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How Clean Is My Water?

2017 Water Quality Year-in-Review

In 2017, GBF's Water Quality Monitoring Team collected and analyzed 615 water samples from 66 sites around Galveston Bay. These samples were collected by 70 different volunteer monitors who sampled for air and water temperature, dissolved oxygen, pH, salinity, water transparency and depth, as well as general field observations. For more information about this program, visit galvbay.org/watermonitors.

Figure 1. 2017 Water Monitoring Locations

This document summarizes our findings for each parameter based on the Team's 2017 data.

To view 2017 Water Quality summaries for each individual site, please click on each site on our sampling map*, linked here or accessed from our webpage (galvbay.org/watermonitors).

This data can be viewed and downloaded from the Citizen Science Data Portal, accessed through a button on our webpage (listed above).

**Sites on map without 2017 data summary are new as of 2018*

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Air Temperature

Average of **23.5° C** in 2017

This is **similar to** previous years.

2016 average: **24.0°C** | 2015 average: **23.1°C** | 2014 average: **22.4°C**

How does air temperature impact water quality?

Air temperature impacts water quality by influencing weather processes and water temperatures.

According to the data…

GBF's Water Monitoring Team observed a slight increase in the air temperature from 2014 to 2016, with 2017's temperature remaining within a similar range.

Water Temperature

Average of **23.0° C** in 2017

This is **similar to** previous years.

2016 average: **22.8°C** | 2015 average: **22.8°C** | 2014 average: **21.9°C**

How does water temperature impact water quality?

Water temperature can impact biological factors, including hibernation, reproduction, and migration.

Water temperature also impacts water chemistry. It can alter the rate of reactions and how much dissolved oxygen the water can hold; cold water can hold more oxygen than warm water.

According to the data:

GBF's Water Monitoring Team has observed a slight increase in the average water temperature from year to year, with 2017's temperature the highest recorded.

Impacts from Hurricane Harvey:

Harvey did not appear to significantly impact water or air temperature.

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Dissolved Oxygen

Average of **6.1 mg/L** in 2017

This level is **good** for supporting animal life.

This is **similar to** previous years.

98% of dissolved oxygen samples could support life in 2017.

What is dissolved oxygen?

Dissolved oxygen (DO) concentrations tell us the amount of oxygen freely available in the water.

How does dissolved oxygen impact water quality?

Fish and other aquatic life depend on dissolved oxygen to survive; if oxygen levels are too low they will suffocate. DO levels of 5 mg/L or higher are required for healthy growth and activity. Levels between 3 and 5 mg/L are stressful to most aquatic animals, and levels below 3 mg/L are considered dangerous.

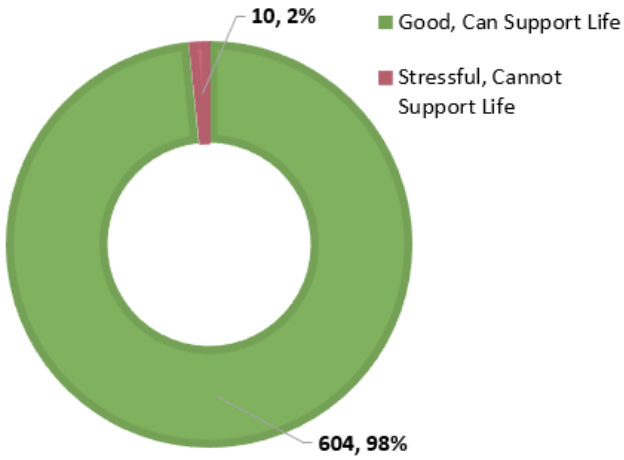
According to the data:

In 2017, 98% of the DO samples collected by GBF's Water Monitoring Team were 5 mg/L or higher. This indicates that DO levels are suitable for life within Galveston Bay.

Impacts from Hurricane Harvey:

Harvey did not appear to significantly impact dissolved oxygen.

Dissolved oxygen values for 2017:



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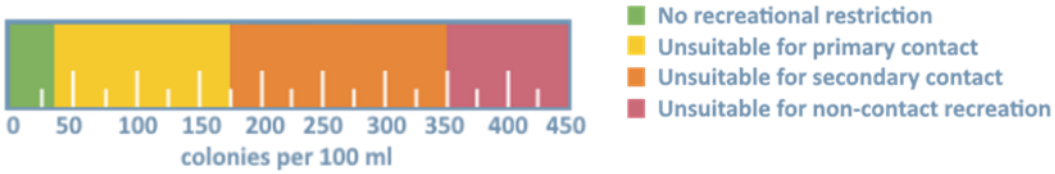
Enterococci Bacteria

Geometric Mean of **8.0 MPN** in 2017



This is considered **safe** for swimming by the EPA.

This is **similar to** previous years.

2016 GM: 6.5 MPN | 2015 GM: 12.8 MPN | 2014 GM: 7.8 MPN

What are Enterococci?

Enterococci are bacteria that indicate the presence of harmful fecal waste in the water.

How do Enterococci impact water quality?

High levels indicate the presence of fecal waste that can make us sick and impact the economy. Sources include polluted storm water, failed wastewater infrastructure, and from pets and wildlife.

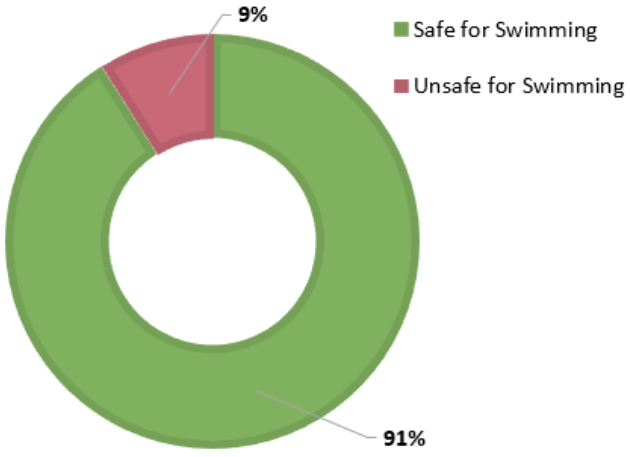
According to the data:

About half of GBF's Water Monitoring sites test for Enterococci. Of the 295 samples collected in 2017, 9% of them were considered unsafe for swimming. Most of these occurred soon after major rain events.

Impacts from Hurricane Harvey:

GBF Water Monitors began collecting water quality samples one week after Harvey hit the Texas Coast. By then Enterococci bacteria levels were low enough to be considered safe for swimming.

Enterococci values for 2017:



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Salinity

Average of **14.3 ppt** in 2017

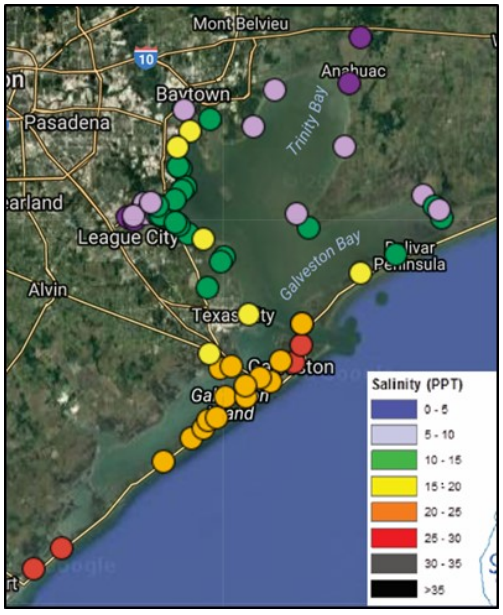

Figure 2. Salinity averages by site, 2017

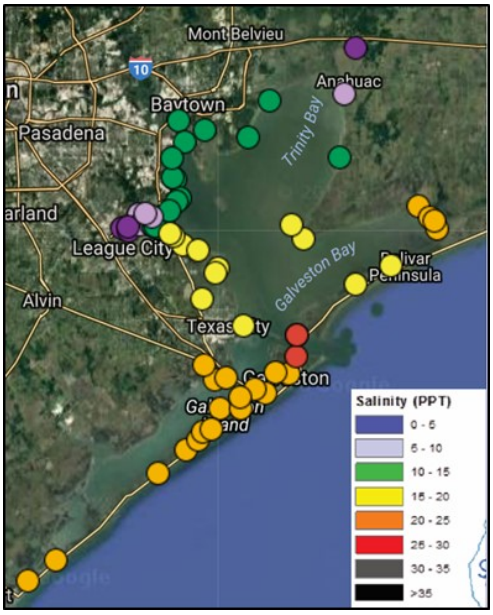

Figure 3. Salinity averages by site, normal year

This is **higher** than in previous years.

2016 avg: 11.9 ppt | 2015 avg: 12.45 ppt | 2014 avg: 19.11 ppt

What is salinity?

Salinity is the total amount of salts dissolved in the water. Fresh water usually has a salinity of 0 ppt, while salty ocean water usually has a salinity around 35 ppt.

How does salinity impact water quality?

Galveston Bay's water comes from freshwater rivers and bayous as well as from inflows from the open ocean. Because of this, Galveston Bay should have brackish water, between salty and fresh.

Salinity within Galveston Bay generally ranges over space and time. Impacts on salinity include proximity to freshwater inflows and seawater exchange, rainfall, and tidal patterns.

Plant and animal life within Galveston Bay rely on a specific range of salinity; water that is too salty or too fresh makes it difficult for life to thrive in Galveston Bay.

According to the data:

GBF's Water Monitoring Team found that in 2017, Galveston Bay experienced saltier water overall than in previous years.

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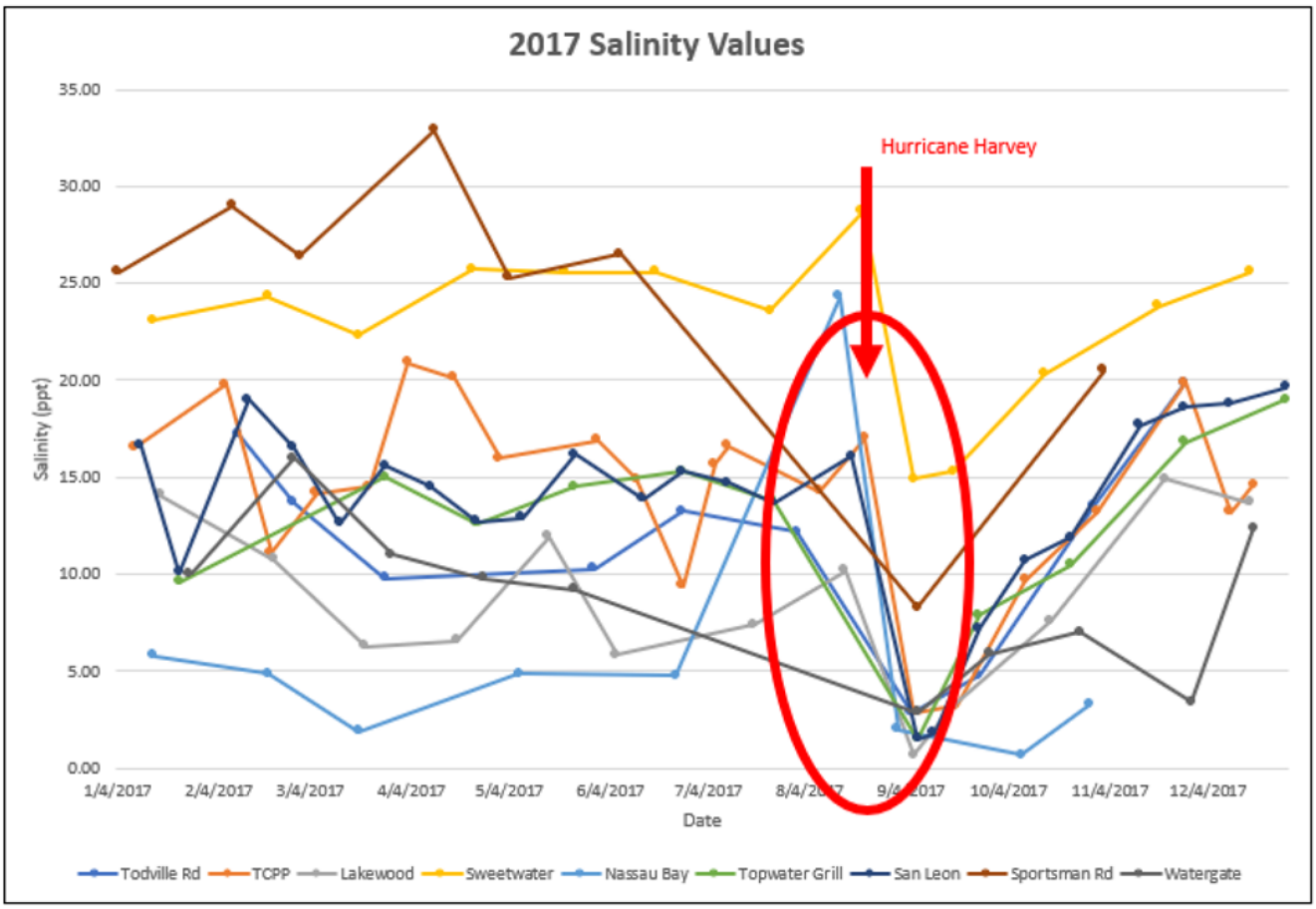
Salinity (continued)

Impacts from Hurricane Harvey:

Harvey caused significant declines in salinity for several months after the storm. Prolonged low salinity levels can harm Galveston Bay wildlife, including oysters and dolphins. While salinity levels remained abnormally low through much of September and October, the average salinity was still higher than in past years, likely due to other months that were dryer than normal.



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Water Transparency

Average of **0.5 meters** in 2017

This is **the same** as in previous years.

2016 average: **0.5m** | 2015 average: **0.46m** | 2014 average: **0.55m**

What is water transparency?

Water transparency, or turbidity, measures how much solid matter is suspended in the water. The higher the transparency, the farther down the light passes and the clearer the water appears.

How does water transparency impact water quality?

Turbid waters can prevent plants from getting enough sunlight to grow, and settling sediment can bury or suffocate plants and animals living on the bottom of the Bay.

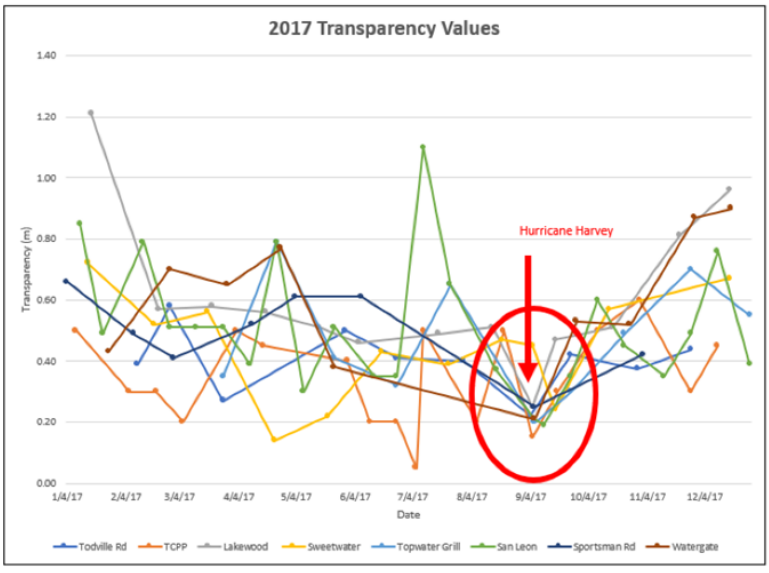
Sediment particles in Galveston Bay are very small. In addition, Galveston Bay is shallow and windy, causing naturally turbid water. However, increased erosion and runoff can increase turbidity.

According to the data:

In 2017, the average transparency measured by GBF's Water Monitoring Team was 0.5 meters, very similar to transparency measured in prior years.

Impacts from Hurricane Harvey:

Harvey caused the water to become much more turbid (or less clear) for a few weeks. This could impact the amount of sunlight that plants and bottom dwelling animals received, and could potentially impact smaller floating animals, such as plankton. Within about a month of the storm turbidity levels were back to "normal."



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pH

Average of **7.9** in 2017

This is **ideal** to support life.

This is the **similar to** previous years.

2016 average: **7.9** | 2015 average: **7.9** | 2014 average: **8.1**

What is pH?

pH is a measurement of how acidic the water is. A pH with a measurement of 7 is considered neutral. Anything less than 7 is acidic, anything greater than 7 is basic. The scale is logarithmic, so every one-unit change equals a ten-fold increase or decrease in acidity.

How does pH impact water quality?

pH impacts the life and growth rates of aquatic life, how chemicals and pollutants dissolve or react in water, and whether or not these pollutants can be absorbed by animals in the water. A range of 6.5 to 8 is considered ideal for most life. A pH less than 5 or greater than 9 is considered dangerous or deadly.

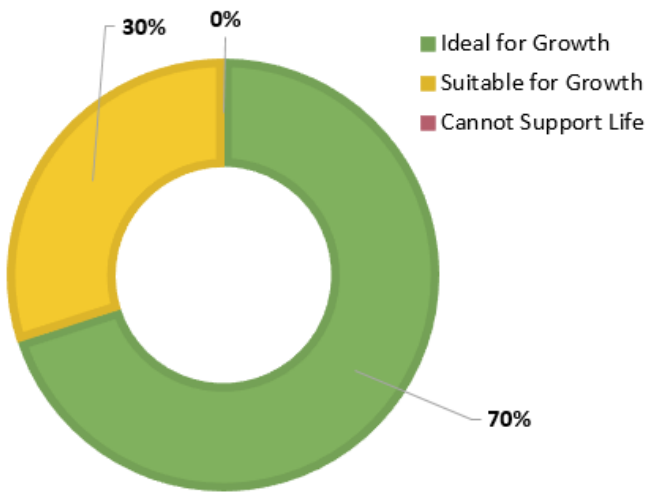
According to the data:

pH has been relatively stable in Galveston Bay over the years, and is considered within a healthy range.

Impacts from Hurricane Harvey:

Harvey did not appear to significantly impact pH levels.

pH values from 2017:



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