Expanding Benthic Habitat Mapping:
West Hawai‘i Habitat Focus Area

Over the past decade, research within the West Hawai‘i Habitat Focus Area (WHHFA) and elsewhere have revealed that coral reef habitats in shallow water are increasingly stressed by rising temperatures, ocean acidification, sedimentation, nutrification (pollution), and fishing pressure. However, little is known about coral reef habitats in deeper water and how they are being impacted by these threats (Figure 1). This knowledge gap emphasizes a need to locate and map coral reef habitats in deeper water to guide research, management, and conservation efforts.

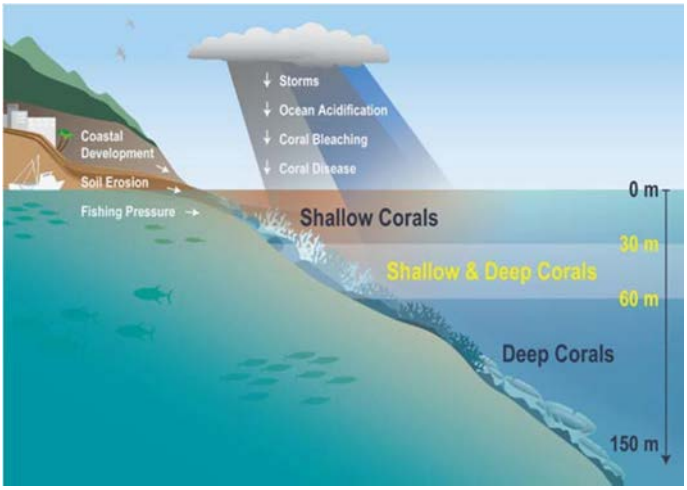

Figure 1. Conceptual graphic of deep coral ecosystems and their relationship with other coral ecosystems and the potential threats they face.

Because deep coral reef habitats (mesophotic depths greater than 30 m that receive low levels of light) are more difficult to access by diver surveys, the benthic features and surface complexity of these habitats are not well understood. It is important to know this information because the health and abundance of fish and coral species depends on the availability and condition of essential seafloor habitats. A few surveys have explored the deeper depths of the WHHFA and identified corals that extend to depths of 30–150 m. To better monitor the health and resilience of these deeper coral reef ecosystems, scientists require improved habitat maps showing their location and structural complexity.

To meet this need, the NOAA Pacific Islands Fisheries Science Center’s Ecosystem Sciences Division (ESD) used a combination of multibeam sonar and optical data (collected with a camera sled pulled from a small research vessel) to collect habitat data for the entire seafloor within the WHHFA, from the shoreline to depths of 150 m. This project directly supports two of the WHHFA objectives:

1. **By providing better management tools in the form of easily-accessible benthic habitat maps and data for informed decision-making, and**
2. **By ensuring that communities are informed and can contribute to the sustainable use and restoration of natural resources.**

Data & Maps

The data and maps created from the benthic habitat surveys provide detailed information for resource managers about the characteristics of the seafloor habitats within the whole WHHFA (Figure 2). For instance, the types of habitat (such as hard bottom, sand, coral, and algae), as well as the surface complexity and “roughness” of reef habitats are now mapped. The surveys identified areas where shallow water habitats and species overlap with deep-water habitats. This overlap highlights the potential for deeper habitats to serve as refuge areas for fish and other species when habitat losses occur in shallow areas. The surveys show that coral is a limited resource that covers 17.10 km^2 of the seafloor within the WHHFA with most of the coral (94%) in shallow water (less than 30 m), where impacts from a changing marine environment and human activities are intense. A small portion (5.7%) of the coral-rich habitat (0.97 km^2) is deeper than 30 m. This distribution underlines the importance of also protecting and properly managing coral reef habitat in deeper waters where an important component of the coral population exists.

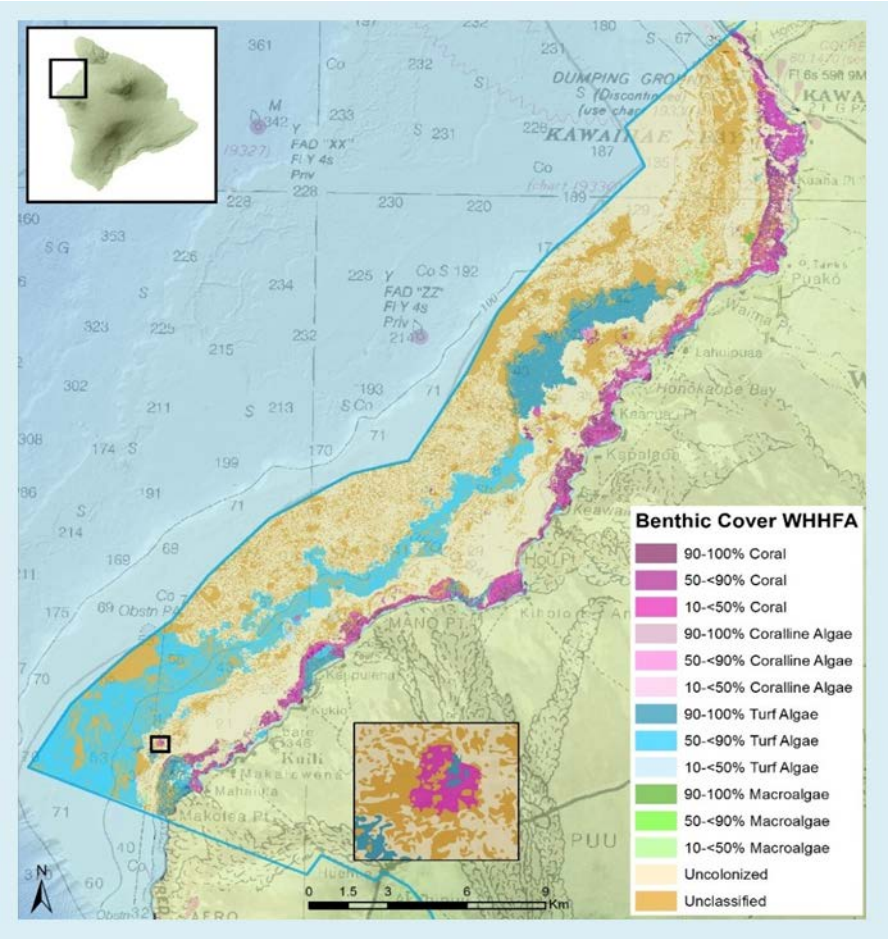

Figure 2. . Benthic Cover map derived for WHHFA. Inset map shows a close-up of an example area with multiple benthic cover classes.

The benthic habitat maps produced during this project are already in use by resource managers and are available to the public (see the link below). The Hawai‘i Division of Aquatic Resources (DAR) has been using the new maps to initiate and inform discussions with stakeholders about the locations of coral reefs and how to improve management of these coastal resources. By providing better management tools in the form of easily- accessible benthic habitat maps and data for informed decision-making baseline characterization of the benthic habitats within the WHHFA, the data and maps created will help facilitate the development of actionable policies, plans, and management activities.

Acknowledgement

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Website:
http://www.soest.hawaii.edu/pibhmc/cms/data-by-location/main-hawaiian-islands/hawaii-big-island/hawaii-habitat/

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