Florida Reef Tract Coral Disease Outbreak

Coordination Meeting #1
July 7, 2016
2:00 – 3:00pm

Meeting Summary

Attendees: Andrew Baker, Meghan Balling, Karen Bohnsack, Wesley Brooks, Charles Castagna, Russell Day, Joanne Delaney, Beth Dieveney, Crawford Drury, Janice Duquesnel, Trudy Ferraro, Scott Graves, Kathy Heym, Meaghan Johnson, Kristi Kerrigan, Yasu Kiryu, Mark Lamb, Jan Landsberg, Cindy Lewis, Kate Lunz, Caitlin Lustic, Derek Manzello, Lisa May, Erin McDevitt, Kelly Montenero, Jamie Monty, Jennifer Moore, Tom Moore, Alison Moulding, Francisco Pagan, Josh Patterson, Esther Peters, Bill Precht, Kayla Ripple, Rebecca Ross, Melissa Sathe, Bill Sharp, Anna Toline, Josh Voss, Joanna Walczak, Brian Walker, Cory Walter, Mark Wayne, Daron Willison, Cheryl Woodley, Ana Zangroniz, Tracy Ziegler.

Welcome, Roll Call, Meeting Purpose

- Karen Bohnsack welcomed everyone and provided some context for these disease coordination calls.
    - Last fall the Florida Department of Environmental Protection's (FDEP) Coral Reef Conservation Program (CRCP) hosted a series of phone calls to allow for better communication and response coordination among many partners regarding a coral disease outbreak that was centered offshore of mainland southeast Florida, particularly Miami-Dade and Broward counties.
    - This summer these calls have been reinitiated due to a recent re-emergence of coral disease reports, which specifically include both potentially new manifestations of coral disease and new locations much further south in the Florida Keys.
    - Partners from across the entire Florida Reef Tract (FRT) have been invited to join these calls so we can get a better handle on what is occurring where, and the severity.
    - This is an initial coordination call to get on the same page about what we know about the disease outbreak along the FRT, and to provide an opportunity for coordination and partnership in any data collection or response efforts.
    - Calls will be held approximately once per month.
- The agenda for the call is to first hear updates on current disease observations across the FRT, followed by information sharing on current response efforts and a few minutes to discuss next steps and identify any possible opportunities for improved collaboration.

Update on Florida Reef Tract Disease Observations

- Kristi Kerrigan (FDEP CRCP)
    - Reports have been received from all along southeast Florida.
    - In Palm Beach County, reports were received as far north as Jupiter Beach, as well as Boynton Beach and Boca Raton. Most observations have been of white plague, which is affecting the *Montastraea cavernosa* (MCAV). This has been observed at most dive sites.

    - In Broward County, again white plague has been observed on MCAV, *Meandrina meandrites* (MMEA), *Orbicella faveolata* (OFAV), *Diploria strigosa* (DSTR), *Solenastrea bournoni* (SBOU) and *Dichocoenia stokesi* (DSTO). There have also been reports of a potential new disease on *Siderastrea siderea* (SSID). Some sites had no signs of the SSID disease in December, but it was observed at repeat visits in March and in June, where one coral had up to 75% mortality from the disease in that time.
    - In Miami Dade, the same species are being affected by the white plague, and the SSIDs are also affected by the unknown disease. Staff have been doing mini disease reports at all Reef Visual Census sites, and have observed white plague at every site visited.
- Vanessa McDonough (Biscayne National Park [BNP])
    - Karen Bohnsack reported on Vanessa's behalf since she was unable to make the call.
    - Biscayne National Park staff have not seen much disease this year so far. They have noticed some bleached coral heads, but are confident that most of what has been observed is a remnant from last year. They are not seeing new bleaching, at least not right now. The bleached corals have been more commonly observed in shallower (< 30 feet) reefs and as of right now, the deeper reefs are in fairly good condition and perhaps have recovered from last year's bleaching.
    - Vanessa did observe one coral head with unusual coloration, but was unsure what was going on there.
    - BNP staff will be keeping an eye out for any emerging bleaching events and disease outbreaks during fieldwork over the next 3 months.
- Cory Walter (Mote Marine Laboratory)
    - Cory sent an image that summarizes disease reports (and no disease reports) from May through July. There is a higher concentration of disease reported in the Upper Keys. The main concern is a white, blotchy disease on SSID reported around Carysfort and also at Horseshoe and Northern Dry Rocks. Black band disease was also observed. Staff from Pennekamp have also reported disease at Mosquito Banks and Basin Hills, including SSID with dark spots.
    - Further south at Looe Key, white disease has been observed affecting from 5 – 10 colonies, including different species, and a patch reef nearshore off of Cudjoe Key had reports of 10 – 15 colonies of *Orbicella annularis* (OANN) with white disease. At Newfound Harbor, there was an unusual observation on a SSID with fish bites and unusual spotting. Also at a 40-60' reef off of Summerland Key, 10 OFAV were observed with white disease, although it did not appear to be moving fast.
    - There have also been a lot of observations of green water Keys-wide, both on the ocean side and the gulf side.
- Meaghan Johnson (TNC)
    - Winter Disturbance Response Monitoring (DRM) results
        - 31 post-bleaching surveys were completed at the CREMP and SECREMP sites. Data show higher than normal disease prevalence in southeast Florida, including white plague prevalence up to 10% at some of those sites. In the Keys, 1 – 5% disease prevalence was observed, mostly dark spots. Different diseases were observed in different regions.

- Other reports/observations
    - Meaghan has also received other various reports, including from Bill Goodwin (FKNMS) at Elbow Reef and other sites in the Upper Keys, and Kerry Maxwell (FWC) in the Middle Keys. Reports in the Middle Keys are very recent; they were not seeing disease a few weeks ago, then recently they have begun to see some affected corals.

Current Response Efforts

- Esther Peters (GMU)– Comprehensive Conditions Project
    - Ester has been working on a Comprehensive Conditions Report with Nikki Fogarty (NSU) and graduate students. The goal of the project was to develop a dataset archive for the many different types of data that were collected between 2012-2015 that might be able to help us understand why we had such a terrible outbreak of white plague, other diseases, and bleaching, especially between 2014 and 2015. They first developed a list of the types of data that might be available, including disease field surveys, samples collected, etc. as well as data on other environmental factors may have contributed to the disease, such as currents, temperature, sedimentation, etc. These can be abiotic pathogens that cause disease in corals and other organisms.
    - Over the past few months, including at the SEFCRI TAC meeting, they have worked to identify all possible source of data, such as sample collection from FWRI, monitoring data from SECREMP, the large coral data by Brian Walker, catch data, RVC data, FRRP, SEAFAN reports, WQ for all SEFL counties, Jack Stamates' NOAA inlet study, etc.
    - They were able to obtain some of the data and have put these datasets into a OneDrive folder at NSU and are still adding to this.
    - Eventually these data need to be analyzed. This will likely require a team of people to do these analyses and interpret what the data might tell us about how conditions may have changed between 2012 and 2015. All had hoped that the disease outbreak would be over, but it is still ongoing in 2016.
    - The report was submitted to FDEP CRCP; all should contact Kristi Kerrigan for additional information on the report. Karen Bohnsack will send the link to the report once it is available online.
- Jennifer Moore (NOAA) – Pillar Coral (*Dendrogyra* cylindrus [DCYL]) Rescue
    - There has been a severe disease event with pillar coral along the entire FRT. It is particularly severe in southeast Florida, but also present along the rest of the reef tract.
    - In response, NOAA has launched a rescue effort to bring fragments of as many colonies as possible into land-based nurseries to provide a genetic bank in advance of this summer's heating event. Although coordinated by NOAA, there are many partners working on this effort, including the University of Miami, Mote Tropical Research Lab, FWC, FL Aquarium, NSU, Keys Marine Lab, Coral Restoration Foundation, the University of Florida tropical aquaculture lab, FKNMS, etc.
    - Fragment collections are occurring now; they are initially being housed at Keys Marine Lab and Mote Tropical Research Lab for a quarantine/stabilization period. Replicate

fragments will then be distributed to several land-based nurseries across the state to spread the risk and ensure that not all fragments are in the Keys.
    - They are also working with Cheryl Woodley to do investigation on the disease and potential treatment options with antibiotics, etc. in the land-based nurseries.
    - Collections will continue through the end of this month; fragments are being collected by FWC, Mote Marine Lab, the Florida Aquarium and Coral Restoration Foundation. The goal is to collect the approximately 100 sites across the FRT that have known DCYL colonies. The southeast Florida population was most severely impacted. There were approximately 60 colonies between Palm Beach County and Miami-Dade, but only 8 colonies were still alive for tissue collection.
    - After this summer, they may also experiment with propagation both in the land-based and field-based nurseries for potential reintroduction of the species along the reef tract.
- Kate Lunz (FWC FWRI) – Coral Tissue Sampling
    - The CREMP Team will be in the Upper Keys starting next Monday, July 11th. Attendees on the call who are interested in collections for histology or flash frozen samples, etc. should contact Kate. FWRI is most interested in collections from the SSIDs. The group will be in the Lower Keys in August.
    - Jan Landsberg's team has been looking at the specimens collected last summer from 5 or 6 species. Once complete they will share this information.
- Upcoming summer FRRP DRM sampling – Meaghan Johnson
    - Annual Florida Reef Resilience Program's (FRRP) Disturbance Response Monitoring (DRM) surveys from August 15th – October 10th.
    - Usually approximately 200 sites are completed from Martin County through the Dry Tortugas. This effort includes ~13 partner agencies that participate in the surveys. This is an opportunity for additional sample collection if needed.
- Additional Information:
    - Esther Peters highlighted an effort from Mauricio Rodriguez-Lanetty's lab. He is the Principal Investigator for a NSF Rapid Response Grant which was obtained to look at the white plague disease outbreak. They were able to isolate some microorganisms and were going to test them.
        - Cindy Lewis clarified that the NSF funding was specific to DCYL bleaching and recovery. They opportunistically observed the outbreak, and are continuing to see it in the Upper Keys DCYL population. Other corals were observed with disease at the DCYL sites in January and April. There was also a disease outbreak in the Middle Keys DCYL site at Coffins Patch Sanctuary Preservation Area, but there is more of a chronic problem in the Upper Keys.
        - Mauricio's lab has sampled, cultured and isolated approximately 30 – 50 isolates. These have been tested, but the information has not yet been complied. They are planning to do disease challenges with some isolates that are potentially pathogenic. These have been tested on aiptasia and several were found to be 100% lethal. These have also been tested on *Porites astreoides* (PAST) which seems to be largely resistant to white plague in the Keys. They are trying to sequence the different isolates to compare differences between the

healthy and diseased tissue. They will hope to have more information available once it's compiled in the next month.

- Wes Brooks (Congresswoman Ros Lehtinen's office) provided an update on new proposed coral legislation.
  - In Washington D.C. they have been working hard to understand what can be done at the federal level to get more resources into the field. Rep. Ros-Lehtinen will be introducing new legislation next week to reauthorize the Coral Reef Conservation Act (CRCA). The legislation is called the "CORAL Act" (Conserving Our Reefs And Livelihoods). The bill acknowledges the environmental and economic benefits of coral reefs, and widens the scope of research that is eligible for funding under the CRCA to include ocean acidification, warming seas, invasive species, coral disease, etc.
  - There are also two mechanisms in the bill to improve emergency response funding. One allows NOAA to partner with FEMA in the case of an acute emergency to use FEMA funds. The other mechanism is more geared towards researchers and local managers. Upon noticing an unexpected disease outbreak or bleaching event, the NOAA Administrator can release funds within 15 days of receiving an application.
  - The legislation also allows federal agency partners to play active roles in restoration and recovery. The new bill moves beyond conservation to focus on restoration and promote innovate research and propagation tools so that we can improve the resilience of corals to future ocean conditions.
  - The final draft of the bill will be send to the partners on the coordination call list.

Next Steps

- Karen Bohnsack asked for input from attendees regarding ideas for moving forward and improving collaboration on the disease response effort.
  - Kate Lunz (FWC) – Requested information from the attendees about who is interested in what samples or analyses. FWC can do histology in house but does not have funding for molecular analysis, although they can collect and flash freeze samples to be sent to others who may be interested in conducing additional analyses.
    - Andrew Baker (UM) expressed an Interest in flash frozen tissue for future analysis. Samples can be useful for investigations beyond coral diseases. There are additional steps that need to be taken when handling samples. They should be flash frozen as soon as possible, and kept dark between the time they are collected and flash frozen.
      - FWC can keep samples frozen at FWRI through the rest of the field season (or drop them off if he has room in the freezer).
    - Ester Peters requested duplicate samples to have one for histology and one for freezing (for molecular analysis, gene expression, microorganism work, etc.)
    - Attendees agreed that the interested parties will get together to discuss and agree upon a protocol for data collection.

        - Interested parties should email Karen Bohnsack, who will connect them to this group.
    - Joanne Delaney (FKNMS) – Requested discussion to come up with a coordinated plan for the purposes of permitting tissue sampling efforts, since within FKNMS it is prohibited to disturb, injure or touch coral resources without a permit.
        - To balance the priority of understanding the current disease outbreak with the workload of issuing permits, it would be helpful to have a well-coordinated effort where Principal Investigators (PIs) get together to agree upon target areas for sampling, species, and methodologies to work under one permit or authorization issued by FKNMS
            - For example, under the DCYL rescue effort there was one permit issued and the lead PI then gives permission to others to work under the permit.
            - Kate Lunz (FWC) agreed to spearhead this permitting group.
    - Karen Bohnsack (FDEP FCO) encouraged everyone out conducting fieldwork to report observations to SEAFAN (mainland SEFL) and C-OCEAN (FKNMS) so that those two programs can provide consistent reporting across the various entities working in the region.
    - Joanna Walczak (FDEP FCO) noted that funding was received through the Florida Coastal Management Program both for Esther's Comprehensive Conditions Report, and an additional project through NSU for *Acropora cervicornis* (ACER) mapping. FDEP CRCP also has begun working with 3D technology, including taking and showing 3D videos, which is very important for communicating with decision makers. Any additional video or landscape-level imagery is helpful.

Wrap-Up and Adjourn

- The next disease coordination call will be Friday, August 19th from 1:00 – 3:00 PM.
    - Karen Bohnsack will send a calendar hold and requested agenda items from attendees.
- Action Items:
    - Karen Bohnsack will send a meeting summary, links to the Comprehensive Conditions Report (when available), SEAFAN and C-OCEAN programs to facilitate disease reporting, and a copy of the draft CORAL Act language from Wes Brooks.
    - Karen Bohnsack will connect the interested parties to continue conversations on tissue sample analysis and FKNMS permit coordination.
    - Disease analysis information form Mauricio's Lab and FWC should be shared when available.