

Punta Borinquen and Desecheo ReefMonitor Update



Liga Ecológica Puertorriqueña
del Noroeste
P.O. Box 250021
Ramey, PR 00604

A joint effort of ReefKeeper International,
Liga Ecológica Puertorriqueña del Noroeste and
Comité ProFondo Marino de Desecheo
to monitor Puerto Rico's coral reefs



Comité ProFondo Marino
de Desecheo
P.O. Box 250350
Ramey, PR 00604

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Puerto Rico's Northwestern Reefs: Maintaining Unstressed Conditions

In January 1999, ReefKeeper International, in conjunction with its ReefMonitor Affiliate groups Liga Ecológica Puertorriqueña del Noroeste and Comité ProFondo Marino de Desecheo, gathered bottom cover data for coral reefs off Punta Borinquen and Desecheo Island. Four reef sites were monitored in January 1999 as part of ongoing quarterly reef monitoring programs to assess reef conditions off Punta Borinquen and Desecheo Island.

Punta Borinquen is located on the northwestern tip of Puerto Rico, between Punta del Boqueron to the south and Punta Sardinas to the north. Punta Borinquen, in fact, forms the northwestern round corner of the island. Desecheo Island lies in the Mona Passage off the northwestern coast of Puerto Rico, less than fifteen miles off Punta Borinquen.

The monitoring off Punta Borinquen began in 1996. Three sites (Gas Chambers, Wishing Well, and Shacks) have been monitored on a quarterly basis but only Gas Chambers and Wishing Well were surveyed in January 1999. The monitoring off Desecheo Island began in 1997. Six sites have been surveyed in this area but only two sites, South Gardens and Candlesticks, were surveyed in January 1999.

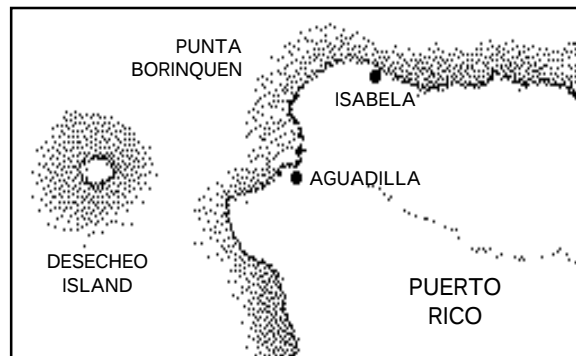
To watchdog the conditions at the Punta Borinquen and Desecheo Island sites, cover data from the most recent monitoring event was compared to data collected during previous monitoring periods (from 3/96 to 8/98) representing an approximate baseline. The results indicated that there was no significant change in either hard coral cover or soft coral cover for any of the monitored sites. Overall, the reefs off northwestern Puerto

Rico appear to be relatively free of stress at this time.

There was, however, a significant (but possibly due to natural habitat variation) increase in algal cover on South Gardens between June 1997 and January 1999.

Coral health data revealed high health values for all reefs for the monitoring events from March 1997 to February 1998 but lower values for the January 1999 survey, in line with reported widespread coral bleaching in the Caribbean for the same period.

An increase in sickness reported at Candlesticks raises concern since no sickness was reported in the past.



Survey Locations

Punta Borinquen's Wishing Well monitoring site (18°28.0'N/67°10.0'W) has a depth of 8 to 10 feet. The other site, Gas Chambers (18°27.0'N/67°10.0'W), has a depth of 50 to 60 feet. Both sites are nearshore patch reefs directly west of Punta Borinquen.

Off Desecheo Island, South Gardens (18°22.729'N/67°29.37'W) has a depth of 45 to 50 feet and Candlesticks Reef (18°22.08'N / 67°29.2'W) has a depth of 53 to 78 feet. Both sites are fringing reefs lying off the southwestern coast of Desecheo Island.

Survey Results: What Was Found PUNTA BORINQUEN

The bar graphs illustrating this report show the January 1999 average bottom cover results and cover ranges from the past year's monitoring events (August 1997-June 1998) for Wishing Well and for Gas Chambers.

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 is 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.

Wishing Well

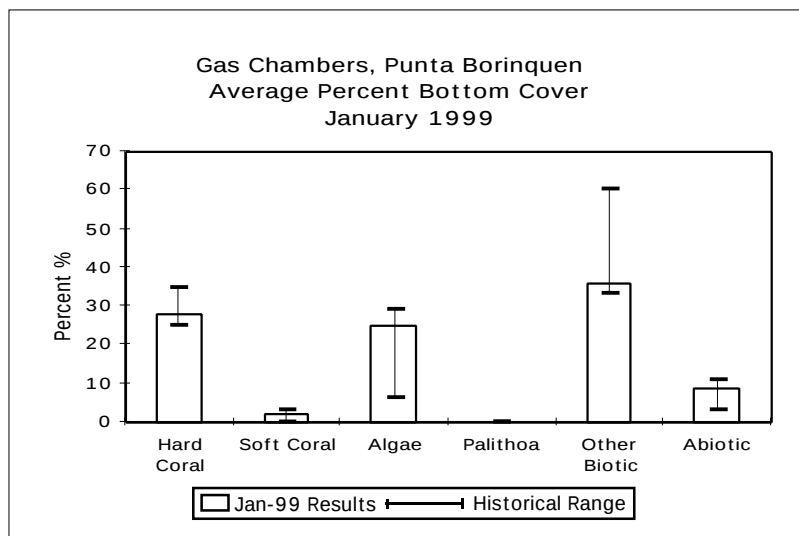
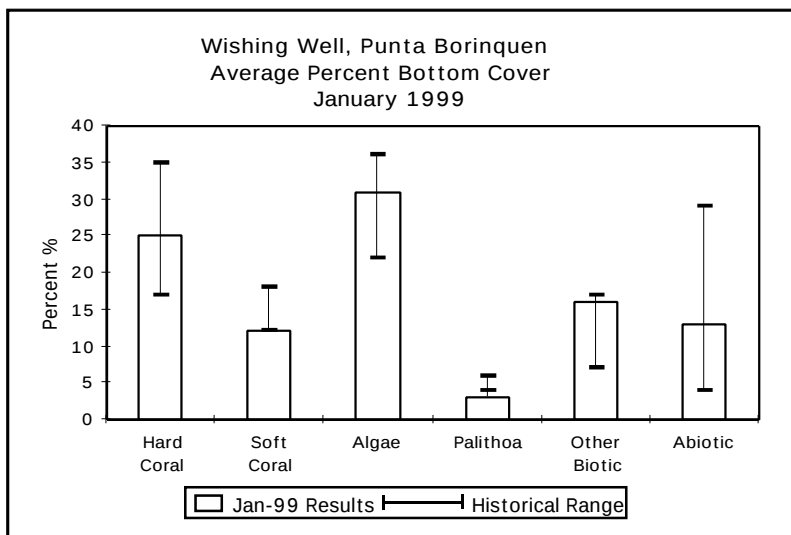
Wishing Well is a shallow (8-10 feet deep) nearshore patch reef with January 1999 average survey values of 25.1% hard coral bottom cover, 12.3% soft coral bottom cover, and 30.8% algae bottom cover. For *palithoa* sp., a "false" coral that competes with real coral for space, average percent bottom cover was 3.1%. For other biotics (sponges, anemones, etc.) average percent bottom cover was 15.9%. Finally, abiotic bottom cover was 12.8%.

The yearly averages calculated from the four prior monitoring events (August 1997-June 1998) produced average coverages of 29.6% hard coral bottom cover, 15.3% soft coral bottom cover, 27.6% algae bottom cover, 4.8% *Palithoa* sp. bottom cover, 11.7% other biotics bottom cover, and 11.2% abiotic bottom cover.

The January 1999 survey results for Wishing Well did not significantly deviate from the aggregate averages calculated from previous results.

The health data for the January 1999 survey of Wishing Well reported 92% of the hard coral bottom cover points healthy, 8% sick and no hard coral bleached. Health data was reported for three of the four previous surveys conducted at Wishing Well. The aggregate averages were 93% healthy hard coral bottom cover points, 7% sick and no hard coral bleached. Again, health data for the January 1999 survey did not significantly deviate from previous Wishing Well results.

Ten species of hard coral were identified along the transects in the January 1999 monitoring event for Wishing Well. Of those, *Diploria strigosa* (Symmetrical brain coral) and *Porites astreoides* (Mustard hill coral) were the most abundant. The four previous surveys have also showed these species to be dominant at this site.



Gas Chambers

Gas Chambers is also a nearshore reef but deeper (50-60 feet) than Wishing Well. In January 1999, bottom cover distributions were 28.1% hard coral bottom cover, 1.5% soft coral bottom cover, and 25.1% algae bottom cover. Other biotics bottom cover average percentage was 36%. Abiotic bottom cover average percent was 9.4%. There was no *Palithoa* sp. bottom cover reported in January 1999, just like there was no *Palithoa* sp. reported for any of the four previous monitoring events. Apparently, *Palithoa* sp. is unusual for Gas Chambers.

The yearly average calculated from the four prior monitoring events (August 1997-June 1998) revealed average coverages of 30.2% hard coral

bottom cover, 1.3% soft coral bottom cover, 18.4% algae bottom cover, 45.4% other biotics bottom cover, and 4.9% abiotic bottom cover.

The results obtained for the January 1999 survey for Gas Chambers did not significantly deviate from the previous results.

The health data for the January 1999 survey of Gas Chambers reported 85% of the hard coral bottom cover points healthy, no hard coral data points sick and 15% bleached. Health data was reported for three of the previous four surveys conducted at Gas Chambers. The aggregate averages were 95% healthy hard coral bottom cover points, 4% sick and 1% bleached.

There was a significant increase in the number of hard coral data points reported bleached at Gas Chambers, in line with the widespread bleaching event that occurred in the Caribbean during the same period.

Eight species of hard coral were encountered along the transects in the January 1999 survey for Gas Chambers. Meandrina meandrites (Maze coral) was the most dominant species reported. The four previous surveys showed this species to be dominant along with Agaricia agaricites (Lettuce coral).

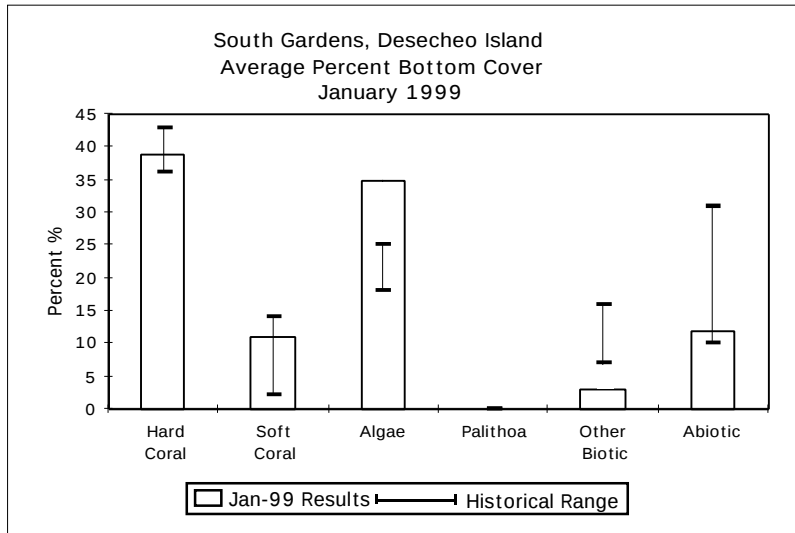
DESECHEO ISLAND

The bar graphs illustrating this report show the January 1999 average bottom cover results and cover ranges from prior monitoring events (March 1996-June 1997) for South Gardens and Candlesticks.

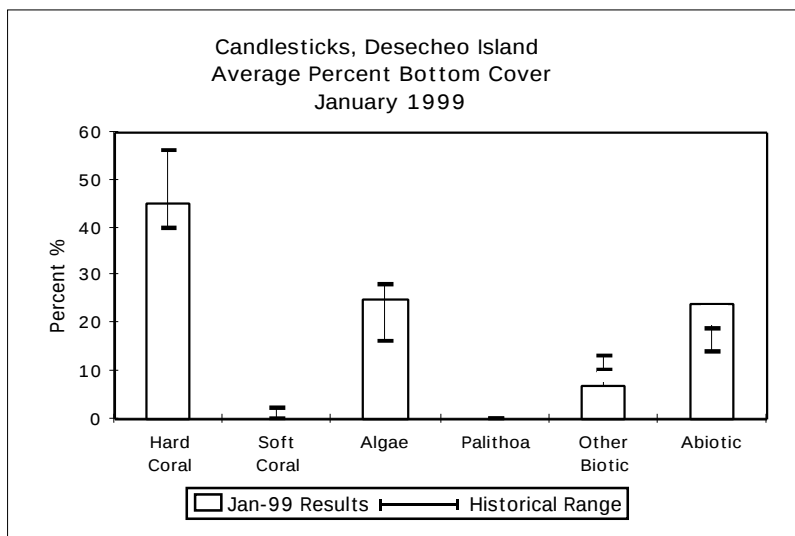
South Gardens

South Gardens is located less than 1/4 mile from the southwest part of the island. The January 1999 survey reported 39.4% hard coral bottom cover, 10.6% soft coral bottom cover and 35.4% algae bottom cover.

Other biotics bottom cover average percentage was 2.5%. Abiotic bottom cover average percentage was 12.1% bottom cover. There was no Palithoa sp. reported for the January 1999 survey just as there was no Palithoa sp. reported for any of the three previous monitoring events.



Aggregate averages for the prior three monitoring events (March 1996-June 1997) revealed average coverages of 40.4% hard coral bottom cover, 9.7% soft coral bottom cover, 21.9% algae bottom cover, 10.2% other biotics bottom cover, and 17.7% abiotic bottom cover.



While January 1999 values for most types of bottom cover did not vary significantly from the aggregate averages, algae bottom cover was higher than the historical average for South Gardens. In fact, the percentage calculated from the January 1999 survey was the highest value ever reported. Most likely, the increase in algae bottom cover was due to natural habitat variation, since the survey transects are not positioned using permanent stakes. It is unlikely that future surveys would

show an increasing trend in algae bottom cover since Desecheo's reefs are pristine and the coral habitat's environment is highly conducive to their growth and maintenance.

Health data for the January 1999 survey of South Gardens reported 71% of the hard coral bottom cover

points healthy, none of the hard coral bottom cover points sick and 29% bleached. Health data for South Gardens was only reported for one of the three previous surveys conducted. Past data reported 99% of the hard coral bottom cover data points healthy, 1% sick and none bleached.

There was a significant increase in the number of hard coral data points reported bleached at Gas Chambers, in line with the widespread bleaching event that occurred in the Caribbean during the same period.

Twelve species of hard coral were encountered along the lengths of the transects for the January 1999 monitoring event for South Gardens. Of those, *Montastrea annularis* (Boulder mound coral) was the most dominant. All previous surveys showed this species to be dominant as well.

Candlesticks

Candlesticks is also located close to Desecheo Island, but is deeper than South Gardens (53-78 feet). Results for the January 1999 surveys were 44.5% hard coral bottom cover, <1% soft coral bottom cover, and 25% algae bottom cover. Other biotics bottom cover average percentage was 7%. Abiotic bottom cover average percentage was 23.5%. There was no *Palithoa* sp. reported for the January 1999 survey just like no *Palithoa* sp. has been reported for any of the three previous monitoring events.

Aggregate averages for the prior three monitoring events (March 1996-June 1997) revealed average coverages of 48.6% hard coral bottom cover, <1% soft coral bottom cover, 23.6% algae bottom cover, 11.2% other biotics bottom cover, and 16% abiotic bottom cover.

The January 1999 results did not significantly deviate from the aggregate averages calculated from previous results.

Health data for the January 1999 survey of Candlesticks reported 70% of the hard coral bottom cover points healthy, 17% sick and 13% bleached. Health data for Candlesticks was only reported for one of the three previous surveys conducted.

Past data reported 100% of the hard coral bottom cover points healthy.

The significant increase in the number of hard coral data points reported bleached at Candlesticks Reef is in line with the widespread bleaching event that occurred in the Caribbean during the same period. However, the increase in hard coral bottom cover data points reported sick is a sign for concern since no sickness was reported in the previous survey.

Nine hard coral species were observed along the transects for the January 1999 monitoring even for Candlesticks. *Montastrea annularis* (Boulder mound coral) was the dominant species at this site. All previous surveys showed this species to be dominant as well.

Significance: What Do The Results Mean?

For Punta Boriquen, Wishing Well's horizontal underwater visibility was 45 feet and the horizontal visibility for Gas Chambers was 45-60 feet. On the other hand, the sites of Desecheo Island had horizontal underwater visibility measurements of 75 feet for South Gardens and significantly more than the transect's 150-foot length at Candlesticks. While the coral reef sites off Punta Boriquen are indirectly influenced by coastal development, the pristine reefs at Desecheo suffer no coastal development impacts since the island is uninhabited. The waters at Desecheo are clearer than the

Hard Coral Health Data NW Puerto Rico Reefs

Punta Boriquen Reefs

Wishing Well	'97-'98 Average	Jan-99
% Healthy	93.0	92
% Sick	6.7	8
% Bleached	0.0	0

Gas Chambers	'97-'98 Average	Jan-99
% Healthy	95.0	85
% Sick	4.0	0
% Bleached	0.7	15

Desecheo Island Reefs

South Gardens	Mar-97	Jan-99
% Healthy	99	71
% Sick	1	0
%Bleached	0	29

Candlesticks	Mar-97	Jan-99
% Healthy	100	70
% Sick	0	17.1
% Bleached	0	12.9

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 is sent to ReefKeeper, where it's 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.

waters at Punta Borinquen and this is one of the reasons why the higher percentages of hard coral bottom cover are observed at the sites of Desecheo.

The January 1999 bottom cover results remained in line with the aggregate averages calculated from previous monitoring events for all sites with one exception. The highest percentage of algae bottom cover ever reported for South Gardens happened for this survey. However, because the reefs off Desecheo Island are considered pristine and because the waters and environmental conditions around the island are so ideal for coral habitat this does not seem to be a need for concern. It is unlikely that future monitoring events will show an increasing trend in algae cover for South Gardens.

The health data, on the other hand, does show a need for concern. The shifts in coral health for Gas Chambers, South Gardens and Candlesticks suggest that these sites were subjected to the same widespread coral bleaching event affecting most of the Caribbean. In

addition, the increase in sickness reported at Candlesticks raises concern since no sickness was reported in the past. This site should continue to be monitored in order to track the health of this reef.

Recommendations: Things To Do

The sites that have been monitored off Punta Borinquen have continued to remain in similar conditions since monitoring began in August 1997. Monitoring should continue in order to watchdog the conditions of all the study sites. Any deviation from the usual should raise concerns that should then be addressed.

In order to maintain the pristine conditions at the sites off Desecheo Island, a Marine Natural Reserve should be established around the island. The reserve should aim to protect coral habitat from anchor damage, fish traps, crowbars, and other negative impacts which are currently sources of stress on the coral habitat off Desecheo Island. Monitoring of these reefs is also a continued recommendation.

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Thank You, Volunteers!

Kathy Hall
Jose Rafols
Michael Nemeth
Joe Rowland

REEFKEEPER INTERNATIONAL

Launched in 1989, ReefKeeper International's one-of-a-kind integrated combination of strategies is applied to all aspects of coral reef conservation by targeting 6 Issue Areas: Offshore Oil, Marine Pollution, Reef Fisheries, Physical Impacts, Coastal Zone Management, and Marine Protected Areas. Through its ReefKeeper Network, ReefKeeper International facilitates and coordinates the pursuit of coral reef conservation advocacy by over 300 Network participant groups. Through its ReefMonitor Affiliate Program, ReefKeeper empowers local groups in Mexico, the U.S. Caribbean, Netherlands Antilles, and Latin America to monitor and watchdog their key coral reef sites. Through its Reef Technical Assistance Program (ReefTAP), ReefKeeper reaches out to potential grassroots activists worldwide to enable locally-organized coral reef conservation initiatives.

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ReefKeeper International
Operations Center
2809 Bird Avenue - Suite 162
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