

ABSTRACT

The Coral Reef Health and Water Quality of the Inshore and Offshore Port Royal Reefs, Jamaica

Kimberley Coore

Coral reefs are threatened by natural and anthropogenic global and local stressors. Sedimentation and nutrification of reefal waters are two key anthropogenic threats to Caribbean reefs. The Port Royal Reefs in Jamaica are located within the Palisadoes-Port Royal Protected Area immediately south of the densely populated Kingston Metropolitan Area, and the eutrophic Kingston Harbour where dredging activities were recently completed in 2018. The strategic assessment of these coral reefs supported by detailed nutrient and sedimentation data to determine potential relationships between reef health and water quality is novel for the Port Royal Cays. In addressing this gap in knowledge, this research provides a detailed assessment of coral and coral reef health, biodiversity, and water quality across the Port Royal reefs. Survey sites lie within differing proximity to the East Ship Channel (an area of high sediment resuspension) and to the harbour outflow channel (an area of high sediment and nutrient influence). AGRRA coral and benthic surveys conducted, assessed the status of five reef sites at two depth ranges (5-7 and 8-14m). The Port Royal reefs are considered to have comparatively good coral cover (23.3%), but with high between- and within-site variability, in part corresponding to the difference between inshore and offshore reefs. The inshore patch reefs exhibited mean nitrate and phosphate concentrations almost 60 times higher than offshore sites, though mean phytoplankton biomass was only five times higher on inshore sites compared to offshore sites. Sedimentation accumulation rates were higher near the ship channel while total suspended solids were higher near the harbour outflow. Both the spatial variability in reef health together with the comparatively poor water quality condition of the inshore reefs underscores the urgent need for a revision and implementation of marine spatial planning and management, and protective mitigation strategies for all users within this valuable marine space.

Keywords: *coral reef health; water quality; sedimentation; nutrient; AGRRA; Port Royal Cays; Jamaica.*