



**Common Name:** TENNESSEE CAVE SALAMANDER

**Scientific Name:** *Gyrinophilus palleucus palleucus* McCrady

**Other Commonly Used Names:** pale salamander

**Previously Used Scientific Names:** none

**Family:** Plethodontidae

**Rarity Ranks:** G2G3/S1

**State Legal Status:** Threatened

**Federal Legal Status:** none

**Description:** The Tennessee cave salamander is a moderately sized, paedomorphic salamander (10 - 24 cm [4 - 9½ inches] in total length) that retains gills throughout life. Adult dorsal coloration is variable, ranging from an immaculate pale brown or pink to beige or brown with some populations possessing black spots. The belly is paler than the dorsum. Juveniles of this species are pale and lack spots. The eyes are small, and the head is long with a squared-off, spatulate snout. Gills are typically reduced, stubby, and pale; however, they may be bright red and bushy, particularly when stressed. A well-developed lateral-line system with noticeably unpigmented, sensory pores is present, and the tail is flattened from side to side with a well-developed fin.

**Similar Species:** The eyes of Tennessee cave salamander are noticeably smaller than those of the closely related spring salamander (*Gyrinophilus porphyriticus*). In Tennessee cave salamander, the diameter of the eye is less than 25% of the length of the snout; whereas in spring salamander, the diameter of the eye is greater than 30% of the snout length. Molecular evidence suggests that the Frick's Cave population is unique from other cave-dwelling *Gyrinophilus* in the region.

**Habitat:** The Tennessee cave salamander inhabits subterranean water and is generally found in cave streams. Populations with relatively high density are associated with inflowing streams and a concomitant increase in organic matter. Rarely have individuals been found outside of a cave. Within caves, individuals occupy stream and rimstone pools. Substrates in these habitats are

typically gravelly and rocky but may be made of sand or soft mud. Salamanders are often found underneath rocks and within mats of organic debris.

**Diet:** Tennessee Cave Salamanders are not selective predators and eat anything that can be captured and swallowed. The list of prey reported includes aquatic insects, annelids, crustaceans, and even other Tennessee cave salamanders.

**Life History:** Very little is known about the reproduction or development of the Tennessee cave salamander. Based on fragmentary data, the species is presumed to breed in the fall or early winter when water levels tend to be low, thus concentrating individuals in pools. It has been suggested that females may not breed every year. Animals which are adapted to cave life typically have low metabolism, slow growth, a protracted juvenile stage, low reproductive potential, and a relatively long life span. Tennessee cave salamander may also possess these life-history characteristics, but data on most of them are not available. Individuals that have been induced to metamorphose are short-lived. However, metamorphosed individuals are known to occur in nature. Movements of Tennessee cave salamanders are cyclical; in the summer and fall, they occupy cave pools and are consequently isolated from other individuals. In the winter and spring, waters in the streams rise, and the salamanders move to deeper areas.

**Survey Recommendations:** Visual searches of cave pools is the preferred survey technique. Unbaited minnow traps have been used to successfully capture related Berry Cave Salamanders (*Gyrinophilus gulolineatus*). A flashlight is essential to illuminate the cave pools and a dipnet is useful in capturing aquatic salamanders for closer inspection. Summer and fall are the best seasons for surveys, but individuals may be found at any time of the year, provided water is accessible.

**Range:** This species inhabits subterranean waters of eastern and middle Tennessee, northern Alabama, and extreme northwestern Georgia. In Georgia, the Tennessee cave salamander has been reported from only two caves, one located on Lookout Mountain and the other on Pigeon Mountain.

**Threats:** Because of their restricted distribution and precise habitat requirements, Tennessee cave salamanders are particularly vulnerable to habitat degradation. Any impacts to subterranean waters in the known or suspected range of Tennessee cave salamanders may adversely affect populations. In particular, agriculture, silviculture, quarrying operations, and urbanization have been suggested to be detrimental because they can adversely affect water quality by increasing herbicide and pesticide load, silt load, and exhaust runoff from roads. Alteration of runoff can affect the amount of water entering into the cave system and either significantly decrease water volume, or potentially increase the volume of flow through the cave and scour out the subterranean passages, flushing aquatic invertebrates (food base) from the cave. Also, over-collecting can threaten animal populations that are small and have low reproductive rates, as is suspected for Tennessee cave salamander.

**Georgia Conservation Status:** No populations are known from public lands, however the Lookout Mountain population is found at Frick's Cave, which is protected by the Southeastern Cave Conservancy.

**Conservation and Management Recommendations:** Additional surveys are needed to determine the full range of the species in Georgia. Known populations should be periodically monitored to assess population stability. Land disturbance activities, and the concomitant erosion and runoff produced by them, should be limited around and above cave systems inhabited by this species.

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J. Goodwin, J. Jensen, B. Miller, and M. Niemiller, Dec. 2007: original account

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