

BC's Coast Region: Species & Ecosystems of Conservation Concern Pacific Giant Salamander (*Dicamptodon tenebrosus*)

Global: G5, Provincial: S2, COSEWIC: T, BC List: Red -Identified Wildlife



Terrestrial adult



Aquatic larva/neotenic

Notes on *Dicamptodon tenebrosus*: A member of the family Dicamptodontidae (“giant salamanders”), a family whose only genus is *Dicamptodon*. Endemic to the Pacific Northwest, the family was originally grouped with Ambystomatidae, the “mole salamanders.” Pacific Giant Salamanders are one of the few vocal salamanders, capable of issuing a low barking or croaking sound when startled. Larger adults are capable of delivering a painful bite.

Description

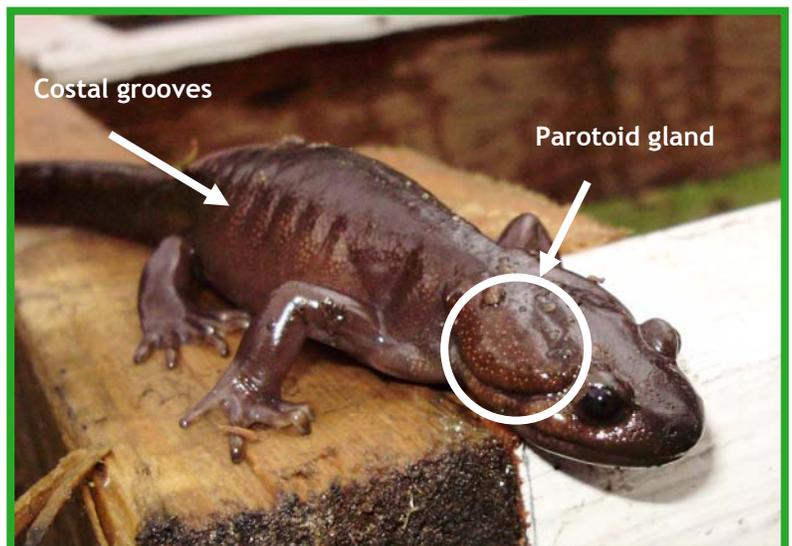
Snout to vent length 6.25 - 17cm, Adults up to 35cm total length including the tail. When fully mature this is the largest salamander in BC (and possibly the ‘stoutest’). The plump body has a wide, wedge-shaped head and fleshy legs. Skin is smooth, dark brown to dark grey usually with brown or tan marbling on the dorsal area from head to tail and upper parts of the legs. The chin and belly is pale grey or cream, eyes vary in colour, often similar to the marbling colouration. Older adults may lose the marbling on the body. Once in terrestrial form, adults have 12-13 indistinct lateral “costal grooves” (vertical indents that look like ribs). Larvae, which are totally aquatic, can reach 20 cm and start out in a somewhat tadpole-like state with only a tail, small forelimbs and external gills. Larval colour is somewhat a monotone light brown with indistinct mottling and lighter ventral areas than adults. Gills are bushy and reddish-brown. Neotenes (aquatic individuals which retain larval physiology but are capable of breeding) may reach full adult size (35 cm). Under some conditions (possibly due to lowered riparian habitat complexity), neotenes can outnumber terrestrial individuals.

Diet

Fully metamorphosed adults are generally terrestrial foragers, and will consume any prey items that can be overpowered and fit in the mouth, including beetles, spiders, shrews, mice, and other salamanders, including other Pacific Giant Salamanders. Larvae are nocturnal foragers, feeding on aquatic invertebrates, Pacific Tailed Frog tadpoles, small fish, and occasionally each other.

Look's Like?

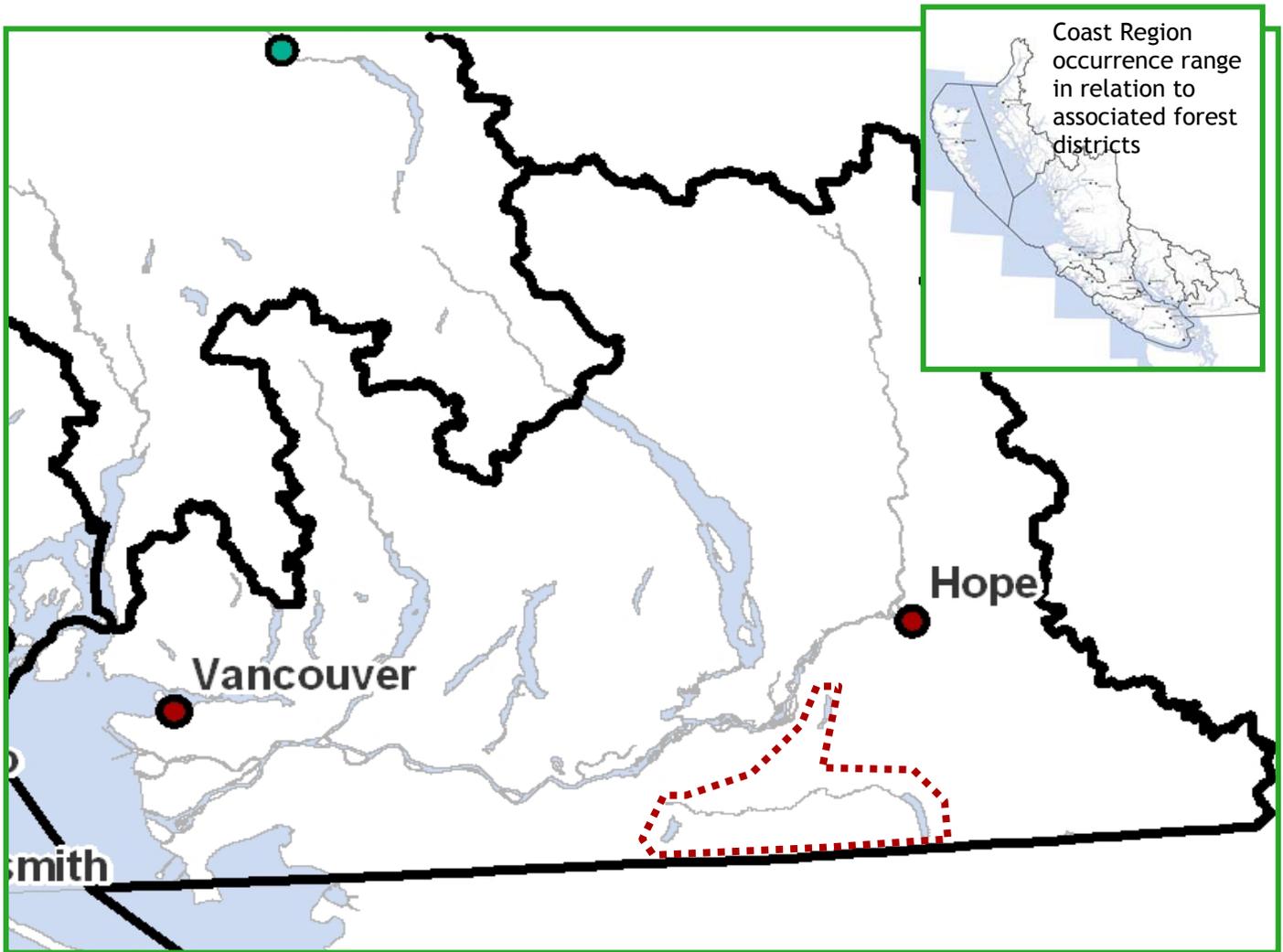
While unrelated, this species can be mistaken for the more common Northwestern Salamander, which can reach lengths of 10cm or more and also exhibits neotenic behavior. Northwestern Salamanders are generally a uniform brown dorsally and ventrally without any marbling and have prominent costal grooves. Adults have noticeable parotoid glands behind each eye which produce a toxic, creamy substance when threatened.



Northwestern Salamander

Distribution

Elevations: 0-2160 m, usually <1200 m in BC. This species is generally found in watersheds on the west side of the Cascades from northern California through Oregon, Washington State (absent from the Olympic Peninsula), and north into the extreme southwest of the Coast Region in the Fraser Lowlands. Distribution in BC is confined to the Chilliwack River watershed and a handful of immediate adjacent smaller watersheds. Known occurrences range from the east side of Chilliwack Lake, side channels and tributaries of the Chilliwack River to the west side of Vedder Mountain. Inventory efforts to date have not been exhaustive and the species may have a wider occurrence range in other tributaries in the Chilliwack Watershed where suitable habitat conditions exist. The population on the the west side of Vedder Mountain may now be isolated because of modifications to the drainage system of this area. In the US, historical populations have probably not declined, though localized extirpations from urbanization and some fragmentation within the range, mostly due to forestry practices have likely occurred.



Pacific Giant Salamander (*Dicamptodon tenebrosus*), known occurrence range for the Coast Region.

Habitat Preferences

This species has a diverse life history which includes an aquatic and terrestrial component. Larvae and neotenes are found in cold, unsilted streams with suitable structures for hiding (logs, boulders, undercut banks). Terrestrial adults are found primarily in mature to old-growth forests adjacent to streams, but are also found in younger forests. As with larvae, adults prefer habitat with substantial cover for hiding as well as to keep moist and avoid desiccation. This species has been known to occur in association with younger riparian and upland forests as well as small stream systems that may be seasonally intermittent.

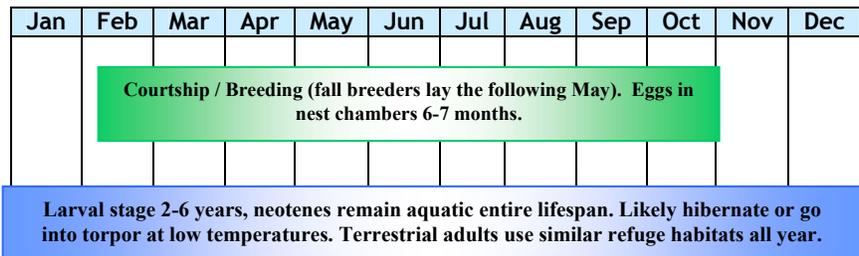


Critical Features

Terrestrial adults were found to be relatively sedentary, spending much of their time in refuges such as burrows and decomposing woody debris and other moist cover typically within 50 meters of streams. However under appropriate conditions adults can disperse significant distances from waterbodies (up to 400 m in Oregon populations). Terrestrial adults appear to be predominantly nocturnal and most active during periods of rain. In BC neotenes appear to be found at higher elevations than terrestrial adults and in larger more permanent waterbodies. Larvae are sedentary showing low dispersal within natal streams. While adults may utilize clearcuts or younger forests, studies indicate a long-term decline in populations after logging of old-growth forests. This species is far more abundant in unsilted streams than in streams that have become silted due to logging or other alteration of the land above the stream. Creek sedimentation eliminates access to cover under rocks in the streambed which is critical habitat. Availability of nest chambers and moist microclimate refuges are critical for sustaining populations. Local reproduction appears to be a more effective means of repopulating an area than larval immigration.

Found in and around cold, clear (unsilted), fast-moving streams associated with old growth and mature second growth coniferous, deciduous, and mixed forests.

Seasonal Life Cycle



Reproduction is aquatic. In BC courtship occurs in hidden, water-filled nest chambers beneath logs and stones mostly in spring, usually in May, but eggs can be found into the fall. Females remain near egg clutches until they hatch and larvae disperse. Clutch size ranges from 83 to 200 eggs each approximately 6.5 mm in diameter. Time period for metamorphosis to terrestrial adults from larval stage varies depending on environmental conditions and the size and permanence of the stream; BC populations appear to take longer (4-6 years) than in the US (2-3 years in Oregon). Recently metamorphosed juveniles move out of streams to the surrounding habitat during wet periods. Lifespan may be up to 25 years. Rates of successful maturation to adult stage is low as is reproductive potential in females

Threats

- ◆ Limited distribution coincides with areas undergoing rapid development, forestry activities and habitat loss/alteration.
- ◆ Forestry and other resource extractive activities can alter microclimate regimes in riparian and upland forest areas, and increase water temperatures and siltation rates in occupied streams.
- ◆ Roadways with inadequately designed or perched stream crossings (e.g. culverts), can negatively effect flow regimes as well as provide barriers to dispersal.
- ◆ Hydroelectric projects that divert or alter natural flow regimes or channel structure and seasonal wetted areas.

- ◆ Disturbance, clearing and fragmentation of upland terrestrial habitat reduces adult survival. Combined with a low dispersal rate, slow development, and low reproductive capacity, the species is highly vulnerable to local extirpation where its habitat is being encroached by human activities.
- ◆ Areas experiencing large-scale or persistent channel disturbance (natural or human caused), will have reduced likelihood of supporting Pacific Giant Salamander populations (adults and larvae).
- ◆ Climate change effects resulting in higher stream temperatures, droughts, or lower water flows. Combined with anthropogenic activities and natural events (e.g., mudslides/avalanches, storms, flooding) that increase siltation, water temperatures or levels.
- ◆ Pacific Giant Salamander, as with most amphibians, easily absorb contaminants through their skin. Direct mortality or sub-lethal impacts can occur throughout all life-history phases from fertilizer and pesticide applications for silviculture management or road maintenance.

Conservation & Management Objectives

- ◆ Apply conservation and management recommendations as set out in “Recovery strategy for the Pacific Giant Salamander (*Dicamptodon tenebrosus*) in British Columbia. Integrate complimentary measures found in Accounts and Measures for Managing Identified Wildlife - Accounts V.2 Coastal Giant Salamander *Dicamptodon tenebrosus*” and “Best Management Practices for Amphibians and Reptiles in Urban and Rural Environments in British Columbia.”
- ◆ Inventory and monitor using Resource Inventory Standards Committee methodology #39 “Inventory Methods for Tailed Frogs and Pacific Giant Salamanders (Version 2.0)”¹.

Specific activities should include:

- ◆ Maintain microclimatic, hydrological, and sedimentation regimes to minimize the occurrence of extreme discharge events and meet foraging and dispersal requirements of post-metamorphic life stages.
- ◆ Ensure adequate buffers are applied to protect the broadest range of habitat features and functions (e.g. at a minimum those set out for Wildlife Habitat Areas for this species under the Forest and Range Practices Act). Riparian buffers imposed to protect fish habitat are likely insufficient for connecting and protecting the complete range of microclimate, water quality and dispersal requirements for this species.
- ◆ Maintain slash-free headwater creeks and forested riparian buffers, especially within fragmented areas.
- ◆ Collect information on population trends, including a monitoring plan for individual sites and watersheds and studies to monitor population responses to disturbance activities, habitat restoration, reintroductions, and the impacts of translocation on populations².
- ◆ Avoid stocking of sport fish or transplanting of fish species to systems utilized by native amphibian species, especially those sites previously non-fish bearing.
- ◆ Maintain clean and stable cobble/boulder gravel substrates, natural step-pool channel morphology, and stream temperatures within the tolerance limits of the species. Silt generating activities and runoff should be appropriately managed to reduce contaminants and sediment loading to receiving waters.
- ◆ Clear-span crossings of streams are preferred. Culvert crossings should be a minimum of 2 meters in diameter, preferably open bottomed with a bottom layer of natural substrate.
- ◆ Employ integrated pest management approaches that reduce the need for chemical applications in silviculture practices.
- ◆ Implement habitat protection measures, including the acquisition of lands in which the species occurs and the creation of further “WHA’s”. To be useful, protected habitat needs to be large enough and in adequate condition for the species to carry out its seasonal activities and life history functions, including protection of not just riparian areas but also surrounding upland habitat and dispersal corridors.
- ◆ Encourage and support the voluntary cooperation of landowners and managers in stewardship activities on a variety of land tenures to ensure successful conservation efforts.

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

¹ Other approaches to inventorying and monitoring such as those found in “Measuring and Monitoring Biological Diversity - Standard Methods for Amphibians” and “Suitability of Amphibians and Reptiles for Translocation” are recommended.

² Relocation and translocation should not be a first choice mitigation or compensation option to avoid land use impacts.

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