



Saving Our Reefs: Pollution Solutions PROGRAM

PRESENTATIONS

The Influence of Wastewater Discharge on Water Quality in Hawaii: A Comparative Study of Lahaina and Kihei

Mailea Miller-Pierce

In Maui, Hawai'i, wastewater reclamation facilities (WWRFs) dispose of partially treated effluent into injection wells connected to the nearshore environment. Hawai'i State Department of Health data from 2004–2015 were assessed for qualitative trends in nutrient, turbidity, and Chlorophyll a water quality (WQ) impairments for fourteen marine sites on Maui Island. We introduce a novel method, the Qualitative Impact Percentage (QIP), to facilitate a qualitative comparison of disparate factors contributing to WQ impairment. Sites near the Lahaina WWRF in West Maui, which was found in violation of the Clean Water Act in 2014, had fewer exceedances and lower geometric means compared to sites near the Kihei WWRF. Our results suggest that WQ impairments may be a greater concern in Kihei than previously acknowledged. This paper attempts to raise the awareness of policymakers and the public and to encourage further research assessing the effects of the Kihei WWRF on the marine environment.

Temporal Analysis of Hawai`i DOH Water Quality Data

Neil Rhoads

By looking at when and where the data were collected we can see some important patterns. This context will help us understand what conclusions we CAN and CANNOT draw from the data. We will see that there are limited periods of time with consistent sampling and for only a subset of sites.

Interpreting the Data

Neil Rhoads

Sparse intermittent data can be challenging to interpret for scientists, and even more so for the general public. It is even worse when the water quality standards are complicated. We will explore the origin and rationale for the Qualitative Impact Percentage and compare its usefulness against some traditional methods.

The Impact of Wastewater on Coral Reef Inhabitants and Ecosystems

Dr. Eric Brown

As human population increases on islands with highly visible limitations on the ecosystem, it is important to understand factors such as wastewater that can alter the ecosystem. Over the past 20 years numerous studies have examined the impact of human wastewater in coral reef ecosystems and identified several key stressors that negatively influence coral reef organisms when present in excess quantities. These stressors include freshwater, dissolved inorganic nutrients, endocrine disrupters, pathogens, solids, heavy metals, and toxins. This talk will review the impact of these stressors on coral reef organisms with on a focus on corals, which are the cornerstone of the habitat. Thresholds for some of the stressors will be presented, but it is important to understand that many of the stressors have been examined individually and not in synergy with other stressors that are also present in nearshore waters.

Recommendations to mitigate wastewater impacts will be discussed in the context of the Maui Nui Marine Resource Council recovery plan.

Is Submarine Groundwater Discharge a Chronic Threat to Maui's Nearshore Reefs?

Daniel Amato

Wastewater input from sewage treatment plants and onsite disposal sewage disposal systems (OSDS) is a major source of nutrients to coastal reefs in Hawaii. While much is known about the impacts of nutrient loading due to streams and rivers, submarine groundwater discharge (SGD) is an often-unseen and understudied, yet nearly ubiquitous transport pathway for nutrients to nearshore reefs. Recent studies show that SGD enriched in wastewater, that originated from injection wells and OSDS, is present at many sites on Maui and Oahu. By comparing water quality with various biological parameters, we have identified clear relationships between land use, groundwater, nearshore waters, and reef health at multiple sites on Maui.

Maui's Wastewater Reclamation Facilities and Alternatives

Steve Parabolici

This presentation will provide the audience with a clear understanding of how Maui County's Wastewater Reclamation Facilities treat wastewater and how the effluent is disposed or beneficially reused. Details on how R-1 water is produced and how nutrients, particularly nitrogen, are managed will be explained. Maui County's plans for expanding its water reuse program in South Maui and a comparison between centralized and decentralized wastewater management will also be discussed.

BIOGRAPHIES

Dr. Daniel Amato

Daniel Amato is a recent PhD graduate from the University of Hawaii at Manoa's Marine Botany program. His dissertation research focused on linking land use to coral reef health in Hawaii with an emphasis on hydrogeological processes and their influence on reef ecology. Daniel is currently leading a three-year research project in American Samoa that aims to assess the status of nearshore reefs and identify land-based sources of pollution in coastal waters of Tutuila.

Dr. Eric Brown

Eric is the Marine Ecologist for Kalaupapa National Historical Park on Molokai. Eric's primary responsibilities at the park include documenting the status and trends of both marine and freshwater resources within the park. His current research focus at Kalaupapa and across the state examines coral recruitment dynamics, long-term trends in coral community structure, and watershed activities in relation to the condition of the marine environment.

Mailea Miller-Pierce

Mailea Miller-Pierce is currently a PhD candidate in Biology at Washington State University, Vancouver. She is in the National Science Foundation's IGERT fellowship program called NSPIRE (Nitrogen Systems: Policy-oriented Integrated Research and Education) which links nitrogen science to policy. Her Masters degree is in Ecology and she holds two Bachelors degrees, one in Biology and one in Environmental Studies.

Steve Parabolicoli

Steve Parabolicoli has over 35 years of experience in the water and wastewater industry in Hawaii. After over 30 years of service, he retired from the County of Maui's Wastewater Reclamation Division at the end of 2014. While with the County, he held the positions of Wastewater Operations Program Superintendent, Water Recycling Program Coordinator and Wastewater Reclamation Facility Supervisor. Steve currently is providing consultant services in wastewater management and water reuse. He is also teaching an entry level water – wastewater operations class at the University of Hawaii Maui College.

Neil Rhoads

Neil Rhoads has BS degrees in Physics and Biochemistry from Iowa State University, and a MS in Biochemistry from the University of Wisconsin at Madison. Most of his working career has been in Computer Science and Software Engineering. He has lived on Maui for over 18 years and has been an avid diver much of that time.