

### Captiva – Post Hurricane Irma

It took Captiva’s “robust program to absorb a storm like Irma” according to Senior Coastal Engineer Thomas Pierro at the conclusion of a presentation of the *Hurricane Irma Storm Damage Report* to the CEPD Board of Commissioners. The Lee County Tourist Development Council and the CEPD jointly funded the cost for the post hurricane report.

The report noted that Irma made landfall on the southwest Florida coast as a Category 3 at Marco Island approximately 80 miles south of Captiva Island in Sep-



**Hagerup Beach after Irma**

tember. The storm surge, waves and winds impacted Captiva resulting in loss of sand from the 2013 nourishment project area. The post-

storm survey done by APTIM Coastal Planning & Engineering in October 2017 was used to determine beach sand volume changes.

Most of the 2013 beach nourishment project area lost volume, with a few isolated areas of small gains throughout the island and the most gain occurring at the north end adjacent to Redfish Pass. The total volume changes between May 2017 (pre-storm) and October 2017 (post-storm) are 38,524 cubic yards. After removing normal background changes of 4,348 CY in volume to adjust for the 5 months between pre and post surveys, the storm-induced change is defined as 34,176 cubic yards. While the shoreline retreated and dry beach deflated, some of the volume lost on the dry beach was retained on the submerged portion of the beach.

Shoreline retreat was also examined. The 2013 project included the entire gulf front shoreline. The damage report compared the beach width remaining from the pre-to post-storm surveys (May 2017–October 2017). On average, the shoreline retreated approximately 18.7 feet in the Captiva Island project area. The average beach width remaining is 128 feet. The project area will continue to be monitored.

### Placing a Value on Beach Recreation

Visitors to Captiva’s beaches this winter can contribute indirectly to the funding of the island’s next beach nourishment project through their willingness to participate in a brief survey during their beach visit. Roving surveyors with official identification and under the supervision of economists William Stronge, Ph.D., and Gary Jackson, Ph.D., will be seeking survey data on the island of beachgoers during the months of February and March. Robust annual beach attendance and spending numbers assist the CEPD in obtaining grant funding for beach nourishment as well as providing a basis for the recreational benefit calculation for project assessment.

The survey instrument will include collection of demographic data regarding permanent residence location, seasonal residence, frequency of beach visits, vacation status, and spending. Length of stay and turnover will be used to estimate annual beach attendance. In addition, a section on willingness to pay including the value placed on the beach visit will be structured into the questionnaire to obtain a non-



**Data from surveys of beachgoers will be used in obtaining funding and as a basis for the recreational benefit analysis**

biased monetary value of recreation for beachgoers. The results of the survey will be in the form of aggregate totals or averages, and not identified with the individual responses of any one person or family.

A report entitled *Recreational Use of Captiva’s Beaches and Economic Impact* will be ready for presentation to the CEPD Board of Commissioners by the end of May 2018.

## NOAA Agency Reports 2017 Was an Extreme Year

NOAA's National Centers for Environmental Information has issued its 2017 climate change and disaster report. It was a year of extremes in the U.S. as floods,



National Centers for  
Environmental  
Information

tornadoes, hurricanes, drought, fires, and freezes claimed hundreds of lives and caused vast economic hardship. Moreover, recovery from the 3 major Atlantic hurricanes and wildfires in the West is expected to continue into 2018.

**Temperature** - The average U.S. temperature was 54.6 degrees F, 2.6 degrees above average, making it the 3rd warmest year in 123 years of recordkeeping. The 5 warmest years on record all have occurred since 2006. For the 3rd consecutive year, every state in the contiguous U.S. and Alaska experienced above average temperatures.

**Precipitation** - Precipitation for the year totaled 32.21 inches, 2.27 inches above the long-term average, ranking 2017 as the 20th wettest year and the 5th consecutive year with above average precipitation. The national drought footprint began and ended with about one quarter of the lower 48 states in drought. The drought footprint reached a low of 4.5% in May, the smallest drought footprint in the 18-year period of monitoring.

**Disasters** - Last year the U.S. experienced 16 weather and climate disasters each with losses exceeding \$1 billion, totaling approximately \$306 billion, a new U.S. record. Far more tragic, at least 362 people died and many more were injured. The disasters included 1 freeze, 1 drought affecting multiple areas, 1 wildfire affecting multiple areas, 2 floods, 3 major hurricanes, and 8 severe storms. The biggest were the western U.S. wildfires (\$18 billion), Hurricane Harvey (\$125 billion), Hurricane Maria (\$90 billion), and Hurricane Irma (\$50 billion). The western fires costs were triple the previous record, losses from Hurricane Harvey ranked second only to Hurricane Katrina, the costliest storm in the 38-year period of record. Hurricane Maria now ranks as 3rd costliest weather and climate disaster for the nation, with Irma coming in as the 5th costliest. Since 1980, the U.S. has sustained 219 weather and climate disasters that have exceeded \$1.5 trillion in overall damages.

For the full report, go to <https://www.climate.gov/news-features/blogs/beyond-data/2017-us-billion-dollar-weather-and-climate-disasters-historic-year>

## Preliminary Design Work for Next Renourishment Begins

While the next beach renourishment project on Captiva is several years away, the work begins well before the first load of sand makes it onto the beach. The first project phase is to secure all necessary permits. In 2015 CEPD was granted a new Joint Coastal Permit from the Florida Department of Environmental Protection and the U.S. Department of the Army authorizing the District to continue beach nourishment along the beaches for a 15 year period.

The next phase of work is to prepare an engineering design and cost estimate for the project with a report for use in planning and to provide the storm damage modeling needed for the CEPD's project economist to calculate storm damage reduction benefits based on the selected design of the proposed renourishment project. The engineering design will update the project design objectives, analyze the coastal processes and historic project performance, develop the project design, prepare the cost estimate and conclude with a recommended design. The recommended plan will describe the design conditions, the advance nourishment volume and the probable distribution of fill sand for the upcoming nourishment project. The available sand sources will be identified and described. An estimated construction schedule, timing and method of construction will be summarized.



Bulldozers and pipe are staged at the beginning of the 2013-14 Captiva Island nourishment project

The District contracted with APTIM Coastal Planning & Engineering to perform the work. The engineering report detailing the engineers' recommended plan and alternatives will be presented to the CEPD by APTIM engineers for review and comment. The final plans and specifications for the next renourishment project will be based upon the finalized engineering report.

## Sex of Turtles Impacted by Climate Change

A study just recently published in the journal *Current Biology* found greater than 99% of green sea turtles nearing adulthood in the northern section of the Great Barrier Reef were born female. A similar number was reported for juveniles. The northern Great Barrier Reef has one of the largest populations of green sea turtles in the world numbering around 200,000 nesting females. In



the southern part of the Reef, where the temperatures are cooler, females still outnumbered

males but at a lesser ratio of between 65% and 69%.

Conducted by the Marine Mammal and Turtle Division of NOAA's National Marine Fisheries Service, the study suggests this phenomenon is a consequence of global warming and might threaten the species. The sex of most turtles is determined by the temperature of the sand in which their eggs incubate. A very narrow and specific temperature range produces a clutch where 50% of the babies are born male. A shift by just a few degrees cooler can produce a 100% male clutch. A few degrees hotter can turn the whole clutch female. Moreover, the heat does not just feminize the turtles; it can kill them. With average global temperature predicted to increase 2.6 C by 2100, many sea turtle populations are in danger of high egg mortality and female-only offspring.

It is possible that virtually no male turtles are now being produced from these nesting sites. Although increased breeding frequency and the polygynous behavior of male turtles may help the offspring sex ratio, it is not known how many or what minimum proportion of males is sufficient to sustain sea turtle populations. The reports says "it is clear that climate change poses a serious threat to the persistence of these populations."

### Information on Red Tide

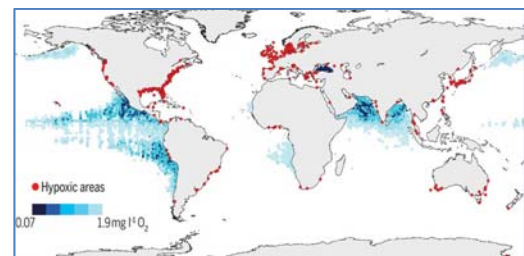
Florida Fish and Wildlife Conservation Commission provides a current status report on red tide in Florida at <http://myfwc.com/REDTIDESTATUS>

Mote Marine Laboratory provides beach condition reports from Clearwater Beach to South Marco Beach at <https://mote.org/research/program/environmental-health/beach-conditions-report-red-tide-information>

## Dead Zones Are Increasing

In its *Summer 2017 Newsletter*, CEPD reported federal scientists forecast the summer's Gulf of Mexico "dead zones" would be the 3rd largest since monitoring began 32 years ago. Now a new study has found dead zones in the open ocean and coastal waters are increasing. The study, published in the journal *Science*, found the areas in the ocean without oxygen have increased over four-fold in the last 50 years. The situation along the coastlines is even more troubling. There, nutrients can stimulate oxygen-draining algae blooms. The study reported there are almost 10 times as many regions along the coast without oxygen than there were in prior studies.

The ocean holds less oxygen when it warms, and as the surface warms, the oxygen has difficulty reaching deeper waters. Low oxygen areas force fish to find new homes and can impede reproduction and growth. These conditions can also cause releases of chemicals like nitrous oxide, a greenhouse gas 300 times stronger than carbon dioxide. Coral reefs could be lost. Coral bleaching events have increased fivefold since the early 1980's.



To stop the decline in oxygen, the researchers suggest taking steps to reduce climate change and nutrient pollution. The former will take extensive global efforts, they say, but nutrient reduction can happen, as evidenced by the reduction in dead zones in the Chesapeake Bay. In 2009, six states and the District of Columbia, with funding from the Environmental Protection Agency, combined their efforts to clean up the Bay. By the summer of 2016, scientists recorded no dead zones. Although progress may be slow and setbacks can happen, success is possible

## Great Whites Spotted in the Northern Gulf

Shark sightings in the Gulf of Mexico are not unusual. The great white shark of the movie *Jaws* fame was thought to stick to its home waters, or so scientists

(Continue on Page 4



**Great Whites Spotted in the Northern Gulf**  
(Continued from Page 3)

believed until technology allowed them to track the animals. Three adolescent female great whites, named Katharine, Betsy and Miss Costa, have all made the journey to the Gulf after they were tagged with tracking devices in New England starting in 2013. This suggests that great whites may be more common in the Gulf than first thought, especially in the northern part.

Miss Costa's tag sent a signal to a satellite tracker while the animal's dorsal fin was above the water's surface January 1, 2018 off the coast of Tampa Bay. Weighing 1,700 pounds and measuring 12 feet long, Miss Costa got her tag near Massachusetts in fall 2016 and has traveled 6,000 miles since. The three sharks in the Gulf were tracked by the nonprofit research group Ocearch, which follows sharks in real time and shares the data publicly.

Tagging a shark is difficult. Sharks must keep swim-



Ocearch scientist releasing a tagged shark

SAVE THE DATE		
3/14/2018	Regular Board Meeting	1:00 pm
4/11/2018	Regular Board Meeting	1:00 pm
5/9/2018	Regular Board Meeting	1:00 pm
6/13/2018	Regular Board Meeting	1:00 pm
7/ 11/2018	Regular Board Meeting	1:00 pm
8/8/2018	Regular Board Meeting	1:00 pm

Meetings are held at Tween Waters Inn. The public is welcome.

ming at all times or they enter a coma-like state and die. Sharks are caught off boats with baited hooks and maneuvered onto a platform attached to the boat. The platform rises and scientists cover the eyes with a wet cloth to keep it calm as a hose is inserted into its mouth to provide a continuous supply of water through which the shark gets oxygen. The process takes about 15 minutes and puts the shark under a minimal amount of stress.

"We need great whites to keep balance in the ocean as top predators," said Dr. Robert Hueter, senior shark scientist at the Mote Marine Laboratory in Sarasota and Ocearch's chief science adviser. "We're trying to find out where they're feeding and reproducing so we know where to focus conservation efforts that will keep the population stable."

Shark watchers can track the path of Miss Costa and other sharks by downloading Ocearch's Global Shark Tracker App for Apple and Android phones or by going to <http://www.ocearch.org>.

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