

Pests

While the Non-native Species section mentioned several alien pests, there are also native pest species that Canaveral National Seashore (CANA) must contend with. Two of those are the mosquito and raccoon. It is notable that Volusia County was once named Mosquito County, before an attempt was made to attract tourists to the area. The two most common and bothersome mosquito species found here are the **salt marsh mosquito** (*Aedes sollicitans*), also known as the "salt marsh terror", and **black salt marsh mosquito** (*Aedes taeniorhynchus*). Female adults lay eggs on exposed mud flats, where they can remain for extended periods until submerged by rain or high tides, when they develop into aquatic larvae and eventually adults. Unlike freshwater mosquitoes, these two species are adapted to saltwater; the larvae can excrete excess salt through the anal gills. The saltmarsh mosquito may bite at any time, but is most active during the warmest parts of the day. The black saltmarsh mosquito bites mainly in the cooler hours of the morning and dusk. Remember mosquitoes are attracted to dark colors, so it is advisable to wear light-colored long-sleeved shirts and long pants if you plan to be out in times or areas frequented by mosquitoes.

When CANA was created, both NASA (which owns the southern two-thirds of the park) and the State of Florida (which transferred the northern portion of the park to the National Park Service) stipulated that CANA must cooperate with the local mosquito control districts. In addition, on former state lands, existing ditches dug for mosquito control are to be maintained. Under these agreements, the park has sought to utilize control methods that cause the least amount of damage to the environment. Two very different approaches are being used. The first is chemical control. Breeding areas are closely monitored by the mosquito control districts. When large amounts of mosquito larvae are observed, a larvicide is applied at those locations. Rather than kill the larvae, the larvicide retards development and prevents them from entering the adult stage. It is thought that the larvicide is very specific and has little impact on other organisms.

The other approach involves a combination of physical and biological control. Before the park was created, much of Mosquito Lagoon was ditched and impounded for mosquito control. The impoundments were created by constructing earthen walls or dikes around marsh areas. These were then flooded, eliminating the exposed mud needed by female saltmarsh mosquitoes to lay their eggs. While effective for mosquito control, this had a devastating ecological effect. It isolated valuable salt marshes that formerly provided significant amounts of food to the lagoon, served as critical nursery areas for many species of fish, and acted as a filtration system for lagoon waters. Today CANA is working with the state and county to reconnect impounded areas by breaching or completely removing the dikes.

Another technique called rotary ditching, addresses the mosquito control ditches, some of which date from the 1920's. Over time, many ditches became clogged and would collect water during rainy periods, actually increasing mosquito breeding habitat. To correct this, a special rubber-tired machine is being used to reopen the ends of the

ditches. Fish from the lagoon can then enter the ditches, reach mosquito breeding areas in the marsh and eat the larvae. The machine also contours the ditches in a shallow "V" shape to simulate a natural tidal stream, rather than the deep, straight cuts that were originally made. The rotary ditcher scatters the dirt out in a very thin film over a wide area, preventing berms that could retard natural water flow across the marsh. It is important to note that the park only allows rotary ditching in previously ditched areas. Non-impacted areas or places where the ditches have healed will not be altered. By allowing fish to feed on the larvae, the need for larvicide applications has been reduced significantly.

The park is concerned about the health and safety of its visitors and neighbors. Volusia County Mosquito Control District monitors birds and mosquitoes in the park and surrounding areas for signs of encephalitis or West Nile virus, which are transferred by mosquitoes. Fortunately, these diseases are rare among CANA's salt marsh mosquitoes, being primarily carried by freshwater species. Freshwater mosquitoes are relatively uncommon in the park, due to a scarcity of appropriate breeding habitat. While use of adulticides (chemicals to kill adult mosquitoes) may be considered in the advent of a serious health threat, the application of adulticides to simply control nuisance mosquitoes is not consistent with CANA's mission. Mosquitoes can be quite aggravating, but are a key component of the barrier island ecosystem and provide an important food source for many desirable species of fish and other animals. To remove them through the use of non-specific adulticides would have a negative impact on many wildlife species.

A second natural pest is the **raccoon** (*Procyon lotor*). As late as 1983, raccoons were destroying over 95% of the sea turtle nests deposited in the park each year. Since that time, the park implemented a nest protection program which has reduced predation to less than 20%. More can be learned about the program in the sea turtle discussion under Animals/Reptiles. Raccoons also prey heavily on other ground-nesting species, such as the black-necked stilt (*Himantopus mexicanus*), gopher tortoise (*Gopherus polyphemus*) and diamond-back terrapin (*Malaclemys terrapin tequesta*). Three things have contributed to what may be an unnaturally high raccoon population at CANA - dikes constructed for mosquito control provide easy access across formerly inaccessible areas of marsh, trash from visitors supplement the food source and natural predators, the red wolf (*Canis rufus*) and Florida panther (*Feis concolor coryi*), are gone. With a large population of raccoons, an outbreak of distemper or rabies is a continual threat.

However, it should not be forgotten that the raccoon also plays a positive role in the ecosystem by spreading plant seeds and helping to control rodent populations and ghost crabs. Ghost crabs can eat a significant amount of sea turtle eggs and hatchlings. The very qualities that make the raccoon a problem are the very ones possessed by humans - intelligence, resourcefulness, dexterous paws that function like hands and an extremely varied diet. The park is seeking funding for research to better understand density, diet, movements and health of its raccoon population.