

The Status of the Hellbender (Cryptobranchus
alleganiensis) in Maryland¹

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Current Status

The hellbender was first acknowledged to be endangered in Maryland by the Maryland Herpetological Society's Committee on Rare and Endangered Amphibians and Reptiles of Maryland (1973). It was formally accorded endangered status in this state by the Maryland Department of Natural Resources in 1975 (Wildlife Conservation Regulation .08.03.01.43). The U.S. Fish and Wildlife Service is also considering adding the hellbender to its List of Endangered and Threatened Wildlife (U.S. Fish and Wildlife Service 1982).

Description

The hellbender is a large, partially paedomorphic, aquatic salamander reaching 740 mm (29 in.) in total length (Fitch 1947). However, individuals of 300 - 500 mm (12-20 in.) total length and weighing from 300 - 645 g (10.5-22.6 oz.) are more common. The adult body is flattened dorso-ventrally and has an oar-like tail. The broad, flat head has small, lidless eyes. Dentition is limited to the premaxillary, maxillary, prevomer, and dentary (Dundee 1971). The legs are short and stout. There are five toes on the hindfeet and four on the forefeet. Lateral skin folds extend along either side of the body. Gills are lacking in adults, but gill slits on either side of the throat are present (Martof et al. 1980). The salamander is

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generally grayish brown in color, sometimes with dark blotches.

Distribution

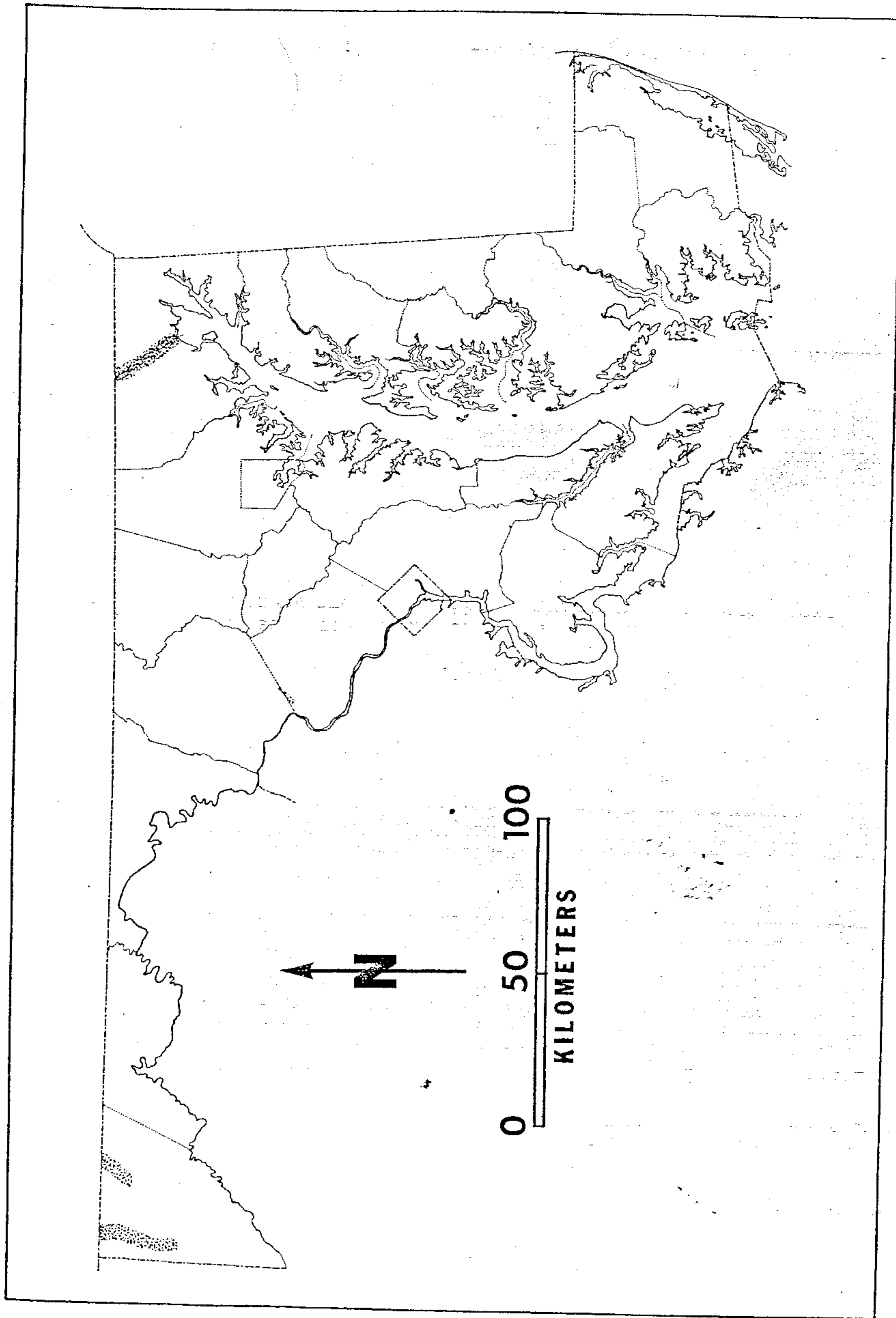
The hellbender ranges from southern New York, south through Pennsylvania, eastern and western Maryland, western Virginia and North Carolina to northern Alabama and Georgia, and west through West Virginia, Kentucky, and Tennessee to southeastern Ohio, southern Indiana and Illinois. Disjunct populations occur in southern Missouri and possibly south-central New York, through eastern Pennsylvania and Maryland. The range is associated with tributaries of the Ohio and Tennessee rivers west of the Appalachian Mountains; the Susquehanna River of Maryland, Pennsylvania, and New York; the upper Savannah River of Georgia; and tributaries of the Missouri and Black rivers in Missouri and northern Arkansas (Dundee 1971). Throughout its range, populations have been extirpated or reduced in numbers because of impoundments, siltation, and various forms of man-related pollution (Williams et al. 1981b).

In Maryland, the hellbender is reported from the Susquehanna River and its tributaries in Cecil County (Chesapeake Bay drainage) and from the lower Casselman and Youghiogheny rivers (Ohio River drainage) in Garrett County (Fowler 1915, McCauley and East 1940, Meszoely 1966, Harris 1975) (Fig. 1). Occasionally, fishermen also provide unsubstantiated reports of hellbenders in tributaries of the Potomac River, such as the Cacapon River in West Virginia and the Shenandoah River in Virginia. An extinct form of Cryptobranchus is known to have occurred in the Potomac River watershed (Atlantic drainage) during the Pleistocene (Holman 1977).

Ecology

The hellbender inhabits large, clear, fast-flowing, rocky streams and rivers generally below 762 m (2,500 ft.) in elevation (Dundee 1971). Cool, well-oxygenated water is thought to be a prerequisite for its survival as it depends almost solely on cutaneous gas exchange (Williams et al. 1981b). This salamander is basically nocturnal in its habits, having a biphasic activity rhythm with peak periods at dusk and dawn (Noeske and Nickerson 1979). It utilizes large, submerged flat rocks, logs, or other cover for den sites, generally in water no deeper than 36 - 60 cm (14-24

Fig. 1. Distribution (stipple pattern) of the hell-bender in Maryland based upon historical records.



in.) (Bishop 1941, Hillis and Bellis 1971). Nickerson and Mays (1973) reported one hellbender using a submerged one pound (0.453 kg) coffee can for shelter. Its home range area is 100 - 300 m² (1,076-3,229 ft.²) (Hillis 1969, Hillis and Bellis 1971). This home range usually contains at least one or more suitable den sites. If these are flat rocks, they may range from 38 - 137 cm (15-54 in.) in diameter (Hillis and Bellis 1971). Its food consists of crayfish, fish, earthworms, mollusks, and insect larvae.

The breeding season begins in mid-August and extends into September. At this time, the male can be recognized by a swollen ridge surrounding the vent. Fertilization is external, a primitive condition among urodeles. The female lays a string of 300 - 400 eggs in a depression under a large flat rock, where they are fertilized by milt from the male. The eggs are 6 mm (0.25 in.) in diameter (Bishop 1941). Thereafter, the male attends the nest for an undetermined length of time. Several females may deposit eggs in the same nest. Bishop (1941) reported that one nest contained 1,946 eggs. The eggs hatch in 68-84 days (Bishop 1941). Newly hatched larvae are 30 mm (1.2 in.) in length. In about 18 months, when the larvae are 100 - 130 mm (3.9-5.1 in.) in length, they lose their external gills and assume a more adult-like appearance. However, sexual maturity is not reached until the fifth or sixth year (Bishop 1941), when the individuals attain lengths in excess of 300 mm (11.8 in.) (Nickerson and Mays 1973). Hellbenders exhibit longevity and may live 55 years in captivity (Nigrelli 1954).

Status

Based on an ongoing stream survey by the Appalachian Environmental Laboratory of the University of Maryland and the Maryland Wildlife Administration (see Williams et al. 1981a for a review of collection techniques), hellbenders are known to occur in Maryland only in the lower Youghiogheny River near Friendsville and in the lower Casselman River near the Maryland - Pennsylvania state line. It was once relatively common in the Casselman River near the U.S. 40 bridge, but no longer occurs there. Pollution from sewage treatment outflow near U.S. 40 as well as siltation and acid mine drainage further upstream has probably contributed to their extirpation from the upper Casselman River. Impoundments on the Youghiogheny and Susquehanna rivers, as well as increased siltation and pollution resulting from human population growth and development of the area, undoubtedly have greatly reduced the

available habitat and consequently impacted adversely upon hellbender populations in these two stream systems. Acid mine drainage and stream channelization has altered the habitat available to hellbenders in several tributaries of the Youghiogheny River. Few hellbenders have been found by us in the Youghiogheny and Casselman rivers and none in the Susquehanna River or their tributaries. As a result, we feel that its continued status as part of the fauna of Maryland may be in jeopardy.

Management Recommendations

Based on our preliminary survey, the hellbender's status as a state-endangered species should remain unchanged. Action should be taken immediately to protect existing habitat in the state, especially the 1 - 2 km (0.6 - 1.2 mi.) section of the Casselman River still containing hellbenders and the 5 - 6 km (3.1 - 3.7 mi.) section of the Youghiogheny River from the reservoir south towards Kendall (see Williams et al. 1981b). Water quality should be monitored to prevent any detrimental perturbations to the lotic community. Based on fish community composition, water quality has improved in several tributaries of the Youghiogheny River as well as in the main channel since 1950 (Hendricks et al. 1979). Surveys should be continued to determine whether populations still exist in the main channel of the Susquehanna River and its tributary, Octoraro Creek. Information on the ecology of the Casselman and Youghiogheny River populations needs to be acquired; especially important are estimations of the population size per kilometer (0.6 mi.) of stream habitat and of reproductive success of the populations over several years. This information should shed some light on the hellbender's potential for continued survival here. Mere presence is an incomplete indication of habitat quality because individuals are so long-lived.

Because the impoundment on the Susquehanna River now limits dispersal by the species, translocation of individuals from the same drainage to suitable habitats (if available) below the impoundment may be a viable management option. The hellbender has low genetic variability (Williams et al. 1981b); therefore, it is doubtful that such releases would be detrimental to any existing populations. If the species has been extirpated from the Susquehanna River in Maryland, consideration should be given to re-establishing populations in certain areas where water quality has improved. It would be a tragedy to lose this magnificent salamander from the state faunal list.

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