The Amphibians and Reptiles of Alaska

A Field Handbook

S. O. MacDonald

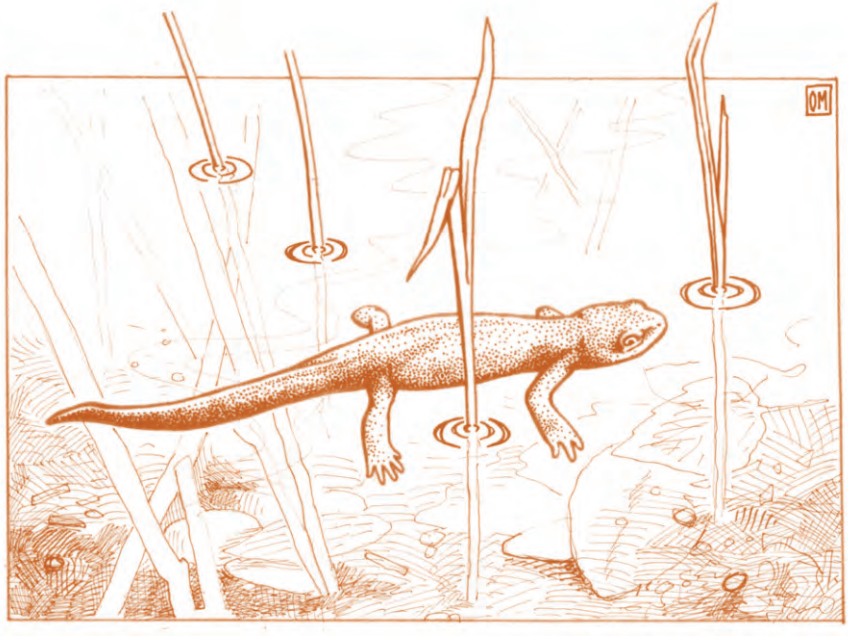
Western Toad (*Anaxyrus boreas*)

The Amphibians and Reptiles of Alaska: A Field Handbook

by
S. O. MacDonald
Research Associate
University of Alaska Museum, Fairbanks
and
Museum of Southwestern Biology, Albuquerque
(somacdonald@gilanet.com)

Illustrated by
Orien MacDonald
(omluthier@yahoo.com)

Version 2.0 - May 2010



Roughskin Newt (*Taricha granulosa*)

Preface

Almost 40 years have drifted by since my first encounter with a Roughskin Newt. Young and newly married, my bride and I and a mound of supplies were deposited in the still snow-filled valley of the Chickamin River on the mainland of Southeast Alaska to begin a year of bush living and adventuring. The newt, discovered crawling along the bottom of a shallow beaver pond shortly after our mid-May arrival, was someone new to the both of us. Fortunately, we had brought along a copy of G. Clifford Carl's wonderful little handbook, *The Amphibians of British Columbia*, from which we learned not only who this was but some important details on its natural history as well. I still have that booklet which has, along with Robert Parker Hodge's (1976) pioneering work on Alaska herps published several years later, served me well over the years.

Thanks to the many good folks of the U. S. Fish and Wildlife Service in Alaska, I have been given this opportunity to incorporate information in these earlier studies and bring up to date information that has been accumulating over the ensuing years. In addition, a website and database connections have been developed to help facilitate much needed inventory and monitoring studies on this fascinating yet still poorly known fauna. My ultimate hope for this effort is that we will learn not just to know and appreciate these fellow community members, but will with time and study become better equipped to cause them the least harm.

Version 2.0 of this handbook incorporates all relevant scientific and common name changes recently advanced by Crother (2008) and others in the sixth edition of *Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico*.

Acknowledgments

The development of this handbook was made possible with funding provided by the Juneau Field Office of the **U.S. Fish and Wildlife Service**.

My sincere thanks to the **Alaska Natural Heritage Program** for generously hosting the web version of this work.

I'm particularly grateful to Kim Hastings and Ed Grossman, USFWS-Juneau, for help and encouragement in all aspects of this effort, and to the number of people who kindly reviewed an earlier draft of this publication. Many individuals and institutions, some of whom may not be listed below, have generously provided their valuable time and talents to help this project through to fruition. Warm thanks to: **Alaska Department of Fish and Game**–K. Pahlke, S. Sonnichsen, J. Whitman; **Alaska Natural Heritage Program**–T. Gotthardt; **NOAA National Marine Fisheries Service, Auke Bay Laboratory**–B. Wing; **National Park Service**–B. Anderson, D. Sharp, S. Wesser, A. Wright; **Private**–R. Carstensen of Discovery Southeast, R. Hadley, R.P. Hodge, N. Lethcoe, N. MacDonald, D. Pakula; **U.S. Fish and Wildlife Service**–S. Brockmann, M. Brown, J. Lindell, D. Rudis, K. Trust; **U.S.D.A. Forest Service**–L. Cabrera, C. Parsley; **U.S. Geological Survey**–K. Simac; **University of Alaska Museum**–B. Jacobsen, G. Jarrell, G. Haas, D. McDonald, K. Hilderbrandt; **Museum of SW Biology**–J. Cook; **Idaho State University**–A. Runck; **Utah State University**–E. Brodie, Jr.; and the **Curators and Staff of Museums** for sharing their invaluable collections with me. And last but certainly not least, my deepest appreciation to my son, Orien MacDonald, whose illustrations grace this work,.

Contents

The Herpetofauna of Alaska (Class Amphibia, Reptilia)

ORDER **CAUDATA** (Salamanders)

FAMILY Ambystomatidae (mole salamanders)

Northwestern Salamander (*Ambystoma gracile*) **p. 13**

Long-toed Salamander (*Ambystoma macrodactylum*) **p. 15**

FAMILY Salamandridae (newts)

Roughskin Newt (*Taricha granulosa*) **p. 17**

ORDER **ANURA** (Toads & Frogs)

FAMILY Bufonidae (true toads)

Western Toad (*Anaxyrus boreas*) **p. 19**

FAMILY Hylidae (treefrogs)

Pacific Chorus Frog (*Pseudacris regilla*) ***Introduced*** **p. 27**

FAMILY Ranidae (true frogs)

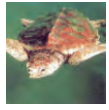
Columbia Spotted Frog (*Rana luteiventris*) **p. 21**

Wood Frog (*Lithobates sylvaticus*) **p. 23**

Red-legged Frog (*Rana aurora*) ***Introduced*** **p. 25**

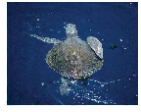
ORDER **TESTUDINES** (Turtles)

FAMILY Chelonidae (sea turtles)



Loggerhead Seaturtle (*Caretta caretta*) **p. 29**

Green Seaturtle (*Chelonia mydas*) **p. 30**



Olive Ridley Seaturtle (*Lepidochelys olivacea*) **p. 31**

FAMILY Dermochelyidae (leatherback sea turtles)

Leatherback Seaturtle (*Dermochelys coriacea*) **p. 32**

ENIGMATIC SPECIES

Alaska Worm Salamander (*Batrachoseps caudatus*) **p. 33**

Common Gartersnake (*Thamnophis sirtalis*) **p. 34**

Introduction

With alarming declines of some amphibians (and all marine turtles) being reported worldwide, it is imperative for biologists and naturalists to take responsibility for the future of local populations of native species. To do so will require an understanding of their distribution, habitat needs, life history, current status, population trends and vulnerabilities. Grounding these is a solid taxonomic framework that adequately reflects the structures of geographic variation and evolutionary relationships.

In the 34 years that have elapsed since Robert Parker Hodge published his pioneering study, *Amphibians and Reptiles in Alaska, the Yukon, and Northwest Territories*, there have been changes made in our understandings of taxonomic relationships, new distribution and natural history information published, alien species introduced, and issues of conservation concern identified. We still have much to learn about Alaska's herpetofauna.

WHAT ARE AMPHIBIANS AND REPTILES? Amphibians and reptiles are "cold-blooded" or ectothermic animals that in practical terms do not produce enough metabolic heat to enable them to warm their own bodies, as birds and mammals do. Thus their body temperature is dependant upon the temperature of their surroundings. This strategy, while conferring advantages such as not having to eat as much just to stay warm and thus directing more energy towards growth and reproduction does, however, restrict their activities to conditions of favorable temperatures and avoidance of extreme heat and cold. Consequently, amphibians and reptiles living in regions with cold winters must hibernate during those times until suitable weather returns in the spring. Therefore, it is not surprising that few amphibians and only the occasional marine turtle are found in Alaska, and that all but one species, the cold-adapted Wood Frog, are restricted to the milder coastal areas of the state. A synopsis of each family represented in Alaska is presented below:

Salamanders. Salamanders, like frogs and toads, typically have moist, soft skins and lack claws and scales. Unlike frogs and toads (anurans), the front and back legs of salamanders are similar in structure and essentially equal in size, and a tail is present even in adults. *Mole salamanders* (Ambystomatidae), of which some 30 species occur only in the New World, typically have a broad head, small eyes, and prominent costal grooves. Larvae of some species do not transform but breed in the larval form (as *gilled adults* or *neotenics*). Adults are typically nocturnal, terrestrial and active burrowers. *Newts* (Salamandridae) have rough-textured skin except in breeding males, and lack costal grooves. There are about 45 species of newts world-wide; in North America this family is represented by two genera of three species each.

Frogs and Toads. There are about 2,700 species, comprising 16 families, of frogs and

Checklist of the Amphibians and Reptiles of Alaska

Order **CAUDATA:** newts and salamanders
- Family **Ambystomatidae:** mole salamanders
  - *Ambystoma gracile*, Northwestern Salamander [SE Alaska]
  - *Ambystoma macrodactylum*, Long-toed Salamander [SE Alaska]
- Family **Salamandridae:** newts
  - *Taricha granulosa*, Roughskin Newt [SE Alaska]

Order **ANURA:** frogs and toads
- Family **Bufonidae**: true toads
  - *Anaxyrus boreas*, Western Toad [SE and SC Alaska]
- Family **Hylidae**: treefrogs
  - †*Pseudacris regilla*, Pacific Chorus Frog [SE Alaska]
- Family **Ranidae:** true frogs
  - †*Rana aurora,* Red-legged Frog [SE Alaska]
  - *Rana luteiventris*, Columbia Spotted Frog [SE Alaska}
  - *Lithobates sylvaticus*, Wood Frog [SE, SC, SW, W, and C Alaska]

Order **TESTUDINES:** turtles
- Family **Chelonidae:** sea turtles
  - *Caretta caretta*, Loggerhead Seaturtle [Gulf of Alaska]
  - *Chelonia mydas*, Green Seaturtle [Gulf of Alaska]
  - *Lepidochelys olivacea*, Olive Ridley Seaturtle [Gulf of Alaska]
- Family **Dermochelyidae:** leatherback sea turtles
  - *Dermochelys coriacea*, Leatherback Seaturtle [Gulf of Alaska]

† Non-native species translocated to Alaska from outside the state.

toads distributed throughout the world. Ninety-five species are found in North America north of Mexico. Adult frogs and toads lack tails and have hind legs that are larger and more robust than the front legs. Most have a well-developed ear and a voice used to attract mates, drive off intruders, and signal distress. *North American toads* (Bufonidae) consist of about 19 genera with about 300 species worldwide. Only one genus, *Anaxyrus*, occurs in North America. Toads are plump, short-legged, and warty. Parotoid glands distinguish them from frogs. *True frogs* (Ranidae) have slim waists, long legs for jumping, extensively webbed hind feet, and often a pair of dorsolateral folds. Some 600 species occur worldwide, mostly in Africa. Sixteen genera, comprising about 250 species, occur in the New World. *Treefrogs and their allies* (Hylidae) consist of some 600 species worldwide, with most found in the New World tropics. Many are tree-living and have well-developed toe pads that are set off from the rest of the toe by a small, extra segment.

Seaturtles. Six species in four genera of hard shelled marine turtles (Chelonidae) and one species of leathery-backed marine turtle (Dermochelyidae) are found primarily in tropical and subtropical seas. Female seaturtles lay large numbers of leathery eggs in nest cavities dug into sandy beaches. Marine turtle populations are in decline worldwide.

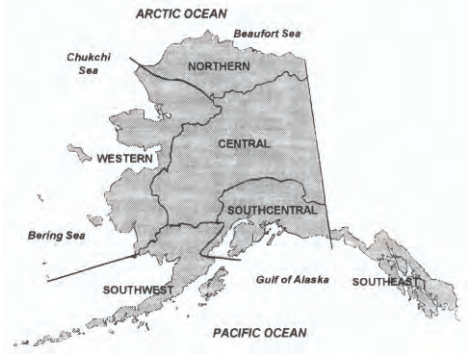
A SYNOPSIS OF THE ALASKA FAUNA. Alaska is home to eight species of amphibians comprising seven genera, five families, and two orders. Two of the species are not native to the region. One other species, the supposed Alaska Worm Salamander, remains too clouded in mystery to be included with any degree of confidence.

Only four species of reptiles, all marine turtles of two families, have been documented within the state's borders. Reports of garter snakes from the mainland of Southeast Alaska have not been substantiated and thus remain hypothetical.

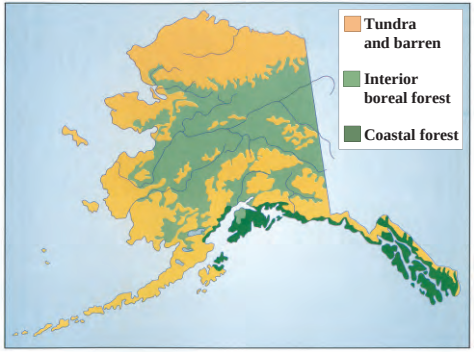
Among amphibians, only two have been documented outside the Southeast region of the state. The Wood Frog, the most hardy and widespread species of frog in North America, has been found from the mainland of Southeast northward to the crest of the Brooks Range. Alaska's lone toad species, the Western (formerly Boreal) Toad, has been recorded throughout the Southeast Panhandle and along the mainland coast to Prince William Sound.

The two non-native amphibians, Pacific Chorus Frog and Red-legged Frog, apparently have restricted but viable populations in the Alexander Archipelago of Southeast Alaska on Revillagigedo Island and Chichagof Island, respectively. Both are the result of unauthorized translocations from populations outside the state.

Marine turtles are uncommon-to-casual visitors to Alaska's Gulf Coast waters (Wing and Hodge 2002) and are considered a natural part of the State's marine ecosystem. All four species are currently listed as threatened or endangered under the U.S. Endangered Species Act (see *Conservation Status*, page 10).



Major geographic regions and marine waters of Alaska



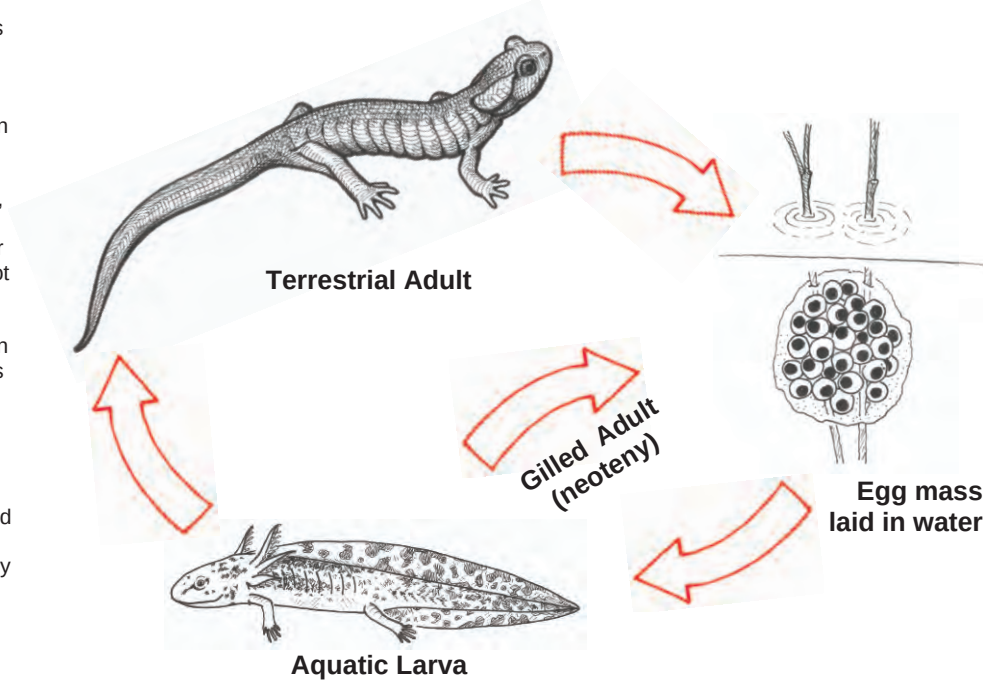
Major vegetation types of Alaska

Amphibian Life

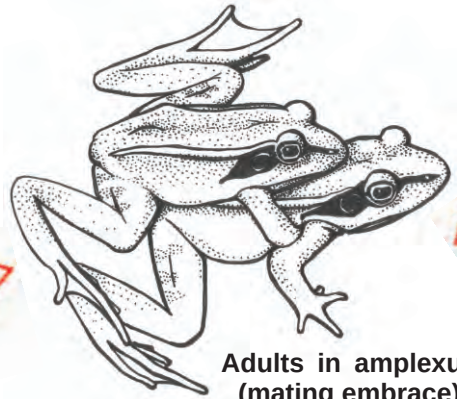
With well over 4000 species of salamanders, toads and frogs in the world, there is an incredible array of life strategies. The six species of amphibians native to Alaska live at the northern limits of their distribution. All emerge from hibernation in spring and migrate to breeding ponds to lay their jelly-protected eggs in the water. The eggs develop rapidly and hatch into larvae, called tadpoles in frogs and toads. The larvae typically metamorphose from aquatic, gill-breathing juveniles into air-breathing, land-dwelling adults, usually by the end of their first or second summer. Some salamander larvae do not transform and instead reach sexual maturity as gilled adults in a process called neoteny. Neotenic salamanders have yet to be recorded in Alaska but have been found in some populations of Northwestern Salamanders close to Alaska in coastal British Columbia.

Amphibians are carnivorous for most or all of their lives. Most are generalists, consuming a wide variety of insects, worms or other animal prey small enough to fit in their mouths. Adult and larval salamanders are strictly carnivores. Tadpoles of toads and frogs, however, are mainly herbivores, feeding on aquatic plants until they transform into predatory adults.

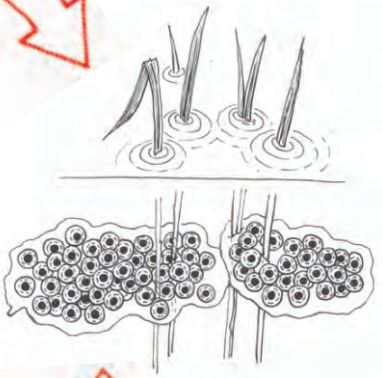
Life Cycle of the Northwestern Salamander



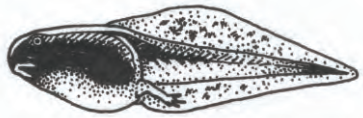
Life Cycle of the Wood Frog



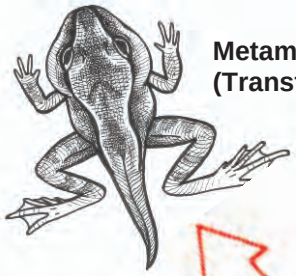
Adults in amplexus (mating embrace)



Egg masses laid in water



Aquatic Larva (tadpole)



Metamorphosing (Transforming) froglet

Field Study

The branch of science that studies amphibians and reptiles is known as Herpetology. Because the herpetofauna of Alaska is so poorly known, there is more than ample opportunity for both professional and amateur "herpetologists" to make significant contributions to our knowledge of this fascinating group of animals. Large areas and numerous islands of Alaska have never been surveyed for their amphibian inhabitants and many gaps remain in such basic information as distribution, abundance, behavior, reproduction, and conservation status.

Finding Amphibians. Techniques and procedures for finding, capturing and properly handling salamanders, toads, and frogs are available from a number of sources listed in *References*. Obviously, the best time to search for Alaska's amphibians is when they congregate in ponds and lakes to breed. Knowing the life history and habitat requirements of a species will help in your search during other times of the year.

Documentation. Locality records are only valuable if the species are properly identified and if the records are accompanied by voucher specimens or good photographs that show identifying details (see *Taking Voucher Photographs*, page 41). In some cases, sound recordings can be used to verify occurrence. Well-documented records must include such basic information as date, observer, locality, species identification and description. A field notebook, camera and GPS unit are fundamental tools of the trade. A field data form is provided for reference or copy on the following page. A printable version of this field data form as well as more detailed amphibian habitat and repeat survey forms developed by R. Carstensen of *Discovery Southeast* are available on our website (www.alaskaherps.info). Information for submittal of vouchered records is provided under *Contact Information* on the back cover.

All of Alaska's herpetofauna are protected under state or federal law. Not only is it illegal to collect any of these animals for scientific purposes without a valid permit from the Alaska Department of Fish & Game and possibly Federal or Tribal authorities, it is also illegal for anyone to "hold, transport or release" any native amphibian. This applies to such activities as casual home rearing and well-intentioned classroom projects. Properly permitted researchers are strongly encouraged to submit well documented and prepared specimens to the University of Alaska Museum Herpetology Collection. Arrangements with the appropriate curators should be made prior to field studies.

Protection. Many amphibian populations worldwide are in decline, but in Alaska attention has only recently been focused on this phenomenon. Because of limited information, the current status designations of Alaska herps (see *Conservation Status*, page 10) may be inadequate. For example, unique populations and endemic taxa may occur on islands along Alaska's Pacific Coast (Cook and MacDonald 2001), yet we still lack even the most basic information to establish conservation priorities for potentially vulnerable insular faunas (see *Island Occurrence*, page 42).

Additional Resources. Detailed information on amphibians and reptiles and their study are available from a wide variety of sources, both in print and online. Important resources relevant to Alaska herpetology are included in *References* beginning on page 39. Two particularly important references for anyone considering inventory or monitoring studies of amphibians are Heyer et al. (1994) and Olson et al. (1997). Heyer et al. (1994) also includes detailed information on the collection and proper preservation of scientific specimens for vouchers and scientific study. Links to many useful websites can be found on our website (www.alaskaherps.info).

Capturing Roughskin Newts in Southeast Alaska with a minnow trap.

Herpetofauna Field Data Form

DATE (e.g., 15 April 2003) _____ Time _____

Observer _____ Address (email, phone) _____

Weather _____ _____

LOCALITY INFORMATION

State _____ Quadrangle _____ District (e.g., island, Nat'l Park) _____

Specific locality _____

Latitude _____ Longitude _____ Elevation _____ Max error (units) _____

Habitat (vegetation, pond, stream, etc.) _____ Datum _____

_____

SPECIES INFORMATION

Species name _____ Number observed _____

Life Stage (adult, juvenile, larva, eggs) _____

Description (color, size, behavior) _____

VOUCHER INFORMATION

Voucher # _____

Nature of voucher (fluid-preserved, frozen tissues, photograph) _____

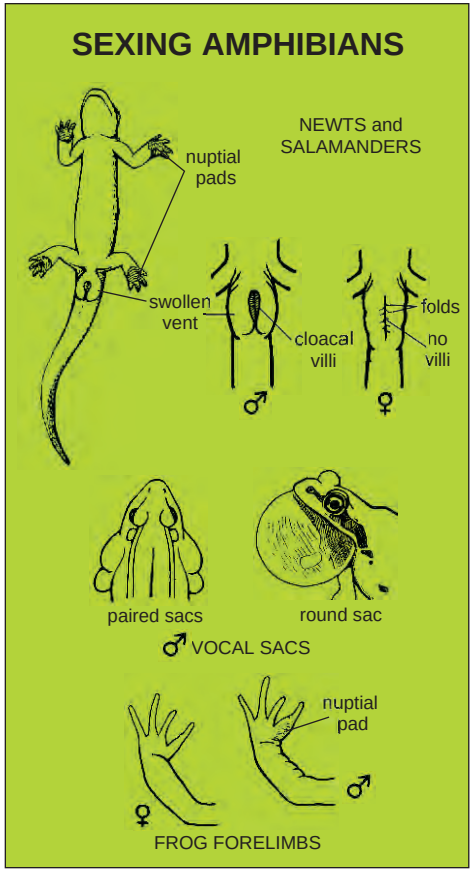
REMARKS _____

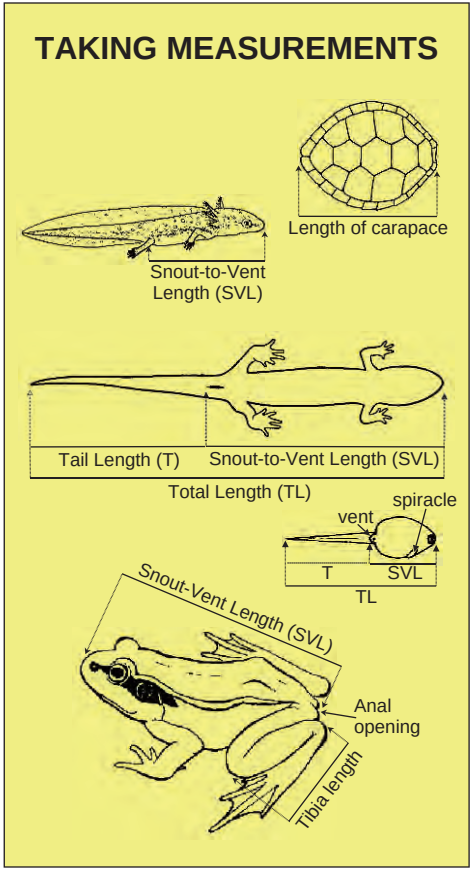
_____

Handling Live Amphibians

Live amphibians should be treated with care and respect. Some basic rules to follow include:

- Keep your hands wet and clean of insect repellant and other chemicals. The unprotected skin of amphibians makes them vulnerable to desiccation and contaminant absorption. Using rubber gloves protects both the handled and the handler.
- Don't let an animal get overheated or dried out. If it begins to dry, pour water over it or hold it in cupped hands or container with water for a minute or so.
- Clean equipment, boots, gloves and clothing after each use and collection site. Such precautions will help prevent the introduction of disease from one population to another.
- Hold frogs and toads with their hind legs extended and gently held together while supporting the body.
- Avoid touching the tails of salamanders because they break off easily when handled (to regenerate later).
- Examine hatchlings, larval salamanders and tadpoles by putting them in a clear container such as a plastic bag with a small amount of water.
- Do not detach individual eggs from the mass, nor the mass from supporting vegetation.





Conservation Status

ADFG. Alaska Department of Fish & Game
Pr = legally protected from taking (No one may take, transport or hold an amphibian collected in Alaska without a permit, and no one may release an exotic amphibian into Alaska waters. Rearing locally collected tadpoles or eggs in an aquarium without a permit is a violation of the law, as is releasing the resulting animals back into the wild.)

HERITAGE. National Heritage Network and The Nature Conservancy (as of November 2001)
G = global (status throughout its range)
S = subnational (status in Alaska)
1 = critically imperiled; 2 = imperiled; 3 = rare or uncommon; 4 = not rare, long-term concern;
5 = widespread, abundant, secure; ? = insufficient data; R = reported to occur

BLM. Bureau of Land Management, USDI
S = sensitive

U.S. ESA. U.S. Endangered Species Act of 1973, as amended by the U.S. Fish and Wildlife Service and the U.S. National Marine Fisheries Service (as of October 2002)
LE = listed endangered
LT = listed threatened
(PS) = partial status (Applies only to portion of species' range; typically indicated in a "full" species record where an infraspecific taxon or population has U.S. ESA status, but the entire species does not. See *www.natureserve.org/explorer/statusus.htm#status*)

IUCN. International Union for Conservation of Nature and Natural Resources (as of 2002)
CE = critically endangered
E = endangered

CITES. Convention on International Trade in Endangered Species of Wild Fauna and Flora (as of July 2000)
AI = Appendix I (most critically endangered)

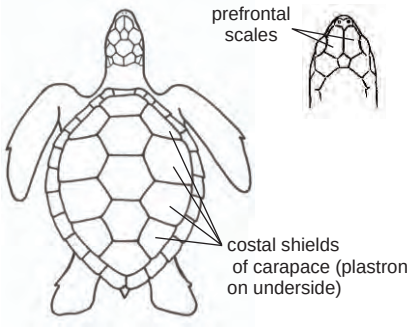
COSEWIC. Committee on the Status of Endangered Wildlife in Canada (as of November 2002)
E = endangered
PS = partial status (applies only to portion of species' range)
NAR = not at risk

BC. British Columbia Provincial Red and Blue List (2002)
RED = extirpated, endangered, or threatened
BLUE = vulnerable
YELLOW = not at risk
ACC = accidental

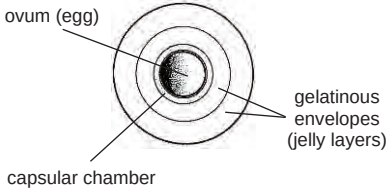
SPECIES	ADFG	HERITAGE	BLM	U.S. ESA	IUCN	CITES	COSEWIC	BC
Northwestern Salamander	Pr	G5/S2?					NAR	YELLOW
Long-toed Salamander	Pr	G5/S2?		(PS)			NAR	YELLOW
Roughskin Newt	Pr	G5/S2?						YELLOW
Western Toad	Pr	GS/S3?		(PS)	E			YELLOW
Columbia Spotted Frog	Pr	G5/S2?	S	(PS)			NAR	YELLOW
Wood Frog	Pr	G5/S3S4						YELLOW
Pacific Chorus Frog		G5						YELLOW
Red-legged Frog		G4		(PS)			PS	BLUE
Loggerhead Seaturtle		G3		LT	E	A1		
Green Seaturtle		G3		LT	E	A1		ACC
Olive Ridley Seaturtle		G3		LT	E	A1		
Leatherback Seaturtle		G2		LE	CE	A1	E	RED
Common Gartersnake		G5/SR		(PS)				YELLOW

External Anatomy

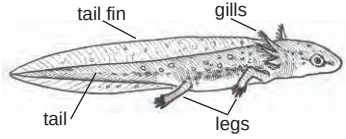
SEATURTLES



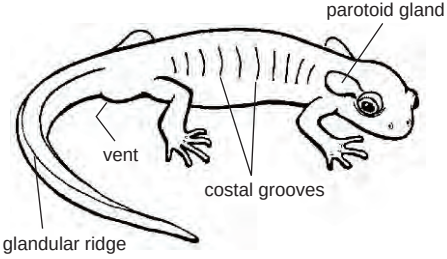
AMPHIBIAN EGGS



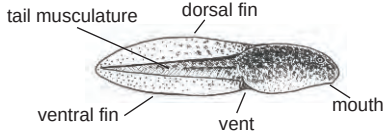
SALAMANDERS

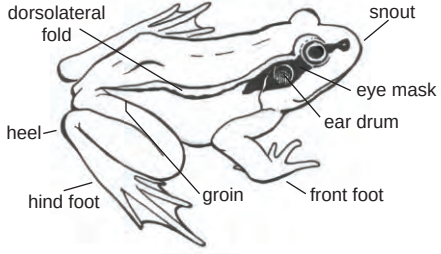


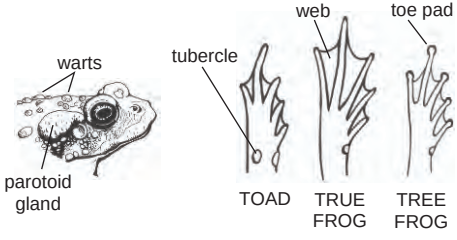
SALAMANDER LARVA–Pond Type



FROGS AND TOADS







Species Accounts

A brief, one or two paged account is provided for each of the 12 species of amphibians and reptiles known to occur in Alaska. For each species, the following sections are discussed:

SCIENTIFIC NAME, COMMON NAME and **AUTHORITY**. The scientific name is followed by the name of the author and the year in which it was described. Scientific and common or vernacular names follow Crother (2008).

TAXONOMY. The scientific classification for each species and any subspecies currently recognized and relevant to Alaska populations are discussed. Amphibian taxa (subspecies, or if monotypic, species) native to Alaska are listed and information for each is presented, including the full scientific name, original description and where published, type specimen (name holder of the taxa), and the type locality.

DESCRIPTION. The description for each species generally includes external features that best describe a species' adult appearance and distinguishing characteristics, including standard measurements (in metric units followed parenthetically by English units), colors, and sexual differences. See page 9 for measurement abbreviations.

DISTRIBUTION. A species' general range and its more detailed occurrence in Alaska are described. Distribution maps were generated from vouchered records (specimens or photographs) from the following institutions: California Academy of Science (**CAS**; including Stanford University collections), San Francisco; Carnegie Museum of Natural History (**CM**), Pittsburgh, PA; Cornell University Museum of Vertebrates (**CU**), Ithaca, NY; Field Museum of Natural History (**FMNH**), Chicago, IL; Museum of Natural History, University of Kansas (**KU**), Lawrence; Museum of Southwestern Biology (**MSB**), Albuquerque, NM; Natural History Museum of Los Angeles County (**LACM**), Los Angeles, CA: Museum of Vertebrate Zoology (**MVZ**), Berkeley, CA; NOAA National Marine Fisheries Service-Auke Bay Laboratory (**AB**; includes former holdings of R.P. Hodge and the Tongass Historical Society Museum, Ketchikan), Juneau; Royal Ontario Museum (**ROM**), Toronto; Texas Cooperative Wildlife Collection (**TCWC**), Texas A&M University, College Station; University of Alaska Museum (**UAM**), Fairbanks; University of Arizona (**UAZ**), Tucson; University of Michigan Museum of Zoology (**UMMZ**), Ann Arbor; and the U.S. National Museum of Natural History (**USNM**), Washington, D.C.

NATURAL HISTORY. This broad section provides information on a variety of topics, including habitat, behavior, and reproduction.

CONSERVATION. Issues of conservation concern are discussed. A species' conservation status is listed on page 10.

REMARKS. A variety of information of particular interest is included in this section.

SELECT REFERENCES. This section includes important sources of information used in text and cited in full under *References* on page 41.

USING KEYS. The keys in this guide are tools to help you arrive at the correct field identification of adult amphibians and reptiles of Alaska, the larvae and tadpoles of the salamanders, frogs and toads, and the eggs of all native and nonnative amphibians. All keys start at number 1 and ask you to choose between one or more diagnostic criteria that best describe the specimen in hand. By making a series of one choice or the other, you will follow these couplets until you arrive at the probable name of your specimen. Illustrations are provided to help clarify and assist. To further assure yourself that the identification you arrived at is the correct one, additional criteria may be given under the account of that species.

Northwestern Salamander

Ambystoma gracile (Baird, 1859)

TAXONOMY. Two subspecies are generally recognized; one occurs in Alaska. Some authors suggest subspecific recognition is not warranted, whereas others suspect these populations may represent separate species.

Ambystoma gracile decorticatum [British Columbia Salamander]
Original Description: *Ambystoma decorticatum* (Cope 1886, Proc. Am. Philos. Soc., 23:514-526).
Holotype: USNM 14493.
Type Locality: Port Simpson, British Columbia.

DESCRIPTION. The Northwestern Salamander is a robust salamander with a broad head, pronounced costal grooves, and pitted areas along the rounded top edge on the tail and on the prominent parotoid glands behind each eye. The skin is smooth, uniformly gray-brown above, lighter below, with the back of some individuals flecked with cream or yellow. Terrestrial adults measure up to about 23 cm (9 in.) TL, whereas gilled adults (neotenics) may reach 26 cm (10.25 in.) TL. Males and females do not differ significantly in size, but males become darker than females during the breeding season.

The Northwestern Salamander is distinguishable from other salamanders by its uniform gray-brown coloration, parotoid glands, and glandular ridge along the top of the tail.

DISTRIBUTION. This species ranges along the Pacific Coast from extreme northern California to Southeast Alaska, where it has been collected at only two localities: SE of Ketchikan on Mary Island, and NW Chichagof Island near Pelican. Two additional but unverified records are a globular egg mass, presumably of this species, found in Figure Eight Lake, Stikine River, on 12 June 1991, and most intriguing, an adult near Graves Harbor on the outer coast of Glacier Bay National Park, reported in 2000 (B. Anderson, pers. comm., 2004).

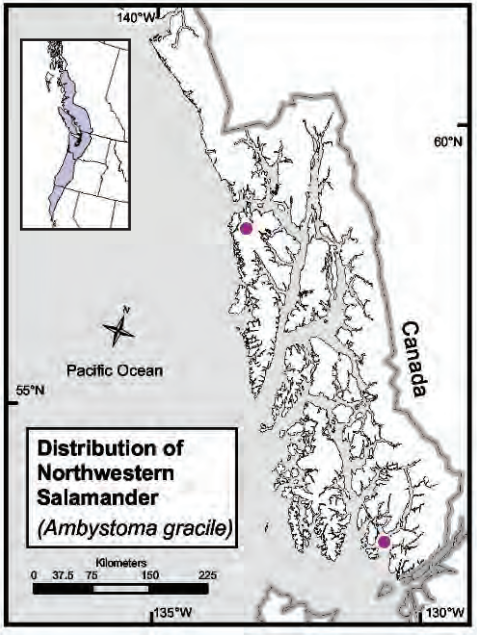
NATURAL HISTORY. Terrestrial adults primarily live below ground, and are usually active on the surface only during rains and migrations to their aquatic breeding sites. In Alaska these sites include muskeg ponds (Mary Island, Pelican)

Metamorphosed adults have prominent parotoid glands and costal grooves, and can grow quite large, up to 9 inches in total length (3.5 inches SVL).

Neotenic forms (gilled adults) are common in populations just south of the Alaska border.

and a freshwater lake (Stikine River). This species has been found elsewhere from sea level to treeline. In Alaska, the larvae may require two years to complete metamorphosis, thus requiring a permanent source of water.

The eggs of this salamander are laid in early spring in a single, firm jelly-like mass about the size and shape of an elongated grapefruit and attached underwater to submerged sticks and stems. Sometimes they turn greenish in color due to the presence of a green algae lining the egg-capsules. The larvae show extreme variation in appearance; they hatch in about a month and spend up to two years in the water. Some may remain aquatic as gilled adults. Metamorphosed adults are known to travel at least 1.5 km to reach suitable breeding sites.



CONSERVATION. The distribution and status of this species in Alaska is unknown and in need of study. In the Pacific Northwest many stable populations are believed to exist throughout the historical range. There is conflicting data on the affinity of this species for old-growth forest habitat. Clear-cutting rendered their habitat unsuitable in one study. Because of their distasteful qualities, predation by introduced fishes and other potential predators is not considered a serious problem.

REMARKS. When molested, this species assumes an elevated-tail pose and secretes a white, milky fluid from its glandular areas. This secretion may cause skin irritation in some people. Some salamanders may also make a series of ticking sounds when disturbed.

SELECT REFERENCES. Corkran and Thoms 1996, Hodge 1986, Nussbaum et al. 1983, Petranka 1998, Titus 1990, Waters 1992.

Eggs are laid in a very firm ball of jelly the size of an orange or small grapefruit, and attached to sticks under water. Green algae often grow inside the inner jelly layer of each egg and in time may color the mass.

Larvae are generally olive-brown with large, dark spots on the back and fins. The poison glands,visible as yellow dots, are concentrated at the parotoid areas and along the ridge of the tail. The gill filaments are long and willowy, and occur along the entire gill stalk. Metamorphosis of the larvae occurs at about 50 mm SVL.

Long-toed Salamander

Ambystoma macrodactylum Baird, 1849

TAXONOMY. Five subspecies are currently recognized; one occurs in Alaska. It has been suggested that the mainland and an island population in the vicinity of the Stikine River of coastal Alaska are phenotypically and taxonomically distinct.

Amystoma macrodactylum columbianum [Eastern Long-toed Salamander]
Original Description: *Ambystoma macrodactylum croceum* Ferguson (1961, Am. Midl. Nat. 65:313).
Holotype: USNM 142228.
Type Locality: "0.5 miles N. Anthony Lakes (SW 1/4, Sec. 7, R37E, T7S), Union Co., Oregon, (Elev. 7100 feet)".

DESCRIPTION. The adult Long-toed Salamander has a slender, smooth-skinned body with 12-13 faint costal grooves, no parotoid glands, and long legs and hind toes, especially the fourth. It is typically dark brown to black above with an irregular stripe of yellow, tan or light green running down the middle of the back from head almost to the tip of the tail. Its sides usually have a sprinkling of fine white flecks and the belly is dark brown to sooty gray.

Adults measure up to 17 cm (6.7 in.) TL, with females averaging somewhat larger in SVL. Males have proportionately longer tails and limbs than the females. Fifteen mixed adults from the Stikine River averaged 13.6 (12.0-15.0) cm TL and 5.7 (4.0-9.0) grams in weight (J. Lindell/E. Grossman field notes 1993).

The Long-toed Salamander is readily distinguished from Alaska's other amphibians by its prominent dorsal stripe and long fourth toe.

DISTRIBUTION. This species is widely distributed in northwestern North America. The extent of its distribution in northern British Columbia is not known, but it has been found in the Stikine and Taku watersheds in the Province and Southeast Alaska, where it has been reported near the mouth of the Stikine River at Figure Eight [=Twin] Lake, Mallard Slough, Cheliped Bay, Andrew Slough, Farm Island, and farther out from the river delta on Sokolof Island. The species has also been collected on the Alaska side of the Coast Range in the Taku River Valley.

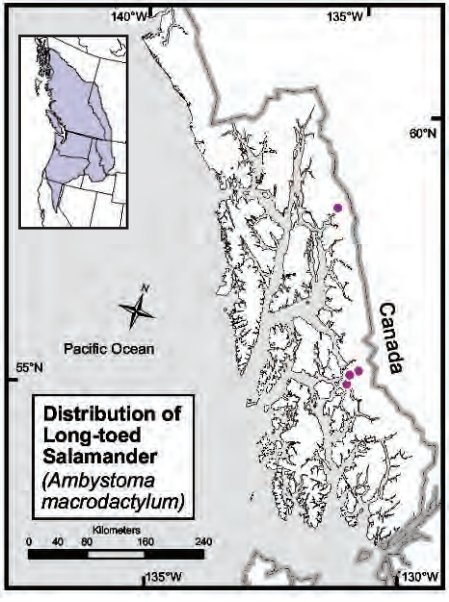
NATURAL HISTORY. Long-toed Salamanders use forested cover adjacent to breeding ponds for foraging and overwintering habitat. The species is versatile, occurring in a wide variety of

Long-toed Salamanders have a prominent green or yellow stripe running down their back and white flecks on their sides.

Terrestrial juvenile and adults are active at night in search of small worms and insects.

habitats and elevations throughout its range. Almost exclusively nocturnal and subterranean, adults may be found during the breeding season under rocks, decaying logs, or other debris, usually close to their breeding ponds, which tend to be shallow (<1 m), not necessarily permanent, and fish-free.

Adults are terrestrial, entering water only during the early spring breeding season (mid-April/May on the Stikine River), often before ponds are clear of ice. Migration to breeding sites is usually on rainy nights, the males arriving before the females and staying longer. The eggs are laid either singly or in small, jelly-coated clusters on submerged vegetation, on the underside of deeply sunken logs, or occasionally loose on the bottom. Eggs collected on Sokolof Island on 5 May 1992 were attached to alder twigs in a vernal pond just upslope of tidal influence. Eggs hatch some 3 weeks later, depending upon water temperature. Larvae in Alaska may overwinter before transforming. Neotenic forms have yet to be reported in Alaska.



CONSERVATION. The Long-toed Salamander is relatively common throughout its range. In Southeast Alaska, the restricted distribution, unknown status, and possible island endemicity of this species are factors for concern. Mortality and incidence of deformities have been linked to UV-B exposure and parasite (trematode) infection. In developed areas, the destruction of wetland habitats may be the greatest threat.

REMARKS. When threatened, the tail is raised, head becomes tucked, and a sticky white excretion exudes from the tail as it is waved about. Up to 14 individuals have been found hibernating communally in gravel substrate below frost line.

SELECT REFERENCES. Hodge 1973, Norman 1999, Miller 1976, Norman 2004, Norman and Hassler 1996, Petranka 1998, Waters 1992.

Males deposit packets of sperm which females pick up after courtship. Single eggs or loose egg clusters are attached to vegetation or debris below the water surface.

The larvae, which may reach 7 cm (2.75 in.) before transforming, are gray or light brown with dark brown or black flecks and a silvery belly.

Roughskin Newt

Taricha granulosa (Skilton, 1849)

TAXONOMY. Some authorities recognize two subspecies; others regard the species as monotypic. A high frequency of breeding adults on Gravina Island near Ketchikan displayed a dark mottling or blotching on their venter, similar only to individuals from Crater Lake, California, the type locality of *T. g. mazamae*. Genetic studies suggest that newts from Wrangell Island differ little from those in Washington state.

Taricha granulosa granulosa [Northern Roughskin Newt]
Original Description: *Salamandra granulosa* (Skilton 1849, Am. J. Sci. Arts, (2)7:202).
Type(s): Unknown.
Type Locality: "Oregon"; restricted to near Oregon City, Claskamas County, Oregon, USA, by Fitch, 1938, Copeia 1938:149.

DESCRIPTION. Roughskin Newts are plain brown to black above, with sharply contrasting bright yellow to reddish orange below. The eyes are pale yellow and crossed by a distinct, dark bar. During much of the year their skin surface is rough and grainy. Breeding males develop a smooth, even slimy skin, swollen vent, flattened tail, and dark pads on feet. Males have relatively longer tails and limbs than females. Costal grooves are absent.

Fifteen adults from the southern mainland of Southeast Alaska averaged 15.2 (13.1-19.2) cm TL, 6.0 (5.6-6.5) cm SVL, and 9.1 (8.5-12.0) grams in weight (J. Lindell/E. Grossman field notes 1993).

The Roughskin Newt can be easily distinguished from Alaska's other tailed amphibians by its rough skin (except in the breeding male), and contrasting yellow-orange belly.

DISTRIBUTION. Roughskin Newts occur along the Pacific Coast from Southeast Alaska through western Canada (including Vancouver Island but not Haida Gwaii [Queen Charlotte] Islands), to California. They have been reported on the mainland of Southeast Alaska as far north as Juneau, and in the Alexander Archipelago on Admiralty Island, nearby Shelter Island, and many of the islands south of Frederick Sound. Newts have been seen on two islets in the Galankin Islands group close to Sitka, but their occurrence there may be the result of a transplant in about 1980 from Ketchikan stock (J. Whitman, pers. comm., 2003). Newts on the mainland near Juneau are transplants from Shel-

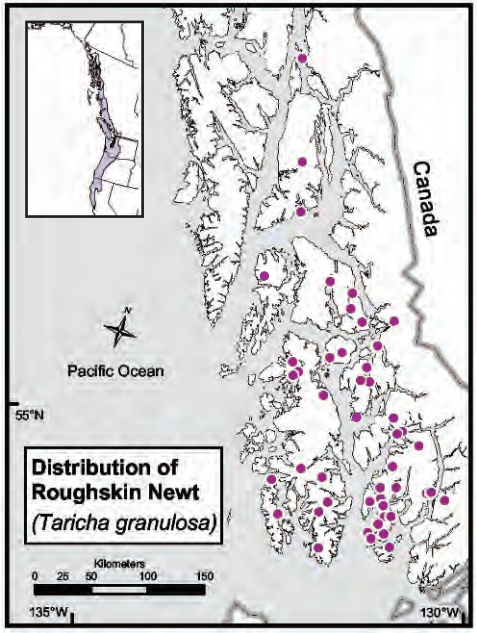
The Roughskin Newt is closely associated with humid coastal forests. Juveniles and adults are occasionally found under bark of rotting logs or in other damp places, but seldom far from water.

When harassed, this highly toxic newt thrusts its head and tail upward to show the brightly colored underside.

ter Island in the 1960s. In 2005, about 50 newts from Kuiu Island were accidentally introduced to wetlands on Baranof Island near Sitka by high school students.

NATURAL HISTORY. This species is closely associated with humid coastal forests, occurring from sea level to high mountain lakes. They are seldom found far from water, living in and about small ponds and lakes, often where there is an abundance of aquatic plants. Forested cover adjacent to aquatic habitat is used for foraging and overwintering below ground. Some transformed adults may remain in ponds year-round.

Newts are most often encountered in the spring when they congregate in ponds and small lakes to spawn. They are often seen crawling over land or moving about in water in the daytime. Breeding in Alaska probably commences in April and continues into June. Eggs are laid singly, attached to water-plants or other submerged objects, making them difficult to observe. Hatching takes 5-10 weeks. Larvae may require two years to complete metamorphosis.



CONSERVATION. The Roughskin Newt is Alaska's most common tailed amphibian. Studies elsewhere suggest that newt populations reach their highest densities in mature and old-growth forests.

REMARKS. Newts defend themselves by possessing a potent neurotoxin. Their toxic properties are not confined to their skin secretions but are widespread throughout the body. Ingestion of newt tissue can cause death in most animals, including man, if eaten in sufficient quantity. Sexual maturity may take 4-5 years, and individuals have been known to live up to 26 years.

SELECT REFERENCES. Hodge 1976, MacDonald and Cook 2007, Matsuda et al. 2006, Myers 1942, Stebbins 1985, Tan 1994.

Eggs are laid singly, attached to water-plants or other submerged objects. Tan above, cream below, the layer of jelly around the egg is thinner than the egg

Newt larvae have narrow, down-turned snouts. They are generally translucent tan, with two or three rows of yellow dots running lengthwise high along the sides. The underside is orange or pink, especially in larger larvae. They transform when about 5-7 cm long.

Western Toad

Anaxyrus boreas (Baird and Girard, 1852)

TAXONOMY. North American toads are now regarded as a separate genus. Three nominal subspecies are generally recognized, one of which occurs in Alaska. Geographic variation within this species is poorly studied and may mask a number of cryptic species.

Anaxyrus boreas boreas [Boreal Toad]
Original Description: *Bufo boreas* Baird and Girard (1852, Proc. Acad. Nat. Sci. Philadelphia 6:174).
Syntypes: USNM 15467-70.
Type Locality: "Vicinity of Puget Sound".

DESCRIPTION. The Western Toad is squat and chunky, with short legs, numerous warts, and dominant parotoid glands at the back of the head. It can vary in color from brown, green or gray above, and white with dark mottling below. There is a conspicuous light-colored stripe running down the middle of the back. The hind feet have two large, rubbery knobs on the heel for digging. During breeding, males may emit a soft, birdlike clucking call in response to other males. They do not have a mating call.

Western Toads can measure up to 12.5 cm (5 in.) SVL. Six toads from the mainland of Southeast Alaska averaged 7.0 (6.1-9.0) cm SVL (J. Lindell/E. Grossman field notes 1993). Females are usually larger, more blotched, and rougher skinned than males.

Toads are distinguished from frogs by their squat shape, warty skin, parotoid glands, and tendency to walk rather than hop.

DISTRIBUTION. Western Toads occur from southcoastal Alaska, through western Canada (including Vancouver and Haida Gwaii [Queen Charlotte] Islands) and western U.S. to Baja California. In Alaska, toads are widespread on the mainland and islands of Southeast Alaska, northward along the Gulf Coast to Prince William Sound. In PWS, they have been documented on Montague and Hawkins islands and on the mainland as far west as the Columbia Glacier and as far north as the Tasnuna River, a tributary of the Copper River. Unsubstantiated reports of toads elsewhere in PWS include Green Island next to Montague, and Heather, Glacier and "Growler" islands near Columbia Bay and the mainland (N. Lethcoe, pers. comm., 2004).

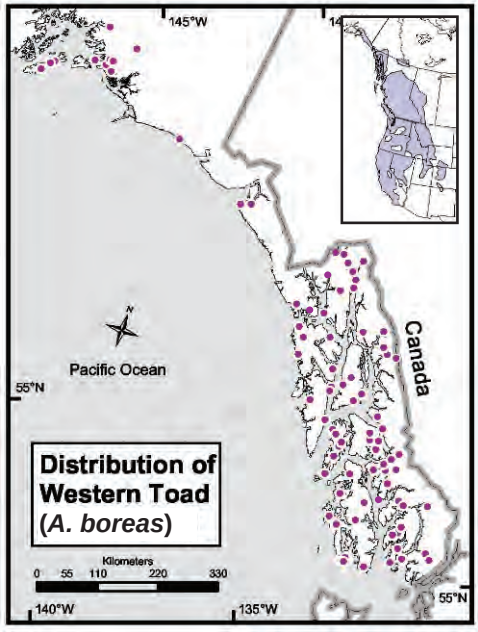
NATURAL HISTORY. Western Toads can be found from sea level to well up in the mountains,

Western Toads are found from southeastern Alaska to Prince William Sound. Some populations may be experiencing declines, causing serious concern.

The belly is white, mottled with black spots and blobs.

usually in open, nonforested areas near water. Primarily terrestrial, they enter water to breed in a variety of ponds, lakes, stream backwaters, ephemeral and sometimes brackish pools. Toads in Alaska hibernate, often communally, in burrows below frostline in forested cover adjacent to wet areas.

Adult toads congregate at freshwater sites to mate and lay eggs. In Southeast Alaska, breeding occurs May-July. Long strings of bead-like eggs are deposited in shallow water, usually entwined around submerged vegetation. Schools of small, black-colored tadpoles and waves of metamorphosing toadlets, measuring about 12 mm SVL, can be seen, often in abundance, along pond margins during July and August. Western Toads in Alaska are active during daylight hours, and especially so during damp weather. They are adept at digging.



CONSERVATION. Western Toad populations appear to be rapidly declining in many parts of their range for unknown reasons, even in relatively pristine environments. There is a growing concern that Alaska populations are experiencing a similar fate. Long-time residents from Haines to Ketchikan have noted sharp declines in toad populations. Alarmingly, five out of nine toads sampled from the Dyea area in 2005 tested positive for the lethal chytrid fungus, *Batrachochytrium dendrobatidis* (Bd).

REMARKS. When handled, toads may emit twittery sounds, puff up, urinate profusely or give off a secretion from skin glands that is highly distasteful to predators. Unlike frogs, Western Toads can tolerate brackish water and are known to survive swimming for several hours in seawater.

SELECT REFERENCES. Karlstrom 1966; Kiesecker and Blaustein 1997; Norman and Hassler 1995; Swarth 1936, Wiedmer and Hodge 1996.

Western Toads congregate in early spring to spawn. Females deposit thousands of eggs in long strings, usually in shallow ponds. This species' tendency to lay their eggs in communal masses may make them highly susceptible to infection by an algae working in synergy with ultraviolet radiation to reduce hatching success.

Toad tadpoles are small (about 25 mm in length) and uniformly black or charcoal with dark tail musculature. The body is rounded and the intestines are usually not visible. They are relatively slow swimmers and are often found in large aggregations.

Columbia Spotted Frog

Rana luteiventris Thompson, 1913

TAXONOMY. *Rana luteiventris* was recently recognized as a distinct species from *R. pretiosa* (Oregon Spotted Frog) based primarily on genetic differences between allopatric populations. No subspecies are currently recognized. Spotted Frogs on Mitkof Island near Petersburg may exhibit a distinct phenotype of heavy dusky gray coloring ventrally.

Rana luteiventris [Columbia Spotted Frog]
Original Description: *Rana pretiosa luteiventris* (Thompson 1913, Proc. Biol. Soc. Washington 26:53).
Holotype: UMMZ 43037. **Paratypes:** UMMZ 42991-43036.
Type Locality: "Annie Creek, Elko Co., Nevada".

DESCRIPTION. The Columbia Spotted Frog is a somewhat bumpy-skinned, medium-sized frog with relatively short hind legs, inconspicuous dorsal folds, and fully webbed toes. Individuals vary from light to dark brown above with a scattering of large black spots often with light centers. The underside is creamy or mottled gray, with a covering of bright salmon or red on the lower abdomen and the undersurfaces of the hind legs in adults. There is a light stripe on the upper jaw, and the eyes are upturned. The males call on warm, clear days from above and rarely under water, their voice a short series of low pitched, quiet grunts and drones heard only up to about 30 m.

The reported average SVL of 104 female Spotted Frogs from Southeast Alaska is 6.3 (5.0-8.0) cm, and 5.5 (4.1-6.9) cm in 209 males. Male Spotted Frogs from the Unuk River are somewhat larger than males from other mainland rivers.

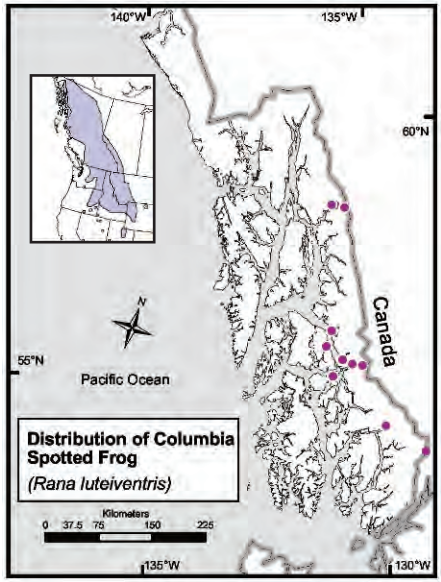
The Columbia Spotted Frog is larger than the Wood Frog, has bright salmon color on the lower ventral surfaces, and lacks a dark eye mask or light vertebral stripe. Juveniles may only show a faint red coloration to none and can be confused with young or adult Wood Frogs. The Wood Frog has shorter hind legs than a young Spotted Frog, the mask is more conspicuous, there is often a dorsal stripe, and the spots do not have light centers. The Spotted Frog is distinguished from the introduced Red-legged Frog by its shorter legs (heel of hind leg when extended forward falling short of snout), with greater webbing, rougher skin, upturned rather than out-turned eyes, shorter jaw stripe, and lack of mottling on the groin.

The Spotted Frog is highly aquatic and nearly always found in close proximity to water. Adults have a strong fidelity to breeding sites, with spawning typically occurring in the same areas in successive years.

The undersides of the hind legs and abdomen have a wash of bright salmon red that appears painted on.

DISTRIBUTION. Columbia Spotted Frogs occur from southern Yukon Territory and northwestern British Columbia (Bennett Lake and its upper watershed close to the Alaska border), southward along non-coastal British Columbia to central Nevada and Utah. The range limits of the nominate species, *R. pretiosa*, are still not known precisely.

Spotted Frogs have been documented along the mainland of Southeast Alaska at Salmon River, Unuk River, Stikine River (including on several delta islands and nearby Mitkof and Vank islands), Pt. Agassiz, and Taku River. Reports of this frog in the Haines area need confirmation.



NATURAL HISTORY. This species is closely associated with permanent water and the riparian habitats of backwater lakes, beaver ponds, muskeg ponds, river channels, and streams, where they breed, forage and overwinter underwater in mud and under stream banks. Spotted Frogs have been found 100 m above the valley floor of the Stikine River in a muskeg pond.

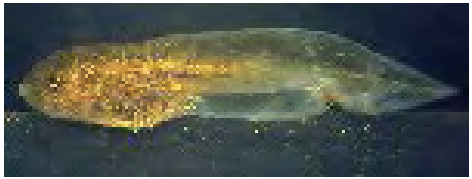
Females communally lay globular, often floating masses of large eggs in shallow water immediately after ice melt (mid-April in the lower Stikine Valley). Although the hatchlings emerge in about a week, some tadpoles may overwinter. Frogs may require two years to reach sexual maturity.

CONSERVATION. Spotted Frogs are disappearing from many areas in their range, but are still considered common in British Columbia. The current status of Alaska populations is unknown.

REMARKS. Symbiotic algae was observed present in most Spotted Frog egg masses examined in the Stikine River region.

SELECT REFERENCES. Cook 1984, Green et al. 1997, Lindell and Grossman 1998, Norman and Hassler 1996, Slough 2002, Waters 1992.

In Southeast Alaska, Spotted Frogs commence breeding in April. Egg masses the size of a softball are deposited in still, shallow water, either atop matted grasses or freely floating among clumps of emergent plants. Often the masses of many females will be deposited on top of each other.



The tadpoles are long-tailed and uniformly brown or gray above with pale gold speckling. They are similar in shape and color to the tadpoles of the Red-legged Frog but they are not so heavily spotted. They may reach 70 mm in length.

Wood Frog

Lithobates sylvaticus (LeConte, 1825)

TAXONOMY. This genus of strictly New World frogs was recently removed from the predominantly Old World genus *Rana*. There is considerable variation within and between populations of Wood Frogs in Alaska and other northern areas. The systematics of this variable species has yet to be resolved. No subspecies are currently recognized.

Lithobates sylvaticus
Original Description: *Rana sylvatica* LeConte (1925, Ann. Lyc. Nat. Hist. New York. 1:282).
Type(s): Not know to exist.
Type Locality: Not stated in original description. Designated as "vicinity of New York" by Schmidt, 1953, Check List North Am. Amph. Rept. 6th ed. p.81).

DESCRIPTION. Wood Frogs are smooth-skinned and highly variable in color and pattern, ranging from light brown or gray to pinkish above and creamy white below. Many northern individuals have numerous dark spots on the dorsal surface. Usually present are a dark eye mask, white jaw stripe, and a light stripe running down the middle of the back. The eyes look outward and the toes are not fully webbed.

Wood Frogs rarely grow more than 7.6 cm (3 in.) SVL. Northwestern populations are relatively short-limbed, the lower leg less than half of SVL. The male is smaller than the female, and during breeding has dark swollen thumbs and a duck-like staccato mating call made louder by paired vocal sacs, one over each forelimb.

Wood Frogs are distinguished from other true frogs in Alaska by smaller size, presence of a dark triangular patch behind the eye, a light vertebral stripe, and by the absence of red color on the underparts.

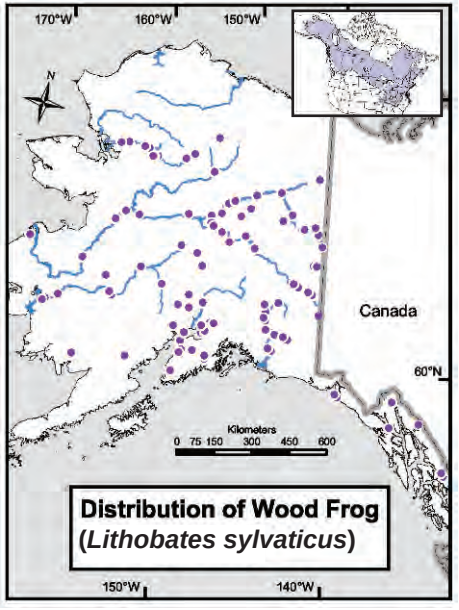
DISTRIBUTION. This species is widespread throughout northern North America and the only amphibian found north of the Arctic Circle. It has been documented on the mainland of Southeast Alaska and throughout Central Alaska to at least Anaktuvuk Pass at the crest of the Brooks Range (sightings of frogs farther north and east on the North Slope have yet to be validated), westward to the Kobuk River Valley, and southward to the base of the Alaska Peninsula. It occurs on the Kenai Peninsula, but is apparently absent from Prince William Sound. A localized population of Wood Frogs on Douglas Island near Juneau are suspected transplants.

Wood Frogs are the most common and widespread amphibian in Alaska, occurring from Southeast's mainland to near the crest of the Brooks Range.

Adults range up to 7.6 cm (3 in.) in snout-vent length. Their undersides are uniformly creamy white without a reddish wash.

NATURAL HISTORY. A species closely associated with Alaska's Interior forests, Wood Frogs inhabit a diversity of vegetation types from grassy meadows to open forest, muskeg, and even tundra. They briefly congregate in early spring to breed in shallow bodies of permanent or temporary water. After spawning, these frogs quickly leave the water and disperse over the surrounding countryside to forage and hibernate under the snow in shallow depressions of compacted forest litter.

Active at near freezing temperatures, Wood Frogs congregate for breeding as soon as winter thaw will permit (usually in April). Eggs are deposited, usually communally in the course of a few days, in baseball-sized masses, submerged and attached to sticks or plants, or sometimes free in the water, one mass stacked atop another. Development from egg to tadpole to frog occurs at a very rapid rate, ensuring complete metamorphosis before fall freeze-up. Adults become sexually mature in two to three years.



CONSERVATION. A small percentage of frogs sampled on the Kenai Peninsula, the Koyukuk National Wildlife Refuge, and in the Arctic National Wildlife Refuge near the Porcupine River displayed growth abnormalities, mostly the lack of limbs or toes. The lethal chytrid fungus, *Batrachochytrium dendrobatidis*, has recently been reported from Wood Frogs on the Kenai Peninsula.

REMARKS. Tolerance to freezing and dehydration during hibernation are important adaptations to survival in this sub-arctic amphibian. Special "cryoprotectant" chemicals allow up to 65 percent of the water in its body to gradually crystallize into ice as body temperature drops to as low as -12^0 C.

SELECT REFERENCES. Broderson 1994, Hodge 1976, Martof and Humphries 1959, O'Harra 2001, Reeves 2008, Reeves et al. 2008.

Wood Frogs survive the rigors of northern winters by hibernating in small nests under the forest litter and snow, their bodies able to freeze and thaw without bursting by concentrating a glucose antifreeze in and around the cells.

Tadpoles are brown or green with a creamy belly and high pointed tail fin that extends forward onto the back. Reaching up to 50 mm in length, they develop rapidly into young frogs before freeze-up.

Red-legged Frog

Rana aurora Baird and Girard, 1852

INTRODUCED

TAXONOMY. The source population of Red-legged Frogs introduced on Chichagof Island in Southeast Alaska is unknown. Two subspecies of this Pacific Coast frog are generally recognized, although it has been suggested that the two may be distinct species. *Rana aurora aurora* (Northern Red-legged Frog) occurs from southwestern British Columbia, including Vancouver Island, to northern California, and *R. a. draytonii* (California Red-legged Frog) is found from California south to northern Baja California. The presence (in *R. a. draytonii*) or absence (*R. a. aurora*) of a light center in the dorsal spots may help separate the two forms.

DESCRIPTION. The Red-legged Frog is a stout, medium-to-large frog, measuring up to 13.6 cm (5.4 in.) SVL (northern forms may average smaller). The head is broader than long, and the snout rounded. The light jaw stripe usually ends at the shoulder, and the eyes look to the side. The hind legs are long (heel of hind leg when pulled forward extends to or beyond the snout), and the toes not fully webbed. The dorsum is reddish-brown to gray, with black speckling or very irregular black marks. The skin is smooth, and the dorsal folds are distinct. There is a bold cream to yellow and black (or red) mottling in the groin area, and the underside of the hind legs and lower abdomen are translucent red (yellowish in young animals). Breeding males have enlarged forearms, thumbs, and webbing. The advertisement call is a weak stuttering "uh-uh-uh-uh-uh-rowr" lasting about 1-3 seconds, with the throat enlarging at the center and sides. Males usually call at night while submerged.

DISTRIBUTION. This species has a large range in western North America, occurring from southwestern British Columbia, including Vancouver Island, south along the coast to northwestern Baja California.

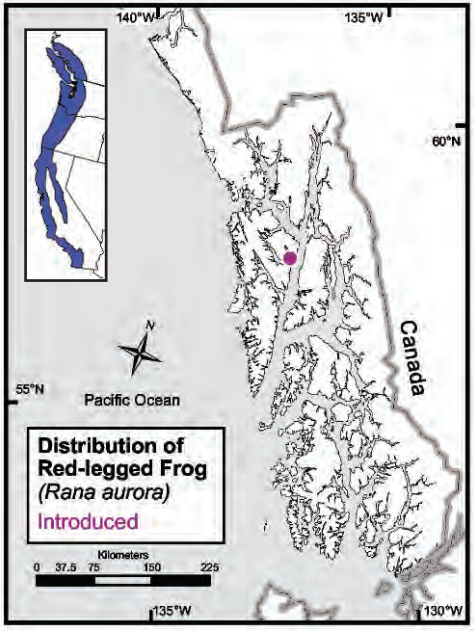
Introduced populations of Red-legged Frogs have become established in the Kennel Creek and Pavlof River drainages of Freshwater Bay, NE Chichagof Island. It is thought they were planted there from a commercial frog source (from Oregon or Washington stocks) by a local schoolteacher in about 1982.

NATURAL HISTORY. This frog occurs in meadows, woodlands, and forests, but is usually found in or near ponds, marshes, and streams. It prefers areas with dense ground cover and aquatic or overhanging vegetation.

Red-legged Frogs were introduced to the Pavlof Bay drainage on northwestern Chichagof Island in the early 1980s. They were still present in this area in summer 2002.

Adult frogs have translucent red hind legs, the color appearing to lie deep in the skin, and mottled groins.

The breeding period of this species is short (1-2 weeks), and takes place in deep pools of permanent, slow-moving water. Large-sized eggs, averaging about 3 mm in diameter, are laid in a soft, grapefruit- to cantaloupe-sized mass, usually attached to submerged sticks and vegetation in the deepest water available. Before hatching, the egg mass often floats to the surface, where it spreads out and looks frothy.



Eggs hatch in about a month and tadpoles metamorphose about four months later. Sexual maturity is attained at three or four years of age.

CONSERVATION. Serious declines and extirpations of local populations are known in Oregon and California primarily due to habitat loss, introduced predators, and perhaps disease. The status, distribution, and possible impacts of this Chichagof Island exotic is in need of long-term monitoring and study. A survey in 2006 found significant population growth and rapid range expansion outward from the initial introduction pond near Kennel Creek, with 100% breeding habitat occupancy over 6000 continuous hectares of wetland and forested habitats that extend from north of Freshwater Creek southward into Tenakee Inlet.

REMARKS. Two captive Red-legged Frogs from British Columbia lived for 11 and 13 years, respectively.

SELECT REFERENCES. Corkran and Thoms 1996, Crother 2008, Davidson et al. 2001, Hayes and Miyamoto 1984, Larum and Piehl 2007, Nussbaum et al. 1983, Sargent et al. 2003, Stebbins 1985.

Grapefruit-sized egg masses are attached to submerged vegetation and debris in deeper waters. Each egg mass is laid separately and usually not on top of others.

Tadpoles have an overall stubby appearance from their short tail and tall dorsal fin. Body color is tan with bright gold or brassy blotches, especially on the underside. They may reach 7 cm before transforming.

Pacific Chorus Frog

Pseudacris regilla (Baird and Girard, 1852)

INTRODUCED

TAXONOMY. Formerly known as the Pacific Treefrog, *Hyla regilla*, the species was transferred to the genus of chorus frogs, *Pseudacris*, a move supported by most authors. A recent study suggests that *P. regilla* likely encompasses more than one species but that further analysis of study material from across the entire range is needed to help clarify the situation. A number of subspecies have been proposed, though infrequently used in the literature (the subspecies of Pacific Chorus Frog translocated to Alaska from Kirkland, King County, Washington is considered *P.r. regilla* by some authors).

DESCRIPTION. Adult Pacific Chorus Frogs are small, measuring between 1.9-5.6 cm (0.75-2.2 in.) SVL. They have a rounded snout, large eyes, a relatively large head with a conspicuous dark mask, prominent toe pads, and limited webbing. The dorsal color and pattern is highly variable and can be quickly lightened or darkened. Both green- and brown-dominated color morphs have been seen in the introduced population on Revillagigedo Island. The undersides are cream colored and yellowish on the hindquarters. Males have a wrinkled, dusky throat, with a round vocal sac that when calling can balloon out to a size three times as large as the head. The amplified call sounds like “wreck it” or “kreck-ek”, repeated every second or so, and throughout the night and part of the day during the spawning season.

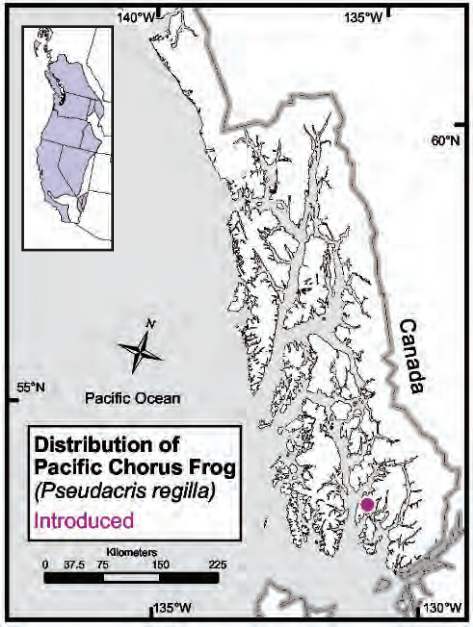
DISTRIBUTION. This frog is found at various elevations from southern British Columbia, including Vancouver Island, to Baja California and east to Idaho and Utah. It has been introduced on the Haida Gwaii (Queen Charlotte) Islands off the coast of British Columbia, and in the Alexander Archipelago on Revillagigedo Island near Ward Lake. The Ward Lake population was still extant in 2002 (six adult specimens collected by R. Whitten and sent to Auke Bay Lab via ADFG); it has apparently not spread beyond the muskeg pond system where the original tadpoles and transforming frogs from western Washington were first introduced about 1960.

NATURAL HISTORY. The Pacific Chorus Frog is primarily a ground dweller that inhabits a wide variety of vegetation from grasslands to woodland forests, usually in low vegetation close to water. Frogs introduced near Ward Lake were

An extant population of Pacific Chorus Frog (formerly Pacific Treefrog) was introduced to a group of muskeg ponds near Ward Lake on Revillagigedo Island sometime around 1960. They apparently have remained confined to this one area for more than 30 years.

found using clumps of grasses and sedges for cover adjacent to muskeg pond margins.

Male frogs were reported calling at the introduction site near Ward Lake on 24 and 26 May 1992, and mating pairs, individual frogs, and egg masses were observed in June. Eggs are laid in a soft, tight, rounded mass (up to 4 cm in diameter) and attached to submerged vegetation or on the bottom of shallow waters.



Tadpoles develop rapidly and are ready to leave the water well before winter. During mild winters on the southern coast of British Columbia, this frog apparently does not hibernate.

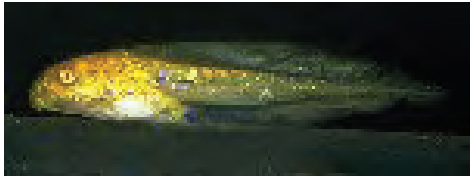
CONSERVATION. So far, Alaska's only known population seems to have remained confined to the same pond system where it was first introduced. The only other amphibians known to occur on the island are Western Toad and Roughskin Newt. These species have bred, apparently successfully, in the same muskeg ponds as the non-native chorus frog.

REMARKS. A group of calling males is known as a chorus. A dominant male, or chorus master, leads off the calling, which is then followed by subordinate males.

SELECT REFERENCES. Hedges 1986, da Silva 1997, Reimchen 1990, Waters et al. 1998.

Both green- and brown-dominated color morphs have been seen in the introduced population on Revillagigedo Island.

The pigmented eggs of this chorus frog are laid in clusters and attached to submerged vegetation or occasionally on the bottom in shallower water. This species has been known to breed in brackish water.



Tadpoles are light greenish-gray and have a short, round body that may reach 20 mm SVL or more before transforming. In top view, the eyes poke out at the edge of the head instead of being more centrally positioned as in the tadpoles of Alaska's other frogs and toad.

Loggerhead Seaturtle

Caretta caretta (Linnaeus, 1758)

TAXONOMY. Although two subspecies have been described, *C. c. caretta* (Atlantic) and *C. c. gigas* (Pacific), no subspecies are currently recognized.

DESCRIPTION. The Loggerhead is a large, hard-shelled marine turtle that may reach 2 m (6.5 ft.) carapace length and 450 kg (990 lbs.). Most, however, are smaller. The head is relatively large with two pairs of prefrontal scales. Its carapace is elongate and high in the front, with a keel along the center line and coarse serrations along the back edge. There are five or more non-overlapping costal shields on each side of of the shell. Carapace color is reddish brown to olive with yellow borders on some scutes. The plastron is cream to yellow and has two longitudinal ridges except in older adults. Males have a large curved claw on each forelimb and a much longer tail (extends past tips of back-stretched hind flippers) than females.

DISTRIBUTION. Loggerhead Seaturtles inhabit the warmer parts of the Pacific, Atlantic and Indian oceans, and the Mediterranean and Caribbean seas. They range into temperate zones in summer. Major nesting areas include the southeastern U.S., Mexico, Oman, Australia, South Africa, the Mediterranean, and southern Japan, the only known breeding area in the North Pacific.

The Loggerhead is a casual visitor to Alaska waters, reported here at least twice. One was a carcass found on Shuyak Island north of Kodiak in December, 1991. The other was a sighting near Cape Georgena, Kruzof Island, northwest of Sitka in July, 1993.

NATURAL HISTORY. Loggerheads mostly inhabit bays, estuaries, lagoons, and open seas over continental shelves. Nesting occurs at lower latitudes in summer, usually on continental shores or occasionally island beaches above the high-tide line. Their diet includes crabs, mollusks, sponges, jellyfish, fish, eelgrass, and seaweed.

CONSERVATION. Nesting trends of this species suggest general decline, with the most significant threats being coastal development, commercial fisheries, and pollution. The Loggerhead Seaturtle is currently listed as threatened under the U.S. Endangered Species Act.

REMARKS. Mitochondrial DNA data from major nesting areas suggest that most breeding colonies have diagnostic genetic characteristics, indicating strong natal homing by nesting females. Loggerheads may take up to 30 years to reach sexual maturity.

SELECT REFERENCES. Bowen et al. 1994, Dodd 1990, Hodge and Wing 2000.

Green Seaturtle

Chelonia mydas (Linnaeus, 1758)

TAXONOMY. Eastern Pacific populations of *Chelonia* are regarded by some authors as a distinct species, *C. agassizii* (Black Seaturtle), as a subspecies of *C. mydas* by others, and synonymous with *C. mydas* by authorities who suggest it not be taxonomically recognized until more definitive work is done.

DESCRIPTION. Adult Green Seaturtles typically reach 1 m (3.3 ft.) carapace length and 180 kg (36 lbs.) weight. The carapace is olive to brown or black in color and may be mottled. It is broad and flattened with no keel and has only slight serrations along the back edge. The plastron is clear white or yellowish. Males have a long, prehensile tail tipped with a horny nail, a long curved claw on the front flipper, and a longer, narrower carapace than females.

Green Seaturtles can be distinguished from other hard-shelled marine turtles by their four costal scutes, and one pair of prefrontal scales between the eyes.

DISTRIBUTION. This species ranges throughout tropical portions of the Atlantic, Pacific and Indian oceans. Nesting in Pacific populations occurs in winter or spring on beaches in areas such as Hawaii, Mexico and central America. Generally a warm-water species, Green Seaturtles occur in higher temperate latitudes, perhaps due to drifting in ocean currents in conjunction with above-normal sea temperatures during El Nino weather events.

The Green Seaturtle is rare to Alaska waters, reported at least nine times between 1960 and 1998. Records of beached carcasses and sightings have ranged from the Alexander Archipelago northward and westward to near Cordova, Seldovia, and Homer. Most (eight of nine sightings) were found from September through November. This was the only species of marine turtle reported in Alaska waters between 1993 and 1998.

NATURAL HISTORY. Green Seaturtles are found in shallow waters with an abundance of sea grasses and algae, their preferred foods, and open seas during migrations. It is the only marine turtle that commonly leaves the water to bask. Females nest every two to four years, up to eight times a season. Sexual maturity takes 20-30 years.

CONSERVATION. Populations have declined dramatically over the last 50 years, although not to the same degree as other marine turtle

species. A primary cause of decline is commercial harvest for eggs, meat and leather. The breeding populations off Florida and the Pacific coast of Mexico are listed as endangered under the U.S. Endangered Species Act, while all others are considered threatened.

REMARKS. The common name of this turtle comes from the color of its fat.

SELECT REFERENCES. Hodge and Wing 2000, Karl and Bowen 1999.

Olive Ridley Seaturtle

Lepidochelys olivacea (Eschscholtz, 1829)

TAXONOMY. Genetic studies suggest that *Lepidochelys olivacea* is phylogenetically distinct from *L. kempii* (Kemp's Ridley Seaturtle), and that Altlantic and Pacific populations of *L. olivacea* are not distinctive. No subspecies are currently recognized.

DESCRIPTION. The Olive (or Pacific) Ridley Seaturtle is a small, hard-shelled marine turtle with a uniformly olive-colored, heart-shaped carapace, usually less than 1 m (3.3 ft.) in length, that typically has 6 to 8 costal shields on each side. Viewed from the front, the carapace appears elevated and flat-topped, with flat, sloping sides. The plastron is light greenish yellow or greenish white in color. This species has a relatively large head with two pairs of prefrontal scales. Males have concave plastrons and tails that extend well beyond the margin of the shell.

The high costal shield count distinguishes this turtle from other hard-shelled marine turtles.

DISTRIBUTION. This species is found primarily in the warmer parts of the Pacific, Indian, and (less frequently) Atlantic oceans. Nesting in the eastern Pacific takes place from Mexico south to at least Columbia. Non-nesting individuals occasionally are found in more temperate waters at higher latitudes, including southeastern Alaska, where it has been documented twice: a carcass found in January, 1986, near Yakutat; and a carcass found south of Ketchikan in June, 1991.

NATURAL HISTORY. Although Olive Ridley Seaturtles can range well out to sea and may even reside in oceanic habitats during the non-reproductive portion of their life cycle, they seek protected and relatively shallow water of bays and lagoons to breed and forage. Females congregate in large aggregations (called *arribadas*) each year to nest, some up to three times per season.

CONSERVATION. The most abundant marine turtle species in the world in terms of absolute numbers, there is growing evidence of population declines resulting from incidental take by fisherman, disturbance and development of nesting beaches, and exploitation for meat, leather, and eggs, among other factors. The Mexican breeding population is listed as endangered, and all others as threatened, under the U.S. Endangered Species Act.

REMARKS. To their detriment and often demise, Olive Ridleys readily eat plastic bags, styrofoam pieces, tar balls, raw plastic pellets, and other marine debris, mistaking these items for food.

SELECT REFERENCES. Bowen et al. 1991, Hodge and Wing 2000, Zug and Wilson 1998.

Leatherback Seaturtle

Dermochelys coriacea (Linnaeus, 1766)

TAXONOMY. Two subspecies have been described, *D. c. schlegelii* (Pacific and Indian oceans) and *D. c. coriacea* (Atlantic Ocean); however, these are poorly differentiated and currently not recognized by most authorities.

DESCRIPTION. Leatherback Seaturtles are the largest living turtle, attaining a length up to 2.4 m (8 ft.) and a weight of 727 kg (1,600 lbs.). This species is easily distinguished from all other seaturtles by the smooth leathery skin with prominent longitudinal ridges on its elongated and triangular shell (the carapace is made up of many small bony platelets embedded in the skin, and lacking a rigid shell, its ribs and vertebrae, unlike those of other turtles, are not attached to the carapace). The carapace is slate to blue-black and the plastron mainly whitish. Its limbs are paddlelike and clawless. Males have concave plastrons and tails longer than the hind limbs.

DISTRIBUTION. A wide-ranging species that may be seen far out to sea, Leatherbacks generally forage in temperate waters and nest on beaches in tropical and subtropical latitudes. Significant nesting areas of Pacific populations have been found along the western continental coasts of Mexico and Central America.

A cold-tolerant species, nonbreeders are seen relatively often at high latitudes. It is the most frequently reported marine turtle in Alaska waters, with at least 19 records between 1960 and 1998 ranging from Southeast Alaska to the Alaska Peninsula. It has also been recorded at Cape Navarin, Russia, 450 km northwest of Saint Matthew Island in the Bering Sea.

NATURAL HISTORY. Mainly pelagic, Leatherbacks seldom approach land except for nesting. Females nest throughout the year, but individuals probably nest only every 2 or 3 years. Males accompany the females to offshore waters to mate. The females lay their eggs in sand under cover of darkness. Leatherbacks feed mostly on jellyfish, which are often abundant in the Gulf of Alaska during late summer and fall.

CONSERVATION. Leatherback Seaturtles are considered uncommon in Alaska waters, with peak numbers being reported in August in the late 1970s and early 1980s. This species is in decline throughout its range. The population nesting along Mexico's Pacific coast, which may support as much as half of all global nesting, experienced a drastic decline in the 1980s and 1990s. Habitat destruction, incidental catch in commercial fisheries, and the harvest of eggs and adults are the greatest threats to the survival of this species, listed as critically endangered by the IUCN.

SELECT REFERENCES. Ernst et al. 1994, Hodge and Wing 2000, Pritchard 1980, Spotila et al. 2000.

Enigmatics, Potentials, and Escapees

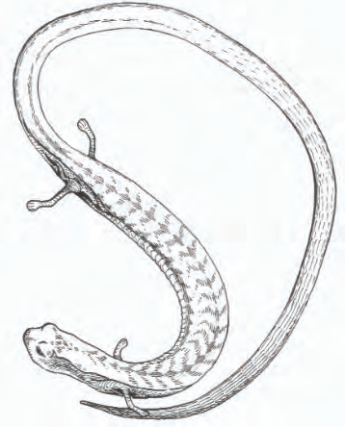
Alaska Worm Salamander

Batrachoseps caudatus Cope, 1889

Slender or worm salamanders of the genus *Batrachoseps* comprise seven or more highly variable species in the large family of lungless salamanders, Plethodontidae. Slender salamanders are confined to the Pacific coast, almost exclusively in California; there are no authenticated records north of the Columbia River. They are slim and small, usually less than 6 cm (2.4 in.) SVL. Their tails, easily broken off but soon regrown, are longer than the body. The hind feet have only four toes, and the sides of the body and tail have conspicuous grooves. They live underground and during rainy periods may be found on the forest floor under debris. Eggs are laid underground or under surface debris, often in communal nests. There is no aquatic larval stage.

The Alaska Worm Salamander is a long-standing enigma of Alaska herpetology. In 1889, E.D. Cope described a endemic species of worm salamander from a single specimen supposedly collected at Hassler Harbor, Annette Island, in August, 1882. Potentially a relict of former times, attempts to find additional worm salamanders on this island have been unsuccessful (Wake et al. 1998). Furthermore, the Alaska specimen appeared virtually identical with members of *Batrachoseps attenuatus* from near San Francisco, California, where Lt. H.E. Nichols, the collector of the Annette specimen, was also known to have visited. The likelihood that this specimen was mislabeled is reinforced by the fact that its collection date is listed as “December 1881”, not “August 1882”, the date given for several specimens of Western Toad and Roughskin Newt (two species known to occur on Annette Island) collected at the type locality by Lt. Nichols.

To add to the confusion, the USNM houses two additional specimens of *Batrachoseps caudatus* (USNM 17260, 20489), labeled as “all data questionable”, supposedly from Yakutat Bay by W.H. Dall in May 1874. (Dall was in fact in the Yakutat area in 1874.)

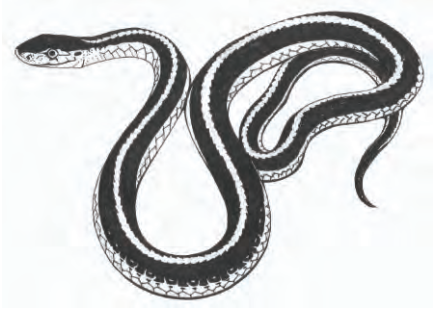


Type specimen (USNM 13561) of Alaska Worm Salamander, Batrachoseps caudatus *Cope 1889, supposedly collected at Hassler Harbor, Annette Island by Lt. Henry E. Nichols. (drawing from Smithsonian Institution photograph in Hodge, 1976.)*

Gartersnake (*Thamnophis* spp.)

The occurrence of the gartersnake in southeastern Alaska has yet to be validated. Hodge (1976) reported several sightings of snakes on the banks of the Taku and Stikine rivers inside Alaska. A gartersnake specimen supposedly collected along the Stikine River was apparently deposited in the old Territorial Museum (now the State Museum) in Juneau (or the University of Alaska Museum in Fairbanks, according to Waters, 1992), but was subsequently lost. All further attempts to locate this specimen or to document the presence of gartersnakes anywhere in the region have been unsuccessful.

The valleys of the Stikine River and Taku River (and perhaps Unuk River) could potentially allow snakes access to the coast from interior British Columbia, however, it remains unclear if natural populations of gartersnakes even occur upriver in these drainages. The herpetofauna of northwestern British Columbia is poorly known. A preliminary search for gartersnake records from major drainages that flow into coastal Alaska has come up negative. Furthermore, a resident of Telegraph Creek. B.C., stated that he could not recall anyone ever seeing a snake in the area (D. Pakula, pers. com. 2003). The Common Gartersnake (*Thamnophis sirtalis*) has been reported north of Terrace, British Columbia, in the watersheds of the Nass and Skeena rivers, and along the eastern side of the province as far north as the Peace River District (Matsuda et al. 2006). The Terrestrial Gartersnake (*T. elegans*) is found along the British Columbia coast, including Vancouver Island, as far north as the Nass River Basin, and east of the Rockies as far north as the Peace River District (Matsuda et al. 2006).



The Common Gartersnake has a long (over a meter), slender body, and a large head that is distinct from the neck. Coloration is highly variable, but back and side stripes are usually well-defined. This species lives near water in riparian habitats and humid forests.

Other Species

In addition to garter snakes, at least one other herp occurs close enough to the border of Alaska to warrant consideration as a “watch-for” species. The Tailed Frog (*Ascaphus truei*) is a tiny, cold-adapted frog found along the coast of British Columbia as far north as the Nass River (Matsuda et al. 2006), just south of Alaska’s panhandle.

A variety of exotic reptiles have on occasion been reported in Alaska, usually as escaped pets near populated areas. Examples include a rubber boa, gartersnake, and bull snake in Juneau, and a snapping turtle near Anchorage.

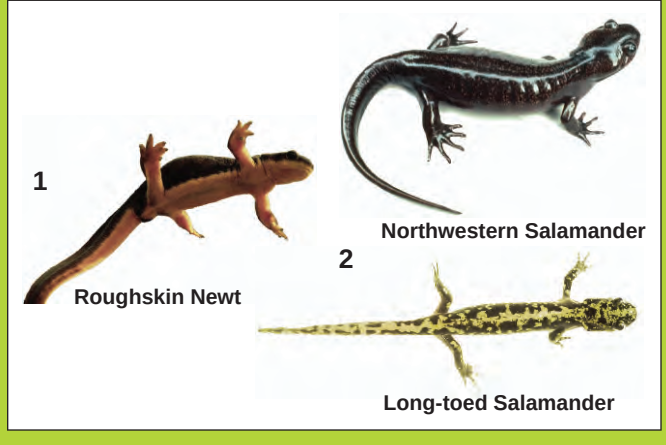
The tiny (up to 5 cm SVL) tailed frog lives in and around clear, cold streams in humid forests. Its eye has a vertical pupil. The tail-like organ of males is used in reproduction.

Identification Keys

Adult Salamanders

1 • Skin rough (except in breeding male) and bright yellow/orange on ventral surfaces .....**Roughskin Newt**
• Skin smooth and color various ..... *go to* **2**

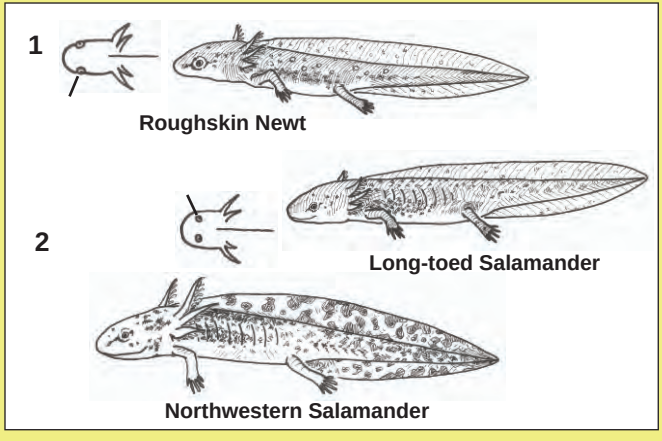
2 • Uniform gray-brown coloration and costal grooves pronounced .... **Northwestern Salamander**
• Bright yellow, tan or light green dorsal stripe, and only faint costal grooves .. **Long-toed Salamander**



Larval Salamanders

1 • Head narrow with eyes on or near outline of head as seen from above; 5-7 gill rakers on front side of 3rd gill arch ..... **Roughskin Newt**
• Head broader with eyes set well in from outline of head; 9-12 gill rakers on front side of 3rd gill arch ..... *go to* **2**

2 • Rough patches of skin on each side of head and along upper side of tail musculature .... **Northwestern Salamander**
• No roughened glandular areas ... . **Long-toed Salamander**



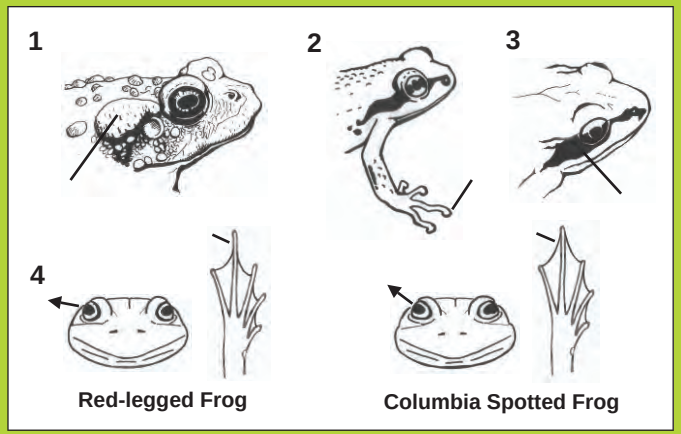
Adult Frogs and Toad

1 • Skin dry and warty; parotoid glands present ..... **Western Toad**
• Skin wet and smooth; parotoid glands absent ..... *go to* **2**

2 • Toes long and straight, with round pads at tips; no dorsolateral folds ..... **Pacific Chorus Frog**
• Toes tapered without pads; dorsolateral folds present .... *go to* **3**

3 • Prominent dark eye mask; underside cream white .... **Wood Frog**
• Lack dark eye mask; underside brightly colored ..... *go to* **4**

4 • Sides usually with coarse black, red, and yellow mottling; eyes turned outward; hind legs long; webbing on hindfoot not full .... **Red-legged Frog**
• Sides usually unmottled; eyes turned slightly upward; hind legs shorter; webbing on hindfoot full ..... **Columbia Spotted Frog**



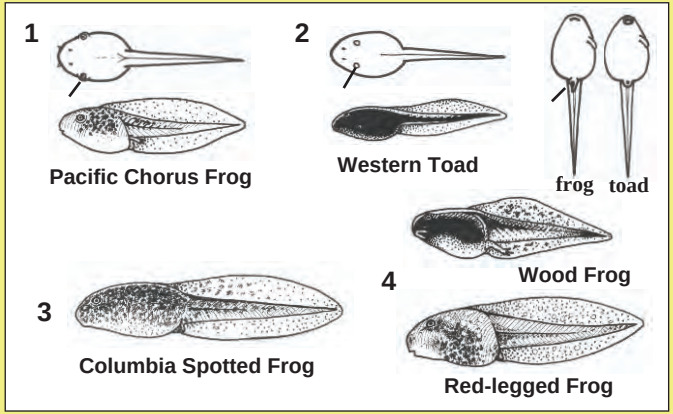
Tadpoles

1 • Eyes spaced far apart and modify body outline (top view); mouth round ..... **Pacific Chorus Frog**
• Eyes located centrally and do not interrupt body outline; mouth indented at the sides ..... *go to* **2**

2 • Body usually small and dark; vent opens straight back; oral papillae confined to sides of mouth ..... **Western Toad**
• Body larger and not uniformly dark; vent opens to right side; oral papillae only absent from middle part of upper lip ..... *go to* **3**

3 • Tail long, usually twice the body length (top view) .... **Columbia Spotted Frog**
• Tall usually 1½ times body length or less ..... *go to* **4**

4 •Tail trunk dark along top, light underneath, with bars of gold flecks radiating out like whiskers around mouth ..... **Wood Frog**
• Tail trunk one color or mottled .. .. **Red-legged Frog**



Amphibian Eggs

1 • Eggs in cylindrical strings .... **Western Toad**
• Eggs single or in globular or irregular clusters ..... *go to* **2**

2 • Egg mass a firm, smooth or slightly lumpy jelly ball .... **Northwestern Salamander**
• Eggs either single or in a soft, lumpy cluster ..... *go to* **3**

3 • Eggs single ..... *go to* **4**
• Eggs in a cluster ..... *go to* **5**

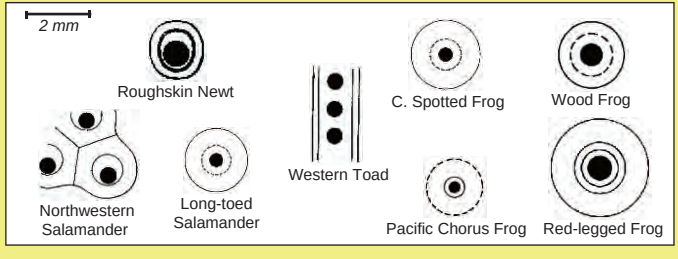
4 • Layer of jelly around egg thinner than egg diameter; egg tan above, cream below ..... **Roughskin Newt**
• Layer of jelly around egg is wider than egg diameter; egg black or dark brown above, white below ..... **Long-toed Salamander**

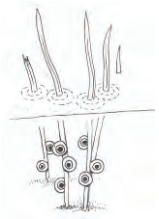
5 • Egg cluster small, usually less than 5 cm in diameter ..... go to **6**
• Egg cluster large, usually more than 5 cm in diameter ..... *go to* **7**

6 • Eggs small (1.5 mm D or less) and packed closely together .... **Pacific Chorus Frog**
• Eggs large (2mm D or more) and widely spaced .... **Long-toed Salamander**

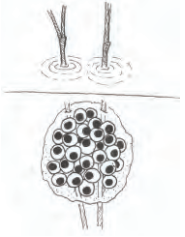
7 • Egg with 3 gelatinous envelopes and usually laid in at least 50 cm of water ..... **Red-legged Frog**
• Egg with 1 or 2 envelopes and usually laid in shallow water .... *go to* **8**

8 • Egg masses firmly attached to submerged vegetation .... **Wood Frog**
• Egg masses free floating or loosely attached ..... **Columbia Spotted Frog**



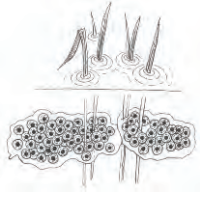


Roughskin Newt
Firm eggs (2 mm D) laid singly, attached to vegetation and usually well hidden.

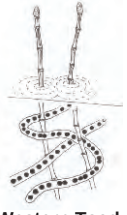


Northwestern Salamander
Large (up to 15 cm D), very firm and smooth cluster attached to submerged sticks and other firm supports. Eggs often green from algae.

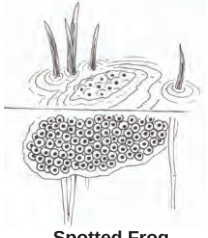
Long-toed Salamander
Small cluster or singly, attached to submerged vegetation or free on bottom. Eggs appear widely spaced in cluster.



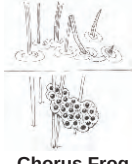
Wood Frog
Many small (5-7 cm D) clusters laid close together and attached to submerged vegetation.



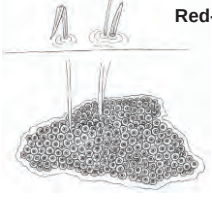
Western Toad
Long single-file strings, loosely intertwined around submerged vegetation.



Spotted Frog
Large (up to 20 cm D) globular clusters, often unattached in shallow water and piled on top of others.



Chorus Frog
Loose, rounded clusters (4 cm D), attached to vegetation in shallow water. Eggs small (1.5 mm D) and tightly packed.



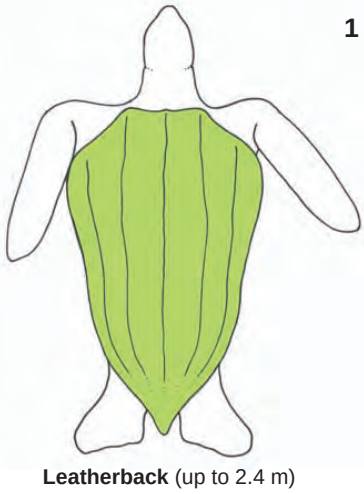
Red-legged Frog
Large (up to 25 cm D), soft clusters attached to deep-water vegetation. Eggs large (3 mm D) with 3 gelatinous envelopes.

Seaturtles

1 • Shell leathery ..... **Leatherback Seaturtle**
• Shell bony ..... *go to* **2**

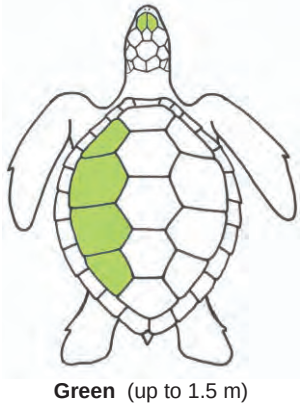
2 • 4 costal shields on each side of carapace and 1 pair of prefrontal scales between eyes .....**Green Seaturtle**
• 5 or more costal shields and 2 pairs of prefrontal scales .... *go to* **3**

3 • Typically 5 costal shields with carapace high in front ....**Loggerhead Seaturtle**
• Typically 6-8 shields with flat-topped carapace ..... **Olive Ridley Seaturtle**



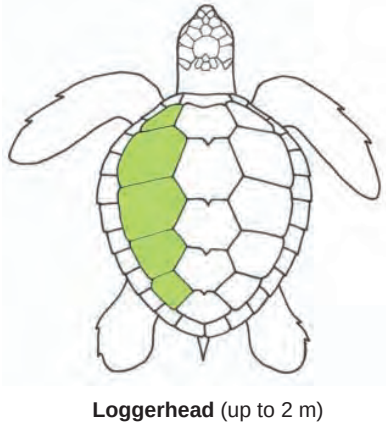
Leatherback (up to 2.4 m)

1



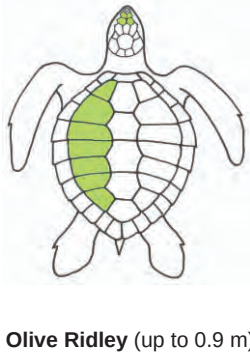
Green (up to 1.5 m)

2



Loggerhead (up to 2 m)

3



Olive Ridley (up to 0.9 m)

References

Bowen, B.W., N. Kamezaki, C.J. Limpus, G.R. Hughes, A.B. Meylan, and **J.C. Avise.** 1994. Global phylogeography of loggerhead turtle (*Caretta caretta*) as indicated by mitochondrial DNA haplotypes. Evolution 48:1820-1828.

Bowen, B.W., A.B. Meylan, and **J.C. Avise**. 1991. Evolutionary distinctiveness of the endangered Kemp's ridley sea turtle. Nature 352:709-711.

Broderson, K. 1994. Frogs and toads. ADF&G Wildlife Notebook Series. www.state.ak.us/adfg/notebook/amphibia/amphib.htm (January 2003).

Carl, G.C. 1966. The amphibians of British Columbia. British Columbia Provincial Museum Handbook No. 2, fourth edition. 63 pages.

Cope, E.D. 1889. The Batrachia of North America. Bull. U.S. Natl. Mus. 34:1-525.

Cook, F.R. 1984. Introduction to Canadian amphibians and reptiles. National Museum of Natural Sciences, National Museums of Canada, Ottawa.

Cook, J.A., and **S.O. MacDonald**. 2001. Should endemism be a focus of conservation efforts along the North Pacific Coast of North America? Biological Conservation 97:207-213.

Corkran, C.C., and **C. Thoms**. 1996. Amphibians of Oregon, Washington and British Columbia: a field identification guide. Lone Pine Publishing, Washington. 175 pages.

Crother, B.I. (ed.). 2008. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, pp. 1–84. SSAR Herpetological Circular 37.

da Silva, H.R. 1997. Two character states new for hylines and the taxonomy of the genus *Pseudacris*. Journal of Herpetology 31:609-613.

Davidson, C., H.B. Shaffer, and **M.R. Jennings**. 2001. Declines of the California red-legged frog: climate, UV-B, habitat, and pesticides hypotheses. Ecological Applications 11:464-479.

Dodd, C.K., Jr. 1990. *Caretta caretta*. Catalog of American Amphibians and Reptiles 483. 1-483.7.

Ernst, C.H., R.W. Barbour, and **J.E. Lovich**. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, D.C. 578 pages.

Green, D.M. 1999. The amphibians of British Columbia: a taxonomic catalogue. B.C. Ministry of Environment, Lands and Parks, Wildlife Bulletin No. B-87. 22 pages.

Green, D.M., H. Kaiser, T.F. Sharbel, J. Kearsley, and **K.R. McAllister**. 1997. Cryptic species of spotted frogs, *Rana pretiosa* complex, in western North America. Copeia 1997:1-8.

Gregory, L.A., and **P.T. Gregory**. 1999. The reptiles of British Columbia: a taxonomic catalogue. B.C. Ministry of Environment, Lands and Parks, Wildlife Bulletin No. B-88:1-25.

Gregory, P.T., and **R.W. Campbell**. 1984. The reptiles of British Columbia. B.C. Prov. Museum Handbook No. 44. 103 pages.

Hayes, M.P., and **M.M. Miyamoto**. 1984. Biochemical, behavioral and body size differences between *Rana aurora aurora* and *R. a. draytoni*. Copeia 1984:1018-1022.

Hedges, S.B. 1986. An electrophoretic analysis of holarctic hylid frog evolution. Systematic Zoology 35:1-21.

Heyer, W.R., M.A. Donnelly, R.W. McDiarmid, L.C. Hayek, and **M.S. Foster**. 1994. Measuring and monitoring biological diversity: standard methods for amphibians. Smithsonian Institution Press Biological Diversity Handbook Series, Washington, D.C. 364 pages.

Hodge, R.P. 1973. *Ambystoma macrodactylum* discovered in Alaska. Hiss News Journal 1:623.

Hodge, R.P. 1976. Amphibians and reptiles in Alaska, the Yukon, and Northwest Territories. Alaska Northwest Publishing Co., Anchorage. 89 pages.

Hodge, R.P. 1986. Geographic distribution extension for *Ambystoma gracile*. Herpetological Review 17:92.

Hodge, R.P. and **B.L. Wing.** 2000. Occurrences of marine turtles in Alaska waters, 1960-1998. Herpetological Review 31:148-151.

Karl, S.A., and **B.W. Bowen**. 1999. Evolutionary significant units versus geopolitical taxonomy: molecular systematics of an endangered sea turtle (*Chelonia mydas*). Conservation Biology 13:990-999.

Karlstrom, E.L. 1966. The northwestern toad, *Bufo boreas boreas*, in central coastal Alaska: a study of an ectotherm at the northern limit of its species range. *In* Science in Alaska. Abstract from Proceedings of the 17th Alaska Science Conference.

Kiesecker, J.M., and **A.R. Blaustein.** 1997. Influences of egg laying behavior on pathogenic infection of amphibian eggs. Conservation Biology 11:214-220.

Lerum, L., and **R. Piehl**. 2007. Southeast Alaska, Chichagof Island Redlegged frog population status. Progress Report, Admiralty Island National Monument, USDA Forest Service.

Lindell, J.R., and **E.M. Grossman**. 1998. Columbia spotted frog (*Rana luteiventris*) distribution and local abundance in Southeast Alaska. Final report. U.S. Fish and Wildlife Service, Southeast Alaska Ecological Services, Juneau. 22 pages.

MacDonald, S.O., and **J.A. Cook.** 2007. Mammals and amphibians of Southeast Alaska. Museum of Southwestern Biology, Special Publication No. 8. 191 pages.

Martof, B.S., and **R.L. Humphries**. 1959. Geographic variation in the wood frog, *Rana sylvatica*. American Midland Naturalist 61:350-389.

Matsuda, B.M., D.M. Green, and **P.T. Gregory**. 2006. Amphibians and reptiles of British Columbia. Royal BC Museum, Victoria. 266 pages.

Miller, J.D. 1976. An extension of the range of the northern long-toed salamander, *Ambystoma macrodactylum columbianum* in Alaska. Canadian Field-Naturalist 90:81-82.

Myers, G.S. 1942. Notes on Pacific Coast *Triturus*. Copeia 2:77-82.

Norman, B.R. 2004. New localities in southeastern Alaska for the Long-toed Salamander, *Ambystoma macrodactylum* (Amphibia, Caudata, Ambystomatidae) Bull. Chicago Herp. Soc. 39:61-64.

Norman, B.R., and **T.J. Hassler.** 1996. Field investigations of the herpetological taxa in Southeast Alaska. Unpublished report 29-95. National Biological Service, California Cooperative Fishery Research Unit, Humboldt State University, Arcata, CA. 76 pages.

Nussbaum, R.A., E.D. Brodie, Jr., and **R.M. Storm**. 1983. Amphibians and reptiles of the Pacific Northwest. Northwest Naturalist Book, University Press of Idaho.

O'Harra, D. 2001. Experts seek clues to frog abnormalities; second year of study to determine whether man, nature at fault. Anchorage Daily News, October 29, 2001.

Olson, D.H., W.P. Leonard, and **R.B. Bury** (editors). 1997. Sampling amphibians in lentic habitats. Northwest Fauna Number 4, Society for Northwestern Vertebrate Biology. Olympia, WA. 134 pages.

Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington. 587 pages.

Pritchard, P.C.H. 1980. *Dermochelys coriacea*. Catalog of American Amphibians and Reptiles 238.1-238.4.

Reeves, M.K. 2008. *Batrachochytrium dendrobatidis* in wood frogs (*Rana sylvatica*) from three national wildlife refuges in Alaska, USA. Herpetological Review 39:68-70.

Reeves, M.K., C.L. Dolph, H. Zimmer, R.S. Tjeerdema, and **K.A. Trust**. 2008. Road proximity increases risk of skeletal abnormalities in wood frogs from National Wildlife Refuges in Alaska. Environmental Health Perspectives 116:1009-1014.

Reimchen, T.E. 1990. Introduction and dispersal of the Pacific treefrog, *Hyla regilla*, on the Queen Charlotte Islands, British Columbia. Canadian Field-Naturalist 105:288-290.

Sargent, J., A. Hutton, and J. Waatti. 2003. Discovery of the red-legged frog in northeast Chichagof Island: an introduced species. Unpublished report, USFS Tongass National Forest, Hoonah Ranger District, March 2003. 4 pages.

Slough, B.G. 2002. Geographic distribution: *Rana luteiventris*. Herpetological Review 33:146.

Spotila, J.R., R.D. Reina, A.C. Steyermak, P.T. Plotkin, and **F.V. Paladino**. 2000. Pacific leatherback turtles face extinction. Nature 405:529-530.

Stebbins, R.C. 1985. A field guide to western reptiles and amphibians. Second edition. Houghton Mifflin Co., Boston & New York. 336 pages.

Swarth, H.S. 1936. Origins of the fauna of the Sitka district, Alaska. Proceedings of the California Academy of Sciences 223:59-78.

Tan, A.-M. 1994. Systematics, phylogeny and biogeography of the Northwest American newts of the Genus *Taricha* (Caudata: Salamandridae). Ph.D. thesis in Integrative Biology, Univ. California at Berkeley. 296 pages.

Titus, T.A. 1990. Genetic variation in two subspecies of *Ambystoma gracile* (Caudata: Ambystomatidae). Journal of Herpetology 24:107-111.

Wake, D.B., E.L. Jockusch, and **T.J. Papenfuss**. 1998. Does *Batrachoseps* occur in Alaska? Herpetological Review 29:12-14.

Waters, D.L. 1992. Habitat associations, phenology, and biogeography of amphibians in the Stikine River Basin and Southeast Alaska. Unpublished report of the 1991 Pilot Project, May 28, 1992. U.S. Fish and Wildlife Service, California Cooperative Fishery Research Unit, Humboldt State University, Arcata, CA. 59 pages.

Waters, D.L., T.J. Hassler, and **B.R. Norman**. 1998. On the establishment of the Pacific Chorus Frog, *Pseudacris regilla* (Amphibia, Anura, Hylidae) to Ketchikan, Alaska. Bull. Chicago Herp. Soc. 33:124-127.

Wiedmer, M., and **R.P. Hodge**. 1996. Geographic distribution: *Bufo boreas*. Herpetological Review 27:148.

Wing, B.L., and **R.P. Hodge**. 2002. Occurrence terminology for marine turtles. Marine Turtle Newsletter 95:15-16.

Zug, G.R., and **R.V. Wilson**. 1998. *Lepidochelys olivacea*. Catalog of American Amphibians and Reptiles 653:1-13.

Taking Voucher Photographs

Good, close-up photographs that clearly show all the identifying features of a species can be used as vouchers in museum collections when the taking of a scientific specimen is not possible or appropriate. Basic equipment is a digital or color film camera with a good macro lens and flash unit. The following is a minimal list of photos needed to properly voucher a record (*adapted from* Corkran and Thoms 1996:25):

- **Whole animal from above**. For salamanders, make sure the animal is relatively straight, with its snout and legs clearly visible. Frogs and toads can be held by their hind legs for this view.
- **Underside**. Before taking your photo of a frog or toad, gently stroke its belly for several seconds to help it remain still. If you (or better yet, your assistant) are holding it by the hind legs make sure your hand is not obscuring the underside of the thighs.
- **Whole animal from the side**. For frogs, make sure you take a shot showing the groin area. For tadpoles, take a photograph from its left side to include the spiracle.
- **Close-up of the hind foot**. For frogs, have your helper hold the tips of the inner and outer toes and spread the foot to show the extent of webbing. For salamanders, place the foot out to the side so that the toes are spread.
- **Close-up of the top of the head and gills**. Take your photo from straight above to show eye orientation, proportion, and overall shape.

Tadpoles and larval salamanders can be photographed in a clear plastic bag (with the top rolled down for an unobstructed top view) or in a wide, shallow plastic tub. Use just enough water to cover the entire body, including the gills. Be mindful of glare off the water's surface. Finally, don't leave before taking some **habitat** photographs.

Island Occurrence of Alaska Amphibians

ISLAND	SPECIES							
	Northwestern Salamander	Long-toed Salamander	Roughskin Newt	Western Toad	Columbia Spotted Frog	Wood Frog	Red-legged Frog	Pacific Chorus Frog
Admiralty			●	●				
Annette			●	●				
Baker				●				
Bamdoroshni			❍					
Baranof				●				
Barrier Is.				❍				
Big Level				❍				
Bushy			●	●				
Catherine				●				
Chichagof	●			●			●	
Dall			●	●				
Dog			●					
Eagle			●					

ISLAND	SPECIES							
	Northwestern Salamander	Long-toed Salamander	Roughskin Newt	Western Toad	Columbia Spotted Frog	Wood Frog	Red-legged Frog	Pacific Chorus Frog
Etolin			●	●				
Gedney			●					
Gravina			●	●				
Hassler			●	●				
Hawkins				●				
Heceta			❍	●				
Herbert Graves				●				
Hotspur				●				
Kosciusko			●	●				
Kruzof				❍				
Kuiu			●	●				
Kupreanof			●	●				

KEY: Closed circle = species present and vouchered; open circle = species reported but not validated by a specimen or photograph.

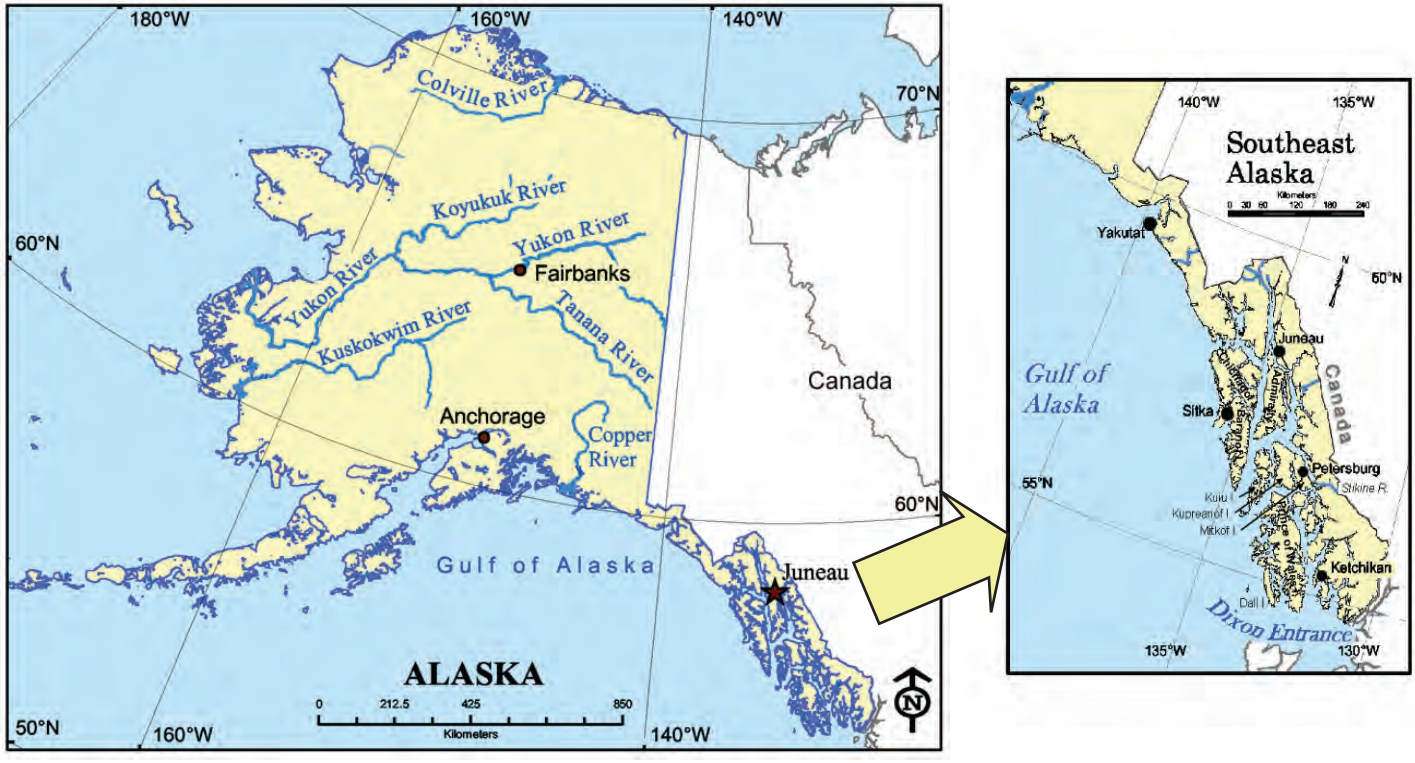
Island Occurrence (concluded)

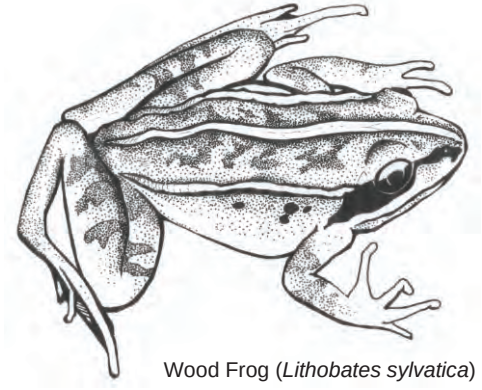
ISLAND	SPECIES							
	Northwestern Salamander	Long-toed Salamander	Roughskin Newt	Western Toad	Columbia Spotted Frog	Wood Frog	Red-legged Frog	Pacific Chorus Frog
Long				●				
Mary	●			●				
Mitkof			●	●	●			
Montague				●				
Noyes				❍				
Onslow				●				
Prince of Wales			●	●				
Revillagigedo			●	●				●
Rynda				❍				
San Fernando				❍				
Shelter			●					
Shrubby				❍				
Sokolof		●						

ISLAND	SPECIES							
	Northwestern Salamander	Long-toed Salamander	Roughskin Newt	Western Toad	Columbia Spotted Frog	Wood Frog	Red-legged Frog	Pacific Chorus Frog
Stikine: Dry						❍		
Stikine: Farm		●		❍	❍	❍		
Stikine: Little Dry				❍	❍	❍		
Stikine: Sergief					●	●		
Suemez				●				
Sullivan				●				
Tuxekan				❍				
Vank				●	●			
Woronkofski				●				
Wrangell			●	●				
Yakobi				●				
Zarembo			●	●				

KEY: Closed circle = species present and vouchered; open circle = species reported but not validated by a specimen or photograph.

General Locality Maps





Wood Frog (*Lithobates sylvatica*)

Photo Credits

The name of the photographer is followed in parentheses with page number of their photograph and its location on the page (**R**ight, **L**eft, **T**op, **M**iddle, **B**ottom):

• Armstrong, Robert (18B, 20B, 24B) • Carstensen, Richard (2MTL) • Flaxington, William (2MTR, 2MB, 13T, 14B, 26T) • Green, D. (13B) • Hodge, Robert Parker (2LM, 2LB, 2MMR, 15B, 17B, 19B, 21B, 23B, 35 all) • Lindell, John (7, 22T) • Peterson, Charles N. (20T) • Rear, Shane (21T) • Shaffer, Brad (28T) • Wallays, Henk (14T, 16B) • White, John (29)

CONTACT INFORMATION

Send your completed data forms with voucher photographs and field notes to:

Alaska Herp Coordinator
Alaska Natural Heritage Program
College of Arts and Sciences, University of Alaska Anchorage
707 A Street,
Anchorage, AK 99501
(907) 257-2780
coordinator@alaskaherps.info

The Amphibians and Reptiles of Alaska website:
www.alaskaherps.info

Museum Collection Information:
Fish, Amphibian, and Reptile Collections
University of Alaska Museum of the North
P.O. Box 756960
907 Yukon Drive
Fairbanks, Alaska 99775-1200
(907) 479-7828
J. Andrés López, curator (fffjal2@uaf.edu)
Online Specimen Database: http://arctos.database.museum