

# Fish Monitoring Brief: Howland, Baker, and Swains Islands, 2018

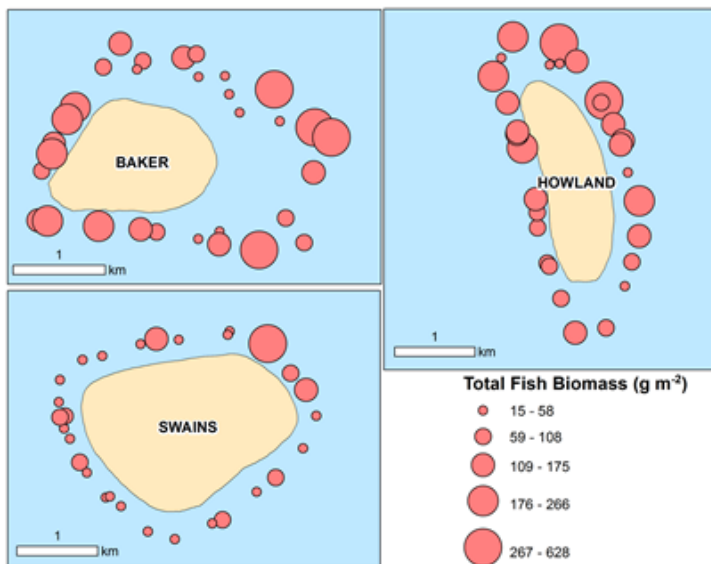
## About this summary brief

The NOAA Pacific Islands Fisheries Science Center conducts the long-term Pacific Reef Assessment and Monitoring Program (Pacific RAMP) to track the status and trends of coral reef ecosystems of the U.S. Pacific Islands. This summary brief provides an overview of the most recent survey efforts. More detailed survey results will be available in a forthcoming status report.

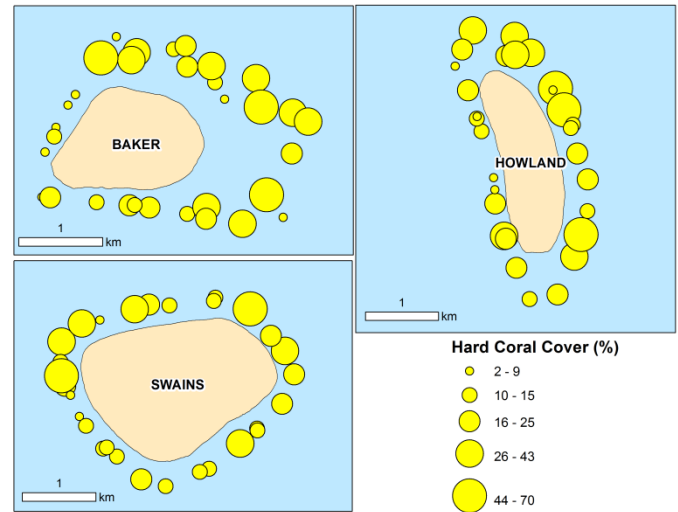
## Sampling effort

- The most recent ecological monitoring took place at Howland, Baker, and Swains Islands from May 31, 2018 to June 22, 2018.
- Data were collected at 91 sites. Surveys were conducted at Baker (n = 32), Howland (n = 29), and Swains (n = 30).
- At each site, divers visually surveyed the fish assemblage and estimated benthic cover.

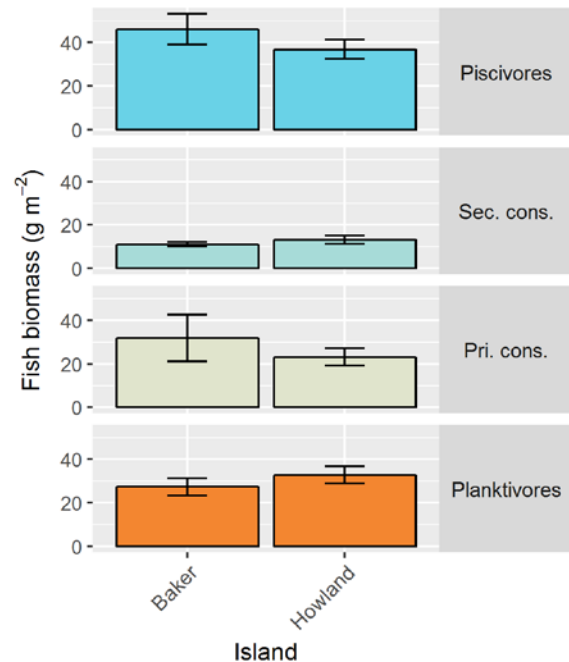
## Overview of data collected



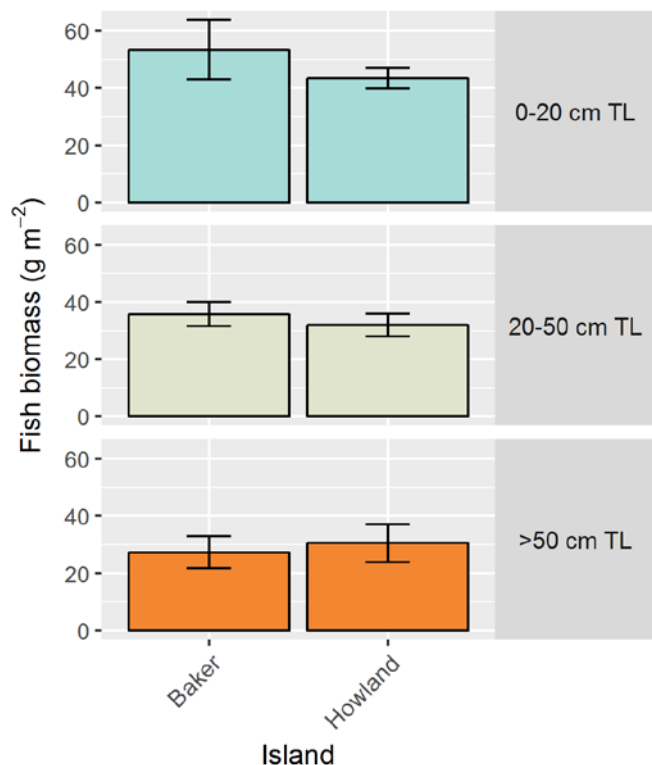
**Figure 1. Mean total fish biomass at sites surveyed.**



**Figure 2. Mean hard coral cover at sites surveyed.**



**Figure 3. Primary consumers (pri. cons.) include herbivores (which eat plants) and detritivores (which bottom-feed on detritus), and secondary consumers (sec. cons.) are largely omnivores (which eat a variety of fish and invertebrates) and invertivores (which eat invertebrates).**



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

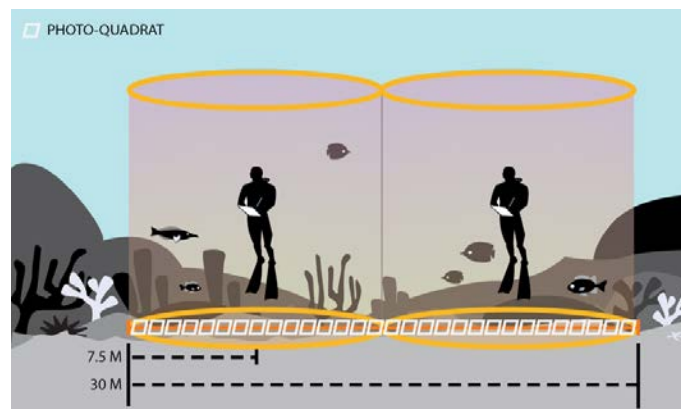
### Spatial sample design

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

### Sampling methods

A pair of divers surveyed the fish assemblage at each site using a stationary-point-count method (Fig. 5). Each diver identified, enumerated, and estimated the total length of fishes within a visually estimated 15-m-diameter cylinder with the diver stationed in the center. These data were used to calculate fish biomass per unit area ( $\text{g m}^{-2}$ ) for each species. Mean biomass estimates per island were calculated by weighting averages by the area per stratum. Island-scale estimates presented here represent only the areas surveyed during this cruise.

Each diver also conducted a rapid visual assessment of reef composition by estimating the percentage cover of encrusting algae, fleshy macroalgae, and hard corals in each cylinder. Divers also estimated the complexity of the reef structure, and collected photographs along a transect at each site that were 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.

### For more information

Coral Reef Conservation Program:

<http://coralreef.noaa.gov>

NOAA Pacific Islands Fisheries Science Center:

<http://www.pifsc.noaa.gov/>

Coral reef ecosystem publications:

<http://www.pifsc.noaa.gov/pubs/credpub.php>

Fish ecology and monitoring:

<http://www.pifsc.noaa.gov/cred/fish.php>

Fish team lead: [ivor.williams@noaa.gov](mailto:ivor.williams@noaa.gov)