

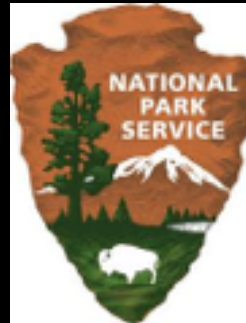


Water Quality for Bioluminescent Mangrove Lagoon in St. Croix, USVI

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Bioluminescence



www.youtube.com



- Caused by dinoflagellate, *Pyrodinium bahamense*
- Distributed all throughout Caribbean and Atlantic
- Caused by oxidation reaction of luciferin
- Possible explanation: Burglar Alarm Theory
- Short residence time + shallow + mangrove coverage



Bioluminescence in SARI

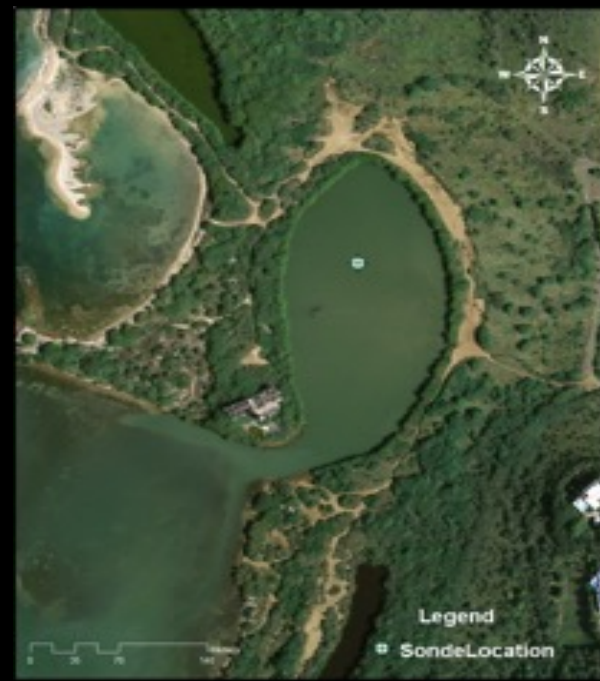


Location	Area (m ²)
Oster Bay, Jamaica	29
Puerto Mosquito, PR	9
Laguna Grande, PR	5
Mangrove Bay, VI	0.3

- Salt River Bay National Historical Park and Ecological Preserve (SARI)
- Mangrove Lagoon is a small, shallow manmade embayment
- Maximum depth: 2.2 m
- *“Ecological Characterization of Bioluminescence in Mangrove Lagoon, St. Croix”*



In situ Water Quality Monitoring

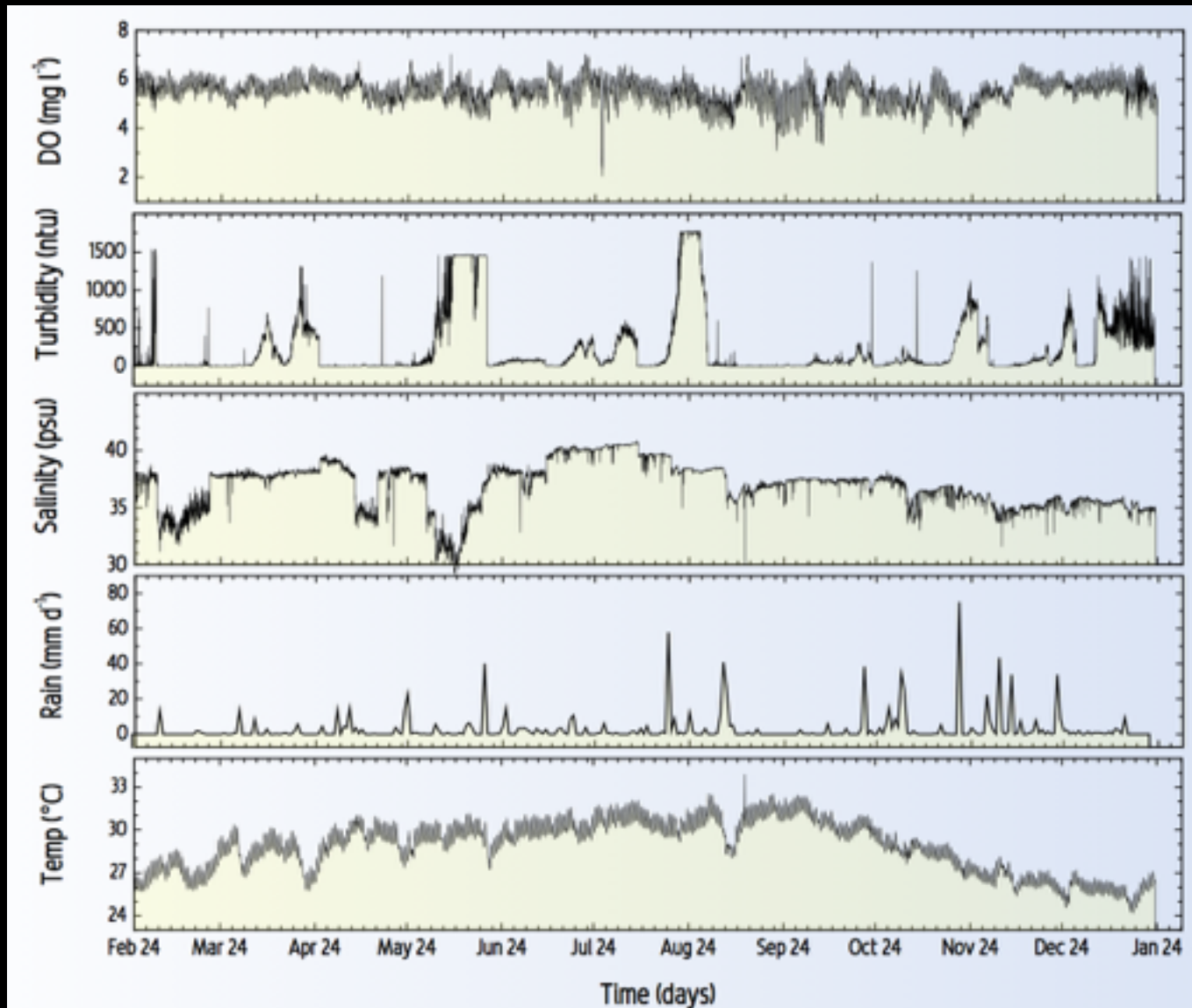


- *In-situ* Multi-parameter Water Quality Monitoring System (Sonde)
- Sonde: YSI 6920 V2
- pH, temperature ($^{\circ}\text{C}$), Turbidity (NTU), Dissolved Oxygen (DO, mg L^{-1}) and salinity (ppt)
- Programmed to log data in 1-hr intervals during the 1-yr study
- Total number of samples logged: $n = 8,085$
- Installed a weather station



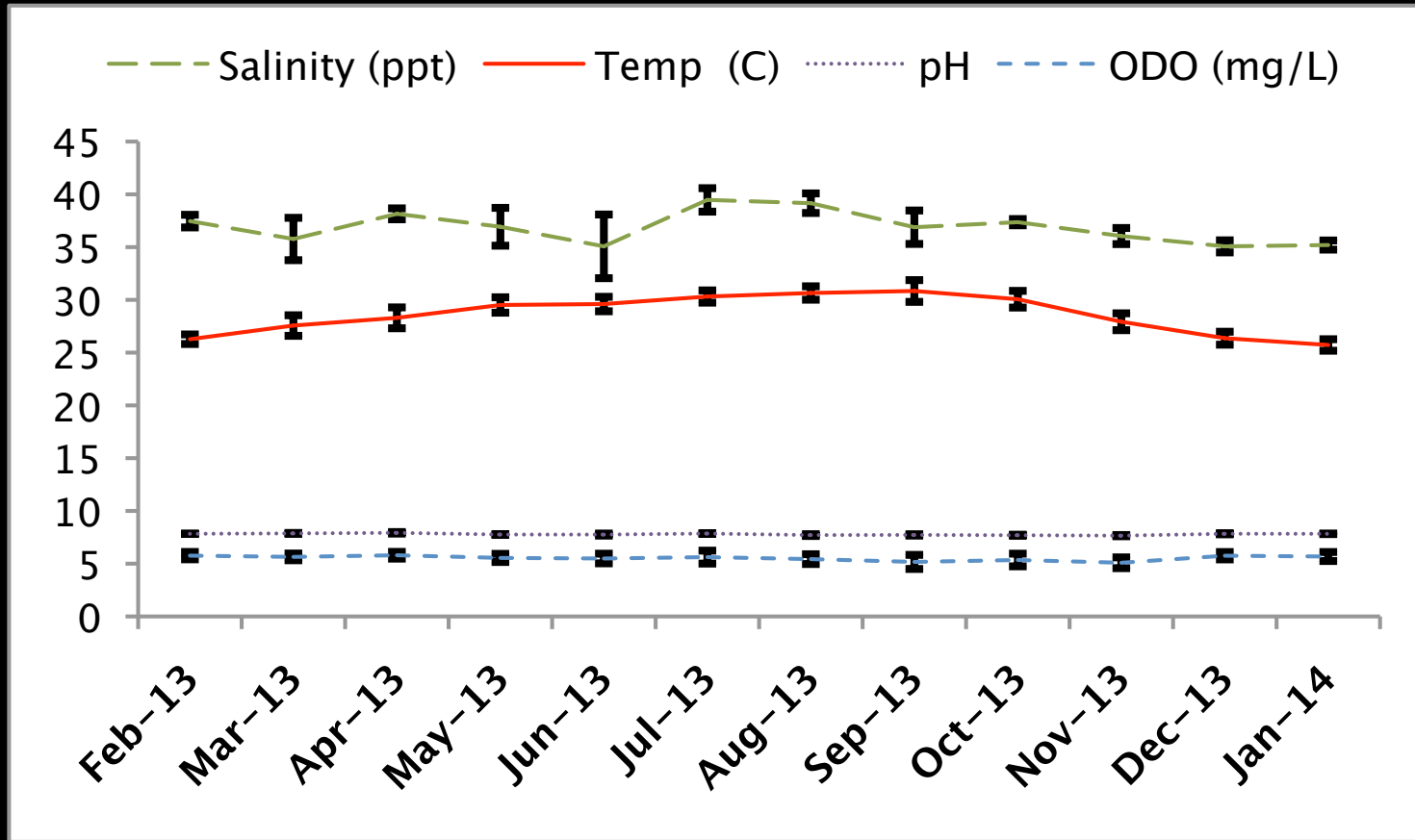


Water Quality Results





Water Quality Averaged



Turbidity:

- Some peaks associated with precipitation
- Data easily fouled

Salinity:

- Lower during rainy season
- Not always correlated with rainfall

Rain and Temperature:

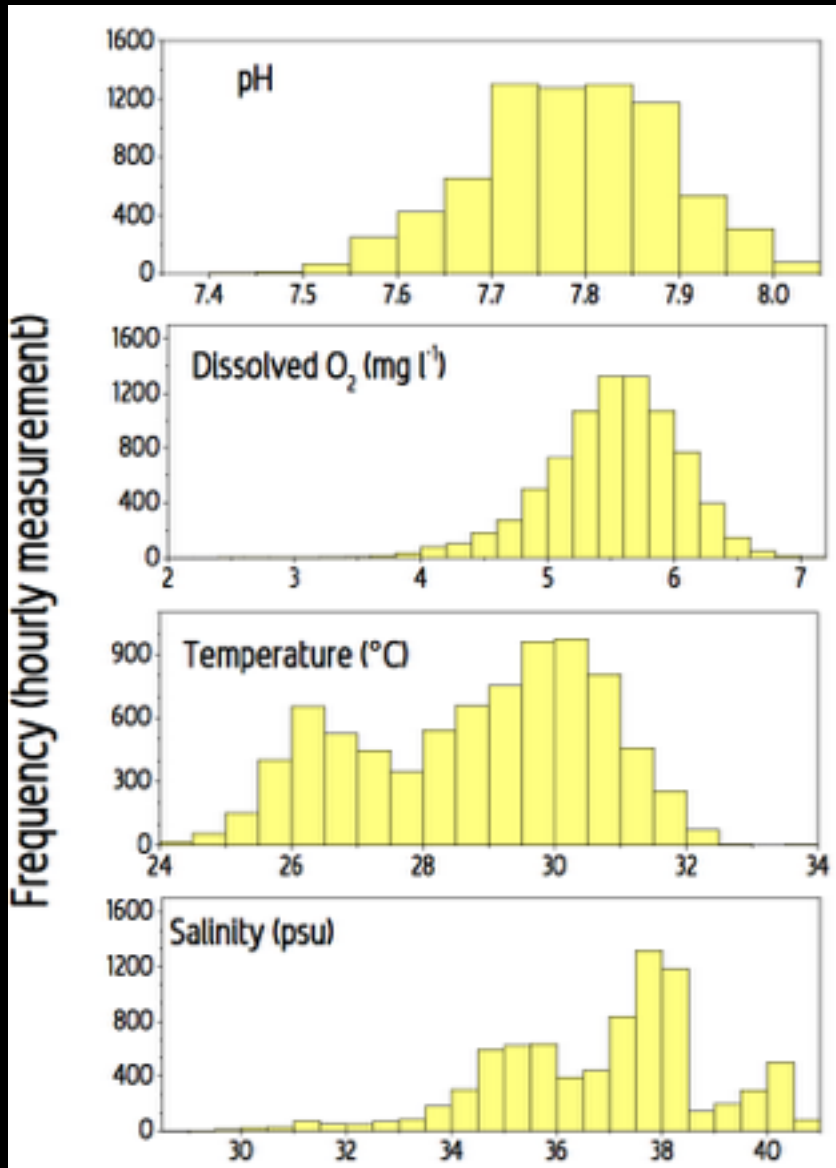
- Seasonal

Dissolved Oxygen:

- Normal diel pattern
- Rarely dropped below 4 mg/L



Hourly Frequency



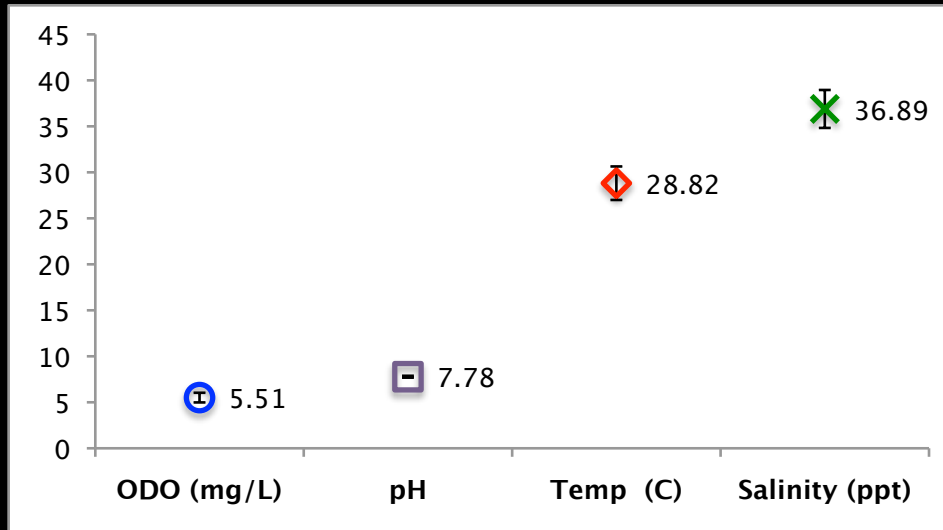
Parameter	Mean	SD	Min	Med	Max
pH	7.8	0.1	7.4	7.8	8.0
DO (mg L ⁻¹)	5.51	0.53	2.04	5.55	7.03
Temperatre (°C)	28.8	1.8	24.2	29.2	33.9
Salinity (ppt)	36.90	2.01	28.98	37.38	40.76



- pH had very little variation
- Temperature and Salinity exhibit seasonal clusters



VI Water Quality Regulations



Parameter	Mean	SD	Min	Med	Max
pH	7.8	0.1	7.4	7.8	8.0
DO (mg L ⁻¹)	5.51	0.53	2.04	5.55	7.03
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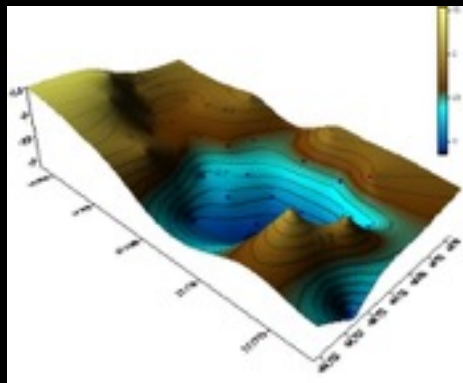
- Salt River is Class B
- Temperature - not to exceed 32 °C at any time
- DO - not < 5.5 mg L⁻¹ from other natural conditions
- pH is 7.0-8.3 (tolerable limit)



Water Quality Comparison

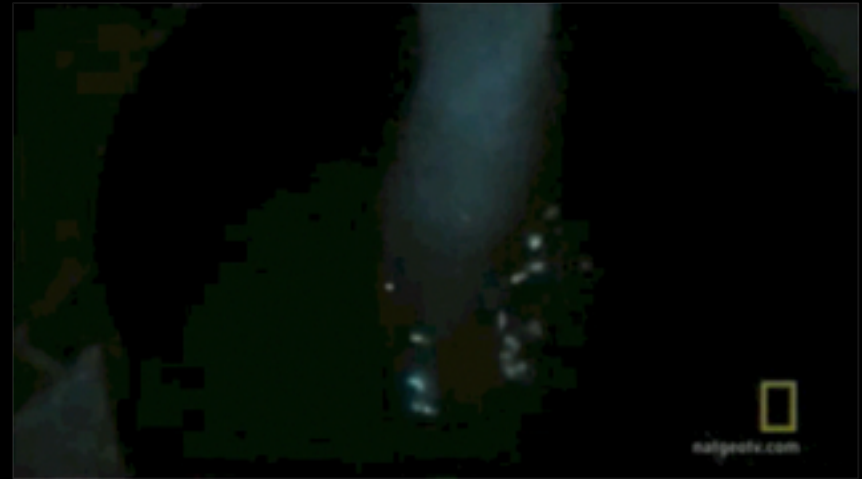


Location	Area (m ²)	pH	DO (mg L ⁻¹)	Temperature (°C)	Salinity (ppt)
Laguna Grande, PR	5			29.1±1.85	35.8±4.10
Mangrove Bay, VI	0.3	5.51±0.53	7.80±0.10	28.81±1.80	36.9±2.00



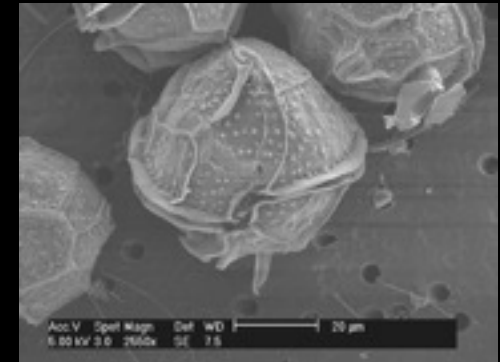


Summary



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- First bioluminescent bay characterized in US Virgin Islands
- Major contributor: *Pyrodinium bahamense*
- DO was slightly below VI regulation
- Temperature and pH were within regulation
- Water quality was comparable with Laguna Grande Bay



THANK YOU

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