



## Benthic Marine Monitoring

### Network Parks Where Resource Is Monitored

- ✦ Kaloko-Honokōhau National Historical Park (KAHO)
- ✦ War in the Pacific National Historical Park (WAPA)
- ✦ Kalaupapa National Historical Park (KALA)
- ✦ National Park of American Samoa (NPSA)

### Importance: Corals Build Marine Reef Ecosystems

Coral reefs are diverse, complex, and important components of shallow fringing and barrier reef ecosystems in Pacific Island Network (PACN) parks. Coral reef ecosystems are centers of biodiversity due to the habitat complexity they provide to different organisms. The reef provides substrate and microhabitats in which sessile and motile organisms live and feed. The architectural complexity is shaped by a combination of many factors, including: nutrient availability, salinity, light, substrate type, temperature, and exposure to wave action. Reef building corals are sensitive to environmental degradation. Therefore, they are good indicators of overall health for nearshore marine ecosystems.

### Long-Term Monitoring

The National Park Service (NPS) initiated the marine benthic monitoring program by surveying coral reefs in KALA in 2006, and began surveying reef communities at NPSA and KAHO in 2007. Ecologist led field teams navigate by boat to 30 randomly selected sites within each park using a GPS system. Once over a site, the dive team descends to the reef below to photograph the benthic community, measure the topographical complexity, and examine coral settlement. The images are processed to derive percent cover for various substrate types and determine the frequency of disease and/or bleaching. This program will allow the NPS to detect significant trends in the benthic community in response to changing climate, coastline development, and management activities.

### Monitoring Objectives

- ✦ Determine long-term trends in percent cover of sessile marine macroinvertebrate (corals, sponges, etc.) and algal assemblages on hard substratum, between 10 and 20 meters depth.
- ✦ Examine trends in benthic topography (rugosity).
- ✦ Determine trends in settlement rate of hard corals to artificial surfaces.
- ✦ Investigate long-term trends in the incidence of coral disease and bleaching.

### Management Applications

- ✦ Identify unique benthic assemblages and areas of high biodiversity within the parks.
- ✦ Document long-term trends in benthic community cover and structure for climate change assessments.
- ✦ Examine coral settlement patterns to determine larval source and sink areas around the parks.
- ✦ Provide early warning system for disease and bleaching events as well as the detection of invasive species.

### Contact Information

Eric Brown, [eric\\_brown@nps.gov](mailto:eric_brown@nps.gov), Paul Brown, [paul\\_brown@nps.gov](mailto:paul_brown@nps.gov), Mark Capone, [mark\\_capone@nps.gov](mailto:mark_capone@nps.gov), Sallie Beavers, [sallie\\_beavers@nps.gov](mailto:sallie_beavers@nps.gov)

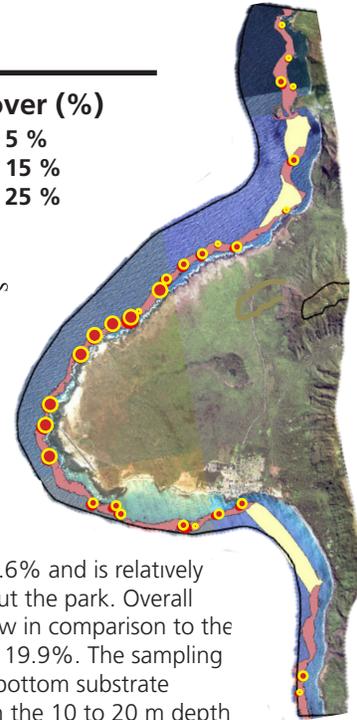
Network: <http://science.nature.nps.gov/im/units/pacn/> Resource: [http://science.nature.nps.gov/im/units/pacn/monitoring/vs\\_benthic.cfm](http://science.nature.nps.gov/im/units/pacn/monitoring/vs_benthic.cfm)

### Coral Cover (%)

- ≈ 5 %
- ≈ 15 %
- ≈ 25 %



Percent coral cover at select locations in KALA in 2006. Average coral cover in the park is approximately 9.6% and is relatively uniform throughout the park. Overall percent cover is low in comparison to the Hawaii average of 19.9%. The sampling frame is the hard bottom substrate (coral color) within the 10 to 20 m depth contour. The black outline shows the marine boundary and underwater areas shaded in yellow are sandy habitats.



A pictorial taste of the PACN's diverse and complex coral reef ecosystems.