

HURRICANE IRMA

5

Category
(catastrophic)

2

Inches of Rain

25.7

Miles per hour
of Max Wind Speed

1.1

Feet of Storm Surge*

Image Credit: NASA NOAA GOES, taken on September 6, 2017

Monitoring the Impact of Hurricane Irma at "Jobs Bay NERR"



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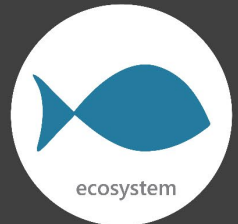
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Culebra, Vieques, and mainland Puerto Rico began to experience sustained tropical storm forced winds as the center of Irma approached on Sep. 7. Although the majority of the rainbands of the hurricane-affected Puerto Rico and the US Virgin Islands, the eyewall remained just north of mainland Puerto Rico. In general, most of mainland Puerto Rico only observed sustained tropical storm forced winds.

The effects of Irma were observed at the **Jobs Bay NERR (JBNERR) Research Reserve** through the **System-Wide Monitoring Program (SWMP)**, which tracks short-term variability and long-term change of weather and water quality in the areas surrounding the southern coast of Puerto Rico.

STORM
STORIES



NATIONAL
ESTUARINE
RESEARCH
RESERVE
SYSTEM



National Estuarine
Research Reserve System
Science Collaborative

Data shown are based on the JBNERR weather monitoring site

*Data based on the Yabucoa Harbor NOS site

Created on May 31, 2022

JBNERR

Jobos Bay NERR (JBNERR) is one of 30 sites in the National Estuarine Research Reserve Systems (NERRS). Each site is a state-federal partnership that combines research, monitoring, and education to advance the understanding and management of estuarine environments.



Locally Relevant, Nationally Significant

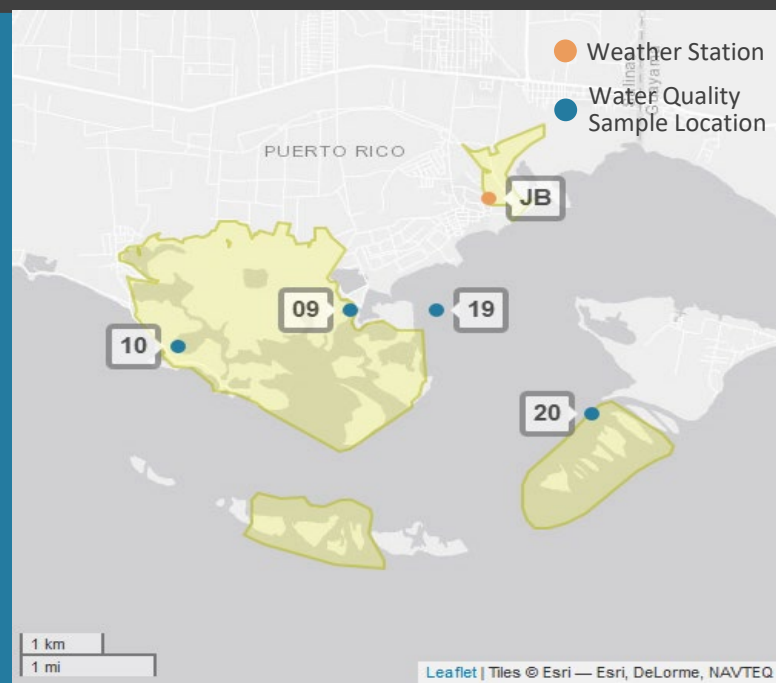
The **System Wide Monitoring Program (SWMP)** tracks weather and water quality as a storm happens and the impacts that follow. Scientific instruments (i.e., data sondes and sensors) are deployed at Reserves along the Atlantic and Gulf of Mexico coastal areas collecting data on the condition of our estuaries 24/7 to help protect people and places.

Data from the extensive monitoring network are delivered to the **Centralized Data Management Office (CDMO)**. Near real-time SWMP data are now available to via smartphone or tablet at: www.nerrsdata.org/mobile

JBNERR Storm Monitoring

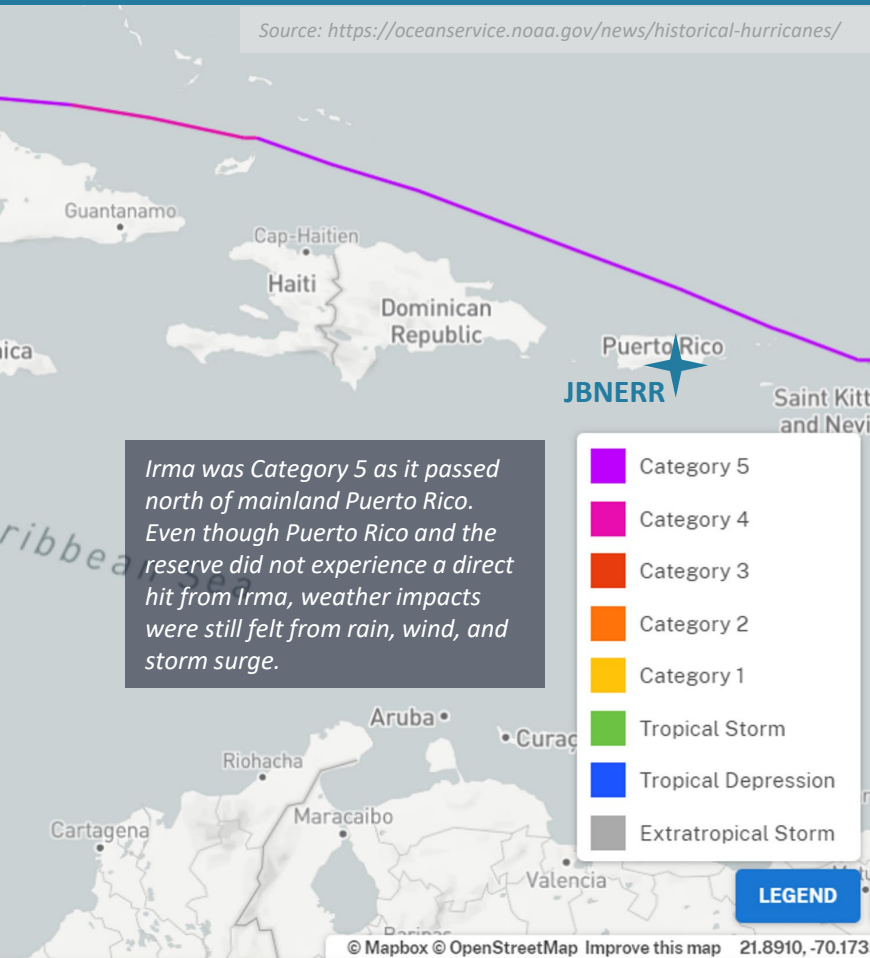
JBNERR operates a weather station located at Jobos Bay (JB) and maintains four continuous, long-term water quality stations including Station 9, Station 10, Station 19, and Station 20.

JBNERR is part of the SWMP. As Hurricane Irma approached Puerto Rico, JBNERR monitored the weather and water quality, collecting data every 15 minutes for the following parameters: air temperature, relative humidity, atmospheric pressure, rainfall, wind speed and direction, water temperature, depth, salinity, dissolved oxygen, turbidity, and pH.



Storm Track

Irma made its third landfall on the island of Virgin Gorda in the British Virgin Islands Sep. 6 as a Category 5 hurricane. The eye of Irma tracked about 50 n mi to the north of the northern shore of Puerto Rico and the Dominican Republic from Sep. 6 to Sep. 7.



Event Impacts



Human Health & Safety

- Heavy rains caused widespread power outages and minor damage to homes and businesses.
- Weak structures on the island collapsed and numerous trees were uprooted.
- There was also a near-total loss of electricity and water supply for several days.
- Three indirect deaths occurred in Puerto Rico from Hurricane Irma.



Economic Losses

- Irma caused more than an estimated \$700 million in damage.



Ecosystem Impacts

- Aquatic life (i.e., oysters, crabs, lobster, fish, aquatic plants, phytoplankton) rely on specific levels of salinity and dissolved oxygen to thrive and survive. Significant drops in salinity levels and dramatic changes to the typical diurnal variation of dissolved oxygen can potentially stress organisms. However, the water quality in the reserve was minimally impacted by Irma.



Weather Data

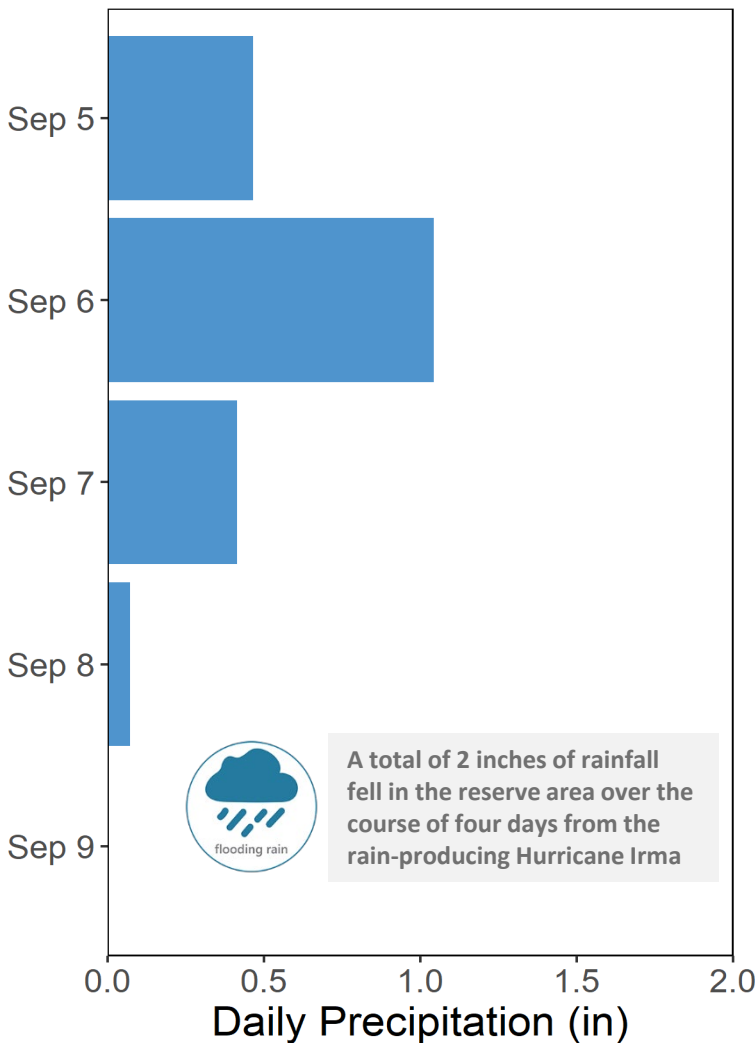
Station	Date	Total Precipitation (in)	Average Precipitation Intensity (in)	Max Wind Speed (mph)	Average Wind Speed (mph)
Jobos Bay Weather	9/5/2017	0.45	0.0238	19.7	4.2
Jobos Bay Weather	9/6/2017	1.01	0.0422	25.7	8.2
Jobos Bay Weather	9/7/2017	0.36	0.0151	25.7	14.7
Jobos Bay Weather	9/8/2017	0.17	0.0069	18.3	10.1
Jobos Bay Weather	9/9/2017	0.00	0.0000	17.7	6.7

The highest local rainfall and wind measurements were recorded as Irma approached north of the mainland island on Sep. 6.

Data reporting time periods for Hurricane Irma: 9/5/2017 - 9/9/2017

RAINFALL

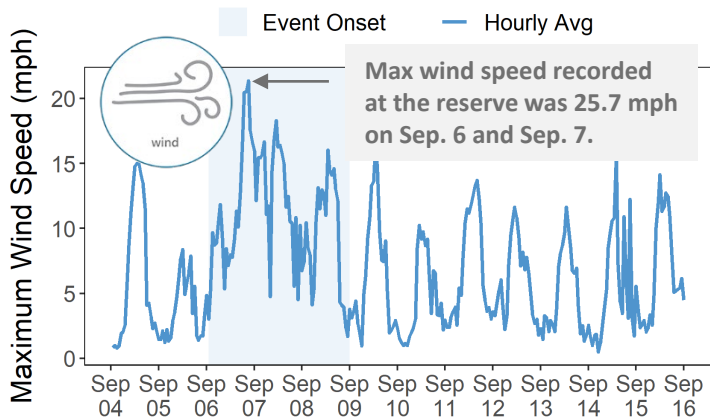
Jobos Bay Weather (JB)



Rainfall measurements at the Jobos Bay weather station from Sep. 5 through Sep. 9.

WIND SPEED

Jobos Bay Weather (JB)



Maximum Wind Speed readings at the Jobos Bay weather station from Sep. 4 through Sep. 16.

Irma brought rain, high winds, and storm surge flooding to Puerto Rico.



A total of 2 total inches of rainfall and a max wind speed of 25.7 mph were recorded at the Jobos Bay weather station. Even though Puerto Rico did not experience a direct hit from Irma, rainfall totals between 10 and 15 inches occurred over high elevations in the central portion of the island between Sep. 5 and Sep. 7. The highest wind speed reported in Puerto Rico was 55.2 mph with a gust of 73.6 mph at an NOS site at La Puntilla in San Juan Bay on Sep. 6. Maximum inundation levels of 1 to 2 ft above ground level occurred along the coast of Puerto Rico.

Although Irma's eyewall passed to the north of Puerto Rico, tropical-storm-force winds and heavy rains caused widespread power outages and minor damage to homes and businesses. Weak structures on the island collapsed and numerous trees were uprooted. There was also a near-total loss of electricity and water supply for several days. Three indirect deaths occurred in Puerto Rico from Hurricane Irma. On the island of Culebra, there was also a near-total power and water loss. Many homes on the island were destroyed or suffered major damage, and widespread uprooted trees were reported.



Water Quality Data

Overall, there was not a strong water quality impact from Hurricane Irma. Salinity levels at Station 19 decreased slightly on Sep. 8 and then quickly returned to pre-storm levels by Sep. 10.

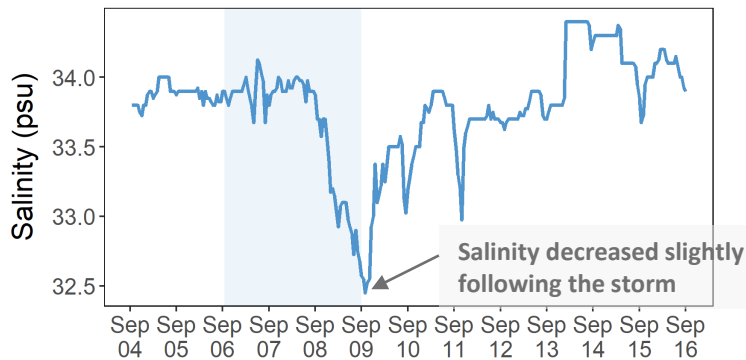
Station	Date	Turbidity Maximum (NTU)	Salinity Minimum (psu)	Salinity Maximum (psu)	Dissolved Oxygen Minimum (mg/L)	Dissolved Oxygen Maximum (mg/L)
Station 19	9/6/2017	6	33.6	34.2	4.9	6.9
Station 19	9/7/2017	6	33.3	34.1	4.5	6.5
Station 19	9/8/2017	3	32.8	34.0	5.0	7.6
Station 19	9/9/2017	8	32.4	33.5	5.1	8.2
Station 19	9/10/2017	2	32.9	33.9	5.0	7.5

Data reporting time periods for Hurricane Irma: 9/5/2017 - 9/9/2017

SALINITY

Station 19 (19)

Event Onset Hourly Avg

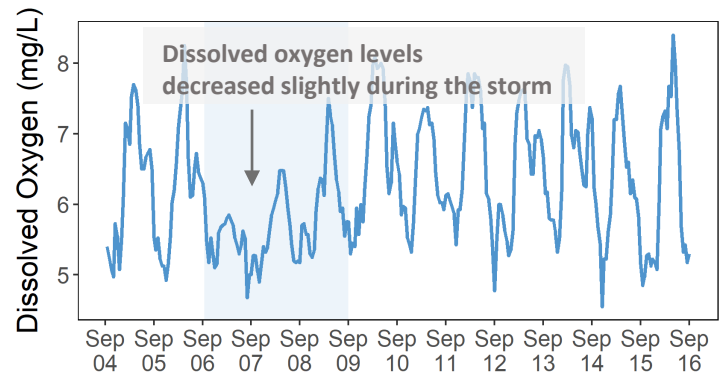


Salinity levels from Sep. 4 to Sep.16

DISSOLVED OXYGEN

Station 19 (19)

Event Onset Hourly Avg



Dissolved oxygen levels from from Sep. 4 to Sep.16

Salinity and Dissolved Oxygen levels that were recorded at the Jobos Bay NERR Station 19 show initial and post-storm water quality in this area. Overall, water quality does not appear to be significantly impacted at this location. Salinity levels decreased slightly after the storm passed but quickly returned to pre-storm levels. Dissolved oxygen levels decreased slightly from Sep. 6 to Sep. 8 but then returned to pre-storm levels by Sep. 9. Dramatic changes in salinity and lower levels of oxygen can cause stress to some aquatic organisms depending on the species and how long the levels deviate from what is normal. Water quality stresses can impact survival and future populations. However, dramatic changes were not observed for Hurricane Irma.



Every plant and animal species have habitat preferences and requirements. Understanding these habitats is critical to understanding populations.

About NERRS

Established in 1972, the NERRS is a network of 29 ecologically significant, locally treasured estuarine places in 23 states and Puerto Rico. Each Reserve is a partnership between NOAA and a state agency or university. Most of the 1.3+ million acres of estuary lands and waters that Reserves help to protect and steward are open to the public. Reserves work with local decision makers, states, universities, nonprofits, and others to set natural resource management priorities and address them through research, environmental monitoring, education, training, and stewardship.

The health of every reserve is continuously monitored by the System Wide Monitoring Program (SWMP). SWMP is a robust, long-term, and versatile monitoring program that uses the NERRS network to intensively study estuarine reference sites for evaluating ecosystem function and change. Reserve-generated data and information are available to local citizens and decision makers. For more information, go to: <https://coast.noaa.gov/nerrs/>

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DATA

Visit www.nerrsdata.org to view and download weather and water quality data from Jobos Bay NERR.

EXPLORE

Interested in learning more? Visit <https://www.drna.pr.gov/jbnerr/>. For video, news updates, online storm data and prediction visualization tools, check out our Storm Story Map at www.stormstorymap.url.



National Estuarine Research Reserves Protect People & Places

This work is/was sponsored by the National Estuarine Research Reserve System Science Collaborative, which supports collaborative research that addresses coastal management problems important to the reserves. The Science Collaborative is funded by the National Oceanic and Atmospheric Administration and managed by the University of Michigan Water Center (NA19NOS4190058).

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