Stony Coral Tissue Loss Disease

Strike Team Training
Part I: Susceptible Coral Species Identification
CORE Strike Teams- Tier System

- **Tier III- Strike Team Volunteer**
  - Has completed classroom and in-water training sessions
  - Can conduct roving diver surveys; can safely be a support diver for Intervention diver
  - Can NOT perform interventions

- **Tier II- Intervention Diver**
  - Has completed classroom and in-water training sessions; has completed adequate number of intervention dives as support diver
  - Determined at the discretion of the field lead prior to a dive day
  - Can perform interventions under supervision of field leader only

- **Tier I- Strike Team Field Leader**
  - Can lead, guide, and organize intervention dive days (under direction of Strike Team Coordinator and Coral Disease Response Coordinator)
  - One Strike Team Field Leader must be present for all intervention dive days
  - Specifically identified and approved by Strike Team Coordinator and Coral Disease Response Coordinator
## The Highly Susceptible Species

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Species Code</th>
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</thead>
<tbody>
<tr>
<td>Maze Coral</td>
<td><em>Meandrina meandrites</em></td>
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<tr>
<td>Elliptical Star Coral</td>
<td><em>Dichocoenia stokesii</em></td>
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<tr>
<td>Pillar Coral</td>
<td><em>Dendrogyra cylindrus</em></td>
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<td>Smooth Flower Coral</td>
<td><em>Eusmilia fastigiata</em></td>
<td>EFAS</td>
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<tr>
<td>Boulder Brain Coral</td>
<td><em>Colpophyllia natans</em></td>
<td>CNAT</td>
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<tr>
<td>Grooved Brain Coral</td>
<td><em>Diploria labyrinthiformis</em></td>
<td>DLAB</td>
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<tr>
<td>Symmetrical Brain Coral</td>
<td><em>Pseudodiploria strigosa</em></td>
<td>PSTR</td>
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<tr>
<td>Knobby Brain Coral</td>
<td><em>Pseudodiploria clivosa</em></td>
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Meandrina meandrites - MMEA

Maze Coral

Tan to yellow-brown hemispherical shaped heads or flattened plates. Mazes of ridges have a zipper-like appearance.
Dichocoenia stokesii - DSTO
Elliptical Star Coral

Yellow-brown or cream colored domed heads with protruding round, oval, or “y” shaped corallites.
Tan to brown pillar like columns. Polyps are extended during the daytime giving a hairy appearance.
Smooth Flower Coral

Hemispherical mound with yellow-brown widely spaced round or oval tubular projections.
Colpophyllia natans - CNAT
Boulder Brain Coral

Large rounded domes or plates. Ridges are typically brown with wide valleys being green, tan, or whitish.
Diploria labyrinthiformis - DLAB

Grooved Brain Coral

Tan to yellow-brown hemispherical heads. Double ridges and sometimes deep valleys.
Pseudodiploria strigosa - PSTR

Symmetrical Brain Coral

Hemispherical domes or plates. Evenly rounded ridges and connected long narrow valleys. Has distinct light line at the top of its ridges.
Yellow- brown or bluish-gray hemispherical domes or encrusting with irregular knobs. Typically only found in very shallow water (~15ft or less)
## The Intermediately Susceptible Species

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<td>Montastrea cavernosa</td>
<td>MCAV</td>
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<tr>
<td>Mountainous Star Coral</td>
<td>Orbicella faveolata</td>
<td>OFAV</td>
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<td>Lobed Star Coral</td>
<td>Orbicella annularis</td>
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<td>Boulder Star Coral</td>
<td>Orbicella franksi</td>
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<td>Smooth Star Coral</td>
<td>Solenastrea bournoni</td>
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<tr>
<td>Blushing Star Coral</td>
<td>Stephanocoenia intersepta</td>
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<tr>
<td>Massive Starlet Coral*</td>
<td>Siderastrea sidereaa*</td>
<td>SSID*</td>
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Montastrea cavernosa - MCAV

Great Star Coral

Green, brown, gray, or fluoresce red orange massive fleshy mounds and domes. Large, excerpt corallites. Polyps usually retracted during the day, but can sometimes be seen extended. Sometimes have bright green polyps.
Orbicella Faveolata- OFAV

Mountainous Star Coral

Large mounding or plating colony, red-brown, brown, green, yellow in color. Small excerpt polyps. Has bumps along regular ridges.
Orbicella annularis- OANN
Lobed Star Coral

Larged semi-hemisphere colonies made of separate pillars or “lobes”. Yellow to brown in color, with very small excerpt polyps.
Orbicella Franksi- OFRA
Boulder Star Coral

Large mounding or plating colony with small irregular bumps, red-brown, brown, green, yellow in color. Small excerpt polyps. Typically found in deeper water.

Differences from OFAV:
- Polyps more spaced out
- Irregular bumps
- Tends to grow in deeper water
Solenastrea bournoni
Smooth star coral

Mounding colony, yellow/brown in color, can sometimes appear quite pale. Bumpy surface with dark, excerpt polyps.
Stephanocoenia Intersepta- SINT
Blushing Star Coral

Small mounds or partially encrusting pale or reddish with dark insert polyps. Pigmentation of the colony is often concentrated into the polyps, leaving bare white skeleton.
Small mounds red in color with dark inset polyps. Extremely common. Can appear blue or purple when bleached. Exhibits signs of stress as Dark Spot Disease (DSD)
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<tr>
<td>Cactus Coral</td>
<td><em>Mycetophyllia</em> <em>spp.</em></td>
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<tr>
<td>Mustard Hill Coral</td>
<td><em>Porites astreoides</em></td>
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Agaricia spp.
Lettuce/Leaf Coral

Thin plates or in encrusting colonies with very little height, thin ridges provide texture. Enormous depth range (3-300+ft), can be found in shallow water underneath ledges or in the open.
Mycetophyllia spp.  
Cactus Coral

Mounding or thick plating colonies with thick raised bumps and ridges. Overall darker in color but can have bright fluorescent colors as well.

Colonies can be fairly rare, usually only a few on a given reef.
Porites astreoides
Mustard Hill Coral

Extremely common, weedy coral species, found as bumpy mounds or plates. Yellow-brown to green in color. Very small corallites.
Stony Coral Tissue Loss Disease

Strike Team Training
Part II: Disease Identification
Other Coral Health Notes (Not SCTLD)

Predation

White Plague

Black Band Disease

Coral Bleaching
White Plague

General Traits:

- Slower
- One lesion from growth edge
- Follows bleaching events
- Largely affects OFAV, OFRA, and OANN

Photo from Dr. Marilyn Brandt at UVI
Black Band Disease

General Traits:

- Distinct “black band” on disease margin of bacteria
- Slow moving
- Consistently present in low levels on the reef, but can have outbreaks

Photos from Dr. Marilyn Brandt at UVI
Coral Bleaching

Caused by thermal stress, coral tissue is still present, but appears stark white.
Coral Predation

Photos from Dr. Marilyn Brandt at UVI
Stony Coral Tissue Loss Disease

Strike Team Training
Part III: Roving Diver Survey Methodology
Roving Diver Methodology

Goals of the Roving Diver:

- Explore and characterize the reef
- Document the status of the reef
- Identify if coral disease is present/absent

- ~20-40min Explorative dive (with photos)
- Recording types of coral
- Recording any impairments
Roving Diver Methodology

Start of dive information:

- Date
- Site “name”
- Surveyor- diver and diver buddy
- Start time
- Max depth (note range of depth if needed)
- Temperature (if possible)
- Reef type (patch, shelf, slope, etc.)
- Misc notes
  - Note here if DPVs are used

Take a photo of the datasheet with this information to separate dives in photos
Roving Diver Methodology

Highly susceptible species:

● Tally presence/absence of highly susceptible species
  ○ None
  ○ Single
  ○ Few (2-9)
  ○ Many (10-25)
  ○ Abundant (25+)

● Take photos of healthy individuals- within reason
  ○ Focus on individuals that would be easily relocated on future surveys

● Count ALL individuals- healthy or diseased, in this count
Roving Diver Methodology

Health impaired corals

- Corals with any health impairments (even if unsure of impairment)
- Record species, observed impairment, and any notes (multiple lesions, previously photographed colony, etc.)
- Photograph the colony
- Tally presence/absence of diseased colonies like highly susceptible species (None, One, Few, Many, Abundant)
- Focus on documenting health impairments across as many species as possible. At a severe location, it won’t be possible to document every colony
Roving Diver Methodology

Reference codes to assist the diver - NOT COMPREHENSIVE

- Possible observations of health impairment (bleaching, disease, paling, recent mortality)

- Coral species codes
Roving Diver Methodology

- Max survey time: ~40 minutes
- Note end time
- Approximate visibility
- Depth range (if different than planned)

Take a photo of the complete datasheet
Stony Coral Tissue Loss Disease

Strike Team Training
Part IV: Disease Treatment Part 1- Amoxicillin
Pre-dive Preparation

1. Weigh out amoxicillin to be used as a **1:8 weight ratio** with Base2b
   a. For 1 jar of Base2b (400g), this is 50g of amoxicillin

2. Within 18 hours of intended use, mix Base2b with amoxicillin
   a. Can be done in the jar with small spatula or spoon, or in a medium sized mixing bowl
   b. Best done with Base2b at room temperature

3. Load syringes/caulking gun tubes with mixture
   a. Best done with Base2b cold (not frozen)

4. Keep mixture out of direct sunlight/high heat during transportation
Diving Protocol

1. Identify SCTLD-infected colony
   a. Do not treat colonies with greater than ~80% mortality

2. Photograph the colony
   a. If colony is to be fate-tracked, nail a numbered tag immediately adjacent to the colony before photographing

3. Apply the treatment along the disease margin, ~1cm width
   a. Take care that any smaller lesions are treated as well
   b. Use modeling clay sparingly to keep the treatment attached to the colony

4. Photograph the colony with treatment
Stony Coral Tissue Loss Disease

Strike Team Training
Part V: Disease Treatment Part 2- Culling/Amputation
Culling Methodology

Culling is the removal of infected coral colonies from the reef, this should be avoided if possible.

- Only remove colonies <30cm max diameter
- Only remove colonies if they cannot be amputated
- Photograph colonies prior to culling
Culling Methodology

1. Photograph the colony
2. Use a chisel or flathead screwdriver to hammer underneath/around the base of the colony to dislodge it
3. Immediately place the entire colony into a sealable plastic bag
   a. It is important to do this quickly to minimize mucus spread in the water column
4. Use a mesh bag to transport removed colonies, and use lift bags for safe transport and ascent.
Amputation Methodology

Amputation is the removal of the now dead coral skeleton and any tissue along the diseased margin

- Only on colonies >30cm in max diameter
- Can only be done when disease is on a growth margin
1. Identify and photograph an infected colony
   a. If fate tracking, install a tag adjacent to the colony before photographing
2. Use a hammer and chisel or long flathead screwdriver to remove recently dead skeleton
   a. May be more time effective to use an angle grinder
3. Place amputated fragment(s) immediately into a large resealable bag
4. Treat the amputation edge and any lesions that could not be amputated with antibiotic paste
5. Photograph the colony, now treated
6. Use a mesh bag to transport removed fragments, and use lift bags for safe transport and ascent.
Strike Team Training
Part VI: Data Reporting
End of Dive Day Data Management

1. Disinfect all equipment and dive gear
2. Rinse, dry, and photograph/scan any datasheets
3. Upload photos to a common location
4. Dive leader contacts strike team leader and disease coordinator with full report:
   a. Include access to photos
   b. Provide summary of corals treated by species
   c. Provide scans/photos of datasheets
   d. Highlight any concerns

Photo Organization

Photos will be organized on the Coral Disease Advisory Committee photo repository following a specific folder pathway:

```
Island → Site Name → Date → Diver name and affiliation
```

“STT” → “Hull Bay” → “2020_04_23” → “JET_Joe Townsend_CDAC”

Photos may be used for research and community outreach purposes with credit to the diver when necessary.

Photos should be kept elsewhere by the strike team lead in a similar format.
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<th>Island</th>
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<th>Latitude</th>
<th>Longitude</th>
<th>Grid (optional)</th>
<th>Zone (optional)</th>
<th>Date</th>
<th>Survey Type (HFCDO, Roving Survey, Researcher Report)</th>
<th>Surveyor(s)</th>
<th>Data Entry (Initials)</th>
<th>SCTLD Present/Absent/eff (P/A/E)</th>
<th>Level of severity of SCTLD</th>
<th>Other sig. impairments observed</th>
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<td>Cocculus Rock Monitoring Site</td>
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<td>5/1/2020</td>
<td>Roving Survey</td>
<td>J. Townsend, J. Quetel</td>
<td>JET P</td>
<td>Moderate</td>
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<td>Roving Survey</td>
<td>Allison Babcock</td>
<td>JET A</td>
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<td>Johnson’s Reef (Northern Edge)</td>
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<td>Researcher Report</td>
<td>Lee Richter, Sara McCutcheon</td>
<td>JET P</td>
<td>Moderate</td>
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Submitting “Researcher Reports”

- If a formal roving diver survey couldn’t be conducted, a dive should still be noted.
- Trained divers who can identify coral species and coral disease can submit “Researcher Reports” to the Hunt for Coral Disease survey sheet.
- Enter the survey sheet as best as possible and put in the notes section “RESEARCHER REPORT” with any observations.
- Include photos and descriptions as much as possible.

https://survey123.arcgis.com/share/9838819b5e1748448297255f6fd1a183
Point of Contact for Questions/Concerns

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Strike Team Lead for St. John
TBA