

Florida Reef Tract Coral Disease Outbreak

Coordination Meeting #3

September 29, 2016

1:00 – 3:00pm

Meeting Summary

Attendees: Mike Feeley, Anna Toline, Amanda Bourque, Jeff Miller, Lauri MacLaughlin, Billy Causey, Brian Beck, Carl Miller, Margaret Miller, Tom Moore, Alison Moulding, Cheryl Woodley, Dana Wusinich-Mendez, Ilsa Kuffner, Caroline Rogers, Valerie Paul, Kristi Kerrigan, Kelly Montenero, Francisco Pagan, Melissa Sathe, Mollie Sinnott, Daron Willison, Ana Zangroniz, Kayleigh Michaelides, Joanna Walczak, Karen Bohnsack, Janice Duquesnel, Trudy Ferraro, Yasu Kiryu, Jan Landsberg, Kate Lunz, Erin McDevitt, Karen Neely, Kerry Maxwell, Rebecca Ross, Sara Thanner, Brian Walker, Cindy Lewis, Esther Peters, Erin Lipp, Josh Patterson, Kayla Ripple, Scott Graves, Eric Bartels, Dan Clark, Stephanie Clark, Ed Tichenor, Meaghan Johnson, Jennifer Stein.

Welcome, Roll Call, Meeting Purpose

- Karen Bohnsack welcomed everyone to the call and reviewed the meeting agenda.
- This is the 3rd coral disease coordination call for 2016. The purpose of these calls is to generate conversation and improve response coordination among the many partners working across the Florida Reef Tract (FRT) on the ongoing coral disease outbreak. The agenda includes a report out on disease observations from across the FRT since the last call in August, updates on the status of current response efforts, report outs from the working groups that have been developed, new information on next steps in moving forward with the disease response effort, and a brief update on other reef-related issues, including the 2016 coral spawning, bleaching, *Xestospongia muta* disease and mortality, and algal blooms.

Update on Florida Reef Tract Disease Observations

- Southeast Florida –
 - o *Kristi Kerrigan (DEP CRCP)*
 - Kristi Kerrigan noted that a total of 38 disease reports were submitted to SEAFAN since the last coral disease call, specifying that 23 of those were associated with additional coral disease data collected from the Florida Reef Resilience Program (FRRP) Disturbance Response Monitoring (DRM) survey sites. All reports included observations of white plague affecting one to multiple colonies of *Montastraea cavernosa* (MCAV).
 - There were no disease reports in Martin County.
 - Seven reports were received from Palm Beach County. In addition to MCAV, other observations included recent mortality of *Pseudodiploria strigosa* (PSTR) and *Meandrina meandrites* (MMEA), and a white plague-like syndrome affecting *Siderastrea siderea* (SSID).
 - In Broward County, reports noted continuing disease observations affecting *Solenastrea bournoni* (SBOU), SSID, *Orbicella faveolata* (OFAV), PSTR, *Dichocoenia stokesii* (DSTO) and MMEA. At one site most coral was reported as

- dead or diseased. Additionally, dark spots was noted on SSID, and a “blotchy, mucousy disease” was reported affecting *Stephanocoenia intersepta* (SINT) that is similar to the disease manifestation on SSIDs. Disease was also reported affecting *Colpophyllia natans* (CNAT) at Staghorn Ledge in Ft. Lauderdale.
- Eleven reports were received from Miami-Dade County, including Emerald Reef where 75% of the *Acropora cervicornis* (ACER) was diseased. Black band disease was observed on a boulder coral, and SINT, SSID, OFAV, and SBOU were all identified with disease.
- *Karen Bohnsack (DEP FCO) on behalf of Josh Voss (FAU)*
 - Karen Bohnsack provided an update on a monitoring effort being conducted in Palm Beach County. Video surveys were completed in Palm Beach County on September 2nd, near a previously surveyed site at Breakers Reef. The team covered approximately 1200 square meters and observed approximately 5-10% overall white syndrome prevalence with MCAV being the only species actively affected. The disease signs were similar to those described previously. Due to strong currents, the team was not able to relocate and photographically record the individual diseased colonies that had been previously documented for fate tracking. However, numerous recently dead colonies were observed. Approximately 25% of the MCAV population exhibited 100% recent mortality. The actively infected plus recently dead observations (30-35% total) were comparable with the previous survey mean white syndrome prevalence value of 33% of the MCAVs (n=322). A handful of recently dead *Meandrina jacksoni* (aka *M. meandrites*) were also observed.
 - Questions/Comments:
 - Dan Clark noted that approximately 1/3 of all MCAV at Staghorn Ledge off of Ft. Lauderdale was affected with disease.
- Biscayne National Park – *Karen Bohnsack (DEP FCO) on behalf of Vanessa McDonough (BNP)*
 - In summary, observations are similar to those that have been previously reported in Biscayne National Park. A decent occurrence of disease is still being observed, particularly but not exclusively on SSIDs. Bleaching remains at very low levels, if present at all.
 - Park staff continue to see disease and mortality of *Xestospongia muta* in the Park. While this is not at an epidemic level, at least one diseased or dead sponge has been observed during almost every dive conducted in the 50 to 90 foot depth range.
 - Park staff recently attempted to devote a full day to coral disease surveys and *X. muta* sampling, however these have been cancelled due to bad weather. This effort will be resumed as scheduling allows.
 - Florida Keys –
 - *Erich Bartels (Mote Marine Laboratory)*
 - Eric Bartels (on behalf of Cory Walter) reported on updated disease observations in the Keys, noting the map that was included in the photos PDF. Disease observations in the Lower Keys continue to be relatively low, although many people associated with C-OCEAN and BleachWatch, as well as Mote Marine Lab staff are actively looking. While disease has been observed across several species, it is not above the normal background levels.

- Similar to previous trends, there is a clear increase in the number of disease observations from the Lower Keys to the Upper Keys. Although it is unknown what factors may be causing this separation in disease observations between the Upper Keys and Lower Keys, Erich noted that there is a gap in observations between the 7 Mile Bridge and the Long-Key/Islamorada area and asked for others working in that region to report to C-OCEAN to provide a more complete picture.
- *Lauri MacLaughlin (Office of National Marine Sanctuaries)*
 - Lauri MacLaughlin provided an update on disease observations from three different patch reefs in the Upper Keys.
 - Horseshoe Reef (H1 buoy; N 25°08.313', W 80°17.689') was surveyed during a 1-hour random swim by 4 surveyors on August 26th. While the focus was on white diseases, a few occurrences of dark spots and one observation of black band disease were recorded. A total of 9 species were surveyed, and data recorded for the total number of healthy, diseased, and recently dead colonies. Across the 9 species, an average of 50-53% of total colonies were affected by disease or recent mortality, with percentages for the individual species as follows:

Species	% Affected	Notes
OFAV	19%	Average % of <i>Orbicella</i> spp. affected: 29%
OFRA	55%	
OANN	14%	
PSTR	88%	Average % of brain corals affected: 72%
PCLI	50%	
DLAB	75%	
CNAT	75%	
SSID	35%	
MCAV	63%	

- No survey was conducted on the *Acropora palmata* (APAL) patch. No counts are available for this site, but the disease prevalence is similar. At this site there was also an issue with *Ceramium* algal overgrowth, which likely increased the overall impacts to corals due to both tissue abrasion and toxins emitted from the algae.
- Two patch reefs further north near Carysfort were also surveyed, including the Das Boot Vessel Grounding Patch Reef and FRRP Strategic Site #1115.
- At the Das Boot Vessel Grounding Patch Reef (N 25°12.631', W 80°14.530'), a 30 minute random swim was conducted by one surveyor on September 22, 2016. A total of 6 species were surveyed and data recorded for the total number of healthy, diseased, and recently dead colonies. Across the 6 species, an average of 31-34% were affected by disease or recent mortality, with percentages for individual species listed below. This site had an overall higher coral cover.

Species	% Affected	Notes
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approximately 2 months. The 2016 follow-up surveys show that the white plague outbreak continues on the Loggerhead Forest Reef. Although possibly not as active as in July (prevalence 9%), it is still well above background levels and has resulted in significant recent live tissue loss. The majority of active lesions on transect surveys (10 x 2 m) were on OFRA colonies (~ 95%). OFRA accounts for approximately 60% of the coral colonies observed at this site; CNAT is approximately 10%. A GPS tracked survey across approximately 1000 meters on the North Terrace (west of Pulaski) indicated disease occurrence continues to be elevated there as well. Concentrated disease “hot spots” of recent mortality were common throughout both these terrace reefs.

- DRTO and SFCN also completed exploratory surveys on Bird Key Reef, south of DRTO’s Garden Key and a 500 meter tracked survey on a north section of Sherwood Forest in the Tortugas North Ecological Reserve. Only normal baseline levels (1%) of white plague disease were observed in both of these reef areas.

Update on Current Response Efforts

- Pillar Coral (*Dendrogyra cylindrus*) Rescue – Cindy Lewis (KML)
 - Cindy Lewis reminded the group that Mote Marine Lab, Florida Aquarium, Coral Restoration Foundation (CRF), Keys Marine Lab (KML), and FWC FWRI worked together for a rescue blitz of *Dendrogyra cylindrus* (DCYL) in July. A total of 81 known DCYL sites were visited, with a total of ~203 frags collected from 64 of those sites (the other 17 sites were already dead or too diseased for collection).
 - Currently 147 live DCYL frags that have been collected since January 2016 remain in three ex situ nurseries, including Mote Marine Lab (40 frags), KML (64 frags), and Florida Aquarium (21 frags); diseased specimens (22 white plague frags) were sent to the National Ocean Service (NOS) for disease treatments. At least 13 known genotypes have been identified from 46 sites, and there are approximately 30 unknown genotypes that still need to be analyzed to determine if there is a match to the existing genotypes. Mote has been working on micro-fragging techniques in DCYL, and had multiple frags (both sexes) spawn in 2016 which have resulted in new DCYL recruits. KML also had 2 females spawn; these gametes will go to the *Dendrogyra* genome project at FIU.
 - An aggressive triage, amputation, and stabilization process has worked best to keep these frags alive as soon as disease or tissue loss appear (which it has even after specimens have been in quarantine for a month or two). When it appears, dead tissue is immediately cut away, the infected pieces are placed in a Lugol’s dip (1/2 cc per liter of sea water; dipped for 15 minutes). The edges are then sealed with a marine epoxy and the specimen is re-quarantined. Applying triple antibiotic ointment on the exposed skeleton has helped too (re-applied every few days). There have been multiple observations of a “brown jelly wasting” in the ex situ DCYL nurseries.
 - The goal is to keep these fragments alive in the hopes of future restoration.
 - Questions/Comments:
 - Esther Peters requested that when the diseased portions of these fragments are being removed, they be preserved in a fixative for additional analysis. Esther will send the necessary fixative upon request (formaldehyde-based).
 - Karen Bohnsack requested photos of the “brown jelly wasting.”

dip. These specimens were then placed in dosing tanks with 100 mg/L Ampicillin treatment for 7 days. The brown jelly wasting disease stopped on all specimens that received this treatment, except for one (on which all dead skeleton could not be fragged off). Of the original 20 fragments, 13 are still alive, with 9 in permanent systems and fully recovered and 4 still in state of recovery.

- Carl Miller noted an interesting observation during the last fragmenting conducted. When cutting off the dead skeleton, there was a strong sulfur smell. It is unknown if the secondary disease was acute sulfur toxicity or a sulfur-loving bacteria. The specimens that were split down the middle did better throughout the whole process than those that remained enclosed. Fragging away all dead skeleton ahead of the tissue margin before issuing any other treatment was a huge factor in determining recovery.
- Questions/Comments:
 - Karen Bohnsack expressed an interest in compiling information about all of the treatments that have been tried to share in the group, whether they were successful or not. Carl Miller and Cheryl Woodley noted that they are finalizing a report with this information, and are also tracking all frags and treatments in an excel file.
 - Billy Causey shared an observation of a similar-sounding brown jelly wasting disease in some of the corallimorphs and other cnidarians. When observed, it happened in unison across the group where the polyps literally turn to jelly. A similar phenomenon was observed on *Acropora palmata* (APAL); when one colony was affected it also swept through the rest. Lauri MacLaughlin added that the same thing happened at Mote to some corals that had been rescued from a grounding site. Cheryl Woodley noted that this happened almost sequentially in the tank; as soon as it appeared on one specimen the others were affected soon after. Even so, they were able to save pieces of the coral. Carl Miller highlighted that after this experiment, they have a lot of information on how to potentially treat both the white plague and brown jelly wasting diseases.
 - Cheryl reiterated that the smell of sulfur or sulfide was also notable, since that is known to be highly toxic to organisms.
 - Regarding this treatment, Jeff Miller inquired if anyone is following the fate of the original DCYL colonies in the field (from which these fragments were acquired) to determine if the disease is still progressing or if those colonies are completely dead. Cindy Lewis clarified that those collected for the disease work in July were the last five pieces of live tissue at Pillar Coral Forest; all 154 colonies were dead or actively diseased at that time. Neither the Elbow or Turtle Rocks sites have been revisited, but they were actively diseased with not much live tissue left when the fragments were taken. Jeff Miller clarified his curiosity about whether the amputation process is a way to mitigate the spreading of a lesion on a colony in the field. Cindy Lewis noted that when amputated in the field, the specimens were removed from below the active disease area, but there was a lot of disease elsewhere on the various colonies.
 - Cindy Lewis noted that one option might be to use the amputation process, where diseased areas are removed above the tissue, dipped in the field, and re-

epoxied to a nearby segment of reef. Esther Peters clarified that while this may be worth a try, it will likely be difficult to do since even healthy-looking tissue may still be manifesting disease in a way that is not visible to the eye.

- Coral Tissue Sampling
 - o Karen Bohnsack asked if any attendees had any updates regarding tissue sampling.
 - o Joanna Walczak noted that avenues for more regular tissue sampling are being explored, including the possibility of including annual sampling in conjunction with the Florida Reef Resilience Program (FRRP) Disturbance Response Monitoring (DRM) surveys.
 - o Kate Lunz mentioned that SSID samples were sent from FWRI to Esther's lab for microbiome sequencing. Additional samples were sent to Julie Myer at the University of Florida for microbiome sequencing.
 - o Regarding the histological samples, Yasu Kiryu noted that work is still underway on tissue samples collected in July from Grecian rocks.
 - o Mike Feeley stated that the National Park Service has initiated collaboration with Erin Muller at Mote Marine Lab. OFRA samples and environmental samples were collected, and they are looking for funding to get these samples processed.
- FRRP Disturbance Response Monitoring – *Jennifer Stein (TNC)*
 - o Jennifer Stein noted that many of the partners have completed their assigned surveys. Data will continue to be turned in until October 10th and the Quick Look Report should be out by late October or early November. Team leaders were asked to collect data on 100% dead corals with any amount of recent mortality, and the supplemental disease survey data is also still being turned in. This information will be shared with Kristi (SEAFAN) and Cory (C-OCEAN). It is unlikely that any post-bleaching surveys will be conducted this year since bleaching has been fairly low.

Coordination Meeting #2 Follow-Up

- Sample Analysis Working Group Report Out
 - o Karen Bohnsack noted that samples are still being processed in the histology lab at FWRI, Updates will hopefully be available for the next call.
 - o Karen Bohnsack reminded the group about Mauricio Rodriguez-Lanetty's interest in obtaining samples for molecular analysis, and clarified that he would be connected with Kate Lunz to coordinate the logistics.
 - o Valerie Paul noted that there may still be frozen samples in Laurie Richardson's lab that were taken from the Smithsonian aquarium. These should also be sequenced. Cindy Lewis agreed to check with Laurie.
- FKNMS Permitting Group Report Out
 - o No updates
- NSF Rapid Grant Proposal
 - o Karen Bohnsack reminded the group that during the last call it was decided that obtain funding to better understand this disease outbreak is critical. A new working group was created to inquire about funding through the NSF RAPID mechanism.

- Since the last coral disease coordination call, the group met and drafted a summary of the proposal to submit to NSF to gauge their interest. The proposal seeks NSF RAPID funding to:
 - 1) Obtain samples and preserve them for histology and molecular analysis. This will also include environmental and water quality data collection, as well as tagging colonies that can be repeatedly examined to measure virulence.
 - 2) Conduct histological investigations of the lesions and adjacent tissues using light and transmission electron microscopy to compare species and provide initial information about potential causes.
 - 3) Determine if the observed disease(s) are transmissible and possibly caused by an infectious agent, utilizing transmission studies with diseased and healthy specimens in aquaria and using size exclusion (filters, differential centrifugation) to determine if the infectious agent could be viral, prokaryotic, larger filamentous microorganism, etc.
 - 4) If it is found to be infectious, isolate and characterize suspect microbial causative agent(s) through experimental exposures, isolation, and culture methods. Lab facilities and aquaria are available at the Smithsonian Marine Station for this work.
 - 5) The coral microbiomes within and adjacent to the lesions and in apparently healthy corals will be sampled and sequenced to examine microbial changes associated with disease progression. There is already a good understanding of the microbiomes of many of these corals when they are apparently healthy through previous work on black band disease; microbiome shifts in this disease outbreak can be compared with other diseases.
- This proposal was submitted to the NSF Biological Oceanography program, but was not suitable for RAPID funding within that program. Valerie Paul is working with Greta Aeby (Hawaii Institute of Marine Biology) to see if the Symbiosis, Defense, and Self Recognition program has any interest in this project.
- Questions/Comments:
 - Valerie Paul clarified that the group is interested in bringing Greta Aeby on board because of her expertise in isolating causative agents for four or five diseases in the Pacific. She is on board if funding become available.
 - Valerie also noted that Julie Myer (UF) has sequencing money and will sequence some microbiome samples from FWRI. Attempts are still being made to move forward as much as possible in the absence of funding.

Next Steps

- Coordination with USGS National Wildlife Health Center – *Joanna Walczak (FDEP)*
 - Joanna Walczak summarized a new effort to coordinate with the USGS National Wildlife Health Center (NWHC) to provide additional funding and/or capacity to help with the response to this disease outbreak. Although based in Madison, WI, they have a coral disease-specific group, which will be approached for assistance in conducting an epidemiological analysis on coral disease data from Florida in an effort to provide clues as to potential causes or drivers of mortality. Assistance with sample diagnostics will

also be requested, although there is already a soft commitment from Thierry Work (who works with the NWHC) to initiate that immediately. Joanna will coordinate a group to put together an official request from Florida, possibly via a joint letter from the different management entities.

- Questions/Comments:
 - Ilsa Kuffner noted that her Center Director called the director of NWHC, who confirmed that this is exactly what they do. They haven't had many coral disease outbreaks before, but their mandate is to respond to wildlife disease outbreaks so they may still be willing to provide assistance. There is also a Florida representative who can act as a liaison; this person needs to be tracked down.
- Data Aggregation
 - Regarding this coral disease outbreak in Florida, Karen Bohnsack noted that there is a lot of data being collected by a number of different people and programs. In many cases the types of data vary, although together they provide an anecdotal understanding of the geographic extent, prevalence, severity and species affected. Aggregating these data into one central repository would provide a more complete story about the disease outbreak.
 - Aggregating data would require: 1) Understanding the data that currently exist (what is being collected, how, how often, etc.); 2) Deciding what are the most pressing questions, if the data we have are sufficient to answer those questions, and how; and 3) Understanding what databases exist and deciding how to proceed to best meet our needs.
 - Karen Bohnsack noted that there are extensive tools and databases, including a global coral disease database; NOAA programs that allow datasets to be searched, visualized and downloaded in common file formats, etc. There are different costs, timelines to get up and running and functionality associated with these various tools.
 - Karen Bohnsack proposed a new sub-group to tackle this issue, which may need to include input from the data providers and people with specialized database knowledge. These people will be identified to help coordinate this effort.
 - Questions/Comments:
 - Brian Beck noted that through the National Centers for Environmental Information (NCEI), the NOAA Coral Reef Conservation Program can provide a platform for the data to be archived and protected for 75 years, including a webpage with links to the available datasets. It is currently beyond the capacity of this program to compile the data into one consistent database that can be queried, but they will be archived and available in one place.
 - Karen Bohnsack noted that in response to inquiries about the types of field data to collect, the NOAA Coral Disease Health Consortium (CDHC) disease data sheet will also be sent out to the group as a reference to help standardize the types of observations that are being collected.
 - Joanna Walczak emphasized the importance of including coordinates with pictures.
 - Dan Clark noted that their group uses GPS buttons on the dive flag that automatically geo-references the pictures on a Google Map. This is posted and

available online if that information is useful. These buttons are ~\$20 online. Karen Bohnsack emphasized that in the past these links were sent via email, which is also acceptable in addition to the SEAFAN/C-OCEAN reporting mechanisms. Ed Tichenor agreed to send out a link with additional information about this GPS Dive Tracker Photo Integration System.

- Communications
 - o Karen Bohnsack inquired about what communications those participating on the coral disease calls have been generating regarding the disease outbreak.
 - Kate Lunz clarified that FWRI did write a report on FWRI's survey of Grecian Rocks; this is available on MyFWC.com.
 - Mike Feeley noted that once the data are analyzed, they will write a paper about the white plague event in the Dry Tortugas, as a follow-up to a paper about the 2008 event.
 - o Karen Bohnsack articulated the importance of communicating about the extent of this outbreak holistically across the entire Florida Reef Tract, and asked for feedback on working together to generate reef-tract wide summary information that can be used to communicate consistently on this issue.
 - o Joanna Walczak strongly supported this effort, especially to more strategically communicate about this issue at the next Ocean's Day in Tallahassee.
 - o Karen Bohnsack noted that DEP can start putting together some talking points, and will likely reach out to the data providers to verify some of the information.
- Field Precautions:
 - o To avoid further transmission of this disease, Karen Bohnsack reminded all divers to consider themselves and their equipment as potential vectors of disease to other locations. To minimize this risk, ALL equipment should undergo a simple sterilization process after diving in an infected area or before moving to a new location. Generally, work should also move from uninfected to infected areas. The Coral Disease Handbook recommends rinsing SCUBA gear and other equipment in a 5% bleach solution then fresh water.

Other Reef Issues

- Summer 2016 Bleaching Update
 - o No updates; 2016 continues to be relatively mild compared to the previous few summers.
- 2016 Coral Spawning Update – *Margaret Miller (NOAA)*
 - o Margaret Miller noted that the NOAA team focused on OFAV and APAL, although Karen Neely and others have worked with DCYL. Overall this was a mediocre spawning year, although at least there was some APAL spawning (some years have shown no spawning). There was also decent spawning of OFAV. This was better than expected given the extensive amount of disease. There were issues with the OFAV larvae this year (more was seen crashing than in previous years), although Mote did have some successful settlement of their OFAV larvae.
 - o Karen Bohnsack provided an update from Vanessa McDonough (BNP): BNP staff did 2 nights of coral spawning dives at a shallow patch reef (Alina's reef) with really high coral

cover (mostly OFAV, MCAV, OANN, SSID). They believe that spawning may have been about to occur on Thursday, but they had to call off the dive due to a lightning storm. On Friday, they were in the water for about 3 hours after sunset and saw no evidence of spawning at all.

- *Xestospongia muta* Disease/Mortality Observations
 - o In reference to some recent reports of *X. muta* disease and mortality in Biscayne National Park and Broward County, Karen Bohnsack asked the group to be on the lookout. There was an outbreak of wasting disease/sponge orange band disease in southeast Florida in 2012, which has also been observed periodically in the Sanctuary since 2005. The disease appears as discoloration of the tissues followed by tissue disintegration. Sponge disease/mortality reports can be sent to SEAFAN or C-OCEAN. Anyone interested in obtaining samples can be put in contact with Joe Lopez (NSU) about sampling protocols.
 - o Questions/Comments:
 - Kristi Kerrigan noted that SEAFAN received 3 reports of *X. muta* disease in Broward County.
- Florida Reef Tract Algal Blooms
 - o Regarding reports of algal blooms, Karen Bohnsack noted anecdotal reports of *Cladophora* spp. washing ashore in the Marquesas and in the Upper Keys earlier this year, as well as recent reports of dense mats (6 inches – 2 feet thick) of green filamentous algae at a number of sites around Key West. Other observations of algal blooms were reported from the Upper Keys this past weekend; Horseshoe reef and the Catacombs both had a long red algae over the gorgonians. Also, the area inside of Carysfort is covered with green filamentous algae that is about 2 feet deep. Lad Akins (REEF) is happy to take water and algae samples, and also has a video of these observations. Algal blooms along the reef can also be reported to SEAFAN or C-OCEAN.
 - o Questions/Comments:
 - Kristi Kerrigan noted that SEAFAN received a number of reports of *Lyngbya* spp. growth on sea fans at 7 different sites in Broward County and 9 sites in Miami-Dade County.
 - Dan Clark inquired about the coordinates for the *Lyngbya* blooms in Broward County. Kristi Kerrigan agreed to follow-up with this information. Valerie Paul also expressed an interest in these coordinates, noting that they have been working on algal blooms for a long time.

Wrap-Up and Adjourn

- Karen Bohnsack reviewed action items from the call:
 - o Karen will send a meeting summary and an updated PDF of images (that includes additional photos from the Dry Tortugas and a map of disease observations reported in southeast Florida). She will also send the CDHC Data Sheet to serve as a reference for the types of information that should be collected in the field.
 - o Anyone interested in working on the data aggregation issue or communications should send Karen an email.

- Karen will connect Kate Lunz and Mauricio Rodriguez-Lanetty to coordinate the transfer of frozen coral tissue samples. Cindy Lewis will also check with Laurie Richardson regarding frozen samples obtained from the Smithsonian Institution's aquarium exhibit.
- Ed Tichenor will provide information about the GPS Dive Tracker Photo Integration System that geo-reference photos onto a Google Map.
- Kristi Kerrigan will send site information and coordinates of reported *Lyngbya* blooms to Dan Clark and Valerie Paul.
- A fourth disease coordination call will be hosted in a month. The date is TBD.