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1999 ReefCheck Florida Keys Report

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No Improvement for Florida Keys Reefs

Between June and September of 1999, ReefKeeper International volunteers surveyed 7 coral reefs located in the Florida Keys. The resulting data were contributed to ReefCheck, an international reef monitoring 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 as well as anthropogenic threats to their health.

Volunteers conduct surveys of several reefs around their area and then send the data to ReefCheck headquarters. All the data are compiled and used to help recommend measures for management of coral reef ecosystems. ReefCheck is based at the Institute for Environment and Sustainable Development at the Hong Kong University of Science and Technology, Research Centre.

This year's study showed results no better than those from last year. The low hard coral bottom cover which has become representative of the area may have dropped even lower this year, from a cumulative

1998 average of 18.7% to 13.3% in 1999. The reefs examined had similar relative average bottom cover compositions for both years. Algae and abiotics continued to dominate many of the reefs, with averages of 27.2% and 20.7%, respectively. Other biotics, mainly in the form of gorgonians, also continued to constitute a major part of the reefs. They constituted an average of 34.6% of the reefs bottom cover.



Sightings of target mobile invertebrates were rare. The only ones noted were lobsters, urchins and banded coral shrimp, and even these were present in very low numbers. Target fish species noted were limited as well. Grouper, parrotfishes and butterflyfishes numbers were low, but not significantly different than last year. Grunts and margates made up the bulk of the fish population at all the reefs, with average numbers per transect ranging from 11.75 at Carysfort to 246.75 at Davis Ledge. The number of snappers sighted

varied at different reefs and ranged from 0 to 50.75 per transect.

ReefCheck'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 depth contour of the reef site. Point-intercept bottom data are noted at half-meter intervals along the transect beginning from the 0 m mark up to and including 20m. A 5.5 m interval is skipped and bottom cover data are noted again from the 25.5 m mark up to and including 45 m, for a total of 80 bottom cover data points for each transect.

Survey Locations

Seven different reefs were studied for Florida Keys ReefCheck 1999: Carysfort Reef (25°12.689'N 80°13.055'W), Conch Reef (24°57.311'N 80°27.463'W), Davis Ledge Reef (24°55.389'N 80°30.299'W), Elbow Reef (25°08.405'N 80°15.590'W), Grecian Rocks Reef (25°06.581'N 80°18.179'W), Molasses Reef (25°00.494'N 80°22.669'W), Hens & Chickens Reef (24°52.241'N 80°32.834'W)

Two different sites were examined within Hens & Chickens Reef, resulting in a total of 8 study sites. The Florida Keys National Marine Sanctuary Management Plan has use designations for all the study sites. Seven of the 8 1999 study sites are no-take zones (SPA's); only Davis Ledge Reef is a multiple use site (C).

Data Collected and Why

Several benthic parameters were examined at these data collection sites. They included percent

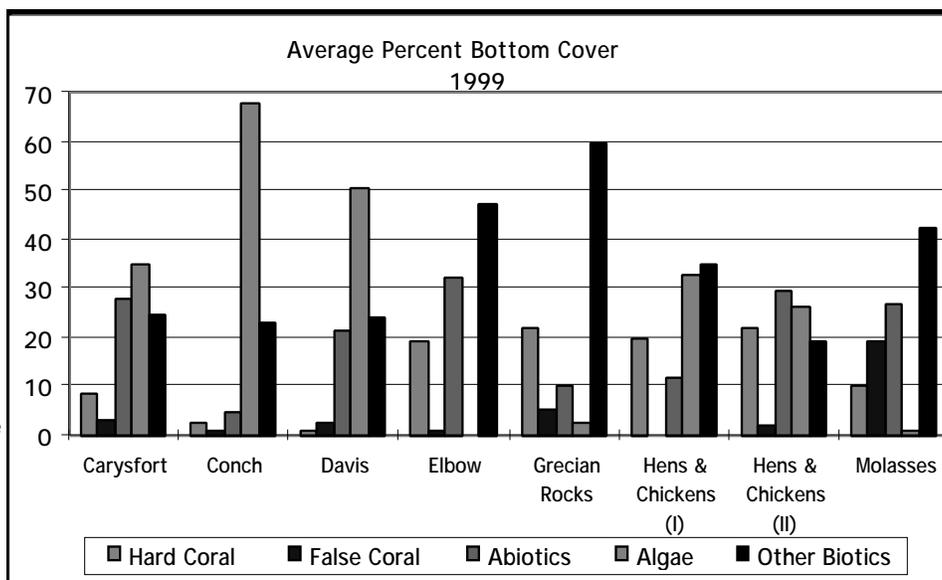
bottom cover by hard coral, false corals, algae, abiotics and other biotics. (When the term algae is used it includes only fleshy seaweeds; calcareous algae such as Halimeda sp. are classified as "other biotics".) Gorgonians are recorded as "other biotics", as well. The category "false coral" includes zoanthids, and consists in this case of Palythoa sp. The percent bottom cover is helpful in assessing reef health by comparing the abundance of hard coral to that of algae and other biotics which compete for space.

Population densities for certain invertebrates and fishes were also estimated. These were used to determine how a reef's biologi-

cal community is affected by anthropogenic influences such as recreational and commercial use. Comparisons between no-take zones and multiple use zones evaluate the effects of removing fishing pressure.

Bottom Cover Results

The highest numbers for percent hard coral cover were at Hens & Chickens (II) Reef with 22.2%, Grecian Rocks Reef with 22.1%, Hens & Chickens (I) Reef with 20% and Elbow Reef with 19.2%. The number dropped for Molasses Reef (10.2%) and Carysfort Reef (8.8%). The lows were at Conch Reef (2.5%) and Davis Ledge Reef (1.3%).



Percent bottom cover for algae was highest at the three sites with the lowest percent hard coral cover: 68.1% at Conch Reef, 50.6% at Davis Reef and 35% at Carysfort Reef. Hens

& Chickens (I)&(II) Reefs had 33.1% and 26.6% algal cover, respectively. The lowest numbers were found at Grecian Rocks Reef (2.6%), Molasses Reef (1.3%) and Elbow Reef, which had no reported algal cover (a result requiring verification).

"Other Biotics" reported at the sites were exclusively gorgonians and calcareous algae, the only exception being a fan worm at Davis Ledge Reef. Grecian Rocks Reef had the highest concentrations at 59.7%, Elbow Reef had 47.4% and Molasses Reef had 42.3% cover by other biotics. Numbers for other sites were

significantly lower.

ReefCheck's fish monitoring protocol uses two 50-meter transects laid out at each reef site studied. Four 5 m wide (centered on transect line) by 20 m long by 5 m high "tunnel" transects are sampled in 5 minute increments for fish species typically targeted by fishermen, aquarium, collectors and others. About four minutes were spent at each 5 m "box" segment. After 4 minutes of observation from the 0 m mark, the diver moves on to the 5 m mark, then the 10 m mark, and so on. At the 20 minute mark, a 5 m interval is skipped and the survey is resumed at the 25 m mark upto the 45 m mark. This procedure is repeated on the second transect line.

Percent false coral bottom cover was highest

at Molasses Reef (19.2%). This high occurrence of *Palythoa* sp. is a possible explanation for the low hard coral numbers, due to competitive displacement. All other sites had numbers that ranged from 0-5%. The low for percent bottom cover by abiotics occurred at Conch Reef (5%). Grecian Rocks Reef and Hens & Chickens (I) Reef had numbers of 10.4% and 11.9%, respectively.

The other four sites had percent bottom cover by abiotics that ranged from 21%-33%.

Mobile Invertebrate Results

Very few mobile invertebrates were seen along the belt transects at the eight sites. At Davis

Ledge, Elbow, Grecian Rocks, Hens & Chickens (I), and Molasses Reefs, no mobile invertebrates were noted. Lobsters were sparsely present at Hens & Chickens (II) (3.25/transect), Carysfort (.5/transect) and Conch Reefs (.75/transect). Carysfort and Conch Reefs were also the only sites where urchins were recorded.

Reef Fish Results

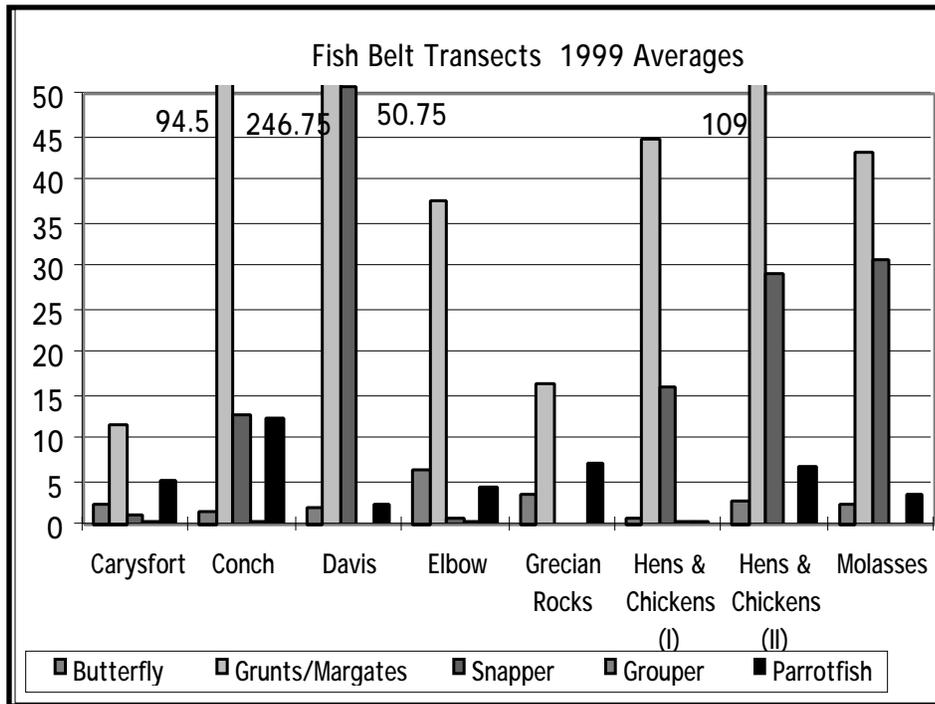
Very high numbers for grunts & margates were found at all the sites, with the highest average number per transect (246.75) at Davis Ledge Reef. This was also the location of the highest average number of snappers (50.75/transect). However, low numbers for groupers and parrotfishes were recorded at this site. Average numbers for groupers at each site were low,

with a high of .5/transect at Carysfort Reef and Conch Reef, while none were found at Davis, Grecian Rocks, Hens & Chickens (II) and Molasses Reefs. Parrotfishes were most abundant at Conch Reef (12.25/transect) and least abundant at Hens & Chickens (II) Reef (.25/transect). The second lowest number of parrotfishes was at Davis Reef (2.25/transect)

The remaining six sites had average populations between 3 and 8 parrotfishes/transect.

Data were available for groupers, snappers and parrotfishes for both 1998 and 1999. All three of these showed

significant decreases from 1998 to 1999 for the overall average number of fish per transect. Groupers dropped from 1.3 to .19 fish/transect, snappers dropped from 77.4 to 17.7 fish/transect and parrotfishes dropped from 13.4 to 5.3 fish/transect. 1998 data for grunts and margates were not available.



Conclusions

Results from this year's ReefCheck are similar to those from last year. However, slight decreases in percent hard coral cover may have occurred. This is difficult to state categorically due to transect placement variability, but continued monitoring should take place.

Percent hard coral cover for both years showed Elbow, Hens & Chickens and Grecian Rocks high-est, Molasses

ReefCheck's invertebrate monitoring protocol uses two 50-meter transects laid out at each reef site studied. Four 5 m wide (centered on transect line) by 20 m long belt transects are sampled for invertebrate species typically targeted as food species or collected as curios. The survey starts at the 0 m mark where the diver meanders around a 5 meter long belt area looking for targeted species for about 4 minutes. Afterward, the diver moves to the 5 m mark and repeats the procedure. At the 20 m mark, a 5 m interval is skipped and the survey is resumed at the 25 m mark up to the 45 m mark. This procedure is repeated in the second transect line.

	<u>Percent Bottom Cover Results 1999 Averages</u>							
	Carysfort	Conch	Davis	Elbow	Grecian	H & C (I)	H & C (II)	Molasses
Hard Coral	8.8	2.5	1.3	19.2	22.1	20	22.2	10.3
False Coral	3.1	1.3	2.5	1.3	5.2	0	1.9	19.2
Abiotics	28.1	5	21.3	32.1	10.4	11.9	29.7	26.9
Algae	35	68.1	50.6	0	2.6	33.1	26.6	1.3
Other Biotics	25	23.1	24.3	47.4	59.7	35	19.6	42.3

	<u>Invertebrate Transect Results 1999 Averages</u>							
	Carysfort	Conch	Davis	Elbow	Grecian	H & C (I)	H & C (II)	Molasses
Bandd. Coral Sp.	0	0.25	0	0	0	0	0	0
Urchins	0.5	1.5	0	0	0	0	0	0
Triton Shell	0	0	0	0	0	0	0	0
Flaming. Tongue	0	0	0	0	0	0	0	0
Gorgonian	95.5	38.5	84	126.25	172.5	43.25	31.5	132.5
Lobster	0.5	0.75	0	0	0	0	3.25	0

	<u>Fish Belt Transect Results 1999 Averages</u>							
	Carysfort	Conch	Davis	Elbow	Grecian	H & C (I)	H & C (II)	Molasses
Butterfly	2.5	1.5	2	6.25	3.5	0.75	3	2.25
Grunts/Margates	11.75	94.5	246.75	37.75	16.25	44.75	109	43.25
Snappers	1.25	12.75	50.75	1	0	16	29.25	30.75
Groupers	0.5	0.5	0	0.25	0	0.25	0	0
Parrotfishes	5.25	12.25	2.25	4.5	7.25	0.25	6.75	3.75

in the mid-range, and Davis and Carysfort lowest. Data for percent algal cover resembled that of last year as well, with Conch and Davis having noticeably higher numbers than the other sites. Percent bottom cover by abiotics was similar to last year, but the number of other biotics increased significantly. This increase is related to the high amount of gorgonians and calcareous algae noted at all sites.

There was a noticeable absence of all target mobile invertebrates. The number of lobsters noted, like last year, was quite low. However, this year showed a drop in the average number of lobsters reported per transect, going from 2.3 to .56. Also

present in low numbers were parrotfishes and groupers. This was a marked contrast to the high numbers of grunts & margates and snappers. The multiple use control site (Davis Ledge Reef) had the lowest average percent hard coral cover, and the second highest average percent algal cover. No groupers were present at Davis and the number of parrotfishes recorded here was the second lowest of all eight sites. The number of butterflyfishes noted was also low. A possible explanation for the high occurrence of snappers and grunts and margates at Davis Reef is the common practice of "fish feeding" that takes place virtually daily at this site.

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ReefKeeper International is a tax-exempt, nonprofit, membership organization exclusively dedicated to the protection of coral reefs and their marine life. Working from Miami (FL), Ramey (PR) Cancun (Mex), and Curaçao (Dutch Antilles), ReefKeeper International conducts an integrated program of field survey investigations, reef monitoring, policy analysis, grassroots organization, technical assistance, advocacy and public awareness. Memberships start at \$25 per year.