



Spatial and Temporal Variability of Jobs Bay Coastal Waters



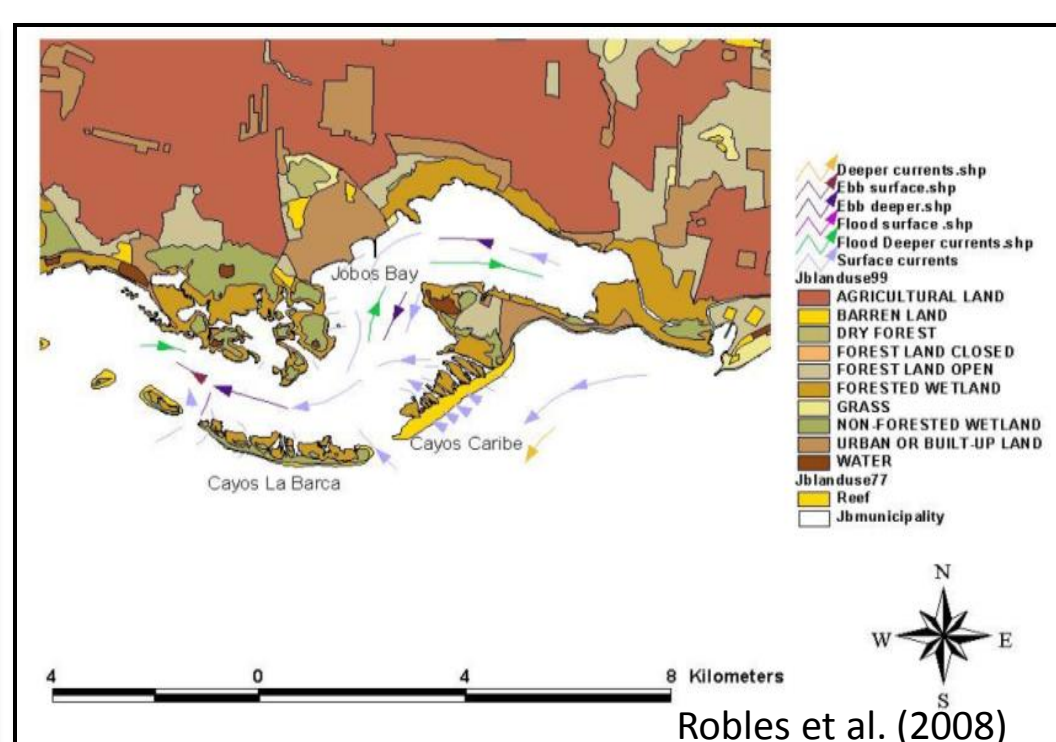
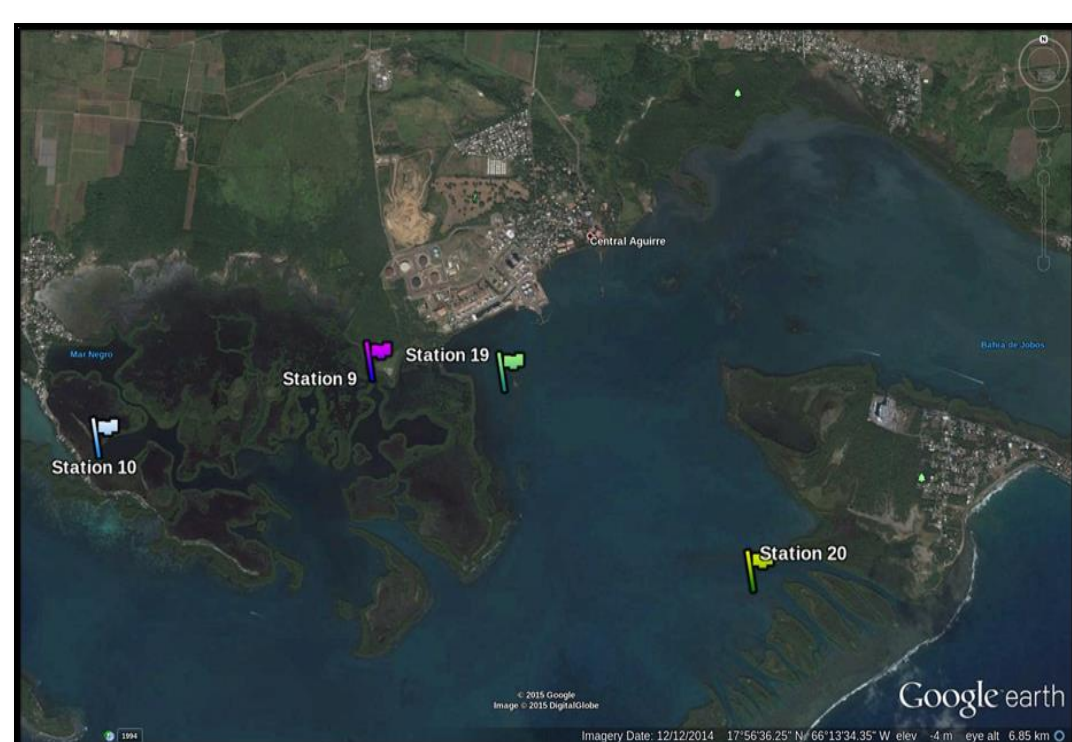
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ABSTRACT

Within a Earth's dynamic system, coastal waters are not exempt of temporal and spatial fluctuations. Jobs Bay is known for having shallow and well-mixed waters nevertheless, there are evident spatial fluctuations among the four fixed measuring stations available within the bay. Spatial fluctuations are consistently affected by temporal fluctuations characteristic to the South of Puerto Rico. With the aim of characterizing these fluctuations, available time data series from 2006-2015 were evaluated for five parameters, in addition to taking in consideration available climatology data. Findings show temperature, turbidity and salinity decreasing as moving from near shore to more open water areas. The opposite was observed for dissolved oxygen and pH parameters, which are inversely affected by temperature and salinity fluctuations. Temporal fluctuations responded primarily to precipitation patterns, controlling atmospheric and oceanic temperature fluctuations and at the same time other parameter interactions within the bay.

INTRODUCTION

Jobs Bay is a semi enclosed estuarine habitat on Puerto Rico's south coast which due to its unique characteristics was designated in 1981 by the NOAA as a research reserve, part of the National Estuarine Research Reserve System (NERRS). JBNERR water parameters have been monitored through four fixed measuring stations; 9,10,19,20. Data series collected from 2006-2015 and depurated for outliers in 2016², was analyzed for spatial and temporal fluctuations with the aim of acquiring a better understanding of the bay's parameters variability. The analyzed data set included measurements for 5 parameters; dissolved oxygen, pH, salinity, water temperature and turbidity, in addition to 3 climate parameters; air temperature, precipitation and wind speed.

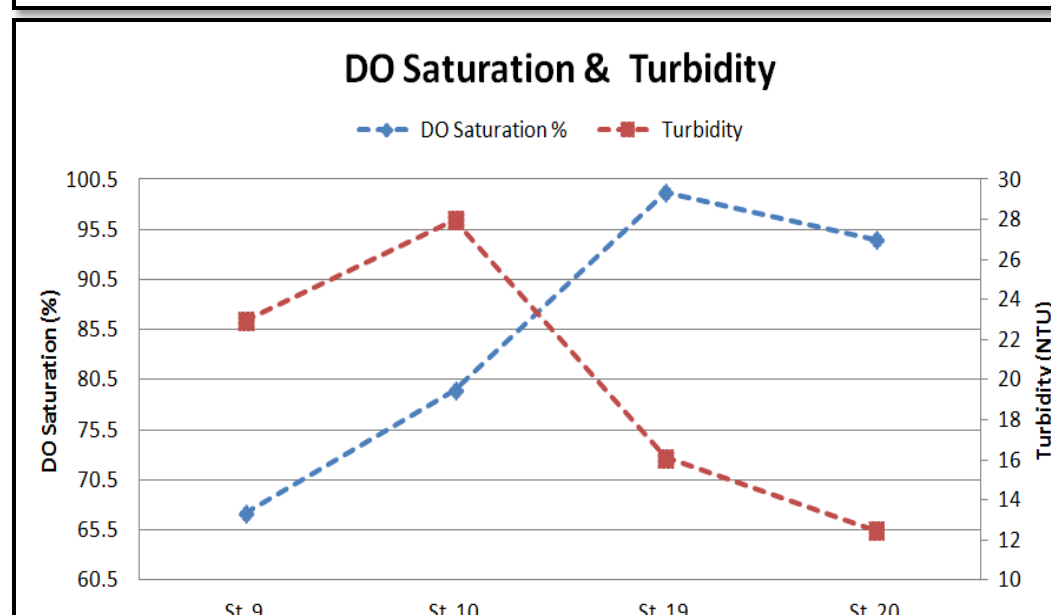
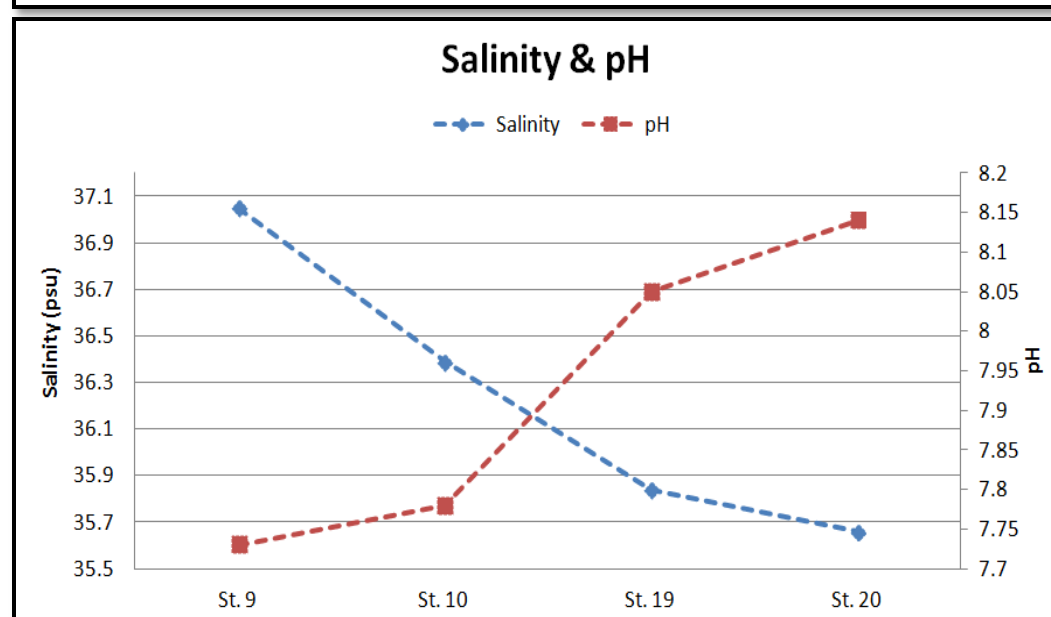
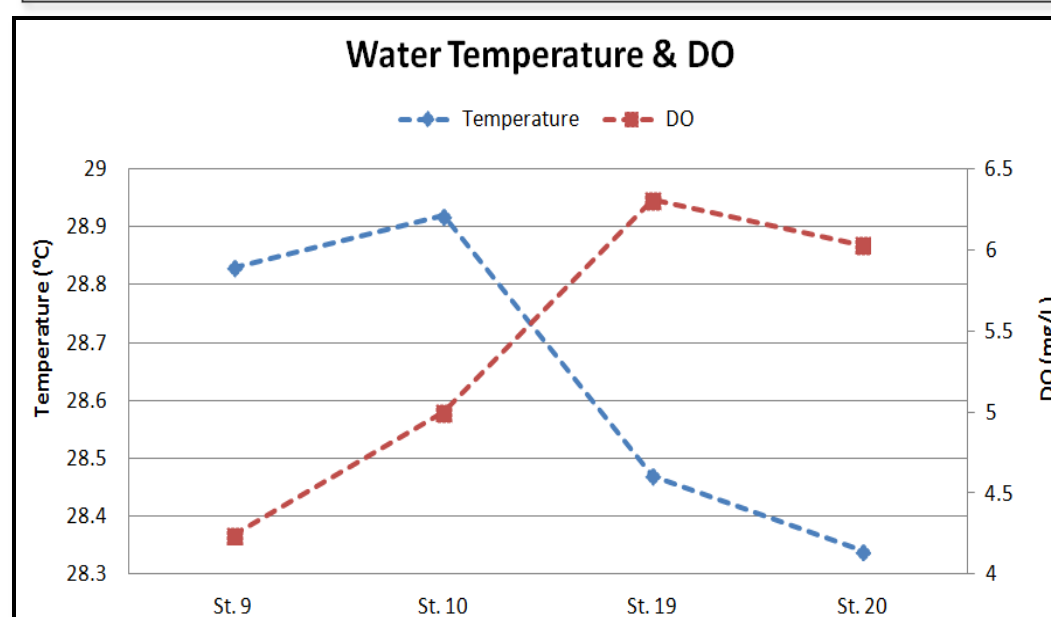


Overview of JBNERR Variability

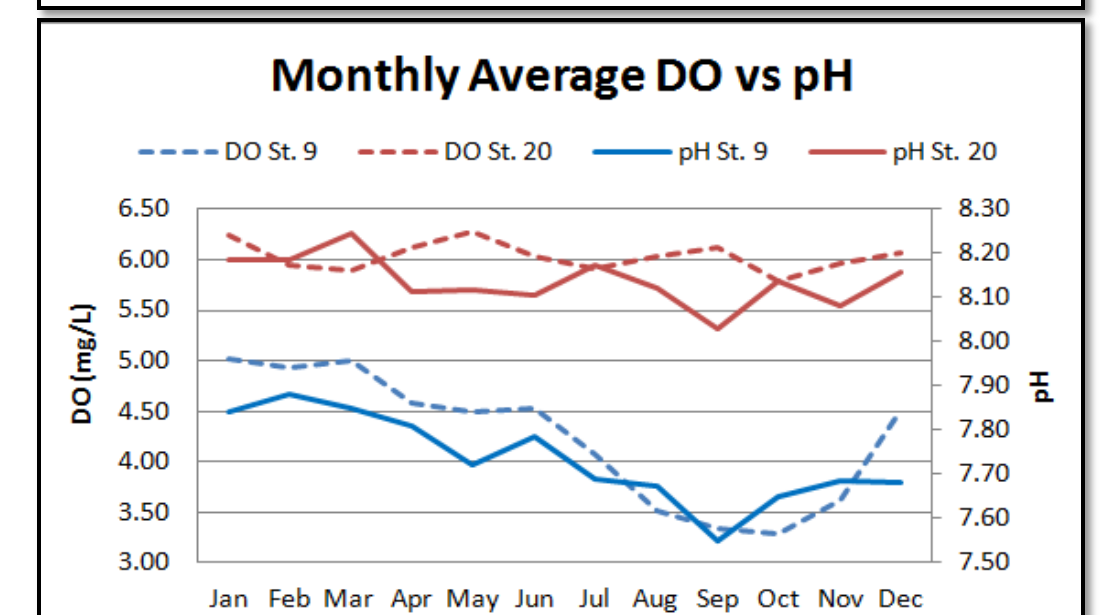
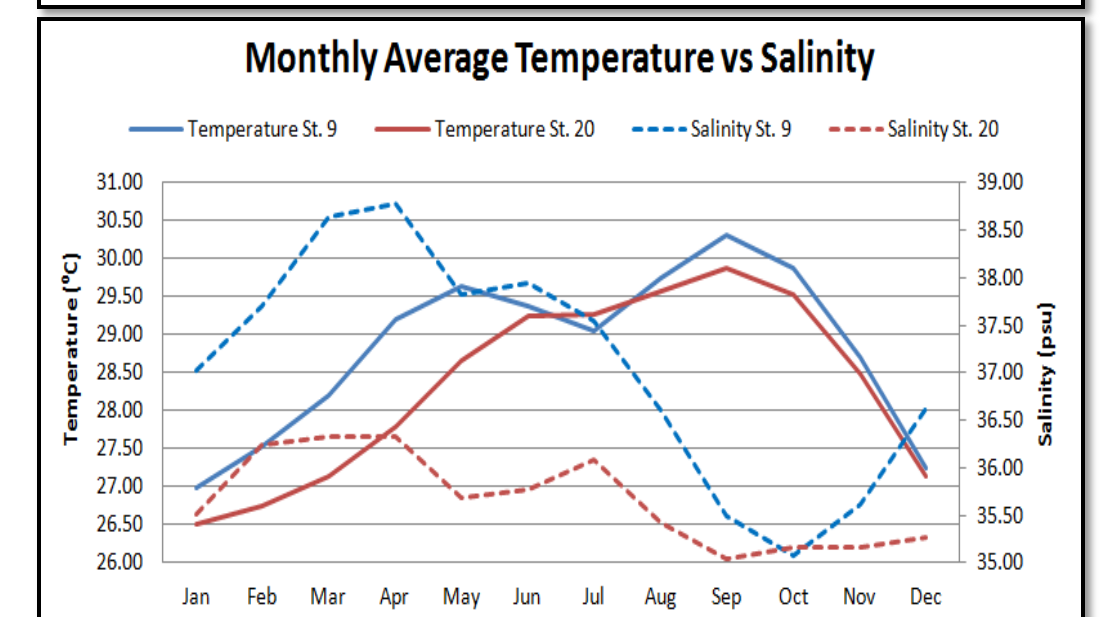
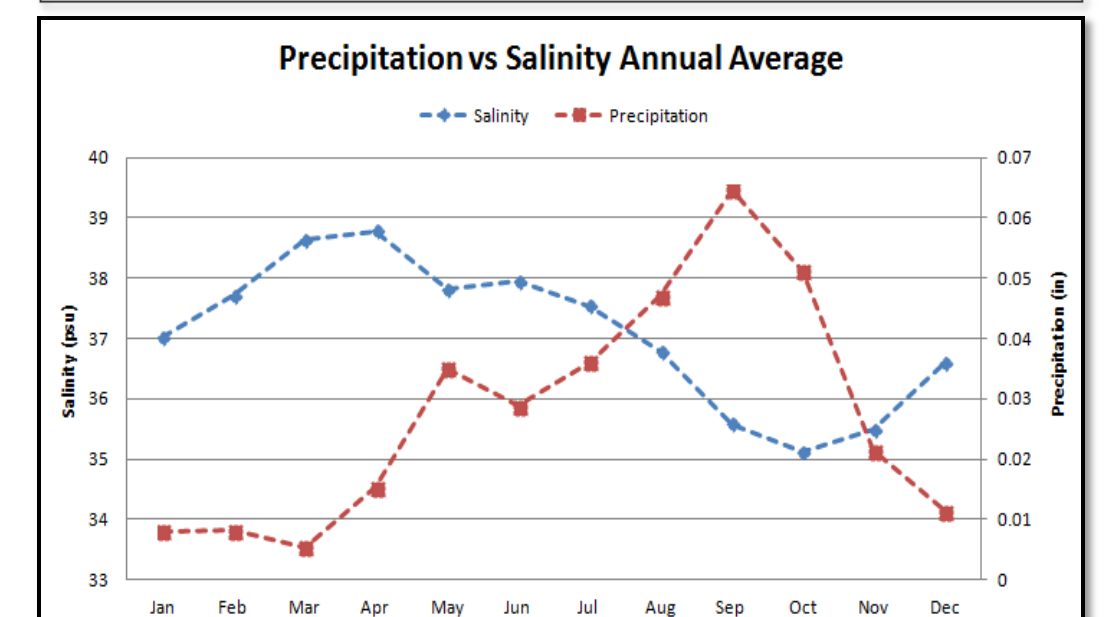
Parameter (Total Averages)	Station 9	Station 10	Station 19	Station 20
Station	17° 56' 35.0" N	17°56'17.96"N	17°56'28.16" N	17°55'49.07"N
Location	66° 14' 18.9"W	66°15'27.60"W	66°13'45.29"W	66°12'41.22"W
Avg. Depth (m)	1.5	1.5	1.5	2.0
Salinity	37.05	36.39	35.84	35.66
Temperature	28.83	28.92	28.47	28.34
DO	4.24	5.00	6.31	6.03
DO Sat.	67.19	79.41	99.19	94.46
pH	7.73	7.78	8.05	8.14
Turbidity	22.95	28.00	16.11	12.49

FINDINGS

Spatial Variability



Temporal Variability

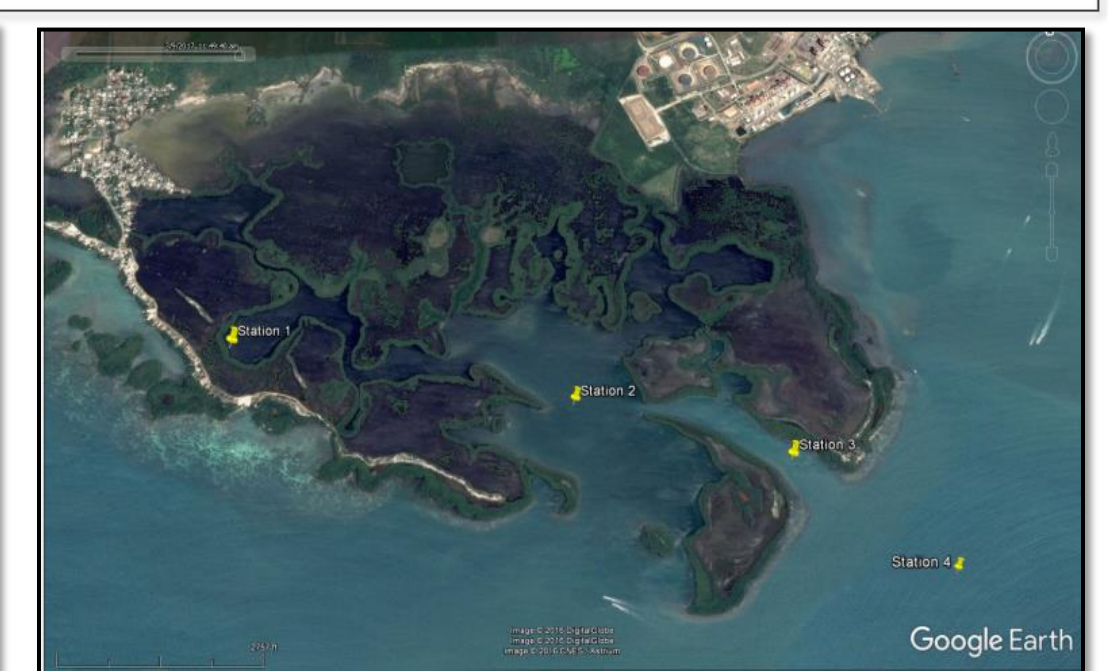


CONCLUSIONS

JBNERR's spatial variability is well defined by a strong gradient in chemical and physical water properties reported by the fixed monitoring stations located throughout the bay. These are located in conditions varying from near shore waters at stations 9 & 10 to more open water stations at 19 & 20. South PR seasonal variability is a major driver on JBNERR water properties while additional variability is driven by physical and biogeochemical processes responding to varying residence time/connectivity to the ocean and carbon inputs presumably dominated by mangroves

FUTURE WORK

Surface Mapping – Flow-Through



REFERENCES

- Robles, P. O., González, C. M., Laboy, E. N., & Capella, J. (2008). Jobs Bay Estuarine Profile, (June), 1–109.
- Capella, J., Morell, J., Acosta, M. (2016). Exploratory JBNERR System Wide Monitoring Program Time Series Data Analysis Final Report (March, 2016)

ACKNOWLEDGEMENTS

