

FACTSHEET





One of the most unusual and distinct organisms that lives in French Creek is *Cryptobranchus alleganiesis alleganiensi*, commonly known as the Eastern Hellbender. This giant amphibian can reach the length of 29 inches and is North America's largest salamander. Males range in size from 11 inches to 22 inches while females tend to be larger.

The hellbender **head** is very flat and broad with a short nose and small dark eyes located on either side of the rounded head. This placement provides a wide field of vision for detecting prey and predators. There is some debate about the efficiency of the hellbenders eyesight but it is agreed that photoreceptors in the **eyes** assist with depth perception and detecting movement. Unlike other aquatic salamanders, hellbenders lack eyelids and feathered gill slits.

Hellbenders have their **ear** bone attached to their lower jaw bone and when they touch their lower jaw to the stream bottom, vibrations are picked up and transmitted to the ear bone just the same as all aquatic salamanders.

The **body** is wide, well-muscled and somewhat flattened. The sides of the body exhibit very distinctive, heavily wrinkled, fleshy folds of skin through which respiration occurs. The extra surface area of this **wrinkled skin** resembles a lasagna noodle and increases the hellbender's ability to absorb dissolved oxygen from the water.

Nicknames for Hellbenders:

- Old lasagna sides
- Snot otter
- Devil dog
- Mud-devil
- Grampus
- Lasagna lizard
- Allegheny alligator

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Hellbenders release a slimy substance from the outermost layer of their **skin** that acts as a deterrent and aids in escape as it makes them very slippery. This mucus is thought to aid in protecting the hellbender from abrasion and parasitic attack as well. They tend to secrete the gelatinous **slime** when injured or grasped, and researchers believe the secretions are probably unpalatable to some predators.

Hellbenders **color** is usually a greenish brown but can range from a yellowish brown to dark brown. Dark spotting is typically present along the back and tail. The underside or ventral body is lighter in color.

Hellbender **legs** are short but powerful with five rounded **toes** on the hind feet and four rounded toes on the fore feet. All digits have webbed skin between them. The **tail** is laterally compressed and rudder-like and is used to help propel them through the water. Both the legs and tail are often used for locomotion. Hellbenders generally exhibit a combination of both crawling and swimming with body and tail undulating horizontally.



Hellbenders have four rounded toes on the front feet and five on the back with webbing between.

Eastern Hellbender

The Eastern Hellbender is broadly distributed throughout the Appalachian region (southern New York to northern Georgia) and also occurs in Kentucky, Ohio, Indiana, Illinois, and Missouri.

Hellbenders are permanent aquatic salamanders that are found in cool, moderate to large streams and rivers that have significant free-flowing currents which provide more dissolved oxygen and prey. Hellbenders tolerance for poor water quality is low, making them bioindicators of stream quality. Therefore, they stay away from slow moving, muddy waters or streams with slab rock bottoms.

These creatures are nocturnal, so during the day hellbenders hide on the stream bottom beneath sheltering objects such as large rocks. Because of this, hellbenders prefer waterways with a rocky substrate



Hellbenders need large sheltering rocks and clean, cool, fast moving water to thrive. with fast cool water. As these large rocks provide protection from predators, hellbenders may abandon a habitat if the rocks are removed or disturbed.

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CONSERVATION



Hellbenders are found throughout the Ohio River drainage basin as well as the Susquehanna River and its tributaries.

The number of hellbenders have been reduced over the last century because of acid mine drainage, industrial pollution, dams and excessive siltation. Nevertheless, they are still found throughout the Ohio River drainage basin as well as the Susquehanna River and its tributaries. Hellbenders can also be found within scattered river systems in the southern Appalachians.

Juvenile hellbenders have many predators, including fish, turtles, water snakes, and other hellbenders. Adults have few predators, but may be eaten by raccoons, minks, and river otters.

French Creek maintains a viable population of hellbenders due to the stream's overall high water quality and its ability to sustain the hellbenders food sources. However, elsewhere hellbender populations are in decline mostly due to continued pollution and silt accumulations.



untamedscience.com

In April of 2019, the Eastern Hellbender was granted the honor of being named Pennsylvania's State Amphibian.

In Pennsylvania they do not have protected status, but are classified as a "Species of Special Concern." This listing makes it unlawful to disturb, harm or harass hellbenders without a valid permit.

While hellbenders are not federally Endangered, some states give them protected status: They are State <u>Endangered</u> in Maryland, Ohio, Illinois, Indiana, and Missouri, and are <u>Threatened</u> in Alabama, a <u>Species of Special</u> <u>Concern</u> in West Virginia, Virginia, North Carolina, Kentucky, Pennsylvania and New York, and <u>In Need of Management</u> in Tennessee, and <u>Rare</u> in Georgia.



Eastern Hellbender State Amphibian logo from the Chesapeake Bay Student Leadership Council

RANGE AND HABITAT

Eastern Hellbender

Hellbenders eat primarily crayfish, but have been known to occasionally eat large aquatic insects, fish, tadpoles, worms and even smaller hellbenders (including eggs). (Figure 1)

When foraging, hellbenders walk along the rocky stream bottom searching crevices for prey. Since hellbenders have small eyes, they rely almost entirely on their sense of smell and feeling vibrations to locate prey.

With its large, gaping mouth, and strong jaws, the hellbender can eat an animal that is quite large. (Figure 2) They use a suction type of movement to capture and eat small prey such as macroinvertebrates, fish and aquatic worms. Their preferred prey of crayfish are drawn into the mouth in a vigorous chomping motion and swallowed. (Figure 3)

Hellbenders are docile (in general) and avoid humans, but will use their strong jaws to bite if mishandled or hurt.



Figure 1

Hellbender (Cryptobranchus alleganiensis)

Class: Amphibia

Order: Caudata

Family: Cryptobranchidae

Genus: Cryptobranchus

Species: Cryptobranchus alleganiensis

Subspecies: Cryptobranchus alleganiensis alleganiensis

Common names: Hellbender, Eastern hellbender

Cryptobranchus means "hidden gills"



Large aquatic insects (macroinvertebrates) such as Hellgrammites or Dobson Fly larva (pictured) are also consumed by hellbenders.





Figure 3

CRAYFISH

There are eight species of "surface dwelling" crayfish found in the streams and rivers of Pennsylvania.

On average, crayfish grow up to almost seven inches in length, but some grow larger. As omnivores, they eat both plants and animals. They will also consume dead and decaying animals and detritus, helping to improve water quality.

Crayfish are a vital link in the food chain of an aquatic ecosystem and serve as a main food source for many mammals, birds, reptiles and amphibians including the hellbender.

Most species of crayfish are pollution intolerant, so streams that cannot sustain a population of crayfish will not have hellbenders present.



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Eastern Hellbender

Hellbenders reproduce yearly with breeding occurring from August to October in Pennsylvania. Hellbenders become sexually mature anywhere between five to eight years of age. While hellbenders are normally solitary species, they communicate with other hellbenders during breeding season using pheromones as well as physical motions to signal they are ready to participate in reproduction. This is the one time of year you may see hellbenders out in the open stream during the day. (Figure 1)

The male excavates a nest hole in the stream bottom beneath a large sheltering object such as a flat rock with the entrance facing away from the current. When a female approaches the nest, the male guides her into the burrow. As she lays her eggs, the male positions himself alongside or above the eggs and disperses sperm over them. Individual eggs are attached to each other and have a beaded appearance resembling a pearl necklace. (Figure 2)

The male then drives the female out of the nest where he remains to guard the developing eggs from predators—including other hellbenders. Females exhibit polyandrous behavior by depositing eggs in several male burrows in one breeding season and can produce 150 to 450 eggs. The maturation period for the eggs is from 55 to 75 days. (Figure A)



Once hatched, larvae are about 1 1/4 inches long and have external gills and gill slits. (Figure B) Larvae will not undergo the metamorphosis stage of losing the external gills for 18 months—one of the longest larval periods of any species of salamander. While gill slits remain, respiration then occurs though the mouth and directly through the body skin which has numerous surface blood vessels for oxygenation of blood. When hellbenders are about two years old, the gills disappear and they start breathing entirely through their skin. (Figure C)

Hellbenders can live up to 30 years, but commonly live between 12-15 years—if they reach adulthood. Survival to adulthood is determined by predation on young. Survival rates to adulthood are low in the wild as large fish like small-mouth bass, rainbow and brown trout, banded sculpin, and even adult hellbenders prey on larvae.



Hellbender populations are declining across their range. Therefore, many states have biologists in zoos and conservation organizations that are studying them, working to rear hellbenders in captivity by collecting abandoned eggs and carefully bringing them to maturity successfully in an aquarium setting. This challenging process has provided scientists hellbender individuals to study and often young are being used to supplement local populations. These diverse initiatives have strong research collaborations between academic institutions and government agencies which often leads to increased protection measures though state and federal regulations.



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RESEARCH

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