Cape Sable Canals Restoration: Crocodiles and Spoonbills Suggest Ecological Response

Restoring more natural patterns of freshwater flow and salinity in coastal estuaries is an important goal of Everglades restoration (refer back to Sub-Goal 1-A, Get the Hydrology Right page 6). As restoration projects are completed, freshwater from upstream areas will be delivered southward through the system. In the meantime, in the Cape Sable and Flamingo area of Everglades National Park, a canal restoration effort has been plugging canals that were built in the early twentieth century. These canals have allowed tidal energy and saltwater to intrude into interior areas where it did not historically occur, causing erosion, marsh degradation, and filling the region's largest lake with sediment. This project gives us a glimpse into a future where ecological improvements will result from restoration actions. Two important species of the area that has been impacted by saltwater intrusion via canals are the American crocodile (Crocodylus acutus), which as juveniles are very sensitive to salinity levels, and Roseate Spoonbills (Ajaia ajaja), which depend on prey fish sensitive to salinity levels and tidal fluctuations.

Park managers, recognizing the need to address the changes created by the canals, plugged the East Cape, Homestead, and other interior canals in 1956 with earthen dams along the marl ridge to prevent further salt water intrusion and loss of freshwater to tide. Many of these dams eventually failed and a series of restoration efforts using stronger materials has followed over the decades and continues to the present time. The Buttonwood canal in the Flamingo area was plugged with a concrete structure in the mid-1980s and has remained in good condition. Now, many years after the canals were first dug, we have studied crocodiles and spoonbills at Cape Sable and Flamingo, where canal restoration actions were implemented, and compared the results to northeastern Florida Bay, an area which once provided the core habitat of the American crocodile in Florida but which now suffers from high salinity levels due to the shortage of freshwater flow through the altered system. Monitoring data collected in Florida Bay over recent decades on various aspects of crocodile life-history (occurrence, hatchling survival, growth, and nesting) show a repeating pattern. The animals have fared best in the Buttonwood canal area (where the successfully dammed canal has led to relatively stable lower salinity), next best in the area of other restored canals (including East Cape and Homestead canals where dams have failed and had to be restored over time), and worst in northeastern Florida Bay (where salinity levels have yet to benefit from restoration of freshwater flow). These results lend preliminary support to the hypothesis that restoring the hydrology of an area can result in ecological improvements.

Further, Audubon Florida scientists found that when the East Cape and Homestead canals were repaired in 2011, greatly reducing tidal influence at inland sites, prey availability increased and low salinity species became more prevalent. The number of Roseate Spoonbills that nest and feed near these sites had plummeted following the damaging 2005 hurricane season but began to increase again after the canals were dammed, restoring more natural conditions.

The canal plugging project in Everglades National Park serves to illustrate that even relatively small restoration efforts may produce meaningful ecological results and can serve to inform larger restoration projects. Because crocodiles and spoonbills in Everglades National Park have been monitored for many years, data needed to analyze response to canal restoration were available. Long-term monitoring of salinity, crocodiles, spoonbills, and their prey in these areas is vital to the assessment and fine-tuning of the restoration process. For a more detailed version of this case study, see the 2014 System-Wide Ecological Indicator Report.