Rookery Bay REVIEW

July - December, 2017

(special Irma issue)

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The official newsletter for
Rookery Bay National Estuarine Research Reserve

Director's Message

Dear Friends of the Reserve,

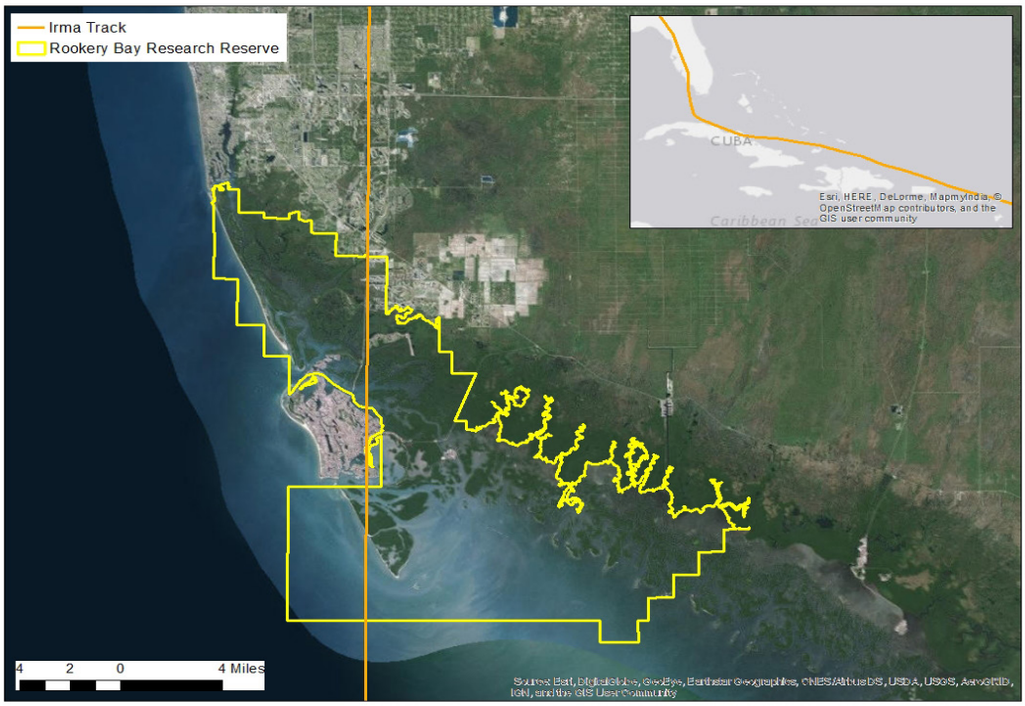
As a native Floridian, I am always keenly aware of hurricane season. This past summer was already shaping up to be a particularly busy season when Irma formed. For two weeks, long-range models insisted on a major hurricane landfall somewhere in South Florida.

Even on the morning of Sept. 10, 57 years to the day that Hurricane Donna made landfall in Collier County, no one knew where Irma was going or how strong she would be. She made her first Florida landfall that day on Cudjoe Key at 9:10 a.m. as a Category 4 storm, and again at 3:30 p.m. as a Cat 3 storm with 115 mph winds just 10 miles south of the Rookery Bay Research Reserve headquarters. Thankfully, Hurricane Irma lacked the 10- to 15-foot storm surge that was expected: Only 4 to 6 feet of surge hit the reserve. Our neighbors to the south in Chokoloskee and Everglades City, however, saw much more of a devastating effect.

In consultation with research staff, we made a gamble earlier that week and left our data sondes in place to record the water quality conditions as Irma came and went. We made this decision because there are very few opportunities in science to gather real-time information about a major change event. Our bet paid off, and we recorded amazing data that showed water chemistry changes before, during and after the storm. We also recorded the impact to fish communities and how their recovery was linked to the water quality. Finally, we are working with visiting researchers to look at mangrove research plots that were placed after Hurricane Donna.

The dynamic nature of coastal systems and barrier islands is that they absorb storms and adjust. The 110,000 acres protected inside our boundary did their job: They protected us. In the coming months and years, we will continue our work with scientists and resource managers to share the lessons from Hurricane Irma and how the reserves benefit local communities.

Keeping up with the tides,
Keith Laakkonen



Hurricane Irma was moving due north when her eyewall passed over Cape Romano, an undeveloped barrier island protected within the Research Reserve boundary. Fortunately, the beach and mangrove forest bore the brunt of the storm, sparing the city of Marco Island the initial and most damaging impact.

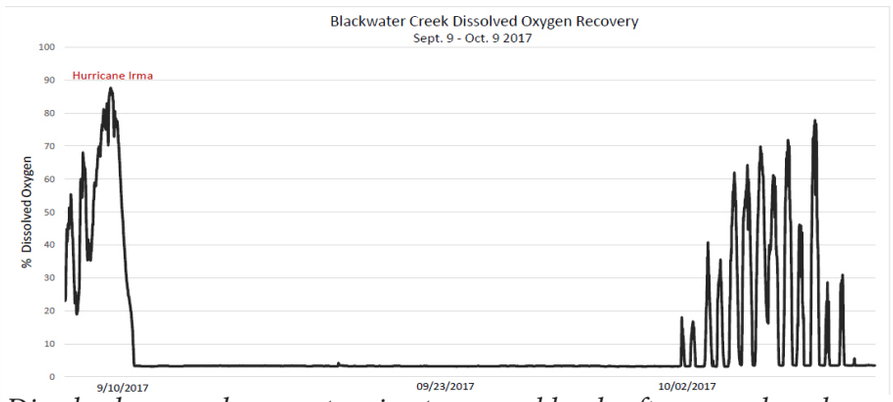
Trawling Program Showcases Estuary Resiliency

Pat O'Donnell hardly ever pulls up an empty trawl net. As a fish biologist working in the Ten Thousand Islands for the past 20 years, Pat has seen a lot of changes. When he resumed his trawling program on Sept. 30, two weeks after Hurricane Irma swirled over Southwest Florida, he wasn't sure what to expect.

Pat and his team of dedicated volunteers have been monitoring fish populations in the Rookery Bay Research Reserve to establish a reference dataset before the Everglades restoration work is fully completed in the Picayune Strand, just north of the Ten Thousand Islands. While many factors play a role for the fish community, the storm and recovery periods were remarkable.

During the week of Sept. 30, this Plecostomus was the only fish caught.

On the first post-Irma survey trips, the net was empty 11 out of 12 pulls. The one time a fish was present, it was a non-native species of armored catfish (*Plecostomos hypostomus*). This species is commonly found in roadside canals and other freshwater bodies, but rarely shows up in an estuary where conditions are typically too salty.



Dissolved oxygen began returning to normal levels after several weeks.

Nearly a foot of rain fell in a 24-hour period. In addition to altering the salinity, the rainwater draining off the land brought with it an abundance of natural organic material that led to intense decomposition and temporarily depleted the oxygen in the waters.

Pat believes the resident fish population moved out to open water in response to the lack of oxygen in the estuary.

In addition to the absence of bony fish on Sept. 30, the team did not catch any invertebrate animals. Crabs, shrimp, urchins, sponges and tunicates, which are commonly associated with warmer, late-summer waters, were scarce.

Pat's catches began returning to more normal composition in about a month. A few species dominated the typical catch, but throughout the recovery period catches became more diverse as oxygen levels rebounded. During the week of Oct. 15, the trawls resulted in a lot more fish than the previous effort. Most of the fish caught were juveniles, considered "young of the year," which speaks to the importance of backwaters as nurseries for estuarine and marine fish.

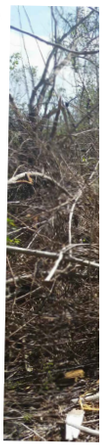
During the week of Oct. 15, this red drum was one of many juvenile fish caught.

Hurricane Irma affected coastal systems in many ways, and it will be years before all the effects are realized. This is the value of having a long-term dataset that allows anomalies and aberrations to be detected before they become trends. This large-scale "change event" quickly impacted the estuary, but recovery was also relatively quick. Within a single month, the system had already begun to correct itself, demonstrating the amazing resiliency that abounds in natural coastal systems.

Pat and his volunteers search a clump of sponge for small crabs.

Memories of Irm

Mangroves and other coastal habitats serve as a first line of defense during rough weather events. They help to slow storm surge, and friction force can help reduce wave energy. This "green infrastructure" helps protect homes and businesses from floating and windborne storm-created debris. Essentially, the mangrove forest was crucial in reducing storm severity in nearby developed areas.



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Thanks to pre-storm preparation by reserve staff, our facilities received only minor wind and surge damage.

High winds brought a lot of the tree canopy across the
grounds of the Environmental Learning Center. Duri
clean-up we encountered several limbs like this one. (
trees are especially known for hosting a variety of "ep
which are plants that grow on the bark of trees, such
bromeliads, butterfly orchids and resurrection fern. T
branch was replaced in a shady spot that remains in
oak hammock.

Material losses included the Research Vessel "Stella," several storage sheds and the aenomometer from our weather station. We also had damage to our pole barn and the roof at headquarters and the Learning Center.

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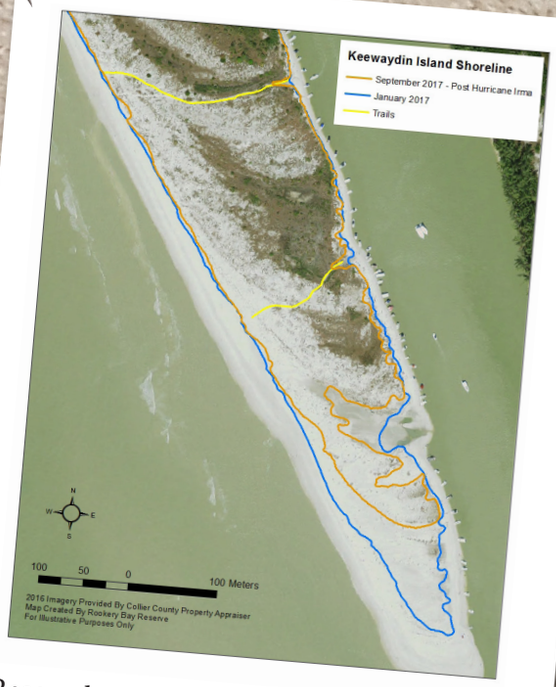
grateful for the assistance provided by a team from
ter site, Apalachicola National Estuarine Research
e, who arrived with chainsaws and fresh energy. They
cut our workload in half!



Research staff use Geographic Information Systems (GIS) to map the shoreline each year. Over the past several years, the island has been slowly accreting, or growing longer. After Irma moved through, however, they found that the beach had eroded by about 126 meters since it was last mapped in January 2017.

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Irma had significant impact on the shoreline of the Cape Romano complex. Wire cages that were protecting 30 sea turtle nests from predators couldn't protect eggs from storm surge or overwash. Post-storm, our recon crew could find only three of the cages and no viable eggs. Because the storm hit after the season's midway point, 45 nests were not impacted. In all, the 2017 nesting season was still a success, due in part to the Friends of Rookery Bay's Sea Turtle Support program that helps fund an annual sea turtle intern and the purchase of those cages.

A New Home for Rookery Bay Survivors Program

In December we hosted our first "Rookery Bay Survivors" seventh-grade field trip in our new outdoor classroom at the Rookery Bay Field Station on Shell Island Road. The classroom has significantly enhanced the seventh-grade and high-school education programs by providing an outdoor space for a variety of immersive, hands-on field trips with focus on the marine environment. The space was renovated with funds raised by the Friends of Rookery Bay during the 2017 Batfish Bash for the Bay.

Volunteer Superstars!

Although delayed by Irma, we hosted our annual luncheon recognizing the year-round dedication of our volunteers. Nineteen of these superstars were honored for reaching new milestones in service, but this summer's newest addition to our "Thousand Hour" club is Susan A. Miller. While Sue divides her time between several departments, she has been most active with the research department's fish trawling program.

Thanks to all for your service!

Team OCEAN Wins Prestigious Award

Team OCEAN was presented with the Guy Bradley Award from Florida Audubon during the annual 2017 Florida Audubon Assembly in St. Augustine on Oct. 21. Each year, this prestigious award recognizes an individual for extraordinary contributions to the protection and conservation efforts of Florida's birdlife.

While Team OCEAN volunteers conduct outreach and education on natural resource protection in many areas of Rookery Bay Research Reserve, it was to their efforts at Second Chance Critical Wildlife Area that the award was directed.

Please help us welcome our newest staff member, Anne Mauro, who is our new avian specialist. Anne hails from Ohio but has extensive Florida experience through her work with Ding Darling Refuge, Zoo Miami and Audubon Florida in various roles of shorebird and wading bird research.

Despite the storm, Anne has been on the water, getting to know the reserve and its birds. On Oct. 23, Anne spotted a piping plover on Keewaydin Island, one of the barrier island beaches protected within the research reserve boundary. Through her spotting scope she was able to see colored bands on the bird's legs. She reported her sighting to plover@umn.edu and learned that the bird had originated from the Great Lakes area, where the Piping plover is an Endangered species.

When Anne returned to the area on Nov.17, she saw the plover again and was able to read two of the digits on the bird's leg band, confirming that the bird was born in 2017 in Pennsylvania. Piping plovers haven't nested in Pennsylvania in 60 years! In 2017, four chicks were banded there, and two of those chicks (including the one Anne saw) have been sighted in Florida this year. *Plover photo by Anne Mauro.*

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From your friends at
Rookery Bay Research Reserve