
AMPHIBIANS AND REPTILES OF THE ERIE ISLANDS

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Near the western end of Lake Erie, there is a series of islands which were so notable for their snakes when the Jesuit explorer, Bonnacampe, visited the region on October 5, 1749, that he referred to them as "Les Iles aux Serpentes" (The islands of snakes). A French soldier (J.C.B.), enroute from Presqu'île, near the eastern end of Lake Erie, to Detroit, spent the night of July 21, 1754, on one of these islands, and recorded in his journal (1941) that his party killed 130 rattlesnakes before they dared to sleep. The map made by Chaussegros de Lery on August 4, 1754, bears the name used by Bonnacampe, but the map made in 1755 by d'Anville and the map made in 1766 by Mitchel label them "Les Iles aux Serpens à sonette" (The islands of rattlesnakes).

The following description of Lake Erie was published in 1806, in the first American edition of Brooke's Gazetteer. It suggests that Lake Erie was more noted for the snakes of its islands than for its geographic features.

Erie, Lake, in North America, lies between 41° and 43° N. Lat. and 79° and 84° W. Lon. It is 290 miles long, and 40 in its broadest part. The islands and banks towards its W. end are so infested with rattlesnakes, as to render it dangerous to land on them. The lake is covered near the banks of the islands with a large pond lily; the leaves of which are thickly spread on the surface of the water to an extent of many acres; on these, in the summer, lie myriads of watersnakes basking in the sun. It is also infested by the hissing snake, which is 18 inches long, small and speckled; when approached it flattens itself in a moment, and its spots, which are of various colors, become visibly brighter through rage. This lake, at its NE end, communicates with Lake Ontario by the river Niagara.

Despite this early fame, no comprehensive report about the reptiles of the islands has been published. Surveys of larger areas, such as those by Kirtland (1838), Smith (1882), Morse (1904), Conant (1938, 1951), Walker (1946), and Logier and Toner (1961) include the islands in maps and records of distribution.

Individual species have received some attention, as in the taxonomic study of the island watersnakes by Conant and Clay, the note by Thomas on a population of Lake Erie Watersnakes, and in my two papers (1951, 1953), one on the Ring-necked Snakes, the other on the Timber Rattle Snakes of the islands. Such

records are cited, but the basis for this report is the series of observations which I made with my associated scientists during 1936-1962, near the Village of Put-in-Bay, on South Bass Island, in Ottawa County, Ohio.

LIST OF AMPHIBIANS AND REPTILES OF THE ERIE ISLANDS

The sequence and names are those used by Schmidt (1953). The common names are those adopted by the American Society of Ichthyologists and Herpetologists (Copeia, 1956(3): 172-185).

1. *Necturus maculosus maculosus* Rafinesque: Mudpuppy.
2. *Ambystoma jeffersonianum* Green: Jefferson Salamander.
3. *Ambystoma maculatum* Shaw: Spotted Salamander.
4. *Ambystoma texanum* Matthes: Small-mouthed Salamander.
5. *Ambystoma tigrinum tigrinum* Green: Eastern Tiger Salamander.
6. *Diemictylus viridescens viridescens* Rafinesque: Red-spotted Newt.
7. *Plethodon cinereus cinereus* Green: Red-backed Salamander.
8. *Bufo americanus americanus* Holbrook: American Toad.
9. *Bufo woodhousei fowleri* Hinckley: Fowler's Toad.
10. *Acris crepitans blanchardi* Harper: Blanchard's Cricket Frog.
11. *Hyla crucifer crucifer* Wied: Northern Spring Peeper.
12. *Pseudacris triseriata triseriata* Wied: Striped Chorus Frog.
13. *Rana catesbeiana* Shaw: Bullfrog.
14. *Rana pipiens pipiens* Schreber: Northern Leopard Frog.
15. *Chelydra serpentina serpentina* Linnaeus: Common Snapping Turtle.
16. *Emydoidea blandingi* Holbrook: Blanding's Turtle.
17. *Graptemys geographica* Le Sueur: Map Turtle.
18. *Chrysemys picta marginata* Agassiz: Midland Painted Turtle.
19. *Natrix kirtlandii* Kennicott: Kirtland's Water Snake.
20. *Natrix sipedon sipedon* Linnaeus: Northern Water Snake.
21. *Natrix sipedon insularum* Conant and Clay: Lake Erie Water Snake.
22. *Storeria dekayi dekayi* Holbrook: Northern Brown Snake.
23. *Thamnophis sirtalis sirtalis* Linnaeus: Eastern Garter Snake.
24. *Heterodon platyrhinos platyrhinos* Latreille: Eastern Hognose Snake.
25. *Diadophis punctatus edwardsii* Merrem: Northern Ringneck Snake.
26. *Coluber constrictor flaviventris* Say: Eastern Yellow-bellied Racer.
27. *Coluber constrictor foxi* Baird and Girard: Blue Racer.
28. *Elaphe vulpina gloydi* Conant: Eastern Fox Snake.
29. *Elaphe obsoleta obsoleta* Say: Black Rat Snake.
30. *Lampropeltis dolia triangularum* Lacepede: Eastern Milk Snake.
31. *Crotalus horridus horridus* Linnaeus: Timber Rattlesnake.

1. *Necturus maculosus maculosus* Rafinesque: Mudpuppy.

The mudpuppy breathes with gills throughout life, and breeds in the water, while other salamanders metamorphose into air-breathing forms, then breed. Morse (1904: 106) stated that the mudpuppy occurs in all parts of Ohio, and he referred to specimens from Toledo and Cleveland. Ruthven, Thompson, and Gage (1928: 15) stated that mudpuppies are common in Lake Erie about June 1 (presumably commonly seen about that time of year).

Mudpuppies have been abundant around South Bass Island on the lake bottom. Some of these salamanders have been pulled through the intake pipelines into the Ohio Fish Hatchery on Peach Point. Many of them have been found in Fishery Bay by minnow dipnetters, some from near the hatchery outflow pipes, and these have had their stomachs full of discarded fish eggs. Many mudpuppies have been caught unintentionally by ice fishermen, and these have been thrown on the ice for the gulls to eat. Some of the ice-fishermen's catch of mudpuppies has been salvaged and eaten by the author. The flesh is white and palatable.

2. *Ambystoma jeffersonianum* Green: Jefferson Salamander.

This blue-spotted salamander is rare on the Erie islands. One was taken on Fish Point of Pelee Island, on 8-24-1938, and another was found 4-14-1942 at the Ohio Fish Hatchery on South Bass Island. (SL. 346 and 915).

3. *Ambystoma maculatum* Shaw: Spotted Salamander.

The Spotted Salamander has been collected on Pelee Island (Logier and Toner, 1961: 14), and on South Bass Island. One was taken 3-24-1939 and another 4-8-1940 on South Bass Island (SL. 513-514). I collected and liberated four of them under a wood-pile in my yard at the base of Peach Point on 9-15-1961. My hopes that they would spawn in a pool close by has not been realized to date.

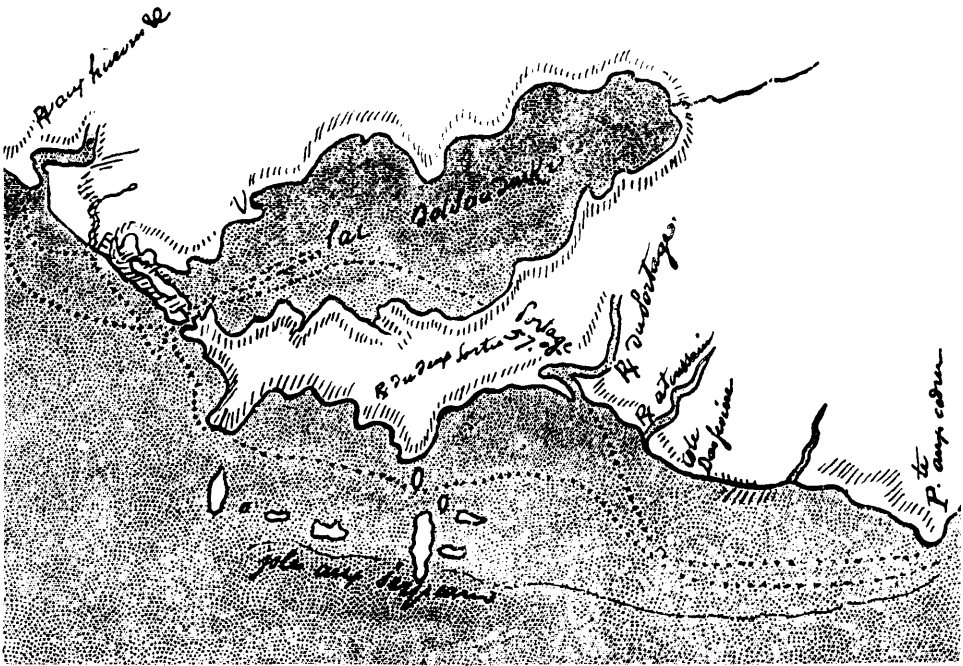


FIGURE 1. Map made 8-4-1754, showing "Les Isles aux Serpens", by J. G. Chaussegros deLery.

4. *Ambystoma texanum* Matthes: Small-mouthed Salamander.

One Small-mouthed Salamander was taken along the margin of Terwillegar's Pond on South Bass Island in August, 1940; three at Fox's Pond on North Bass Island 6-25-1942; another was found at Haunck's Pond on Middle Bass Island 7-6-1942. Dr. N. W. Britt stated orally (3-25-1957) that he had found young ones in abundance in 1946 at Fischer's Pond on Middle Bass Island, but that none were found there between 1946 and 1957.

5. *Ambystoma tigrinum tigrinum* Green: Eastern Tiger Salamander.

Only four adult Tiger Salamanders and one larva were taken during our span on the island, and all of these were taken within a period of four years. An adult was collected at Fischer's Pond on Middle Bass Island 10-3-1938, and a larva came from the same place 7-7-1939. I collected two adults on Peach Point about 1940, beneath wet leaves and other debris in an outside cellarway. The fourth adult was taken on South Bass Island 6-10-1942.

6. *Diemictylus viridescens viridescens* Rafinesque: Red-spotted Newt.

Newts were found in Fischer's Pond on Middle Bass Island and in Fox's Pond on North Bass Island by Dr. C. F. Walker until about 1949. Dr. D. H. Stansbery searched the same ponds for newts, unsuccessfully in 1952 and 1953, but both ponds yielded newts again in 1960.

Logier and Toner (1961: 16) reported that specimens from Pelee Island are in the Royal Ontario Museum, at Toronto.

It is probable that there were newts in the marshy pool at the Narrows on South Bass Island until 1910 when the marsh was filled to make a site for the International Peace Memorial and Perry Victory Monument.

7. *Plethodon cinereus cinereus* Green: Red-backed Salamander.

Two Red-backed Salamanders were collected 6-23-1940, one 7-6-1941, and others have been taken each spring since 1949 near Duff's Cave, South Bass Island. Four were taken 5-11-1943, and two were found 10-20-1949 near Heineman's Cave, on South Bass Island. None have been reported from any of the other Erie islands.

8. *Bufo americanus americanus* Holbrook: American Toad.

American Toads were taken 8-3-1938 on Gibraltar Island, and 4-25-1939 at Fischer's Pond, on Middle Bass Island. Walker (1946: 30) recorded 4-15-1942, as the date for the earliest eggs, and 6-10-1942 for the latest eggs on South Bass Island.

I noted loud singing in our boathouse pool, beside Terwillegar's Pond, on the following dates: 5-20-1945; 4-17-1946; 5-2-1949; and 4-17-1950. The toads spawned also at Duff's Pond, on South Bass Island in May, 1950, but I have not seen a toad, nor heard toad singing since that year. Dr. Britt informed me that he found a large dead toad in a street of the Village of Put-in-Bay in the summer of 1954 or 1955.

9. *Bufo woodhousei fowleri* Hinckley: Fowler's Toad.

Recorded by Logier and Toner (1961: 32) as occurring on Pelee Island, but Fowler's Toad has not been collected on any of the other Erie Islands. (Walker, 1946: 38).

10. *Acris crepitans blanchardi* Harper: Blanchard's Cricket Frog.

A Cricket Frog was caught 7-24-1929 on North Bass Island, another 6-26-1941 at Haunck's Pond, on Middle Bass Island. Walker (1946: 42) found scattered individuals at Middle Bass Island on December 6, "at depths of 8 to 14 inches in coarse gravelly soil under some willow trees at the edge of a small pond." Ligas (1952) found Cricket Frogs in the stomachs of American Bitterns taken at Fox's Pond, on North Bass Island. Britt (oral, 3-25-1957) found them in abundance in 1954 at Fischer's, Wehrle's, and Haunck's Ponds, on Middle Bass Island. Logier and Toner (1961: 34) reported specimens from Pelee Island in the Royal Ontario Museum, at Toronto.

11. *Hyla crucifer crucifer* Wied: Northern Spring Peeper.

Jones (1912: 103) reported the Spring Peeper as "fairly numerous away from the water" on Pelee Island in 1910. This is the only record from the Erie Islands, so the species may not be present on any of the islands at this date (Walker, 1946: 61).

12. *Pseudacris triseriata triseriata* Wied: Striped Chorus Frog.

Walker (1946: 54) noted the absence of this Chorus Frog from the Lake Erie Islands, and Hirschfeld and Collins (1961: 1) reported collecting two of them in a quarry pool on Kelleys Island on July 3, 1960.

13. *Rana catesbeiana* Shaw: Bullfrog.

Jones (1912: 103) stated that bullfrogs were found in 1910 in the swamp on Pelee Island. Walker (1946: recorded specimens from Middle Bass Island in the Ohio State Museum, and from South Bass Island in the Stone Laboratory collection.

In August, 1932, I sent a quantity of bullfrog tadpoles from Zoar, Ohio, to Sandusky, and they were placed in Haunck's Pond on Middle Bass Island. Bullfrogs may have been present there before that introduction; they have persisted in small numbers since, and occasional individuals have strayed from there. Two came across the channel to South Bass Island in 1939, one in July, 1941, and another landed 6-11-1942, at Gibraltar Island. I found a small Bullfrog 9-30-1954 in our pool, and adults have spent their summers there in 1961 and 1962. An adult Bullfrog came up on our porch and jumped for insects at our lighted window, 8-6-1960.

14. *Rana pipiens pipiens* Schreber: Northern Leopard Frog.

Leopard Frogs were found in the swamp on Pelee Island in 1910 by Jones (1912: 103). Walker (1946: 92) reported specimens from North Bass, Middle Bass, and South Bass Islands. They have been collected also from West Sister Island and Kelley's Island. I collected one there 4-15-1945; eggs 4-20-1950; and another adult 4-11-1951.

15. *Chelydra serpentina serpentina* Linnaeus: Common Snapping Turtle.

Snapping turtles were found in the canals on Pelee Island in 1910 by Jones (1912: 103), and Logier and Toner (1961: 49) list specimens from that island in the Royal Ontario Museum. Many of them were undoubtedly produced in the marshes on Pelee Island before about 1891 when the canals were dug to drain the marsh lands. Conant (1938: 126) listed a specimen from Put-in-Bay in the U. S. National Museum.

Snapping Turtles are surely less numerous on many of the other islands than before drainage has destroyed their habitat, as on South Bass Island, where Chapman's Marsh was filled to provide a site for the Monument. They burrow into damp soil to hibernate, and they congregate to hibernate in suitable sites, especially if such sites are limited in area and extent. One such area on South Bass Island is the lowlands behind our boathouse, on the pond-side of the base of PeachPoint. Here, 4-5-1945, I found a twelve-pound female buried under a clump of iris roots, at a depth of about six inches. A fourteen-pound male appeared out of hibernation, 4-22-1949, in the pool I had dug, and I excavated one 9-30-1954 which had a carapace length of seven inches. I dug out one on 10-12-1957, and I dug out five of them from an area of about 15 square feet during September and October, 1958. I found two Snapping Turtles 10-26-1959, by probing with a pitchfork, kept them overnight in a washtub, and released them the next day to watch them dig in again.

Since I have been unable to find descriptions of the behavior of Snapping Turtles when burrowing in for the winter and when emerging from hibernation, my observations are presented.

The two turtles which I dug out on October 25, 1959, were both females, one eight inches, the other eleven inches long. They were holed in for the winter about six feet apart, each where there was a gentle slope to the bottom, like those found in 1958. They were lethargic when brought out of the ground, but they became active presently, scrambling around and trying to escape from the washtub in which I had placed them for keeping overnight. The temperature dropped to about 40° during the night, and the following day was chilly and overcast. I liberated them about 1 PM when the light permitted photographing their behavior, and they went underground in about ten minutes.

The smaller turtle moved at once towards a wet spot on bottom where water

had filled one of my boot prints, clambering over the head of the larger turtle instead of making the slight detour necessary to bypass it. As it walked, its head was outstretched towards its objective, and, upon reaching the edge of the puddle, the head swung around as if taking a last orienting look, then was drawn back in. Next, the turtle pushed its rear end upwards the full length of its hind legs, thus tilting the body to an angle of about 35° , then projected its head out full length in the plane of the body, and walked down into the mud.

The second turtle moved along bottom about ten feet to the second wet spot, and proceeded like the first one, to pause and look around at the edge, retract its head, hoist its hind end, project its head in the new direction, descend below the surface, level off about a body length from the point of entry, then be still.

One of the turtles which I had exposed while digging on 10-12-1957, was just touched gently and so was not disturbed. I carefully removed the 8 inches of wet black soil from above it, thus exposing the turtle to warm sunlight, then I sat quietly and watched it become active.

As exposed, its legs were held tightly under cover of its shell, with its tail coiled tightly against its right hind leg. The first movement was the gradual extension of the neck, and the open right eye was aimed in my direction while soil still covered the head region and the left side of the shell. The head then was moved sideways, thus making space for further head movements. The tail then made a big swing to the rear, thus making space for leg action. The legs became active soon thereafter, pivoting the body in a way which made space for its movement. Soon thereafter, the turtle swung its head end to the right, moving into the space opened by my shovel, then walked towards the pond, about 100 feet away.

16. *Emydoidea blandingi* Holbrook: Blanding's Turtle.

Blanding's Turtle is seen only occasionally on any of the islands at the present time, though it is so abundant in the marshes on the Ohio mainland that many of them have been trapped for sale to restaurants in Toledo. Jones (1912: 103) found it in the marsh on Fish Point of Pelee Island in 1910. Conant recorded this species from Green Island and from Middle Bass Island (1938: 134). Individuals have been recorded from North Bass Island 5-19-1939, 7-13-1940, and 5-1951; from Middle Bass Island 7-23-1928 and 6-30-1931; and from South Bass Island 6-18-1952, and 5-15-1960. Another Blanding's Turtle was picked off the rocks by me in a rowboat, and released without recording.

The specimen taken on 5-15-1960 was found beside our pool, and its full bladders suggested that it may have just come out of water, perhaps just emerging from hibernation.

17. *Graptemys geographica* LeSueur: Map Turtle.

This aquatic turtle, marked with concentric lines like a contour map, seems to be abundant only in the shallow water, mud-bottom coves in the island region. They hibernate in soft bottom materials. They emerge in response to bright sunlight, and spend hours basking on logs or stones. I have seen them thus on 3-28-1946, 5-2-1949, 5-13 and 5-23-1950, 5-4-1952, 7-27-1950. They bask also on bright days in autumn, and were seen thus on 10-5-1946, 10-20-1949, and 10-1-1950.

Map Turtles subsist on small molluscs, crayfish, and vegetable matter, all swallowed under water. Five specimens from Put-in-Bay include two taken in August, and one on September 28, 1938, and two taken 10-5-1941 (SL. 341-2-353-796-797).

18. *Graptemys picta marginata* Agassiz: Midland Painted Turtle.

Jones (1912: 103) reported that the "Margined Turtles" were found in the canals on Pelee Island in 1910. The species is common in the Harbor of South Bass

Island, and it has been collected on Middle Bass Island at Wehrle's Pond, 7-13-1939, and at Haunck's Pond on Middle Bass Island, 6-26-1941. Conant (1938: 148) recorded it at North Bass Island.

I uncovered a three-inch Painted Turtle, 4-5-1945, hibernating in the wet mud behind our boathouse, and I found a young-of-the-year specimen in the water there 7-3-1961. I collected an adult male, 5-31-1946, with the long claws which develop at breeding season and are used to flagellate the female.

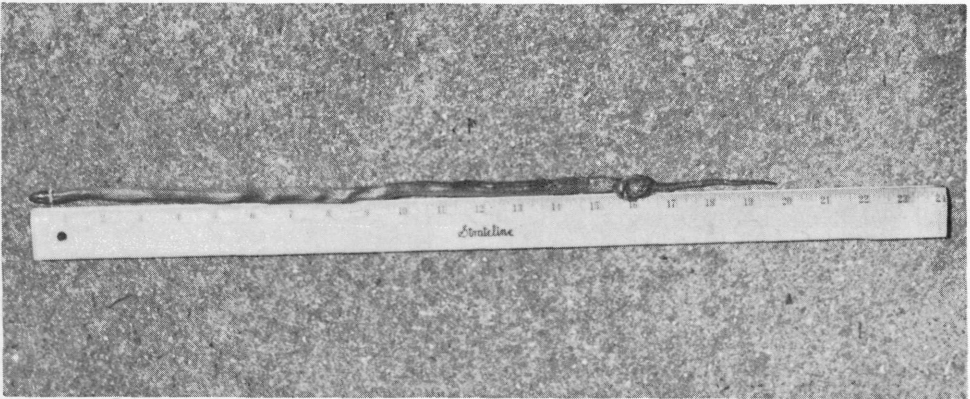


FIGURE 2. Ringneck Snake with knot in its tail, dorsal view.

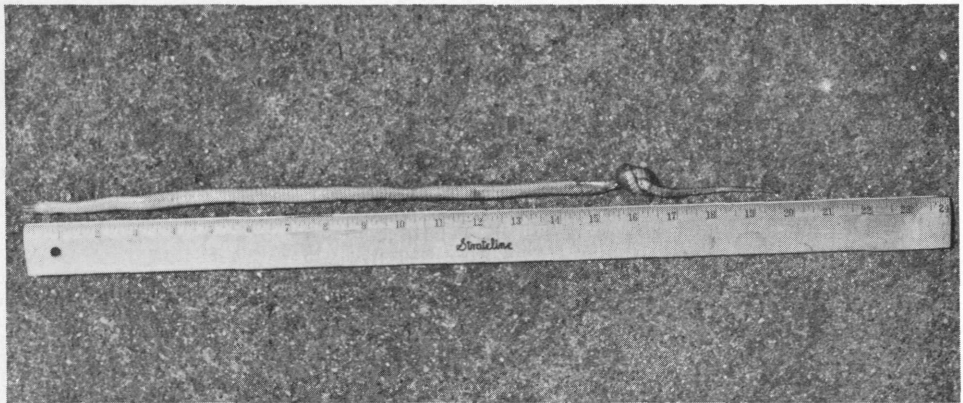


FIGURE 3. Same, ventral view.

19. *Natrix kirtlandi* Kennicott; Kirtland's Water Snake.

I collected a Water Snake in 1937 on South Bass Island which has been identified as Kirtland's Water Snake (SL. 313). It may have been confused with the Lake Erie Water Snake, subsequently described by Conant and Clay (1937), as this sub-species occurs in a variety of forms.

20. *Natrix sipedon sipedon* Linnaeus: Northern Water Snake.

Jones (1912: 103), referring to Pelee Island, stated as follows: "In the lake, swimming around, and occasionally ashore, were found both the common Water-

snake (*Natrix fasciata sipedon*) and the Red-bellied Watersnake (*Natrix fasciata erythrogaster*)."'

Conant (1951: 87) examined specimens from Kelley's Island, Green Island, Lost Ballast Island, Middle Bass Island, Put-in-Bay, and Rattlesnake Island which had been identified by Morse (1904) as *Natrix fasciata erythrogaster* Shaw, and he found them all to be Lake Erie Water Snakes. Morse (1904: 131), listing *Natrix fasciata erythrogaster* Shaw, stated as follows: "Among the islands of Lake Erie the writer has taken specimens. Thus at Put-in-Bay it is common, but *sipedon* is found along with it."

Conant (1951) lists the Common Water Snake only from Mouse Island, which is at the tip of Catawba Point of the Ohio mainland. Almost all, if not all of the other Erie Islands are included in Conant's records of distribution of his new subspecies, now called the Lake Erie Water Snake.

21. *Natrix sipedon insularum* Conant and Clay: Lake Erie Water Snake.

The Lake Erie Water Snakes appear to be much less abundant now around the islands than they were in 1936, but they are still probably the most-often-seen

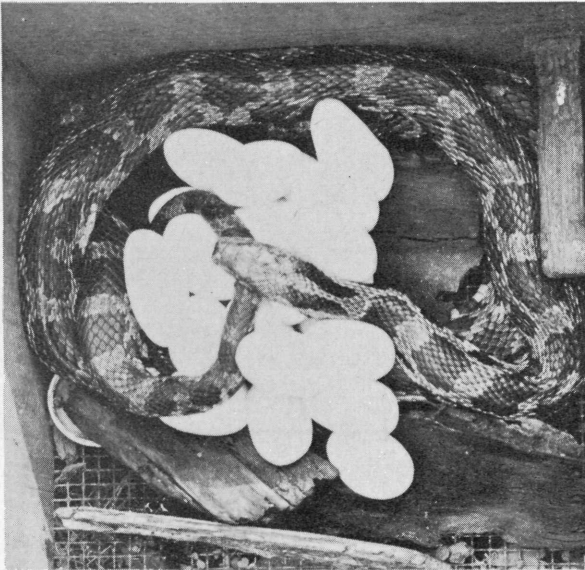


FIGURE 4. Female Eastern Fox Snake, laying eggs.

snake. Six specimens from South Bass Island and one from Gibraltar Island have been recorded (S.L. 317, 568, 768, 966, 967, and 315), and Logier and Toner (1961: 62) report them for Pelee Island and possibly Middle Island.

Mating occurs in May, and young snakes are born in the autumn. Reports of sunning bunches of watersnakes are really records of courting groups, each group consisting of a single large-bodied female and as many as a dozen males. Sometimes two or more of such courting groups get into the same sunlit areas on the shore rocks, and the total may be thirty, or more, snakes.

Water Snakes capture muddlers, mudpuppies, and stonecats on the bottom of the lake, at depths as great as 32 feet, and they bring these items out of water where swallowing does not lead to drowning.

22. *Storeria dekayi dekayi* Holbrook: Northern Brown Snake.

Conant (1938: 90) recorded specimens of the Brown Snake from Put-in-Bay



FIGURE 5. Courting group of Lake Erie Water Snakes.

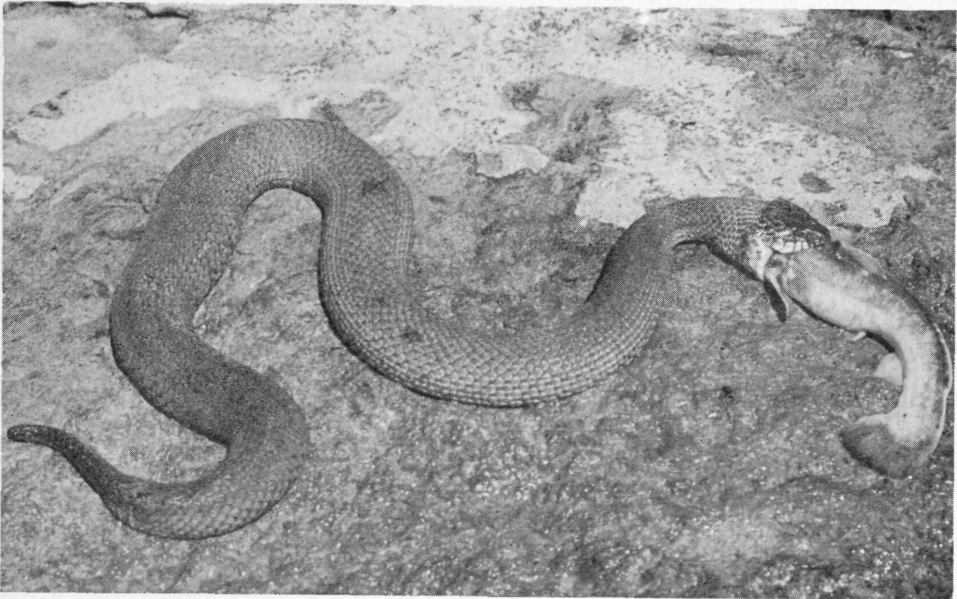


FIGURE 6. Water Snake swallowing a Stonecat.

and from Rattlesnake Island. Logier and Toner found the species on Pelee Island (1961: 63). There are many of them on South Bass Island and Gibraltar Island near gravelly or bouldery shorelines where they feed on sowbugs and slugs. Two females yielded 14 young ones, each, on August 15, 1954. I have collected specimens each year at dates ranging from May 9 to November 12.

23. *Thamnophis sirtalis sirtalis* Linnaeus: Eastern Garter Snake.

The common Garter Snake occurs on most of the Erie Islands, including Pelee (Jones, 1912: 103). The Stone Laboratory Collection includes specimens from North Bass Island, Middle Bass Island, South Bass Island, Middle Island, Pelee Island, Kelley's Island, and West Sister Island. The species has been collected during the months from April through September.

In July, 1949, over 200 specimens were taken from Middle Island by student collectors, and this was a deplorable decimation. I could find but one Garter Snake on that island 9-5-1950, and I left it there.

Black (melanistic) Garter Snakes are not uncommon on the adjacent Ohio mainland, and a few of them have been found on the islands.

24. *Heterodon platyrhinos platyrhinos* Latreille: Eastern Hognose Snake.

Called the Hissing Snake in Brooks Gazetteer (1806), and often called the Blow Adder, the Hognose Snake was certainly more abundant on the islands years ago than it is now. Jones (1912: 103) stated that the Puffing Adder was found among the cedars on Pelee Island in 1910, and a single specimen, collected 8-18, 1939, on Pelee Island, is in the Stone Laboratory Collection. Early residents of South Bass Island have recounted seeing them there in the 1920s, but I have heard of none there since 1936. In Michigan, it fed exclusively on toads, and its passing from the islands may be related to progressive decline of toad habitat, and of toads.

25. *Diadophis punctatus edwardsii* Merrem: Northern Ringneck Snake.

The center of distribution of these small, pretty, harmless snakes on South Bass Island (the only Erie island on which they have been found) is between Stone's Cove and Peach Point, not far from the precipitous western shoreline. This area is characterized by its ridges of exposed bedrock and by its cover of woods. There are exposures of loose rock, and there are known to be caves underneath part of the area. Ringneck Snakes have been seen but rarely by islanders because they live in loose rock or in rotten logs, and most people do not prowl into such habitats.

One specimen was taken 6-24-1930, but the collector and exact site are not known. A second specimen was found dead on the road across Terwillegar's Pond by one of our daughters, about 1938. A third one was collected 6-11-1942, in Victory Woods, near Stone's Cove, by Dr. Harley Brown. V. Biaggi brought in the fourth, on 4-14-1946. The only young one, about five inches long, was picked up 10-7-1949, along the west shore road by Dr. J. Verduin. A sixth one was obtained alive from Harold Mack, found in Victory Woods 6-4-1950.

The largest specimen, a male, $22\frac{1}{4}$ inches long, was found under unusual circumstances, 5-31-1952. This snake had been emerging through a very narrow crack at the end of a concrete step on Harold Mack's lawn, beside Stone's Cove, and it had been kept from complete freedom by a knot in its tail. It had died on the steps, three-fourths of the way out, because the space was too narrow for backing up or for simply crawling out of the knot. When the edge of the concrete was chipped away, the knotted tail was pulled out with ease.

Another male Ringneck Snake, 16 inches long, was captured in that same area by Robert Whittacre, 9-11-1957. This was released by me in our backyard, close to the Peach Point woodlot. A female, $18\frac{1}{2}$ inches long, was captured and re-

leased at the woodlot site, 8-27-1957. Hopes for a colony are not strong, since six years has passed without any Ringneck Snakes showing in the woodlot area.

These several records suggest that emergence from hiding takes place in the middle of April, but most movement occurs in June, so June is probably the mating month. No eggs have been found, although rotten logs have been explored. Young ones are known to emerge from eggs in late summer or early autumn.

26. *Coluber constrictor flaviventris* Say: Eastern Yellow-bellied Racer.

In 1912, Jones reported finding a Black Snake (*Bascanion constrictor*) on Pelee Island, towards the base of the point. Logier and Toner (1961: 74) cite Jones as authority for listing the Eastern Yellow-bellied Racer on Pelee Island. There are no records of this form from the other Erie Islands.

27. *Coluber constrictor foxi* Baird and Girard: Blue Racer.

The Blue Racer may be more common on the Erie Islands than records indi-

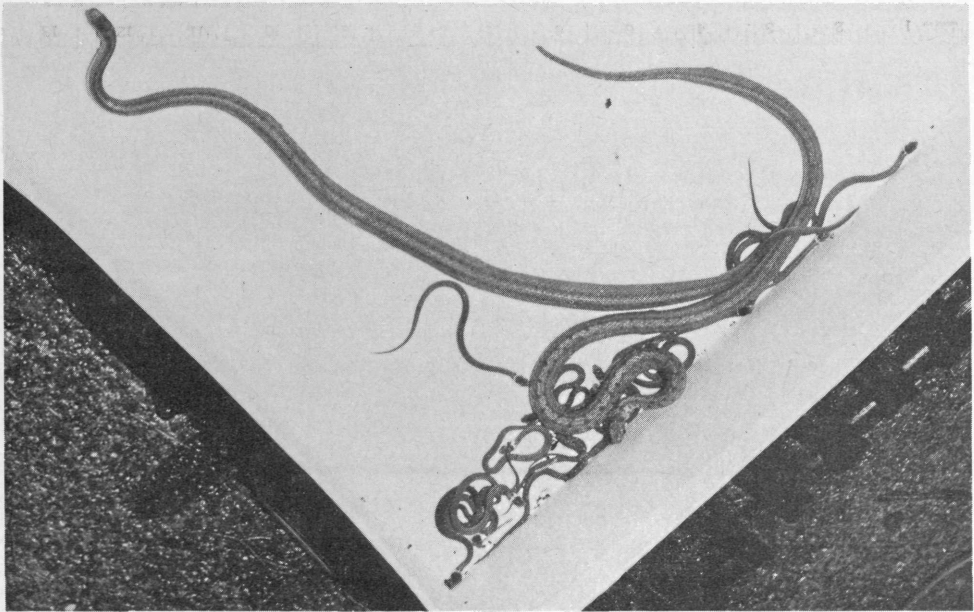


FIGURE 7. Northern Brown Snakes, one with 14 young; the other before delivering 14 young.

cate, because they are inconspicuously colored, seldom venture into open areas, and get away quickly when alarmed. They are known to mate in May and lay eggs in mid-summer. The Stone Laboratory Collection includes one taken 8-22-1938, on Middle Bass Island, and one caught 9-18-1944 on South Bass Island. Elmire Langlois caught one 5-18-1947 in our backyard, at the base of Peach Point, and some students caught one 5-20-1951. Conant (1938: 55) reported a specimen taken on Kelley's Island.

28. *Elaphe vulpina gloydi* Conant: Eastern Fox Snake.

The Fox Snake is quite abundant on all of the Erie Islands, including Middle Bass Island and Put-in-Bay (Conant, 1938: 62) and Pelee Island (Logier and Toner, 1961: 76). Some of them become very long; Fox Snakes four feet long are

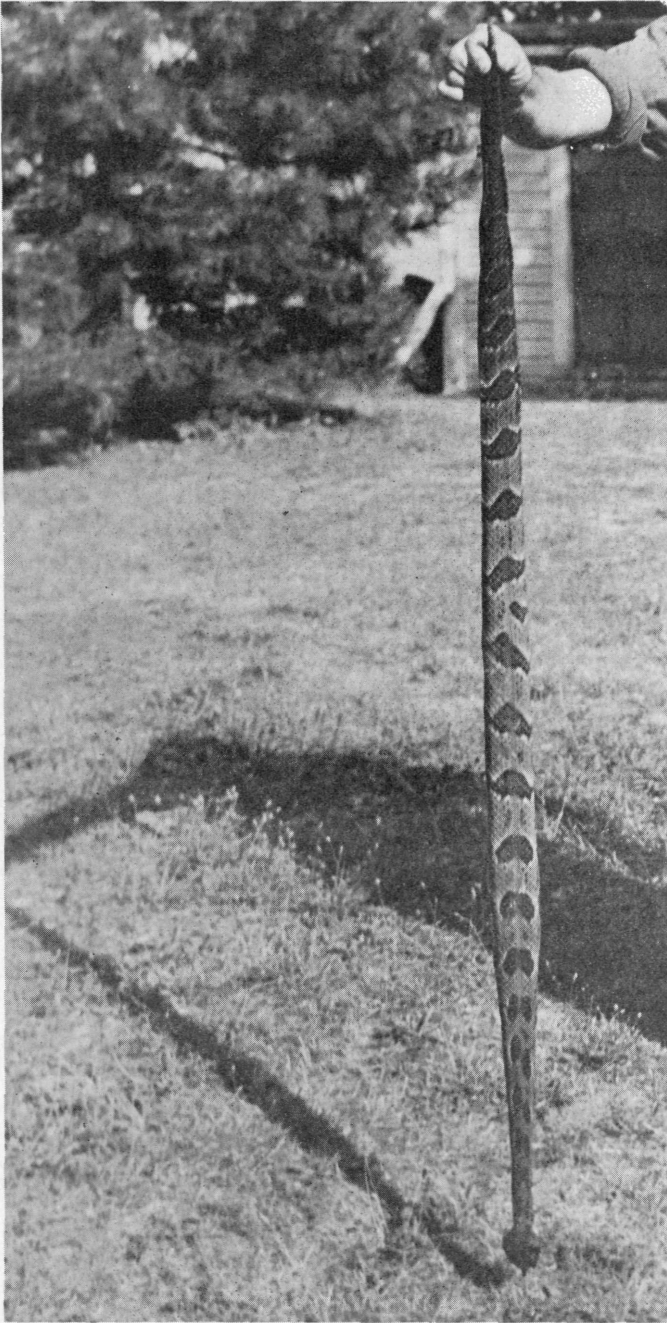


FIGURE 8. Timber Rattlesnake, 42 inches long, killed 9-20-1942 on South Bass Island.

common, and snakes longer than six feet have been reported, reliably. Fox Snakes are expert climbers, and are sometimes seen on shrubs, trees, or on buildings, ten feet or more above the ground. They consume small rodents and sometimes take birds' eggs or young right out of the nests. We have seen them swallow an egg from the nest of a song sparrow, and some nestling starlings. They were found preying upon pheasant eggs and young on Pelee Island.

I collected a female Fox Snake 7-18-1960 near our house on South Bass Island, and she was so obviously *enceinte* that I encaged her. She laid a clutch of 27 eggs 8-4-1960, and I watched the oviposition from the 18th egg on. The first interval between layings was 12 minutes, and the succeeding intervals varied between 18 and 22 minutes. The snake was looped around a central space in which the eggs were massed, and her chin resting on the dorsum of her tail, just caudad of the vent. Four eggs were laid in series against the side of the mass, each upgrade from the previous one, then three more were laid alongside of this series. Before extruding her last three eggs, the snake moved her vent, thus, intentionally or otherwise, avoiding mounting the eggs any higher. Previous similar movements may explain the fact that 19 eggs were struck together, three other eggs adhered in a separate cluster, while five eggs were unattached to each other or to other masses.

The movement of each egg caudad, towards the vent, proceeded individually, and the extrusion of each egg appeared to be accomplished with considerable effort. The eggs were large in cross diameter, and each elongate egg reached the vent endwise. One egg showed a fold in its leathery covering as it was forced through the vent.

The eggs varied in size, with the longest ones laid early in the series. Lengths ranged from $1\frac{1}{4}$ to 2 inches, and one egg was smaller in diameter than all of the rest. This one had a softer shell than the others, and was probably infertile. The 27 eggs, placed end to end, had a total length of 46 inches, and the double row, as if in two oviducts, was almost two feet long. The female measured 55 inches in total length. When weighed separately, the snake weighed 22 ounces, and the mass of eggs weighed $16\frac{1}{2}$ ounces.

The eggs were kept in moist, rotten wood, but most of them collapsed as if dehydrated, so the incubation period was not determined from this clutch. Conant (1938: 63) listed a clutch of 15 eggs obtained from a snake 51 inches long, laid July 29, kept in damp moss until they hatched October 19; a clutch of 17 eggs from a snake 49 inches long, another of 15 eggs from a snake 50 inches long, and a clutch of 29 eggs from a snake 59 inches long. All of the eggs of the biggest clutch listed were soft, flabby, and infertile.

Pink, probably newly-hatched Fox Snakes were collected 10-4, 6-1950, each about 10 inches long, and one young one, $12\frac{1}{2}$ inches long was found 5-18-1949. The latter one had probably hatched in autumn and grown a little over winter, or early spring. Conant listed the lengths of three newly-hatched Fox Snakes as $10\frac{1}{2}$, 11, and $10\frac{7}{8}$."

29. *Elaphe obsoleta obsoleta* Say: Black Rat Snake.

Jones (1912: 103) recorded this species on Pelee Island in the following words: "In the heavy deciduous timber, climbing the trees, were found several Pilot Snakes (*Coluber obsoletus obsoletus*). One was brought to my attention by a troop of about fifty warblers, which had gathered about one in a tree about sixty feet high. One of these was the largest snake we killed, measuring five feet and three inches in length."

Conant (1938: 58) records one from Put-in-Bay in the Bowling Green State University collection. Mr. E. R. Miller reported (orally) seeing one, six feet long, at the State Park on South Bass Island in August, 1950, but I have never seen one on the islands, and have not heard of anyone else seeing them since 1950.

30. *Lampropeltis doliata triangulum* Lacepede: Eastern Milk Snake.

Jones (1912: 103) recorded the Milk Snake as occurring among the cedars on Pelee Island in 1910. There have been no other records of collection of this form on any of the islands.

31. *Crotalus horridus horridus* Linnaeus: Timber Rattlesnake.

It is a curious fact that a relict colony of Timber Rattlesnakes has managed to persist on South Bass Island, Rattlesnake Island, Mouse Island, and on the Catawba Peninsula of mainland, although every individual seen has been killed, if possible. Curiously also, all of those killed are big, old ones, and young ones are never seen, or never reported if seen. Reproduction must occur, but the young must be nocturnal in habit or subterranean in habitat to be so invisible.

All of the few big rattlesnakes which have been killed on South Bass Island during recent years have been found on the high rocky area adjacent to Stone's Cove, and survival in this place may be attributed to the deep masses of loose rocks and to caves. None have been seen elsewhere than this Victory Woods area during the last 15 years, but stories are told of one found close to the Village and of another killed near Peach Point, years ago.

Seasonally, no rattlesnakes have been found earlier than April 17, and none after September 20, so winter inactivity may be presumed. Dates of collection, arranged according to the time of year, are as follows:

4-7-1951, 5-13-1951, 5-20-1951, 5-28-1950, 6-12-1935, 7-9-1938, 7-14-1955, 7-21-1938, 8-1-1941, 8-4-1951, 8-8-1950, 8-11-1938, 9-20-1942.

The only observation which might throw light on the breeding season of the Timber Rattlesnake on South Bass Island was made 7-21-1754 by the French soldier previously referred to. This soldier was a member of an expedition which camped overnight on an island near the end of the Detroit River. He saw several rattlesnakes enter the hollow of a fallen tree, and four soldiers fired shots into the hollow. He stated that "after shots some of the snakes rolled out like a ball of twine, many living and some dead, cut to shreds and dragged away by the living ones."

Mating snakes are unable to separate quickly, and alarmed females commonly drag their attached partners away from the site of the disturbance, so the rattlesnakes may have been mating then and there. Later summer mating probably results in the birth of young the following June, as early embryos were found in the 41-inch female killed on 5-28-1950.

The well-known habit of Timber Rattlesnakes of feeding upon small rodents, and the abundance of common rats and mice on South Bass Island suggest that the island snakes may depend upon this type of food. However, no observations have been made of actual ingestion, and there have been no analyses of stomach contents of the island snakes.

Conant (1938: 117) lists specimens in collections at the Sandusky High School and the Toledo Zoological Society, from Put-in-Bay.

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