



# Has the Red Drum Population in The Gulf of Mexico Recovered Following Deepwater Horizon

Jakobey Johnson, Devin Lowe, Simcha McGee, Melissa Vereker, Lillian Wallace

Christian Collegiate Academy

## Abstract

In 2010 The Deepwater Horizon Oil Spill in The Gulf of Mexico caused widespread damage to the Gulf of Mexico ecosystem (White et al., 2017). The Red Drum fish population had been thriving before the spill. Following the spill, scientists found that fish exposed to oil showed stunted growth, enlarged livers, changes in the heart and lungs, fin erosion, and impairment in reproduction (NOAA, n.d.). Oil exposure can also affect baby fish whether a lethal and sublethal amount of oil. When affected by oil, even if it is a little bit, the fish is unsafe for humans to consume (NOAA, n.d.). Oil floating in the water can also affect what fish eat. It can contaminate things like plankton, algae, fish eggs, and larvae of various invertebrates. If these species are affected and consumed by fish, the fish will also be affected by the oil that is on their food or by the direct toxic effects of the oil. The same thing would happen to humans if we consumed fish with oil in or on them (NOAA, n.d.). GLOBE hydrology data helped to show how resilient The Gulf of Mexico is. It is important to remember that human harm could change that someday. Further research is needed and a better statistical analysis of the existing data to fully understand the impact on the Red Drum population and how long it will take the fish to fully recover. Our findings show that humans can be poor stewards of the environment and are not respecting and obeying God's command to take care of the earth.

## Research Question

**Research Question:** How has the red drum population in the Gulf of Mexico recovered following Deepwater Horizon?

**Hypothesis:** There has been a severe decrease in the red drum population and the red drum population has not fully recovered.

## Introduction

Since the 2010 BP oil spill, marine scientists have sampled more than 2,500 individual fish representing 91 species from 359 locations across the Gulf of Mexico and found evidence of oil exposure in all of them, including some of the most popular types of seafood (Prueitt, 2018). The highest levels were detected in Red Drum. Fish with the highest concentrations of PAH were found in the northern Gulf of Mexico, a region of increased oil and gas activity and in the vicinity of the Deepwater Horizon spill that gushed nearly four million barrels of oil over the course of three months in 2010. Oil-rich sediments at the bottom where much of the oil settled are resuspended by storms and currents, re-exposing bottom-dwelling fish (Prueitt, 2018).



## Research Methods

### Planning Investigations

Describes the planning process

- GLOBE hydrology and atmosphere protocols were used, and the GLOBE data retrieval tool was utilized.
- Previously collected GLOBE data was used from The Marine Resource Center and The University of South Florida.
- Our team learned the GLOBE atmosphere protocol and collected air temperature, rainfall, rain pH, barometric pressure, humidity, ground conditions, and cloud observations.

Figure #1 – Gulf of Mexico

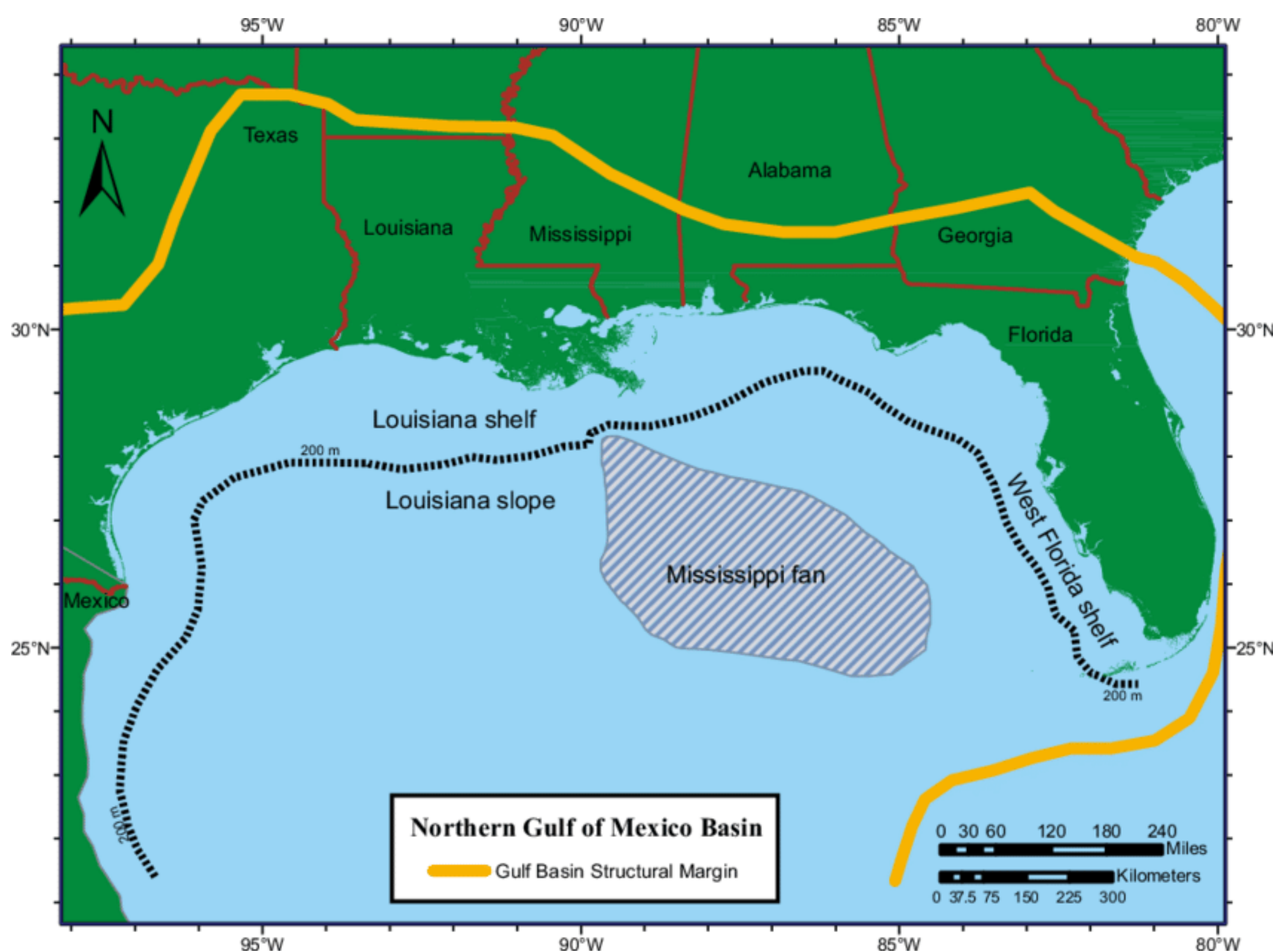


Figure #2 – Red Drum



## Results

- The data shows the resilience of the Gulf of Mexico.
- There was harm to the Red Drum population shown by research articles.

Figure #3 Graph from Summary Statistics

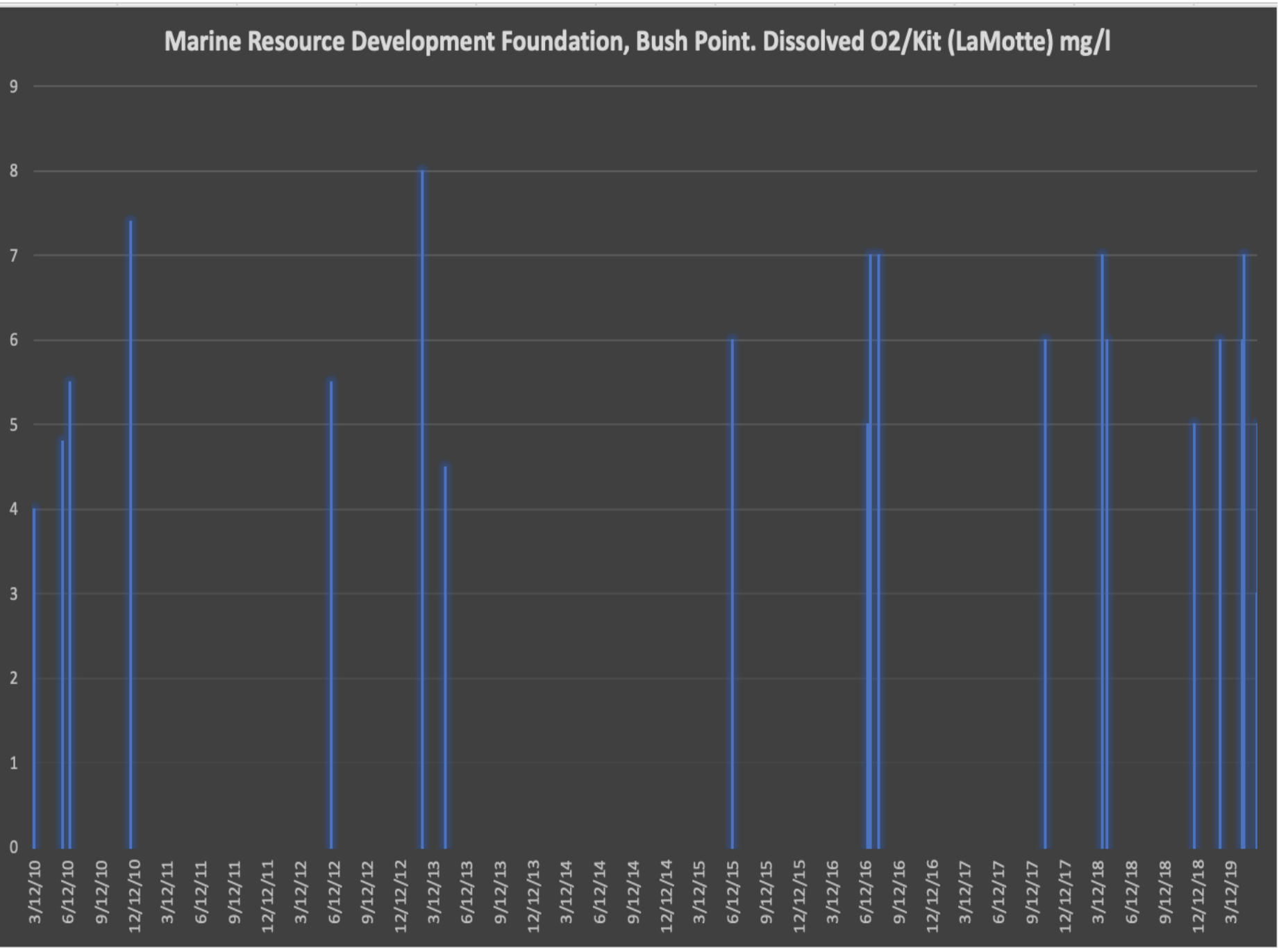


Figure #4 Graph from Summary Statistics

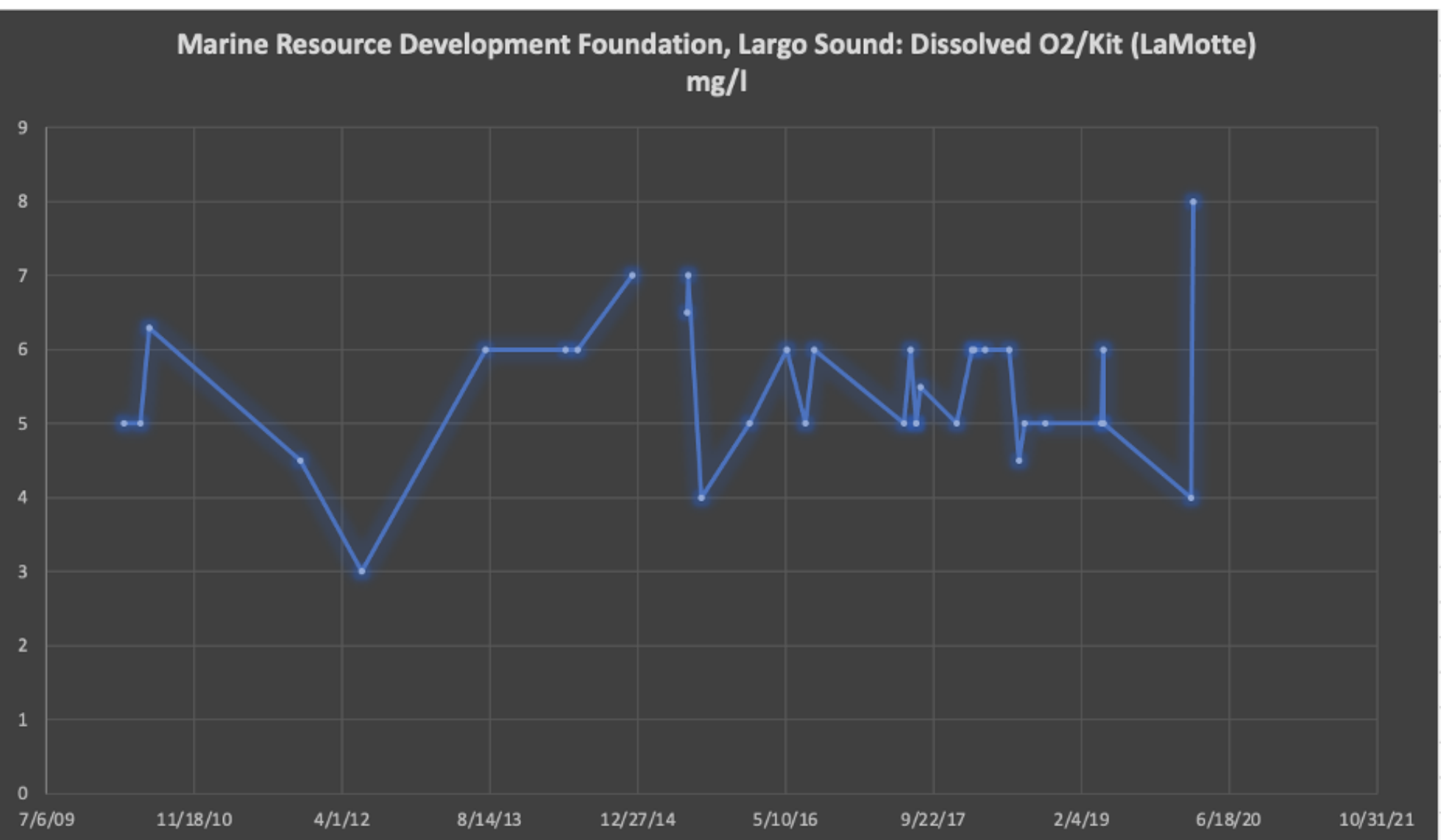
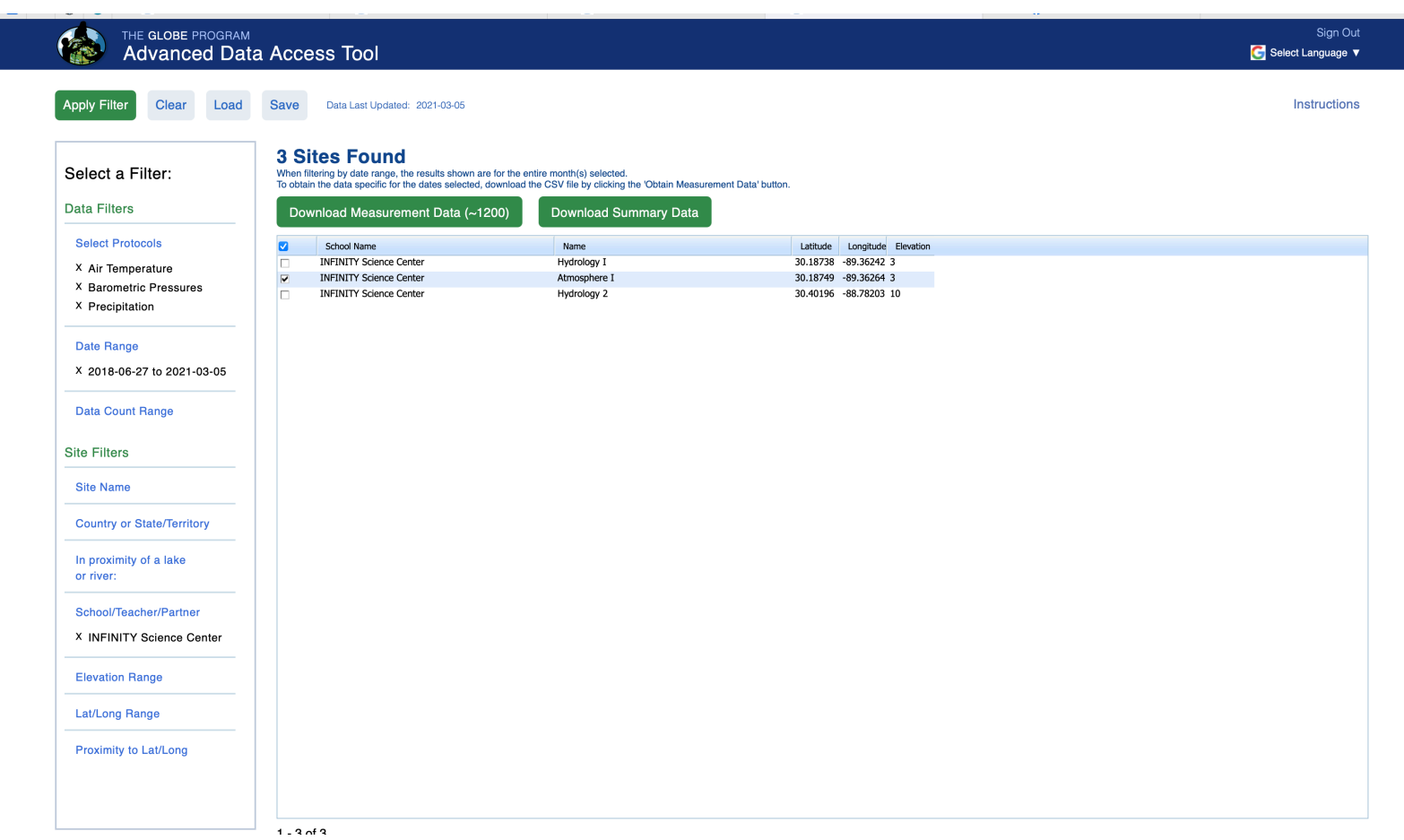


Figure #5 – GLOBE Data Retrieval Tool



## Discussion

### Interpreting Data

Our team used GLOBE data from the Marine Resource Development Foundation and The University of South Florida. This data was chosen because it was the only GLOBE data available for the GOM dating from 2010 (time of Deepwater Horizon) forward. Marine Biology ran summary statistics on the pH, Dissolved Oxygen, and Salinity which were the water quality measurements recorded in GLOBE and extracted using the GLOBE data retrieval tool. The following table summarizes the summary statistics of the continuous data for each variable. There were no obvious fluctuations in any of the recorded GLOBE variables from either organization that would explain harm to the Red Drum from Deepwater Horizon. There is little fluctuation as shown by the mean and standard deviation for any of the water quality variables and The University of Southern Florida only recorded water pH. The GLOBE data did show the resilience of the GOM following Deepwater Horizon.

Figure #6 – Summary Statistics Chart

GLOBE Water Quality Measurement	Site Name/Location								
	Marine Resource Development Foundation: Bush Point	Marine Resource Development Foundation: Large Sound	Marine Resource Development Foundation: Pelican Key	Marine Resource Development Foundation: Saxon Cove	Marine Resource Development Foundation: Tarpon Basin	University of South Florida: Kelly Park	University of South Florida: Long Point Park	University of South Florida: Rotary Park	University of South Florida: St. Petersburg
Dissolved O2 (mg/l ± SD)	5.65 ± 1.27	5.48 ± 0.97	5.59 ± 1.18	5.51 ± 1.41	5.36 ± 1.33	No Measurements Recorded	No Measurements Recorded	No Measurements Recorded	No Measurements Recorded
Water pH (± SD)	8.19 ± 0.18	8.1 ± 0.18	8.20 ± 0.18	8.09 ± 0.17	8.15 ± 0.23	8.31 ± 0.42	8.24 ± 0.18	8.27 ± 0.45	7.97 ± 0.18
Salinity (ppt ± SD)	31.28 ± 5.29	34.33 ± 3.65	32.56 ± 4.94	32.88 ± 6.28	32.47 ± 4.83	No Measurements Recorded	No Measurements Recorded	No Measurements Recorded	No Measurements Recorded

## Conclusions

### Drawing Conclusions & Next Steps

In conclusion, the Red Drum population was affected by the spill and more research is needed to fully understand the harm and how long it will take them to fully recover. Additionally, more needs to be done to prevent human harm to Red Drum to ensure that their populations can fully recover.

## References

- NOAA. (n.d.). *How does oil impact marine life?* National Ocean Service: National Oceanic and Atmospheric Administration. <https://oceanservice.noaa.gov/facts/oilimpacts.html#:~:text=When%20exposed%20to%20oil%2C%20adult,fin%20erosion%2C%20and%20reproduction%20impairment.&text=Even%20when%20lethal%20impacts%20are,unsafe%20for%20humans%20to%20eat>
- Prueitt, B. (2018, March 27). *A missing generation of fish from the Deepwater Horizon oil spill.* The University of South Florida. <https://www.usf.edu/news/2018/missing-generation-fish-deepwater-horizon-oil-spill.aspx>
- White, N. D., Godard-Coddling, C., Webb, S. J., Bossart, G. D., Fair, P. A. (2017, June). Immunotoxic effects of in vitro exposure of dolphin lymphocytes to Louisiana sweet crude oil and Corexit. *J Appl Toxicol.* 2017 Jun;37(6):676-682. doi: 10.1002/jat.3414.