

South Florida/Caribbean Network Inventory and Monitoring

National Park Service
U.S. Department of the Interior



Marine Reef Fish Communities Monitoring: Biscayne National Park and Dry Tortugas National Park

2019

Importance: *Critical resource for Florida's economy*

Reef fish populations are valued as recreational and commercial fisheries, are popular attractions for divers and snorkelers, and are essential components of coral reef ecosystems. The health of reef fish communities has a large impact on the economy of South Florida.

Monitoring: *Multi-agency approach*

Monitoring assists management decision-making by documenting trends in relative reef fish density and occurrence, community composition, distribution, and size structure; identifying potential causes of changes; and evaluating the effectiveness of fishery regulations in different management zones.

Data collection involves a Reef Fish Visual Census (RVC) point count in which all fish are identified to species, counted and size estimated by a diver within a 15-meter (49.2-foot) diameter cylindrical sampling unit. Sites are selected in different types of reef habitats using a stratified random survey design. Special attention is paid to important recreational and commercial reef fish species such as White Grunt, Hogfish, Mutton Snapper, Gray Snapper, Yellowtail Snapper, Red Grouper, and Black Grouper. Habitat data are also collected and used to update benthic maps and refine community distribution analysis.

This cutting-edge program monitors hard-bottom habitats throughout the Florida Keys in a cost-efficient collaborative multi-partner survey effort involving federal, state, and local partners including the NOAA Fisheries Southeast Fisheries Science Center, NOAA National Ocean Service, Florida Fish and Wildlife Conservation Commission, University of Miami—Rosenstiel School of Marine and Atmospheric Science, and the National Park Service.

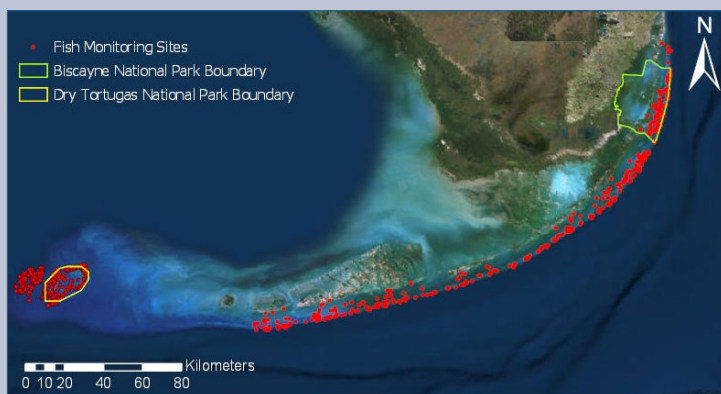
South Florida/Caribbean Network staff and park staff collaborated with multiple agencies and scientists on two 10-day monitoring trips in the Tortugas region and operated on

small boats in the Biscayne region. A total of 88 sites within Biscayne National Park and 89 sites within Dry Tortugas National Park were surveyed as part of an interagency Florida Keys-wide effort that completed 772 total sites in 2018.

Multi-agency reef fish surveys will continue on a biennial basis in South Florida, alternating years with US Virgin Islands reef fish monitoring efforts. The next scheduled survey for the Florida Keys will occur in 2020.



Above: Nassau Grouper (*Epinephelus striatus*), a federally listed threatened species, photographed during Dry Tortugas fish monitoring. NPS photo/Rob Waara.



Above: Location of fish monitoring sites in Biscayne National Park, Dry Tortugas National Park, and along the Florida Reef Tract in 2018.



South Florida/Caribbean Network
18001 Old Cutler Rd. Suite 419
Palmetto Bay, FL 33157
<http://www.nps.gov/im/sfcn/marine-fish.htm>

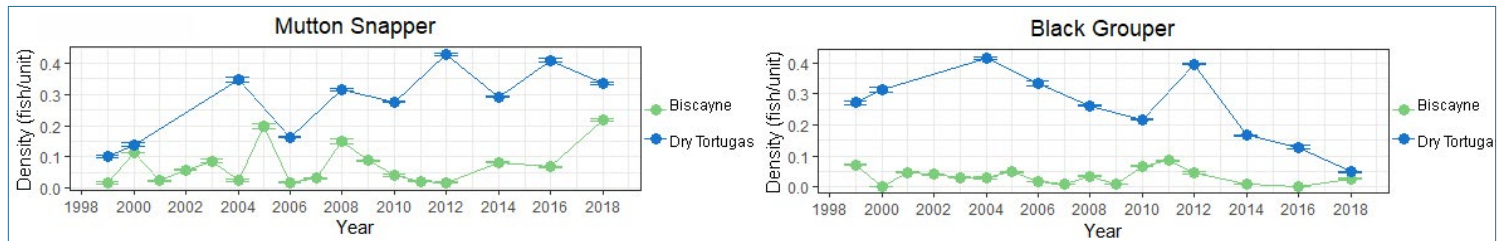
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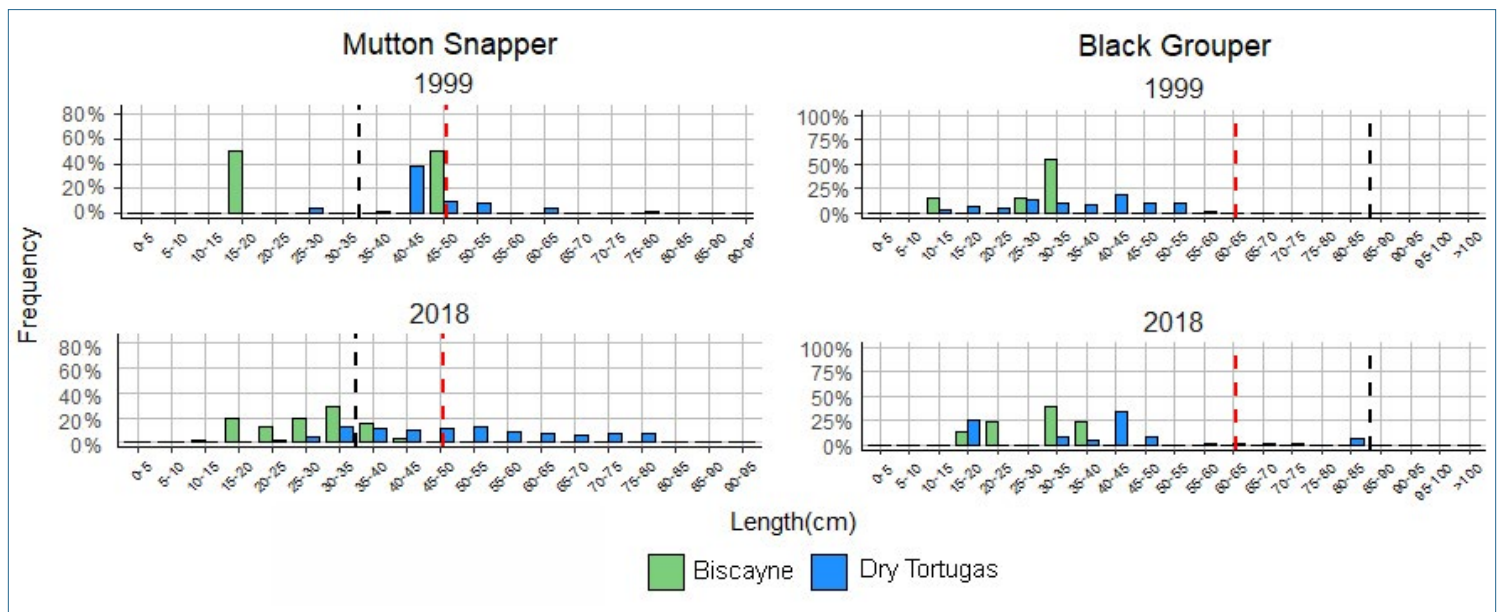
Significant findings: Mutton Snapper success story shadowed by recent decrease in Black Grouper in Dry Tortugas National Park

Relative density of Mutton Snapper (*Lutjanus analis*) has increased gradually and significantly ($p < 0.05$) in Dry Tortugas NP since baseline data was first collected in 1999. Since then, no-take marine reserves were established that provided year-round protection on spawning grounds and home range areas in the network of Tortugas Ecological Reserves (2001) and the Research Natural Area in Dry Tortugas NP (2007). In addition, the length frequency distribution of Mutton Snapper in Dry Tortugas NP has shifted so that more fish are now reproductively mature, providing the opportunity for more fish to be sustainably

available in the surrounding open fished areas of the park and the Florida Keys (i. e., spill over). Mutton Snapper population density and size in Biscayne NP has remained unimproved and suppressed in comparison, although since 2012 there has been an upward trend in relative density within the park. For Black Grouper (*Mycteroperca bonaci*) after what was believed to be an initial positive response to the implementation of the Tortugas reserves and a federal seasonal shallow water grouper closure (2010), the population has significantly ($p < 0.05$) declined in Dry Tortugas NP. Numbers of Black Grouper have declined to levels approaching the low densities seen in Biscayne NP for the past 20 years, a park that has no spatial protection and is open to commercial and recreational fishing.



Comparison of relative density (fish/sampling unit $\pm$ standard error) for juvenile and adult Mutton Snapper (*Lutjanus analis*) and Black Grouper (*Mycteroperca bonaci*) between Biscayne National Park and Dry Tortugas National Park from 1999–2018.



Comparison of fork length (in centimeters) distribution of Mutton Snapper (*Lutjanus analis*) and Black Grouper (*Mycteroperca bonaci*) between Biscayne National Park and Dry Tortugas National Park for 1999 and 2018. Red dashed line is the legal minimum size of capture and black dashed line is the length at sexual maturity.

