Overview

Coral Disease 101

Florida Coral Disease Outbreak

Ongoing Response Efforts
Disease is defined as:

Any impairment (interruption, cessation, proliferation, or other disorder) of vital body functions, systems or organs.¹
Causes of coral disease:

- **Infectious agents (pathogens)**
  - Microorganisms such as viruses, bacteria, fungi, and protists
  - Transmitted from one host to another

- **Natural or human-induced environmental stressors**
  - Non-infectious
  - Result from changes in ambient conditions

- **Inherent or congenital defects in the coral host**
  - Non-infectious
  - Impair normal functions
  - Increase susceptibility
Coral Disease 101

Causes of coral disease:

Pathogen
Environment
Host
Disease

Inherent or congenital defects in the coral host
Infectious agents (pathogens)
Coral Disease 101

- Food
- Competition for space
- Population of Predators
- Natural Disasters
- Disease

Population Size vs. Time

Carrying Capacity
A background level of disease is normal for coral reefs.

Endemic Disease Prevalence: $\leq 6\%$
A disease outbreak is defined as:

**An unexpected increase in disease or mortality that includes:**

- New time or place
- Greater frequency
- Species of concern
- Unidentified lesions
Coral Disease Outbreak

Coral graphic: Lingaile Zlukaite and Marco Galtarossa from Noun Project; Catharine Collier/Dieter Tracey, IAN Image Library (ian.umces.edu/imagelibrary/)
Disease Triangle:

- Inherent or congenital defects in the coral host
- Infectious agents (pathogens)

Natural or human-induced environmental stressors

Existing Pathogens

Susceptibility

Stressors

Pathogen

Disease

Environment

Host
Overview

Coral Disease 101

Florida Coral Disease Outbreak

Ongoing Response Efforts
2014 Status of Severe Coral Disease Reports Across the Florida Reef Tract

** Note - Based on qualitative and quantitative reports **
2015 Status of Severe Coral Disease Reports Across the Florida Reef Tract

** Note - Based on qualitative and quantitative reports **
2016 – April 2017

2016 Coral Disease Reports Across the Florida Reef Tract

** Note - Based on qualitative and quantitative reports **
Florida Coral Disease

Black Band  |  Dark Spots  |  White Plague  |  Other/Unknown

“White Blotch”

Photos: Vanessa Brinkhuis, FWC

* ESA Threatened Species
## Florida Coral Disease

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Acropora cervicornis (Staghorn Coral)</td>
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<tr>
<td>Acropora palmata (Elkhorn Coral)</td>
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<td>Agaricia agaricites (Lettuce Coral)</td>
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<tr>
<td>Colpophyllia natans (Boulder Brain Coral)</td>
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<tr>
<td>Dendrogyra cylindrus (Pillar Coral)</td>
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<tr>
<td>Dichocoenia stokesii (Elliptical Star Coral)</td>
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<td>Diploria labyrinthiformis (Grooved Brain Coral)</td>
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<td>Eusmilia fastigiata (Smooth Flower Coral)</td>
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<td>Meandrina meandrites (Maze Coral)</td>
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<tr>
<td>Montastrea cavernosa (Great Star Coral)</td>
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<tr>
<td>Mycetophyllia spp. (Cactus Coral)</td>
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<tr>
<td>Orbicella annularis (Lobed Star Coral)</td>
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<tr>
<td>Orbicella faveolata (Mountainous Star Coral)</td>
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<tr>
<td>Orbicella franksi (Boulder Star Coral)</td>
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<tr>
<td>Porites astreoides (Mustard Hill Coral)</td>
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<tr>
<td>Pseudodiploria strigosa (Symmetrical Brain Coral)</td>
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<tr>
<td>Pseudodiploria clivosa (Knobby Brain Coral)</td>
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<tr>
<td>Siderastrea radians (Lesser Starlet Coral)</td>
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<tr>
<td>Siderastrea siderea (Massive Starlet Coral)</td>
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<tr>
<td>Solenastrea bournoni (Smooth Star Coral)</td>
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<tr>
<td>Stephanocoenia intersepta (Blushing Star Coral)</td>
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</tr>
</tbody>
</table>

21 of 46 Species

* ESA Threatened Species; ³FKNMS Conditions Report 2011
Most Impacted Species

- Montastrea cavernosa
  Photo: Vanessa Brinkhuis, Upper Keys

- Siderastrea siderea
  Photo: Sara Thanner, Miami-Dade

- Diploria labyrinthiformis
  Photo: Lindsay Huebner, Upper Keys

- Colpophyilia natans
  Photo: Dan Clark, Broward

- Pseudodiploria strigosa
  Photo: Vanessa McDonough, Biscayne NP

- Dichocoenia stokesii
  Photo: Vanessa Brinkhuis, Upper Keys

- Meandrina Meandrites
  Photo: Meghan Balling, Broward

- Eusmilia fastigiata
  Photo: Vanessa Brinkhuis, Upper Keys
Most Impacted Species

Pillar Coral
(Dendrogyra cylindrus)
Dendrogyra cylindrus

Baseline Data (2013-14)

Dead
Diseased
Healthy

Area Enlarged

Image: Karen Neely, FKCC
Dendrogyra cylindrus

Summer 2016

- Red: Dead
- Yellow: Diseased
- Green: Healthy

Image: Karen Neely, FKCC
Dendrogyra cylindrus

Spring 2017
(including % genotypes lost since 2014)

- Biscayne/SEFL: -91% (-97% in wild)
- Upper Keys: -61% (-71% in wild)
- Middle Keys: -13%
- Lower Keys: -2%
- Dry Tortugas: 0%

Image: Karen Neely, FKCC
Oldest Living Corals

330+ years old
Oldest living corals

Reported as effectively dead (5% tissue remaining) in Dec 2015
Landscape Photos

Broward County 2015
Photos: Ana Zangroniz, FDEP
Overview

Coral Disease 101

Florida Coral Disease Outbreak

Ongoing Response Efforts
Response Efforts

What are we doing?

- Monitoring
- Identify pathogens
- Understand other environmental factors
- Treatments/intervention
- Funding/capacity
Response Efforts

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Save the Date
38th US Coral Reef Task Force Meeting
Aug. 7 – 11, 2017
Ft. Lauderdale, Florida
www.coralreef.gov

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