PIFSC DATA REPORT - DR-16-012 **Issued 1st June 2016**
doi:10.7289/V5/DR-PIFSC-16-012

Pacific Reef Assessment and Monitoring Program

Fish monitoring brief: American Samoa 2016

About this summary brief

The purpose of this document is to outline the most recent survey efforts conducted by the Coral Reef Ecosystem Program (CREP) of the NOAA Pacific Islands Fisheries Science Center as part of the long-term monitoring program known as the Pacific Reef Assessment and Monitoring Program (Pacific RAMP). More detailed survey results will be available in a forthcoming status report.

Sampling effort

- Ecological monitoring took place in American Samoa from April 15 2016 to May 5 2016.
- Data were collected at 202 sites. Surveys were conducted at Ofu and Olosega (#=11), Rose (#=47), Tau (#=50) and Tutuila (#=94).
- At each site, the fish assemblage was surveyed by underwater visual census and the benthic community was assessed.
- At a subset of sites (#=51), paired comparisons of fish surveys performed on closed-circuit rebreather versus open-circuit scuba were conducted. Those data will be analyzed and presented separately in a future publication.

Overview of data collected

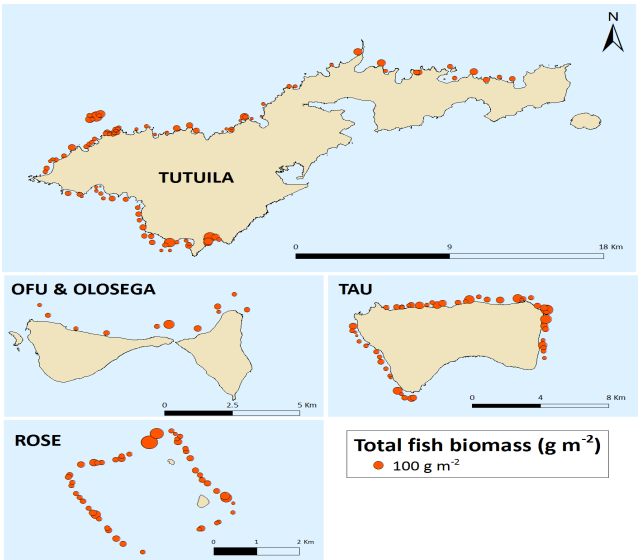

Figure 1. Mean total fish biomass at sites surveyed.

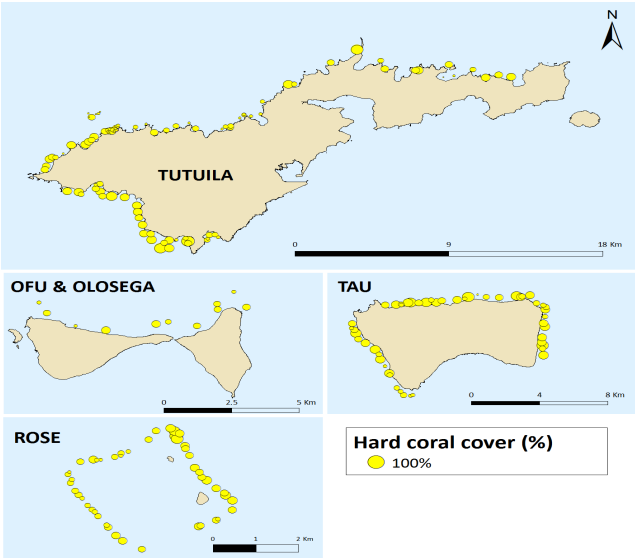

Figure 2. Mean hard coral cover at sites surveyed.

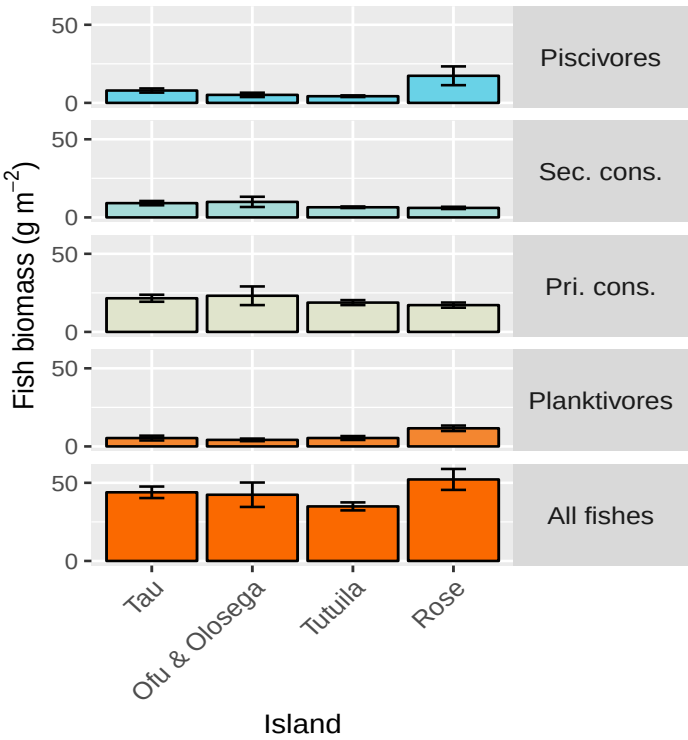

Figure 3. Mean consumer group fish biomass (± standard error). Primary consumers are herbivores and detritivores, and secondary consumers are omnivores and invertivores.

Primary consumers include herbivores (which eat plants) and detritivores (which bottom feed on detritus), and secondary consumers are largely omnivores (which mostly eat a variety of fishes and invertebrates) and in-vertivores (which eat invertebrates).

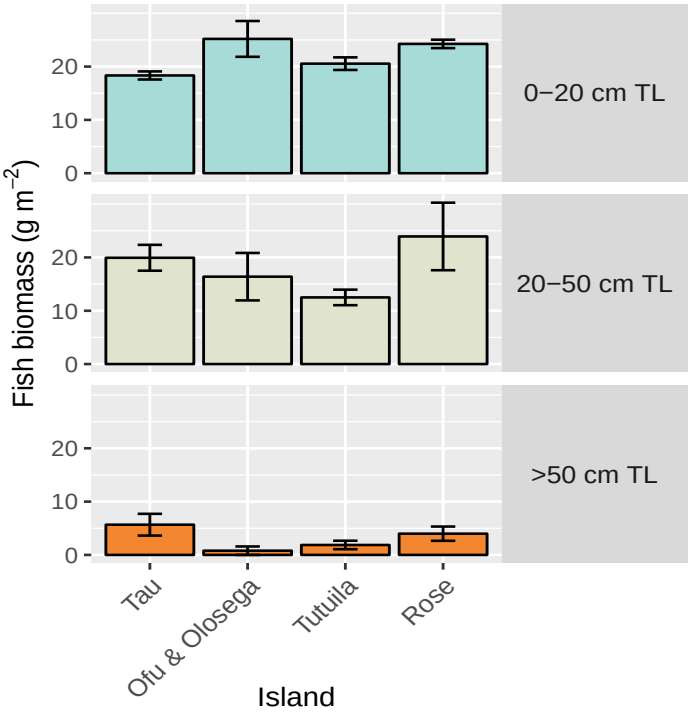

Figure 4. Mean fish biomass per size class (± standard error). Fish measured by total length (TL) in centimeters (cm).

Spatial sample design

Survey site locations are randomly selected using a depth-stratified design. During project planning and the project itself, logistic and weather conditions factor into the allocation of monitoring effort around sectors of each island or atoll. The geographic coordinates of sample sites are then randomly drawn from a map of the area of target habitat per study area. The target habitat is hard-bottom reef, the study area is typically an island or atoll, or in the case of larger islands, sectors per island, and the depth strata are shallow (0-6 m), mid (6-18 m), and deep (18-30 m).

Sampling methods

A pair of divers surveys the fish assemblage at each site using a stationary-point-count method (Fig. 5). Each diver identifies, enumerates, and estimates the total length of fishes within a visually estimated 15-m-diameter cylinder with the diver stationed in the center. These data are used to calculate fish biomass per unit area (g m^{-2}) for each species. Mean biomass estimates per island are calculated by weighting averages by the area per strata. Island-scale estimates presented here represent only the areas surveyed during this project. For gaps or areas not surveyed during this project, data from this and other survey efforts will generally be pooled to improve island-scale estimates.

Each diver also conducts a rapid visual assessment of reef composition, by estimating the percentage cover of major benthic functional groups (encrusting algae, fleshy macroalgae, hard corals, turf algae and soft corals) in each cylinder. Divers also estimate the complexity of the surface of the reef structure, and they take photos along a transect at each site that are archived to allow for future analysis.

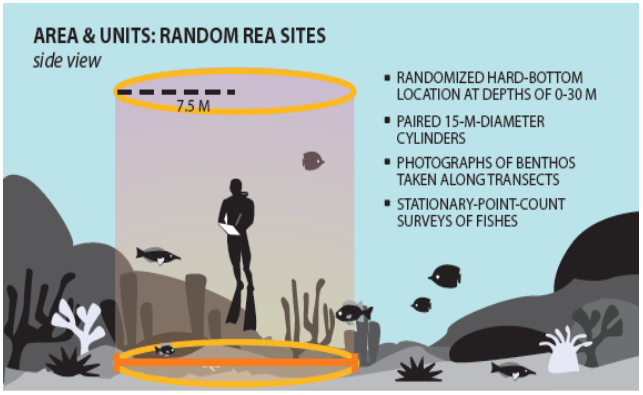

Figure 5. Method used to monitor fish assemblage and benthic communities at the Rapid Ecological Assessment (REA) sites

About the monitoring program

Pacific RAMP forms a key part of the National Coral Reef Monitoring Program of NOAA's Coral Reef Conservation Program (CRCP), providing integrated, consistent, and comparable data across U.S. Pacific islands and atolls. CRCP monitoring efforts have these aims:

- Document the status of reef species of ecological and economic importance
- Track and assess changes in reef communities in response to environmental stressors or human activities
- Evaluate the effectiveness of specific management strategies and identify actions for future and adaptive responses

In addition to the fish community surveys outlined here, Pacific RAMP efforts include interdisciplinary monitoring of oceanographic conditions, coral reef habitat assessments and mapping. Most data are available upon request.

For more information

Coral Reef Conservation Program:
http://coralreef.noaa.gov
Pacific Islands Fisheries Science Center:
http://www.pifsc.noaa.gov/
CRED publications:
http://www.pifsc.noaa.gov/pubs/credpub.php
CRED monitoring reports:
http://www.pifsc.noaa.gov/cred/monitoring_publications.php
CRED fish team:
http://www.pifsc.noaa.gov/cred/fish.php
Fish team lead and fish survey data requests:
ivor.williams@noaa.gov, adel.heenan@noaa.gov