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1998 Level III Volunteer Reef Monitoring

Establishment of the Florida Keys National Marine Sanctuary's 23 no-take Sanctuary Preservation Areas (SPAs) became effective in 1997. To gauge and document the effect of the SPAs on reef conditions between 1997 and the scheduled Florida Cabinet review of the Sanctuary's management plan in 2002, it is necessary to gather reef condition data and to monitor trends in those conditions on a periodic basis. This reef monitoring is partially being carried out through a volunteer-driven program conducted by ReefKeeper International with partial funding from the Florida Keys National Marine Sanctuary and in cooperation with the Volunteer Stewardship Exchange of the Nature Conservancy. In 1998, 34 volunteers were trained and participated in these reef monitoring activities.

ReefKeeper's reef monitoring protocol uses 2 or more separate 50-meter transects laid out at each reef site studied using factory-marked fiberglass transect tape that follows the designated depth contour for the reef site. Point-intercept bottom cover data is noted at half-meter intervals along the full 50 meters of the transect, producing 100 bottom cover data points for each transect. For hard coral colonies at data collection points, health condition is noted and species are identified when possible. Using a 5-meter wide belt transect centered on the bottom cover line transect, data is also collected on abundance of key fish and invertebrate species such as snappers, groupers, barracuda, lobsters, urchins and others.

Three types of sites are monitored: Sanctuary Preservation Areas (SPAs), multiple-use Control Sites (C) and Research Only Areas (ROAs). In 1998, Level III reef monitoring targeted Sanctuary Preservation Area sites at Sombrero Reef (SPA), Coffins Patch (SPA), Tennessee Reef (ROA) and Alligator Reef (SPA), which were paired for comparison with Sanctuary-designated control sites at Delta Shoals (C) and Crocker Reef (C).

Two semiannual (spring and summer) surveys were conducted in 1998 for the six sites chosen for monitoring. In general, there is more hard coral bottom cover in SPAs, although the data is not conclusive. However, hard coral coverage was low at all sites, ranging from a high of 18.5% at Coffins (SPA) to a low of 3.3% at Alligator (SPA). As expected, where hard coral cover was low, algae dominated. Seasonality of algal cover was present, with much higher levels of algae present during the summer survey than the winter survey. Algae bottom cover was highest (74.5%) at Crocker (C) during the summer monitoring and lowest (0.5%) at Alligator (SPA) during the spring monitoring cycle. Fish abundance shows a stronger correlation with SPAs versus Control Sites. Only SPAs were noted to have Nassau grouper and barracuda (in very small numbers). In general, there were higher numbers of snapper observed at SPAs than at multiple-use Control Sites.

ReefCheck 1998 Reef Assessment

ReefCheck is an annual international event involving recreational divers and marine scientists from around the world. The major goal of ReefCheck is to raise awareness about the value of coral reefs and anthropogenic threats to their health. These annual reef assessments are being carried out in the Florida Keys through a volunteer-driven program conducted by ReefKeeper International with partial funding from the Florida Keys National Marine Sanctuary and in cooperation with the Volunteer Stewardship Exchange of the Nature Conservancy. In 1998, 34 volunteers were trained and participated in these reef assessment activities.

As part of the worldwide 1998 ReefCheck, ReefKeeper volunteers surveyed a total of 18 reefs in the Florida Keys between May and September of 1998.

The data collected at the 18 sites consisted of percent bottom cover by hard corals, soft corals, algae, sponges, abiotics, etc. Surveys were also conducted for invertebrates such as *Diadema* and pencil urchins as well as for fish populations like the Nassau grouper and snappers. These served as abundance indicators of important commercial, recreational, and ecological groups of species inhabiting the reefs.

ReefCheck's reef monitoring protocol uses 2 pairs of 20-meter long transects at each reef site studied using factory-marked fiberglass tape that follows the depth contour of the reef site. Each pair of transects is laid out in line, with a 5-meter skipped interval between transects. . Point-intercept bottom cover data for hard corals, soft corals, algae, sponges, abiotics, etc is noted at half meter intervals along each transect . Fish abundance data is collected for species typically targeted by fishermen and aquarium collectors. Using 5-meter wide belt transects centered on the bottom-cover line intercept transedts, fish data is recorded by a stationary observer for 4 minutes at successive 5-meter linear transect segments. Abundance is also recorded for invertebrate species typically targeted as food species or collected as curios. Covering the same 5-meter wide belt transect used for fish abunadance counts, a meandering observer looks for targeted invertebrate species along the bottom for 4 minutes at each successive 5-meter linear transect segment.

Similarly to results from the 1997 ReefCheck, the reefs in the Florida Keys continued to show signs of stress and degradation. Algae bottom cover still exceeded hard coral bottom cover. Targeted invertebrate species were extremely rare and fish numbers were alarmingly low, especially among the Nassau grouper populations. There was a positive correlation, however, between the Florida Keys National Marine Sanctuary no-take zones in the Middle Keys and fish populations. In Middle Keys areas where fishing is not allowed, the number of many species of fish exceeded the number found at the Florida Keys National Marine Sanctuary multiple-use control sites.

The sites surveyed for ReefCheck 1998 in the Upper Keys were Conch Reef (SPA), Davis Reef (C), Elbow Reef (SPA), Grecian Rocks (SPA), Hens and Chickens Reef (SPA), Molasses Reef (SPA), and Pickles Reef (SPA). The highest amount of hard coral bottom cover was generally found at the sites off the Upper Keys, with Hens and Chickens recording the highest percent bottom cover of hard coral at 36.9%. Algae bottom cover was very high at Davis Reef (70%) and Conch Reef (59.4%). Surprisingly, the highest number of snappers was seen at Davis Reef, a multiple-use control site. The highest numbers of parrotfishes and groupers were reported at no-take zones.

The ReefCheck 1998 survey sites in the Middle Keys were Alligator (SPA), Coffins (SPA), Crocker (C), Delta (C), Doughnut (SPA), Pleasure (C), Sombrero (SPA), and Tennessee (Research Only Area =ROA). The highest amount of hard coral was observed at Coffins Patch with 14.4%

bottom cover. For seven of the eight Middle Keys sites, algae cover was higher than hard coral cover. Alligator Reef had the highest amount of algae bottom cover with 76.9%, followed by Crocker with 71.3%. While there were no lobsters, no urchins, and no groupers found at the control sites, all were recorded at the no-take SPA sites. The number of snappers found at the no-take zones exceeded the number found at the control sites.

The three sites surveyed off the Lower Keys for ReefCheck 1998 were Horseshoe (C), Nine-Foot Stake (C), and Western Sambos (Ecological Reserve). There was a wide disparity in hard coral bottom cover between the multiple-use control sites and the no-take zone. Hard coral bottom cover percentages were 6.3% for Horseshoe (C), 8.8% for 9-Foot Stake (C), and 21.3% for Western Sambos (ER). Surprisingly enough, there were more lobsters, groupers, and snappers observed at the two control sites surveyed in the Lower Keys than at the single no-take zone assessed. This result may be due to the low sample size.