

Impact of Sanitation Best Management Practices on Human and Coral Reef Health: Half Moon Bay, Honduras Case Study

Impacto de las Buenas Prácticas en la Gestión del Saneamiento en la Salud Humana y de los Arrecifes de Coral: Estudio de Caso de Half Moon Bay, Honduras

Impact des Meilleures Pratiques de Gestion de L'assainissement sur la Santé des Humains et des Récifs Coralliens : Étude de Cas de Half Moon Bay, Honduras

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EXTENDED ABSTRACT

Over a million people depend on the Mesoamerican Reef as a source of livelihood (Kramer and Kramer, 2006). According to the IUCN Red List of Ecosystems the MAR is critically endangered. In the past years, macroalgae cover has nearly doubled along the MAR and there has been a significant increase in diseases linked to waterborne pathogens (McField et al., 2020). It is increasingly clear that nutrient pollution (Tuholske et al., 2021). However, to date there is limited work on the impact of Sanitation Best Management Practices (SBMPs) on human and coral reef health in the region. Here, we present the case study of Half Moon Bay (Roatan, Honduras) where after 15 years of implementing SBMPs from the bottom-up, both marine water quality and coral disease have improved.

We carried out a literature review, stakeholder interviews and focus groups to systemize local ecological knowledge. This information helped us understand the SBMPs implementation process in Roatan. Additionally, we analyzed enterococcus data in marine waters collected between 2013 and 2020 from the monitoring program led by the Bay Islands Conservation Association, data on connections to the sewage treatment plant from Polo's Water Board collected between 2014 and 2019 and data on coral diseases in 3 sites within the area of influence of the sewage treatment plant from the Healthy Reefs Initiative collected in 2014, 2016 and 2018; to determine the changes in pathogens through time and their impact on the reef.

According to our data the creation and strengthening of a local water board was key for the implementation of SBMPs by improving transparency; currently 99.65% of accessible connections in West End have been connected to a sewage treatment plant which meets national standards and has developed cost-effective processing methods. Moreover, long term marine water quality data was important in the implementation of SBMPs, providing leverage to advocate for investment in sanitation. Since 2017 a steady increase in connections to the sewage treatment plant have been observed, which correlates with a decrease in enterococcus levels up to 2 orders of magnitude. Consequently, in 2019 Half Moon Bay was declared a Blue Flag Beach. Furthermore, coral disease in the area of influence of the sewage treatment plant dropped to 0% after the implementation of SBMPs.

The West End case study shows that sewage treatment plants work and are a cornerstone for SBMPs however on the ground governance work is also required. Furthermore, when implementing SBMPs in Honduras and other areas, managers must ensure these are locally tailored, adaptive and involve the community every step of the way. In conclusion, SBMPs are key for both human and coral health and should be incorporated into coastal ecosystems' management frameworks.

KEYWORDS: Sanitation Best Management Practices; Water quality; Mesoamerican reef; Sanitation; Coral reef

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