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habitat destruction from burning, development, and conversion for petroleum facilities may have extirpated many populations. Adults, eggs and hatchlings are exploited for human consumption and the pet trade.

U.S. ***Trachemys stejnegeri malonei*** (Inagua Island turtle); proposed as Endangered [FR 55(80):17469-17473, 4/25/90]

This subspecies of central Antillian terrapin inhabits only Great Inagua Island. Threats to its freshwater habitat include consumption of fresh water by an expanding human population and the possible expansion of solar salt processing operations.

U.S. ***Trachemys terrapen felis*** (Cat Island turtle); proposed as Endangered FR 55(80):17469-17473, 4/25/90]

This emydid occurs only in freshwater ponds on Cat Island in the Bahamas. All but one known site have been degraded by agricultural burning or excessive human use, and the total population appears to have dwindled.

The SSAR Conservation Committee has notified the USFWS that Seidel (1988) formally sank this taxon, which he believed to represent an introduction of *T. terrapen* from Jamaica.

U.S. ***Cnemidophorus vanzoi*** (Maria Island ground lizard); proposed as Endangered [FR 55(80):17469-17473, 4/25/909]

Now restricted to the islets of Maria Major and Maria Minor, off St. Lucia, this teiid was probably extirpated by introduced rats and mongooses from the mainland of St. Lucia before specimens could be documented. Fewer than 1000 individuals are believed to remain on 30 acres of habitat.

U.S. ***Boiga irregularis*** (brown tree snake); importation or shipment prohibited without permit (4/25/90)

The USFWS has added this non-indigenous colubrid to its list of injurious live reptiles. Importation, acquisition or transportation of any live specimens or eggs between the continental U.S., the District of Columbia, Hawaii, Puerto Rico, the Northern Mariana Islands or any territory or possession of the U.S. is prohibited. Introduced brown tree snakes on Guam have resulted in a precipitous decline in the endemic avifauna of the island and also pose other detrimental effects to agriculture and human health and safety.

U.S. ***Liophus ornatus*** (Maria Island Snake); proposed as Endangered [FR 55(80):17469-17473, 4/25/90]

Extirpated from St. Lucia for most of the twentieth century, presumably by introduced rats and mongooses, this small snake is now restricted to the adjacent islet of Maria Major, where as few as 100 individuals may survive.

Florida Commercial Sale of native reptiles and amphibians or products thereof; permit required.

In an attempt to monitor the commercial trade in the state's native herpetofauna (both as pets and as consumptive products), the Florida Game and Fresh Water Fish Commission will require all dealers to obtain a no-cost permit and to prepare periodic reports documenting sales of native amphibians and reptiles and their parts.

Dale R. Jackson, Chair
SSAR Conservation Committee ●

FEATURES

THE STATUS AND DISTRIBUTION OF THE HELLBENDER, *Cryptobranchus alleganiensis* IN OHIO.

Barton (1812) provided the first account of the hellbender in Ohio when he reported it from the Muskingum, Miami, and Scioto Rivers. Kirtland (1838) correctly said that it "is found in all the tributaries of the Ohio but not in those of Lake Erie." By 1985 hellbenders had been reported from 48 localities in Ohio representing all the major systems draining into the Ohio River. These localities are represented by less than 70 specimens. Most of the records were obtained by fishermen or were collected incidentally to some other effort such as seining or bait collecting. Other than locality records, there is little information available on hellbenders in Ohio. In an effort to determine the status and distribution of hellbenders in Ohio, the Ohio Department of Natural Resources funded the present study so that an effective management plan could be prepared for this species.

METHODS AND MATERIALS

Microhabitat requirements of hellbenders were first determined by visiting localities where specimens had been most recently collected. All of the known localities within the state were subsequently explored, and a systematic study of all topographical maps was undertaken to identify suitable habitats. Every stream with a watershed of 260 square km (100 sq. mi) or greater was checked, except for the largest rivers where the silt load and depth made work impossible.

The most productive habitat included riffle areas 60 cm or less in depth with large, flat slabs of rock on a substrate of sand or gravel. No animals were found under any rocks that were less than ca. 50 cm in diameter nor were any animals found under objects other than rocks. We never found more than one hellbender under a single slab although on one occasion a hellbender and a mudpuppy were found in separate compartments under a 1 m diameter slab.

In unfamiliar watersheds we began in the headwater regions and worked our way down stream until sufficient flow and suitable habitat was found. One technique that was found to be particularly useful was studying topographical maps in search of places where a stream took a sharp turn against a hill. The logic that a stream cutting into a hill caused slabs to tumble into the stream bed proved useful as often this was the only place where rocks could be found in a particular stream.

An attempt was made to locate hellbenders utilizing electroshocking apparatus according to a method described by Williams, Gates and Hocutt (1985). However, we were unable to successfully reproduce their efforts and this technique was abandoned during the final year of the project.

Temperature, pH, and general stream conditions were noted at each locale. Slab rocks were systematically turned, beginning at the downstream end of an area. Slabs were turned into the current whenever possible so that silt would be carried away. Ordinary cotton work gloves allowed a better grip on larger rocks and hellbenders as well.

Total length (Fig. 1) and standard length were recorded for each animal using an

Kw: amph, Lcl

ordinary transparent plastic thistle seed bird feeder. This provided restraint without stressing the animal. During the breeding season (August to mid-October) the area surrounding the vent of the male becomes greatly enlarged. This was the only time when animals could be accurately sexed. The general condition of the animal was noted including distinctive scars and missing limbs and parts of limbs. Each animal was tagged with a numbered Floy T-tag through the dorsal fin of the tail. It was then released back into the stream usually next to the rock where it was captured.

RESULTS

One hundred twenty-one animals were tagged over the course of this study (Fig. 1). Eighty were captured or recaptured during the breeding season and could be reliably sexed. Sixty-two of the animals were males and 18 were females. This unbalanced ratio in favor of males is similar to other findings in the east. In Pennsylvania, for example, Smith (1912) reported a male : female ratio of 2:1 to 3:1, and Hillis and Bellis (1971) reported a 1.58:1 ratio. Males averaged 51.2 cm in total length while females averaged 51.7 cm.

Animals were found in streams where the water temperatures ranged between 0° C and 33° C. The pH was between 6.0 and 9.2 while water clarity ranged from opaque to clear to a depth of 1 m.

Most of the new populations (Fig 2) were discovered during 1988 subsequent to the preparation of *Salamanders of Ohio* (Pfingsten and Downs 1989). The 1988 discoveries were directly attributable to the effects of the drought that year. Not only were streams shallower and narrower as a result of the drought, but the silt reduction and clarity made it possible to work in streams where even brief summer showers ordinarily kept them too turbid to work. In addition, water temperatures were unusually high in 1988. A young male was found in water at 33° C. This is close to the upper limits of temperatures reported in nature for this species (Nickerson and Mays 1973) and close to the critical thermal maximum for the species (Hutchison et al. 1973).

In an attempt to estimate population density in the West Fork of Little Beaver Creek we tagged 54 animals in a 120 m long riffle during 16 visits to the area. Eight animals were recaptured and one of these was recaptured a second time. The interval between capture and recapture ranged from 40 days to 358 days. All recaptures were made in the immediate vicinity of the original capture. Because of the small number of recaptures, no estimate of population size was made.

On two visits in August 1987, this riffle was worked with a crew of 6 - 9 people. Almost every rock in that stretch of stream was turned and it was felt that nearly every animal in the riffle was captured. On the first visit we captured 11 animals and on the second we found 10. At least on these occasions the density was ca. one animal for every 350 sq. m of riffle.

There are no records or literature accounts of hellbenders being captured during the coldest part of winter in the northern part of their range. It was decided that if good weather occurred an attempt would be made to find some hellbenders. On 23 December 1986 it was sunny and calm and the air temperature was 7° C. Previous to this there had been several days of subfreezing temperatures. The West Fork of the Little Beaver Creek was low, clear and 0° C. Ice had formed along the shoreline and quiet areas of the stream and small chunks of ice and slush covered most of the flowing surface of the stream. A large male (TL=58 cm) was found curled under a rock slab in the center of the riffle. When removed from the water, he was so stiff that it took several minutes to straighten him out so that he would fit into the measuring tube.

The largest hellbender found was a male with a total length of 63 cm. When captured, on 27 September 1986, the animal was placed in a bucket. Within a few minutes it regurgitated a complete frog skeleton. The skeleton was in perfect condition an no flesh remained on the bones. Total length of the skeleton was 255 mm, and was most likely that of a bullfrog, *Rana catesbeiana*. Bullfrogs and the green frog, *Rana clamitans*, are common in the area. There are no literature accounts of frogs being eaten by hellbenders in the wild although they are known to take frogs in captivity (Smith 1907).

The only complete hellbender nest reported for Ohio was discovered on 21 September 1986 (photo in *Salamanders of Ohio*, Pfingsten and Downs 1989). The nest contained ca. 250 eggs, was found under a slab measuring 132 cm x 74 cm x 21 cm, and appeared to have an opening on the downstream side of the rock.. The rock was partly out of the water and within one meter of the shore. At that point the main flow of the stream was along the shoreline. The depth of the egg cavity under the slab was 38 cm and it was ca. 35 cm in diameter. A large male (TL=54 cm) was lying on the bottom of the cavity beneath the egg mass. When the male was captured and placed in the bucket, four eggs were expelled from the gill slits indicating that he had been cannibalizing the egg mass. Slightly more than half of the eggs were fertilized and had developing embryos. They appeared to be similar to the 18 day embryos shown by Smith (1907).

Twenty-five percent of all the animals we saw had some sort of injury. Eighty percent of the injuries involved missing toes, feet and limbs. Other injuries included scrapes to the top of the head, gashes to the flanks and tail and at least one had scars on the snout and face which looked like the bite from another hellbender.

Nickerson and Mays (1973) reported than many injuries may be caused by canoes as they strike rocks during periods of low flow. In Ohio, however, the injuries were apparent in all populations including those from streams which are too small for canoeing. Animals with fresh wounds were seen only during August and September and may have been the result of battles during the breeding season.

DISCUSSION

No animals were found west of the Scioto River except for Scioto-Brush Creek. Further, no animals were found in the Ohio River, a result that was not unexpected. The completion of the high dam projects in 1965 raised the level of the river ca. 3 m, eliminated all riffle areas, and changed the environment from that of a river to one resembling a lake.

No larvae were found during the study. The rather unusual population structure of hellbenders is weighted heavily towards old adults. Because of their longevity of 30 or more years (Taber et al. 1975), low population density, and lack of natural predators as adults, there are few replacement young needed in the population. The rarity of larvae has been reported by Swanson (1948), Hillis and Bellis (1971), and Taber et al. (1975). Larvae are either occupying some yet unknown microhabitat or more likely are so few in number that they remain virtually undetected.

There are fewer than 200 hellbenders recorded in Ohio. This is due in part to

their very secretive nature as well as to their low population density. Higher densities may have been common in Ohio before the land clearing and resulting siltation of streams by European settlers.

While the present study provides data on the Ohio distribution of hellbenders, little information exists about nests, eggs, larvae, population densities, and migration patterns within a stream. The Ohio Department of Natural Resources has recently revised its endangered species list. Ohio now joins Illinois, Indiana, and Maryland (Pisani 1976) in affording protection to the hellbender as an endangered species.

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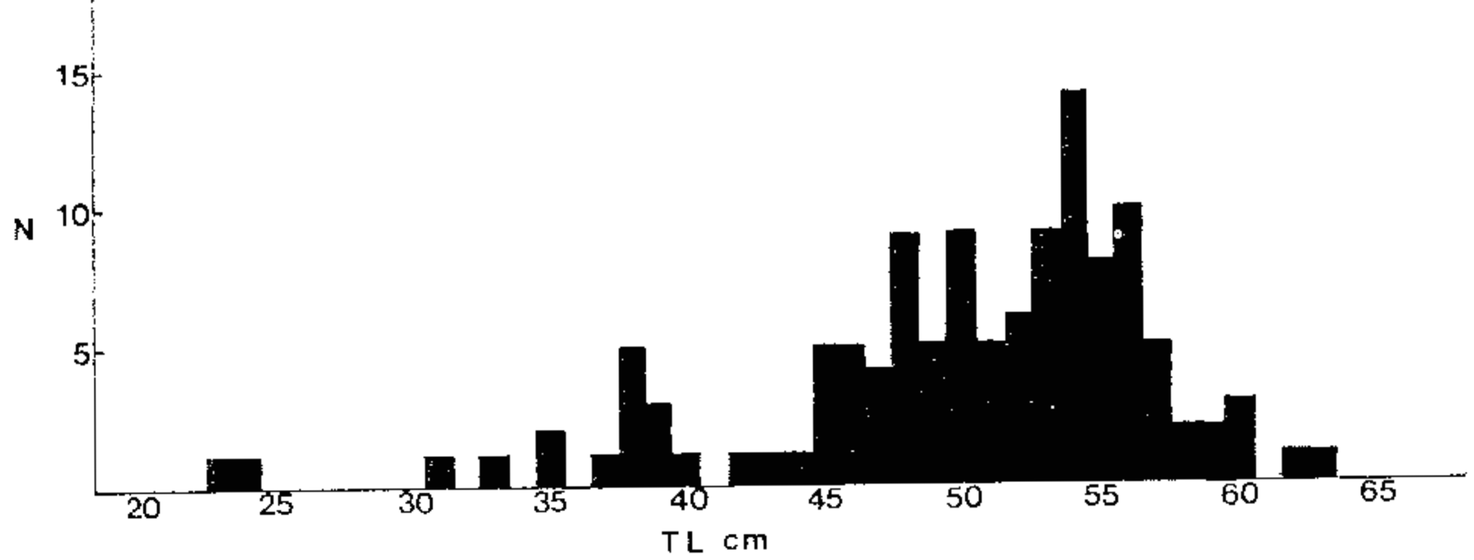

Figure 1. Total length of *Cryptobranchus alleganiensis* tagged in Ohio between 1 September 1985 and 1 November 1988 (N = 121).

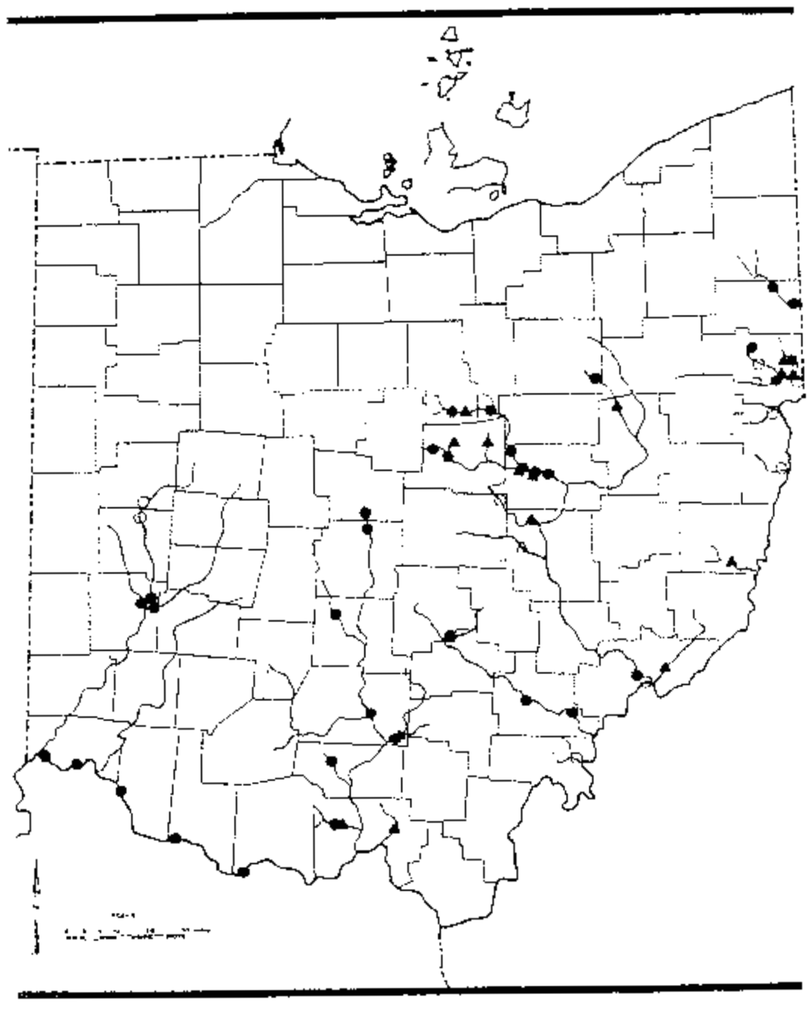

Figure 2. Distribution of *Cryptobranchus alleganiensis* in Ohio. Circles represent populations known prior to 1985. Solid circles indicate a voucher specimen is available whereas open circles indicate the lack of voucher specimens. Solid triangles indicate localities where animals were tagged during this study. Open triangles indicate a verified population but no animal was tagged.

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REPRODUCTIVE DATA ON THE CHELID TURTLE *Chelodina siebenrocki* FROM NEW GUINEA

Chelodina siebenrocki Werner 1901 is a poorly-known snakeneck chelid turtle that occurs only in the southern coastal swamps of the island of New Guinea. It is most closely related to the northern Australian species *Chelodina rugosa* (Rhodin and Mittermeier 1976). The only information available on the morphology, natural history, and reproduction of *C. siebenrocki* is presented in Rhodin and Mittermeier (1976). They document the only recorded data on clutch and egg size for the species. Data were reported from two egg clutches, comprising 4 and 17 eggs, with egg size averaging 36.1 x 28.9 mm in the smaller clutch, and 35.0 x 28.3 mm in the larger clutch. Since then, we have observed four more egg clutches laid in captivity by two female *C. siebenrocki*. These observations were made in our respective collections of turtles kept in indoor facilities in northeastern United States (see Table 1 for summary).

One female (carapace length 255 mm, body mass 2.5 kg) from the vicinity of Daru, Western Province, Papua New Guinea laid a single clutch of 11 eggs (see Table 1 - Clutch 1). These eggs had an average mass of 20.5 ± 0.47 gm (mean ± S.D.). The 11 eggs were deposited over 19 days and were laid at the following intervals (day number:eggs laid): 1:2, 2:2, 5:1, 8:1, 10:1, 11:1, 15:2, 19:1. Egg-laying occurred in late June through early July 1977, after obtaining the specimen from the wild in April 1977. No hatchlings resulted.

A second female (carapace length 261 mm) from the vicinity of Merauke, Irian Jaya, Indonesian New Guinea laid three clutches of 16, 19, and 14 eggs respectively (see Table 1 - Clutches 2, 3, and 4). The clutch of 16 was laid in April 1988, 2 eggs hatched 6 months later in October after incubation at 29°C in damp vermiculite. The clutch of 19 was laid in April 1989, of which 2 eggs hatched 5 months later (measurements of one hatchling at age ca. 1 month with egg caruncle still present: carapace length 37.5 mm, width 27.0, depth 13.7, head width 11.3). The clutch of 14 was laid in September 1989, suggesting the potential of a two-clutch laying season, and 10 hatchlings resulted only 3 months later.

Egg sizes of the various species of *Chelodina* have not previously been compared, except for the work by Legler (1985) where he compares *C. "expansa"* (a generic grouping including *C. expansa, C. rugosa,* and *C. oblonga)* with *C. "longicollis"* (a generic grouping including *C. longicollis, C. novaeguineae,* and *C. steindachneri).* We have compared our data on egg length and width for *C. siebenrocki* with data from the literature for other species of *Chelodina* (Table 2 and Figure 1). Of note is that *C. siebenrocki* eggs fall at the upper end of the size spectrum, most similar in size to the other large species *C. expansa* and *C. rugosa.* Also of interest is the separate clustering of smaller eggs in the smaller species *C. longicollis* and *C. steindachneri.* The eggs of *C. parkeri* and *C. oblonga* are somewhat intermediate-sized between Legler's two "generic" groupings, with *C. parkeri* also being differentiated by having slightly more spherical eggs than all the other *Chelodina* species.

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Table 1. Clutches of eggs laid by *Chelodina siebenrocki* in captivity. Sizes in mm - Mean ± Standard Deviation (Range).

Clutch	$Eggs_n$	Length	Width
1	11	37.7 ± 0.67 (36.3 - 38.3)	31.0 ± 0.29 (30.7 - 31.7)
2	16	—	—
3	19	35.6 ± 1.05 (33.8 - 37.4)	28.3 ± 0.52 (27.4 - 29.3)
4	14	32.9 ± 0.76 (31.6 - 34.3)	27.9 ± 0.47 (27.2 - 29.0)