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Palm Beach ReefMonitor Update

A joint effort of ReefKeeper International
 and Palm Beach Reef Research Team
 to monitor Palm Beach County's coral reefs



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September, 2001

Breakers Reef: Stable But at Risk

Executive Summary

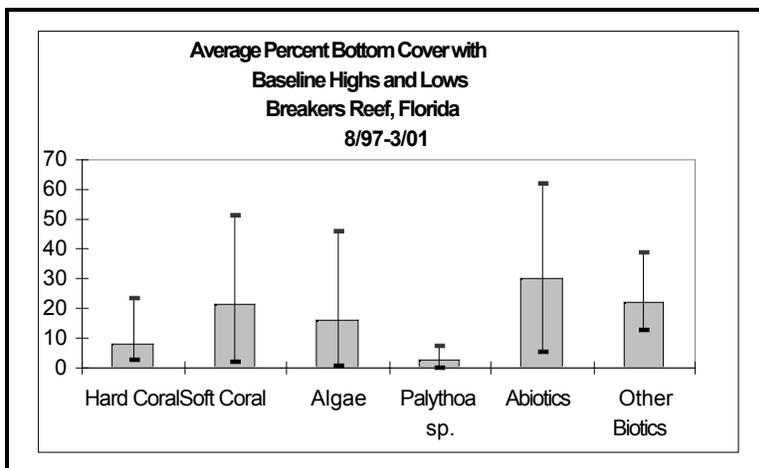
In an attempt to watchdog the conditions of coral reefs off Palm Beach, Florida, Breakers Reef was monitored from December of 1996 to March of 2001. This monitoring was a joint effort of ReefKeeper International and Palm Beach Reef Research Team to assess the reef conditions and observe any changes.

The results show that overall this reef system is dominated by abiotics (30.3%), soft corals (21.5%) and other biotics (22.6%). Also prevalent at this site are algae, which constitute 16.1% of the total bottom cover. Average percent bottom cover by hard corals is 8.2%, and *Palythoa sp.* make up 2.4% of the bottom cover. Although hard coral cover is low relative to the other types of bottom cover, it has remained rather consistent over the past five years. Protection for these reefs is important, as they serve as a recruitment habitat and nursery for many species of fish and invertebrates.

Beach renourishment projects and stormwater runoff are two of the problems that Breakers Reef faces. Both of these result in increased turbidity in the waters, and induced chronic siltation around the reefs. With decreased sunlight penetrating the waters, the processes that would allow the reefs to flourish are hampered.

Introduction

The site monitored was Breakers Reef. Monitoring took place on a quarterly basis at two different depths. The data collected include percent bottom cover composition, hard coral health and hard coral species identification. The reason for the monitoring is to establish baseline parameters for the reef's conditions. We can then hopefully identify any trends (either positive or negative) that are occurring on the reef. Such trends could then be correlated with both natural and anthropogenic impacts on the reef to determine what kinds of influences are affecting these fragile ecosystems.



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ReefMonitor Update is one of the publications issued by ReefKeeper International, a tax-exempt, nonprofit membership organization exclusively dedicated to the protection of coral reefs and their marine life. Working from Miami (FL), Boqueron (PR), and Cozumel (Mex), ReefKeeper International conducts an integrated program of field survey investigations, reef monitoring, policy analysis, grassroots organization, technical assistance, advocacy and public awareness. ReefKeeper activities are partially supported by Jamee & Marshall Field Fndn, Goldman Fund, Henry Fndn, Homeland Fndn, Curtis & Edith Munson Fndn, Elizabeth Ordway Dunn Fndn, Orchard Fndn, Patagonia Fndn, Pew Charitable Trusts, Rockefeller Brothers Fund and Turner Fndn. Memberships start at \$25 per year.

Deep Zone

Survey Locations

Breakers Reef is located directly east of the Breakers Hotel off Palm Beach in Palm Beach County, Florida. This reef site marks the northern end of a major reef formation. The reef is approximately 125 yards wide, and tapers gradually into the sand on the seaward side.

The monitoring took place at two depths on the reef. The shallow, nearshore zone (26°42.568 N / 80°01.715 W) is situated at a depth of approximately 9 meters. The deeper, offshore site (26°42.720 N / 80°00.956 W) is situated at approximately 21 meters of water.

Bottom Cover

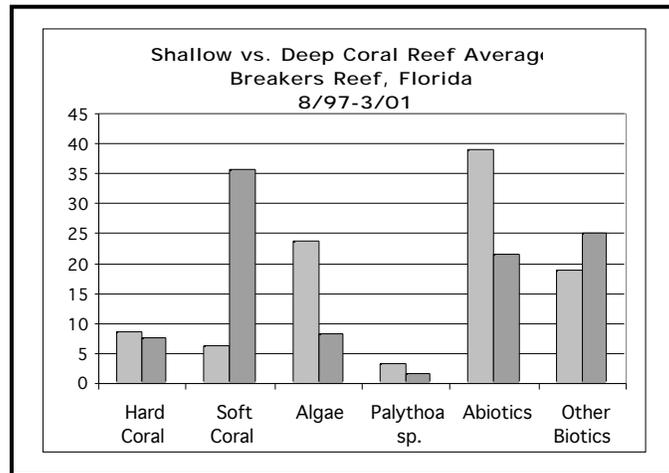
Overall Averages

Overall average percent bottom cover by hard corals is 8.2% and by algae is 16.2%. These two types of bottom cover, along with *Palythoa sp.* (2.4%), were the lowest of the six examined. Abiotics (30.3%), soft corals (21.5%) and other biotics (22.6%) were the three types of bottom cover that dominated the reefs on average.

Shallow Zone

Percent bottom cover by hard coral at this depth averages out to be 8.7% of the total bottom cover, which is slightly higher than the average for deep transects. Abiotics are the major contributor to bottom cover at this depth, at 38.9%. Also dominant are algae (23.8%) and other biotics (19.0%). Average percent bottom cover by soft corals and by *Palythoa sp.* are 6.4% and 3.2%, respectively.

The average hard coral bottom cover for the deep transects is 7.7%. Soft corals are the dominant type of bottom cover, composing 35.6% of the total. Other biotics, such as sponges make up 26.1% and abiotics compose 21.6% of the bottom cover. The average percent bottom cover by algae, at only 8.4%, is quite low compared to the shallow site. *Palythoa sp.* make up only 1.6% of the total bottom cover.



Hard Coral Health

Hard coral health at Breakers Reef was similar at both the shallow and deep monitoring areas. The average for healthy hard corals is 95.9%. Average for bleached corals is 2.9% and average for sick corals is 1.2%. The deep transects showed a slightly higher average for healthy hard

corals, at 96.6%, while the shallow transects had 95.1% healthy hard corals. There was no evidence of sickness recorded at the shallow transects, but 4.9% of hard corals were reported as being bleached. At the deep transects, only 1% of the hard corals were reported bleached, and 2.4% of hard corals were sick.

Hard Coral Species

There were 12 different species identified at the shallow transects, and 10 different species identified at the deep transects. Only 6 of the species were common to both depths, while all the other species were present at either the shallow or deep transects. Taking both reef sites together, a total of 16 different hard coral species were identified on Breakers Reef.

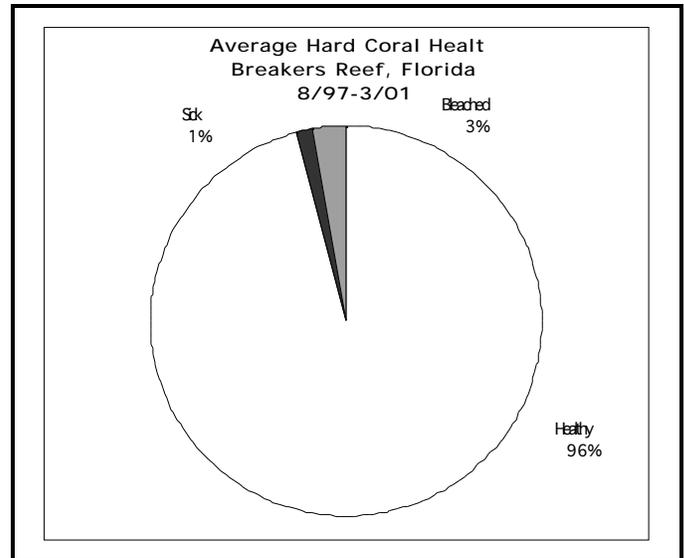
ReefKeeper's reef monitoring protocol uses 2 or more separate 50-meter transects laid out at each reef site studied using factory-marked fiberglass transect tape that follows the depth contour of the reef site. Point-intercept bottom cover data are noted at half-meter intervals along the 50 meters, producing 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. If feasible, a visual record of each transect is made with photos taken every four meters along each transect and/or with a continuous video of each transect. This monitoring procedure is repeated every three months.

Significance

Breakers Reef appears to be relatively stable. Very obvious at this site are the distinct differences between monitoring depths. Clearly there are two sets of environmental parameters at work here. The shallow transects show high abiotic and algal cover, while the deep transects are dominated by soft corals and other biotics. Although the numbers for hard coral cover appear low at both depths for this reef, there have not been any significant changes over the past 5 years of monitoring. This is true for the other types of bottom cover, as well.

The most likely explanation for the differences between the two monitoring depths is that the

shallow part of the reef is more easily influenced by human activities, as well as natural events. The greater algal cover at the shallow site might be attributable to higher nutrient input into the waters from human activity on shore. The shallow part of the reef would be subject to higher nutrient concentrations than the deeper section, because these nutrient-rich waters would not be as mixed and diluted as those at the deeper part of the reef.



Hard Coral Species Identified Breaker's Reef, Palm Beach County 8/97 – 3/01		
	Shallow	Deep
<i>Agaricia agaricites</i> (Lettuce coral)		X
<i>Colpophyllia natans</i> (Boulder brain coral)	X	
<i>Dichocoenia stokesii</i> (Elliptical star coral)		X
<i>Diplora clivosa</i> (Knobby brain coral)	X	
<i>Diplora strigosa</i> (Symmetrical brain coral)	X	
<i>Favia fragum</i> (Golfball coral)	X	X
<i>Madracis sp.</i>		X
<i>Meandrina meandrites</i> (Maze coral)	X	X
<i>Millepora alcicornis</i> (Branching fire coral)	X	
<i>Montastrea cavernosa</i> (Great star coral)	X	X
<i>Montastrea annularis</i> (Boulder star coral)	X	X
<i>Porites astreoides</i> (Mustard hill coral)	X	X
<i>Siderastrea radians</i> (Lesser starlet coral)	X	
<i>Siderastrea siderea</i> (Massive starlet coral)	X	
<i>Solenastrea bournoni</i> (Smooth star coral)		X
<i>Stephanocoenia michilini</i> (Blushing star coral)	X	X
Unidentified	12	10

The hard coral species that were identified also support the idea that the sites encompass two different zones of the reef. Of the hard corals that were identified, only 6 of them are common to both depths. This is most likely a combination of light limitation at the deeper area of the reef, and the different water regime.

What is Next?

Although Breakers Reef is not as well formed as coral reefs in the Florida Keys and throughout the Caribbean, this does not diminish its importance as an ecological habitat. Large numbers of fish and invertebrate species utilize the protective area of Breakers Reef as recruitment habitat and as a nursery. The lack of a high amount of reef-building corals does not compromise the significance of this area. A serious threat to this reef is its utilization as a source for beach renourishment and this must be stopped. Any amount of dredging on or around this reef would have irreversible repercussions. Sediment from the dredging would bury the reefs,

even the dredging were to take place off the reef. Actions must be taken now, if there is to be any hope of maintaining Breakers Reef as a sanctuary for marine life.

A serious threat to this reef comes from proposed beach renourishment dredging near the reef and subsequent deposition of the dredged sand directly onshore from the reef. Any amount of dredging on or immediately around this reef could easily have

irreversible repercussions. Sediment from the dredging could bury the reef, and navigational error could result in major grounding damage to the reef. Any beach widening activities in this area should be carried out following a precautionary approach that minimizes risks of impact to the natural reefs. Design beach widths should be reduced to avoid burial of nearshore hardbottoms associated with Breakers Reef.

Thank You Volunteers!!

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Why Monitor Reefs?

If you don't monitor the oil level in your car's engine, sooner or later you're going to be out of oil and out of an engine. The analogy strongly applies to coral reefs, and that's why ReefKeeper International sponsors reef monitoring by local volunteers. There's really no other way to catch problems before they become catastrophic – or even better yet, before they begin by having data to make a case against reef threatening human action. These volunteer reef monitors watchdog significant coral reef sites for changes in coral health, coral cover and other key early warning signs of environmental impact. The gathered data are sent to ReefKeeper, where they are analyzed for use in conservation efforts. Most significantly, these monitoring activities act as a deterrent, serve as a catalyst for other local conservation action, and focus attention on the value of these reef sites.