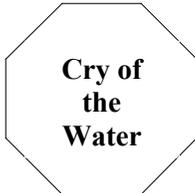




# Broward ReefMonitor Update



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A joint effort of ReefKeeper International  
and Cry of the Water to monitor  
Broward County's coral reefs

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## Broward Reefs: Near Shore and Under Chronic Stress

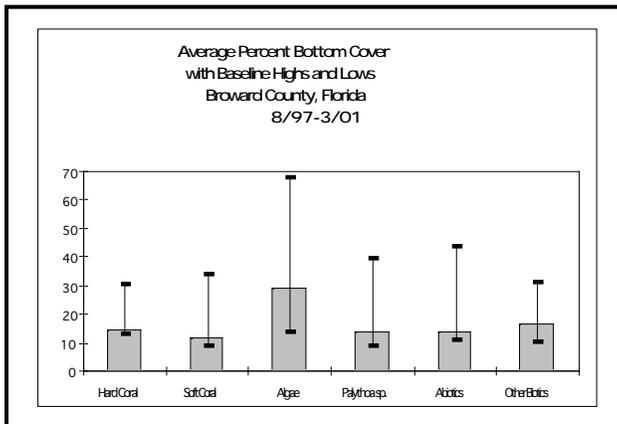
### Executive Summary

Coral reef monitoring has taken place at two Broward County reefs since August of 1997, at a third reef since October of 1999, and at a fourth reef since May of 2000. This joint effort between ReefKeeper International and Cry of the Water is done with the intention of assessing current reef conditions and the changes they may be experiencing. The results from the monitoring of all four reefs show an overall average of 14.7% hard coral cover and 29.1% algal cover. Other biotics, such as sponges, are one of the more dominant forms of bottom cover at 16.9%. Soft coral constitutes 12% of the total bottom cover. *Palythoa sp.* and abiotic cover are similar, at 13.6% and 13.8%, respectively.

The overall average for hard coral health for these Broward Reefs is 91.3% of hard corals being reported healthy, 4.6% sick and 4.1% bleached. Hard coral species diversity ranged from 6 to 17 species between the four reefs.

These reefs are close to shore, which makes them vulnerable to numerous anthropogenic influences.

Boat traffic, localized pollution, chronic siltation and stormwater runoff are all serious threats to the health of these coral reefs. A comparison of annual averages from each reef shows a general trend of decreasing hard coral cover and increasing algal cover. If steps are not taken to preserve the reefs now, there may not be much left of them in the future.



### Introduction

The four reefs monitored are Fisher's Pedestal Reef, Opal Towers Reef, Danny's Reef and Barracuda Reef. Fisher's Pedestal Reef and Opal Towers Reef have been monitored on a quarterly basis since the summer of

1997, while monitoring at Barracuda Reef began in the fall of 1999. Danny's Reef was monitored for three quarters in 2000, beginning in May. The data collected at the reefs include percent bottom cover composition, hard coral health and hard coral species identification.

### Survey Locations

The four reefs monitored are all located approximately a half-mile off the coast of Broward County, Florida. Opal Towers Reef is farthest north

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.

(26°17.617'N / 80°04.135'W) and is located about 2.5 miles north of Pompano Beach's Hillsboro Inlet. It is a patch reef that runs parallel to shore at depths ranging from 35-36 feet. Danny's Reef is situated south of Opal Towers Reef (26°12.172'N / 80°04.717'W) in approximately 40-45 feet of water. Fisher's Pedestal Reef (26°08.663'N / 80°05.401'W) is located just south of Hugh Taylor Birch State Park. This reef runs parallel to shore as well, at depths from 20-27 feet. Barracuda Reef (26°04.469'N / 80°05.574'W) is located in 20-30 feet of water off the coast of John U. Lloyd State Park Beach.

### Bottom Cover

#### Overall Average

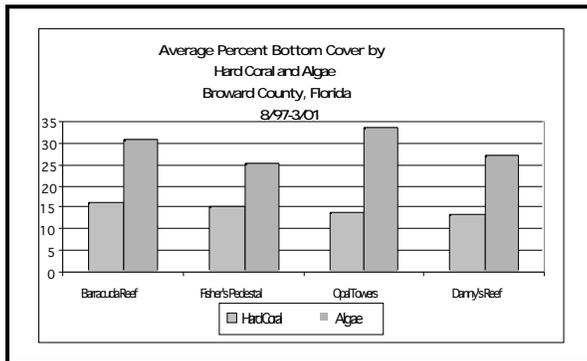
The overall average bottom cover composition for all four reefs combined shows hard coral at 14.7%, algal cover at 29.1% and other biotics at 16.9%. These are more abundant than soft coral (12.0%), abiotics (13.8%) and *Palythoa sp.* (13.6%). Algae were the most dominant average bottom cover at each of the reefs except for Shallow Reef, where abiotics dominated the reef.

#### Opal Towers Reef

The average for Opal Towers Reef hard coral cover over the year is 13.7%, while average cover by algae is 33.4%. The highest percent bottom cover by algae is at this site. Other biotics, composed mainly of sponges, are present at 18.3% while *Palythoa sp.* make up 11.3% of the bottom cover. Percent bottom cover by soft coral and abiotics are 9.8% and 13.5%, respectively.

#### Danny's Reef

Other biotics in the form of sponges are dominant at this site, composing 28.1% of the total bottom cover. Algae make up 27.0% of the bottom cover. Hard coral is only 13.4%, and abiotics and *Palythoa sp.* make up 13.2% and 2.7%, respectively. Soft corals, at 15.7% are in the mid-range.



#### Fisher's Pedestal Reef

Fisher's Pedestal Reef shows the dominant bottom cover as algae, at 25.4%. Abiotic cover is 17.5%, and soft coral and *Palythoa sp.* each make up 16.8% of the total bottom

cover. Hard coral is recorded to be 15.4% at this site. Other biotics are present at 8.1%.

#### Barracuda Reef

Algae and *Palythoa sp.* are prevalent at Barracuda Reef, at 30.7% and 23.7%, respectively. The average hard coral cover is 16.1% here, the highest of the four reefs. Abiotics (10.8%) and other biotics (12.9%) are in the mid-range at this site. Soft coral is very low at this site, making up only 5.8% of the total bottom cover.

	Barracuda Reef	Fisher's Pedestal	Opal Towers	Danny's Reef
Hard Coral	16.1	15.4	13.7	13.4
Soft Coral	5.8	16.8	9.8	15.7
Algae	30.7	25.4	33.4	27
<i>Palythoa sp.</i>	23.7	16.8	11.3	2.7
Abiotics	10.8	17.5	13.5	13.2
Other Biotics	12.9	8.1	18.3	28.1

#### Hard Coral Health

Average hard coral health at all four reefs combined is a relatively high 91.3%. For individual reefs, hard coral health ranged from 81.6% at Danny's Reef to 97.4% at Barracuda Reef. Barracuda Reef reports only 1.9% of hard

corals bleached and 0.8% sick. Opal Towers has 95.1% of hard corals healthy, with 2.1% bleached and 2.9% sick. Fisher's Pedestal reports a lower percentage of hard corals healthy, 91.0%. At this reef site, 5.7% are bleached and 3.2% are sick. Danny's Reef has the lowest reported values for healthy hard coral, at only 81.6%. Sickness is

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.

significant at this site, at 11.8% and 6.6% of hard corals are reported bleached.

### **Hard Coral Species**

Fisher's Pedestal Reef has the highest number of hard coral species reported at 17. Opal Towers Reef has 15 hard coral species reported, Barracuda Reef shows 13 species identified and Danny's Reef reports 6 different species identified. The average number of hard coral species per reef is 13. Taken together, the 4 reefs have an aggregate total of 21 different hard coral species.

### **Significance**

All four of these Broward County coral reefs are located nearshore and within close proximity to a major shipping port. In addition, the beaches and waters that border these reefs experience extremely high recreational use year-round. The results of these uses include high turbidity, anchor damage, high nutrient input and pollution, and chronic siltation, just to name a few. A comparison of annual averages from each reef shows a general trend of decreasing hard coral cover and increasing algal cover. If steps are not taken to preserve the reefs now, there may not be much left of them in the future.

The monitoring shows that all four coral reefs have a percent bottom cover by algae that is significantly higher than the percent bottom cover by hard corals. The previously mentioned anthropogenic effects are all likely to impact hard corals the hardest. Once

hard corals are injured or killed, algae have a better opportunity to thrive. This, combined with the nutrient-rich waters provides an ideal situation for the algae.

### **What is Next?**

The biggest problem with the negative effects that humans have on these reefs is that the damage is chronic. When damages occur due to natural causes, the reefs have a chance to regain their balance. This is not so in the case of these Broward County coral reefs. A necessary first step is to increase public awareness about the potential damage they can do to the reefs. Whether boating, anchoring or diving, people should be informed about the hazards of touching the reefs.

Steps should be taken to increase water quality. As a result of the high population on shore and the large number of shipping vessels, nutrient concentrations are most likely quite high. This is just one other major obstacle that must be overcome in order to ensure the preservation of these reefs for future generations.

Beach renourishments, which are chronic events 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. Sand bypassing should be implemented at all inlets along this reach of shore in order to reduce the frequency of beach renourishment and/or reduce design beach widths.

## **Thank You Volunteers!!**

**Lucy Chabot, Dan Clark, Stephanie Clark,  
Carol Davies, David Kaplan, Laura Kaplan,  
Steven Miller, Mike Sheffer, South Florida Diving Headquarters,  
Edrianna Stillwell, Jim Stillwell, Alex Stone, Ryan Wagner**

#### **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.

**Hard Coral Species Identified at  
Broward County Coral Reefs  
1997-2000**

	Barracuda Reef	Fisher's Pedestal	Opal Towers	Danny's Reef
<i>Agaricia agaricites</i> (Lettuce coral)			X	
<i>Colpophyllia natans</i> (Boulder brain coral)		X	X	
<i>Dendogyra cylindrus</i> (Pillar coral)	X			X
<i>Dichocoenia stokesii</i> (Elliptical star coral)	X	X	X	
<i>Diplora labyrinthiformis</i> (Grooved brain coral)	X	X	X	
<i>Diplora strigosa</i> (Symmetrical brain coral)	X	X	X	
<i>Favia fragum</i> (Golfball coral)		X		
<i>Madracis mirabilis</i> (Yellow pencil coral)			X	
<i>Madracis pharensis</i> (Star coral)	X	X		X
<i>Mancina areolata</i> (Rose coral)		X		
<i>Meandrina meandrites</i> (Maze coral)	X	X	X	X
<i>Millepora alcicornis</i> (Branching fire coral)		X		
<i>Montastrea cavernosa</i> (Great star coral)	X	X	X	X
<i>Montastrea annularis</i> (Boulder star coral)	X	X	X	
<i>Porites astreoides</i> (Mustard hill coral)	X	X	X	
<i>Porites porites</i> (Finger coral)		X		
<i>Siderastrea radialis</i> (Lesser starlet coral)	X	X	X	X
<i>Siderastrea siderea</i> (Massive starlet coral)	X	X	X	X
<i>Solenastrea bournoni</i> (Smooth star coral)	X	X	X	
<i>Solenastrea hyades</i> (Knobby star coral)			X	
<i>Stephanocoenia michilini</i> (Blushing star coral)	X	X	X	
Total	13	17	15	6

**Boat  
Donors**

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