Reef fish and benthic marine surveys in Faga'alu and Vatia watersheds, Tutuila, American Samoa

Depth-stratified random biological monitoring surveys conducted by NOAA 4–6 April 2012

NOAA FISHERIES

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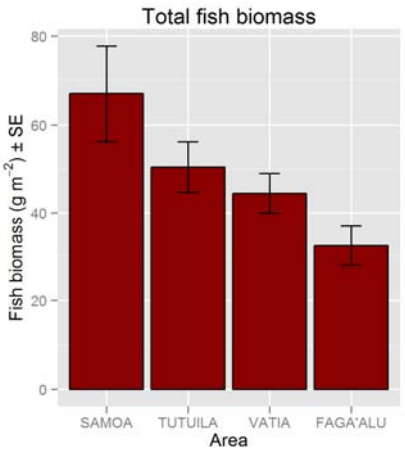
Overview

Vatia and Faga'alu Bays were selected as high-priority sites in American Samoa on the basis of their potential for successful, locally based coral reef management and conservation (NOAA CRCP 2010). In 2012, staff of the Coral Reef Ecosystem Division (CRED) of the NOAA Pacific Islands Fisheries Science Center surveyed the bays fed by these priority watersheds with the same methods used in the long-term Pacific Reef Assessment and Monitoring Program (Pacific RAMP).

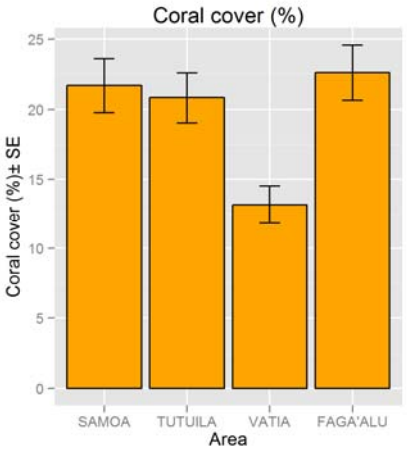
Methods

Monitoring surveys took place in April 2012 (Vatia Bay: 4–6 April and Faga'alu Bay: 8–10 April). In each bay, survey sites were randomly selected using a depth-stratified design. Sampled sites were selected pseudo-randomly from all available sampling locations using a map of the total area of target habitat, with an equal density of sites selected in each depth stratum: shallow (0–6 m), mid (6–18 m), and deep (18–30 m). At each site, the fish assemblage was surveyed using the stationary-point-count method, and the benthic community composition and structure were assessed. A pair of divers identified, counted, and estimated the size of all fishes within a visually estimated 15-m-diameter cylinder centered at the site. These data were used to calculate fish biomass per unit area (g m^{-2}) for each species. After completing each fish survey, both divers visually estimated the percentage of cover of encrusting algae, fleshy macroalgae, hard corals, turf algae, sand, and soft corals from the center of their cylinders. Divers also estimated the slope, broad habitat type, and complexity at each site.



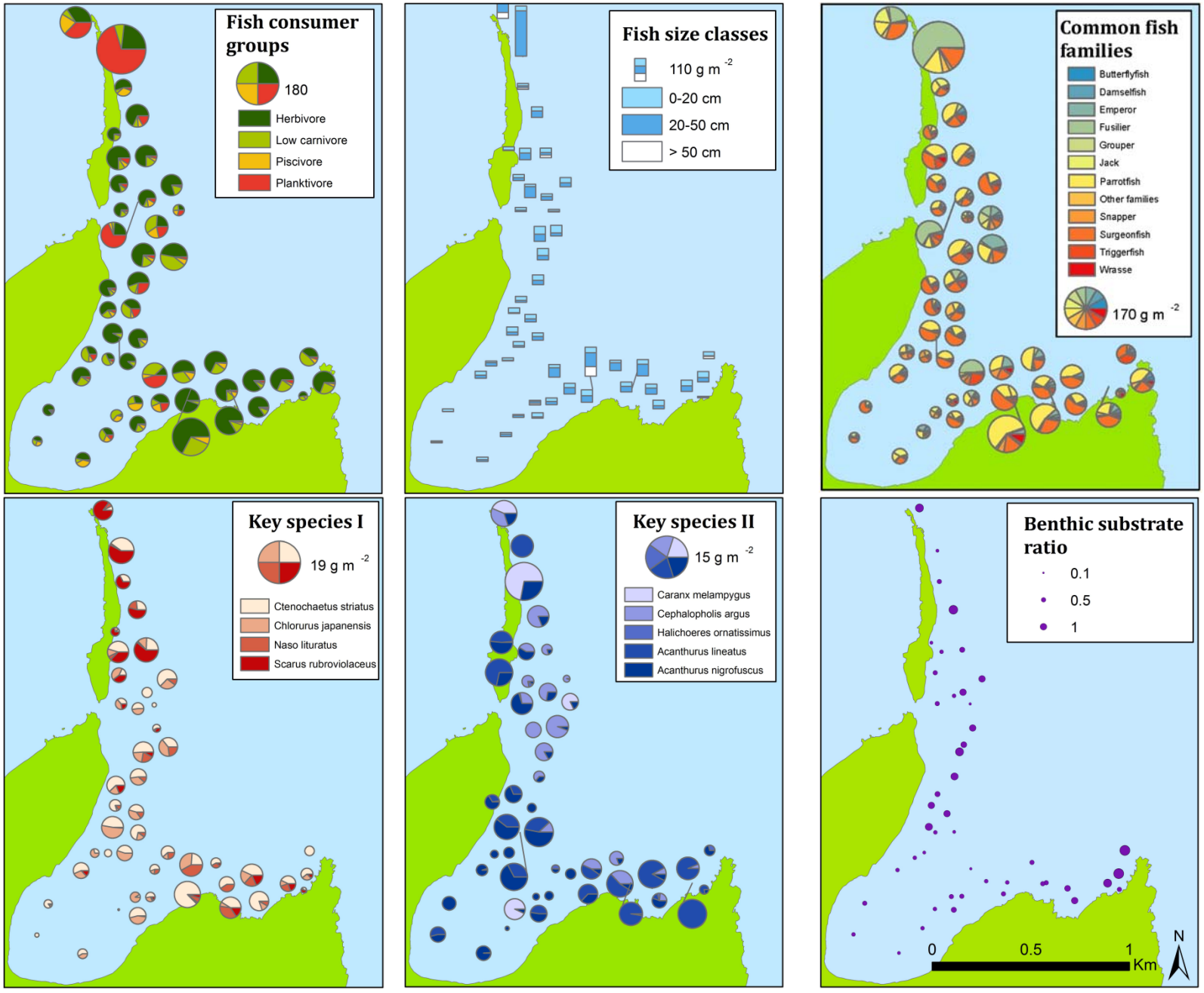
Data summary

First, the total fish biomass and coral cover observed at each of the bays are presented alongside mean values of these attributes for the island of Tutuila and the archipelago of American Samoa from surveys conducted during the Pacific RAMP cruise in 2012. Second, for each of the bays, the following data are presented as a series of maps: the biomass of fishes per consumer group, the biomass of fishes per size class, the biomass per common fish family, the biomass of key reef fish species, and the benthic substrate ratio. Consumer groups are herbivores, which mainly eat plant material; low carnivores, which eat invertebrates; piscivores, which eat fishes; and planktivores, which eat plankton. The size classes for fishes are 0–20 cm, 20–50 cm and > 50 cm in total length. The common fish families are butterflyfishes, damselfishes, emperors, fusiliers, groupers, jacks, parrotfishes, snappers, triggerfishes, surgeonfishes, and wrasses. These families include species observed in the Department of Marine and Wildlife Resources (DMWR) Key Reef Species Program, the Commercial Fisheries Biosampling Program, and the Samoan Archipelago Coral Reef Ecosystem Genetics and Connectivity Program. Biomass is displayed only for key species, namely those observed in more than 15% of the survey sites. Finally, the benthic substrate ratio indicates the balance between the cover of benthic components that contribute to reef accretion (corals and crustose coralline algae) compared to those components that do not (turf algae and macroalgae).

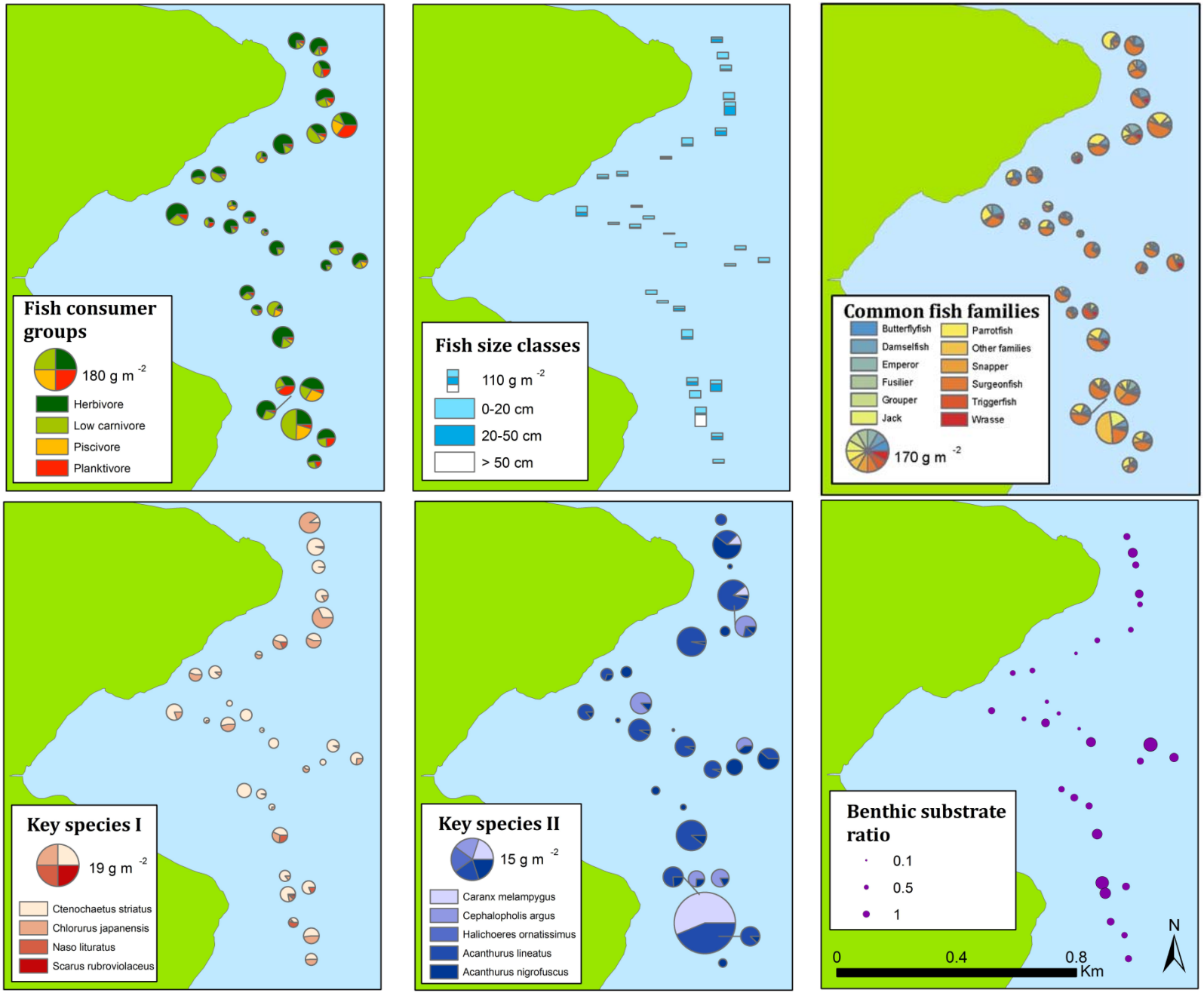


Uses of survey data

The purpose of these monitoring surveys was to provide baseline data on the fish assemblage and associated coral reef habitats for each of the bays. Augmented by data from future surveys, this information can be used as a reference point to monitor how these coral reef areas change over time and to help assess the effects of coral reef conservation and management decisions. All survey data and more detailed results are available upon request (email: nmfs.pic.credinfo@noaa.gov; web: www.pifsc.noaa.gov/cred).


Fish consumer groups
180
Herbivore
Low carnivore
Piscivore
Planktivore
Fish size classes
110 g m -2
0-20 cm
20-50 cm
> 50 cm
Common fish families
Butterflyfish
Damselfish
Emperor
Fusilier
Grouper
Jack
Parrotfish
Other families
Snapper
Surgeonfish
Triggerfish
Wrasse
170 g m -2
Key species I
19 g m -2
Ctenochaetus striatus
Chlorurus japanensis
Naso lituratus
Scarus rubroviolaceus
Key species II
15 g m -2
Caranx melampygus
Cephalopholis argus
Halichoeres ornatissimus
Acanthurus lineatus
Acanthurus nigrofuscus
Benthic substrate ratio
0.1
0.5
1
0
0.5
1
Km
N

Vatia Bay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Acanthurus nigrofuscus
Benthic substrate ratio
0.1
0.5
1
0
0.4
0.8
Km
N

Faga'alu Bay