Reef Connect: BleachWatch VI

BleachWatch Training
For Volunteers
Why are coral reefs important?

- Shoreline protection
- Beach stabilization
Why are coral reefs important?

- Juvenile developmental habitat
- Spawning aggregations
- Areas of high biodiversity
Why are coral reefs important?

- Tourism
- Recreational dive industry
Why are coral reefs important?

- Commercial and Recreational Fisheries
- Bio-medical research
Why are coral reefs in danger?
Why are coral reefs in danger?

- Global climate change
  - Coral Bleaching, storm intensity and frequency
- Ocean Acidification
Why are coral reefs in danger?

- Point-source pollution
- Sewage, oil, trash

- Non point-source pollution
- Run off, sedimentation
Why are coral reefs in danger?

- Coastal development
- Vessel groundings
- Anchor Dragging
Why are coral reefs in danger?

- Over-fishing
- Destructive fishing practices
- Invasive species
Why are coral reefs in danger?

- Diadema urchin die-off
- Coral diseases
10 Easy ways **YOU** can help coral reefs

1. Reduce Fossil Fuel Emissions (as individuals and as nations)

2. Avoid or find natural alternatives to chemical pesticides and fertilizers
3. Support local and/or organic agriculture

4. Conserve water

5. Don’t buy coral or shells as jewelry or décor.

6. When boating, swimming, snorkeling or diving, don’t touch or anchor on the reef.
7. Reduce, Refuse, Reuse, Recycle: especially plastics!

8. Only eat sustainable seafood

9. Use your voice and your vote!

10. Volunteer!
Reef Connect: BleachWatch VI

BleachWatch Training
For Volunteers
BleachWatch is NOT

- Has nothing to do with Clorox bleach products
- Installing air conditioning in the ocean to stop warming seas
- Going to stop climate change
What is BleachWatch?

• A program that prepares for, monitors and assesses bleaching and other reef disturbances in the USVI

• Part of a two tier bleaching response plan
  – Tier 1: early warning from community observations and Coral Reef Watch data
  – Tier 2: dispatch scientists, managers and other partners for in-depth surveys
What are the objectives of BleachWatch?

- Monitor environmental conditions and reef health
- Provide an early warning alert for bleaching in the US Virgin Islands
- Involve the community in coral reef monitoring
Why BleachWatch?

➢ More eyes on the reef reporting disturbances
➢ Determine extent and severity of bleaching events
➢ Identify and protect resilient reefs
➢ Use data to inform further conservation efforts
What is coral bleaching?
Coral Anatomy 101

Anatomy of a Coral Polyp

- tentacles with nematocysts (stinging cells)
- zooxanthellae
- nematocyst
- mouth
- living tissue linking polyps
- gastrovascular cavity (digestive sac)
- limestone calice
- skeleton

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Coral Anatomy 101

- Zooxanthellae = microscopic, photosynthetic, dinoflagellate algae
- Symbiotic relationship: zooxanthellae give the coral food (carbohydrates) from photosynthesis; coral gives zooxanthellae shelter and waste products for photosynthesis
What is coral bleaching?

• Bleaching occurs when corals lose their photosynthetic algae (zooxanthellae) due to stressful conditions (such as warm waters, high salinity, change in nutrients, etc).

• Without their zooxanthellae to provide food and pigment, the coral turns bright white and becomes vulnerable to disease and starvation.
What is Coral Bleaching?

*Colpophyllia natans*

Healthy  Paling  Bleached
Coral Bleaching

Stage 1: Healthy Coral

A Healthy Coral

Healthy corals get their color from tiny algae organisms called zooxanthellae that live in their tissues. This mutually beneficial arrangement is known as a symbiotic relationship.
CORAL BLEACHING

STAGE 2: BLEACHED CORAL

TIME BETWEEN STAGE 1 AND STAGE 2: DAYS / WEEKS

A BLEACHED CORAL

Warmer water temperatures can stress corals, causing them to expel the zooxanthellae. Without their algae, corals appear white. This process can happen in a matter of days or weeks.
Coral Bleaching

Stage 3: Dead Coral

Time between Stage 2 and Stage 3: Days/WEEKS

A Dead Coral

If temperatures remain elevated, the prolonged stress could kill the corals after only a few weeks.

Stage 3 Alternative

Return to Healthy
However, if the temperature returns to a more normal level, the coral could recover its zooxanthellae and return to health. This process could take up to several weeks or months, though, and the coral may be more susceptible to diseases.
Examples of Bleaching/Paling

*Orbicella faveolata* Bleached

*Orbicella annularis* Bleached Upper Surface

*C. natans* Bleached

*Siderastrea siderea* Paling

*Colpophyllia natans* with Paling

*C. natans* Bleached
Mass Bleaching Event
Current Alert Level Sept 11th, 2018

- Low level thermal stress
- Bleaching Possible
- Bleaching Likely
- Mortality Likely
How can you help?

Fill out a BleachWatch VI Report!

Be the ‘eyes on the reef’ and report back using the website or BleachWatch VI app! Use the underwater datasheet to guide you!

Take photos of what you see!

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**BleachWatch VI Report (side 1)**

**CRITICAL DATA**

Date: ___________ Time: ___________ Island: ___________

Dive Site/Specific Location: __________________________

Water Temperature: _______ °F     Depth Range: __________

Percentage of live hard coral across the entire reef area: (circle one)  
0%  1-10%  11-30%  31-50%  51-75%  76-100%

What were the 3 most common types of hard coral at your site?  
Brain    Branching    Pillar    Flowering/Cup  
Mound/Boulder    Fleshy    Leaf/Plate/Sheet

Did you see bright white bleaching on any of the corals in your site?  
Yes (answer questions below)  No (skip to side 2)

Percentage of corals bleached bright white across your site: (circle one)  
Low (1-10%)  Medium (11-50%)  High (51-90%)  Extreme (>90%)

What depth did the bleaching occur? (if needed provide range) __________ ft

Which of the following were most affected by the bleaching?  
Brain    Branching    Pillar    Flowering/Cup    Mound/Boulder    Fleshy  
Leaf/Plate/Sheet    Zoanthids    Fire Corals    Soft Corals

Notes: (give a brief description of what you saw or other notes about your site)

Take photos and submit data online: www.reefconnect.org/bleachwatch
Submit your observations

Submit using the BleachWatch VI app

Submit online at www.reefconnect.org

Email observations to BleachWatchVI@tnc.org

Submit by mail or in person to:
BleachWatch VI
3052 Estate Little Princess
Christiansted VI 00820
Submit your observations

Even reports of “no bleaching” are useful and appreciated... so please tell us about the sites you visit!
BleachWatch wants to know...

**BleachWatch VI Report (side 1)**

**CRITICAL DATA**

Date: ___________  Time: ___________  Island: ___________

Dive Site/Specific Location: ________________________________

Water Temperature: ______ °F  Depth Range: __________

Percentage of live hard coral across the entire reef area: *(circle one)*

0%  1-10%  11-30%  31-50%  51-75%  76-100%

What were the 3 most common types of hard coral at your site?

- Brain
- Branching
- Pillar
- Flowering/Cup
- Mound/Boulder
- Fleshy
- Leaf/Plate/Sheet

Did you see bright white bleaching on any of the corals in your site?

- Yes *(answer questions below)*
- No *(skip to side 2)*

Percentage of corals bleached bright white across your site: *(circle one)*

- Low (1-10%)
- Medium (11-50%)
- High (51-90%)
- Extreme (>90%)

What depth did the bleaching occur? *(if needed provide range) _________ ft*

Which of the following were most affected by the bleaching?

- Brain
- Branching
- Pillar
- Flowering/Cup
- Mound/Boulder
- Fleshy
- Leaf/Plate/Sheet
- Zoanthids
- Fire Corals
- Soft Corals

**Notes:** (give a brief description of what you saw or other notes about your site)

Take photos and submit data online: [www.reefconnect.org/bleachwatch](http://www.reefconnect.org/bleachwatch)
BleachWatch wants to know...

Did you see bright white bleaching on any corals at your site?

What percentage of corals were bleached bright white across your site?

What depth (s) did you see bleaching?
BleachWatch wants to know…

Which types of corals were most affected by bleaching?

Coral ID

**Brain Corals:** Includes all of the following: Brain Corals, Maze Corals, Rock Corals

**Encrusting, Mound & Boulder:** Includes all corals that often take the shape of what they grow over or the massive /boulder shaped excluding brain corals.

**Branching & Pillar**
Include all of the following: Branching, Pillar, Finger-like, Knobby

**Plate, Leaf & Sheet**
Includes all corals that are flattened and are usually layered.

**Flowering & Cup**
Includes all corals that the corallites appear independent from the rest of the colony.

**Fleshy Corals**
Includes all corals with a fleshy appearance; Cactus Corals

Notes and comments section

Take photos and submit data online: www.fscconnect.org/bleachwatch
BleachWatch wants to know...

Did you see any other impacts?

- Paling
- Disease
- Recent Mortality
- Invasive Species
- Anchor Damage
- Marine Debris
- Other

BleachWatch VI Report (side 2)

ADDITIONAL DATA

Check the boxes below if you saw any of the following impacts to corals. For each impact, please indicate:

- **Percentage of corals affected across your site**  [Low (1-10%), Medium (11-50%), High (51-90%), Extreme(>90%)]
- **Types of coral that were most impacted**  [Brain, Branching/Pillar, Fleshy, Flowering/Cup, Leaf/Plate/Sheet, Mound/Boulder, Soft Coral, Fire Coral]

- **Paling** (starting to lose color)  Percent affected:_________
  Most impacted coral types:________________________

- **Obvious disease** (distinct band or pattern)  Percent affected:_________
  Most impacted coral types:________________________

- **Recent mortality** (white skeleton with no tissue, maybe thin layer of algae)
  Percent affected:_________  Coral types:________________________

- **Other impact** (invasive species, anchor damage, marine debris, other)
  Impact:_________  Percent affected:_________
  Most impacted coral types:________________________

Did your site contain abundant/dominating amounts of any of the following?

- Soft Coral
- Fire Coral
- Zoanthids
- Tunicate Mats
- Macroalgae
- Sponge
- *R*amicrusto*alga*e
- Dead coral (skeleton)

**Notes:** (give a brief description of what you saw or other notes about your site)

Take photos and submit data online:  www.reefconnect.org/bleachwatch
BleachWatch wants to know…

If yes, what percent of the corals at your site were affected?

- Low (1-10%)
- Medium (11-50%)
- High (51-90%)
- Extreme (>90%)

**Coral ID**

Brain Corals: Includes all of the following: Brain Corals, Maze Corals, Rope Corals.

Encrusting, Mound & Boulder: Includes all corals that often take the shape of what they grow over or the massive/boulder-shaped excluding brain corals.

Branching & Pillar: Includes all corals that are flattened and are usually layered.

Plate, Leaf & Sheet: Includes all the branching, Pillar, Finger-like, knobby corals.

Flowering & Cup: Includes all corals that the corallites appear independent from the rest of the colony.

Fleshy Corals: Includes all corals with a fleshy appearance, Cactus Corals.

**BleachWatch VI Report (side 2)**

ADDITIONAL DATA

Check the boxes below if you saw any of the following impacts to corals. For each impact, please indicate:

- **Percentage of corals affected across your site** [Low (1-10%), Medium (11-50%), High (51-90%), Extreme (>90%)]
- **Types of coral that were most impacted** [Brain, Branching/Pillar, Fleshy, Flowering/Cup, Leaf/Plate/Sheet, Mound/Boulder, Soft Coral, Fire Coral]

- Paling (starting to lose color) Percent affected: ___________
  Most impacted coral types: ___________

- Obvious disease (distinct band or pattern) Percent affected: ___________
  Most impacted coral types: ___________

- Recent mortality (white skeleton with no tissue, maybe thin layer of algae) Percent affected: ___________
  Coral types: ___________

- Other impact (invasive species, anchor damage, marine debris, other) Impact: ___________
  Percent affected: ___________
  Most impacted coral types: ___________

Did your site contain abundant/dominating amounts of any of the following?

- Soft Coral
- Fire Coral
- Zoanthids
- Tunicate Mats
- Macroligae
- Sponge
- Ramicrusta Algae
- Dead coral (skeleton)

Notes: (give a brief description of what you saw or other notes about your site)

Take photos and submit data online: [www.reefconnect.org/bleachwatch](http://www.reefconnect.org/bleachwatch)
BleachWatch wants to know…

Did your site have overwhelming amounts of any of the following?

- Soft Coral
- Fire Coral
- Zoanthids
- Tunicate Mats
- Macroalgae
- Sponge
- *Ramicrusta* algae
- Dead coral (skeleton)

Notes and Comments about the ‘other impacts’

Take photos!
BleachWatch wants to know...

**BleachWatch ID Key**

**Coral ID**

- **Brain Corals:** Includes all of the following:
  - Brain Corals
  - Maze Corals
  - Rose Corals

- **Encrusting, Mound & Boulder:** Includes all corals that often take the shape of what they grow over or the massive/boulder shaped excluding brain corals.

- **Branching & Pillar:** Include all of the following:
  - Branching
  - Pillar
  - Finger-like
  - Knobby

- **Plate, Leaf & Sheet:** Includes all corals that are flattened and are usually layered.

- **Flowering & Cup:** Includes all corals that the corallites appear independent from the rest of the colony.

- **Fleshy Corals:** Includes all corals with a fleshy appearance; Cactus Corals

**Estimating % Cover**

- 0-10%
- 11-30%
- 31-50%
- 51-75%
- 76-100%

**Bleaching Guide**

- **Healthy**
- **Paling**
- **Bleached**

**Disease**

**Predation**

**Other ID**

- *Ramicrusta*

**Zoanthid**

www.reefconnect.org/bleachwatch
When estimating percent live hard coral in reef areas, use this guide—imagine you zoom out and view the entire area as a whole—how much of the reef area is taken up by live hard corals (brain, branching, boulder, etc).

When estimating the amount of corals impacted by bleaching (or other disturbances) use this guide—low, medium, high, extreme. Of all the corals on the reef, how many were affected?

<table>
<thead>
<tr>
<th>%</th>
<th>Description</th>
<th>Visual Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>Low or mild bleaching</td>
<td>Bleached colonies seen occasionally and are conspicuous, but vast majority of colonies not bleached</td>
</tr>
<tr>
<td>10-50</td>
<td>Moderate bleaching</td>
<td>Bleached colonies frequent but less than half of all colonies</td>
</tr>
<tr>
<td>50-90</td>
<td>High bleaching</td>
<td>Bleaching very frequent and conspicuous, most corals bleached</td>
</tr>
<tr>
<td>&gt;90</td>
<td>Extreme bleaching</td>
<td>Bleaching dominates the landscape, unbleached colonies not common. The whole reef looks white</td>
</tr>
</tbody>
</table>
Coral ID Key - Hard Corals

**Brain Corals:**
Includes all of the following:
- Brain Corals
- Maze Corals
- Rose Corals

**Encrusting, Mound & Boulder:**
Includes all corals that often take the shape of what they grow over or the massive /boulder shaped excluding brain corals.

**Branching & Pillar**
Include all of the following:
- Branching
- Pillar
- Finger-like
- Knobby

**Plate, Leaf & Sheet**
Includes all corals that are flattened and are usually layered.

**Flowering & Cup**
Includes all corals that the corallites appear independent from the rest of the colony.

**Fleshy Corals**
Includes all corals with a fleshy appearance.
- Cactus Corals

Drawings courtesy of Reef Coral Identification - 2003 copyright
New world Publications www.fishid.com
Healthy Corals – Hard Corals

Brain Corals
Brain Corals

Meandrina meandrites
Pseudodiploria strigosa
Diploria labyrinthiformis
Colpophyllia natans

Slide from Cory Walters, Mote Marine Lab
Healthy Corals – Hard Corals

Encrusting Mound and Boulder
Encrusting, Mound & Boulder

- Montastraea cavernosa
- Porites astreoides
- Siderastrea siderea
- Solenastrea bournoni
- Orbicella annularis
- Orbicella franksi

Slide from Cory Walters, Mote Marine Lab

Courtesy of Reef Coral Identification - 2003 copyright New World Publications
Healthy Corals – Hard Corals

Branching and Pillar

©K. Lewis

©K. Lewis

©K. Lewis

©L.Terry
Branching and Pillar Corals

- *Acropora prolifera*
- *Acropora cervicornis*
- *Acropora palmata*
- *Porites*
- *Madracis mirabilis*
- *Dendrogyra cylindrus*
- *Porites porites*

Courtesy of Reef Coral Identification - 2003 copyright New World Publications

Slide from Cory Walters, Mote Marine Lab
Healthy Corals – Hard Corals
Plate, Leaf, and Sheet

©K. Lewis
Healthy Corals – Hard Corals

Flowering and Cup

©K. Lewis
Flowering and Cup

Eusmilia fastiana

Photo: Coral Reef ID

Eusmilia fastiana

Eusmilia fastiana

Slide from Cory Walters, Mote Marine Lab
Healthy Corals – Hard Corals

Fleshy Corals

©K. Lewis
Fleshy Corals

- *Mycetophyllia ferox*
- *Mycetophyllia lamarckiana*
- *Mycetophyllia aliciae*

Courtesy of Reef Coral Identification 2003 copyright New World Publications

Slide from Cory Walters, Mote Marine Lab
Other Benthic Forms

- Dead Coral Skeleton (old mortality)
- Fire Coral
- Soft Coral/Gorgonians
- Dead Coral Skeleton (old mortality)
Other Benthic Forms

- *Ramicrusta* algae
- Macroalgae
- Encrusting sponge
Other Benthic Forms

Zoanthids (Palythoa)

Tunicate mats
Impacted Corals

Bleaching
Paling
Disease
Impacted Coral - Bleaching

Branching and Pillar Corals
Impacted Coral - Bleaching

Encrusting Mound and Boulder

©M. Brandt
Impacted Coral – Bleaching

Branching Corals

©M. Brandt
Impacted Coral – Bleaching

Plate, Leaf and Sheet Corals

© L.Terry

© L.Terry
Impacted Coral – Bleaching

Branching and Pillar Corals

©M. Brandt

©M. Brandt
Impacted Coral – Bleaching

Branching and Pillar Corals

Cane Bay
September
2013

© N. Terry
Impacted Coral - Bleaching

Some bleached corals glow pale (pastel), purple, pink, or blue!

Siderastrea siderea
Impacted Coral - Paling

Brain Corals

©M. Brandt
Impacted Coral – Paling, bleaching

Encrusting Mound and Boulder

©M. Brandt
Impacted Coral - Bleached and Diseased

Brain Corals
Impacted Coral - Diseased

Brain Corals

©M. Brandt
Impacted Coral - Diseased

Plate Leaf and Sheet Corals

©M. Brandt
Healthy corals with new growth, not bleaching!

Encrusting Mound and Boulder (O. Franksi) with new growth

Acropora corals with new growth on the tips of the branches— not bleaching!
Distinguishing predation:
(forms distinct patches, removes polyps completely… mention predation in notes/comments section)
Recent Mortality vs. Bleaching

No Polyps = Recent Mortality

With Polyps = bleaching
Other disturbances…

- Coral disease
- Lionfish sighting
- Other invasive species
- Marine debris
- Vessel grounding
- Anchor damage
- Other…
Common Caribbean Seagrass Species

Turtle Grass
(Thalassia testudinum)

Manatee Grass
(Syringodium filiforme)

Paddle Grass
(Halophila decipiens)

Shoal Grass
(Halodule wrightii)

Invasive species (Halophila stipulacea)

- Native to the Indian Ocean
- Fast growing, forming very dense mats
- Ecosystem impacts unknown
- Expansion into new areas is being monitored
**Ramicrusta spp.**

Crustose algae that forms thin crust over live coral tissue

Strong competitor, can spread rapidly!!
Other Observations

You can also use BleachWatch to report cool things like coral spawning or other happy reef phenomenon's!
Submitting a BleachWatch Report

Use the Reef Connect website or BleachWatch VI mobile app to submit your observations.

Website: www.reefconnect.org
Mobile App: BleachWatch VI
Submit your observations

Submit using the BleachWatch VI app

Submit online at www.reefconnect.org

Email observations to BleachWatchVI@tnc.org

Submit by mail or in person to:
BleachWatch VI
3052 Estate Little Princess
Christiansted VI 00820
Submit your observations

Even reports of “no bleaching” are useful and appreciated… so please tell us about the sites you visit!
Current Conditions Report

➢ Published once a month, distributed via email and posted on Reef Connect Facebook page

➢ Contains current bleaching status and summarizes most recent BleachWatch reports

Current coral bleaching alert level: WATCH as of August 28, 2018
NOAA’s Coral Reef Watch 5-kilometer Coral Bleaching Alert Areas indicates that the U.S. Virgin Islands (USVI) and surrounding area is currently experiencing two levels of thermal stress (Figure 1). USVI bleaching conditions summary:
➢ Ocean temperatures are higher than normal, but are not yet a major concern for mass coral bleaching. The current sea surface temperature (SST) is slightly above the monthly maximum mean, but remains below the bleaching threshold (Figure 2). Corals experience thermal stress when the SST is 1°C greater than the warmest monthly mean temperature, known as the maximum monthly mean. The bleaching threshold is one degree above the maximum monthly mean. When SST exceeds the bleaching threshold, corals experience thermal stress and mass bleaching events are more likely to occur.
➢ Coral bleaching risk is relatively low since temperature stress has not been accumulating in recent weeks. The risk of coral bleaching increases when SST remains higher than normal over an extended period of time. Accumulated stress can be quantified using Degree Heating Weeks (DHW). One DHW is equal to one week with temperatures 1°C greater than the maximum monthly mean. Currently, DHW = 0 in the USVI (Figure 1).
➢ Based on current predictions, coral bleaching risk is not expected to significantly change until December. Based on 4-month predictions from NOAA, the USVI is expected to remain under a bleaching watch until December. By the end of December, the region is expected to be under no stress.

Volunteer report summary:
BleachWatch VI received 210 observation reports from May 2016 to August 2018. All of the reports came from sites located on St. Croix. There were 4 reports of individual corals paling including plate corals and brain corals. There were 4 reports of individual brain corals showing signs of disease (Figure 4). The remainder of the reports observed no signs of paling, bleaching or disease. Observations came mostly from 5-15ft depth range, but some reports included depths down to 50ft. These few isolated cases of paling or disease do not seem to be linked to thermal stress. Thank you to our volunteers and please keep reporting on what you see (even reports of no bleaching are useful).

Lisa K. Terry
BleachWatch VI Program Coordinator
bleachwatchvi@nco.org
www.reefconnect.org/bleachwatch

The Nature Conservancy
3952 Estate Little Princess
Christiansted, VI 00820
(340) 776-5556

UPDATES:
BleachWatch trainings will commence on St. Thomas, St. John, and St. Croix in September – dates, times, and locations will be announced soon via email and the Reef Connect Facebook page!
Extra Practice

From the Mote Marine Lab BleachWatch program
Mustard Hill Coral

Porites astreoides

healthy, bleached

Slide from Cory Walters, Mote Marine Lab
Great Star Coral

*Montastraea cavernosa*,
healthy/paling

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral

*Colopophyllia natans*, healthy, bleached

Slide from Cory Walters, Mote Marine Lab
Finger coral

*Porites porites*, Bleached

Slide from Cory Walters, Mote Marine Lab
Boulder Star Coral

*Orbicella franksi*, healthy

Slide from Cory Walters, Mote Marine Lab
Mountainous Star Coral
*Orbicella faveolata*
Yellow-band disease

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral
*Colpophyllum natans*
White plague disease

Slide from Cory Walters, Mote Marine Lab
Rough Cactus Coral
Mycetophyllia ferox
Dead/Live Coral

Slide from Cory Walters, Mote Marine Lab
Elliptical Star Coral
*Dichocoenia stokesi*
White Plague Disease

Slide from Cory Walters, Mote Marine Lab
Elkhorn Coral
*Acropora palmata*
White Pox Disease

Slide from Cory Walters, Mote Marine Lab
Boulder Star Coral
*Orbicella annularis*

Paling

Slide from Cory Walters, Mote Marine Lab
Massive Starlet Coral
*Siderastrea siderea*, paling/bleached

Slide from Cory Walters, Mote Marine Lab
Massive Starlet Coral
*Siderastrea siderea*, paling/bleached

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral
*Colpophyllia natans*, paling, bleaching

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral
*Colpophyllia natans*,
paling

Slide from Cory Walters, Mote Marine Lab
Massive Starlet Coral

*Siderastrea siderea*,

paling

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral
*Colpophyllum natans*, paling, bleaching

Slide from Cory Walters, Mote Marine Lab
Grooved Brain Coral

*Diploria labyrinthiformis*,

Bleached/healthy

Slide from Cory Walters, Mote Marine Lab
Palythoa sp., paling

Slide from Cory Walters, Mote Marine Lab
Maze Coral

*Meandrina meandrites*,

White Plague Disease

Slide from Cory Walters, Mote Marine Lab
Massive Starlet Coral

*Siderastrea siderea,*
paling

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral
_{Colpophyllia natans,}_
paling/bleaching

Slide from Cory Walters, Mote Marine Lab
Grooved Brain Coral

*Diploria labyrinthiformis*,

Dead

Slide from Cory Walters, Mote Marine Lab
Symmetrical Brain Coral
_Pseudodiploria strigosa_
Black Band Disease and Paling

Slide from Cory Walters, Mote Marine Lab
Staghorn Coral

Acropora cervicornis

Bleached

Slide from Cory Walters, Mote Marine Lab
Maze Brain Coral
*Meandrina meandrites*,
healthy

Boulder Brain Coral
*Colpophyllia natans*,
paling

Grooved Brain Coral
*Diploria labyrinthiformis*,
healthy

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral
*Colpophyllia natans*, Healthy, paling

Slide from Cory Walters, Mote Marine Lab
Symmetrical Brain Coral

*Pseudodiploria strigosa*

Paling, healthy

Slide from Cory Walters, Mote Marine Lab
Boulder Brain Coral
*Colpophyllia natans*,
paling
Boulder Brain Coral
*Colpophyllia natans*, bleached

Slide from Cory Walters, Mote Marine Lab
Thank you for your contribution!

- Kemit Amon Lewis
- Marilyn Brandt, University of the Virgin Islands
- Cory Walters, Mote Marine Lab
- John Melendez
- Karli Hollister
- VICRAG
- The Nature Conservancy
- NOAA CRCP