

Fagatele Bay National Marine Sanctuary

Connectivity, Diversity & Relationships

Management Issue

Ecological connectivity between disparate locations and the processes that support that connectivity drive the diversity and community composition of places like the Fagatele Bay National Marine Sanctuary (FBNMS or Sanctuary). Managers need information on the relationships between the biological resources they manage and the ecological processes that influence them in order to effectively engage in protecting these resources.

Description

Connectivity, diversity and the relationships organisms have with the environment are all very important aspects of coral reef ecosystems. These factors not only contribute to the uniqueness of the ecosystem but they also contribute to resiliency and if impacted, the overall health of an ecosystem can be affected. The Sanctuary is likely connected with other coral reefs throughout the Samoan Archipelago, not just through water motion but through the materials transported in the ocean such as marine debris, nutrients, sediments, larvae and mobile organisms. Diversity is important to the resiliency of an ecosystem. Both species level and population level diversity are crucial and sensitive components of coral reefs and often serve as ecosystem level health measures. Managers need to understand which populations are related so that they can account for upstream-downstream impacts. Mobile organisms such as fish may live in an area permanently, semi-permanently or occasionally. Managers need to understand the use of the habitat by the organisms in order to effectively manage both.



Coral reef communities of the FBNMS
Image credit: Kip Evans

Questions and Information Needs

- 1) What is the species level diversity in the Sanctuary?
- 2) What is the genetic level population diversity of key species in the Sanctuary?
- 3) What is the genetic and larval connectivity within the Sanctuary with areas outside?
- 4) Is there genetic and larval connectivity within the Samoan Archipelago and the greater South Pacific?
- 5) What are the movement patterns of permanent and migratory species within and outside the Sanctuary?

Scientific Approach and Actions

- Assess and monitor species level diversity of coral and coral reef organisms within the Sanctuary.
- Complete genetic analyses of populations of key species within and outside the Sanctuary.
- Complete genetic analyses of populations of key species in the Samoan Archipelago and South Pacific.
- Use tracking studies to determine the movements of key species spatially and at depth.

Key Partners and Information Sources

Hawai'i Institute of Marine Biology; NOAA/NMFS/PIFSC/Coral Reef Ecosystems Division; NOAA/NMFS/PIFSC/CRED/Pacific Benthic Habitat Mapping Program; NOAA/NMFS/Pacific Islands Fisheries Center; NOAA/NOS/National Center for Coastal Ocean Science; NOAA/NMFS/PIRO, US Fish and Wildlife Service; US Geological Survey/Biological Resources Division; USGS/BRD/National Biological Information Infrastructure/Pacific Basin Information Node; Territorial Government of American Samoa, American Samoa Department of Marine and Wildlife Resources, The National Park Service of American Samoa

Updated: 5/26/2011

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>

Management Support Products

- Connectivity maps
- Larval transport modeling
- Migratory tracking maps
- Analysis of changes in diversity

Planned Use of Products and Actions

- Marine zoning and spatial planning
- Developing management relationships with connected areas
- Strategic management of less diverse and more sensitive populations



Clownfish and sea anemone. Photo credit: Kip Evans

Program References

FBNMS Management Plan

- Action Plan 4.1 Marine Conservation Science
 - Strategy MCS-3:
 - Activity MCS 3.3 – Identify movement patterns of permanent and migratory species
 - Activity MCS 3.5 Determine genetic connectivity and diversity dynamics of key reef species
 - Strategy MCS-5: Continue to enhance research and monitoring programs throughout the life of the plan
 - Activity MCS-5.1: Continue long term monitoring efforts and target new monitoring to assess recovery and resilience from natural disasters and coral reef health throughout the life of the plan
 - Activity MCS 3.5 Determine genetic connectivity and diversity dynamics of key reef species

FBNMS Condition Report

- Questions 5, 6, 9, 11, 12, 13

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