

Everglades Ecosystem Restoration - Florida Apple Snail

The South Florida Everglades ecosystem is currently the subject of an extensive multi-disciplinary study to determine the effects of various restoration scenarios proposed for the Everglades. No animal or plant will be unaffected by the restoration effort, including the Florida apple snail. This golf - ball sized wetland snail is a critical food web component in Florida wetlands, contributing to the diets of turtles, fish, alligators and wading birds.

Apple snails are most notably the exclusive food source of the endangered Florida snail kite. Understanding the effects of restoration efforts on snail kites and other wetland wildlife requires understanding the possible effects on apple snails.

Native to Florida, the apple snail is the largest fresh water snail in North America and is found in wetlands throughout the State. Despite their widespread distribution and importance in Florida wetlands, especially with regard to snail kites, little is known about the life history, ecology, and population dynamics of apple snails. The effects of dry downs, a hydrologic event where the water table drops below ground level, are of special



Snail kite eating an apple snail

concern. Although dry downs occur naturally in Florida wetlands, increases in the frequency and duration of dry downs, a result of water control projects, are generally believed to negatively affect apple snails and therefore snail kites.

Although dry downs may have harmful short-term effects on snails and kites, understanding the long-term benefits to the wetland habitats that support these species is critical to restoration success. Dry downs in wetlands are analogous to fires in upland systems in that they oxidize organic materials in the substrate, stimulate seed germination, and increase habitat heterogeneity.

The Florida Cooperative Fish and Wildlife Research Unit (FCFWRU) has investigated the life cycle of apple snails in relation to seasonal fluctuations in water level. Egg cluster production consistently peaks in April or May, followed by an annual post reproductive die off of adults. Clusters are laid above the water on emergent vegetation, but reproductive maturation and mating require water depths in excess of 10-20 cm. Dry downs occurring during peak reproduction periods can suppress or eliminate egg laying in the population for an entire year, so the timing of dry downs is critical.



Apple snail laying eggs on emergent vegetation

The proportion of the population that becomes stranded in dry down conditions, and therefore does not reproduce, is directly proportional to the spatial extent of the wetland that goes dry.

Dry downs also have a direct impact on snail survival. Dry down tolerance in snails is age and size dependent. A population of pre-reproductive snails with shells 25 mm or larger exhibited a survival rate of 75% after 3 months in dry down conditions. This degree of tolerance should allow snail populations to persist through most dry downs, which occur naturally in Florida wetlands, provided they do not suppress egg laying. However, newly hatched snails (5-mm shell size) may only tolerate a few days in dry conditions, but few data are available. Dry down timing, again, is critical because the hatchling snails must have enough water and food to grow large enough to survive an ensuing dry down.

The FCFWRU and the USGS-Biological Resources Division are continuing the efforts to demonstrate the crucial

relationship between snail populations and drying events. Many questions about snail ecology remain unanswered. Virtually nothing is known about the distribution and abundance of apple snails in different vegetation types or across environmental gradients such as hydroperiod. Survival across age classes, predation rates, and density-dependent growth rates remain unknown. Incredibly, given all the attention to snail kites in the past 20 years, the relationship between apple snail abundance and snail kite demography is still poorly understood. Clearly, one aspect of restoration success depends on further research to shed light on the relationship between apple snails and the organisms that depend on them for food.



Everglades apple snail habitat under wet conditions



Everglades apple snail habitat under dry-down conditions

For more information about the Florida apple snail and Everglades restoration contact:

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