

Natural Resources Management

Island Apple Snail

National Park Service
U.S. Department of the Interior

South Florida Natural Resources Center
Everglades National Park



One of south Florida's most recent invaders is the island apple snail, a baseball-sized invertebrate from South America. Widespread in many of south Florida's wetlands, the snail is found in Everglades National Park along Tamiami Trail and is now penetrating through the Shark Valley area. This exotic was initially believed to be the channeled apple snail (*Pomacea canaliculata*), however, recent genetic investigations by researchers at Florida International University have shown it to be the island apple snail (*Pomacea insularum*).

A popular aquarium and food species, the island apple snail has caused problems in many regions outside its home range. Once released into a new environment, it reproduces profusely — each hot pink egg mass contains up to 700 eggs. And, it can travel long distances when snails or egg masses become “aquatic hitchhikers,” transported accidentally in live wells or along with vegetation adhering to boats or trailers. Reproduction often goes unchecked because the snail lacks natural predators in these new environments. As a result, this prolific species is capable of altering entire ecosystems.

With a voracious appetite for macrophytes — or vegetation that can be seen with the unaided eye — the island apple snail can convert lush ecosystems into barren ones, dominated by algae. For example, in many Southeast Asian wetlands, algal blooms persist where snails have devoured the macrophytes. The microscopic algae are so dense that they block sunlight from penetrating the water, killing any remaining plants and altering ecosystem function.

National Park Service scientists are concerned that the exotic snail will similarly impact the park's wetlands and that it will compete with the native apple snail (*Pomacea paludosa*) for food and habitat. If this happens, the native snail population could decline. Such a

scenario could be disastrous for animals, such as federally-endangered Everglade Snail Kites, that rely on *Pomacea paludosa* for food.

While a few native birds, including Limpkins and Glossy Ibises, have been observed feeding on the exotic snail, it has been suggested that the Snail Kite, with its specialized beak, may have trouble extracting meat from the invertebrate's large shell. Potential for island apple snails to cause harm to Snail Kites at this point remains uncertain.

Apple snails are also known to be vectors of disease in some areas where introduced. It is not known what parasites the island apple snail harbors in Florida or what affect there might be on predators or people.



Eradication

Likely introduced to Florida's natural areas by pet owners, the island apple snail, abundant in some parts of Florida, has only recently (May 2005) been observed in Everglades National Park (ENP). So far, it has been documented in the L-29 Canal to the north of the park, in the Old Tamiami Trail canal just inside the northern boundary of the park, and in the marshes along the Shark Valley tram road.

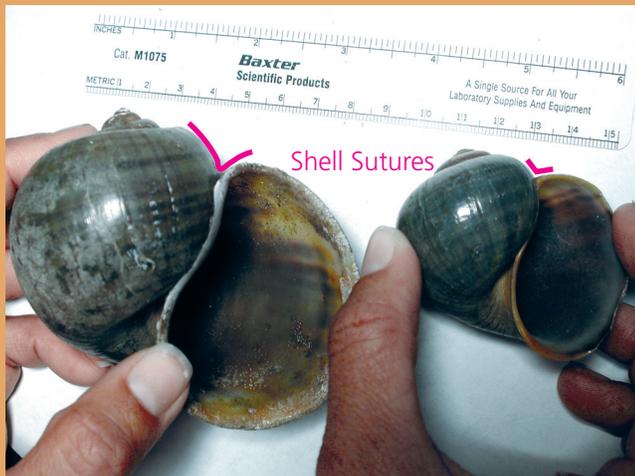
Soon after the exotic snail was observed, park scientists began conducting studies to define the extent and status of the population in ENP. They surveyed along transects, collecting all live snails and eggs, and documenting the locations with a handheld GPS unit.

Exotic island apple snail egg masses along Tamiami Trail
Photos by Skip Snow, ENP, and Jeff Kline, ENP

In 2005, 488 island apple snail egg masses and 19 adult snails were removed from surveyed areas. The number of egg masses observed in the Old Tamiami Trail canal decreased when water levels rose and the canal overflowed, indicating that the snails probably disperse into adjacent marshes during periods of high water. At these times, egg masses were found farther into the marsh. Park-wide surveys detected no exotic snails south of Shark Valley in 2005.

In 2006, park scientists removed 2,857 island apple snail egg masses and 34 adult snails from the infested area. They also found large numbers of empty shells along the shore, suggesting the snails were eaten by predators. The data indicate that the snail population is increasing and spreading east along the Old Tamiami Trail canal and south along the Shark Valley tram road canal.

Future fieldwork may include the use of basic trapping methods for detection and removal of snails, and to estimate snail density. Park managers are considering the use of chemicals approved for aquatic ecosystems to control the spread of the population. Research conducted by the University of Florida is examining the effectiveness of treating egg masses with a variety of sprays, including vegetable oil, as well as treating the canal during the dry season to kill adult snails. Experimental treatments may be conducted as early as 2007.



P. insularum (invasive) vs *P. paludosa* (native)

Visual Characteristics:

P. insularum (invasive)

- Large adult
- Shell suture <90°
- Small pink eggs
- Large number of eggs

P. paludosa (native)

- Smaller adult
- Shell suture >90°
- Larger whitish eggs
- Fewer eggs



photos by Jeff Kline, ENP

Everglade Snail Kite

Flying directly into the wind, the Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*) tucks its slate gray head downward against the air current and scans the shallow marsh waters with red eyes. With a few deliberate beats of its wings and a careening glide, the bird skims the surface of the water in search of its favorite meal, apple snails. Once it spots its prey, the Snail Kite extends ochre-hued legs with talons unfolded and plucks the snail from its watery haven.

Like many of south Florida's native fauna, the life history of this escargot-eating raptor is intimately linked with hydrology. The bird feeds primarily on the native apple snails that live in south Florida's freshwater marshes and shallow lakes. These smooth, coffee-colored invertebrates require nearly continuous flooding for more than a year to survive; however, if the water gets too high – more than around 16 cm – Snail Kites aren't able to access them. The birds will eagerly snatch snails from the shallows, but are not known to plunge into deep water to capture their prey.

The Everglade Snail Kite was listed as endangered in 1967 concurrent with the creation of the Endangered Species Preservation Act. At that time, the bird's population numbered only 21. Today, although still endangered, Snail Kite populations have increased to around 1,000. However, the recent appearance of exotic island apple snails has park scientists wondering about potential impacts on the rare bird. If these exotic snails cause a decline in native apple snail populations, the Everglade Snail Kite could suffer.



Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*)

Photo by Robert Bennetts, NPS