



Eastern Banded Tigersnail



Photo: © Annegret Nicolai

Scientific name

Anguispira kochi kochi

Taxon

Molluscs

COSEWIC Status

Endangered

Canadian range

Ontario

Reason for Designation

This large terrestrial snail remains in small isolated habitat patches on Middle and Pelee islands, in Lake Erie. The loss of subpopulations on some smaller islands was probably due to habitat destruction from overabundant Double-crested Cormorants, which colonized the islands in the early 1980s, as well as human activities. Habitat loss and alteration on Pelee Island likely led to subpopulation declines and fragmentation. Climate change is the most serious threat.

Wildlife Species Description and Significance

Banded Tigersnail is a large land snail (adult shell width 2.0 – 2.5 cm) with a globular, yellow to brown shell that has an opening in the centre when viewed from below and a light-coloured spiral band bordered by a darker band on either side. Variations include

size, shell thickness, and colour of the shell, as well as the visibility of bands. Two subspecies are currently recognized: *Anguispira kochi kochi* on the Lake Erie islands in Ontario, and *A. k. occidentalis* in British Columbia. The Eastern and Western subspecies are part of the unique faunas of the Carolinian and northern Columbia Basin ecosystems, respectively, and have significance for biodiversity, research, and conservation. As part of the gastropod community in forest ecosystems, Banded Tigersnail plays a role in litter decomposition and nutrient cycling.

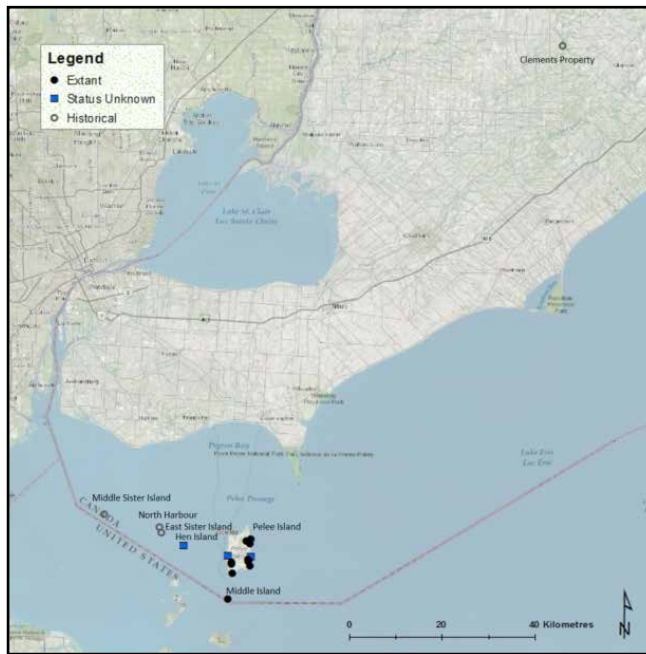


Photo: © Annegret Nicolai

Photo showing the shell pattern of live Eastern Banded Tigersnails. The bands are always visible on the inside of the shell.

Distribution

The distribution of Banded Tigersnail is disjunct, consisting of an eastern and western North American component, and extends from southern Canada southward to Tennessee in the east and to Oregon in the west. In Canada, the Ontario and British Columbia populations are separated by over 2000 km with no connections through the US. In Ontario, Eastern Banded Tigersnail is currently known to occur on two islands in Lake Erie (Pelee and Middle islands). In British Columbia, Western Banded Tigersnail occurs in the southeastern part of the province with most records from the West Kootenay region.



Distribution of Eastern Banded Tigersnail in Ontario. Map prepared by Alain Filion (COSEWIC Secretariat) based on records compiled for the COSEWIC status report.

Habitat

In Ontario, Chinquapin Oak-Nodding Onion treed alvar, dry-fresh Hackberry deciduous forest, dry-fresh Sugar Maple-White Ash deciduous forest, and dry Black Oak woodland are preferred habitats of the Banded Tigersnail. These habitats, encompassing approximately 98 ha in total, are characterized by the proximity of limestone bedrock to topsoil or a sandy soil with a substantial leaf litter layer. Pelee Island is largely developed for agriculture, and habitat loss is historical. Habitats continue to be affected by flooding and management measures such as invasive species control and prescribed burning, as well as erosion of the tip of Fish Point on Pelee Island. Middle Island has been uninhabited by humans since the 1980s, but habitats continue to be modified by storms and overabundant Double-Crested Cormorants.

In British Columbia, the snails inhabit moist, well-vegetated mixed-wood forests and are often found in riparian areas along lakes, rivers, and creeks, especially where Cottonwoods are present. A well-developed litter layer and coarse woody debris on the forest floor provide hiding places and refuges from inclement weather. Historically, land conversions for residential and industrial developments and for agriculture have resulted in loss of habitat at lower elevations, especially along river valleys, lake shores,

and highways. Habitats across the snails' range continue to be modified and fragmented by forestry, road networks, expanding urban development, and increasing frequency and duration of droughts projected under climate change.

Biology

Banded Tigersnail is an air-breathing (pulmonate), simultaneous hermaphrodite (possesses both male and female reproductive organs), egg-laying snail. Few details of the life history of the species in Canada are known. Mating probably occurs in mid-spring and mid-summer, and egg-laying in late spring and late summer. Hibernation extends from early October until April in temperate regions. Snails are prone to freezing in winter and dehydration in summer. They rely on sheltered refuges and snow cover to buffer them from freezing during winter. Dormancy in summer may occur during prolonged drought. Sexual maturity is probably reached at 2 – 3 years of age. The generation time is probably 5 – 6 years. Active dispersal for colonization of new areas is in the order of tens of metres over several years. Passive dispersal by flooding of rivers or transportation by birds is possible but has not been documented. There is no evidence that the species is transported by humans.

Population Sizes and Trends

Eastern Banded Tigersnail could be confirmed only on Middle Island and Pelee Island during fieldwork in 2013 – 2015; historical habitat disturbance suggests a reduction in abundance in some sites on these islands. The species has apparently disappeared from Middle Sister Island, East Sister Island, and a property near Alvinston in Lambton County on the mainland. The persistence of the species on Hen and North Harbour islands is uncertain. The population is currently estimated at about 800,000 mature individuals. Recruitment was observed in most sites where the species was found alive. Rescue from outside Canada is not possible due to Lake Erie acting as a barrier.

Nothing is known of densities and population trends of Western Banded Tigersnail, but it is probable that the species was historically more widespread and abundant than currently, particularly in larger river valleys. Most distribution records are recent (since the 1990s), and there are insufficient historical records to allow for comparisons. Threats to habitats continue from various sources and may result in declines in

the future. Several records of the species exist from the vicinity of the Canada – US border, and where habitat is continuous, there is potential for rescue. However, due to poor dispersal ability of the snails and habitat fragmentation, rescue of British Columbia subpopulations from the US is of limited importance.

Threats and Limiting Factors

In Canada, Banded Tigersnail exists at the northern limit of its range. Low dispersal ability and low physiological resistance to fluctuating environmental factors such as temperature and humidity are considered limiting factors.

In Ontario, climate change represents an important but poorly understood threat to the snails through storms on Middle Island and erosion and flooding of forest on Pelee Island. Moreover, risk of droughts and extreme temperatures, resulting in spring frost, are a threat at all sites. Other threats include competition with introduced snails and slugs and increased predation pressure from introduced omnivorous Wild Turkeys and Ring-necked Pheasants on Pelee Island. On Middle Island, nesting native Double-crested Cormorants have severely altered habitats, resulting in alteration of soil chemistry, tree dieback, reduced plant species' richness, and an increase in exotic species. Exotic plants and earthworms on Pelee Island also contribute to modification of the litter layer and habitat structure. Prescribed fire affects potential habitat.

In British Columbia, threats include habitat loss, alteration, and fragmentation by logging, roads, urban development, and wildfires, as well as increased frequency and intensity of droughts, storms and flooding, as predicted under climate change. Prolonged summer droughts associated with climate change are likely to exacerbate the effects of logging and wildfires. Climate change and forest disturbance may facilitate the spread of introduced invertebrates such as slugs, snails, and ground beetles, which may compete with or prey on tigersnails.

Protection, Status, and Ranks

Banded Tigersnail has no legal designations. It is ranked as globally secure and nationally secure in the US but vulnerable in Canada. It is ranked as imperilled in Ontario and vulnerable in British Columbia. In Ontario, most of the species' range is on protected lands managed by Parks Canada, Nature Conservancy Canada, or Ontario Ministry of Natural Resources and Forestry. In British Columbia, land ownership varies across the species' range, but most records are from unprotected provincial forestry lands. In British Columbia, the species has been recorded from five provincial parks; several other provincial parks and other protected areas exist within its range.

Source: COSEWIC. 2017. COSEWIC assessment and status report on the Eastern Banded Tigersnail *Anguispira kochi kochi* and the Western Banded Tigersnail *Anguispira kochi occidentalis*, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xv + 82 pp.

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