# Southeast Florida Coral Reef Initiative (SEFCRI)

# Technical Advisory Committee (TAC)

# Report of Proceedings

# April 19-20, 2017

**Nova Southeastern University Oceanographic Center**

**8000 North Ocean Drive**

**Dania Beach, Florida**

**MEETING ATTENDANCE**

| **Technical Advisory Committee (TAC)** | | **Day 1** | **Day 2** |
|---|---|---|---|
| Ken Banks | Broward County | X | X |
| Don Berhinger | Fisheries and Aquatic Sciences UF/IFAS | X | X |
| James Byrne | The Nature Conservancy | X | X |
| Nancy Craig | Broward County | X | |
| Dick Dodge | Nova Southeastern University - Oceanographic Center/ NCRI | X | X |
| Phil Dustan | COFC | | |
| John Fauth | UCF | X | X |
| Piero Gardinali | FIU | X | X |
| Dave Gilliam | NSU-OC/NCRI | X | X |
| Lew Gramer | UM RSMAS/ Keys Marine Lab | X | X |
| Kurtis Gregg | NOAA | X | X |
| Dale Griffin | USGS | X | X |
| Judy Lang | AGRRA | | |
| Diego Lirman | UM RSMAS | | X |
| Jose Lopez | NSU-OC | X | |
| Kate Lunz | FWC | | |
| Arthur Mariano | UM RSMAS | X | |
| Margaret Miller | NOAA/ NMFS | X | X |
| Valerie Paul | Smithsonian Marine Station | X | X |
| Esther Peters | George Mason University | X | X |
| George Sedberry | NOAA | X | X |
| Manoj Shivlani | Center for Independent Experts (CIE) | | |
| Jack Stamates | NOAA | X | X |
| Brian Walker | NSU-OC | X | X |
| Ken Weaver | FDEP | X | |

| | | | |
|---|---|---|---|
| Dana Wusinich-Mendez | NOAA | X | X |

| **Florida Department of Environmental Protection (FDEP) Coral Reef Conservation Program (CRCP) Staff** | | **Day 1** | **Day 2** |
|---|---|---|---|
| David Cox | FDEP CRCP | X | X |
| Kristi Kerrigan | FDEP CRCP | X | X |
| Daron Willison | NOAA | X | X |
| Kelly Montenero | NOAA | X | |
| Francisco Pagan | FDEP CRCP | X | X |
| Meghan Balling | FDEP CRCP | X | X |
| Joanna Walczak | FDEP CRCP | X | |
| Aubree Zenone | FDEP CRCP | X | X |

| **Additional Presenters and Observers** | | **Day 1** | **Day 2** |
|---|---|---|---|
| Daniel Kipnis | SEFCRI | X | |
| Jay Grove | NOAA | X | X |
| Sara Thanner | Miami-Dade DERM | X | X |
| Jocelyn Karazsia | NMFS | X | |
| Tauna Rankin | NOAA/NMFS | X | X |
| Jan Landsberg | FWC-FWRI | | X |
| Alicia Vollmer | NSU | X | X |
| Robert van Woesik | Florida Institute of Technology | | X |
| Henry Briceño | FIU | | X |
| Maribeth Gidly | UM/CIMAS/AOML | | X |

Meeting Summary: Wednesday, April 19th – Thursday, April 20th 2017

***Meeting Guidelines***

David Cox introduced himself as the Land-Based Sources of Pollution Coordinator for the FDEP Coral Reef Conservation Program. TAC and SEFCRI members introduced themselves. He reviewed meeting participation guidelines for TAC members and observers, which included his role as the facilitator, guidelines for discussion, consensus rules, comment card procedures, and the use of meeting evaluation forms. Then reviewed the day's agenda.

Three large goals: help SEFCRI move forward with management strategies, help DEP with turbidity water quality standard review and revision, and plan second phase of the TAC outfall project.

***Session #1: Southeast Florida Coral Reef Initiative (SEFCRI) Team Meeting Review***

1. (Brian Walker) *Many of you were there at the SEFCRI meeting, but for those of you who weren't I just wanted to give you a brief update as to what was discussed. The beginning of the meeting was started by Francisco giving updates on the CRCP projects, in-progress projects, and upcoming projects in the CRCP cooperative agreement. Then, Kristi Kerrigan gave an update on the coral disease outbreak in the*

*region and plans to address that, discussions of the recent events, including the proposed method for removing the old tire reefs, a landfill in Pompano taking sludge and dumping it, sunscreen banning, projects underway to estimate the economic value of coral reef resources in the region, and sediment and turbidity work…we discussed a range of different topics. The group selected 10 ideas that will be considered as potential new LAS projects at the next meeting. The selections were made from a list of ideas that had condensed from the remaining original LAS projects that selected OFR RMAs and the original CRCP objectives. And I believe we've seen those lists as well when we've voted on ideas in past meetings. The discussions centered around new topics and ideas like more information on reef fish populations and data gaps that exist there. Then the team did a survey gizmo where they selected the ideas they'd like to explore as LAS. They basically all voted online and tallied the results. Also, during the meeting, they voted on new vice-chairs for the SEFCRI (every two years, there are two two-year terms that they can take, so they can re-run after two years). They listened to members introduce themselves and voted for the new vice-chairs. These are all new vice chairs. So a whole new list of vice-chairs: the diving group is hosted by Shaina Phelan, the local agency by Jamie Monty, state agency Mason Smith, federal is Jime Bohnsack, private business is Ron Coddington, citizen at large is Deedee Halpern, fishing is Dan Kipness, academic is Henry Briceño, and NGO is (?), so a whole new host of vice chairs.*

2. (Francisco Pagan) *Once again welcome all, also we are broadcasting as a webinar and we already have people logging in, so welcome. I want to add a couple of remarks about Local Action Strategies. Way back then, some of you were involved in that process, a series of 140 local action strategies. That was over 12 years ago. Some are ongoing, some we are working on right now. It is a moment to regroup and come up with new Local Action Strategies (LAS). The group came up with 10 new ideas. But an idea is not a Local Action Strategy. It needs more work. It needs clear objectives. It needs projects. It needs research gaps identified. And that's we're bringing you today. Later today, but this seems like the perfect moment to have a brief conversation about it. All those Local Action Strategies ideas with potential that you will see today are for you to expand on, a couple of those ideas could be implemented or could be worked together. Anything you want to send back to SEFCRI will be considered an idea, or a particular set of concepts to be taken back. We will give you an opportunity to write down, kind of make a case, and we will bring it back to SEFCRI at their meeting in September this year, right before your next meeting which is in October. So we're keeping that cycle of communication with two meetings a year for each group, and we will keep doing it for the upcoming years. So far, and I know Local Action Strategies and charter reviews, which if you're not involved you don't have to worry about that part (some of you do) will take a couple of rounds. And given the importance of the applications, potential management applications, it's very, very important that we get it right and that's why we have these bouncing (inaudible). So for that, I want to thank you for everything you're going to do today and now I'll get you back to David so we can get the ball rolling.*

3. (David Cox) *With that in mind you have the background of the LAS and where SEFCRI fits in that process. On the screen, and you have this handout with you, is the list that came out of the meeting. The items, you've seen before, you have commented on these before, probably more than once. It should be the top sheet right under the agenda. Your comments on some of these are included in this packet. You have commented on the Our Florida Reef RMAs (Recommended Management Actions) that were prioritized by the SEFCRI team in the past. You have commented on prioritizing the legacy LAS that have been or have not been implemented yet and that feedback went back to the SEFCRI team. There are a few ideas also that you as a group have pushed that you thought you would like to see SEFCRI take up. So this is the list of ideas for potential Local Action Strategies for next generation LAS down the road that the SEFCRI team voted on in March. So the black font are the ones that you can vote on today and you can choose the ones that you would like to not only send back to SEFCRI as a priority but also to work on today, to work on one or two projects, to help them choose their next generation of LAS. Let me repeat that. You will be choosing today from among this list a project that you would like to, and for which you can, develop a discreet and specific project to turn this proposal, this idea, into a Local Action Strategy, so this is where the rubber hits the road. Now the ideas in blue font are not the ones that generated the most interest. However, as Francisco said, if there is an idea amongst those that you believe maybe should be elevated or that you would like the SEFCRI team to consider, make a strong case for it, we'll add it to the chart and (inaudible) and if you agree, then we will take that as a project to work on today and send back to SEFCRI. Is there a question?*

4. (??) *No, I think you just clarified it. So the ones in the black font are those ten projects that Brian mentioned, that SEFCRI selected?*

   →(David Cox) *Well there was one or two that was purely regulatory, and or lobbying say, for more money, from FWC. Which we didn't think really lent themselves toward a project. There was minor editing but I can show you those also. And take into consideration that we are looking into a project that we would like to implement, typically these LASs are implemented in three years. And it might be something that can be (inaudible) as stated in the SEFCRI charter. So if you're looking at your packet here, here's your list. We can't guarantee that if you pick something from the ideas that really received much less interest that SEFCRI will take it up. So it kind of behooves us to work with what they want to work with as well, put together. Underneath the next page in line is your comments from the last TAC meeting, when you saw this list of prioritized LAS and Our Florida Reefs RMAs. So there are some comments. The comments vary from "no comment" to "just do it", to people coming up with specific ideas for a project regarding turbidity. So that's there for your reference also. There's going to be some reference materials placed at your groups also. There's some background on the RMAs, so you can look and see if there's already some projects that have been proposed in there, you can see if there's a great idea. There will be the SEFCRI charter there to look at some goals and objectives. I have also pulled those out of the charter, a condensed version to make it easier. The next document in line is what we're going to fill out. This is the template that's been used in the past, for*

*project development of Local Action Strategies. It has the elements that you'll be working on to fill out, so we'll start off with the proposed LAS idea or concept. From that is the SEFCRI goals and objectives, the next sheet has those and pretty much the ones that are relevant to the projects you are looking at today, and that's broken up by focus area. And you can have multiple goals and objectives as well. And I threw in a couple of examples of LAS proposals that you may recognize from the past, also as a point of reference. There's one in there for coral toxicity, there's one in there for turbidity, someone wanted runoff. And there's also a sheet in there that lists some ongoing coral toxicity work done by NOAA and Cheryl Woodley, to give you an idea of what they're doing and also to help avoid copying work or suggest work that's already being done. So that in a nutshell is the pile of papers that you have in front of you. Any questions on that?*

5. (Kurtis Gregg) *Just a clarification from the SEFCRI team meeting. Under the Fishing Diving and Other Uses worksheet, identify (inaudible) management, that idea was identified as one of the things that has to happen (inaudible) implement a framework for special areas. So as the TAC is looking at it, don't just consider that as a stand-alone, think about how that would feed in to one that the SEFCRI team did identify as one of the higher priorities.*

   → (David Cox) *Yeah that's a great point. There's a lot of mixing and development that can go on here. Some ideas are very similar, and some could be building up to a broader idea or concept, a project that may then (inaudible) as Kurtis mentioned. At the end of each one of these is also its source. There's an S or N with a number, that's Our Florida Reefs Recommended Management Action, Team is something from the SEFCRI team meeting, a new idea, and then there's LAS for Legacy Local Action Strategies, and, as well, there's a mention of a proposed CRCP cooperative agreement grant project that will be coming up in the next fiscal period. So those are the sources of these, and I know you've all seen them before. And just to reiterate, they've kind of been bantered back and forth, they've been prioritized and commented on a couple times and finally voted on and this is the latest iteration of that selection process.*

6. (Brian Walker) *I'd just like to point out that this may seem very familiar to us because we did a similar exercise last year, and then we brought that information to the SEFCRI team meeting for their choosing process. One of the concerns is that the best intentions were to fully inform all the SEFCRI team members of each of these ideas and to make sure they understood the magnitude and what each idea means and its intention, but it may have fallen short of that. So the individual SEFCRI team members have a wide range of knowledge: some of them are very scientific and some don't know any science. The voting may have reflected that. So if you see their top 10 choices, and you feel like, wait a minute this doesn't makes sense to me, some of these items in the blue are much more important, have much more impact That's the kind of thing we want to let the SEFCRI team know, and we can call those out specifically and say, hey you guys missed the mark here because of this. And we can give them an explanation and then allow them to make an educated decision based on the facts. That's one of the big points here going through this process. I just wanted to point that out.*

→ (David Cox) *Ok that's great, thank you for that Bryan, I appreciate it. At this point I think it would behoove us to look at the list.*

7. (Margaret Miller) *Are these titles all we are working from? Things like "coordinate adaptive monitoring strategies"? Is there any other explanation of what the team has meant by that, as an example?*

   → (David Cox) *That was one of the new ones that came out. Do we have additional details?*

   → (Daron Williams) *Some of them are from RMAs, so they have content behind them, some of them are the LAS which have content behind them, but the one that you particularly chose, they had the opportunity at the last SEFCRI team meeting to identify potential project ideas that they didn't think were covered under any of those and that's where that came from, so that's, no.*

   → (Margaret Miller) *So we have a title and that's it.*

   → (David Cox) *Is there any relationship between that and the CRCP cooperative agreement proposal?*

   → (Daron Williams) *I don't think so.*

   → (Francisco Pagan) *There is a couple of ideas here that seem to be very similar, and actually the TAC, as the advisory body, you can actually join them together with the background case, you know this idea, this idea, this idea. Because these are ideas of interest right now, that doesn't mean that one idea leads to one project. Some of these are greater in scope than others, and might need more than one project to move forward, and that's how the TAC as an advisory body, this is what the SEFCRI asks of you to decide. Are there research gaps? Are there potential projects that need to be implemented for this idea to happen? And once again, because of the high diversity of ideas, it might take more than one round, and it might take more than one project depending on the concept that you're going to be working on.*

   → (Margaret Miller) *We have nothing to go on in terms of, we're sorting reading their mind in terms of what they were intending.*

   → (Francisco Pagan) *You can pick Brian who was at the meeting.*

   → (Dana Wusinich-Mendez) *That's a prime example of what we're trying to do better this time around because the first LAS was essentially just that, and the people who put them down weren't at the table anymore, and we were kind of, "what did they mean?", so that's why we're trying to delve in deeper today.*

   → (Margaret Miller) *So we're interpreting what those things mean and matching up things that maybe fall into the same category, like Francisco was saying in terms of perhaps coordinating adaptive monitoring strategies but the team needs identification or whatever, (inaudible).*

→ (David Cox) *I think the definition of it is (inaudible) and I think there are a couple of ideas on the list that could be linked to that very ambiguous proposal.*

8. (Kurtis Gregg) *I have a question and maybe Megan or (inaudible) could help out since they were at the meeting. What was the adaptive management strategies related to?*

   → (Megan Balling) *I thought that came from, Dan Clark recommended that and it sort of stemmed from the disease outbreak and how we're responding to that.*

   → (David Gilliam) *I think that was the broader topic, but because disease was something we were already talking about, because the actual disease, like what Brian was saying these are people of various backgrounds, disease became something that's "oh yeah, that's really, really important," so the specific disease kind of floated to the top, but it could be argued that the bigger effort is this coordinated adaptive monitoring.*

9. (Jack Stamates) *If I may, I want to get something off my chest here. Port Everglades dredging, and this could fall under adaptive management, is going to happen, and this is something we have the opportunity to get ahead on. (inaudible). Keep aware, and engaged (inaudible). If that is what happens, and I think we all know it's going to happen. (inaudible) Be ahead of the curve.*

   → (Richard Dodge) *Left the station on that. Emergency working group with state agencies and federal agencies, NOAA, to (inaudible).*

   → (Jack Stamates) *I'm not privy to that information.*

   → (David Gilliam) *Doesn't seem to be (inaudible).*

   → (Margaret Miller) *Well maybe that's something that we could request. That is a good point, and maybe that is something that we could request as the TAC, sort of a summary, since this is a particularly relevant local issue, that I think there is a lot of confusion, or lack of transparency maybe, about how those decisions are being made and how that monitoring planning moving forward.*

   → (Richard Dodge) *(inaudible) just published some protocol about how they're going to be doing their study, for getting baseline information. One of which (inaudible) 150 (inaudible).*

   → (Margaret Miller) *I think those protocols are still under (inaudible).*

   → (Richard Dodge) *They've been finalized.*

   → (Margaret Miller) *Anyway, so we're getting off topic. But, perhaps the SEFCRI could take note that it is something that folks have a lot of interest in, and if there would be a possibility for the next meeting to have some direct dialogue with that process, it might be useful. I don't know if that's possible.*

→ (Ken Banks) *That's another agency, restricted to agency DEP, EPA. There's no reason someone here, if we give them the name of a person, would not be part of that. I'm sure they would (inaudible). Representing this group.*

→ (Kurtis Gregg) *I'm going to go ahead and throw Jocelyn under the bus. Jocelyn is on the inter-agency working group, she has been very active in the drawing of the protocols, as have I, and we work closely with the DEP Beaches program, etc, that is the group leading, providing the foundation and framework, for the inter-agency working group. Jack is right, though, there is not a good feedback mechanism to this group on what's going on. Jocelyn's going to be here later today, we can talk to her about getting something set up, when we get those protocols finalized, that it comes to this group.*

10. (Francisco Pagan*) I think that's an excellent opening, later we can have another round of this kind of conversation. I want to be very, very direct here. This is the objective for the next few days. We are going to fill these with as many potential projects following the ideas that we've been talking about this morning. We will take these to SEFCRI and they will look at them and they will go through their own process. I once again want to mention that just because you have a big concept here doesn't mean that you have to translate such big concepts on one piece of paper. You can see that that concept merits two, three, four separate projects, like four pieces of paper. You're the TAC. You're the advisory and we will take that. We will take all potential projects to SEFCRI. So I don't want you to feel constrained but at the same time I want you to show some restraint as Dave was saying, we don't want to get too much into the weeds.*

    → (David Cox) *Take a look at the list, familiarize yourself with it, and think about the top 10.*

    → (Margaret Miller) *There are two that are half and half.*

11. (David Cox) *The ones that are in blue font. Think about those and think about the whole list. If someone would like to propose turning blue to black, let's talk about that, and, if we can get a consensus about that, we can put it up on the flip chart for a vote. Pretty much what we want to do today is think about quality rather than quantity. Really come up with a pitch as to why SEFCRI should do this. And there will be chances down the road to also revisit this, I'm sure, when SEFCRI processes this, we'll see how that shakes out. We will be working in small groups and some of the best exchanges[sic - ideas] come from these exchanges. So what I'm proposing is later today you'll get the chance to hear what other people have done, and comment on that. And also I will send out the information gathered here today to give people a chance to comment additionally before these project ideas go \to the SEFCRI team. Unfortunately we don't have two full days to work on four or five projects, but we will take all the steps that we can to make sure we get your input on all the ideas. And luckily we have a thing called the internet.*

12. (Brian Walker) *I have a question. I see under LBSP number 3: encourage closing of outfalls by 2025. What kind of project is that? That seems a little bit silly to me to elevate it to this level of a project.*

→ (Aubree Zenone) *So SEFCRI itself is not an advocacy body, so that one in particular is something we're going to have to look very carefully at. We're not really clear as to how we'll move forward with that one yet. Francisco, did you have anything to add?*

→ (Dana Wusinich- Mendez) *Is it more of an outreach and communication type of project? Because if it is, wanting to do more advocacy type work, to inform decision making.*

→ (Aubree Zenone) *Again this wouldn't be an advocacy thing, this would be more of an informational thing. These are here. They're still here, here's what they do.*

→ (David Cox) *Is that allowed? Is DEP allowed to do that?*

→ (Aubree Zenone) *If we present it as more of an informational approach, as opposed to a "this is here, here's what you do about it," then it's okay. So this is more of an awareness and appreciation kind of approach, much like we do just with the reefs themselves, except with the outfalls.*

13. (David Cox) *Just as a quick reminder, when you use your dots to vote on your top ideas, we're going to tackle the top four. We're not sitting here trying to accomplish all ten today.*

→ (Margaret Miller) *Can you go through the steps that you expect us to take this morning because I'm not sure what we're doing exactly. We're going to vote first and then work on initial proposals, is that what's happening?*

→ (Ken Banks) *It's a comment and the DEP cannot lobby for this, but we have another body now and we've heard about it over and over again. There's a forum, we have legislation right now in Tallahassee. So, if there is something people feel compelled to lobby for, we can work it through that group. There's an interest group. They might be willing to do that in Tallahassee.*

14. (David Cox) *We're going to end up working on probably at least five proposals by the end of today, and I think we're going to keep it. Is three enough dots?*

→ (Margaret Miller) *We have some descriptions for some of them already, is that not correct?*

→ (David Cox) *If you'd like to see some stuff right now, we can do that, but also the idea was once we have the top four or five chosen, I'll give you all the information and we can break into groups to work on them.*

→ (Margaret Miller) *Well I guess that's sort of the question , what are we prioritizing? Are we prioritizing what topics we think are most important, or which ones need development? Because if they're ones that are already developed, then we don't need to highlight them today.*

→ (David Cox) *Exactly, so that should go into your decision. Something that you think is already being taken care of or is beyond the purview of SEFCRI, then you won't be voting on that.*

→ (Dana Wusinich-Mendez) *I think she's saying that we don't have that understanding for all of them.*

→ (Ken Banks) *If we'd like it to move on, then we vote for it.*

→ (Margaret Miller) *Prioritization is a different thing than what we need to work on today, is my point.*

→ (Dana Wusinich-Mendez) *I think we are prioritizing the things the TAC wants to work on today, because we think they could be part of the next generation of LAS.*

→ (Francisco Pagan) *To keep the concept, there are still ideas and you'll be developing projects for those ideas, I don't think we should consider these as priority. You'll be selecting what you want to work on today*

→ (Dana Wusinich-Mendez) *The things in black are things that are moving forward because the SEFCRI team voted them to move forward, right? If there are things in blue that we think are really important, but not necessarily relevant for us to work on today, maybe we can still make recommendations about those items, saying, "we think you should rethink including this blue item in the mix because of a, b, and c, even though we're not going to spend the time mapping it out here today."*

→ (Margaret Miller) *I just think we have a lot of different things muddled up, so I'm not sure what we're going to come out with if we just put dots on a thing, because I think everybody's voting for something different, it seems really muddled what we're trying to decide.*

→ (Dale Griffin) *The outfall, number 3 and number 4, those are political. There's nothing that the TAC's going to do mitigating storm water runoff, or encouraging closing of the outfalls. I can be devil's advocate, and play on the opposite side and go, "why would you encourage closing of the outfalls? What scientific proof do you have that they're causing harm?" I don't think you have it.*

15. (Francisco Pagan) *Let's change the procedure, then. We have that list, and I'm listening to all of you, and I think that we can quickly go over the list so you can all mention comments. If something needs to be taken out of the list immediately, we will not even consider it any further for the TAC today. Okay? And then, out of whatever's left, if we have like 10 (I'm making up a number), then we can either use the dots to select the ones you want to work on, or use a raise of hands to select three or four concepts to be further developed today. And we're taking minutes, we're taking notes, so whatever comments you're making about what on the list is there and what we should be doing*

*with it, will be on the minutes. So if you have a really important comment about any of those please speak up so we have that on the record. Okay?*

→ (James Byrne) *Black and blue?*

→ (Francisco Pagan) *Yes.*

→ (Dana Wusinich-Mendez) *And we're not saying the things that the SEFCRI team voted to move forward, we're not saying they shouldn't move forward, we're saying the TAC shouldn't spend time working on these today.*

→ (Francisco Pagan) *They need to be developed, they need the feedback from the TAC. Even if the feedback from one of the things in black is, it cannot be implemented as proposed. Because some of the things you're saying, they need that feedback.*

→ (Dana Wusinich-Mendez) *No I think what I'm saying is that as the TAC we should focus on science-oriented projects, because that's the experience of the TAC, not that that's not an important task, just not something we should deal with.*

→ (David Cox) *And the idea is to show you everything that they have, I kind of assumed that you wouldn't choose encouraging closing of the outfalls, that you'd just brush past it and say, that's legislative, another issue. I kind of thought that you would lend yourselves to vote for the projects which, or the ideas which, readily lend themselves for a project idea. For example, coral toxicity, somebody probably mentioned trying dosing experiments. So pretty much just trust that things could shake out naturally as you cast votes, but if you'd like we can go through this list and remove things.*

→ (Francisco Pagan) *I'll have people know, if you have a comment for the record on any of these, they will write it down.*

***Session #2: TAC Review of SEFCRI Local Action Strategy Proposals***

FDOU

1. (David Cox) *So let's start with the list. If you look at your handouts, previous comments about the mooring buoy proposal are in there.*

2. (Dana) *We don't necessarily need to comment on every item on this list, here, right? This exercise is more about clarification of what these things are, so we know what we might want to work on? Otherwise then we're working on everything.*

→ (Francisco Pagan) *Yes, comment quickly and we're moving on.*

→ (Brian Walker) *This is an OFR recommendation, this is has been worked on for hours and hours and hours.*

→ (Margaret Miller) *I feel like this is something useful but it isn't think something that we're going to have useful input over and above the extensive processes that Brian and the group workers have already been through.*

3. (Margaret Miller) *Move on*.

   → (Francisco Pagan) *So let's keep it, and I like the way Daron wrote it down, anything that doesn't require TAC input today, we can keep using that comment to move forward.*

4. (Dana Wusinich-Mendez*) Number 2, I agree with the comment Kurtis made, it's really, I think that idea, the proposal for that kind of item, came up in the context of N146. We were having very prolonged discussions about N146 at the SEFCRI team meeting. It was identified from the FWC perspective that there needs to be more effort put into identifying some of the data use for fisheries management, more of the data that\ support the place-based assumptions to management.*

   → (Francisco Pagan) *So what I'm hearing from you is move that older N146 and write it down as one of the things needed, TAC recommends that that is looked at.*

   → (Dana Wusinich-Mendez) *It could be something that we focus on today.*

   → (Don Berhinger) *We already have some data, we funded a project years ago with Jerry Aldman [?], we assessed the status of fisheries and SEFCRI reefs, and so there's already a place to start.*

   → (Dana Wusinich-Mendez) *It [sic] be more of saying, "here's what we have, here are some gaps".*

   → (James Byrne) *And getting FWC to buy in on that.*

   → (Lew Gramer) *I just wanted to verify that what we're talking about here, this is something we will vote on today, this isn't necessarily one of the top four or five things?*

   → (John Fauth) *Is that a legitimate request from FWC or is it stalling action?*

   → (David Gilliam) *It's stalling.*

   → (John Fauth) *Then let's take it off the list.*

   → (Kurtis Gregg) *I actually disagree with taking it off the list because their communications to Our Florida Reefs, FWC staff communicated FWC policy, and*

*said this is what we've got, we have these depths, these years, we could fill those information gaps. And I think we're right at the point where we say we've got could say that 5 year dataset, we've got the 10 year assessment that we've done, work on spawning aggregations. We're filling the gaps that FWC said "you have to have all these things." I think this is the perfect place for the TAC to weigh in and say we think this is what we need to move forward. We've got FWC staff at the staff level supporting us moving forward with it, by providing the information that they say they needed, so I think it's a great option.*

→ (John Fauth) *Well it sounds like that solves it. Just do it.*

→ (David Cox) *Anyone else have a concern?*

→ (Sarah Thanner) *I just wanted to give a little perspective. A lot of the fisherman said they couldn't get behind N146 because they said we have no reason to close things down, but they would be supportive of spawning aggregations. There's comments about there's no documented knowledge of where those spawning aggregations are, maybe anecdotal knowledge, but I think if we could pinpoint where those spawning aggregations may be, then we might get a little buy-in.*

→ (Dana Wusinich-Mendez) *That is actually a funded project. That would be part of that discussion.*

→ (David Cox) *So we're good to go ahead with that being considered today? Okay, great.*

5. (Don Berhinger) *FDOU 33B, there was a lot of evidence in that project that showed that lobster trap damage was a potential issue, especially on the nearshore reef. Probably not in the entire SEFCRI region, but in the Miami-Dade County area, especially in Broward County area as well.*

   → (David Cox) *How do people feel about including that for consideration today? Leave it in? Alright.*

   → (John Fauth) *I've got a question on that one for the local folks: is lobster trap damage greater than the damage done during the recreational harvest? Should that be examined as well?*

   → (Don Berhinger) *That's a bit of what's unknown, is how much of the damage that we saw is a result of lobster traps. You can see lobster traps, lines, all that sort of stuff, but then there's also the damage from anchors, flipping things over, and you can't tell or tease apart the relative proportions of trap damage.*

   → (David Cox) *Just a quick note, you should use your teaching voices, we're not picking up too much of the sound on the ambient mike, every now and then I'll give you guys a reminder.*

→ (Richard Dodge) *So this really amounts to fishery damage?*

→ (David Cox) *I think that would be a safe assumption.*

→ (Don Berhinger) *Although, one could argue that to a large degree that is anchor damage. Fishery damage, more generally.*

→ (Margaret Miller) *Let me clarify something. We're making this a high enough priority, and trying to convince the SEFCRI team when they were decided that this is a high enough priority to pursue. Is that the gist of what we're saying?*

→ (David Cox) *We're just saying we're not removing it. If you vote on it, then you are saying keep it in.*

LBSP

1. (David Cox) *Moving on to LBSP: implement LBSP reduction at pollution hotspots.*

→ (Esther Peters) *My question there is whose job is that?*

→ (David Cox) *Say this idea, this proposal, was popular amongst yourselves, in your project idea you'd be targeting who would be responsible and what they'd be doing. You would be defining a way to reduce (inaudible) {LBSP].*

→ (Esther Peters) *But aren't there laws in all the state agencies about who's supposed to be (inaudible).*

→ (Kurtis Gregg) *There are laws and things like that. Those laws are not based on what's effective for the coral reef ecosystem. What this work does is it provides that coral reef ecosystem-centered focus. For example, our turbidity standard for background is not very useful for protecting coral reef ecosystems. So that's what this project would do is bring this body's perspective.*

→ (Dana Wusinich-Mendez) *And there's lots of work that would need to be done to inform that. Where are these hotspots, for example? Where are our major areas of pollutant input, whether it be nutrients, or toxins, or sediment, into the system? What are the primary sources of those, and what are the management options to reduce those? And at that point, if we answer all those questions, then yes, we make the recommendation to the appropriate authority to take that management action, but what apart [sic] from there?*

→ (James Byrne) *So that would be the elements of the projects that we've been developing.*

→ (Dale Griffin) *How is that a TAC issue? We don't even know what the hotspots are?*

→ (David Cox) *For example, the Boynton project that's ongoing now that Kurtis is involved with is one of those types of projects to identify, I guess you could call it a hotspot, look at sources of pollution coming out and model that to a certain degree.*

→ (Kurtis Gregg) *I just want to point out that this is N97 which is a management action that was proposed by the OFR Community Working Groups, that's why there's that action strategy input, but in order to do that they need the input from the experts to figure out where those hotspots are. They need that from this group.*

→ (Brian Walker) *I believe this group has provided that in the past through all the OFR review process. If it has an N-something or an S-something, there's a lot of information behind that that we this group and those involved have worked for before. I think that information is available if you need it, but if we're going to make progress on developing some other LAS projects this might not be (inaudible).*

→ (Dana Wusinich-Mendez) *We provided information at the level of what are some of the information gaps out there that we need to inform this, but we haven't filled those information gaps. This is really about the watershed approach, it's really about for example what we're trying to do in Boynton right now, with identifying that contributive area, and hammering down into identifying where are we going to get the most bang for our buck in this one area to reduce the introduction of pollutants into the reef system. We've provided feedback on those OFR RMAs at that 30,000 ft level, but we haven't actually dug into any of them to do necessary research or fill data gaps that need to be filled in order to take that management action.*

→ (David Cox) *Alright, coral toxicity sessions.*

→ (John Fauth) *Can I suggest putting it with six & seven? Because we do know from my student Danny's work that inlets are one of the prime correlates, at least spatially, where you've got corals that aren't performing well. And it's all across the board. And then we know there's lots of evidence that when water gets discharged from Lake Okeechobee, that's when a lot of damage occurs. And so numbers 6 and 7 on that list probably should get moved up to number 1.*

→ (David Cox) *These are as SEFCRI sent them, so if the group feels that we should elevate it. A lot of these can be lumped together. For example, you vote on number one, then six & seven are potential ideas when you brainstorm, six and seven could be ideas that could get bantered back and forth at that time as one of many possible projects that help define that potential.*

→ (John Fauth) *For example, number seven, we know what is coming out of Lake Okeechobee.*

→ (David Cox) *That's something that's monitored ad nauseum.*

→ (Brian Walker) *So if you worked on number one, you could incorporate number seven into it, right?*

→ (David Cox) *Sure.*

→ (Kurtis Gregg) *It bears remembering the scope of the Local Action Strategy funding levels, I mean you are looking at $10,000 maybe $100,000 for a project. You know, you're not going to make a whole lot of forward progress, if you (inaudible) because instead of accessing that funding separately, you potentially access (inaudible).*

→ (David Cox) *You may recall, in your past comments, that you have in that sheet someone commented that we've been profiling inlet waters quite a bit, so not that it's completely thought that we're all done, but that was one of your past comments about number six.*

2. (David Cox) *Can I move on to coral toxicity?*

   → (Richard Dodge) *Let's keep it.*

3. (David Cox) *Okay good. Encourage closing of the outfalls?*

   → (Dana Wusinich-Mendez) *Probably not*.

   → (David Cox) *Second that motion?*

   → (James Byrne) *Yeah I'll second that motion.*

4. (David Cox) *Reducing LBSP and storm water runoff?*

   → (Dave Gilliam) *Yes.*

5. (David Cox) *Alright so now we're getting down into the lesser interest ideas. Protect and restore estuarine habitat?*

   → (Margaret Miller) *Yes.*

   → (David Cox) *Just do it?*

   → (Richard Dodge) *Don't bother discussing, do it.*

6. (David Cox) *Six, profile inlet waters?*

   → (Dana Wusinich-Mendez) *I just want to clarify, it feels so good to just say yes and move onto the next item, but if you say yes and you say yes and you mean two*

*different things, so I think what you're saying by yes is "do these, but we don't need to talk about them today" Is that correct?*

→ (David Cox) *Yes, it'll be on the ballot, but may not be chosen when it comes down to choosing what you actually want to work on.*

→ (??) *Yes means leave it in.*

→ (Dana Wusinich-Mendez) *I think we're saying number five doesn't need to be discussed because it's a management action, and how do you decide, and prioritize which habitats should be protected, and what protections are we talking about, and how do we choose which areas to restore, and all of that requires technical input?*

→ (Margaret Miller) *And I don't disagree, but this is where we kind of have a muddle, because I thought our first premise was the blue things were things that the SEFCRI team decided not to report on, unless we made a really strong case that it was more important than something that was in black.*

→ (Dana Wusinich-Mendez) *But we might want to vote on it.*

→ (Richard Dodge) *If it can be discussed and voted on then it should be voted on.*

→ (David Cox) *All of you in favor of encouraging (inaudible).*

7. (David Cox) *Alright, monitoring freshwater in Lake Okeechobee?*

→ (??) *No.*

→ (David Cox) *Okay, if I hear some votes and I don't hear anything to the contrary.*

→ (??) *I think it's being done extensively.*

→ (Dale Griffin) *Well, I don't know, the key is freshwater on that, because most of the monitoring stops once it's in the marine environment. They're not looking at (inaudible) or association of how algal blooms are fueled by freshwater and so forth. I don't see any publications coming out with biomass blooms coming off Lake Okeechobee are fueling offshore blooms, or their effects, or anything like that.*

→ (Nancy Craig) *Well, they're freshwater algae so they're not going to do anything to the marine environment.*

→ (Dale Griffin) *Yeah, but like, generally Indian River, those blooms are easier to see, so almost looking at these freshwater blooms that are dumped into the marine environments and their organic loads translating to a marine bloom, in the absence of (inaudible) and the effects of HAB's and so forth on the marine community outside of the inlets.*

→ (Kurtis Gregg) *I would say that there is coral-specific work being done on that. Josh Voss is looking at correlating Lake Okeechobee discharges to what's going on in the marine environment. So that is not quite accurate. He works on that.*

→ (David Cox) *Can I get a show of hands on whether to move this one forward or keep it off the list?*

→ (Margaret Miller) *Well if we're just voting on whether we're going to vote on it or not, we can leave it on it's not a big deal.*

8. (David Cox) *Alright. Evidence of wastewater-associated pollutant stress in the marine prokaryote community?*

   → (David Cox) *I would say that that sound (silence) is…(inaudible).*

   → (Dale Griffin) *Well that just depends on if you want to get it straight that there is a risk out there. If you're not interested in proving scientifically that these sources are causing a problem in the marine environment, then you'd say it's not important.*

   → (Valerie Paul) *Then why is it the prokaryotic community?*

   → (Dale Griffin) *Because that is the first responder, in all ecosystems, our microorganisms. Their reproduction rates, in some like 15-20 minutes, that is where you see the effects first. I say it should be a prime target.*

9. (David Cox) *Alright, reduce dissolved organic carbon?*

   → (Piero Gardinali) *There's no way we can reduce that. Natural organic carbon. I don't understand how that can be easily made into a TAC project.*

   → (Margaret Miller) *Okay, you say this came from Jim Bohnsack? He's basing this on the type of hypotheses that we kind of described earlier.*

   → (Valerie Paul) *Well then it should be under eight.*

   → (Margaret Miller) *Potentially, yes.*

   → (David Cox) *We'll keep that in there for your consideration.*

10. (David Cox) *Water monitoring stations?*

    → (Esther Peters) *Wasn't some work done with that?*

    → (David Cox) *I believe so.*

→ (Jack Stamates) *It was. Actually for engineering purposes and to get into deeper water we were considering a (inaudible). I think I brought this up a long time ago, but we talked about buoy systems as opposed to the pier systems because piers are in awfully shallow water, so it may just be easier to put buoys (inaudible). We've looked at the piers and they haven't had quite the effect that we wanted (inaudible).*

→ (David Cox) *Keep it in, and if it gets to a vote, start working on modifying the project.*

<u>MICCI</u>

1. (David Cox ) *We're going to be working on it as a group this afternoon, so that's in.*

2. (David Cox) *The next one, water quality standards support, was really designed to support that. If for example, you feel that there are water quality standards beyond turbidity that you would like to address, we do have a proposal in for a cooperative agreement for two years of funding for a project, and it's defined as supporting state water quality standard development. I think that can go beyond turbidity. We can leave that in, but it's slightly redundant. I would say leave it in, and if you can think of it in terms something beyond turbidity, and as protecting resources.*

   → (Arthur Mariano) *You don't think that it is important?*

   → (David Cox) *We're going to work on turbidity as a group and we're going to have a full session on it. If you want to add some other water quality standards, then vote for this one.*

   → (Ken Banks) *There are some special statutes on turbidity that are applied to coastal construction, not general water quality standards, but specific to coastal construction monitoring.*

   → (David Cox) *Right, so we're not just addressing a number, but perhaps monitoring techniques and methods.*

   → (Ken Banks) *Standards, too?*

   → (David Cox) *The whole package.*

3. (David Cox) *Number three, integrate quality control procedures, and corrective actions. The regulatory aspect of the permitting process, an offshoot of, more of the result of what the project would show, that we need to modify where monitoring takes place.*

   → (Dale Griffin) *Don't they have QA/QC procedures?*

→ (David Cox) *They are defined for their goals and hopefully the result of the work with DEP and TAC, they're kind of adjusting a little bit better.*

→ (John Fauth) *This one I think this is important because some of the standards are set one item at a time, but we know that the effects are multiplicative. And so if you've got, say, sedimentation occurring during a bleaching event that becomes extremely damaging. As opposed to sedimentation, which is bad, happening during cold water.*

→ (David Cox) *And that's the type of thing that's going to be built into your exercise this afternoon, talking about timing, frequency, exposure, iteration, things like that.*

→ (John Fauth) *Reproductive period.*

→ (David Cox) *Exactly, exactly. You'll see that this afternoon.*

<u>Place-Based</u>

1. (David Cox) Implement a zoning framework?

   → (Dave Gilliam) *To be discussed.*

   → (David Cox) *Should be, right?*

2. (David Cox) *Define the SEFCRI region (the "Box").*

   → (Ken Banks) *There's proposed legislation to do that right now.*

   → (David Cox) *Okay so that's a no on number two.*

   → (John Fauth) *Can you give us an update, Ken? What was the outer limit of the box that was proposed?*

   → (Ken Banks) *I can't give you the coordinates off the top of my head. State waters, the SEFCRI boundary north and south, it's specific coordinates.*

   → (John Fauth) *So there's no depth requirement?*

   → (Ken Banks) *No it doesn't have any restrictions, just the box, and it will roll out when DEP puts in their budget request every year, they budget projects in that box. Right now we're trying to find some elected official to sponsor that legislation. It's in the house.*

<u>RR</u>

1. (David Cox) *Create coral disease response plan? Good.*

2. (David Cox) *Back to coordinate adaptive monitoring strategies? Keep it, and interpret as you will.*

3. (David Cox) *Protected species demographics and monitoring? Keep it for consideration.*

4. (David Cox) *Coordinated discussion about data needs for management. This is a proposed cooperative agreement grant for the coral program.*

   → (Dana Wusinich-Mendez) *Isn't that already happening? Like it's a project that's funded in a grant, and (inaudible)?*

   → (Francisco Pagan) *It's probably there because it relates to one and two.*

   → (James Byrne) *It sounds like that would be a great project to have the TAC involved in.*

   → (Francisco Pagan) *As soon as that starts on July 1, yes.*

   → (Dana Wusinich-Mendez) *Not necessarily an LAS.*

   → (Francisco Pagan) *It could become one.*

5. (David Cox) *Acropora mapping?*

   → (Brian Walker) *It's covered under three.*

6. (David Cox) *Alright, and that brings us to coral reef mitigation success criteria and application of best practices. Mitigation success criteria? Okay, that's going to stay in.*
   → (Brain Walker) *I would like to comment on this list that we have here. This is broken up into black and blue lines but it is a list that SEFCRI and the TAC have voted on over the past year, and they're all high priorities for the region, so I'm unsure why we would need to strike anything from the list, but maybe prioritize instead, not remove things, organize this list in a logical way because some are raw ideas and some are very specific, and then keep them together and build from this list into the broader topics that are issues, right, the water quality issue. And so, I don't know why we would have to just pick ten from this list. I mean obviously we can't work on all these today. We're going to prioritize which of these we want to work on today. But in terms of LAS, the future LAS of the region, I don't know why we can only pick a certain few.*

   → (David Cox) *I guess some lend themselves better, some work is already ongoing for some of them. Some of them lend themselves more toward not a discreet project. So that's kind of the reason behind whittling down the list, and giving folks a chance to consider. There's really no reason to not consider any except the fact that the SEFCRI*

*ideas that generated the most interest for them are in black, so if we go outside of that, they voted on it, we'd really have to have a strong case for asking them to reconsider it. But at the same time your dots, your votes are a ranking in and of themselves. So it shows some sort of preference.*

→ (Brian Walker) *For example, the prokaryote community thing, that's pretty specific project. Most people don't understand why that's on the list, unless you understand the science behind it. So that's not going to get a lot of votes in SEFCRI land unless they understand specifically why, but it falls under other categories. So I guess my point is maybe from this list, it could be reorganized into ten categories that all of these things could fit into, and we wouldn't lose them, but if, say, a pot of money jumps out and someone gets $10 or $15,000, that might be a good fit, we could make a quick project and do something small but specific. That could still be informative and address an LAS project. I think if we organize this list a little differently, a lot of these could remain in LAS and not be lost.*

→ (Don Berhinger) *I think I agree. We could come up with our own assessment and see where those come together. Some of these are very actionable items, and you're right some things they might not have gotten the importance of. But I think some of these things may not have landed very high on the list because they were sort of nebulous things like restoring and protecting estuarine habitats, I mean if that were more specific it probably would have landed higher. Some of these raw brush ideas are great ideas, but they need to be refined and turned into some kind of actionable item, so that the project could be funded. And so perhaps that's what we can do today too.*

→ (Dana Wusinich-Mendez) *That is exactly what you are here to do today. Some of these larger things, I don't think we should be deterred from choosing them. The point is if we were to choose an item like the exact one you just gave, there may be fifteen projects that we identify that are needed, that are action items as you said, in order to support that outcome. So some things are already written as a tangible, specific project, and some things are broader at the objective level and we would need to develop multiple projects to support them, but I don't think we should discount them because of that.*

→ (Don Berhinger) *Right I just wanted to make sure, it seemed like we were sort of getting funneled toward these ones in black and we'd have to make a really strong justification for the ones in blue.*

→ (David Cox) *When the ideas come back to the SEFCRI team, they'll say "we didn't vote on that, we didn't prioritize that, why didn't the TAC pay attention to that?" That's kind of the crux right there. On the one hand, like you said, Brian noted they might not have the technical expertise to push ideas forward, but the broader strokes do sound great.*

→ (Francisco Pagan) *I will be a bit more practical. If something from the SEFCRI meeting arrives here, as an idea and you look at it, it's very general, like a one liner, and if we're taking anything from you back to SEFCRI, we cannot take a one liner. Because we will be deciding the whole conversation, "what does the line mean? What*

*are we considering" If we are getting any feedback from this meeting back to SEFCRI, it needs to be better than a one liner, and that's what they, maybe it's not clear enough.*

→ (Aubree Zenone) *Keep in mind, if you guys can get clever about this, a lot of these can be wrapped into one, so if you see one that SEFCRI has selected as one they potentially want to move forward with and you notice other ones they didn't, if you see ones they hadn't selected that are still worthwhile, and can fit underneath one of those selected ones as an action item or objective, that could be hugely useful to the SEFCRI.*

→ (David Cox) *Prokaryote and the outfall, under pollution hotspot, for example.*

→ (Dana Wusinich-Mendez) *Maybe the question is, are there things in blue that don't fit under anything in black that this group feels strongly need to be in the future LAS, and we want to save it?*

→ (David Cox) *I think definitely yes, right?*

→ (Dale Griffin) *Well there's some things in black that I just view as a feel-good topics, I don't think there's a science base and I don't understand why we're even discussing some of them.*

→ (Aubree Zenone) *Again, the idea is that you guys will take everything you're thinking right now into consideration when you make that decision. So when you put your dots up there, keep that in mind. And you don't have to select these things because of any one reason. Those reasons are perfectly valid, as are anyone else's, so it those are the ones that are selected with the most dots, we'll talk about them, that's the will of the TAC, but if not, then that's going to be reflected.*

→ (Dale Griffin) *You know, I'm all for shutting down the outfalls, but where's the water go? And that's not our question. Or land-based sources of pollution, I'm all about mitigating that, but these are like feel-good type topics and it's not science. I don't see the point of this.*

→ (Aubree Zenone) *Of course, and if that should come up, then we can discuss that further, but if it's not selected then there's really no point in discussing that right now.*

→ (Francisco Pagan) *While David provides you with more dots, or not, it's break time.*

→ (David Cox) *Any of the ideas in blue, which you'd like to consider, identify those right now. So this is just for future LAS. We're going to choose the ideas under which you'd like to develop projects. One dot per idea. To reiterate: you as the TAC think that right now this is a great idea to consider for a future Local Action Strategy. And it may already be up here on the board as well. If I hear a distinct no, if I hear nothing, I'm just going to move down the list. You have four minutes starting now:*

a. Identify data needs for fisheries management? Yes
b. Lobster pots? Yes
c. Protect and restore estuarine habitat? Yes
d. Profile inlet waters? Yes

e. Monitoring freshwater from Lake Okeechobee? Yes
f. Evidence of wastewater associated pollutants? Yes
g. Total dissolved organic carbon? Needs more development, no
h. Pier water monitoring? Buoy water monitoring? Yes
i. Water quality standard support? Yes
j. Integrate quality control procedures? Yes
k. Protected species demographics? Yes
l. Coordinate an assessment of Acropora? Under three
m. Mitigation success criteria? Yes

→ (David Cox) *Great, you have just come up with a list for SEFCRI team of potential future Local Action Strategies. Thank you. Okay, now, to go back over the vote, what you're voting on, we're going to basically choose the top four ideas and work on those in groups to come up with actionable projects, so bear that in mind. You're not necessarily voting for that concept or idea but the project within it that could achieve the goal of pushing forward with the next generation of Local Action Strategies. That said, does anyone need more comments, questions, before we cast our dots? Alright, please, cast your dots.*

Results of Voting:

1st: Identify Data needs for Fisheries Management (Team)

2nd: Implement an MPA Zoning Framework for Special Areas of Interest within the OFR Region (N-146)

3rd: Coral Toxicity Studies of LBSP (Legacy LAS)

4th: Profiles of Inlet Waters and their Effects on Nearshore Reefs (Legacy LAS)

5th: Create Coral Disease Repose Plan (Team)

6th: Protected Species Demographics and Monitoring (Legacy LAS)

## ***Session #3: TAC Review of SEFCRI Local Action Strategy Proposals***

Report Out for LAS Proposals

1. (Dana Wusinich-Mendez) *Okay. So we had N-146 as our overall, overarching strategy to identify specific projects from, which was the MPA zoning framework for the whole region. And so we really decided to take the approach of, since this group was dealing with identifying, specifically, the fisheries information gaps, and fisheries approaches, we decided to do the easy stuff, which is everything but the fisheries. And so we looked back to the original proposed, Recommended Management Actions from the OFR process and reminded ourselves of the other types of zones that were proposed as a part of that recommendation, and also discussed the whole idea that yes, it's great that we have this defining, and legislating the SEFCRI area as a management area in the legislative process*

*right now, but if for some reason that doesn't successfully happen this year, we would recommend a project to actually try and inform and motivate those actions so that does happen, because that's a necessary stepping stone to implement the rest of what N-146 calls for. And so we identified the fact that if we don't get that area designated through the state legislative process this year, we would want to get the TAC together to pull together a white paper, similar to the white paper that the TAC worked on focused on land-based sources of pollution issues, talking about the need for a placed-based approach for a management in the SEFCRI region, and helping to define what that should and could look like. So that was our first project idea. The second project idea was [sic] trying to pull together, we identified in our conversations on place-based management, we have trouble explaining and getting support for the concept of ecosystem-based management and the link between healthy fish populations and healthy habitat and so really wanting to support a literature review that pulls together the latest and greatest state of global knowledge that makes that connection and talking about the link between habitat condition and fish populations. And so the second project is a literature review focusing on that, and like I said it would be not just limited to Florida, but looking worldwide for the latest and greatest current state of knowledge on that topic. You guys feel free to chime in if I miss something.*

→ (Lew Gramer) *One important thing that Dave suggested for teaching this project was the combination of peer review, and dissemination to a broader audience base.*

→ (Dana Wusinich-Mendez) *Good point. Yeah, for each of these products, wanting to have a scientifically defensible peer-reviewed document, but then also to generate some outreach pieces that could be targeted at the public, at the layperson, help explain in more simple terms the concepts. The third project looked at one of the more specific types of zones that were proposed for N-146 which is restoration areas, and so we talked about doing an assessment throughout the whole SEFCRI region to identify areas that are important restoration sites, whether they be sites for coral reef gardens, for example, or outplanting sites, this would fit into an overall zoning structure for the SEFCRI region with an emphasis on restoration activity. So really, a subcomponent to the overall zoning plan which is a restoration plan. Starting off by looking at the menu of all the different restoration tools and approaches out there and then applying that to our map in the SEFCRI region and applying that to where we could site different restoration approaches. Project number four was another type of zone that was proposed in the original N-146 which was areas to help manage user conflict. So thinking about some of the social science that's been done to look at how different users with conflicting uses were coming into conflict in the same areas and how those might be managed. This is an approach that the sanctuary has used to deal with user conflict within the sanctuary, so wanting to consider an approach like that for this area too. So again, it's designing a particular type of zoning structure fitting into this bigger zoning framework. And then I think this is the last one, which was really focused on coral spawning and wanting to provide some seasonal protections, really identifying areas that are important for either spawning or for recruitment, and identifying some seasonal restrictions to activities that would influence the ability to either spawn or to recruit, such as dredging or beach renourishment, or other activities in the vicinity of important coral areas throughout the SEFCRI region. And I think that was our last project, right? Did I miss anything?*

→ (Brian Walker) *I'd just like to comment on that last one, I think it kind of evolved into a kind of two-part, where you would be able to identify these areas of high coral, say, cover and diversity and stuff like that, you would be able to identify those sites for potential special management application, including temporal aspects, looking at doing certain activities or restricting certain activities during certain times of the year. So it wouldn't just be the temporal thing, but we could also have the identification of those higher diversity and cover type sites.*

→ (Dana Wusinich-Mendez) *Well that is what we focused on in our conversation was the temporal aspect, but that could be tweaked, we did definitely focus on temporal-type restrictions in the conversation.*

→ (David Cox) *Alright, thank you very much, well done.*

2. (Kurtis Gregg) *So, I got volunteered to report out from our group, since I as absent for half of the session. So I was in the group that is looking at assessing the fisheries data and gaps and how we might fill that. What we've come up with is the need for characterization and assessment of reef fish assemblages using fisheries dependent and independent data as it relates to reef ecosystem condition. It's a lot. The description of this overall project focuses on the need to determine how the demographic characteristics of fish assemblages and other metrics of coral reef condition compare between coral reefs in the SEFCRI region and either reference locations or model outputs or control reefs. Through the NCREMP report card process I've learned, painfully, that we don't have good control reefs for southeast Florida, and so we are looking at other options. Correlations between identified assemblage characteristics and conditional metrics such as functional groups, species richness and diversity, important fisheries species status, invasive species status (like lionfish), macroinvertebrate richness and diversity and coral reef condition. Basically the connectivity between all of these organisms and an assessment of how southeast Florida's reefs are doing in that. So, the first project is looking at modeling the ecosystem condition here in southeast Florida. We've got some expertise in the group that suggested that some of the options could include EcoPath or EcoSim, community dynamic modeling, looking at energetics, energy transfers between trophic groups, and stable isotopes. Some of the gaps that would need to be understood for input into the model include seasonality of some important species, for example gag, and their cross-shelf migration, also spawning aggregations, locations, and contributions to the reef fish assemblage locally and reef-tract wide, assessing data gaps and how we would move forward on that. Also, comparative status of assemblages, functional group composition, numbers of herbivores, and invasive species. And then also looking at connectivity: how do these data connect to coral condition, coral cover, disease, and overall coral reef ecosystem condition. Products and outputs would be datasets and reports. Then, on the second project that we were looking at, the status of some of the important reef fish species. Outputs would be local species demographics of some important target species. Some of that work has been started. This would be a desktop analysis based on the five-year fishery-independent RVC dataset here in SE Florida. We could use this work to validate and perhaps calibrate the model that was done in project one. It is also comparative data and we could look at reference locations*

*along the Florida Reef Tract, and we had a suggestion to also consider looking at the Bahamas as a reference location: same latitude, other side of the stream. So that's the two main projects that this group developed. Questions from the group?*

3. (Aubree Zenone) *Okay, so, I've been nominated by the group that was developing the coral toxicity studies. This actually turned out to be what I think is a pretty straightforward and objective-oriented project. We identified three project objectives, the first one being to conduct an up-to-date literature review on the current information out there about the toxicity thresholds and substance toxicity levels to corals, specifically in our region. We've been told that there have been several efforts even here at Nova. Someone just defended their thesis and might be able to contribute that towards hormonal introductions to the reef and its effects on corals. The description requires a literature review of any and all available ecotoxicology literature relevant to designated classes of potential toxins. The group identified that it was important to separate out potential toxins into groups that they deem necessary, so please do feel free to comment if you think that something needs to be added or taken away. We designated the groups as pharmaceutical, pesticides, heavy metal, nutrients, herbicide, endocrine disruptors, fungicides, and hydrocarbons. These all of course are as they relate to marine environments in southeast Florida and the corals in particular. So once we have the literature review and figure out where we lie and how much we know about each of these, we would then of course want to determine what is here on our reefs. So our second objective would be to conduct studies here on our coral reefs to determine and identify relevant substances that affect the corals. This project includes natural toxins and substances from other living organisms, from indirect sources, and also from hormonal inputs. So the products that would come out of this project would ideally be a priority list of compounds broken into those classes that we listed, and you would have each of those classes with however many of those toxins that you have. This would be used to motivate the third objective which would take the top five or so of each of those classes and investigate those. So the third project is, as I said to take the top five or so of those toxins in each class and then perform the threshold level and the toxicity level studies on the corals. We made a note of it and it is very important to use relative endpoints, so basically for both the coral and the symbiont health, to determine whether or not these toxicity studies should be aimed more at the larval stages or adult stages and see how those toxins affect that. The end goal of this would ideally be publications on each of these toxicity thresholds that could be used for informing management decisions, and also potentially targeting the ESA-listed species we have here in Florida for perhaps an easier way to generate interest in these projects. Of course there would be a final summarization of all this work, etc. etc. etc. Did I miss anything, coral toxicity group?*

→ (Valerie Paul) *One thing that we did talk about for the experimental work was to make sure we had appropriate quality control in place for regulatory practices.*

→ (Aubree Zenone) *Yes.*

→ (John Fauth) *It all sounded good, I just want to add one thing. That is looking at mixtures. So, the temptation would be to do each of the five compounds in isolation, but there's something called a factorial screen design where you could look at mixtures and you don't have to do all the combinations but it lets you, basically in one fell swoop,*

*figure out the individual and combined effects, so it's a really powerful and efficient way to go. So if you think about it as one experiment as opposed to five separate ones, you'll get a lot more bang for your buck.*

→ (Aubree Zenone) *I think that is a fantastic methodological suggestion. I've added it to the notes.*

→ (John Fauth) *Because a lot of times there are multiplicative effects, and it's multiple things acting at once that just hammers the coral.*

→ (Aubree Zenone) *I have it in the notes so that SEFCRI will have it at their disposal.*

→ (John Fauth) *Actually one other thing that needs to be done is temperature and light intensity because those interactions are going to be multiplicative.*

→ (Esther Peters) *Most of this would be novel.*

→ (Aubree Zenone) *These toxicity studies are not generally well-done, especially here in southeast Florida.*

→ (Kurtis Gregg) *The focus on the scleractinian coral is focused on about 3% of our coral reefs. Is there any discussion of looking at these effects on soft corals and sponges, which are the dominant organisms?*

→ (Aubree Zenone) *Well given that the subject was coral toxicity, we did not have that discussion. I would believe that these types of pilot studies would lend themselves toward generating other studies of interest in those kinds of areas*.

→ (David Gilliam) *Also remember that just because it's 3% now, doesn't mean that it shouldn't be 10%, 15%, 20% later, and also sponges and octocorals and ascidians and everything else, they don't accrete, so if we want to keep our reefs, we need to keep our stony corals.*

→ (Margaret Miller) *The only thing I just wanted to add is we kind of presented it as three components, but I think the actual screening assay components don't need to wait until the other components are completed, I think there are some good candidates that we could identify to begin those threshold determination lab experiments.*

→ (Aubree Zenone) *Any other questions?*

4. (Kristi Kerrigan) *They [the group] really just had the last 15 minutes or 20 minutes to work on this, so they really only identified one big project idea, but this was for the coral disease response plan, so obviously this is a big LAS and there are a lot of components to that. But the one idea they really focused in on is how we are getting our data and how it's being used, and so instead of talking about some of our citizen science program like SEAFAN and Sea Ocean, and sort of this idea to supplement those programs and really*

*expand on this. So the big project idea was to establish a database portal to store reports, do observations, so really just a serious expansion of some of those existing programs. Identify a list of sites that should be monitored, and then basically we need a better way to document reports for better coverage across the region, maybe doing periodic surveillance. But the big thing that they talked about was really involving the public and the diving community especially, because there's so many dive charters and they're taking people out all the time, we just need more reports of disease, if we ever have another outbreak in the future. So how are we going to get these reports, like, coming up with a webpage portal where it'd be open access to anyone and it'd kind of be live, like dots would pop up on a map, so you're seeing where reports are, there would be a way for you to upload photos so you're looking at photos from across the region. And then, some of the products or outputs would be this open-access data portal or this webpage that would have interactive tools to show the disease, there would be a public education link for people to learn about diseases, a photo-upload feature like I said, we'd also develop datasheets for important fields that need to be observed when you're out in the water, and making some of them required, like coordinates are extremely helpful. And then developing some materials for the dive charter groups to help educate their customers on diseases and ways to report, and then for sure developing an app so it's easy for people to report and for easy tracking as well. Performance measures, basically utilization of this database, how many people are visiting the site, QA/QC of those reports that we are getting, someone will have to be tasked with that. We thought about making this an opportunity for a student, of course free labor, that's nice, to sort of develop this database and perform some of the QA/QC. Definitely, again, involving the diving community. Someone mentioned this similar program called EBird which was developed by Cornell University and they have a pretty well-established program that we found online so we provided that information in the notes section, we could emulate something like that, including sponsorships and programs to encourage youth.*

→ (Valerie Paul) *Yeah EBird was sort of a model database, it's a citizen science project to capture the extent of (inaudible).*

→ (Kristi Kerrigan) *Yeah and they have their own app, so it's pretty well-established.*

→ (Valerie Paul) *The idea behind the student project wasn't just some biology student, we thought about just putting out a competition with a $1000 prize to computer science programs in the area universities, and we figured someone could probably do this thing overnight.*

→ (Margaret Miller) *This obviously can be a great outreach, a citizen science tool. Is the thought that this is really an important step to addressing the coral disease problem in the region?*

→ (Kristi Kerrigan) *I guess this is one of many.*

→ (Margaret Miller) *What is the thought of what we're going to learn, sort of science-wise, is it extent and timing that we're not picking up on now? But you don't really get surveillance, do you? Because surveillance indicates that you're observing on a*

*regular basis and so you're observing the absences as well as the presences in some sort of quantitative way. So I don't see that this gets you what a surveillance program does.*

→ (??) *Well you definitely get a lot more coverage, Margaret, than if you do if you do what FWC has where you have a set number of locations and you go there quarterly, or twice a year. I mean here you have full coverage of the region, technically. You get a lot more frequent contact. That is the point.*

→ (Margaret Miller) *Yeah, it seems very problematic to interpret that type of data, is what I always am concerned about, in terms of investing a lot of resources in that type of tool as a data tool. It's very hard to interpret that because it means that someone saw something that they called a disease on this date at this time.*

→ (Kristi Kerrigan) *We'd encourage photographs.*

→ (Margaret Miller) *Those have to be required. That's one point, but some sort of, like, what proportion, this was one colony that showed something that looked like disease, I don't know how useful it is, or if that's distracting. So it's just a thought, as I said, I think interpreting the data that comes out of that type of tool is really, really difficult with this type of phenomenon.*

→ (Dave Gilliam) *You have to interpret the data as well. When you have these type of programs it gets irritating when people are contributing to the program and they don't see anything coming out of the program. There would have to be a mechanism up front to do something with all this information.*

→ (David Cox) *I don't know if there's a lessons learned from the Hawaiian model that might address some of these issues.*

→ (Esther Peters) *I would like to see this discussed also with the dive shop community, and is (inaudible) still on the SEFCRI team? Jeff? To run it by them as well and see how that might work. We need that connection so you need to run it by them to see if that is something that can be implemented. And I would think also a better avenue would be expanding peoples' awareness of the resources, and what is being done.*

→ (Lew Gramer) *Just a practical comment: getting a grad student to develop a website, which they then graduate, and we don't have anyone working on it for the next few years is not a long-term strategy for it to be working long term.*

→ (Kristi Kerrigan) *Yeah we added an additional partner, a long-term database manager.*

→ (David Cox) *Alright, thank you. Profiles of inlet waters? And I would like to reiterate and repeat that I will distribute these to the group as whole, since we often do get a lot more great brainstorming. Folks will have a chance to comment on these*

*before they actually make it to the SEFCRI team, and then I'll be tasked with totaling your comments and ideas on these. So there will be a chance to read over these and add some additional input.*

5. (Arthur Mariano) *Okay, I'm summarizing our group and if I make any mistakes, please correct me. Project one is to develop a nearshore regional circulation model, to document thermal, salinity, water circulation, and groundwater variability, assess the nutrient and microbial components of inlet waters, and make it possible to merge the data to create a holistic regional model of inlet water conditions and constituents. Probably would be a very good project for a graduate student. Description is to measure temperature, freshwater inputs, organic components, microbial communities and salinity, monitor changes in turbidity, sedimentation as well as all of the above. We're going to need an array of censors to monitor the different factors, and definitely to develop a regional model, you're going to need data to inform the model, especially the inlet conditions, other components of flowing out with inlet waters, measurements of northern and southern boundaries of our domain that we're going to pick. The domain we suggested to pick for the model will have to be larger than the Florida Reef Tract domain. There's a lot of good numerical modeling reasons to do that. One particular reason to do that is to lessen the influence of the boundary conditions on the region of interest. That approach has been used by a number of modelers in the past, to their advantage. With respect to the eastern boundary, those boundary conditions could be supplied by any of the operational models, for example such as HICOM (?) And now how exactly to put the data along the southern and northern boundaries would require careful analysis based on the local topography in that region, complexity of the flow, and the available data from the operational models that are being run at coarser resolutions, to force that. We suggest to start with a 1 km curvilinear grid, we think a curvilinear coordinate system is really important to try to set up a regional model in this area. Now of course we don't have all of this data available to be able to start to run such a model in real time prediction mode, so the first action item I would suggest with such a model is to run it in climatological mode, getting the best available data to force the model. It would be really good for such a model to actually get temperature and salinity from the bottom, we have orders of magnitude more temperature data at the sea surface because of the satellites. Temperature sensors are cheap these days but as you all know salinity is a much harder measurement to make and expensive. So the products we are proposing is develop the physical model for circulation, changes of condition and flow, and this model should be a regional mode. We believe that we will definitely have to put sensors in the inlets to really be able to do this modeling effort as accurately as possible, and that would require high density sampling, given the time scales associated in this coastal zone. Proposed partners, the lead for modeling would be an academic institution, some interactions with present modeling groups. There's a number of models right now that are capable to modeling this, some examples would be the ADCIRC (?) model that's being developed by Clint Dawson's group at the University of Texas, and then at the University of Miami we have (name?) working on a nearshore regional model. I really think that the fact that we've been doing this project for ten years without a regional model, you're all looking at a science in a vacuum, most of the data that's been collected over the past ten years had severe aliasing problems, had severe problems in not totally resolving the fields for many places, and I think a regional*

*circulation model could help you all try to put that data in a better context by knowing where the stuff is actually going. I think a lot of the patchy distributions that you all see here in the health of the coral, I know a lot of effort's been made to try to explain that with biochemistry and stuff, but it all may be determined by some grid scale temperature variability. The temperature variability here is great. The temperature variance here on a kilometer scale is greater here than in most other places in the world, and given that and the very different topography and the physical mechanisms, like Lew did in his dissertation on the siphon and the small-scale horizontal circulation cells. You really all need to start looking at that, because I think that truly is what's going on here. It's been demonstrated all around that world that temperature stress on reefs is probably one of the greatest stressors, yet in ten years of this program there has really been done much effort to look at those temperature stressors at the depths where the stressors are currently. So, that's the viewpoint of a physical oceanographer. Lew, you could add to that?*

→ (Lew Gramer) *Yes, I just want to comment that there are a lot of lessons learned on how to do this multi-mesh-grid modeling efforts from the Great Barrier Reef, and down in Belize, that can be applied here, I mean this is a very complex region. So, there are people who need work who have already had significant investments and funding in their research in other areas.*

→ (David Cox) *Alright, for the sake of keeping on schedule, I'll give you guys an opportunity at another time to add more comments, but we have to move on.*

6. (Brain Walker) *Alright, we had the protected species demographics and monitoring. This was one that we felt really deserved some attention here, and so we really wanted to try to tackle it. We came up with five main portions to this effort. We felt that under the protected species, the ones that occur in here in our region, there's going to be two approaches needed because the Acropora cervicornis is a very different growth form than the rest. And so, we split that out into a separate task, and so basically that is topic five under the reef resiliency, Acropora mapping and assessment, is kind of a project within number three, the protected species demographics. And that would be to monitor the Acropora thickets every few years to understand how they're changing, if new ones are popping up, if old ones are going away, the condition of the thickets through time to understand if we are gaining or if we're losing Acropora thicket cover. And then the next idea would be to basically do a benthic biogeography study to associate benthic data with the habitat mapping data, similar to what we've done with fishes, so that we can then get a sampling strategy to sample for species demographics across the reef scape. So that would be mostly a data-mining effort, where we take datasets that are available from NCREMP and FRRP and other datasets that were already previously collected and do this benthic biogeography assessment. Once those groupings are defined, say for instance the nearshore habitats from Government Cut through Hillsboro might be very similar, but the ones off of Palm Beach might be quite different. So it would be looking at those kind of differences and then once those groups were defined, then we'd have a regional stratification that we could then use to identify areas for targeting assessments for these protected species. The next part of that would be to supplement NCREMP and FRRP collections, to collect data on the demographics of, basically, Orbicella, because there aren't enough of palamata, or Dendrogyra, or Mycetophyllia, to really capture in any type*

*of randomized study, but we could do it for Orbicellids, and that would get different size classes and understanding of the population demographics for those species. And then a fifth component would be to fate track a select group of different demographics of each of those species, so some of the largest individuals, some medium individuals, some smaller individuals, to fate track those through time to understand what's going on with those. So basically five components within that broader species demographic and monitoring. We didn't really flesh out all the details for each one, we threw a lot at Megan, she got most of it down, did that just about cover what we wanted to discuss?*

→ (Margaret Miller) *Yeah, we talked about fecundity sampling for each of those species as well. It's another demographic phase that could be quantified as a separate activity.*

→ (Brain Walker) *Yep, so also looking at fecundity in terms of the large ones to understand if they are even sexually active, and that sort of thing.*

→ (David Cox) *Thank you, you got a lot done in a short amount of time, came up with some great ideas. We're going to take a short break now.*

***Session #4: Water Quality Standards Criterion Development***

1. (JocelynKarazsia*) Okay, so I'm sorry I wasn't here at the beginning of the meeting but I understand there was some discussion and some interest in the port dredging projects. Our office is NOAA's lead on those port projects, and it's my understanding, I mean you guys can let me know, but, there was an ask from the TAC to be updated on activities related to the port projects, so I'll provide just a really quick update. The Corps is almost finished with their one year post-construction monitoring in Miami. That one year post-construction monitoring was really the last piece of information we needed to start talking about additional mitigation requirements for here in Port Everglades. NMFS completed their biological opinion in March of 2014, and one of their terms and conditions, which are the legally binding components of a biological opinion, required that the Army Corps establish this inter-agency working group, and I think that was the group that you guys might have been talking about earlier. So this inter-agency working group has been involved in developing the reconnaissance level plans for characterizing the coral reefs and surveying the coral reefs, and for Endangered Species Act listed corals I could go into more detail on that, but I won't. But I will say that one of the biggest lessons, one of the many, many lessons learned from Port Miami, is that we've realized that words on a page don't always translate well to what kind of information is collected in the field. So one thing that we've done is we've spent a lot of time actually crafting the datasheets that the divers will take in the field with them, so that there's more transparency as to what is being described as being needed to be collected in the field as opposed to what is actually collected in the field, and so those are included within these survey plans. And, the Army Corps in February restarted their scoping under the National Environmental Policy Act to redo their environmental document, and so a new Environmental Impact Statement or Environmental Assessment will be available for public review at some point in time, and NMFS and the Army Corps have committed to redoing the biological opinion that was finalized back in 2014 to reflect what we've learned in Miami since then. I'm happy to*

*provide updates to the TAC, we could just wait until we have some substance to pass along, and work with whoever to get that information to you. Kurtis is my alternate on the inter-agency working group, and Ken conveniently disappeared but he's on the inter-agency working group too. If you guys are interested, we're happy to keep you informed, and if you have the bandwidth to help us to help us review and develop some of these plans, we would certainly welcome any additional technical support.*

→ (David Cox) *Next we're going to talk about the turbidity standards. Ken Weaver from the DEP's Standards Program. One of the goals of today's session is to get feedback from you about stressors, about the aspect of the resource that you wish to protect, and generate information. And then we'll end the session with talking about that SEFCRI proposal that's going to revise the turbidity standards, and look at methods for monitoring. For which we'll probably have two group sessions to work on the two different aspects of that proposed idea. And with that, I will hand it off to Ken.*

2. (Ken Weaver) *Alright, thank you David, and thank you for having me today. I've enjoyed the discussions so far, thank you for letting me come and listen in.*

- Surface Water Quality Standards Components
    - Use designations (classifications)
    - Water Quality Criteria
    - Antidegradation policy
    - Relief mechanisms
    - ("Three-legged stool": criteria, designated uses, antidegradation)
- Surface Water Classifications
    - Class I: potable water supplies
    - Class I-Treated: treated potable water supplies
    - Class II: shellfish propagation or harvesting
    - Class III: fish consumption; recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife
        - "All water should be fishable and swimmable"
        - Water quality supports a healthy aquatic community
        - Water quality supports recreation in and on the water
    - Class III-Limited: fish consumption; recreation or limited recreation; and/or propagation and maintenance of a limited population of fish and wildlife
    - Class IV: Agricultural water supplies
    - Class V: Navigation, utility, and industrial use
- Water Quality Criteria
    - Set to protect designated uses of a waterbody
    - Based on sound scientific rationale
    - Aquatic life or human health-based
    - May be expressed in numeric of narrative form
    - Magnitude: how much of a parameter
    - Frequency: period over which the instream concentration (or load) is averaged or evaluated
    - Duration: how often can the concentration (or load be exceeded)
        - In terms of turbidity, duration is probably an important parameter

        - Criterion for turbidity could be made to be more complex than a single number
- Standard (Toxicity Based) Approach to Aquatic Life Criteria
    - Use $LC_{50}$ and $EC_{50}$ experiments to determine acute and chronic criteria
    - FL has historically been stringent
    - Supplying an acute threshold that can never be exceeded might be useful
- Other Approaches
    - Empirical stressor response models
    - Reference condition or reference period approach (maintain data distribution associated with healthy condition)
    - Scientific literature and expert judgement
    - Mechanistic models
    - Multiple lines of evidence
    - Regardless of approach, must demonstrate that designated uses (healthy, well-balanced population of fish and wildlife) will be protected
- Conceptual Model
    - Useful to help explain relationships between stressor and resulting ecological condition
    - Explains relationships between biological, physical, and chemical conditions of a water body.
    - Break down into manageable chunks:
        - Management Goal
        - Assessment Endpoint
        - Measure
        - Stressor
        - Source
- Management Goals
    - Statements and goals related to propagation and maintenance of populations
    - Protect coral species growth, fecundity, recruitment, and survival
        - Successful spawning
        - Successful larval recruitment
        - Insignificant increase in larval mortality rates
        - Insignificant effects on growth
        - Prevent mortality events

Questions for Ken Weaver:

1. (Ken Banks) *David at this point, it's the interactive part, right?*

2. (John Fauth) *In the definitions, what's considered shellfish? Are lobsters shellfish?*

    → (Ken Weaver) *From the standpoint of Class II, it's usually the clams and oysters.*

    → (John Fauth) *So real shellfish.*

→ (Ken Weaver) *Real shellfish. But I think when you look at the definition under the Clean Water Act, when I go to goals, when they talk about shellfish, then they are talking about the crabs, and the shrimp, and the lobsters.*

3. (John Fauth) *Can you back to slide 11? So those specific endpoints, the first three are going to be seasonal, so they're not going to be much good outside of spawning or recruitment season. And corals grow so slowly that you might as well forget about. And the same thing with preventing mortality events. If you're into a mortality event, then you're too late. So you need something that responds much more quickly. That's going to be a challenge figuring out what that is. It's going to be something at the subtler physiological level, not at the ecological level, that's a problem.*

→ (Ken Weaver) *I agree. And we could express the criteria, if need be, on a seasonal basis, too. If there was a need to.*

→ (David Cox) *There has been that discussion, say during coral spawning, then your criteria change a little bit. They become more stringent, for example. Shut down a project much quicker.*

→ (John Fauth) *You're getting away from turbidity and a few of us almost jumped out of our seat. That's probably 90% of the battle right there is getting away from these kind of standards because that's not what's important to the coral. Transparency, I think we've got a fairly good handle on that, but sedimentation is tough because it depends on the nature of the sediment. And so a lot of times maybe the problems not the sediment, per se, it's what's bound up in the sediment.*

4. (David Cox) *Alright so you guys have already started on a conceptual model, and that is the idea, to start generating feedback.*

5. (Margaret Miller) *It's very good news to hear you say that we're not bound to turbidity because that's been a concern because that obviously isn't what affects corals.*

→ (David Cox) *And to back up that, they have up in Tallahassee mentioned that perhaps to calibrate TSS turbidity, perhaps, because TSS is a better indicator of stress.*

→ (Margaret Miller) *There's no direct, I mean that's a variable by region.*

→ (David Cox) *Well that's exactly the point that has come up, is that it would be project by project, and would vary by region perhaps, but it might give you some additional tool where you could measure turbidity and then come up with some sort of calibrated TSS value.*

→ (Ken Weaver) *Because the talk from Jen was that that would be done on a project by project basis, but practically I'm not sure how they do that either. She's used to working with the dredgers and to kind of let her run with that idea, but I'm not sure how you do it.*

6. (David Cox) *So that's what the conceptual modeling exercise is for, to look at these management goals, the aspect of the resource that needs the protection, but also in terms*

*of sensitivity, which is the most sensitive that we should be targeting?. For example, successful spawning, how would that be affected by what amount of turbidity or sedimentation. And then we also want to have the best indicators of stress. I think that you guys could provide that feedback.*

→ (Ken Weaver) *Or the management goals that lead down the path that is most likely to be fruitful. Because talking with Joanna, I know the timeframe here is we'd like this sooner rather than later, and these standards developments can take a while. We are committed to try to get it done in the timeframe, if we can bring the science to bear, we're trying to move it forward.*

7.(Kurtis Gregg) *Ken, you mentioned sedimentation was difficult to assess, one of the things that we saw in the experience with Port of Miami, is there was a lot of sublethal sedimentations stress on the hard corals. There was time to do something, but the dredge never stopped, and it continued on the mortality was pretty high, I think there, sublethal indicators would be appropriate criteria.*

→ (Ken Weaver) *Yeah, to be clear, we're not talking about setting criteria at the lethal level, we're talking sublethal, we want to protect these communities.*

→ (Esther Peters) *And that comes back to who makes the decisions about the dredging (inaudible).*

→ (Kurtis Gregg) *Yeah if there's not a regulatory trigger, the dredge is not going to stop.*

→ (Ken Weaver) *Yeah I think the interest in that is as mentioned, so our dredge folks, you want to stop the dredge before there's a problem, so what they need is a quick measure. So either NTUs, or even water clarity, is a measure they could get very quickly in the field and then make a real-time decision whether or not to stop that process. Something like TSS needs to get sent to the lab, and there's several days turn-around and by that time it may be too late. So there's just the interest in having a measure that could indicate a problem very quickly. Those dredges move, and maybe by the time we have the answer, it's moved and already caused the damage, and we want to avoid that damage.*

→ (Esther Peters) *It has to be something quick.*

→ (Ken Weaver) *Yes.*

8.(Piero Gardinali) *Let me ask a question for the coral folks. NTUs are easy to measure I mean it's what we measure right now, so there's hardly something easier than that, but the symbionts require light to perform, right? We can measure the photosynthesis capacity of the symbiont and relate that to the NTU, that's probably the easiest thing to do for sublethal stress in the coral? Is there data already available?*

→ (Margaret Miller) *I don't know. Why would you not just measure the light? That seems just as quick to measure, and actually the functional thing that corals care about. And so it seems to me that, as the quick and dirty, as the projects are going on, how*

*you keep tabs on things on a day to day basis, I don't see why light incidence, on the coral at the bottom, isn't the easiest indicator to work with. Now there are other parameters I think that we still want to worry about, like deposition and things falling on the coral, but for that quick and dirty as the project's going on, light is the easiest relatable to the coral health responses that we're going to be depending on.*

→ (Dale Griffin) *I think you're right, but I don't think light has ever been used to assess water quality. At least turbidity there's a record (inaudible).*

→ (Esther Peters) *With algae and whatever, light quantity and quality (inaudible) and related to turbidity, it may be faster just to measure the power.*

→ (Nancy Craig) *What if you are in the canal? There's no corals in the canal.*

→ (Margaret Miller) *Well then this is a good criterion, this isn't the Class III that's going to be abided now, is it?*

→ (Nancy Craig) *Yeah. That's what they are, they're Class III waters, it's going to be a state-wide standard.*

→ (Margaret Miller) *Corals are the most sensitive component.*

→ (Ken Weaver) *I think it would be likely a regional standard, maybe the SEFCRI region, it would be an area where corals occur, and that would be a part to decide too, but. This was designed to protect the corals, not the canal, so it would be kind of a regional thing. I think the canals for right now would continue to have the current criteria.*

→ (Kurtis Gregg) *The point was made that measuring light is definitely useful during the day, but the dredging is operating at night, as well.*

→ (Margaret Miller) *Are they actually going to be dredging at night though?*

→ (Kurtis Gregg) *Yes, that's the problem.*

→ (Dan Kipnis) *At Port Miami they did not dredge at night, they only did it during the daytime.*

→ (Lew Gramer) *I just want to chime in here. Regarding the Port of Miami dredging, the turbidity is measured frequently, and it's measured in terms of distance upstream and downstream.*

→ (Dan Kipnis) *Four times a day. Weather permitting. Many times, I got every single turbidity report. Many times they didn't do at all because they were in a little boat.*

→ (Jack Stamates) *So just the question about light, I look at sea temperature variability so I was looking at light, you know there's a lot of confounding variables When do you measure the light, if there's a cloudy day, is there wind, what is the wind climate like?*

→ (Margaret Miller) *But that's why you still have, the same thing is true for turbidity, if it's windy it will be more turbid than when it's not windy. I feel like that's true for any parameter.*

→ (Jack Stamates) *Right but the scale of variability for available light will be much finer, and so as a result you have to do more measuring to get a representative. The technique (inaudible) two light sensors (inaudible).*

→ (John Fauth) *It seems to me that some of the projects that I've been on, I did one off the north shore of Puerto Rico, there was a road project and they were being a little sloppy with containing sediment, and so the sediment got on top of the coral that we had just sampled the week before, so it was actually that deposition that was killing the palmata in this case, now they got saved by a hurricane that was just far enough offshore, waves big enough to clean it off but not to smash it. Now you've got to figure out the sort of chronic effects of the light, but we've got the acute effects of the deposition, so some sort of sensor that can give us those measurements would be the way to go. Yeah, a combination of sediment trap, sort of shelf sediment trap and a light sensor on it.*

→ (Brian Walker) *So what he's saying is try to build the better mousetrap, trying to figure out the better sediment trap.*

→ (Jack Stamates) *I'm not advocating, but there is a Miami company that specializes in water quality and sedimentation measurement devices, and they are incorporating standard turbidity sensors in that (inaudible).*

9. (David Cox) *We're getting a little bit away from the conceptual model exercise, we're going to start with the management goals, those aspects of the resource that we should be targeting and focusing on. And with respect to helping DEP move their work forward, and come up with some threshold and number that they can at least view the background and supporting evidence for, then to be able to revise the standard. So we have some examples of management goals, we would like you to consider them, and suggest new ones that they should be looking at. And then at the same point, start thinking about the assessment endpoints, and how we can come up with the best indicators of stress, which you've been doing, you've been talking about, and that's great, that kind of information does feed into the conceptual model.*

→ (??) *I think what we can point out is that everything that's under management goals examples is not operational, and so we need something else.*

→ (Dana Wusinich-Mendez) *Well the goals don't have to be operational right, the goals are just things you're trying to fix?*

→ (Margaret Miller) *That's what you're measuring that would be the indicator. I think spawning and larval recruitment are appropriate management goals. They may or may not be particularly quantifiable to a greater or lesser extent, but I think they are appropriate management goals.*

→ (??) *We need to identify specific stressors that are going to affect the viability of those management goals. For example the success of spawning, if we have suspended solids, we're not going to have successful spawning, so we need to look at stressors related to that.*

10. (Dale Griffin) *I saw something on the Clean Water Act, some aspects of it may be on the chopping block under the new administration, so should [sic] standards and definition may shift and change in a relatively short period of time.*

→ (Ken Weaver) *So the part of it that's on the chopping block is what's called Waters of the US, and that was a recent EPA, Corps of Engineers rule related to Supreme Court decisions about what is going to be included and protected under the Clean Water Act and what's not, and a lot of it had to do with non-perennial systems, maybe some treatment systems, and I don't think that's going to be picked up by this. And as my division director said, all this stuff, we're basing it on the Clean Water Act, but it's all being implemented under current state law and we don't expect that to change. The main thing's going to the be that Waters of the US, which isn't going to affect it.*

→ (Dale Griffin) *I'd just kind of like to make a point that I think turbidity is a great tool for dredging and monitoring dredging, but I know many waters I've studied that are crystal-clear, they're loaded with pathogens, and so forth, so lack of turbidity doesn't mean lack of risk. And there's issues you can look at even with dredging, so there's a remobilization of certain types of microorganisms in the water column that would extend their transport much beyond the range of the turbid cloud.*

→ (Kurtis Gregg) *I think it's important to find a management goal to maintain what actually reflects what we're trying to do, incorporates the stressors, I think what we're trying to do is maintain conditions, environmental conditions for the benthic organisms. I think that is probably a more clear example than what we see here.*

→ (Jocelyn Karazsia) *Yeah I was just wondering if successful fertilization is an intermediate step between one and two that needs to be called out, or it that's something that was intended to be covered in one or two.*

→ (Margaret Miller) *It's a good point, it could be a separate step.*

→ (Kurtis Gregg) *And this is the simplest conceptual model, too. We could have confounding factors, and additional steps added in, but it fits between one and two, yes.*

→ (James Byrne) *We should consider where we would fit in stress level of the system at its current state, and if that changes, then that would then necessitate a change in criteria. So if we're actually have a bleaching event that's starting to coming on, how should the criteria be adjusted for that, it's not the same if the system is in stress already.*

11. (Ken Weaver) *It wasn't something we were looking into. How would we implement that? I understand what you're saying. Stress relates to the seasonality.*

→ (Kurtis Gregg) *One of the main items that causes that synergy is sea surface temperature, and you could actually combine a sea surface temperature with a turbidity measurement.*

→ (Brian Walker) *The surface is easy to measure from space.*

→ (John Fauth) *The other item was number six on the potential negative steps, I'm not sure it's above baseline, it's the below effect, you see what I'm saying? So if the corals are close to the tipping point due to elevated ocean temperatures then you don't have much room to go, vs above baseline, that doesn't help you understand it.*

→ (Ken Weaver) *Right, and I think David might have added that one thinking about current criteria and it's expressed as something about above background, natural background, and we're not tied to that either, our thresholds may make more sense, or a combination.*

→ (Margaret Miller) *A combination. It makes more sense. It does makes sense over baseline, you're going to have different baselines, maybe, but there are also absolute ceilings, especially with light, where that's always a problem no matter what your baseline is. So a combination is the only that makes sense in that regard. So a baseline with an absolute ceiling, or floor, whatever you want to call it.*

→ (Jocelyn Karazsia) *I don't know how this would fit into your model, but in an area like offshore right here, where the disease event has really devastated the coral community, we're in dire need for several years of successful spawning and recruitment events, so it might be even more important to adopt something more conservative in this particular area, in order to help the area recover from the disease impacts, than it may be in other areas that were less affected by the disease.*

→ (Dan Kipnis) *That new system you were talking about, could do it (measure day and night)?*

→ (David Cox) *One of the main goals today also was to address the SEFCRI proposal that came forth regarding this, the two-part proposal, one of which is to set turbidity standards, and also to look to improve the monitoring. It looks like we've had a little bit of conversation on both aspects, so to really address that SEFCRI need and proposal, what we'll do is break up into two different groups. One will focus on the turbidity standard aspect and come up with project ideas. The other group will work on the methodology aspect, how to get the measurements that we need.*

NO PUBLIC COMMENT

<u>Report Out</u>

Setting new standards:

(David Cox) *Alright everybody, I'll kick off the set new standards section. So we started looking at a project-level approach to setting new standards, and we can sum it up in three words: look to Australia. We realize that a lot of great work has been done in Australia, so*

*why reinvent the wheel, whether that's looking at their experiment approaches, their in situ measuring…And in that regard, we thought for a project we would start off for a literature review, and focusing on what they're doing over there. They have an entire institute created for this purpose. And a couple of the focal areas that the lit review would focus on are light attenuation and shading, sedimentation and deposition, and with respect to those two, knowing that the impacts are different for different species. And also probably looking for transfer from species in Australia to species here. And also, with respect to sedimentation, would be looking at what's in it. We know that a high organic content in the sedimentation leads to microbial remobilization and toxicity effects, so that would be another focal area of a lit review. Another big aspect of this lit review would be looking at the lab experiments that have been done over there and seeing what also could be transferred over here. And aspects of that would be again, looking at different species from a perspective of vulnerability, knowing that certain species are going to be more vulnerable to sedimentation, deposition, light attenuation, and shading. Cervicornis was mentioned, it's pretty sensitive to these stressors. And that we would also for the purpose of these lab experiments look at different morphologies, such as the plate or flat corals. So in a nutshell, we would like to look towards Australia.*

New methodology:

(Aubree Zenone) *Okay, so we went over new things that we decided to do, we have recommendations for how their implemented from this side of the room. First of all, when we're using the different methodologies to determine the effects of the dredging, the sedimentation, the turbidity, etc. These arrays that are collecting these data should be displayed in a grid pattern in the assumed or studied approximate plume area. We need to resolve the biological toxicity of the sediments, so the origin of the material, understanding what the native sediments are. This would obviously have to be done prior to the dredging itself. That way we know how to anticipate what might be covering the corals in the future. We need to do aerial surveys to determine the extent of the plume. This could be anything from drones, motus (?), satellite data, acoustic Doppler, ADCP, or even the building across the street with the camera on top of it, just to see in real time the size of this plume and where we need to be collecting this data. Criteria could be contextually dependent on other stressors such as temperature, spawning events, etc., so these compounding effects on the stress of corals and so it would be wise to include all of them at the same time. The idea here is that when we cross any of these thresholds or meet any of these criteria, there's a button that you press and it shuts the dredge off until these criteria are lowered again. So that's the idea we're operating under. We should not dredge during water management actions, the background NTUs should not be a moving target, potential asymmetrical currents across the inlet should be accounted for in dredging areas, and is also contextually dependent upon currents. There is a new paper and Margaret, could you describe a little bit about that device that you identified that might better measure*.

→ (Margaret Miller) *Yeah, it's that same group in Australia, but they've developed a paper, I think in press, that describes a surface that can be tailored to mimic a coral surface, with fiber optic tunnels where sediment deposits as it would on a coral surface, and then fiber optics are used to quantify that sediment deposition, so it's a means of*

*logging sediment deposition in more or less in real time. It can be deployed in the field and behave as a coral would be, receiving that deposition.*

→ (Aubree Zenone) *Thank you. She has that paper if anyone's curious to look at it. Finally, if conditions are such that methods determining the dredge button being hit and being turned on and off cannot be deployed, so if we can't go out and collect this data, if the arrays aren't giving us information, should the dredge keep going? So that's one of the questions that they need to ask when applying new methodology to this dredge. Does anyone have any questions or comments? Group, did I adequately cover what was discussed?*

Adjourn

**DAY 2 SPRING 2017 TAC MEETING**

***Introduction***

David Cox introduced himself as the FDEP LBSP coordinator, welcomed all in attendance to the Southeast Florida Coral Reef Initiative (SEFCRI) Technical Advisory Committee (TAC) meeting, reviewed meeting participation guidelines for TAC members and observers, which included the facilitators' role, guidelines for discussion, consensus rules, comment card procedures, and the use of meeting evaluation forms. David then reviewed the day's agenda.

***Session #1: TAC Wastewater Outfall Project Discussion***

1. (John Fauth) *The design is pretty straightforward; it's a regression design. So you have a point source and we need to look at the weight of them to see the zone of influence. Due to the limit of the budget we can't go northward and southward on the outfall to get both directions. So we chose going northward which may or may not be where the prevailing current is. The prevailing idea is you have some exponential decay, a dilution as you go away from the source. To fit that curve with a regression [is] what really matters, its not the number of samples at each site but how many points you have along the distance. So it's a compromise from doing a regression analysis like folks normally do in a regulatory world. Taking triplicate samples at each of the eight sites is the way to do it without blowing the budget. We could go down to just duplicate samples and that would not affect the analysis at all but folks do triplicates so we will stick with triplicates.*

→ (Don Berhinger) *So has the sampling already been done?*

→ (John Fauth) *No. This is all new.*

→ (Don Berhinger) *What would preclude you from going to get all the samples in one day?*

→ (John Fauth) *It's the depth. It's about 90-100 feet so that limits bottom time and the number of dives.*

→ (Don Berhinger) *If you went out with some current meters and got a reading of which way the current is actually going, how long is it going to stay in a certain direction? You could go out a get a sense for which way it is going at that time before you go and sample. To make sure that when you sample it is not flowing south.*

→ (John Fauth) *As long as you are sampling for organisms you are probably safe.*

2. (Kurtis Gregg) *Based on observations from Miami work looking at sediment distribution, we expected to see that gradient where you got the dredge working and you see that gradient across the reef and it was very heterogeneous. It's not linear. You are not going to get that sloping because of the habitat and because of the dynamics and the eddies that we know occur out there.*

3. (David Cox) *Let me add one caveat, we need to have some locations set up in advance. We cannot be trying to modify this on the fly. Unless we could come up with a list of coordinates, Dave could help us with this.*

→ (Dave Gilliam) *I think we have to do that. Use our long-term data to make the best decision of where they should go and then go for it. We are trying to look at the long term effects of the outfall and that is what is going to tell us.*

4. (David Cox) *We are not going to make it to the methodology today. Sampling will take place over the next 2 year state fiscal period starting July 1st. The proposed sampling design calls for dry season meaning we wouldn't get in the water until November 2017 but most likely not until January, February, March of 2018. Is that a safe assumption?*

→ (John Fauth) *Yeah. We want to try and narrow down the influence as much as we can. We need to focus on the outfall and avoid all of the confusion we talked about last time.*

5. (David Cox) *So today's main goal is to look at this list of parameters and narrow that down to make a choice there. After that we will pick apart the other parameters and methodology and site selection. Today we will have some time to get into the weeds but first things first talk about what we are going to sample.*

→ (Richard Dodge) *You have to decide what you are looking for. Are you looking for long-term effects in the sites?*

→ (Jack Stamates) *We are talking about benthic sites.*

→ (Richard Dodge) *(inaudible)*

→ (Dale Griffin) *We are looking for long-term effects in whatever organism there may be. We may screen a suite like we have done in the past.*

→(David Cox) *With that how about I show you a list of proposed parameters.* (See table below.)

6. (Dana Wusinich-Mendez) *This project is included in the new cooperative agreement proposal. We have a whole slew of requirements under NEPA. In order for me to get this project cleared I have to be able to say that more or less what we are going to sample and that we are not harming listed species whether by taking tissue from them or disturbing them as a side effect of other things. We have to provide this level of information to get funding.*

→ (David Cox) *That is our second goal today. First is to choose the parameters and then second answers these questions based on permitting.*

7. (Jack Stamates) *The average over 2 year period at the Hollywood outfall is the north component is positive at 7.1cm per second and the number that were positive was 56% of the time.*

8. (David Cox) *The goals of today are to decide the parameters and then after that see how they answer the NEPA questions that we have to answer for the permit requirements based on what you have selected as the best parameters to determine the zone of influence and the impact on the biota.*

→ (Esther Peters) *Didn't Dana just say that if they are listed species we can't touch any coral?*

→ (Margaret Miller) *The permit is coming from FWC. We will have the proper permits anyways.*

9. (Don Berhinger) *From an experimental perspective, what about putting coral fragments or sponges, putting out a suite of things that we are interested in and put them out at known distances. We can sample before we put it out there and after. We can put it in an array in both directions, its relatively easy, and then going down and collecting them when you are done.*

→ (David Cox) *The funding lasts for two years but its for a one and done sampling.*

→ (Don Berhinger) *It is just something to consider because everybody knows when you are going out sampling the natural environment there is so much variability. Just in locations and determining how far you are going between locations.*

→ (David Cox) *I think moving forward any ideas like that can build upon this effort but which don't bust the bank may work well.*

10. (Kurtis Gregg) *Getting back to john's description of the transect, what is the distance from the outfall of those eight locations?*

    → (John Fauth) *Well it is exponential. The closest one is as close as you can get to the outfall and the furthest one is 1.7 km or something like that.*

    → (Jack Stamates) *I would reduce that in terms of nutrient concentrations. Our lab shows you are done by a kilometer.*

    → (David Cox) *That is a question we need to address but let's start with the parameters.*

    → (Valerie Paul) *Once you get 2 km away from the outfall aren't you close to where you are getting inlet influence?*

    → (David Cox) *So these are methodology questions. Let's take a look at the proposed parameters that can out of the sampling design from the pilot project. This budget includes $4500 for a boat assuming we sample for 3 days. These are the quotes I got over the past 2 months.*

Outfall Project Proposed Parameters Menu

Budget $19,500

| Entrees (Pick One) | Sides Pick (2 3) |
|---|---|
| **Bacterial Resistance ($12.5k)** | Seawater Microbiome ($700 + data analysis) |
| **Benthic Surveys ($12k-$17k)** | Stable Isotopes (coral, sponge, algae, sediment, water column) ($2200) |
| **Coral Gene Expression via Transciptomic Analysis ($15k + Data Analysis)** | Sucralose ($1500) |
| **Comparison Microbial Community ($10.8k + Data Analysis)** | Water Quality (TSS, Chla, CDOM) $1000 |
| **Genotype Comparison via microsatellites ($8100 + Data Analysis)** | Water Quality (nutrients only) $3000 |
| **Targeted Genetic Sequencing ($10k-$12.5k)** | Water Quality (full nutrients + TSS, Chla, CDOM) $4000 |
| ***Norovirus?*** | |

11. (David Cox) *Does anyone have any questions about this?*

    → (Ken Banks) *If we are trying to focus on what would give us an integrated signal why would we measure water because its all over the place?*

→ (David Cox) *Then don't vote for it. It may be too many options but if there is something that makes no sense based on this oneand-done sampling protocol then just ignore it.*

→ (Lew Gramer) *If we are looking for accumulation of reagents, are we doing sediment nutrient analysis?*

→ (David Cox) *We do have sediment under the stable isotopes.*

→ (Valerie Paul) *Just to comment on the stable isotopes I think we are just talking about carbon and nitrogen.*

→ (Diego Lirman) *We need a strong hypothesis statement. What are we trying to ask?*

→ (David Cox) *Really zone of influence. Its something that hasn't been done. It's only eight sites so it is somewhat limited north and south. Then after that look for signals that indicate an impact on the biota. That's why an impact gradient is needed. For example, Dale in the past has seen the norovirus out there and it is coming from one source and the sucralose could be tied to it too. Start over on the survey if you already did them.*

12. (Francisco Pagan) *Before you start just remember that this is a compilation of the previous TAC project. You had a question that you wanted answered. We combine all this information. Please do not see this as a project with a small budget that needs to happen, this is your project and you can contribute. This could be as big as you the TAC could make it.*

→ (David Gilliam) *Going back to what Francisco says this is not going to get done if we don't have commitment from people in the room. Getting out on a boat and working in 90 feet of water it is too costly. I can put together a budget to have my lab do all of the fieldwork but its not going to be $19,500 and I'm cheap. There has to be some commitment.*

12. (Ken Banks) *How long does it take for each of those things? I know benthic surveys take a long time.*

→ (David Cox) *Does anyone have any experience collecting coral tissue and can speak to the time needed?*

→ (Margaret Miller) *It's finding them.*

***Bacterial Resistance- Dale Griffin, USGS***

- Outfall affects the ecosystem permanently
    - Need organism with high metabolic rate (larvae, fungus, bacteria) to show resistance
        - Like African dust study where vibrios goe up in 24 hours and then they become dominant member

- Proposed antibiotic resistant genes in the sediment
    - Based on USGS project from NE Coast of US
    - 277 sample sites along rivers, estuaries, and beaches
    - Tested based on plant samples from Broward County that Ken Banks took that had 11 out of 15 antibiotic resistant genes
    - Washington, DC had the same number of hits as Broward County sample and it was from the Potomac near a sewer outfall
    - Sites with highest hits were near outfalls and sewers because we are dumping pharmaceuticals
    - Recreational human risk going from the outfall inward in future
    - Willing to self-fund at the end of the year if we get the money

1. (Kurtis Gregg) *What time scale Dale?*

    → (Dale Griffin) *Relatively quickly.*

2. (Valerie Paul) *Are you doing qPCR on all of those samples?*

    → (Dale Griffin) *I had a digital PCR machine that gives me a number of gene copies in that sample.*

3. (Francisco Pagan) *If we take a sediment sample can we keep it a while?*

    → (Dale Griffin) *Yes, you can freeze it down.*

4. (Margaret Miller) *These were sediments, right? It's not like coral mucus?*

    → (Dale Griffin) *My plan was sediments. Coral mucus has not been looked at.*

5. (Lew Gramer) *I have a statement. Chris and Maribeth are on their way. I think it is a supplemented project. They can sneak a small number of samples in with one of their projects for sequencing and microbial source tracking.*

    → (Kurtis Gregg) *That is the smoking gun that Joanna is looking for. What is the link from LBSP to the coral reef ecosystem? That's the smoking gun.*

6. (Margaret Miller) *Maybe I'm missing something but the coral genotyping, I don't see how this tells you anything about LBSP. It's a shame that Josh is not here to explain the transcriptomics stuff. That response of the corals is a strong link to the outfall. I don't know what that resolution is. It would be helpful to have a better understanding of that. In theory those types of stressors can be seen in that. I don't know what the sampling changes are for that as well.*

    → (John Fauth) *We have to get the same species across the board for each site. We can't afford strikeouts anywhere.*

→ (Margaret Miller) *At the outfall site there are not that many corals there to begin with.*

→ (John Fauth) *There are two challenges there with the transcriptomes. We don't the function of all of these genes and it will tell us a xenobiotic response but we don't have an idea to the quantities at the pipe. It will be useful in concert with the benthic surveys with the population of the community level. The transcriptome work could say what components within the outfall are most problematic.*

→ (Esther Peters) *We need histology in order to be able to interpret the data, we need to know what the coral tissue is doing.*

→ (David Cox) *So what I'm hearing is that ideas are surfacing for leverage of this effort. We could collect samples for you also as an aside. When you rank these take that into consideration also. Please put that in the comments. We will have this leverage outside of this meeting.*

7. (James Byrne) *Going back to the species, I think we need to look at protected species.*

→ (Margaret Miller) *I did one dive there, there are not a lot of choices for corals that you are going to sample at the outfall site. Again, further along the transect you might see Orbicella.*

→ (James Byrne) *If Orbicella is present at that depth away from there but that could be the reason they are not there. That could be a great way to show it.*

→ (John Fauth) *So at the outfall we have at least one sample for cavernosa, astreoides, and siderastrea.*

→ (Lew Gramer) *Genotype comparison is not a direct function. It would be hard to link it to the phenotype but isn't the outfall (inaudible).*

→ (Jack Stamates) *The point of the outfall is for the water to go up to the surface.*

***Session #2: Outfall Project Parameter Selection***

1. (David Cox) *Here are the results. It looks like everyone went for the lobster. The transcriptomes was popular even without Josh here to explain it.*

→ (Valerie Paul) *I think you should shop it around.*

2. (David Cox) *I'd like to get more info. There is talk of using this federal money as a source for other small grants to fund some of this work. Looking inside this room for some resources and volunteering time. We have options on how to proceed. I'd like to ask your suggestions on how to move forward?*

→ (Valerie Paul) *I have a question for the group as to why stable isotopes wouldn't rank higher?*

→ (John Fauth) *Maybe we need to have some samples from the Bahamas and the Keys as well to figure out a signal.*

→ (Diego Lirman) *It's cool and novel but on a one shot deal I worry about the signatures staying on in both spatial and temporal scale.*

→ (Ken Banks) *Variability is huge.*

→ (Don Berhinger) *Everything you keep saying just points to an experimental approach provided we can get those corals. If we put them out in a set array, the tissue turns over fast enough and we know exactly what they were when they went out.*

→ (John Fauth) *I have already done a three-way reciprocal transplant like exactly what you describe. We took them from Port Everglades, the Hollywood outfall, and a control site. We had three clones from each site, fragmented them, put them on tiles, and moved them out. At the end of two years there was no significant differences.*

→ (Dale Griffin) *I think from the transcriptomic it would be cool to see the data from two samples just as a pilot to assess how useable it is. You might get masking and its not clear cut on interpretation.*

→ (James Byrne) *It might help at the next meeting if Josh could be here to see what he found up in St. Lucie.*

→ (David Cox) *One problem with that is you are getting away from using the first year of funds. It has been proposed also that you use the money to fund a substantial collection effort and some would be archived and then prioritize them for analysis and processing. I don't know if that gets you anywhere in this conversation right now. We still need to select how you want to use that money.*

→ (Valerie Paul) *The stable isotopes is easy to do.*

→ (David Cox) *You could shop around the transcriptomic from several sources. It would dominate the budget but you could choose that and stable isotopes.*

→ (Lew Gramer) *To answer the question as to why stable isotopes wasn't higher in my book is that I assumed you could wiggle $2200 into whatever else you choose.*

→ (David Cox) *I could create a new survey using the top 5 or 6 options as sort of a run off. That is another option as well.*

→ (Dale Griffin) *If someone could show me if the transcriptomics is successful as a source tracking tool in the past. For number two that is my thing and we could freeze them down and use whenever.*

→ (Margaret Miller) *Isn't that true, we are looking at a gradient with the source tracking from a spatial source tracking.*

→ (Dale Griffin) *I can't recall that assay being used for a source tracking experiment before. Are you looking at proteins or the cell in general? If someone has used it it's a lot of data.*

→ (David Gilliam) *We don't have enough money to do what we want. We know all these thing require some type of sampling. Maybe the first round is going out and committing to collecting samples and then having to feed that into addition grant writing or in-kind service but otherwise you just keep going around and around.*

→ (David Cox) *We do have state money that needs to be used in the next fiscal year that would cover the stable isotopes. It's a mix of federal and state but the amount in the state would cover stable isotopes and that needs to be spent by June 31, 2018. Federal can be pushed, that would buy time and it would be nice to get some resolution and output. Maybe the stable isotopes would do that.*

→ (David Gilliam) *We need to be careful that we don't… it's important information either way.*

→ (David Cox) *There are other avenues. We've heard about Chris' offer and we could try and leverage this as much as possible with partners or connections.*

→ (Valerie Paul) *We could possibly do the microbiome analysis for just the cost of it.*

→ (David Cox) *Joe has offered to prep the samples and provide the supplies so that is the first step there.*

3. (Aubree Zenone) *I'd like to switch things up a little bit. I'd like to hear about the antibiotic resistant bacteria. It seems to have gotten quite a few votes. Who has thoughts on that?*

→ (Dale Griifin) *That's a large chunk of the budget and like I said might be able to self-fund that but I just don't know it right now. I would say collect the samples and stick them in the freezer. Now back up to number one, the transcriptome work that is RNA based. RNA is a very short-lived molecule so I don't think freezing over a long period of time could work for that. That is something to keep in mind but it would nice to have someone present on the topic.*

→ (Esther Peters) *My thought on that is there is sediment everywhere so* (inaudible).

→ (Kurtis Gregg) *Getting back to Aubree's question about thought on antibiotic resistant bacteria. I think that is a parameter that gives us a connection to both the coral reef ecosystem and is there an effect. Yes. The number of theses can tell us there is an effect on it but what they don't give us is a linkage back to the coral reef ecosystem. That one gives us both.*

→ (David Cox) *By these numbers we could fit both the stable isotopes and the antibiotic resistance work. We do have the funding for that. Esther?*

→ (Esther Peters) *If you get a sediment sample could you also sequence a microbial community in a sediment sample while you are at it? Instead of doing coral mucus you could also tell whether your potential pathogens may affect any marine organism. Then we might have a better idea of why things are growing near the outfall.*

→ (Dale Griffin) *We could do the microbiome. I agree that the coral surface, mucus layer, would be hard at this point, like what Margaret was saying. Like I say you could freeze it down and do it later.*

→ (Valerie Paul) *We have a lot of microbiome in coral mucus already published so its comparable.*

→ (Esther Peters) *I was thinking what is affecting other sediment organisms too.*

→ (Don Berhinger) *Those communities could change through time so I wouldn't say you samples them too far apart when you sample the sediment and the organisms.*

→ (John Fauth) *They want to do all the sampling simultaneously.*

→ (Lew Gramer) *I have some additional text information. They can do water, mucus, coral tissue, sediment, seagrass mix and match however you want as long as you have the permits. The free analysis they are talking about is 16S and 18S RNA sequencing for biodiversity and taxonomic ID and for fecal indicator source tracking.*

4. (Aubree Zenone) *Any other thoughts on the subject?*

→ (John Fauth) *I just don't see how can you do anything without the benthic surveys. Folks are going to ask so what? How do you know the coral haven't just accommodated it? Like the biomarker stuff, sometimes the corals that are doing the best up-regulate everything in the book, that's why they are doing well. The way you tell is the condition of the resource. That to me seems critical. In the FRRP data that signal is coming through.*

→ (Ken Banks) *It varies so much spatially.*

→ (Margaret Miller) *What signal are you talking about? From an outfall?*

→ (John Fauth) *Yes, from an outfall.*

→ (Margaret Miller) *Ken, I feel like you have the best local knowledge. Do you think investing in a lot of surveys is worth it?*

→ (Ken Banks) *I just think about how much time it takes to do the surveys. There are not a lot of corals around the slope. Just SECREMP stuff on the transects.*

→ (David Gilliam) *It's transects and then point count and video. Each SECREMP sites is four twenty-meter transects. Then each one of those four stations, has digital images from percent cover.*

→ (Dale Griffin) *This study would require a survey at each of the eight sites. We have the outfall and we would need the same data type at each of the eight sites. That's what would cost us.*

→ (Margaret Miller) *I guess maybe one proposal is to not do demographic stuff but do percent cover to get some sort of benthic documentation and it would be a compromised approach on the benthic surveys. Just shoot video transects for percent cover and not do demographics.*

→ (David Gilliam) *You have to be careful. It depends on what methodology you want. What we are doing for SECREMP is capturing some of the colony. You can look at the images to see if we capture any recent mortality, condition data of stony corals is hard to get.*

→ (James Byrne) *To me thinking about it knowing the long-term impact we are trying to get at, this isn't an event that just occurred, it has been years and years. I'm not sure if one area with recent mortality that is closer or further away has anything to do with it considering we are looking at a long-term effect. I'm not sure it helps us answer any questions.*

→ (Dale Griffin) *I could see John's point, if we were going to go true north. If you go south you stay on that ridgeline. If you stay in that environment you expect to see the same number of corals, sponges, etc.*

→ (Ken Banks) *But you don't. It's not a homogenous system.*

→ (Dave Gilliam) *I go back to what I said earlier, go down and target samples and swim and take qualitative notes on what is down there. That can help us drive benthic surveys at phase two of the project.*

→ (Aubree Zenone) *Just to give you guys a heads up, we are making a new quiz with the top three ticket items or we could do a show of hands.*

→ (David Gilliam) *I'm not confident at all in my ability to make this decision. I count corals, I don't know what is the best.*

→ (Lew Gramer) *Kurtis suggested, Maribeth is on her way up here so she could shed light on it before we vote.*

→ (Dale Griffin) *This is a microbudget so remove my work off the list and we can just freeze the samples.*

→ (James Byrne) *What is the question we are trying to answer? So I can know which one is best for answering that question.*

→ (Dale Griffin) *Show a link for what is being emitted out that pipe and a negative effect on the ecosystem.*

→ (John Fauth) *All we want is to figure out the zone of influence of the outfall. The question about whether or not it has an effect we have answered multiple times.*

→ (David Cox) *If you know the microbial community has been altered then that is an effect on it.*

→ (John Fauth) *We have an effect we just don't know the distance*

→ (Aubree Zenone) *The question then becomes as a body here it seems that we need to designate the question we are trying to answer. It does not appear that there is a consensus here. Is the question the effects of the outfall or the range of the outfall?*

→ (Dana Wusinich-Mendez) *The effects are established. Can we agree that we are comfortable with the documented effects?*

→ (John Fauth) *The report got published in one of the symposium volumes.*

→ (Piero Gardinali) *I have a more basic question. The outfall is freshwater that is colored but do we have data on that, the extent of that thing?*

→ (Jack Stamates) *It is measured by CDOM.*

→ (Piero Gardinali) *Can I look at a picture that gives me an extent of the effect of that outfall based on salinity?*

→ (Jack Stamates) *Yes.*

→ (Deigo Lirman) *It is very dynamic.*

5. Maribeth Gidly arrives

→ (Dale Griffin) *If you freeze down samples how long can they be good for transcriptomic work?*

→ (Maribeth Gidly) *There are several process that have to take place. It depends on the type of sample, the samples need to be frozen very quickly. Do the extraction in one day while keeping them on ice or refrigerated, once they are extracted they can stay in a -80 freezer for over a year especially if you use a preservative like RNA Later. If you are collecting a sample and not extracting it quickly but put it in a -80, I'm not sure there are a lot of studies on how long you can hold it there before you extract it. We try not to hold it there for more than two or three weeks. I've never attempted to put RNA Later in sediments themselves but I know people who have put it into coral mucus or the polyps themselves and that allows it to stay longer and not extract right away. I've never done that.*

→ (Dale Griffin) *So like with DNA we use RNA inhibitor after it is already extracted. I'm not even sure what the longevity on that is. Do you know if someone has used transcriptome data to show fate tracking? To show a gradient from a plume shoot site to a control site. Have you seen anything like that?*

→ (Maribeth Gidly) *For source tracking, it is always just strict identification. I have never heard of transcriptomics being used for source tracking.*

→ (Dale Griffin) *I never have either. That is the key. Can we use transcriptomics on an environmental gradient to demonstrate the change?*

→ (Maribeth Gidly) *You would have to already have a curve in place. You would have to know what it is you are testing for in the first place. Transcriptomics, unless you are pairing it with true identification you can sometimes get hits for rapidly different organisms. That is part of the problem with transcriptomics, it should not be done in a vacuum. It merely shows activity of the cell, it does not identify what influences it.*

→ (Valerie Paul) *You are talking about microbial metasamples as opposed to coral samples. That is very different. In a coral we are looking for up and down regulation.*

→ (Dale Griffin) *In a way, looking at a gradient and you would expect to see different gene expression.*

→ (Maribeth Gidly) *When I say source tracking I am saying finding where the microbial organisms originated.*

→ (Margaret Miller) *I know that Sarah published a couple of papers on specific genes that looked at impacted versus non-impacted sites using a specific set of genes and there were differences. There were several papers she has published along those lines. I assume there are several techniques.*

→ (Dale Griffin) *I worry about alternate influences like inlets.*

→ (Margaret Miller) *But you have that with any system. That's the whole point of the gradient.*

→ (Dale Griffin) *So your lab, have you done this type of work?*

→ (Maribeth Gidly) *We have done the extractions and we just installed a server. We have a hire who is coming on next month that does the transcriptomics work.*

→ (Dale Griffin) *Any feel on cost per sample?*

→ (Maribeth Gidly) *It very much depends on everything you want done and what you are doing it on. We would have to know what you are bringing us. Right now we farm it out for $50 a sample after we have done the extractions. Someone you really need to talk to is Joe Lopez because he has some of the ability in his lab. I*

*think transcriptomics for coral it is great because it shows you what pathways are being activated but not why they are being activated.*

→ (Ken Banks) *What is the take home message?*

→ (Maribeth Gidly) *If you are looking strictly at coral activity, I think tanscriptomics is the future. For length of sample, I would say get it extracted as soon as possible and use some sort of RNA preservative. If you are interested in what might be influencing the coral get water and test for pharmaceuticals and test for microbial load. I think couple transcriptomics with metagenomics.*

→ (Aubree Zenone) *Thanks Maribeth.*

***Session #3: Outfall Project Planning***

Run-off Vote Results:

| Topic | Number of Votes |
|---|---|
| Bacterial Resistance | 9 |
| Benthic Surveys | 2 |
| Transcriptomics | 1 |
| Seawater Microbiome | 4 |
| Stable Isotopes | 15 |
| Water Quality | 0 |
| Sediment Nutrients | 2 |
| Sucralose | 7 |

NO PUBLIC COMMENT

1. (David Cox) *We have a potential idea that comes out to be about $16,000. We have wiggle room of $3200.*

→ (Dale Griffin) *They can do the samples in Chris' lab but the question is how many?*

→ (Maribeth Gidly) *We could do a handful, maybe 15-20 as a starter to show how it's done. If you could cover some of the supply costs we would throw the labor in for free. It just depends on what you wanted.*

→ (Diego Lirman) *The cost for the benthic surveys that includes one boat to collect the samples. You have an extra $3200 maybe that should go towards extra boat cost to find those corals.*

→ (David Cox) *That is a good idea. We have a rough draft of some ideas and see what deals could be made on the side. Anybody that wants to make a deal, talk to me. So that's it.*

→ (John Fauth) *When the bacterial data come in are they presence/absence data?*

→ (Dale Griffin) *Any positives when you run the PCR it gives you a number of amplifications.*

→ (Valerie Paul) *Is there a place for all of the TAC work? Like a library of the publications that have come out of it.*

→ (Aubree Zenone) *It's on the DEP website.*

→ (Brian Walker) *For the OFR I made an Endnote bibliography of all of the stuff that has come out of this area. It's online but it hasn't been updated in a while.*

***Session #4: Coral Disease Research & Current Efforts***

Jack Stamates - St. Lucie Inlet Circulation Study

- Deploy low cost current meters around the inlet to describe the dispersal of material out of the inlet
- Generate data to supplement acoustic fish tracking studies
- Generate bottom temperature data to identify the frequency and magnitude of low temperature events in the area
- Lowell Tilt Current Meters (TCM) were deployed at selected sites (5) to measure current speed, current direction, and bottom temperatures
    - Hurricane Matthew happened during the first deployment
    - Tidal predictions act with the current
    - Site A has a faster current and is blowing predominantly North
    - Evan's Quarry Reef has very strong southern flow
    - Temperature is probably indicative of upwelling

Dave Gilliam- Coral Disease Projects

- Pillar coral is essentially extinct in these three counties (Palm Beach, Broward, Miami-Dade)
- SECREMP data shows top five stony coral species by abundance
    - *Porites astreoides*: up over the past four years
    - *Montastraea cavernosa*: reduced by half (46% decline)
    - *Siderastrea siderea*: reduced (28% decline)
    - *Stephanocoenia intersepta*: slightly reduced
    - *Agaricia spp.*: slight increase
- *M. meandrites* and *D. stokesi* decreased drastically (95% and 89% respectively)
- Regional disease prevalence has increased over the past 4 years

1. (Brian Walker) *Did you see any disease with Acropora cervicornis?*

    → (Dave Gilliam) *We always see disease with A. cervicornis. We don't think we are seeing anything in the outplants, nursery, etc but in the two dense patches there is disease. My guess it is environmentally related to what is happening offshore with all of these disease events.*

→ (Margaret Miller) *Our palmata in the Upper Keys show no disease.*

Robert van Woesik- Coral diseases: Are we asking the right questions?

- The Caribbean is a coral disease hotspot
  - 14 coral disease have been described in the last 4 decades
  - Consequences of disease outbreaks:
    - Reduces live coral cover
    - Changes community composition
    - Reduces species diversity
    - Reduces structural complexity
    - Loss of ecosystem function
  - Lack a basic knowledge of most coral disease etiologies
- Question 1: Where are the disease hotspots in the Caribbean?
  - Relative risk depends on population size
- Question 2: Is there a relationship between ocean temperature and white-band disease?
  - Likely bacterial, possibly Vibrio spp.
  - Temperature increases host specificity, pathogen growth rates, and pathogen virulence
- Question 3: Are coral disease contagious?
  - Clustered distribution suggests a contagious mode of transmission
- Question 4: Where are the diseases along the Florida reef tract?
  - FRRP shows where bleaching is occurring
  - 2398 sites
- Question 5: Which environmental variables mater, along the Florida reef tract?
  - Sea surface temperature
  - Chlorophyll-a concentrations
  - Light attenuation
- Question 6: How fast did the recent white-pox disease outbreak spread along the reefs of SE Florida?
  - This strain of white-pox appears to be contagious
  - First detected Sept. 26, 2014
- Question 7: What caused the disease? Where did it come from?
  - North of Virginia Key
  - Source is speculation
    - Dredging of Port Miami going on
    - Miami Central Outfall
    -

1. (Diego Lirman) *Does that include fire corals?*

   → (Robert van Woesik) *No.*

2. (Lew Gramer) *The discharge rates of the rivers in volumetric flow is pretty significant?*

→ (Robert van Woesik) *Yes, absolutely. It's a volcanic island so the slopes are pretty steep. The watersheds are not large but there were significant amounts of water coming out during the monsoon season.*

3. (Brian Walker) *I was interested in the Florida Keys work. I'm unclear as to what that result meant. You said corals preferred clear waters. The most cover and diverse cover is in Hawk's Channel. I wonder what that actually means and the most diversity is on the patch reefs.*

→ (Robert van Woesik) *I guess I shouldn't say prefer. That's what we saw, most of the coral we saw, the higher density was there. When you start looking at the species level and did cervicornis by itself, I got the exact same result. This is talking about patch reefs are not (inaudible). These turbid locations are acting as refugees, coral reefs in the future may not be the crystal clear water reefs that we know today. These patch reefs may be the norm. If there is some selective pressure it will change.*

→ (Valerie Paul) *There has to be some sort of thermal stress protection.*

4. (Dave Gilliam) *Brining it back to the context here, with what we have seen in this disease event here in terms of its range and severity, how likely is it that it's is a point source. Is it more likely that the additions stressors made it manifest?*

→ (Robert van Woesik) *All of the work that we did before there were no diseases that were contagious. They were driven by environmental threshold. We are talking about thresholds in humans 2% is high and here we are talking about 98% of the corals. I would speculate that it stems from a point source and it is very different from one we have ever come across before.*

5. (Esther Peters) *So this is going to be published? Will it include all of the graphs?*

→ (Robert van Woesik) *Yes. All that code and shape files will be there in the appendix so people can take it and work with it further.*

<u>Jan Landsberg- Coral disease investigation at Grecian Rocks</u>

- Initial reports of disease outbreaks offshore Miami in 2014
- There was coastal construction and El Nino
- Disease was documented at the Grecian Rocks during the annual CREMP survey in July 2016
- Coral tissue sampling from disease and healthy portions of each colony
- Histology and TEM: putative CLOs in diseased/unaffected area of the same colony
    - Putative stramenopiles in *C. natans*
    - Endolitchic fungi common in multiple coral species
    - Need molecular identification of symbionts vs potential pathogens
    - Understand baseline ultrastructure of healthy/diseased coral tissues

1. (Margaret Miller) *I haven't made that connection with dark spot before.*

→ (Jan Landsberg) *I would hope we can all start sharing samples and reference materials. That way we can see if it resembles anything we are seeing here. Through the effort going on we will be able to catalog whose got what and collectively share and learn what we can. I'd like to know what has been done for the molecular group.*

2. (Dave Gilliam) *How does this get tied together? What is needed? Time spent on samples already collected or collect more samples?*

→ (Jan Landsberg) *When we first started we got samples from the 2015 collection. We did see the same thing in those few and now we see the same thing. If you had a point source and it spread or if it was a transmissible disease and you are seeing three different outcomes, how would that manifest in terms of one pathogen? I am novice to coral disease but it seems like there is a lot of work that needs to be done. Like Esther has said for years we need a systematic approach with epidemiologists. The Grecian Rocks is a good site and we have some background there. If anyone wants to send us samples of a diverse range on coral species would be helpful.*

→ (Esther Peters) *Both of those things are needed. Some of the things Jan found I have seen too. Target the cells through microdissection.*

→ (Jan Landsberg) *The basic community of a coral has a lot being done with the molecular work and there are large data sets coming out. When we look at a tiny snapshot and try to say if it is normal or not. We can do experimental exposure work to see if that organism is causing a disease but it could be a whole range of them. We have to plug along and get more samples to look at. If there are new areas that have early stage legions, we need those.*

<u>Kristi Kerrigan- Southeast Florida Coral Disease Outbreak</u>

- Disease affecting 21/40 species
    - D. cylindris 95% loss of known populations
- Oldest living coral is 330+ years old
- Disease started in 2014 near Virginia Key
    - In 2015 disease spread to both Miami-Dade and Broward counties
    - In 2016 disease spread even further: highest in Upper Keys, Miami-Dade, and Broward; moderate in Palm Beach and Martin counties
- Currently we are monitoring, trying to identify pathogens, understanding other environmental factors, looking for treatments/intervention strategies, and looking for funding

***Adjourn – David Cox***

David reviews meeting achievements and states that the next meeting will be held over the late summer. Email Francisco or David with any further thoughts or comments.