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Cryptobranchus alleganiensis

(hellbender)

Information

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Classification



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By John Herman

Geographic Range

The hellbender, *Cryptobranchus alleganiensis*, occupies the Susquehanna River drainage in southern New York and Pennsylvania, and large portions of the Missouri, Ohio, and Mississippi River drainage from western Pennsylvania, southern Ohio, extreme southern Indiana, most of West Virginia, Kentucky, and Tennessee, northern Alabama and Georgia, western North Carolina and Virginia. The subspecies *Cryptobranchus alleganiensis bishopi*, or Ozark hellbender, is only found in the Black River and White River systems of Missouri and Arkansas (Danch 1996).

Biogeographic Regions:

nearctic (native).

Habitat

The hellbender prefers clear fast-flowing larger streams and rivers with rocky bottoms and plenty of cover in the form of logs and debris (Behler and King 1979).

Aquatic Biomes:

rivers and streams.

Physical Description

The hellbender is a large totally aquatic salamander characterized by loose highly folded skin along the lower sides of the body. The folds of skin are used in respiration as the hellbender has no gills and the lungs are only used for buoyancy control (Danch 1996). The hellbender's body is dorsoventrally compressed and the head is extremely flattened. The hellbender undergoes incomplete metamorphosis so that adults lack eyelids and retain one pair of gill slits that are seen as circular openings on the neck. All adults have four digits on each forelimb and five digits on each hind limb (Cogger and Zweifel 1998). The hellbender is sexually dimorphic in size, with females being larger than males. The length in

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adults varies from 11-29 inches, with most being in the range of 11-20 inches. The other dimorphic characteristic for the hellbender is only seen in the breeding season when the male develops a swollen ring around the opening of the cloaca (Behler and King 1979). The body color varies from yellowish brown to almost black with very faint scattered dark or light spots in the adults. The young, once they lose their external gills at about 4 to 5 inches, have numerous irregular dark spots that are easily seen on a light body color (Conant and Collins 1998).

Reproduction

Unusual among salamanders is the fact that the hellbender exhibits external fertilization. The breeding season shows a degree of geographic variability. With those in the eastern populations demonstrating breeding activity in late August through early September. While the western and southern populations begin breeding activity in early September to early November. At the onset of the breeding season the male will excavate a nest site that he will defend from other males. The nest site is usually beneath flat rocks or other debris. Males will persuade females to enter the nest site and lay their eggs. The eggs are between 5 and 7 millimeters in diameter and are spherical in shape. The eggs are always laid in paired rosary-like strings that form an egg mass that contains anywhere from 270 to 450 eggs. The male will float over the female and will undulate his lower body in order to disperse his milt throughout the nest cavity. Often times the male will attract more than one female to the nest site in a season so there could be as many as 1,000 or more eggs per nest site. The male will remain with the eggs until hatching to provide protection from predators. The eggs usually hatch 68 to 84 days after fertilization, with larvae ranging in size from 23 to 26 millimeters in length. The larvae retain their external gills for approximately one and a half years or until they reach about 4 inches in length. At this stage the larvae resemble the larvae of other salamanders and lack the pronounced flattening of the body and the dermal folds. The hellbender grows very slowly at a rate of about 2 centimeters per year, and may continue for five or six years before sexual maturity is reached, at which point the individual will be approximately 14 inches in length. The hellbender is long lived and captive individuals have been recorded to survive for 29 years (Danch 1996).

Behavior

The hellbender is a very solitary species. Outside of the breeding season meetings between two hellbenders are usually violent. If equally matched in size they may fight or just go separate ways, but if one is bigger than the other cannibalism is very frequent. During the breeding season the male will aggressively defend his nest site from predators and competitors alike. The hellbender is a nocturnal animal and remains hidden under rocks during the day, except during the breeding season when the hellbender exhibits diurnal habits. The only movement by the hellbender would be a side to side swaying of the body with the rippling of their skin folds to mix the water around the body. This is done so that oxygenated water is always present for cutaneous respiration. The small eyes located on the top of its head can detect light but are not very good at forming images. Interestingly, the entire dermal surface of the hellbender has been shown to be photosensitive, with the tail greater than the head. At night the hellbender may forage for food using the lateral line system to detect its prey. The hellbender can swim but it prefers to walk on the bottom with its sturdy limbs. The toes of a hellbender end in a rough pad that allows for traction on the algae covered rocks and gravel of its habitat. The hellbender has on occasion been seen walking over land from pool to pool but this is probably only done in an extreme case of need. The hellbender has a variety of predators including turtles, water snakes, pike, muskellunge, and humans. As mentioned earlier, small hellbenders would also have to look out for larger hellbenders (Danch 1996).

Food Habits

The hellbender is strictly carnivorous. The diet consists primarily of crayfish but insects, fish, and worms will also be eaten (Behler and King 1979). The hellbender has a very unique mechanism for capturing and consuming its prey. It exhibits a highly unusual mode of asymmetrical suction feeding in which the bilateral elements of the mandibles and hyoid move independently. Typically the hellbender only depresses one side of the mandible, dropping the jaw 10 to 40 degrees from the resting position and the prey is drawn in with a jet of water (Pough et al. 1998).

Economic Importance for Humans: Positive

The hellbender does not have a direct positive economic importance. However, the hellbender belongs to the suborder Cryptobranchoidea which is the most primitive of the living salamanders and may hold clues for scientists to use when studying the evolution of other salamanders (Cogger and Zweifel 1998).

Conservation Status

Although the hellbender has no special status given to it there are still a number of factors which may in the near future change it's status. Agricultural runoff and the acidic runoff from large scale mining operations threaten much of the hellbenders habitat. The

IUCN Red List: [\[link\]](#):
No special status.

most serious threat to the future of the hellbender is the impoundment of rivers and streams for the formation of recreational lakes and hydroelectric facilities. Another threat to the hellbender comes in the form of indiscriminate collecting, for both the pet trade and scientific research (Danch 1996).

US Federal List: [\[link\]](#):

No special status.

CITES: [\[link\]](#):

No special status.

Other Comments

There are two subspecies of hellbender *Cryptobranchus alleganiensis alleganiensis*, Eastern hellbender, and *C. a. bishopi*, Ozark hellbender. The Ozark hellbender is smaller and often has more numerous and larger dark blotches on its back, but the best way to tell them apart is solely based on geographic location (Danch 1996).

There is a wealth of folklore that surrounds the hellbender. It has been said that a hellbender will smear a fisherman's line with slime in an attempt to drive them out of the area. The hellbender has also been reported to chase off game fish and if disturbed they will inflict a poisonous bite. For these reasons the hellbender has been nicknamed Allegheny Alligator and Devil Dog. The problem is that the hellbender is completely harmless and avoids game fish altogether, or it risks being eaten, so this folklore leads to unwarranted persecution (Behler and King 1979).

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