

SATELLITE AND FIELD OBSERVATIONS OF WATER QUALITY PARAMETERS ASSOCIATED TO CORAL REEF HIGH PRIORITY AREAS IN PUERTO RICO

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Coastal and marine ecosystems (CMEs) in Puerto Rico have been severely impacted by land-based sources of pollution for decades. These impacts decrease light availability in the water column and increase smothering affecting coral growth rates and cover, and susceptibility to disease. Remote sensing has been used as a tool to estimate trends in water quality parameters from satellite and allow a synoptic view of these impacts to the CMEs. The chlorophyll-a concentration (Chl-a) and the attenuation coefficient at 490nm (Kd490) from moderate resolution satellite (Visible Infrared Imaging Radiometer Suite - 750m, Moderate Resolution Imaging Spectroradiometer) and high-resolution (Landsat 8 Operational Land Imager - 30m, Sentinel 2 Multi-Spectral Instrument - 10m) satellite data were used to develop a water quality baseline analysis for coral reef nursery sites and restoration areas of Puerto Rico. The analysis used daily images from 2001-2020 and included *in situ* water quality measurements mainly on the SW and NE of Puerto Rico. Results from the moderate resolution sensors for the Guánica sites shows an average value for Kd490 of approximately 0.15 (m⁻¹) for the Cayo Coral East and West. For Chl-a, higher peaks are observed by the Cayo Coral West site, which suggests the potential influence of the Guánica bay plume track in the observed values during rain events. For the Northeast sites, all sites for both Fajardo and Culebra areas have an average of 0.10 (m⁻¹) value for Kd490, except the Palominito site (0.15 m⁻¹). All the sites located in La Parguera (San Cristobal, Margarita East and West) present an average Kd490 value of 0.14 (m⁻¹). The Margarita East Site, present peaks across the time-series that double the average value for Kd490, especially during the rainy season (August-November). The higher resolution data was focused more on events due to the limited temporal resolution. For La Parguera, all sites show Kd490 values higher than 0.1 m⁻¹, and between 2-4 ug/L for chlorophyll-a concentration. The Margarita East station shows a peak for February 2020 that exceeds the 0.5 m⁻¹ Kd490 values, however the peak does not appear in the chlorophyll-a concentration, suggesting the contribution to the peak in the attenuation values were suspended sediments and not chlorophyll-a concentration. *In situ* sampling was limited due to COVID 19 restrictions, but temperature loggers were deployed and continue collecting temperature data to validate satellite derived sea surface temperature (SST). A time-series for SST was develop and the monthly climatology (2012-2020) shows the SST values peaks in September and the lowest values in February. SST values for 2018 were lower, but then increased for 2019 and that continued for 2020, making the latter the highest average SST for all sites analyzed. The data from this project will provide scientifically sound remote sensing and *in situ* water quality analysis for management recommendations on water quality parameters and potential thresholds standards for coral reef restoration areas in Puerto Rico.