

Flower Garden Banks National Marine Sanctuary

Coral and Sponge Disease

Management Issue

Recent evidence of periodic disease outbreaks have alerted the Flower Garden Banks National Marine Sanctuary (FGBNMS or Sanctuary) to the need to characterize the maladies, track their frequency and severity, and evaluate whether levels of susceptibility and resilience are changing and, if so, why they are changing.

Description

To date, very little coral disease has been documented at the Flower Garden Banks, probably due to many factors, including distance from shore, relative isolation, and excellent water quality. There is some evidence that frequency is increasing, with several potential causes, but very little evidence supporting any in particular. Pathogens previously absent from the banks may have arrived in recent years. Changing environmental conditions may have enhanced disease transmission or virulence. Or coral immune systems may be compromised by changing environmental conditions or exposure

to pollutants not previously present, lowering resistance and making them more susceptible to infection. In the winter of 2005, the first widespread coral disease event occurred at the Sanctuary, affecting multiple species. Subsequent disease events were documented in the winters of 2006, 2007, and again in 2008. Coral disease researchers have collected observations and samples to begin studying the subject. A barrel sponge (*Xestospongia muta*) disease event was also observed during this period. No studies have been directed to this topic yet.



Plague-like disease affecting a massive star coral (Montastraea faveolata) at the Sanctuary. Photo credit: FGBNMS

Questions and Information Needs

- 1) What is the spatial and temporal distribution of coral and sponge diseases at the Sanctuary?
- 2) What are the frequencies of occurrence and levels of severity?
- 3) How do levels of disease related mortality compare to other factors affecting tissue health (coral bleaching, parrotfish bites, damselfish gardens, algae competition, overgrowth by invertebrates)?
- 4) Have the diseases that occur been identified elsewhere?
- 5) Are certain coral species more susceptible to disease than others?
- 6) Are formerly bleached coral colonies more susceptible to disease?
- 7) Does the coral mortality rate exceed the replenishment rate for affected species?
- 8) Are certain size categories affected disproportionately?
- 9) Are changes in frequency and severity correlated with declining water quality, changing water temperature, diminished coral resistance, or other likely causative factors?
- 10) Can dive equipment act as vectors for the introduction of diseases from other locale?

Updated: 5/1/2010

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>

Scientific Approach and Actions

- Collect tissue samples during outbreaks for disease characterization and indicators of coral condition
- Quantitative assessments by divers (% affected by species, size class data, rate of advance, duration of outbreak)
- Colony tagging and marking to track coral mortality, age-specific survival rates, tissue regeneration, and colonization of exposed skeleton
- Determine coral recruitment, survival, and growth rates
- Collect concurrent water quality data (temperature, contaminants, perhaps pH and alkalinity)

Potential Key Partners and Information Sources

George Mason University; National Centers for Coastal Ocean Science; Texas A&M University

Management Support Products

- Estimates of population impacts of disease outbreaks and other causes of tissue loss at current levels
- Prediction of future impacts with scenarios of changing climate and other environmental conditions
- Maps of disease hotspots, if appropriate
- Protocols for detection and monitoring for diseases
- Guide to identification of pathologies

Planned Use of Products and Actions

- Changes to monitoring protocols to allow for early warnings of outbreaks
- Evaluate response options (e.g., intervention at the colony level, temporary closures during outbreaks to minimize spread)
- Reducing threats that enhance the prevalence of diseases at the Sanctuary (perhaps diving during outbreaks, if that enhances transmission, discharges that affect water quality, or other factors)
- Training of recreational and scientific divers in the identification and reporting of outbreaks
- Guidelines or requirements for dive equipment preparation prior to diving at the Sanctuary, to reduce the risk of spread of pathogens

Program References

FGBNMS Management Plan Review Process

- Public Scoping Reports

FGBNMS Condition Report

- 1,2,3,4,5,6,7,8,9,12,13,14

ONMS Performance Measures

- Number of sites in which living marine resources, based on long-term monitoring data, are being maintained or improved

Other Documents

- 2003 ONMS Science Needs Assessment
- Long-term monitoring reports,

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