

A Tour of the Islands of Pine Island Sound: A Geological, Archaeological, and Historical Perspective

Part 6: Cayo Costa Geology & Archaeology

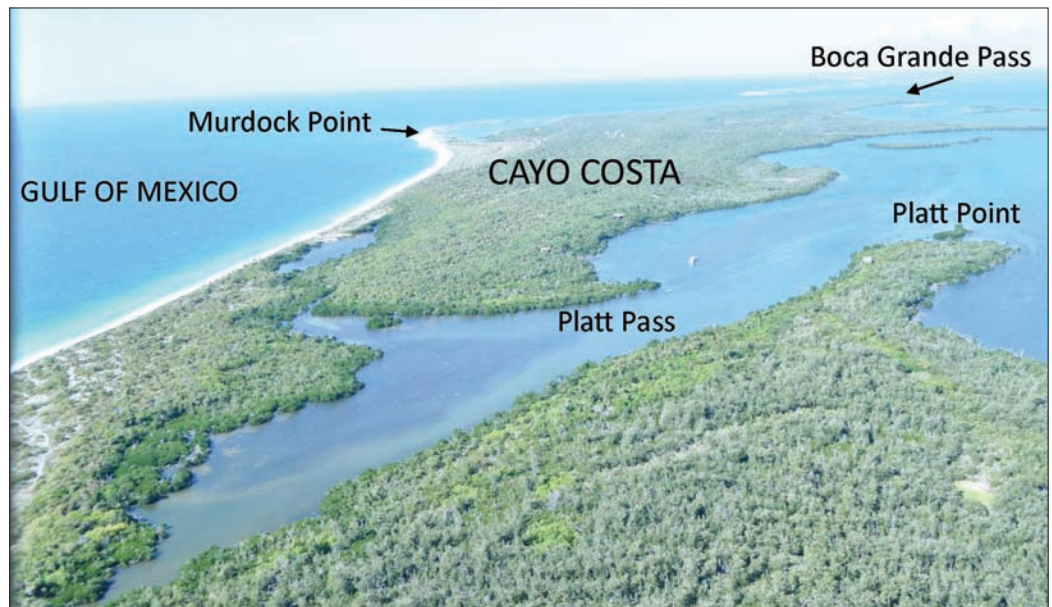
by Denége Patterson

Cayo Costa is a seven-mile long barrier island, with the Gulf of Mexico on the west and Pine Island Sound on the east. The north end at Boca Grande Pass is three miles west of the entrance to Jug Creek on Pine Island. Captiva Pass at the south end is five miles due west of Pine Island Center. Although about 25 private homes exist on building lots platted in the early 1900s, most of the island is a state park encompassing more than 2,400 acres.

The island rests on a solid foundation of limestone from the Miocene,* [terms with asterisks are defined below] and the upper layer of this belongs to a Pleistocene* series of sediments called the Anastasia Formation, a mixture of coquina-based limestone, sand, and clay. According to geologist Richard A. Davis, Jr., of the University of South Florida, writing in *The Geology of Florida* edited by Anthony F. Randazzo and Douglas S. Jones, the nearshore subtidal Holocene* sediments beneath the present barrier islands are 4,200 to 4,500 years old.

Geologist Albert C. Hine and his colleagues published a study in the *International Association of Sedimentology Special Publication*, 2009, suggesting that the sparkling sand visible today on Florida west coast beaches eroded from the quartz-rich Appalachian Mountains, carried downriver in fluvial channels during the Holocene. According to Davis, wave action and storms then lifted this sediment higher and higher onto Cayo Costa Island until beach foredune* ridges became elevated enough to prevent overwash.*

Barrier islands constantly move, and portions of them move faster than others. In 2005, researchers with the Charlotte Harbor National Estuary Program noted that the National Geodetic Survey markers were difficult to find after Hurricane Charley because the bay shoreline appeared to have shifted east by four feet.



Cayo Costa Island, northern half. (Photo by Judy Hopkins.)

The island's beach ridges and passes differ in age as a result of dynamic processes. Sediment samples on dry land range in age from 3,000 years old to less than 100 years old, according to geologist Frank Stapor and his colleagues. As reported by Karen Walker in *The Archaeology of Pineland* and by William Marquardt in *The Archaeology of Useppa Island*, geological and zooarchaeological evidence suggests that the effects of sea-level fluctuations and storms may have eroded away the entire southern half of Cayo Costa at various times in its history. This thin, sandy area is still vulnerable to overwash and breaching; the most recent was in 2004 during Hurricane Charley.

Murdock Point on the west coast of Cayo Costa is described by Hine as a prograding* formation. A sand spit in the Gulf of Mexico emerged west of Cayo Costa in 1944. In very slow motion over fifty-five years, it "bumped into" the island, enclosing its own lagoon. A channel just wide enough for boats to enter from the Gulf remained open. Geologists predict the sand bar may continue to move eastward to enclose the lagoon completely, after which the water body may leach salt and become an inland freshwater lake.

On the eastern side of the island, sand formations shaped like drumsticks constantly rotate their sand spits according

continued on page 2

continued from page 1

to tidal currents. Evidence of these formations may be observed on the map accompanying this article.

Cayo Costa offers a rare and valuable collection of ecological systems. The variables of moisture, salinity, and type of sediment, whether sand or muck, come together, attracting specifically adapted plants and animals and forming twelve classes of natural communities on the island. From beach dune to maritime hammock to coastal grasslands to marine tidal marsh and more, each unique system thrives today according to its own elevation and micro-environment.

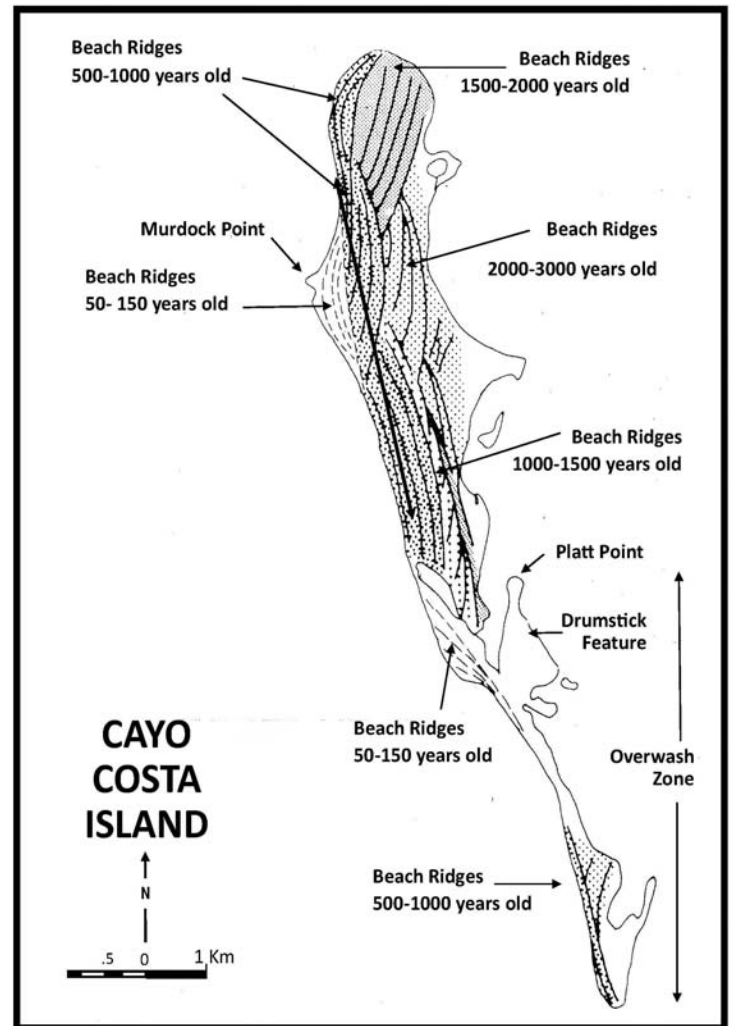
Today the beaches provide nesting sites for endangered sea turtles and ground-nesting birds such as piping plovers. The eastern fringe of red mangroves calms the waters, making good habitat for fish nurseries and bird rookeries. Bald eagles and ospreys select the most prominent trees for nesting. The eastern waters provide a natural sanctuary for aquatic mammals such as manatees, dolphins, and river otters.

Five or more archaeological sites or pre-Columbian mounds exist on Cayo Costa. The sites on state land are protected by laws designed to preserve the integrity of the cultural deposits. The Mark Pardo shell midden, which dates from the Caloosahatchee IIA to IV periods (AD 500–1500), is composed of linear shell deposits that parallel the shoreline adjacent to a black mangrove forest. The site may have been first occupied when sea levels were lower. It covers an estimated thirty acres, and the mound ranges up to 5 feet above the ground. It is bounded by a private residence. This site was placed on the National Register of Historic Places in 1996 for its potential to yield information about past environments and Calusa use of barrier islands.

The privately owned Faulkner Mound is located on the south end of Cayo Costa. Facing east, it is a flat-topped mound of shells. At 15 feet high, the shell mound extends its fingers several hundred feet through mangroves on the bay side. The mound was named for an early 1900s family who built a house there. According to a local fisherman quoted by Robert Edic in his book, *Fisherfolk of Charlotte Harbor*, the family did not fish for a living but kept beehives and sold honey.

The Old Ware Mound is a shell mound with an associated borrow pit extensively vegetated by mature trees, cactus, century plant, yucca, and buttonwood. The mound is deteriorated, slumping, eroded, and weathered, and shows animal damage, roots, and human disturbance from the distant past. Two relatively undisturbed shell middens of unknown cultural affiliation and temporal period are also located on Cayo Costa. Finally, a collection of linear shell ridges lies under an area covering 650 feet north-south by 130 feet east-west. This prehistoric site of unknown age is preserved beneath two historic town sites from the 1800s.

The historic sites and trails are intriguing because of their connection to the historic families who still occupy the region today. These and other aspects of Cayo Costa's early modern history will be discussed in the next article in this series. 🏰



Cayo Costa Island, showing numerous patterns of beach ridges and features. (Labels by D. Patterson; adapted from Stapor et al. 1988, modified by Davis 1997.)

Miocene epoch: time period lasting from 24 to 5 million years ago

Learn more: www.youtube.com/watch?v=wsbJ9cC5_aI

Pliocene epoch: time period lasting from 5 to 2 million years ago

Learn more: www.youtube.com/watch?v=v4iyv4Hcktg

Pleistocene epoch: time period lasting from 2 million to 10,000 years ago

Learn more: www.youtube.com/watch?v=UPf2o5ZrWis

Holocene epoch: time period lasting from 10,000 years ago to the present day

foredune: a dune ridge, parallel to the shore, that is stabilized by vegetation

overwash: the part of the wave that flows over the highest part of the dune or other structure and does not flow directly back to the ocean

prograding: the process by which a beach or delta enlarges by progressive deposition of sediments



Protecting Randell Research Center's Trees from an Invasive Pest

By: Siavash Taravati, Catharine Mannion, and Holly Glenn (University of Florida, Tropical Research and Education Center, Homestead, Florida)

In the summer of 2011, we received a report from the Randell Research Center (RRC) of an invasive whitefly. Besides its archeological value, RRC has a beautiful landscape with a variety of trees, shrubs, and grasslands open to the public. The gumbo limbo trees, which are native, are particularly treasured at RRC due to their aesthetic value and old age. Some of these trees were heavily infested with the rugose spiraling whitefly (RSW), *Aleurodicus rugioperculatus*, an invasive whitefly species first reported in south Florida in 2009.

Whiteflies are related to scale insects, mealybugs, and aphids. They have a piercing-sucking mouthpart, which they



Predatory lady beetle (*Nephaspis oculata*) feeding on a whitefly. (Photo by S. Taravati.)



Parasitoid wasp (*Encarsia guadeloupae*). (Photo by S. Taravati.)

insert into the plant tissue to feed and remove nutrients from the plant. The RSW also excretes a sticky, clear substance called honeydew, which provides an excellent substrate for the growth of sooty mold. Infestations of RSW are not only damaging to the plants they feed on, but create an enormous mess and nuisance with the accumulation of honeydew and growth of sooty mold. Everything in the vicinity of an infestation is affected.

In order to assist the RRC in controlling this whitefly infestation, two methods of control were evaluated. In the first method, select trees were treated with a systemic insecticide using two methods of application (drench and injection). Insecticide treatments were supplied and applied by TruGreen. The insecticide has been



Gumbo limbo trees at the RRC. (Photo by S. Taravati.)

previously used for whitefly control and when applied to the soil or trunk can provide long-term control.

The second method of control involved the release of known natural enemies of the whitefly on certain infested trees. These include a predatory lady beetle (*Nephaspis oculata*) and a tiny parasitic wasp (*Encarsia guadeloupae*). Both species are known to kill the immature stages of the whitefly, preventing them from becoming adults and reproducing.

The whitefly population on the insecticide-treated trees was reduced and the natural enemies were successfully established on infested trees. With the initial knockdown of the whitefly infestation from the insecticide and the establishment of the natural enemies, we hope that the whitefly population on RRC's trees will remain at non-damaging levels and that the honeydew and sooty mold will no longer be a problem or nuisance. 🍷

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The Randell Research Center

joined with dozens of area organizations in accepting a proclamation from the Lee County Board of County Commissioners commemorating VIVA 500. The Florida Department of State designated 2013 as Viva Florida 500 to commemorate our cultural legacy and reflect on the achievements of all who have contributed to Florida's dynamic growth, rich diversity, and economic prosperity. (Our own Cindy Bear is in the center, holding the proclamation.)

Recent graduates of the Coastal Module, Florida Master Naturalist Program instructed by Cindy Bear at RRC, found the class to be an informative and fun experience. They have put their new knowledge and confidence to work in new jobs, as community volunteers, and through sharing with their friends, families, and visitors. A special bond forms among class members and it has inspired continued field learning experiences and friendships.

This adult education class will again be offered at RRC on Oct. 23, Oct. 25, Oct. 30, Nov. 1, Nov. 6, Nov. 8, and Nov. 13 from 9 a.m. to 4:00 p.m. each day. Designed by the University of Florida IFAS/Extension, the class includes classroom learning, hands-on activities and field trips into the Pine Island Sound estuary, a salt marsh, a local commercial fishing operation, and the seashore at Ft. Myers Beach. Information is provided on general ecology, habitats, vegetation types, wildlife, and conservation issues of coastal Florida, specifically coastal upland, estuarine, and near-shore marine environments. It also teaches naturalist interpretive skills, environmental ethics, and the role of people in shaping our past and determining our future.

The cost for the course is \$225, which includes all field trips, over 40 contact hours of instruction, a comprehensive student reference workbook, a certificate of achievement, an embroidered

FMNP patch, and a FMNP coastal lapel pin. The only requirements of students are enthusiasm, attendance, and completion of group final projects. To register, visit the website at: <http://www.masternaturalist.ifas.ufl.edu/>. For more information, visit the website or call instructor Cindy Bear at 239-283-6168. (Photo by Rosemary Putnam, also a graduate.)



RRC News

Editor: William Marquardt

Writers: Holly Glenn
Catharine Mannion
Denége Patterson
Siavash Taravati

Production: GBS Productions



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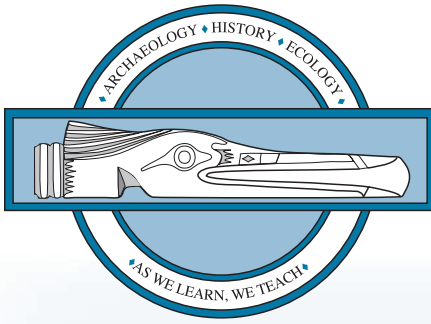
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Friends of the Randell Research Center

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Dear Friend,

You are cordially invited to join, or renew your membership in, the RRC's support society, *Friends of the Randell Research Center*. All Friends of the RRC receive a quarterly newsletter and free admission to the Calusa Heritage Trail at Pineland. Supporters at higher levels are entitled to discounts on our books and merchandise, advance notice of programs, and special recognition. Your continuing support is vital to our mission. It means more research, more education, and continued site improvements at the Randell Research Center. Thank you.

Sincerely,

William H. Marquardt
Director
Randell Research Center



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