

Cope's Giant Salamander (*Dicamptodon copei*)



Species Description

These medium-sized salamanders are unique in that they rarely transform into terrestrial adults: with few documented exceptions, Cope's giant salamanders remain in a paedomorphic form (sexually mature adults with aquatic, juvenile characteristics), retaining their bushy external gills and a wide tailfin they use to expertly navigate the water throughout adulthood. Cope's giant salamanders are one of the largest salamanders in Oregon, growing up to 4.75 inches from snout to vent and 8 inches in total length. They have stout bodies, with long heads about the width of their body, and a wide, laterally compressed tailfin. In their common aquatic form, they are dark brown in color with distinctive yellowish-tan patches, and have short bushy external gills. In their rare terrestrial form, they are marble brown and tan in color with short, lightly mottled tails.

Cope's giant salamanders are one of four closely related giant salamander species in their genus. They are the smallest of the four species, and are the only one that regularly remains in a paedomorphic form. They may be difficult to differentiate from juveniles of the closely related coastal giant salamander that often co-occurs in the same waterbodies: key traits to look for in the field are the head shape (Cope's have a long and slender head about the width of their body, coastal have short heads wider than their body), and presence of distinct yellowish patches.

Range and Distribution

The range of Cope's giant salamander extends from the northwestern Olympic Peninsula in Washington south to the northwestern Oregon Coast Range, and in the west Cascades from near Mt. Rainer National Park south to the Mt. Hood National Forest.

Their range in Oregon is limited, confined to the northernmost areas of western Oregon near the Columbia River Gorge in the Cascades and Coast Range. They are absent from the Willamette Valley.

Habitat Characteristics

They are habitat specialists that are closely associated with cool, permanent streams in coniferous or mixed forests in the Coast and Cascade Ranges. Occasionally populations may be found in cool montane lakes. Within these habitats, they are often found in small pools with slow moving water. Coarse substrates of cobble and gravel and woody debris are important habitat components that provide shelter and microhabitats suitable for reproduction. They are sensitive to sedimentation.

Diet and Foraging

Cope's giant salamanders are carnivores capable of taking large prey items, but the bulk of their diet consists of aquatic insects like flies, beetles, and water mites. They will also take fish eggs and eggs of their own species or other giant salamander species. Terrestrial adults have been observed consuming small mammals and banana slugs. They are typically sit and wait predators, though will pursue prey at times. They use their strong jaws to crush prey.



Life History and Ecology

Cope's giant salamanders are adapted to cold water, and are intolerant to warm temperatures. They are ectothermic, or "cold-blooded," meaning that they rely on the environment to maintain their body temperatures at the right temperature for metabolism. They are most active at night. At other times of day they are typically found concealed under rocks or debris in streams. They are territorial, and will defend territories from other giant salamanders. They have limited movement across landscapes, as terrestrial adults are very rare and still cannot venture far from the stream.

They have distinct mature and immature body forms, though most individuals in the wild never transform, or metamorphose, staying in their aquatic immature form throughout their entire life. They are commonly found as a reproductively mature paedomorph, meaning adults retain aquatic juvenile characteristics. When they do metamorphose, their external gills shrink, their lungs develop, and their wide tail fin shrinks. Metamorphosis is not reversible. The environmental and physiological conditions needed for Cope's giant salamanders to undergo metamorphosis in the wild are not understood.

Limited information is available on the life history traits of Cope's giant salamanders, and much of the data available are derived from the closely related California giant salamander. Courtship and breeding appear to occur throughout the spring, summer, and fall with little synchrony between individuals. Females lay clutches of eggs one at a time in protected locations such as small chambers under stones, undercut banks, and downed wood. Eggs are attached to the wall of the nests. The eggs take a long time to develop and hatch, well over 200 days! Females stay with their nests to protect their eggs throughout their prolonged development, biting and snapping at intruders, but egg predation is still high. Average clutch size is 50 eggs, but can range from 25 to 115. Hatchling Cope's giant salamanders are only about 20mm in total length, and are entirely aquatic. Larvae reach sexual maturity at around 65 to 76 mm in length from snout to vent. Their total lifespan is unknown.

Predators of Cope's giant salamanders include other Cope's giant salamanders, coastal giant salamanders, garter snakes, trout, and water shrews.

Fun Facts

- Few metamorphosed adults have ever been found; in 1996, only six metamorphosed individuals had been documented in the wild! However, more recent research has found that metamorphosis may be more common in the wild than initially thought.
- The *Dicamptodon* genus was initially thought to be one single species, the Pacific giant salamander. Cope's giant salamander was first described as a separate species in the 1970s. The Pacific giant salamander was later further divided into four total separate species.
- They have distinct "M" shaped vomerine teeth, which are small projections on the roof of their mouth that help them hold onto prey until they can swallow them whole.

Conservation

Very little information is available about the historic status and trends of Cope's giant salamander populations. They can be locally abundant in suitable habitat, but their current distribution is poorly described. They are a dispersal limited species, incapable of long-distance movements overland.

Cope's giant salamander are sensitive to alterations in stream temperatures, stream flow patterns, and stream substrate. Land-use activities like road construction, forest management, and other habitat alterations can cause sedimentation in streams and increases in temperature that may affect Cope's giant salamander. They may also be impacted by pollutants in runoff.

While hiking in Cope's giant salamander habitat, it is important to stay on trail. Going off trail in their sensitive habitat can inadvertently cause sedimentation and disturbance to sensitive habitats. Cope's giant salamander and other amphibian species in Oregon may be vulnerable the effects of aquatic invasive species and the amphibian chytrid fungus. To help prevent the spread of invasives and pathogens, make sure to disinfect field gear in between use in different waterbodies.

Cope's giant salamanders are an Oregon Conservation Strategy Species, and a Sensitive Species in Oregon. For more information about the conservation status of Cope's giant salamanders including special needs, limiting factors, data gaps, and conservation actions, refer to the Oregon Conservation Strategy.