



Caribbean Spiny Lobster Monitoring in South Florida/Caribbean Parks

2019

Importance

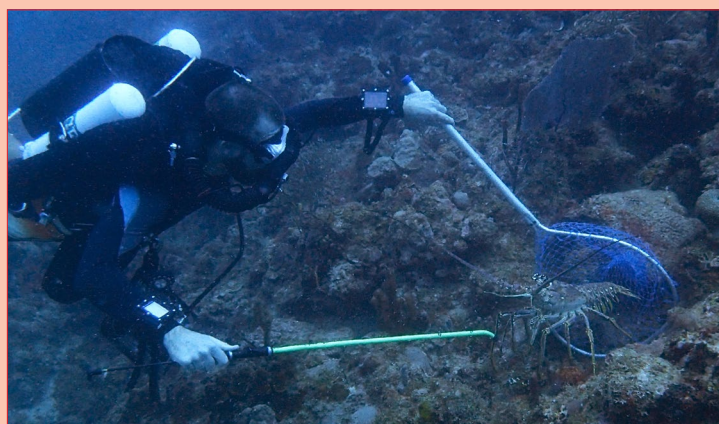
The Caribbean spiny lobster (*Panulirus argus*) is a common tropical and subtropical species in the western Atlantic Ocean, with a distribution ranging from Bermuda and North Carolina to northeastern Brazil. The spiny lobster life cycle includes both a free-swimming larval phase and a benthic adult life stage, has a complicated reproductive cycle, and can be affected by regional connectivity and stressors. Adult spiny lobsters feed mainly on gastropods, chitons, bivalves, corals and scavenged food remains. Increased consumer demand, higher market value, and expanding fishing fleets lead to resource depletion, with spiny lobsters being fully or over-exploited across much of their range. Spiny lobsters support a large commercial and recreational fishery throughout the Caribbean, including within South Florida/Caribbean Network (SFCN) park boundaries. The Caribbean fishery has been regulated for more than half a century in some regions. Existing principal management regulations include bag limits, a minimum legal size, a closed season, and a ban on the taking of egg-bearing females. SFCN parks have variable regulations with some being complete closures (e.g., Buck Island Reef National Monument, Dry Tortugas National Park) and others with more restricted bag limits (e.g., Virgin Islands National Park) or are open to commercial and recreational fisheries (Biscayne National Park offshore). Balancing resource extraction and environmental degradation with sustainability is a key management concern. The impacts of fishery management tools such as no-take marine reserves are of interest to resource managers and the public.

Objectives and Approach

The main objectives for this protocol are to determine the status and trends in relative density, relative frequency of occurrence, and average size of exploited-phase lobsters within SFCN parks. Secondary objectives include obtaining size distributions, sex ratios, prevalence of reproductively active females, and molt stage ratios. Monitoring data will assist national parks with making informed management decisions.



Above: A spermatophore (tar patch) is seen on a female spiny lobster during a survey in Buck Island Reef National Monument.



Above: Capturing a lobster during a pilot survey in Virgin Islands National Park.



Above: An observer measures the carapace length of a juvenile lobster in Salt River Historical Park and Ecological Preserve.



Monitoring

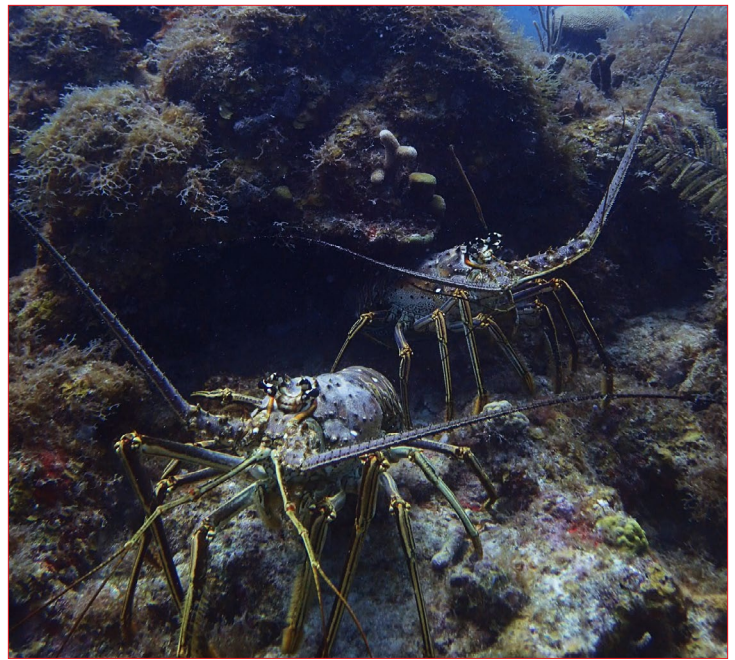
The SFCN Caribbean Spiny Lobster Monitoring Protocol was published in December 2018. The first full-scale monitoring survey was completed in Buck Island Reef National Monument and Salt River National Historical Park and Ecological Reserve in April 2019. Surveys occur on a four-year rotating basis with planned sampling anticipated to occur in Biscayne NP in 2020, Dry Tortugas NP in 2021, and Virgin Islands NP in 2022. Samples are selected using a stratified-random survey approach on hard bottom habitats within the parks which is derived from the design used in the Reef Fish Monitoring protocols. Samples are re-randomized for each sampling event. Each sample consists of two adjacent 7.5-meter-radius circular plots, where a team of divers search the plots to capture, measure, record demographic information, and release every lobster encountered.

Status and Trends: Buck Island Reef NM

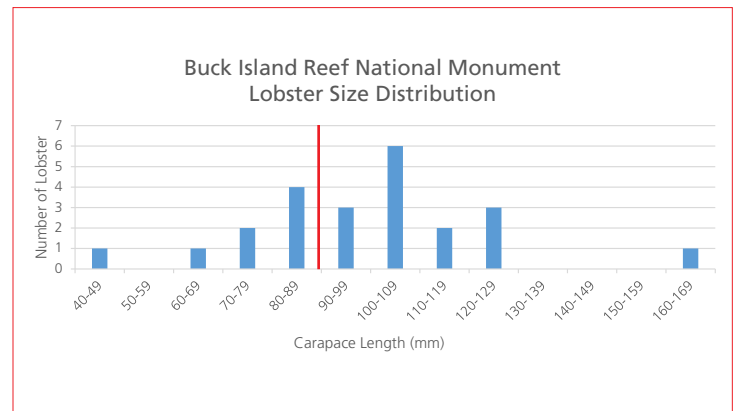
During the first lobster sampling event in Buck Island Reef National Monument, 76 sites were completed across four strata. Of these, no lobsters were observed within 58 sites, which produced low values for mean relative density (0.12 [95% CI 0.04, 0.21]) and mean relative frequency of occurrence (0.14 [95% CI 0.05, 0.25]). A total of 23 lobsters were observed on the survey, 65% of which were adults. Average carapace length (CL) in the exploited phase was 108 ± 4.6 millimeters (SE). The sex ratio (M:F) of observed lobsters was skewed towards females (3:12). Many of the females were reproductively active, where 42% of the females had eggs and 67% had a spermatophore. As this is the first sampling event in the park unit, no trend analyses are possible yet.

Status and Trends: Salt River NHP&EP

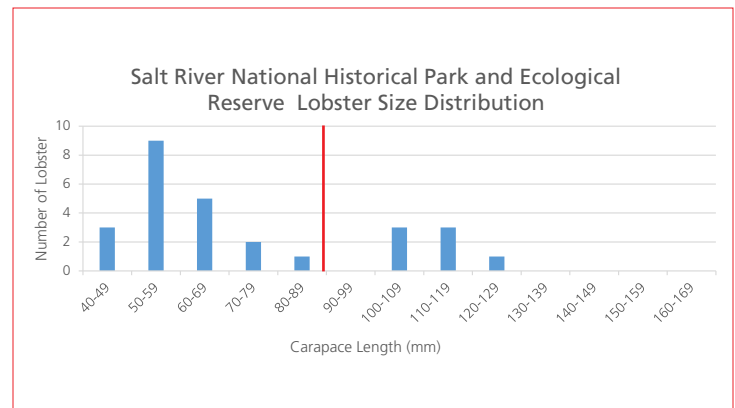
During the 2019 lobster survey in Salt River National Historical Park and Ecological Reserve, 32 sites were completed across two strata. Of these, no lobsters were observed within 24 sites, which produced low values of mean relative density (0.11 [95% CI 0.01, 0.25]) and mean relative frequency of occurrence (0.24 [95% CI 0.12, 0.59]). A total of 27 lobsters were observed on the survey, 26% of which were adults. Average carapace length (CL) in the exploited phase was 108 ± 3.2 millimeters (SE). The sex ratio (M:F) of observed lobsters was skewed towards males (6:3). Only one of the observed females had eggs. As this is the first sampling event in the park, no trend analyses are possible yet.



Above: Two lobsters observed at Yawzi reef in Virgin Islands National Park.



Above: Size distribution in carapace length (CL, in millimeters) of all observed lobster in BUIS (n=23). Red line denotes exploited size (89 mm)



Above: Size distribution in carapace length (CL, in millimeters) of all observed lobster in SARI (n=27). Red line denotes exploited size (89 mm).

