How Clean Is My Water?

2018 Water Quality Year-In-Review

In 2018, Galveston Bay Foundation's Water Quality Monitoring Team collected and analyzed 647 water samples from 65 sites around Galveston Bay. These samples were collected by 71 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 www.galvbay.org/watermonitors.

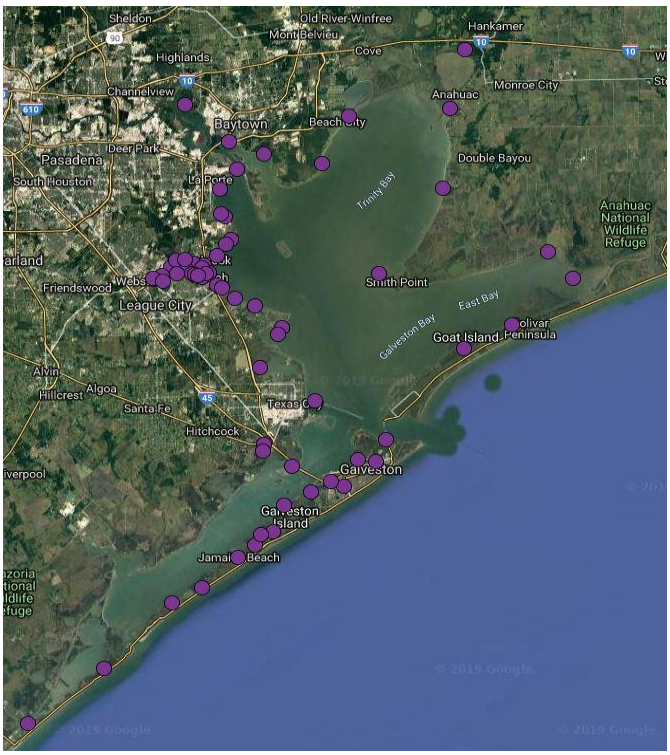


Figure 1: 2018 Water Monitoring Locations

This document summarizes our findings for each parameter based on the Team's 2018 data.

To view 2018 water quality summaries for each individual site, please click on each site on our sampling map*, or access it from our webpage.

These data can be viewed and downloaded from the Water Quality Data Portal, accessed through a button on our webpage (listed above).

**Sites on map without 2018 data summary are new as of 2019*

Air Temperature: average of 22.3°C in 2018

This is **LOWER** than in previous years

2015 average: **23.1°C**, 2016 average: **24.0°C**, 2017 average: **23.5°C**

How does Air Temperature Impact Water Quality?

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

According to the Data…

Galveston Bay Foundation's Water Monitoring Team observed a slightly lower average air temperature in 2018 compared to prior years.

Water Temperature: average of 21.8°C in 2018

This is **LOWER** than in previous years

2015 average: **22.8°C**, 2016 average: **22.8°C**, 2017 average **23.0°C**

How does Water Temperature Impact Water Quality?

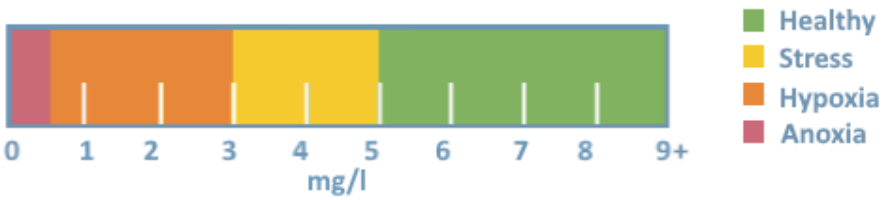
Water temperature can impact biological factors, including hibernation, reproduction, and migration.

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

According to the Data…

Galveston Bay's 2018 average water temperature was the lowest recorded in the past four years by Galveston Bay Foundation.

Dissolved Oxygen: average of 6.5 mg/L in 2018



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

75 percent of samples had Dissolved Oxygen levels high enough to support life in 2018.

What is Dissolved Oxygen (DO)?

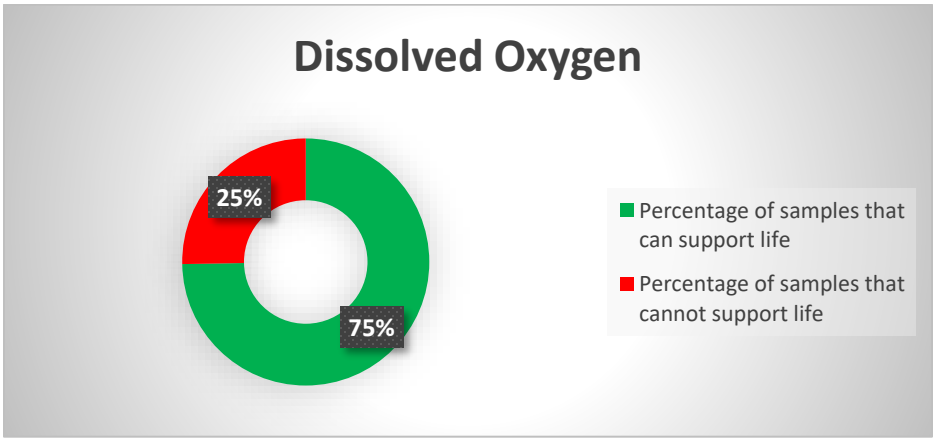
Dissolved Oxygen (DO) concentrations tell us the amount of oxygen freely available in the water.

How Does DO Impact Water Quality?

Fishes and other aquatic wildlife 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 detrimental to aquatic life.

According to the Data…

In 2018, 75 percent of the DO samples collected by Galveston Bay Foundation's Water Monitoring Team were 5 mg/L or higher. There were more samples collected in 2018 that were too low to support life than in prior years.

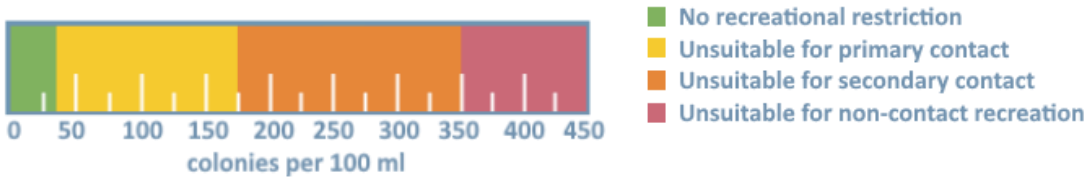


Enterococci Bacteria: Geometric Mean of 14.1 MPN in 2018

This is considered **SAFE** for swimming by the EPA (<35 MPN is safe to swim)

This level is **HIGHER** than in previous years

2015 geomean: **12.8 MPN**, 2016 geomean: **6.5 MPN,** 2017 geomean: **8.0 MPN**



What are Enterococci?

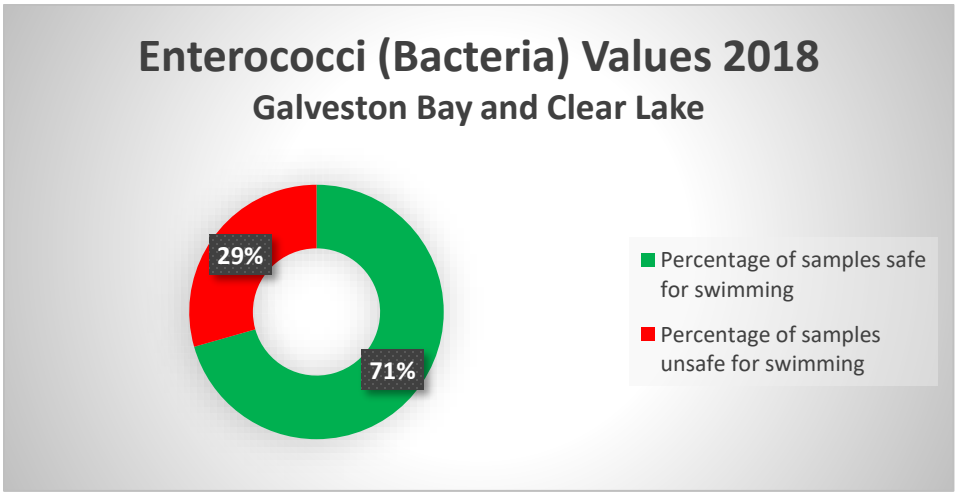
Enterococci are a group of indicator bacteria that indicate the presence or absence of fecal matter in saltwater and the potentially harmful microorganisms associated with fecal waste.

How do Enterococci Impact Water Quality?

Enterococci in the water indicate the presence of microbes from fecal matter that can make people sick and impact Galveston Bay's oyster and tourism economy. Fecal matter enters our waterways through polluted storm water, failed wastewater infrastructure, and from pets and wildlife, to name a few.

According to the Data…

About half of Galveston Bay Foundation's Water Monitoring sites are tested for Enterococci. Of the 391 bacteria samples collected in 2018, 29 percent of them were considered unsafe for swimming by the EPA. Most of these exceedances occurred soon after major rain events. This reflects a higher percentage of unsafe samples than in prior years. These results can be viewed on our bacteria map.



Salinity: average of 13.8 ppt in 2018

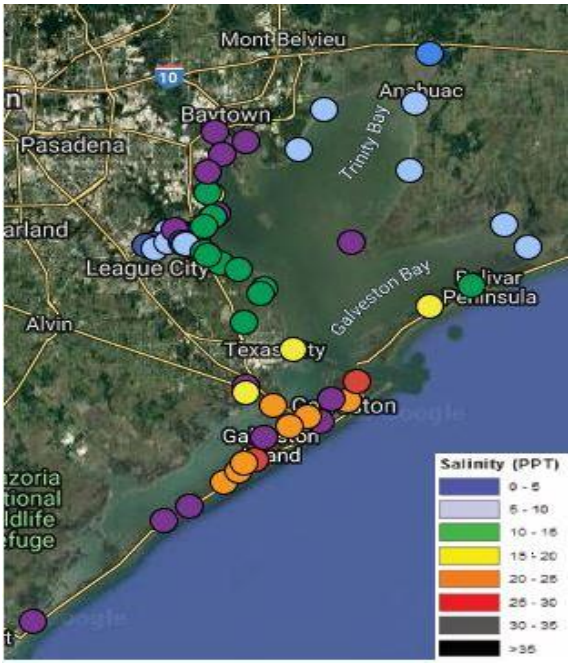


Figure 2: Salinity averages by site, 2018. Sites in purple are either new or there were not enough samples for analysis in 2018.

This is **SIMILAR** to previous years

2015 average: **12.45 ppt**, 2016 average: **11.9 ppt**, 2017 average **14.3**

What is Salinity?

Salinity is the total amount of salts dissolved in the water. Fresh water usually has a salinity of 0 ppt, while saline 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 saline and fresh.

Salinity within Galveston Bay generally varies between regions of the Bay. 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 saline or too fresh makes it difficult for life to thrive in Galveston Bay.

According to the Data…

Galveston Bay Foundation's Water Monitoring Team found that Galveston Bay experienced less saline waters in 2018 as compared to 2017, and higher salinity compared to the two prior years.

Water Transparency: average of 0.45 meters in 2018

This is SIMILAR to previous years

2015 average: **0.46m**, 2016 average: **0.5m**, 2017 average **0.5m**

What is Water Transparency?

Water transparency, or turbidity, measures how much solid matter is suspended in the water. It directly measures how these suspended solids decrease light passing through 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.

Galveston Bay's turbid waters are due to:

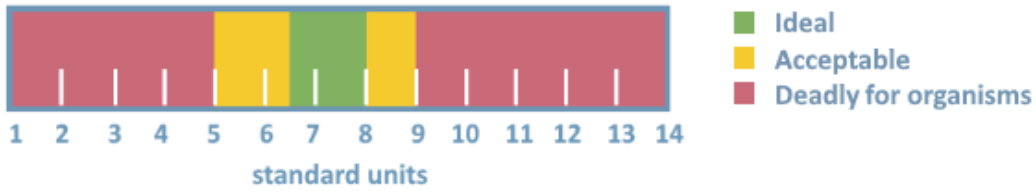
- *sediments from the Bay Bottom mixing in the water column*
- *erosion of the surrounding land*
- *vegetation (ie. plankton, algae) growing in the water column*

Galveston Bay and the surrounding land has very small sized sediment particles, so sediment often stays suspended in the water column for an extended period of time before settling to the bottom. This, coupled with a shallow and windy bay system, naturally leads to relatively turbid water in Galveston Bay. However, increased erosion due to development and storm water runoff can increase the amount of particles in the water column, causing the water to be more turbid (or less clear).

According to the Data…

*In 2018, the average transparency measured by Galveston Bay Foundation's Water Monitoring Team was **0.45 meters**, which was very similar to the transparency measured in the previous three years.*

pH:



What is pH?

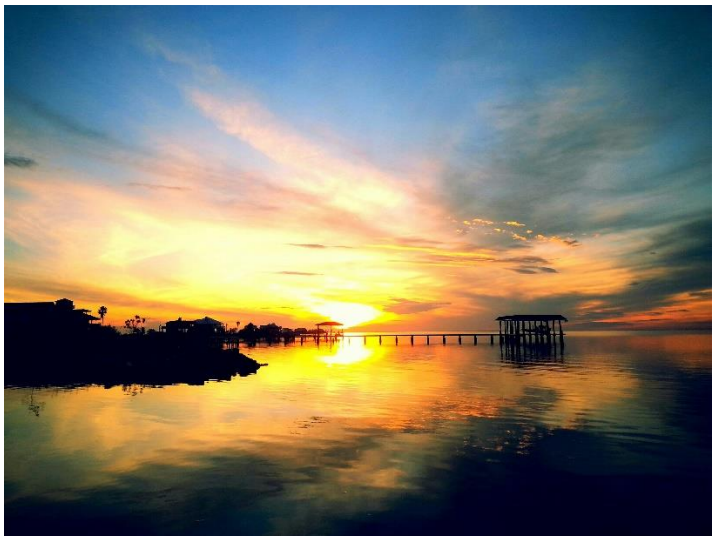
pH is a measurement of how acidic or alkaline the water is based on a unit-less logarithmic scale from 0 to 14. A pH with a measurement of 7 is considered neutral. Anything below 7 is acidic, anything higher than 7 is alkaline. Every one-unit change equals a ten-fold increase or decrease in acidity or alkalinity.

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 depending the organism in question.

According to the Data…

pH has been relatively stable in Galveston Bay over the years and is considered to be within a healthy and normal range. To view the pH of individual sites sampled in Galveston Bay, see our Water Monitoring Team page on our website. In 2018, pH values ranged from 6.0 to 10.0.



Acknowledgements

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