ragged edges or may be broken into blotches

YES

Long-toed Salamander *Ambystoma macrodactylum*

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Exceptionally long fourth toe (second from the outside) on each hind foot; tail keeled (with a ridge) rather than rounded; sides black or dark grey with light flecking; total length up to 165 mm; adult body length up to 85 mm.



NATURAL HISTORY This species is the most widespread salamander in northern B.C. The salamanders have broad habitat requirements and occupy wetlands and adjacent forests and meadows. They breed in shallow pools and ponds often with abundant aquatic vegetation. The female lays eggs singly or in small clusters very early in the spring. Larvae are brownish grey or tan with fine darker flecking; the gills appear orderly and often have a long spike near tip of gill stalk. The snout is broad (photo A). Larvae usually metamorphose in late summer of the same year but may overwinter, especially at higher latitudes and altitudes. When not breeding, the salamanders forage in the forest or meadows, seldom far from water. They are secretive and shelter under decaying logs or rocks, in piles of bark, rodent burrows, or other moist hollows. At some localities the salamanders retain larval characteristics into adulthood (neotenic populations) and never leave the water.

VULNERABILITY AND THREATS The distribution and status of populations throughout B.C. are poorly known. In particular, more information is required on the location and status of neotenic populations. Introduced fish are considered a threat, especially neotenic populations in mountain lakes.

NOTES Three subspecies are known from B.C., two of which occur in northern regions: Northern Long-toed Salamander (*A. m. krausei*) and Eastern Long-toed Salamander (*A. m. columbianum*).

- Skin “warty”, **and**
- Pronounced oval poison gland (parotoid gland) behind the eye (photo A)

NO

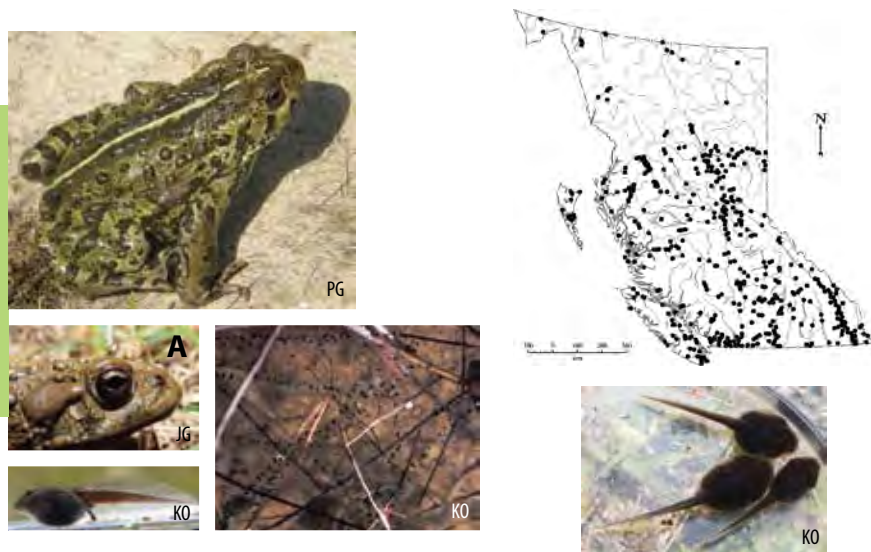
YES

Western Toad *Anaxyrus (Bufo) boreas*

STATUS Special Concern (Canada); Yellow List (B.C.) ●

ADDITIONAL FEATURES Stocky body and short legs; colour variable, from greenish to tan, brown, grey, or black, with or without mottling; light line along mid-back (may be lacking in small toadlets); raised poison glands (“warts”) on the body often reddish brown, surrounded by a dark ring; adult body length 60–125 mm.

Compare with **Great Basin Spadefoot**, which lacks parotoid glands and has smoother, soft skin.



NATURAL HISTORY This species is widespread throughout the province. The toads inhabit wetlands, meadows, and a variety of forest types. They breed in ponds, slow portions of streams, and shallow edges of lakes, usually with sandy bottoms. The female lays a clutch of thousands of small black eggs in long strings at traditional breeding sites. Females typically deposit their eggs communally, one clutch upon the other. Tadpoles are small and black and tend to form large, dense aggregations in shallow warm water. In the summer, metamorphosed toadlets migrate en masse from breeding sites to foraging and hibernation sites. Juvenile and adult toads forage in wetlands, meadows, or forest and overwinter on land. Sometimes they can be found far from water.

VULNERABILITY AND THREATS Western Toads have undergone drastic declines in southern B.C. and in the U.S.A. They are particularly vulnerable to a fungal pathogen (*Batrachochytrium dendrobatidis*), which is linked to many amphibian declines. During mass migrations toads are vulnerable to road-mortality, barriers to movement, and pesticide applications.

- Squat body and short, blunt “pug-like” snout, **and**
- Eyes with vertical pupil (seen when not dilated)

NO

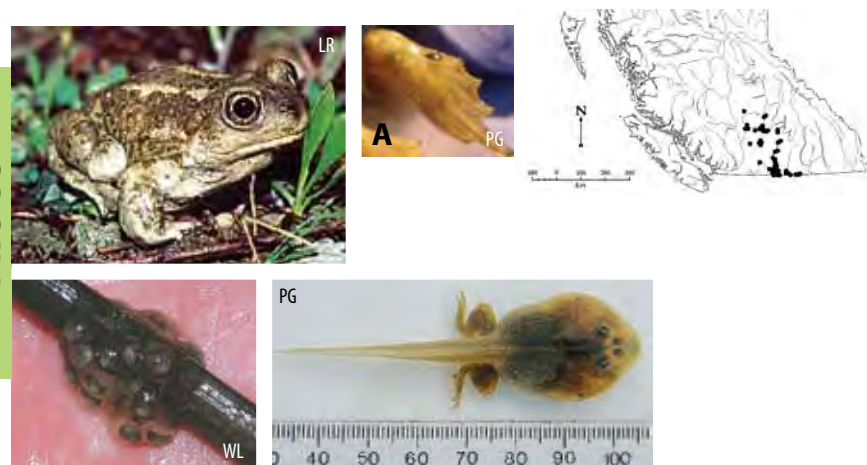
YES

Great Basin Spadefoot *Spea intermontana*

STATUS Threatened (Canada); Blue List (B.C.) ●

ADDITIONAL FEATURES Skin relatively smooth and soft; eyes large; tympanum (eardrum) indistinct; round knob on top of head between eyes; **sharp-edged, black tubercle (spade) on the underside of each hind foot** (photo A); colour light grey, greenish, or brown with two irregular light streaks and small darker blotches along the back; adult body length 40–65 mm

Compare with **Western Toad**, which has prominent parotoid (cheek) glands and rougher skin with pronounced “warts”



NATURAL HISTORY This species occurs in arid and semi-arid regions between the Rocky Mountains and Coast Mountain Range. Previously undocumented populations near the northern distributional limits of the species (southern Cariboo) continue to be found in B.C. Spadefoots occupy grasslands and woodlands from valley bottoms to elevations up to 1800 m. They prefer areas with loose sandy soils where they burrow into the substrate or shelter in rodent burrows. They breed in seasonal pools or shallow edges of lakes from spring to early summer. Eggs hatch within days, and tadpoles develop rapidly. Tadpoles are distinctive with close-set, raised eyes, a globular body, and a triangular snout. Metamorphosed juveniles disperse from breeding sites about 4–8 weeks after hatching, sometimes *en masse*. Spadefoots are adapted to survive long periods in a dormant state buried underground when conditions are unsuitable for activity.

VULNERABILITY AND THREATS Spadefoots are declining in southern parts of their range in B.C. Suitable habitats are shrinking and degrading as a result of building construction, agricultural development, wetland drainage, livestock ranching, pesticide use, and off-road recreational vehicles (mud-bogging). Road mortality is also of concern.

- Light patch between the eyes across the snout, **and**
- Solid colouration with no distinct markings

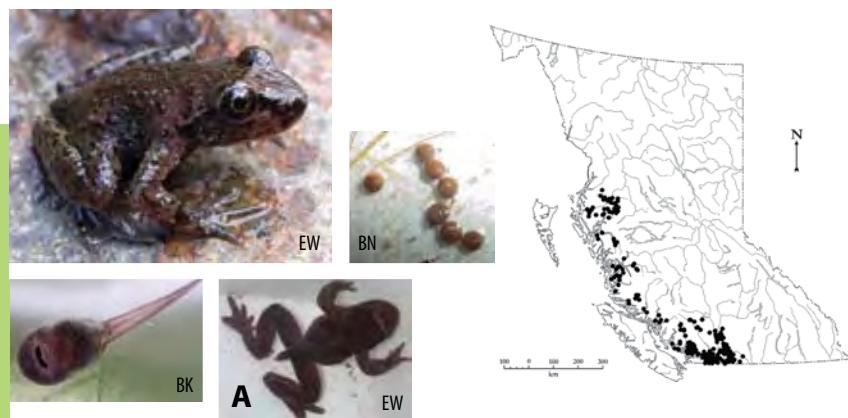
NO

YES

Pacific (Coastal) Tailed Frog *Ascaphus truei*

STATUS Special Concern (Canada); Blue list (B.C.) ●

ADDITIONAL FEATURES Slender body without a longitudinal fold of skin along the sides; eyes with a vertical pupil (visible when not dilated); tympanum (ear drum) lacking; hind feet fully webbed; outer-most toe flatter and wider than other toes; **adult males with a tail-like appendix** (photo A); back and sides brown, grey, or black; adult body length 30-50 mm.



NATURAL HISTORY The Tailed Frog occurs along the coastal mainland up to the Alaska panhandle and inland along the Coast Mountains. These frogs inhabit cold, clear, rocky streams and adjacent forest from near sea level to subalpine areas. The frogs mate in the autumn; females store sperm and lay eggs the following summer in stream habitat. The eggs are unpigmented and in gelatinous strings attached to the underside of rocks. Tadpoles are dark brown or black and have a white spot near the tail tip. They cling to rocks with their large, sucker-like mouth. Tadpoles spend several years in streams, and forage by scraping algae off rocks. Juvenile and adult frogs usually occur close to streams but on wet nights may travel farther into the forest. These frogs mature slowly and have a lifespan of 15-20 years. Tadpoles can be abundant, but adult frogs are usually difficult to find.

VULNERABILITY AND THREATS Tailed Frogs are vulnerable to changes in their stream habitat, including siltation and altered water temperature and flow that may result from forestry, power production, road building, or other development activities. They are also vulnerable to fragmentation and loss of foraging habitat in the forest adjacent to streams.

REMARKS Tailed Frogs are unique in many ways including reduced lungs, presence of ribs in adults, tongue attached to the back of the mouth, and presence of tail-like appendix in males that is used for internal fertilization. A second species, the Rocky Mountain Tailed Frog (*A. montanus*) occurs in southeastern B.C.

- Skin smooth, without longitudinal folds, **and**
- Enlarged adhesive toe-pad at the end of each digit

NO

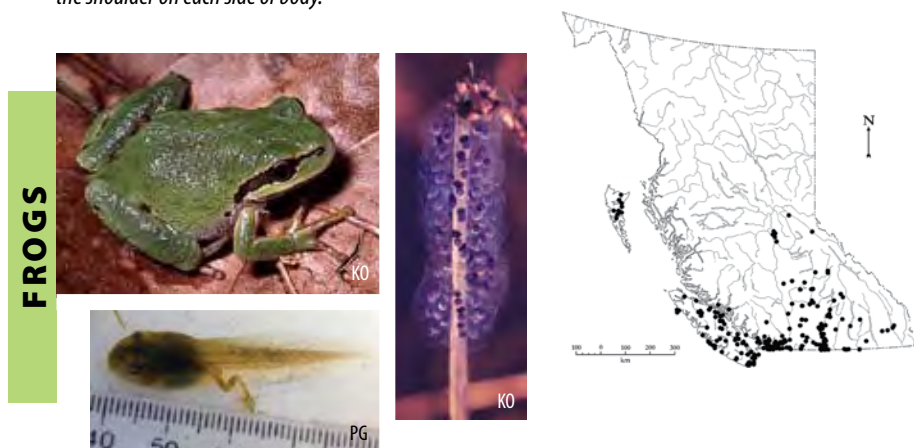
YES

Pacific Chorus Frog *Pseudacris (Hyla) regilla*

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Slender body; tympanum (eardrum) clearly visible; a dark eye stripe extending from each nostril across the eye to the shoulder; colour of the back and sides highly variable, ranging from green to brown or black and from solid to striped or mottled; underside whitish with dark throat in breeding males; adult body length 25-50 mm.

Compare with **Boreal Chorus Frog**, which lacks enlarged toe-pads and has a dark stripe extending beyond the shoulder on each side of body.



NATURAL HISTORY This species has a wide distribution across the southern third of B.C. and ranges farthest north in the east-central part of the province. It has been introduced to Haida Gwaii. These frogs inhabit open woodlands, forest edges, and marshlands. They breed in a variety of seasonal and permanent ponds and wetlands with abundant aquatic and emergent vegetation, where males form loud breeding choruses. Females lay multiple small (<5 cm diam.) egg clusters of 10-80 eggs from early spring to early summer. Tadpoles vary from greenish to tan and dark brown with indistinct mottling and brassy flecking. The body is somewhat square in shape, and the eyes are at the sides, protruding beyond the dark outline of the head (in top view). Tadpoles metamorphose from late spring to summer. Juvenile and adult frogs forage in riparian areas and other moist habitats. They are nimble climbers and often forage among shrubs and bushes and may be found climbing walls of buildings. While on land, males produce a short "dry-land" call that differs from their breeding call.

VULNERABILITY AND THREATS The Pacific Chorus Frog appears to be secure in B.C., but local populations are at risk from urban development and other human activities that alter habitats. Loss of seasonal wetlands, fish introductions, pesticides and other contaminants place local populations at risk.

- Skin smooth, without longitudinal folds, **and**
- Dark stripe extending from the nostril across the eye to the groin on each side

NO

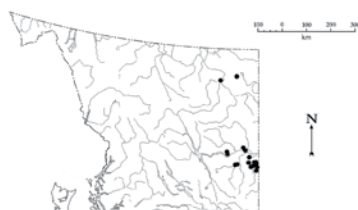
YES

Boreal Chorus Frog *Pseudacris maculata*

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Slender frog with pointed snout; tympanum (eardrum) clearly visible; hind legs relatively short and with long toes; no distinct toe-pads; back and sides grey, greenish, or tan with three distinct dark, longitudinal stripes, which may be broken into patches; adult body length 20-40 mm.

Compare with **Pacific Chorus Frog**, which has enlarged toe-pads and a dark eye stripe that does not extend beyond the shoulder; known distributions of the two species do not overlap.



NATURAL HISTORY This species has a wide distribution in North America but in B.C. occurs only in the northeast. It is cold-adapted and ranges to high latitudes and altitudes. These frogs inhabit wetlands, meadows, and moist woodlands. They breed in a wide range of water bodies but prefer shallow, seasonal ponds. Males start calling very early in the spring from ponds still partially covered with ice. Females lay multiple clutches of 5-75 eggs in small (about 25 mm diam.) clusters attached to submerged vegetation. Tadpoles are dark greenish or black with gold flecks; the eyes are on the sides of the head, protruding beyond the outline of the body (in top view). Tadpoles metamorphose by late summer. Juvenile and adult frogs overwinter on land and have physiological adaptations that enable them to survive freezing. Individual frogs are thought to mature early and live only a few years. Boreal Chorus Frogs are difficult to find outside the breeding season, and their habits are poorly understood.

VULNERABILITY AND THREATS The Boreal Chorus Frog appears to be secure in B.C., but very little is known of its distribution and status of populations here and elsewhere within its range. Local populations may be at risk from human activities that alter habitats.

REMARKS Much of what is known of the species is derived from studies in eastern North America. Even basic natural history information for populations in the west, including B.C., is lacking.

- Longitudinal fold (dorsolateral fold) on each side, **and**
- White, mottled underside of body and legs

NO

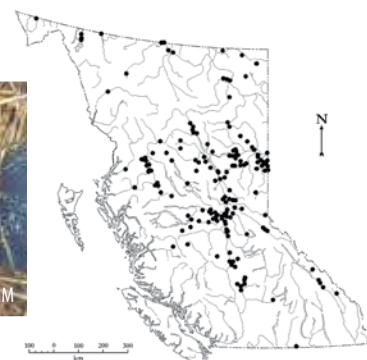
YES

Wood Frog *Lithobates sylvaticus* (*Rana sylvatica*)

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Distinct dark facial mask, extending from nostril across the eye to the shoulder, often bordered by a cream-coloured line on upper lip; tympanum (eardrum) distinct, about the size of the eye; hind legs relatively short with incomplete webbing and long toes; back and sides tan, brown, or grey, solid or with indistinct dark markings; a white stripe along mid-back is often present; adult body length 35-50 mm.

Compare with **Columbia Spotted Frog** and **Northern Red-legged Frog**, which are larger and have red on the underside of the legs and lower abdomen. The back of Columbia Spotted Frog also has distinct dark spots.



NATURAL HISTORY This species has a wide distribution in North America and occurs farther north than any other amphibian in Canada. These frogs are cold-adapted and have physiological adaptations that enable them to withstand freezing. These frogs occupy a variety of habitats and can be found in wetlands, muskeg, forest, and meadows. They breed in shallow ponds and wetlands very early in the spring when temperatures are just above freezing. Males congregate in breeding choruses and advertise their presence by loud duck-like quacks. Females lay a globular mass of up to 1500 eggs, often communally near egg masses of other females. Tadpoles have a short, round body and are black or dark brown with gold flecks. Development is rapid, and tadpoles usually metamorphose by mid-summer. Juvenile and adult frogs can be found far from water bodies and overwinter on land.

VULNERABILITY AND THREATS The status of populations in B.C. is poorly known. Livestock grazing, introduced fish, and resource extraction, including logging, may threaten local populations.

REMARKS Frogs in western North America are genetically unique, reflecting their survival and subsequent dispersal from glacial refugia such as Beringia.

FROGS

FROGS

- Red tint to underside of legs/lower abdomen, **and**
- Back with distinct dark spots with a light center

NO

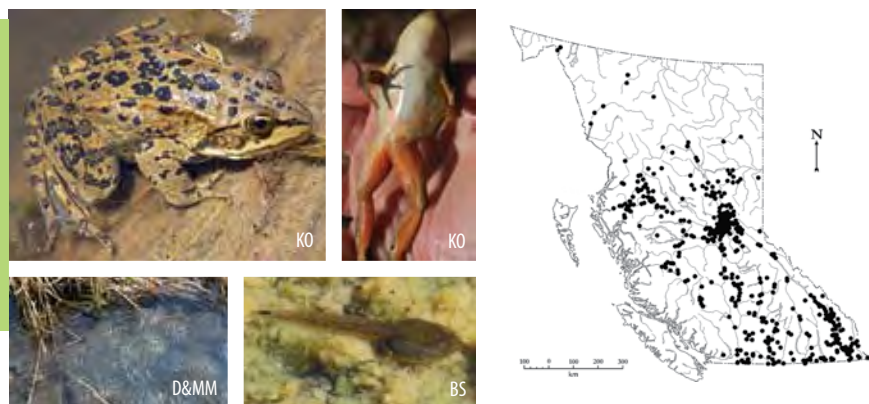
YES

Columbia Spotted Frog *Rana luteiventris*

STATUS Yellow List (B.C.) ●

ADDITIONAL FEATURES Longitudinal fold (dorsolateral fold) on each side; eyes point upwards; legs long; dark facial mask present, sometimes faint, bordered from below by cream-coloured upper lip; back greenish, tan, or brown with dark spots; red undersides of legs may be lacking in small juveniles; groin without mottling; adult body length 50–100 mm.

Compare with **Wood Frog** and **Northern Red-legged Frog**; Wood Frogs lack red on underside of legs and lower abdomen; introduced populations of Red-legged Frogs may occur locally near the coast in the north — take photographs if in doubt.



NATURAL HISTORY This species has a wide distribution in northern B.C. These frogs breed in permanent ponds, shallow lakes, and slow-flowing portions of streams very early in the spring. Breeding males are vocal but their low-pitched calls are faint; a full chorus has been described as a “quiet whisper over the surface of the water”. Females lay a large floating cluster of up to 800 eggs, usually communally with other females. Tadpoles have a globular body and a tail with a high dorsal fin; the tail is long, more than 1.5 times the body length. They metamorphose by late summer of the same year but may overwinter in northern localities. Juvenile and adult frogs may forage in riparian areas and wet meadows but are seldom found far from water. Metamorphosed juveniles and adults overwinter in the bottom of deeper water bodies.

VULNERABILITY AND THREATS Apparently healthy populations remain in many areas of B.C., but anecdotal observations suggest that the frogs have disappeared from some areas where they were formerly abundant. Draining of wetlands, disturbance to shoreline vegetation, fish introductions, and epidemic disease can all result in population declines or loss. The closely related Oregon Spotted Frog (*Rana pretiosa*) has all but disappeared from much of its former range, and other members of the genus *Rana* have undergone precipitous declines in western North America.

- Red tint to underside of legs and lower abdomen, **and**
- Groin mottled with yellowish green and black (seen when the hind leg is extended)

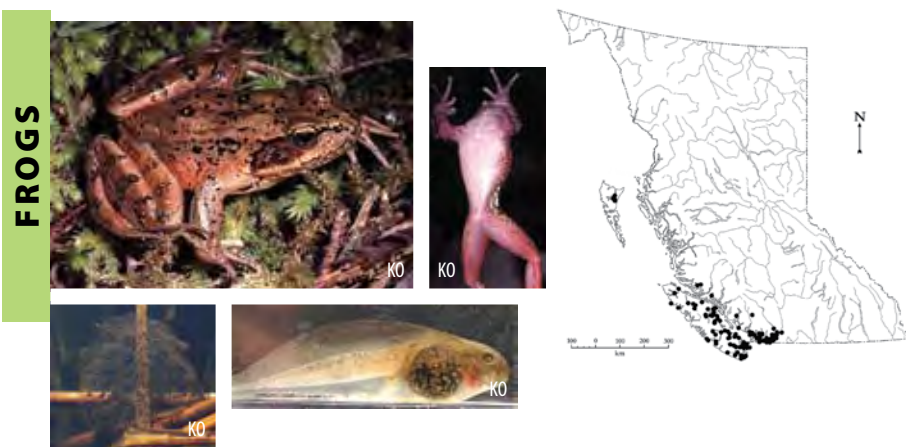
YES

Northern Red-legged Frog *Rana aurora*

STATUS Special Concern (Canada); Blue List (B.C.) ●

ADDITIONAL FEATURES Longitudinal fold (dorsolateral fold) on each side; legs long; dark facial mask present, sometimes faint, bordered from below by cream-coloured upper lip; back greenish, tan, or brown, often with dark spots or flecking; red undersides of legs may be lacking in small juveniles; adult body length 50–100 mm.

Compare with **Wood Frog**, which lacks red on the underside, and **Columbia Spotted Frog**, which has eyes pointing slightly upwards, unmottled groin, and undersides of legs without leg bones visible through the skin. Introduced Red-legged Frog populations may occur locally along the coast in the north — take photographs if in doubt.



NATURAL HISTORY In northern B.C., this frog occurs on Graham Island, where it is possibly introduced. An introduced population is also known from coastal Alaska, well north of the species' natural range. Red-legged Frogs inhabit wetlands and moist forests. They breed in marshes, ponds, lakes, and slow-moving sections of streams. While vocal during the breeding season, they are seldom heard, as males usually call while submerged under water. Eggs are laid very early in the spring during a short breeding season. Eggs are in large (about 10–15 cm diam.) globular clusters of soft jelly with up to about 2000 eggs. Tadpoles have a globular body and a tail with a high dorsal fin; the tail is rarely more than 1.5 times the length of the body. Metamorphosis usually occurs by mid-summer. Adults and juveniles can be found on the forest floor, often along stream banks or pools but sometimes far from water in moist habitats.

VULNERABILITY AND THREATS Within its natural range in southwestern B.C., threats include habitat loss and fragmentation from development and logging, fish introductions, and epidemic disease. Documenting populations at the northern limits of the species' natural range and the presence of possible introductions is important.

FROGS

FROGS

CONSERVATION OF AMPHIBIANS

Northern regions of B.C. are in a unique position to monitor and protect amphibians because many northern areas still appear to support healthy populations. A better understanding of distributions and status of amphibian populations and threats facing them is needed for management and conservation efforts to be effective.

All frogs and most salamanders found in northern B.C. are semi-aquatic and gather at suitable aquatic habitats for breeding, often in large numbers. Wetland drainage or contamination of important breeding sites can reduce their numbers over a wide area. Many amphibians are unable to breed successfully in water bodies with introduced fish. Amphibians forage in the forest and meadows surrounding breeding sites, and some wander far from water. Protecting the integrity of both terrestrial habitats and breeding sites is important for the survival of populations. Amphibians are particularly vulnerable to road-mortality, barriers to movement, and pesticide applications during mass migrations to and from breeding sites.

WHAT CAN BE DONE?

- Join BC Frogwatch and report occurrences to help better delineate amphibian distributions; document observations with photographs (<http://www.env.gov.bc.ca/wld/frogwatch/>)
- On a broader scale, establish a network of amphibian monitoring sites to provide baseline information on population trends in protected benchmark areas and in areas subjected to resource development and other human activities
- Record and report road-kill observations to help identify amphibian movement corridors
- Record and report observations of dead or dying frogs that may indicate epidemic disease, contamination, or other catastrophic events (http://www.env.gov.bc.ca/wld/frogwatch/amphibian_disease.htm)
- Take precautions such as cleaning waders, nets and other field gear to avoid inadvertently spreading pathogens to amphibians habitats (http://www.env.gov.bc.ca/wld/frogwatch/amphibian_disease.htm)
- Identify and protect aquatic breeding sites and associated terrestrial habitats during resource, agricultural and urban development . Apply best management practices for amphibians (http://www.env.gov.bc.ca/wld/BMP/herptile/HerptileBMP_final.pdf)

WHERE TO REPORT OBSERVATIONS?

- BC FrogWatch Program (<http://www.env.gov.bc.ca/wld/frogwatch/>)
- Local Ministry of Environment representative (<http://www.env.gov.bc.ca/main/regions.html>)

Photography by: Suzanne Collins (SC), Ted Davis (TD), Purnima Govindarajulu (PG), Michael Graziano (MG), Joyce Gross (JG), Sandra Kinsey (SK), Brian Klinkenberg (BK), William Leonard (WL), Mark Leppin (ML), D. and M. McIvor (D&MM), Gary Nafis (GN), Bradford Norman (BN), Kristiina Ovaska (KO), Leah Ramsay (LR), Brian Slough (BS), Elke Wind (EW).

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Ministry of
Environment

