Florida Reef Tract Coral Disease Outbreak

Coordination Meeting #12
September 6, 2018
1:00pm – 3:00 pm

Meeting Summary

Attendees:
Mike Feely, Jennifer Moore, Dana Wusinich-Mendez, Kurtis Gregg, Alison Moulding, Andy Bruckner, Gena Parsons, Lonny Anderson, Jennifer Simms, Billy Causey, Xaymara Serrano, Jerry Slaff, Keeley Belva, Dana Williams, Lew Gramer, Derek Manzello, Ilsa Kuffner, Natalie Nguyen, Steve Blackburn, Lena Weiss, Wade Lehmann, Amanda Bourke, Mel Parsons, Valerie Paul, Kristi Kerrigan, Aubree Zenone, Francisco Pagan, Joanna Walczak, Karen Bohnsack, Ana Zangroniz, Janice Dusquesnel, Karen Thurston-Chavez, Trudy Ferraro, Stephanie Schopmeyer, Lisa Gregg, Nick Alcaraz, Yasu Kiryu, Bill Sharpe, John Hunt, Erin McDevitt, Jan Landsberg, Kathy Fitzpatrick, Cammy Clark, Jena McNeal, Karen Neely, Brian Walker, Alysha Brunelle, Dick Dodge, Dave Gillium, Julie Meyer, Roy Yanong, Esther Peters, Ian Combs, Scott Graves, Erinn Muller, Abigail Clark, Allison Delaschmidt, Blake Ushijima, Maite Ghazaleh

Meeting Reports, General Updates – *Maurizio Martinelli (FDEP)*

- Leadership Meeting (June 15)
    - Secretary Valenstein of FDEP convened a meeting at the National Coral Reef Institute, housed at Nova Southeastern in Dania Beach, to gather the Leadership of the various agencies and organizations that have been most involved in disease response thus far. The purposes of the meeting were to ensure that all parties were working towards the same goals with regards to disease response and to have all the organizations begin to identify where additional resources and capacity might be brought to bear and leveraged effectively. A follow-up, invitation-only meeting is scheduled for tomorrow at Biscayne National Park.
- Intervention Action Plan Workshop (July 11-13)
    - FKNMS, NOAA CRCP, and FDEP co-hosted a three-day workshop in Key Largo with the main goal to develop an intervention action plan. The workshop had groups divide to discuss what sorts of intervention activities should be pursued based on a 'disease status' designation: endemic- areas where the disease has been established for a few years; epidemic - areas that have lost most of the highly susceptible species but still have infections on the later susceptible species; invasion - areas where only the highly susceptible species are showing signs of infection; and pre-invasion/vulnerable - areas that do not have corals showing signs of this disease. One key outcome of this workshop was to focus our near-term attention in the area where invasion is just beginning, in order to try to slow or stop the progression through the Lower Keys. However, acknowledging that a large deal of the reef tract will be in the epidemic or endemic stages, likely for a few years at least, topics of future research into coral diseases and restoration in the face of this disease were also discussed.
        - You can contact M Martinelli for a copy of the workshop notes. To note: the document is nearly 30 pages long
- Business Leaders & Tourism Development Councils (July 19)
    - FDEP and FKNMS co-hosted a meeting of business leaders and economic development councils of South Florida to discuss the role that their community might play in coral disease response, but also in moving the whole system towards conditions that are conducive to natural recovery. It became clear during this meeting that the business community of South Florida is quite concerned with the current condition of our reefs and eager to find ways to better engage. There will be a larger meeting of business leaders to happen sometime in the next few months to better engage these folks on coral reef conservation issues.
- Wreck Check
    - On the last call is was mentioned that there were some reports that this disease was absent or not as severe on some metal artificial reefs, notably wrecks. In response to this, a few folks performed surveys

of wrecks in the Upper Keys and in SE Florida to check on disease status. Unfortunately, these folks did find active disease on the susceptible species – so there does not seem to be a correlation between metal wrecks and lowered disease impacts.

- Disease Nomenclature
    - Over the past few years there have been numerous names applied to the disease. As such, a small team of disease experts convened to discuss disease names and decided that the term "Scleractinian tissue loss disease" (or, for a more public-friendly name, "Stony-coral tissue loss disease") was the most accurate and appropriate. Please use this tissue-loss terminology moving forward.
- Case Definition
    - A case definition is a document that outlines criteria for disease identification, including the affected species, location of disease through time, gross clinical signs of the disease, and any laboratory findings that can assist with a diagnosis. Having a case definition is important to positively identify and differentiate this disease from others through space and time, and will be shared with the wider interested community when available. This is a living document that is being developed by the Research & Epidemiology response team.

Disease Reports

- Dry Tortugas National Park – *Mike Feely (NPS)*
    - The annual coral reef monitoring trip to the Dry Tortugas was conducted from June 26-July 4. Monitoring entailed video analysis of benthic surveys at three fixed sites to record percent cover and disease. Transects were 10m; disease data was collected in a 20 m^2 area.
        - The three sites were (1) Bird Key – a spur and groove fore reef; (2) Loggerhead Forest – a deeper, terraced reef; (3) North Terrace – a deeper, terraced reef.
    - The surveys revealed elevated disease levels, particularly at North Terrace and Loggerhead Forest (which have 15-30% coral cover). As compared to background disease prevalence of ~1%, Bird Key had 2%, North Terrace had 8%, and Loggerhead Forest had 11% prevalence.
        - There were many small lesions, sometimes gathered in "hotspots"
    - The diseases found were white plague and yellow band disease. This was reminiscent of 2008 and 2016, both years of elevated disease.
    - E Peters: was disease only found on *Orbicella spp*?
        - M Feely: The reefs are dominated by *Orbicella*. About 90% of the lesions were found on OFRA, but a total of seven species were noted with disease.
- International Reports – *Maurizio Martinelli (FDEP) on behalf of Judy Lang (AGRRA)*
    - There have been reports of similar disease signs on corals known to be affected by the tissue loss disease that we have here in Florida. We cannot confirm whether or not this is the same disease without a pathogen identified or clear, distinguishing pathological or histological signs, but it is certainly worth keeping our eyes on. The reports come from Jamaica and Mexico
        - Jamaica: http://www.agrra.org/front-page-news/august-update-coral-disease-outbreak/
            - In summary, the disease was first noticed in several *Meandrina meandrites* and *Siderastrea siderea* at Mammee Bay on the central-north Jamaican coast in July 2017. Diseased SSID were also photographed at a site near Discovery Bay during the severe bleaching event of 2017. After many sick corals were sighted near Ocho Rios in early February 2018, their prevalence increased dramatically along the north coast. Prominent among the taxa with multiple lesions are: DCYL, SSID, PSTR, DLAB, CNAT, *Orbicella spp*. and MCAV.
        - Mexico: https://www.barcolab.org/copy-of-outbreak-of-caribbean-coral
            - In summary, Dr. Lorenzo Alvarez-Filip reported the first signs of corals dying quickly from disease at a site off Pto. Morelos in the northern Mexican Caribbean on July 3, 2018. By August 25, diseased corals had been found up to 20 km north off Limones, but

not off central western-southwestern Cozumel. Disease prevalence overall was greatest in MMEA, SSID, DSTO and PSTR.

Coral Disease Response Teams

- As follow up to the Intervention Action Plan Workshop in July (above), a new response structure was conceived. Ten teams focused on priority focus areas were established. Each team is comprised of volunteers who have an interest and/or expertise in that arena. Each team also has between one and three co-Leads who help shepherd their teams towards its stated objectives. Below are descriptions of the teams; four of the teams provided more detailed updates.
    - The *Management Team* is led by Dana Wusinich-Mendez of NOAA. This team aims to synthesize the information from the other teams, help determine funding and capacity allocations, draft leadership asks, and keep the forward momentum on big-picture issues such as re-establishing the enabling environmental conditions for reef recovery.
    - The *Reconnaissance & Intervention Team* is co-led by Karen Neely of NSU and Stephanie Schopmeyer of FWC. This team's goals are to identify the disease boundary for treatment sites and to test, coordinate, and prioritize treatment actions.
        - *K Neely (NSU) & S Schopmeyer (FWC)*: the team is comprised of representatives from FWC Restoration Ecology team, FKNMS, Mote, Nova, and FDEP.
        - Over the past few weeks, the team has been conducting recon surveys near the disease front, which was last found to be ~5 miles southwest of Looe Key, ~1.5 miles northeast of American Shoals. Since April/May, the western disease progression has slowed.
            - If anyone has disease observations from sites that they do not think were previously impacted by disease, please let the Recon & Intervention team know! In addition, citizen science reports of disease (and no disease!) can be submitted to SEAFAN (www.SEAFAN.net). The Survey123 reporting tool for trusted observers should be ready for prime time soon.
        - On the Intervention side, the major goals of the team are to test and recommend intervention protocols and to develop a plan for intervention strike teams. The Intervention Action Plan workshop (above) identified that a priority is to work at the plot or reef level right at the disease front – to get in when the disease first appears at a site and see if any treatment can alter the trajectory of the disease progression within those sites. The team will then consider if and/or how to scale up these projects.
        - Other goals include identification of 'strategic' corals in areas that are already affected by disease. Currently the discussion is on the criteria to identify these corals. In addition, the team is working to test different intervention strategies, including previously used and novel techniques.
    - The *Research + Epidemiology Team* is co-led by Andy Bruckner of NOAA and Karen Neely of NSU. The team is working to identify the overarching research needs related to the current outbreak, which includes collating and synthesizing all existing information. This is the team working on the Case Definition.
    - The *Coral Rescue Team* is co-led by Lisa Gregg of FWC and Jennifer Moore of NOAA. They are responsible for the development of a large-scale coral collection plan to preserve genetic material for restoration.
        - *J Moore (NOAA)*: the team is made up of members from NOAA, FWC, DEP, NSU, and NPS.
        - The main objective is to develop a reef-tract wide coral collection plan to ensure an appropriate number of individuals from affected species are held in land-based captivity for future reintroduction in the wild to ensure that genetic diversity is preserved if we continue to lose significant numbers of these corals. This plan will cover many areas including collection, transport, long-term housing (*in* and *ex situ*), genetic management, propagation, reintroduction, restoration, and data management.
        - A pilot collection is about to commence to start the process and to help identify any unforeseen capacity needs. The collections will occur at three (maybe four) sites in the Lower Keys that have

not been impacted by disease. A total of 96 colonies will be collected: eight colonies per species will be collected for 12 target species: CNAT, DLAB, DSTO, EFAS, MAUR, MANG, MALI, MFER, MLAM, PCLI, PSTR. Species were identified based on disease susceptibility and rarity. Colonies will be collected in two size classes, <10cm and 10-30cm. The corals will be housed at Keys Marine Lab.

- DCYL is also a targeted species, but will be managed under the existing rescue project headed by K Neely.
- Six of the above species will likely not have the target met due to their rarity.

- The larger collection plan aims to collect a total of 2,400 colonies: 200 colonies per species in two size classes (<10cm & 10-30cm) for the 12 priority species named above. As funding, capacity, and time allow, the team wants to expand this to include the other species that are affected by the disease.
- The team is in discussions with the Association of Zoos and Aquariums (AZA). In initial discussions, the AZA was supportive of this plan and is helping to identify housing for the corals. AZA has identified three tiers of facilities: facilities that are ready to go with appropriate space and personnel, facilities that have space and personnel but need time for preparation, and facilities that do not have space and/or personnel but have funds or other resources to provide.
    - AZA facility requirements are being reviewed.
- Moving forward, the team will frame restoration/reintroduction criteria and set a time-frame. In addition, the team is planning to develop funding options for the larger collection and long-term storage.
- D Dodge: NSU has some space to house corals in Dania
- G Parsons: would love to get some images and/or videos of the process to share on the web portal (below)

- The *Restoration Trials Team* is co-led by Kristi Kerrigan of FDEP and Erinn Muller of Mote Marine Lab. This team is responsible for determining where and when outplanting trials of various corals should occur in consideration of the four condition scenarios.
    - *E Muller (Mote)*: the team formed about a month ago and has 15 members. The goal is to have representation from all the major restoration groups, to ensure that they all have a voice. Anyone who has an interest in this arena should feel free to reach out to Erinn! So far, the team includes representatives from Mote, DEP, NOAA, FWC, USGS, NSU, FLAQ, CRF, TNC & CRC.
    - The initial goal is to assess all the activities along the Florida Reef Tract related to restoration – identify what plans are in the pipeline, what activities are taking place over the next few months to years. The biggest concern at the moment is whether restoration might add more fuel to the fire (i.e., increase the pathogen load). Additionally, there is the question of whether non-susceptible species (e.g., acroporids) might serve as vectors or reservoirs, or even become susceptible.
    - The team aims to collect information on what species each organization has, where the nurseries are located, where the outplant locations are, and what biomass is being outplanted into the four regions.
    - The hope is that we can learn from the restoration activities that are underway or that are about to commence. There are discussions on how to alter or tweak existing outplanting plans in order to increase our knowledge about the disease and to inform subsequent restoration practices.
        - To note, adding a research component to a restoration plan can be time consuming and expensive, especially when considering laboratory components, and not all the organizations have capacity to do this. The team is trying to come up with very focused research questions (both in the field and in the lab) that can be used to apply for funding.

        - Using the work planned by Mote and CRF, the team has been discussing how they might answer questions about susceptibility to various diseases and whether or not acroporids can impact the disease dynamics in affected zones.
    - The *Data Management Team* is co-led by Nick Alcaraz and Rene Baumstark both of FWC. The Data Management Team is responsible for understanding each team's data needs and data production, and ensuring those datasets are organized, transparent, synthesized and available to all partners in a timely manner. They are the heart of our knowledge management.
    - The *Regulatory & Compliance Team* is co-led and comprised of Joanne Delaney of NOAA FKNMS, Lisa Gregg of FWC, and Jocelyn Karazsia of NOAA NMFS. This very streamlined team is responsible for ensuring regulatory compliance of all the other teams and to identify the needs of regulatory bodies in activities moving forward.
    - The *Communications Team* is co-led by Gena Parsons of NOAA FKNMS and Aubree Zenone of FDEP Coral Program. The Comms team is responsible for advancing all forms of communications surrounding the coral disease outbreak and ensuring consistent messaging across the various response partners.
        - *G Parsons (NOAA)*: there is a core team that has been meeting for a few months with representatives from FDEP, NOAA, and FWC to scope out what needs to be done. Recently, the team brought in more members from many partners (e.g., Mote, FLAQ, NSU, TNC, USGS, the counties, and more) to help develop and distribute information and communication pieces, and to ensure that we are sharing information in a unified and coordinated way.
        - The web portal launched a few weeks ago (https://floridakeys.noaa.gov/coral-disease/) and is the primary tool for telling the public about the disease, the response, and citizen engagement opportunities. We rely on all the partners to provide this information (images, links, news items, etc.).
        - The team has been working on a communications plan and workplan to help guide the team. They are approaching this as crisis communication, ensuring that key messages include the severity of the event but that a great deal is being done in response.
    - The *Citizen Engagement Team* is led by Andy Bruckner of NOAA FKNMS and aims to create and promote opportunities for members of the south Florida community to make meaningful contributions to coral disease related activities.
    - The *International Coordination Team* is co-led by Jennifer Koss of NOAA Coral Program, Judy Lang of the Atlantic and Gulf Rapid Reef Assessment (AGRRA), and Dana Wusinich-Mendez of NOAA Coral Program. This team is responsible for communication to and from other coral reef jurisdictions and states, with an emphasis both on ensuring that managers and scientists in those regions can benefit from what has been learned in Florida, but also that Florida managers and scientists can be assisted by our colleagues elsewhere.

Research and Intervention Updates

- *In situ* SE FL intervention experimentation (chlorine) – *Brian Walker (NSU)*
    - https://floridadep.gov/sites/default/files/Large-Coral-Disease-Intervention-Summary-Report.pdf
    - To start, Walker's team had conducted a large coral assessment in the Southeast region. As the disease event came through this region in 2015, there was a loss of coral density and species from the region, but it was discovered then that there were a fair number of large corals (>2m in diameter). Mapping efforts identified 115 large corals in 2015. This year, the team was funded to reassess these corals and find potential new ones – and found 113 new corals (now a total of 295).
        - 142 of these are dead (don't know for how long). A remaining population of 153 have some live tissue of them. But of these, 41 are >95% dead.
        - There was a significant downward shift in the amount of live tissue on these colonies between 2015 and 2018. E.g. in 2015, 25 colonies had 75-100% mortality, in 2018, 50 were in this range. In addition, 9 colonies went to complete mortality.
        - The impacts were likely from the coral disease

- A priority was identified to try and treat these large corals, as they are some of the few reef building species remaining and provide a disproportionate ecosystem function in an otherwise rather flat hardbottom area. They provide oases for fish and other critters to gather and live.
- Initially 23 corals were identified with disease and treated: 16 OFAV, 6 MCAV, 1 SSID. As efforts continued, a total of 37 colonies with active disease were identified – 27 were treated. On the remaining 10, the disease was too far advanced to be worth treating.
- The treatments were relatively successful – as of June, the team had treated 86 active margins and created 119 firebreaks:
    - Active margins were successful 58% of the time.
    - Firebreaks were successful 97% of the time.
- Undoubtedly, the treatments saved large portions of tissue on these colonies, at least in the short term. It would be worth testing whether the treatment would be successful without the chlorine or using different epoxies.
- The treatments were not able to stop the coral from being re-infected in other locations. In a few cases, the team had to retreat a coral that developed new disease lesions. In two cases, the team ceased treatment because they thought the coral was a goner – however, in one of these, the disease stopped and the coral is recovering.
- In May, the team prioritized corals according to colony size and amount of live tissue. They then picked out the top 50 corals with >4m^2 of tissue, and that were less than 10% dead for monthly monitoring and treatment. This project is slated to last one year.

- *In situ* Keys intervention experimentation (antibiotics & chlorine) – *Karen Neely (NSU)*
    - Around the time of the last Coordination Call, the lab trials were just wrapping up. These trials included various physical barriers, antiseptics, and antibiotics. By far, the most effective treatment was antibiotics. Thus, the first field trials (all conducted on DCYL) utilized antibiotics as they were intended to save these heavily infected colonies, not compare treatments.
        - Amoxicillin treatments were applied to 15 colonies on a total of 62 lesions. Of these, 47 treatments have been in place long enough to assess some sort of effectiveness. In 44 cases (94%) the disease was halted at or before the treatment line. In cases where new lesions did not appear, this has proven to be a rather effective method. In some of these cases, the corals have regrown over the treatment area.
            - In a lot of these colonies, there is a 'halo' effect where the only living tissue remaining on the colony is ~10cm strip around the treatment area. However, after some time, the disease has crept back into a few of these areas, suggesting that any antibiotic "immunity" might last just a few months.
    - Next, in situ trials of the different treatments on different species were conducted. The aim was to see if there were species-specific responses and if different delivery media could be used (as Z-Spar can be difficult to work with).
        - Tested Z-Spar + chlorine, Aves Apoxie + chlorine, modelling clay + chlorine, CoreRx Base 2b + amoxicillin, and shea butter + amoxicillin.
        - The treatments were also divided between lesions (i.e., longer disease front, treated on the active disease margin plus a firebreak) and patches (i.e., small discrete lesion where treatment could just be directly applied).
        - Initial failure rates for chlorine breaking past all barriers (margin & firebreak) were 25-43%. In 100% of cases, disease passed the margin treatment. The amoxicillin treatments thus far have a 0% failure rate.
            - Difference in results from B Walker's work might be due to something related to the environment or pathogen load in the water, or even a species response (there has been more success with OFAV than any other species).
                - OFAV has seen no failures, but DLAB has not seen any successes with chlorine.
    - These all lead to higher level questions. What level of effectiveness are we willing to work with? If only 40% of corals we treat have any chance of surviving, is treatment worth the time/cost? What is an

acceptable time-frame for treatment success to warrant application effort (i.e., if the treatment only lasts for a few months)? How do we weigh the risks of large-scale application of these treatments? We need to figure out the cost-benefit analysis for each of these questions.
    - V Kosmynin: were the methods the exact same as B Walker's?
        - K Neely: Yes. Which also are the methods that were used by Greta Aeby in the Pacific. As far as we can tell, the methods are as identical as can be.
- Sentinel Site, High-Frequency Monitoring – *Bill Sharp (FWC)*
    - The objectives of this project were twofold: to collect tissue samples for histopathology, and to set up sentinel sites ahead of the disease front to perform high frequency monitoring to study the spatial dynamics of this disease at different scales (colony to reef). This will focus on the latter objective.
    - In December 2017, the disease front was approximately at the eastern boundary of Marathon in the Middle Keys. The team established marked colony sites in which approximately 60 colonies were tagged for monitoring every two weeks. In addition, they established four sentinel sites, two inshore and two offshore, that ranged from 25-100m^2 (based on colony density). At these sites, the team mapped all colonies >10cm (except for a few species like MMEA, where all colonies were mapped). Before the disease arrived, the team took area measurements of all the colonies (l*w*h) and noted the area of live vs. dead tissue. These sites were monitored every two weeks. When the disease arrived, the team recorded percent of the colony diseased and mortality through time.
        - As there were just under 1,400 individual colonies marked, this generated a LOT of data from the sentinel sites.
    - Data from the marked colony sites supports field observations on the species-specific susceptibility. When they began data collection in January 2018, CNAT were just starting to show disease signs, but MMEA were also rapidly impacted and perished in six months. PSTR also showed signs of high susceptibility, and MCAV were impacted somewhat later.
    - In line with what had been mentioned earlier about slower progression rates, these data showed that colony-level disease progression slowed during the past few months. The team estimated the area of disease-affected tissue for each colony (assuming hemispherical growth) and percent diseased through time by species.
        - For all species, the pattern was similar: by mid-July, the tissue loss slowed considerably across all species and thus far has remained about level. This is true for both early and late susceptible species.
    - The team also looked into small-scale spatial epidemiology. They first confirmed that coral colonies are randomly distributed throughout the plots. They calculated the Euclidian distance for every coral pair (between same species, different species, disease statuses, etc.). But, at this scale, there are not spatial patterns yet identified.
    - This is consistent with larger scale observations: all four sentinel sites (which were a few miles apart) saw the disease appear nearly simultaneously. Thus, it might not be surprising that no signal was readily discernable at this smaller spatial scale.
    - The sentinel sites will still be monitored, but will be cut back to once per month as the focus switches towards intervention.
    - B Walker: A suggestion: we know that the disease affects species differently, it would be interesting to see if the Ripley's K holds when looking at individual species and disease clustering.
        - B Sharpe: Absolutely! That's an additional question that these data can answer.
- Pathogen Isolation & Virulence – *Blake Ushijima (University of Oregon)*
    - Quick review of previous work by Greta Aeby and Valerie Paul that demonstrates that the disease is transmissible among and between species (tested with MCAV, OFAV, CNAT, MMEA), and therapeutic diagnosis using antibiotics (on MMEA, CNAT) suggests that bacterial agents may be involved with lesion progression. Noting three important caveats (the bacterial pathogen(s) may not be culturable, multiple bacteria may be responsible, and bacterial agents may be progressing the lesions while the underlying

infection may be viral), this project aimed to isolate putative bacterial pathogens from diseased coral samples.

- To start, bacterial isolates were gathered from diseased corals that had been experimentally infected (to ensure that bacteria being isolated are from a transmissible lesion). These isolates were then tested via controlled infection experiments.
  - Initial suspected pathogens are from *Vibrio*, *Altermonas*, and *Leisingera* genera. These are all susceptible to amoxicillin and kanamycin, which is consistent with the therapeutic diagnosis.
  - Thus far, 300 bacterial isolates have been screened; more tests should be run for more conclusive data.
- On the caveats above:
  - While 300 isolates have been screened, there is still the chance that the primary bacterial pathogen might not be easily culturable (i.e., the bacteria spp. identified might be secondary pathogens).
  - Some isolates may cause disease signs when inoculated together, suggesting that multiple bacteria may be required for infection to occur.
  - Co-infection (e.g., with a virus) is still a strong possibility.
- Bonus! Brief update on probiotics
  - Bacterial isolates with antibacterial activity (i.e., show a zone of inhibition when placed on a 'lawn' of bacteria) are being identified from MMEA, OFAV, MCAV, DSTO, and CNAT.
    - Some have been tested opportunistically on CNAT fragments, and in 50% of cases, disease progression slowed. However, these are very preliminary data and the treatment requires optimization (dose, regiment, isolate concentration, temperature, etc.).
    - In addition, the original host was MCAV and previous work has shown that some probiotics are very specific.
  - There are a few benefits of probiotics, including that they can provide lasting protection for corals they can colonize, this treatment can be grown instead of purchased, and there is the possibility that some can produce multiple inhibitory compounds.

Wrap-up and Adjourn

- There will be a new position announced soon for an overall Coral Disease Outbreak Coordinator – a position intended to provide a single focal point for organizing the work of all the various response teams. The Coordinator will work closely with the leadership of the main management response agencies.
  - The position is funded for one year, with the possibility of extension. The position is funded by NOAA and housed by Florida Sea Grant.
- Next Coordination Call (#13): **Thursday, December 6 @ 1-3pm EST**
- Please submit disease reports to SEAFAN (www.seafan.net) for the entire reef tract, including the Keys!