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CASE STUDY
COASTAL
YSI

Online Real Time Water Quality Monitoring at Bendera, St. John's Island, Singapore with DB600 and YSI EXO3

Introduction

The 3.9 hectare Bendera Bay is a lagoon located on St. John's Island (see Figure 1). It houses a variety of mangrove, coral, seagrass, sandy shore and rocky shore habitats. The lagoon was secured in 2019 by the National Parks Board Singapore (NParks) and is managed by the Friends of the Marine Park (FMP) for the purposes of education, outreach and research. The lagoon supports activities related to marine science R&D, marine conservation, and responsible in Singapore.

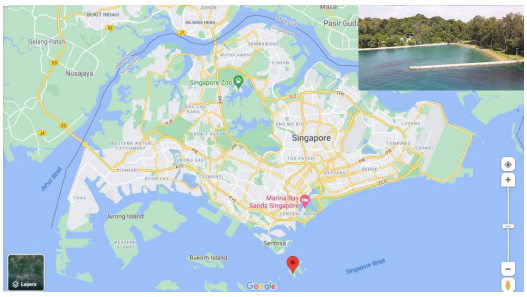

Figure 1: Bendera Bay, St. John's Island (red pin) is located at the South of Singapore. (Source: Map from Google Map; Photo from www.greatnewplaces.com.sg)

Project Scope

In support of this initiative, Xylem provided a buoy (DB600) equipped with YSI EXO3 sonde to test real-time monitoring of the water quality in the lagoon. The DB600 is Xylem's water quality monitoring buoy. The buoy measures 600 mm in diameter and weighs 21 kg, making it possible to be deployed by one or two persons. It is designed to house a multi-parameter probe, Aanderaa single point current sensor, solar panels and the AI1 (All-in-One) datalogger that allows collection and transmission of information for real-time monitoring. (see Figure 2).

Methodology

In this deployment, the parameters (temperature, conductivity, salinity, pH, dissolved oxygen and turbidity) were logged at every 15 minutes interval. The EXO3 was also equipped with a central wiper which significantly reduces the time need for on-site maintenance. GPS is enabled at the site to ensure the unit is stationary at the measurement point and also provides alarm data should the unit move from its current position.

Figure 2: DB600 buoy deployed at Bendera Bay, St. John's Island, Singapore. Onsite training to SJNML – TMSI staff on installation, deployment and maintenance of DB600 buoy and YSI EXO3 Sonde.

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Online real time monitoring – Eagle IO

All EXO3 data can be viewed real time using any internet browser from your phone, tablet or laptop. Real time data can be displayed in a dashboard format to show latest water quality (see Figure 3) or as temporal plots (see Figure 4). Cloud-based environmental IOT platforms allow users to work with simple data files remotely and to easily configure alarms. It is secure, reliable and easy to use which makes it very popular for users who wish to connect, configure and control monitoring sensors remotely (e.g., home, office or lab).

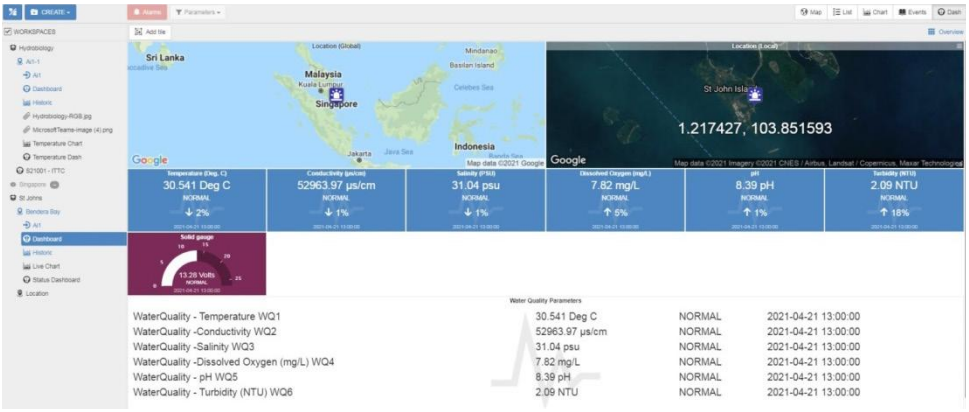

Figure 3: Screenshot of real time water quality monitoring at Bendera Bay, St. John's Island, Singapore The data is displayed in dashboard form showing latest measured water quality parameters.

Figure 4: Water quality parameters plotted in graphical mode to display the water quality parameters over time.

The water quality information at Bendera Bay is useful for not only recreational activities such as diving and kayaking that take place within the lagoon, but also for research purposes. As part of FMP, the lagoon is used by various researchers, including those from the St. John's Island National Marine Laboratory (SJINML), as a living laboratory to understand responses of organisms (e.g. corals, seagrasses) to environmental changes/variations. The buoy will be maintained by researchers from SJINML.

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