

Effects of water quality on sea grass community productivity and biodiversity

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Very little is known on sea grass communities and coastal water quality in Puerto Rico, especially near the major population centers of the island. Sea grass beds are one of the most common productive near shore habitats in tropical and temperate zones, and serve as habitat for numerous ecological and commercially important species. These areas provide food for endangered species and mobile or benthic invertebrates, damp waves and currents and filters nutrients and suspended sediments.

One of the most important environmental variables affecting sea grass productivity and survival is light availability. Four main anthropogenic stressors impact light availability in the near shore: eutrophication, sedimentation, over fishing and habitat destruction. These factors are further exacerbated by rapid population growth and urban expansion. Natural phenomena can also play a role in the decline of sea grass populations, especially storm generated waves and suspended sediments.

In this project Loretta Roberson from the Department of Biology of the UPR will quantify both physical and biological characteristics of sea grass habitats. Surface and pore water samples will be collected by divers at all sites and analyzed for total nitrogen, total phosphorus, particulate organic carbon, turbidity, chlorophyll and salinity. Watershed characteristics will be analyzed by the USGS including monthly average of rainfall values, stream flow, and stream water quality data. Daily average wave heights, wind speeds and tidal heights for San Juan will be used as a proxy for local hydrodynamic conditions. Digital photographs used for sea grass demographics will also be used to measure species richness of sea grasses, epifaunal invertebrates and algae, and macroalgae. Species will be identified to the lowest taxonomic level possible and counted. Photosynthesis will be measured by oxygen production rates in *Thalassia* and *Syringodium* leaf tissue.

The proposed work will be performed in collaboration with government agencies and will establish a baseline data set that can be extended into a long term data set. Near shore habitats and the accompanying watersheds will be characterized to provide resource managers with policy recommendations based on scientific data. Connections will be made between water quality of streams and rivers and near shore habitats. Data on the size, productivity and biodiversity of sea grass habitats in Puerto Rico as well as the minimum water quality required for optimum sea grass productivity, especially in high risk areas near San Juan metropolitan area will be provided.