SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

CORAL ADVISORY PANEL MEETING

Hilton Garden Inn
North Charleston, South Carolina

May 7, 2013

Summary of Minutes

Coral AP:

Stephen Blair, Chair
Dr. Clark Alexander
John Cramer
Jocelyn Karazsia
Kimberly Puglise
Dr. Joshua Voss
Dr. David Gilliam, Vice-Chair
Dr. Kenneth Banks
Dr. Henry Feddern
Dr. Bob Van Dolah
Margot Stiles
Kate Lunz

Council Members:

Tom Swatzel

Council Staff:

Gregg Waugh
Mike Collins
Anna Martin

Observers/Participant:

Jennifer Moore
Kate Quigley
Rusty Hudson

The Coral Advisory Panel of the South Atlantic Fishery Management Council convened in the Hilton Garden Inn, North Charleston, South Carolina, Tuesday morning, May 7, 2013, and was called to order at 1:00 o'clock p.m. Chairman Steve Blair.

MR. BLAIR: My name is Steve Blair. Welcome, everybody, to the meeting of the Coral Advisory Panel for the South Atlantic Fisheries Management Council. I know we have this one individual who hasn't been with us before. I think we'll go around and kind of give a general introduction for ourselves of who we are, who we work for and our area of expertise that we bring to the table.

DR. FEDDERN: Henry Feddern; marine biology, doctorate at the University of Miami in 1968. I've been diving in South Florida since 1956, I guess. I'm currently and for a long time have been a marine life fisherman, catching aquarium organisms for sale throughout the U.S. and Europe. I've been on this panel for quite some time; in fact, since about 1980s, I guess.

DR. ALEXANDER: I'm Clark Alexander from Skidaway Institute of Oceanography. I'm a marine geologist and so the expertise and my interest is in deepwater coral communities.

MS. STILES: Margot Stiles. I'm a scientist at Oceana, a conservation group, and work mostly on fisheries in the U.S. and other places.

DR. VAN DOLAH: My name is Bob Van Dolah. I'm with the South Carolina DNR, Marine Resources Research Institute. I have not been doing recent research on corals, but was heavily involved in some offshore studies a number of years ago.

MR. CRAMER: Jeff Cramer; commercial fisherman from the Florida Keys; lobster, stone crab fisherman mostly, also in the Sanctuary Advisory Council. I'm also on the Coral AP for the Sanctuary Advisory Council.

MS. KARAZSIA: I'm Jocelyn Karazsia with NOAA's National Marine Fisheries Service, the Southeast Region. I work a lot with the essential fish habitat provisions of the Magnuson Act in South Florida primarily and the U.S. Caribbean. I also do some other coral reef conservation activities in that area.

MR. BLAIR: I'm Steve Blair. I'm with Miami-Dade County's Department of Regulatory and Economic Resources in their Environmental Resources Management Division. I have been a member of the AP since the late nineties. Most of my background for bringing to the table is in shallow water reef communities of the Southeast Florida area.

MS. MARTIN: I'm Anna Martin. I know most of you here and I appreciate you being here for this spring meeting. I am council staff. I have been on board with them for about four years now. I work specifically developing the coral amendments, working with the Coral Advisory Panel;\, and also the shrimp amendments, working with our Deepwater Shrimp and our Shrimp Advisory Panels. I am one of four tech staff member. We all wear a number of different hats, but those are my primary responsibilities for the council.

DR. GILLIAM: Dave Gilliam; Nova Southeastern University in Fort Lauderdale. Many would argue I don't have any expertise, especially my graduate students, perhaps, but shallow water coral reef communities, generally in Southeast Florida.

MS. PUGLISE: Kimberly Puglise. I'm with NOAA's Center for Sponsored Coastal Ocean Research. I manage their mesophotic coral ecosystem research program as well as the South Florida program.

DR. BANKS: I'm Ken Banks. I work with Broward County, Florida, an environmental agency with lots of different acronyms and names, which change seasonally. I manage their marine resources programs, which includes the coral reef communities in our area. We have a very narrow shelf so we work with all of that; sea turtle conservation. We get into beach erosion issues, artificial reefs when the money allows, and whatever happens in the nearshore coastal area.

MS. LUNZ: I'm Kate Lunz. I am with Florida Fish and Wildlife Research Institute. I'm the associate research scientist for their corals' program.

DR. VOSS: I'm the new member. I'm Joshua Voss. I am a professor at Harbor Branch at Florida Atlantic University. My background is in coral health, but mostly now I do mesophotic and shallow coral reef ecology; focusing on using neo-molecular techniques to kind of get a handle on how they might be connected and functioning.

MR. BLAIR: Okay, very good, thank you very much and welcome again. I want to kind of give a couple just general aspects. First off, did everybody get copies of the briefing information? If you did not, Anna does have it on a jump drive so that it can be passed around and you can load it on your computer. I actually have a disk I can give you and I can take that on the computer.

Either way, if you didn't get it, let me know, but it is available here for you to get. As you know, we're having kind of an afternoon meeting, following with a joint meeting tomorrow morning with the Habitat Advisory Panel. A large focus of the two meetings is to move forward on the Coral Amendment Number 8, which involves the expansion of a number of the coral habitat areas of particular concern.

The panel has already given its recommendations and those recommendations have been reiterated, if you will, or supported by the Habitat AP, but we'll be going through today, amongst other informational aspects of it, to be able to refresh ourselves with what the panel's decisions have been.

We'll kind of take a look at it in a little bit of a kind of new light, but with a little bit more information on the VMS data. A large portion of this is to give us some informational background and updates on the pending ESA listings for a number of the Caribbean – for a total of nine Caribbean species. We wanted to also bring to the panel an update on the present status of the coral nursery restoration work that has been ongoing in the Keys and off Broward County and Miami-Dade as well; and have an update from the Fisheries Habitat Conservation Division.

Then we'll get into our Coral Amendment 8. A lot of this is information and getting ourselves kind of getting thoughts back in our mind as to where we are for the coral amendments, but also

relative to some new information. Then tomorrow's meeting will be a joint session. We'll go through a little bit more in depth of the Coral Amendment 8, so we can come out with a final product. Anna, correct me if I misspeak at any point, but at this point it will then go to council for adoption of the final recommendations and then from there go out for public meetings.

MS. MARTIN: That's right; this amendment has taken a number of different timelines. Where we are right now, this is something the council has asked for final AP input on, so that is why we have convened the Coral and the Habitat APs as well as the Deepwater Shrimp APs this week. They are looking for final input from these groups before they consider preferred alternatives at their next council meeting, which is June; so coming up fairly soon.

They would then approve potentially this document for public hearings, which would be held later this summer. Looking forward, this may be the last opportunity for these APs to come together as a group and review this amendment before it is finalized. Potentially that could happen at the September council meeting. That is kind of where we stand with timing and development for the amendment and what the council is looking for from the AP tomorrow.

MR. BLAIR: We'll get into that or can get into that in a little bit greater depth as necessary when we get to that point on the agenda. What I would like to do is we can start off with the resource update on ESA listed species. I am out of order already. We have to do a couple of preliminary things first.

First off is approval of the agenda. If there are any modifications or changes that wish to be made or I request that we approve the agenda. All in favor say aye; okay. The second is the approval of the October 2012 Coral AP minutes that is included in the briefing documents that were forwarded to you earlier.

AP MEMBER: I'll move that we approve.

MR. BLAIR: A second we need.

MS. PUGLISE: I second.

MR. BLAIR: **All in favor say aye. Okay**, now we'd like to move to the protected resource update on the ESA listings.

MS. MARTIN: Okay, let's get them on the line. We have Jen Moore and Jennifer Lee with the National Marine Fisheries Service Office of Protected Resources. They weren't able to be here in person so we are remotely streaming them in for a presentation. This may take just a second. Jen, are you on the line? If you would just speak up, we can hear you and you have the floor.

MS. MOORE: Thank you very much for inviting us to present to the panel. I know several of you and I'm happy to meet the remainder of you virtually. As Anna said, I'm with the Protected Resources Division. I work primarily on ESA coral listings and recovery actions. I've been the lead staff biologist here in our region working on the proposed rule.

We've been working jointly with the Pacific Islands Regional Office and their Protected Resources Division on this petition and response and proposed rule. I am going to jump right in

and just kind of quickly let you see the timeline. This has been a long process mostly due to the complexity and the geographic rest of the petition.

The petition came from the Center for Biological Diversity back in October of 2009 and requested that we look into listing 83 species of corals. At the 90-day review phase in February of 2010, we had to make a determination as to whether or not the petitioner presented substantial information that the petitioned action may be warranted.

At that stage we determined that they had presented that substantial information for 82 of the 83 petitioned species. The one that we did not go forward with the status review on was Oculina varicosa, because they did not present the substantial amount of information in their petition to meet that bar at the 90-day stage.

That species was a rather negative 90-day finding, and then the remainder of the 82 species we went forward with a status review. Then last summer we put the status review document and the biological status draft management report out for public engagement. It wasn't a formal public comment period, but it was to seek information that we may have omitted in preparing those two documents that we were going to base our determination on.

We had a 90-day comment period and we also hosted a series of engagement workshops. All the information we received during that extended public engagement period together with the draft management report and the status review document formed the basis of our 12-month finding, which we did that back in December of 2012.

We opened up a public comment period and actually my slide is incorrect with the date, because we initially had a public comment period that went through March, but we received multiple requests for extending that. We extended that public comment period for 30 more days, and so we closed on April 6.

Now we have to go through the public comments and respond to them and determine if we are going to go ahead with our proposed rule by December of 2013. That is just a quick-and-dirty timeline. I'll get into a little bit more of the meat. What are we proposing? We are proposing to list 66 of the 82 species for which we were petitioned.

We are also proposing to reclassify the two currently listed acroporids in the Caribbean from threatened to endangered. We did determine that 16 of the 82 – they all occur in the Indo-Pacific – did not warrant listing under the ESA. As I said on the previous slide, the basis of a proposal initially was the status review document prepared by a status review team of coral scientists and experts in climate change and ESA population viability. We also composed a management report which identifies all of the regulatory and non-regulatory mechanisms that can manage the threat to coral species.

The status review was developed by a biological review team, which was composed of seven federal scientists, five from NOAA, one from the USGS and one from the National Park Service. The status review reviews the general threat to corals, their life history and ecology and then gives individual species a cast for each of the 82 species, identifying their particular life history characteristics, threats to individual species, and then provides an extinction risk estimate for each of the individual 82 species.

It is an extremely comprehensive document, and I definitely encourage you to take a look at it. The status review document concluded that most coral species are likely to be in danger of extinction by the year 2100 according to their extinction risk analysis. The corals face global and local problems.

Their analysis was done on a likelihood scale of 0 to 100 of a species being likely to fall below what they called a critical risk threshold. That was a condition in which the species were at such low populations as to be such low genetic diversity that recovery would be virtually impossible. That was their critical risk threshold that they evaluated each individual species extinction risk again, and then basically voted on placing their votes in the various categorical bins of extremely likely, likely, more likely than not; like that following the IPCC's Likelihood Scale.

The biological review team identified many threats – all of the threats for coral species that identified ocean warming, diseases and ocean acidification were the three major threats that could contribute to coral extinction generally. That is not to say that individual species aren't more or less susceptible or vulnerable to different threats.

The three threats that would cause the highest extinction risk to coral species were ocean warming, diseases and ocean acidification; which are either all directly or indirectly related to climate change and greenhouse gas emission. As you can see here on this next slide, there are a multitude of other threats that were identified by the biological review team.

Like I said, for several of the individual species; some of these other threats were more influential to that particular species extinction risk; but on average for all coral species, generally there was a ranking of threats and the three at the top that could cause in contributing to extinction risks for corals across their range and across the species.

As I mentioned, not only did they identify the threats to corals but they also examined at which life stages each of the 19 threats were affecting coral species. In addition to a textual description, the figures were developed for each of the 19 threats that identified the life stage at which that individual threat contributed to help you with the extinction risk analysis.

As you can see here for warming and acidification, most of the life stages, not all but most of the life stages are affected by these two threats. The contrast with disease – and we thought our current understanding of diseases, which is obviously very limited, the understanding is that at the juvenile and adult life stages that diseases are causing extinction risks.

The ESA prescribed five factors of which we need to evaluate if a species is at risk of extinction because of. Four of those were analyzed by the biological review team in their status review report. The ESA does prescribe that we consider the inadequacy of regulatory mechanism as one of the factors contributing to extinction risk.

The biological review team felt that it was not within their expertise to evaluate that, so that fell to the management side of NOAA to undertake that analysis. In addition to the inaccuracy of regulatory mechanisms, ESA also instructed us to consider conservation efforts which are non-regulatory that may be abating threats such that the actual status of the species is abated; that the threat has been abated but that the status of the species is no longer threatened or endangered.

To do that, we developed this management report and we identified all that we could, all of the existing regulatory mechanisms and conservation efforts acting on the species – acting for abatement of threats for coral species across their entire ranges. We're talking about 82 countries across the entire Indo-Pacific and the greater Caribbean Basin, and not only for the regulatory mechanisms but also for the conservation effort.

We concluded from that report, you've got the worse threats are the hardest to manage. Obviously, those related to greenhouse gas emissions; but that actions that we take now could benefit corals for future generations. Like I said, we have these two different categories of information that we had to analyze; and we broke it up between the types of regulatory mechanisms that affect the global threats, mostly related to greenhouse gas emissions, and then those mechanisms that are addressing local threats.

As you can see on the slide here, we went from international treaties of convention to individual local regulations for which we could identify those from the various sources. We did put this report out as draft last summer; because we wanted to ensure that we did identify all the appropriate regulatory mechanisms, and then to provide us this best available information to conduct our analysis as to whether or not the inadequacy of those regulatory mechanisms contributed to the extinction risk of the corals.

Then additionally we identified similarly in that breakdown of global versus local threats all the conservation efforts that are ongoing. There are a multitude of things that are going on to benefit coral reefs. When we put out the status review document, which was completed by the biological review team, and our draft management report during that extended public engagement period last summer; we received a multitude of new information, and that was exactly what we were hoping to receive.

We identified or were provided approximately 400 relevant scientific articles, reports or presentations that either had been produced since the status review report was finalized, which was in September of 2011, or were not included in the original report. A large portion of that new science that was submitted to us came from the International Coral Reef Symposium, which was held in July in Cairns, Australia.

I'm sure most of you are aware that the conference that happens once every four years and so often a lot of scientists will present their new research at that conference, and so that's why we had a lot of new information that came in as part of that public engagement period. We compiled all of that information into a separate report, and that is also available with all of the other documents that contributed to forming the basis of our determination.

Because we had such a multitude of information and we had to analyze the extinction risk for 82 individual species, we wanted to produce a way to be transparent and have a tool to help us be replicable for each of the individual species, to distill evolving information from the Status Review Report, the Management Report, and then the Supplemental Information report. We developed what we called the determination tool. It uses three categories of information.

The three categories are demographic, spatial structure and vulnerability to threats. Then there are various elements within each one of those categories for which we provided data on the

individual species where we had it. It provided this consistency in making 82 separate determinations. I know that this is likely to be difficult to see on the screen.

I'm not sure if you guys are looking at a large projection or not, but this document is also available on our website. It is just a schematic that basically takes you through the flow of our determination tool. At the top you can see that the first step is vulnerability to threats. We identified that there were those three global sets of warming, disease and acidification are the ones that contribute most – as the biological review team identified that those are the ones that contribute the most to extinction risk.

If a species is highly vulnerable to a high important threat, that significantly affected its extinction risk. The next category of information was demography, and that has to do with the estimates of their abundance or if we had any information on trends or recruitment rates; those things that would indicate that the species is either at higher or lower extinction risk either because of their life history and demographic characteristics.

The next category is spatial in nature and that has to do with the geographic range that they cover within a more disturbed basin, and so that had another influence on the extinction risk. Lastly, we had to identify if the inadequacy of the regulatory mechanisms for which those species were vulnerable to threats were inadequate; and then going through these various steps came out with our one of three determinations.

We have three determinations we could make at the end of the day; either the species is endangered, the species is threatened or the species is not warranted for listing under the ESA and does not meet the definition of threatened or endangered. This is a tool that we developed to help us identify the relevant information that we had for each of the species to help us identify whether or not those species met the definition of threatened, endangered or not warranted.

Here is kind of an excerpt of what the determination tool actually looked like. We show here three different species; one that we had proposed as endangered; one that we had proposed as threatened; and the one that we have identified as not warranted for listing. For each of the species, we populated our determination to one of the various categories with the information that we had from the various sources in the status review document, mostly in the supplemental information.

We then took that information and we developed a three-point rating scale for each of those elements and then rated each species and each of those elements based on the information that we had. For example, one of our local species, Montastrea annularis, we determined based on the relevant information that it is highly vulnerable to bleaching diseases and acidification.

Additionally, it has varying vulnerabilities to the local threat. As you can see, the sedimentation and nutrient over-enrichment also is highly vulnerable; but other things like sea level rise and collection and trade, it has got low vulnerability. Next, we looked at the generalized range-wide of abundance. The problem that we had in many of the species is that we don't have very good population data; and so to ensure that we used the best information that we did have available, we resorted to the generalized range-wide abundance category for this species.

Montastrea annularis has been described as common; however, we do know that due to a number of disease outbreaks and bleaching events over the recent past, there has been a declining trend in abundance. That information was available for Montastrea annularis; but as you can see going across, under the other species we don't have trend information data for most of the Indo-Pacific species.

Similarly, another category of information that we didn't have a lot of information for most of the species was relative recruitment rate. However, again, because Montastrea annularis is relatively highly studied, we have information that their relative recruitment rate is low. Spatially, then we also rated the species as to whether or not their overall distribution was narrow, moderate or wide.

We have parameters identified that basically give us what the definition of each one of those mean; but in general because of the geographic area occupied by the greater Caribbean is relatively small in comparison to the Indo-Pacific, the greater Indo-Pacific; for the amount of area that is potentially occupied by corals; their spatial distribution is considered to be narrow.

Additionally, the reason that we have a separate factor for ocean basin is that we have information that because the Caribbean is relatively small, semi-enclosed and highly impacted; that occurrence there also elevated extinction risk as compared to, say, the wider Indo-Pacific. However, the restrictions to the Eastern Caribbean also was one of those contributing factors to increasing extinction risk because of also the highly disturbed nature of that area and its high vulnerability to climate effects and acidification.

Lastly, we then evaluated for the rest that the species are vulnerable; we evaluated whether or not the regulatory mechanisms were inadequate and is that inadequacy contributing to their status. You can see that in general, species that are being proposed as endangered are highly vulnerable, and then don't have the buffering capacity of either wide range or high abundance or stable or increasing trend; whereas, contrasting with the porites horizontalata, it is not highly vulnerable to any of the high important threats nor is it highly vulnerable to any of those more local threats.

It is common and has a wide distribution. All of those things together greatly reduce its extinction risk. Again to summarize, we are proposing 66 species and reclassifying the two acroporids. The reason we are doing that is because we have new information since the time that they were originally listed; and we conducted the same analysis that we did on the other 82 species and determined that they too are at elevated risk of extinction; such that they should be reclassified from threatened to endangered.

Sixteen of the original 82 species for which we were petitioned did not warrant listing. Generally, corals with lower abundances, smaller distributions and higher vulnerabilities to threats are at the highest extinction risk. This is just a breakdown of the number of species by jurisdiction. Now for us it is pretty simple, because all the species occur in the three U.S., Florida and Caribbean jurisdictions. Seven species are being proposed as endangered. That is five of the newly petitioned species and the two that we're proposing to reclassify and two species being proposed as threatened. Where this slide is a lot more informative is in the Indo-Pacific where they have varying distributions of the various species in their U.S. jurisdiction.

Then, of course, the question is what if corals are listed for endangered? All of these are automatic and they get increased protection from impacting federal activities. I'm sure many of you are familiar with Section 7 Consultation. That is automatic for endangered species. There is also the Section 9 prohibition, which regulates anything related to import or export or take of the species or any sort of commercial activity. We are required to develop recovery plans.

Then there is also the potential for cooperation with the states and territories to implement recovery actions via our Section 6 Granting Program. The reason there is an asterisk for threatened species in the Section 9 Prohibitions' Category is that is not automatic for threatened species.

If we determine that it is necessary and advisable for the conservation of threatened species to extend those prohibitions, we have to undergo a separate rule-making process, which again some of you may be familiar with the two currently listed acroporids. That is called a 4D rule and they issued a 4D rule for them back in 2008.

In that we identified that, yes, almost all of the prohibitions were necessary for the conservation of the species with the exception of take that resulted from research and restoration activities that were otherwise authorized. As long as you have your local permit to conduct research, you do not require an ESA permit.

Similarly, if you were authorized to engage in restoration activities such as under the National Resource Damage Assessments or Oil Pollution Act; then you can go ahead and any take that resulted from that was now prohibited. If any of these species proposed as threatened are ultimately listed, we would look into the advisability of whether or not we should extend the Section 9 prohibition, the 4D.

The good thing about that is it provides us with some flexibility in determining exactly what needs to and does not need to be prohibited when it comes to providing for the conservation. What listing does not automatically do is prohibit recreation around coral reefs. It doesn't ban fishing on coral reefs. It doesn't prevent boating on coral reefs and it doesn't stop research. Those are obviously several misconceptions that people often think when species become listed.

It is only those activities that ultimately result in take, which is injury or mortality of the species that are prohibited. As long as these other activities are being conducted responsibly and with the ability to try to avoid take of the species, they are not prohibited. What happens next? As I mentioned, the public comment period ended about a month ago.

We held 18 public hearings in January and February in addition to having that public comment period open. Our final listing determination is due by December of this year. Then I have a couple of other slides. I am going to flip through them, because I think they would be more useful in question and answers.

I just had them in there in case I needed some backup with some questions, because I got a few heads up on some of the things that you guys might be most interested in. Here is my contact information and the website where all of the documents are available. I will forward this presentation on to Anna so she can distribute to the AP so you guys have a copy of it, too. I guess with that I will go ahead and take questions.

MR. BLAIR: Thank you very much, Jennifer; that was very nice, very good. We'll kind of go around. We'll start with Henry and then Bob. For Jennifer's sake, please go ahead and state your name as you give your question just so can hear who is speaking.

DR. FEDDERN: I have a few comments about the ESA proposal. First of all, it is incomplete because it does not discuss aquaculture of examine the effects on the aquaculture industry. It is only mentioned once in that legislation on Page 732.34 even though aquaculture is a major industry in the U.S. and many other countries.

It employees many people and creates refuges for people with aquariums. Aquariums create refuges for the coral; so if there is a natural disaster, then there are still species alive. The problem is that this proposed legislation makes possession or sale illegal. It criminalizes millions of people and makes aquaculture of these corals illegal.

It will drive aquaculture businesses out of business, and it deprives emerging countries from operating green businesses. It is also based on questionable extrapolations of climatic trends. An easy solution to this is to add language to the legislation that exempts aquaculture corals from bans on possession, aquaculture or sale.

It should also add in legislation to create a paper trail for aquaculture corals. The benefits of this modified legislation are many. For the reef, it stops wild harvest. For the third world countries, it allows and stimulates development of green industries to help their economy. For businesses, it allows development and increased profits, because the prices of these things are going to soar if the wild harvest is stopped.

For the hobbyist, it allows aquaculture in hobbyist tanks and trade between hobbyists, and also allows hobbyists to have a continued enjoyment of the corals. For the environment, its presence in hobbyists' tanks serves as refuges in case of reef disasters. This won't happen with staghorn and elkhorn corals, because there is no provision for this.

If there is a major disaster in the Caribbean and these things die off, that's it. The disadvantages of this would be an increased cost of aquaculture corals due to the lack of wild specimens. Of course, that benefits the businesses. It also creates extra paperwork to verify aquaculture origin. I strongly suggest that this legislation be modified to allow possession and sale of these aquacultured corals.

Then pass the modified legislation and then periodically review the endangered status and verify environmental extrapolations used for the basis of designation. I have no financial interest in stony corals. I just wish to see that legislation that is passed is fair, accomplishes its mission and does not have any injurious, unintentional side effects. That's it.

MS. MOORE: Henry, I thank you for your comment. It is definitely something we've heard a lot about in the public comment period and received numerous other comments similar to yours about the potential impact of the proposed listing on the aquaculture industry. I just wanted to respond to a couple of points. One is that possession of the species is not prohibited as long as you have proof that you have acquired them legally prior to listing.

In the future possession would not be limited as long as you had an ESA permit for research or enhancement activities. That is just one point of clarification, that possession and this other stuff is not one of the prohibitions in Section 9. But, yes, you are correct that automatically for the endangered species commercial activities are prohibited, and that is part of the law.

It is not part of our proposed listing. That is part of the ESA itself, and there is nothing that we can do in our proposed listing to change that. Where we do have flexibility; that was for those species that are being proposed as threatened, and we are well aware of the potential adverse effects of the proposal on the aquaculture industry.

However, we are explicitly again by law not allowed to take those into consideration in the listing determination. The only thing that we could take into consideration for a listing determination is the best available scientific and commercial activity that identifies whether or not the species status meets the definition of threatened or endangered.

Even though there may be an economic impact due to a listing, we are not allowed to consider that information in making our determination. A few suggestions that the status of the species be periodically reviewed is also a provision of the Act that we are to conduct status reviews of the species every five years to determine if they still meet the definition of threatened or endangered or if they should have a reclassification; similar to what we are proposing with the two listed acropora that their status is now proposed for listing as endangered, upgrading it from their current status as threatened.

We fully understand that aquaculture activities for enhancement and restoration of species are extremely important and that they can provide refugia for the species against environmental events that may occur in the wild. That is why we fully support the activities that are going on with the various coral nurseries that are throughout Florida and the Keys and the U.S. Caribbean for acropora cervicornis and starting a lot more now with palmata. We understand that those are very valuable tools for the recovery of the species. It is just that as far as from a commercial standpoint, the Act itself prohibits any commercial activity with respect to an endangered species.

DR. VAN DOLAH: I had just two questions. One, can you clarify what the logic is behind the presumed or listed threat of sea level rise on these species. Two, if they move to the endangered status – and this is a question to the larger group I think as well is proposed port expansion or channel deepening activities; what impact would this have? I would presume it might in fact make that cease and desist. I would like to get a clarification on both of those.

MS. MOORE: In terms of sea level rise; the biological review team summarized the threat in the status review document; but basically they identified that the major impact would likely be from additional terrigenous-based impacts because of the sea level rising. It is likely that the projected rate of sea level rise would not cause what they call the drowning of the corals; but it would happen in a rate too fast for the corals to keep pace. They weren't positive that the information was there to support that. But with any increase in sea level rise, you have additional sedimentation, which could also cause other contaminants and nutrients to be delivered to the reef. That was the focus that the biological review team identified for sea level rise; but they did rate that as a relatively low impact to extinction risk for the corals globally.

Then for the second one; if you're speaking of the two currently listed elkhorn and staghorn coral that are currently threatened; if their status changes to endangered, in terms of the ability to review projects that have a federal nexus under Section 7 of the ESA; actually nothing really changes other than our better understanding of the status of the species; but from a regulatory standpoint, because we extended all the prohibition other than takes that would result from restoration or research for elkhorn and federal corals back in 2008; so take that occurs from any other activity is prohibited.

If there were to be takes that would result from a port extension kind of like I think what you were referring to is Port Everglades, that already requires Section 7 Consultation to determine if that project may affect the species; and then if it is may affect, does that rise to the level of jeopardizing the species. Additionally, we have critical habitat designated for the species, and so we would also analyze whether or not that project would destroy or adversely modify the critical habitat.

Really, the effect of the uplifting from threatened to endangered is really not there. The same thing would happen if they stay as threatened. If the other species are listed, then that would just be an additional analysis that we would conduct in that Section 7 Consultation and do the same determination as to whether or not the project is jeopardizing the continued existence of the species.

That would be based on the facts at hand in terms of we would have to have information about the abundance of the species, what the effects of the project would be and whether or not we felt that was going to be contributing to increasing their extinction risk and jeopardizing their existence.

MR. BLAIR: Just so I can put it in my mind; through the consultation aspect, if there is a determination – I mean, obviously the listing of the species would put it into a consultation basis. If after the review there is a finding that the project in and of itself would not create a threat or negatively impact the population, then the project would be able to go through with appropriate mitigation or mediation types of processes; is that what we're saying?

MS. MOORE: Yes, essentially. Of course, every law has different words that they use. In terms of essential fish habitat consultation, mitigation is a relevant term. What we use in terms of the Section 7 world for ESA is if we determine that it is not going to jeopardize the existing species, but there will be take so there will be species that are either injured or killed as a result of the activity; we issue what we call an incidental take statement, which is essentially your permit; because you need authorization.

Because that is a prohibited activity, you need authorization to actually do that. Then we have what we call RPMs, reasonable and prudent measures that we implement. It reduces the impact of the take. It is not mitigation in the sense; because basically the way I always look at it is if you kill an owl here, you can't make a new one there, because they were talking about the species; so if you take the species and it is dead, you can't make a new one, theoretically. In corals it is a little bit different, but you can't really make a new one, so we don't really talk about mitigation, but we do try to do things to reduce the impact of the take on the species. Then we have terms and conditions that basically implement those reasonable and prudent measures.

DR. ALEXANDER: I was curious if you would comment on the implications for listings giving the three major threats related to climate change, for what are the implications for regulation of greenhouse gas emissions.

MS. MOORE: We are responsible for implementing the Endangered Species Act, and we're responsible for identifying all the threats that contribute to the status of the species. We are not necessarily responsible for recovering the species. We are responsible for identifying what needs to be done to recover the species, but we are not the only entity that has the jurisdiction to actually implement all of the recovery actions necessary.

That was a long way of saying that the Endangered Species Act does not give us the authority to regulate greenhouse gas emission. We can identify that things that may need to occur to reduce the effect of those threats such as the species no longer need the protection under the ESA. That is our responsibility in the development of recovery plan, but it is not within our jurisdiction to regulate greenhouse gas emission.

DR. ALEXANDER: That sounds a little bit toothless to develop a plan. Doesn't it provide any impetus to other agencies in government?

MS. MOORE: Yes, it definitely provides an impetus. It is not mandatory. Recovery plans are guidance documents. Like I said, they identify all the things that need to occur to get the species off of the endangered species list. We in recovery planning identify all those actions that need to occur and the likely parties that need to implement them.

It can provide an impetus, but there is not a regulatory action under the ESA. Therefore, we can't compel somebody other than ourselves to implement these recovery actions. That is not to say that there may not be other avenues with the intersection of the Endangered Species Act and some of these things.

It is just that it is very difficult – in terms of a Section 7 Consultation, it is very difficult to identify the effect at the species level of an individual point source of CO2. You have to be able to identify that emission in and of itself is causing take of the species. In terms of that, there has been understanding that would be a very difficult analysis to do. That is not to say though that it is prohibited or that we wouldn't do that. It is just that it is a very difficult analysis to do.

MR. CRAMER: I worked with you guys doing the Section 7 Consultation on the spiny lobster traps. I was just wondering – and I'm sure you're aware that I am on the Sanctuary Advisory Council's Coral Advisory Panel or workgroup, and we're working on more areas right now. We're actually being kind of a little proactive.

The sites that we couldn't protect in state waters; we are doing so now or at least we're proposing to. My question is if the threat level is raised from threatened to endangered; do we have to start this Section 7 Consultation all over again? Is there more rigid guidelines? I was just wondering what the effect would be on the trap fishery, if any.

MS. MOORE: Just the change in status in and of itself does not necessarily mean that the consultation would need to be reinitiated. However, if there is new information since the

original consultation was completed that we think that would change our analysis, then that would result in reinitiation on the two currently listed species.

I am not familiar with all of the ins and outs of that consultation. Maybe Jennie is a little bit more. As far as I understand it, the information that was used to identify those particular closed areas was based on the population information we had and that currently gets constantly updated, and I don't think that there has been any dramatic shift in that.

One of the main things contributing to the change in status is the better understanding of the severity of the climate threats so it's lowered and their effects on the different life stages, especially as related to acidification of the two listed species, and also the fact that they are not showing to be reproducing in the wild. Those are two of the major things that contributed to their change in status.

The areas that were identified through your consultation to be closed were based on where there were higher densities of the corals currently living and to avoid the interaction of the traps with those species. I am not sure that they would necessarily need to be revisited. What may occur is if any of these other species become listed, then we would likely need to initiate consultation on the essential effects of the fishery on those new species; but that is not to say that there would be any change in the actual outcome of that consultation.

DR. GILLIAM: You mentioned in your presentation that if the two acropora species are moved to endangered, that there would be additional ESA permitting involved. I wonder, since I am kind of going to give an overview of our nurseries following, it might be interesting if you can briefly discuss what that process is getting those additional permits for research activities.

MS. MOORE: Section 10 of the Endangered Species Act provides for this permitting program for research and enhancement activities. I have this slide up here specifically about nurseries or aquariums and any corals that are in captivity. Again, these are ideas that we have started to develop going forward in the theory that the species ultimately become either up-listed to endangered or additional species become listed that may be in these facilities ?.

Maintenance and asexual propagation would not require a permit. That is just maintaining them, keeping them alive in the nursery, fragging them; that in and of itself would not require a permit. Any additional activities, though, such as experiments or transferring or outplanting any of the fragments out of the nursery back into the wild would require a permit.

The same thing with if you were going to be doing any sort of import or export of fragments to other locations; that also requires CITES permits so that is a secondary type of thing. That permitting process is beginning to be developed for corals. Now we have a long history of permits for sea turtles and mammals and other listed species, but not specific to corals.

We're having ongoing conversations; but one of the things that we are definitely trying to figure out is streamlining. Because of the fact that corals are so heavily regulated, anyway, we are trying to identify ways to streamline this permitting process with the other various permitting processes that are out there similar to kind of what we did with the 4D Rule.

We're also looking into ways to streamline via either programmatic permits or batching of permits because of similar activities. There are definitely ways that we can try to make this as least impactful on the researchers or restoration practitioners as possible while still complying with the Act.

We have people up at headquarters, because that is where our permits division is, currently working on this. I'm heavily involved as well as my counterparts out in the Pacific Islands, and so we're trying to figure things out. I wouldn't be surprised if you were contacted relatively soon about some of these streamlining processes that we are trying to work on specifically for the nursery activities. Stay tuned.

DR. GILLIAM: Thanks, Jen. Also ongoing or future monitoring efforts that don't necessarily include take, but that may involve sites that have acroporids or some of these other species or actually are targeted for those species but there is not real take; would those involve any permitting?

MS. MOORE: The idea of the permit is to authorize prohibited take. If you are not taking the species, you don't need a permit. It is my humble opinion that monitoring activities, the placement of quad racks and tapes does not result in take, and so therefore you would not require a permit for those activities.

This is something that we are in continued discussion with. I don't have a solid answer for you, but it is definitely on our list of continuous discussion and we'll make it very known what will and will not require a permit into the future. Like I said, it is my opinion and what we are trying to figure out how to not necessarily require permits for monitoring activities, whether the species are being targeted or not.

MS. KARAZSIA: For contacts for the folks in the room; the NMFS Protected Resources Division and the Southeast Fisheries Science Center developed a survey protocol for the two currently listed species. My question, Jen, is are there any current plans to update or re-scope that survey protocol to accommodate any potentially new listed species?

MS. MOORE: Yes, it is on the list. Where it falls in the priority is not certain, but, yes, we definitely want to do that. We definitely want to be able to provide people with the appropriate guidance on how to survey these species. Just trying to do everything is very difficult. It is on our radar and we'll definitely try to have it in hand should the species ultimately become listed in December.

MR. BLAIR: Okay thank you. Are there any other questions from the panel?

DR. FEDDERN: Just one more clarification. If these corals are placed on the ESA list; is there any method by which legislation could be passed that would allow sales of aquacultured corals?

MS. MOORE: Not under the Endangered Species Act for endangered. Threatened corals; the prohibitions are not automatic against any activities. We have to go through separate rulemaking to extend those prohibitions; so through that we may determine that it is not necessary to prohibit commercial activity for the threatened species. Remember that there are seven species in the Caribbean that are being proposed as endangered, but to our knowledge none of them are in the

aquarium trades. There are 12 species out of 800 or so plus in the Indo-Pacific that are being proposed as endangered. It is not a ban on all coral commercial activities; it is just those 12 species, if they are determined to be endangered. Back to your question, though, no, under the ESA it is a prohibition and it is automatic. I don't know what other options may be available.

DR. FEDDERN: You have no way of modifying that proposal and inserting an exception for this. I'm sure this has never come up before, because it has never encountered organisms that are in the trade already, but there should be a mechanism for modifying this.

MR. BLAIR: Henry, just a point to that; it is not just this. If I'm thinking correctly, acts like the Trade in Endangered Species Acts would prohibit it as well. It is not just this legislation, but there are other regulatory aspects already in place that would preclude that activity from being authorized. Am I correct in that, Jennifer?

MS. MOORE: Well, currently all stony corals are listed under Appendix 2 of CITES, the convention on trading endangered species, which means that you need to get a permit from the country of export. Stony corals are currently in the trade and receive CITES permits. We are aware that there are much more of increasing activities for mariculture instead of wild collection.

We understand that, but I guess the point that I'm trying to make is that it is not our current proposed rule that is making this be a prohibition. It is the Endangered Species Act itself. We are determining based on the biological information and the threats to the species, if these species meet the definition of endangered under the ESA; it is the ESA itself, the law, the Act that says you cannot do any commercial activities related to endangered species. Under this proposal, there is no opportunity to provide any exception for endangered species for commercial activities. It would require a reauthorization of the Endangered Species Act.

DR. FEDDERN: Yes, that is what I was afraid of. It is unfortunate that legislatures weren't foresight enough to include a provision for modification due to unforeseen circumstances.

MR. BLAIR: Any additional questions?

DR. VOSS: I had one. For almost all other species that are regulated by ESA, possession of skeletons without documentation prior to the enactment of the law makes it illegal. Is the same standard going to be held for coral skeletons as well?

MS. MOORE: You were breaking up there a little bit there, Joshua, but I think if I heard you correctly, the Act covers the live individual and any part thereof. That would include gametes, that would include eggs, that would include larvae, and that would include dead skeletons. Yes, you would need to have proof that those parts were collected legally.

Currently under their threatened status for elkhorn and staghorn, you would have to have proof that they were collected legally from a local permit. In the future ultimately if some of these species are listed as endangered, then you would also have proof of your Endangered Species Act permit.

In addition if you are importing or exporting them, you would also have to have your CITES permit in addition to the ESA permit. Hold on, if you possess the species prior to them being

listed or up-listed, you just have to provide documentation that you did possess the species previously before they became endangered. That could be you have a photograph, it could be a permit, it could be various different things that just provide that date or clarification that you possessed the specimen legally prior to its endangered listing. You can work with our permits division to certify that possession pre-Act.

MS. MARTIN: I just had a question about something you mentioned earlier regarding Oculina varicosa. The biological review team did not fully assess the species because the petition filed by Center for Biological Diversity didn't fully provide enough rationale in the petition that was filed; is that correct? Did the team take that a step further and consider oculina in this proposed listing? I just wondered if you could elaborate on that.

MS. MOORE: When NOAA Fisheries receive a petition, we have to evaluate the petition. The ESA has a standard that we have to evaluate the petition for a certain level of information. That is basically to protect us from superfluous petitions for listing of species. There has to be a minimum amount of information that's required for us to identify whether or not we should go forward with the whole status review. That is what we determine at the 90-day stage.

The Agency determined at that 90-day stage that the information that the petitioner presented us on Oculina varicosa did not meet that bar; did not meet that threshold. The Agency determined that we were not going to go ahead with the status review for Oculina, but that we would go ahead with the status review for the remainder of the species.

The main crux of that was that they had not presented information that the threat that they were reporting were contributing to the other 82 species condition; were the same threats that are affecting Oculina. That was one of the main things. Also, they hadn't really provided enough information on their status or other threats.

It did not meet that threshold, and so we made that determination at the 90-day stage. Because the agency made that determination and we charged the biological review team with providing a status review of 82 pieces for which we did want to evaluate their status for potential listing, they didn't and they really couldn't take on an evaluation of Oculina varicosa.

DR. FEDDERN: One more; say a person collected a piece of fire coral 50 years ago while collecting coral was legal, but he has no documentation because he got it himself and he has it on his shelf; now how can he possibly prove legally that he has it; what do you think about that?

MS. MOORE: I'm not an expert in how you document or certify that you possessed it legally pre-Act. I would definitely refer you to our permits division; but I have heard anecdotally that things like a picture from 10 years ago with it sitting on your shelf and there is a date stamp of that picture on the back of the photograph; that is sufficient.

There are multiple ways of documenting even if you didn't need a permit when you collected it, but I'm not exactly positive. In a particular case our people in our permits division would provide the appropriate guidance and help people try to figure out what is the way to document this or take a picture of it now. If it is not prohibited that you had it now, take a picture of it now.

MR. BLAIR: Okay, any other comments or questions for Jennifer? Jennifer, we really appreciate your time and all the information and the responses to the questions. It is greatly appreciated and gave us a lot better – or gave me at least a better understanding of more of the impacts. I know that was some of the concern of the panel; and not so much an understanding of the relative effects of the proposed legislation may have on a variety of different programs and projects. Thank you very much.

MS. MOORE: Thank you, it was my pleasure. If you guys have any follow-up questions, feel free to contact me. I'm happy to continue dialogue. I know some of these potential impacts are upsetting and potentially harmful. We acknowledge that and we just have to make sure that everybody understands that we are expressly prohibited from considering that in making our determination. I do apologize for that. But, again, we're just implementing the law. But I appreciate the opportunity to discuss; and anything else that you guys have, please feel free to give me a shout out.

MR. BLAIR: I appreciate it. Thank you very much, Jennifer. We're going to take a quick five-minute break to get set up for the next presentation. Be back here at 2:31 please.

MR. BLAIR: Okay, we'll come back and get back to the meeting again. I thought it would be a good idea to give the panel kind of an update on activities and status and progress on the nursery activities associated with acropora cervicornis. It kind of follows in well with the last topic that we had, and I've asked Dave Gilliam to please give us a summary of where they are and what is going on with the nurseries.

DR. GILLIAM: This is really good timing following Jen's talk on the status of those stony corals. I guess I just start by where the support for these efforts has come from; a really wonderful relationship with the Nature Conservancy and NOAA through various programs. Then one of the big pushes for these nurseries along the Florida reef track was funding through the stimulus ARRA program, and that really allowed us to expand our nurseries.

Really, this presentation is a summary provided from all the partners in our program, including our nursery in Broward County through Nova Southeastern University; then our other partner, University of Miami, Diego Lirman's Lab, and their nursery in Biscayne; then Ken Nedimeyer, who we all know and his Coral Restoration Foundation in the Upper Keys, and I'll talk more about how he started this whole program; and then John Hunt's group in the Middle Keys, Florida FWC; and then Mote Marine Lab; so each of those institutions are managing nurseries.

What is nice then is we have this network of nurseries all the way from Broward County all the way through; and also the Nature Conservancy is managing a nursery in the Tortugas as well. We basically have these staghorn coral nurseries along the entire Florida reef track, from Broward County, at the northern end of that Florida reef track, all the way to Dry Tortugas in the southern end.

I need to start by thanking the people who kind of gave me all the information to put this presentation together for me. Caitlin Lustic with TNC sent me a lot of information and a lot of the slides that I'm going to show are modified from her; and then my three graduate students that are doing parts of their research on utilizing and managing the nurseries; Liz Larson, who really

does most of the work managing our nursery; and then Zach Zostroff who just defended – and Cody who is working now with aspects in the nursery.

Staghorn coral, acropora cervicornis; I'm sure that we're all pretty familiar with this particular species. It is a very unique and challenging stony coral species to work with. What makes it unique and challenging is that it is branching and has very fast, tight growth rates. It creates this very complex living structure.

It is this structure that is very important in how it provides habitat for various reef-associated fishes, as well as a lot of other invertebrates as well. As Jen said, it ranges throughout the greater Caribbean, generally in shallower depths. Currently, one of the reasons why it is currently listed as threatened is that it is more likely found – it is isolated colonies versus even low density aggregations are even the preferred in terms of its ability to recover and reproduce these patches or thickets.

Those are now fairly uncommon to find those large extensive patches. As I said, it is a unique stony coral in the sense that it has two really significant forms of reproduction, both sexual and asexual. As a stony coral sexual reproduction, it is a hermaphrodite, meaning it is both male and female. It produces these gamete bundles, synchronous spawning, July and August.

I say that; it has been a challenge the past couple of years to capture spawning of these guys. Then external fertilized eggs; as a lot of stony corals, they develop into larvae and then settle onto the reef and develop into polyps and then colonies. This sexual reproduction is really the source of genetic diversity and is ultimately going to be the way that these species have any chance of recovering is through successful and increasing sexual reproduction.

They also reproduce, if you will, asexually, and that is through fragmentation. It is really this natural behavior, if you will, of this species that has allowed us to start these nursery programs; that they fragment. It's a natural process. Fragments, broken branches from these colonies can survive if they happen to settle on suitable substrate during suitable conditions.

There are a lot of factors that go into whether these fragments can survive, but they do survive; and it is through these fragmentation events that many of the large thickets form. We've had the chance to do some analysis to some of our patches and thickets off of Broward County. Essentially they're all one genotype, meaning that essentially all the thickets we have are a result of growth and fragmentation; this asexual reproduction.

This is really common, but it is limited dispersal and it really doesn't contribute to the diversity. As a natural process, its ability to help the species recover is important; but, like I said, it is enhancing or improving successful sexual reproduction that will allow this species to potentially recover.

Threats or what we see along the entire Florida reef track is fire worm. It is this polychaete worm in the upper left column there. It just basically sucks the tissue off the tips of the colonies. Damselfish; they build these territories within these colonies and they don't necessarily prey upon the coral tissue, but what they do is they keep these algal gardens tended in the colonies. We've seen areas where you start to get a little bit more of a dense aggregation of colonies and

these damselfish will come in and it is really amazing, if you get too many territories, the impact they can have on the colonies.

Then there is a gastropod that actually preys upon the tissue. Disease, kind of the classic white-band disease, which is one of the culprits that theorized that led to its dramatic decline in the seventies and eighties. Then there is a condition; what we and others kind of term rapid tissue loss. It may just be kind of a catchall for a lot of conditions, but it tends to be what we have been identifying along the Florida reef tech and some of our monitoring efforts as being one of the major causes of mortality now.

Then I just have the catchall usual threats to reefs. Anything that generally impacts or threatens reefs also then threatens this particular species. Jen went over this, so it was listed as threatened in 2006. As she mentioned, it is proposed to be up-listed to endangered. I don't need to go into that. Really, nurseries then have been designed kind of as a tool – or one of many potential tools that could be used to try to help this species, to help conserve and potentially help the species recover.

That is a tough thing, but at least it is a tool that could help. Just quickly here, essentially fragments are collected from parent or donor colonies. They are brought into a nursery where they are grown and then they are fragmented again second generation, and then maybe they are growing and fragmented again third generation. That can go on and on; so you can start with a few individual fragments and then over time get many, many fragments.

Then you take fragments from your nursery corals and you out-plant them on the natural reef; and then the hope being that you can be successful in terms of your numbers or your placement of these out-plants to promote sexual reproduction, which then hopefully will contribute to species recovery.

This basically just illustrates what I just said. You basically borrow from a donor colony, a parent colony and then that grows. From there you create nursery fragments and they grow. From there you create more nursery fragments and they grow, and you just go on and on. Really, the thought is that you really only take from donor parent natural colonies early in the process; and if your diversity numbers are appropriate in your nurseries, you don't have to go back and take from the natural environment again.

Then on the right there; that image was taken from kind of a manual that we all produced about a year and a half ago on this process. A little bit about our Florida Partnership Project History – Ken isn't here. Ken wasn't able to make it. He is actually probably much more appropriate to give this talk than I am. He is kind of the grandfather of all this.

I'm sure many of you know the story that Ken had a live rock farm in the Upper Keys and in the early 2000's some acropora cervicornis recruited onto his live rock. Being the conservation-minded and wonderful person that Ken is, he recognized that as being something unique and very important.

I think with the help of his daughter and a 4-H project, he started fragmenting those colonies and kind of developing this nursery process here in Florida. He then teamed up with TNC and the Sanctuary and expanded his nursery and did some of the first out-planting. This seemed to be a

really wonderful thing. A couple of us heard about this great opportunity so we stepped in and raised our hands and said we wanted to get involved as well.

A couple of us worked with TNC and NOAA and Ken and received some funding from NOAA to establish some additional nurseries; one in Broward, one in Biscayne National Park through University of Miami, Diego Lirman. I expanded this first time and it worked well as we expected.

Then we brought in some additional partners and received some of the stimulus money in 2009, and that really allowed us to significantly expand our current nursery and then create a number of new nurseries as well. To where we are now, all the nurseries are very active and growing and very busy.

As you can see, right now the capacity within the available material within nurseries is quite high. I'll get into more of that in a moment. Much of those numbers though are part of Ken's effort, because his nursery is significantly larger than the rest of ours. But in terms of our partnership, that is a quick summary of numbers there. It is a very short history, but successful.

We really owe it to Ken and some others in kind of their conservation-minded thinking that allowed us to grow and this partnership to continue. Like I mentioned, 2009 was a real significant opportunity for expansion of these nurseries. The green dots are the nurseries that were established in 2009.

Broward County is about almost chopped off there, but that is the northern nursery; then there is one off of Biscayne National Park; and then the Upper Keys, which is Ken's; then the Middle Keys, FWC; and Lower Keys; Mote, and then Dry Tortugas, TNC is managing that one.

Then there are a number of nurseries in the U.S. VI as well, too, that is part of this partnership, but today I'm just concentrating on those nurseries along the Florida reef track. I am just going to run through kind of a general process of how these nurseries evolved. If people want to jump in and ask me questions as I go through this, I prefer that; or if you have something to add, please do.

MS. STILES: Thank you for this helpful presentation. I was wondering if you put out the fragments that you've grown up in the nursery; how long do you expect it to take before you have sort of a functioning patch reef there? I mean, there is no end point for growing reef, obviously; but when you feel like there is sort of a normal assemblage of fish and vertebrates and things are pretty stable?

DR. GILLIAM: Well, we haven't gotten there yet in terms of – I'll mention it in a second, but we just had our major out-planting event. Just last year was our big major push. Those colonies are all still fairly small; but I would think it would take a number of years for these colonies to grow and then naturally fragment to create additional colonies; but to have a patch or thicket much like we see in some areas off Southeast Florida, it is going to take a number of years.

MS. STILES: Maybe decades?

DR. GILLIAM: Maybe not decades, but five to ten – I know it is hard for me to guess, but years.

MS. STILES: That is hopeful.

MR. CRAMER: Have you seen that four-minute video that they made in Puerto Rico on that grounding site, the staghorn they planted out? I don't know if you have or not. But I saw it – we had a meeting a couple weeks ago and it was incredible. I couldn't believe it. They planted out a bunch of these little fragments and in one year it looked like some of those thickets you were showing up there. It is incredible. I know it's on the web somewhere, but that would be really interesting for people to see that video, because I couldn't believe it. Everybody in the room was like, wow.

DR. GILLIAM: I haven't seen that video in particular, but I wonder if it is associated with the grounding events that occurred.

MR. CRAMER: It was a Puerto Rico site. It planted out with this nursery. It was incredible, in one year.

DR. GILLIAM: A lot of that depends on the size and the density spacing of your out-plants as well, if you know how quickly they would form those thickets. Yes, it is amazing. This thing was funding – quickly I went through the procedures all the partners kind of went through. We targeted 20 parent donor colonies in each of the regions.

From each donor colony, we clipped three 10 centimeter clippings. Then for most of the nurseries, each of those ten centimeter clippings were then further divided into 3 centimeter fragments. From each donor colony, we were able to collect nine fragments that were put into the nursery.

Some of the nurseries as well have added to their nursery stock by collecting from fragments of opportunity. That is essentially when they're swimming on the natural reef and they find a loose fragment. They can bring some of those into their nursery. As part of this funding, Iliana Baums from Penn State University, we gave her little samples from all the donor colonies and she did genetic analysis of all the donors.

All of our donor colonies are genotyped, which is very interesting. Then we are required to monitor the donor colonies for a period of time after collecting. Basically, all the data shows that the removal of this small amount of tissue from the donors didn't really negatively impact the donor colonies. They all recovered and grew.

DR. VOSS: Did anyone – have they typed the zoax from all the different regions?

DR. GILLIAM: That is ongoing right now, actually. One of the last slides I'll show is some of the research efforts that have been associated with this effort, because it is not often that you have this opportunity where you have these species on such a large region as the entire Florida reef track where we have captive individuals, in essence, so they have all been genotyped. Yes, there are a number of those types of efforts that are going on as well. That was the start. That was the collection from the donor parent colonies that brought into the nurseries.

Then the nurseries have ongoing work, ongoing monitoring and maintenance. As part of our initial permits, we were required to do a certain amount of monitoring within the nurseries as they were becoming established just to make sure that the locations for the nurseries were appropriate and that our techniques were appropriate and that fragments were surviving and growing.

In addition to that, we all have continuous efforts. There is minor cleaning of both the platforms and lines that the nursery colonies are growing on. At various intervals at this point really nursery dependent, we record nursery colony condition in our nursery, because we're very interested in the science of these efforts and learning more about the species.

We try to visit the nursery monthly, but not all the nurseries can get out quite that frequently. I know Ken gets out perhaps even more frequently. But we'd like to keep track of if there has been any breakage injury within the nurseries, presence/absence of disease, predation and other types of impacts. It also allows us to keep somewhat of an inventory of how our production is going in the nursery.

Then I have growth; we were measuring growth of these things. It is not that easy and is actually somewhat time consuming. We did quite a bit of that at the beginning to get a handle on growth. Now we're just doing it on a subset and really almost project related. We're not measuring growth on all the nursery colonies anymore. It takes too much time.

But then one of the other things that we do year round is. whenever we can, as nursery colonies get large, we fragment them in the nursery and then take those fragments and transplant them in the nursery to increase our numbers. As we do that. we keep track of – as we go for these second and third and fourth generation fragments in the nursery, we keep them mapped so we know their genotype and what generation they were.

That is information that is interesting for us to know within our nursery; but also when we out-plant, one of the things that we need to keep track of is what genotypes are going at each of our out-plant sites. These are just some of the examples of some of the platforms or types of nurseries.

Most of us started with the type in the upper left. This small platform structure is basically just concrete blocks with pedestals epoxied or cemented on top and then pucks cemented on the pedestals and then these fragments epoxied on top of the pucks. In many places these small concrete blocks were prone to damage from storm events and such.

Ken has been very innovative in his different designs. He went to the same type of structure but using more PVC pipes to get them further off the substrate and to allow energy and sediment to move between. Ken now is really going towards lines and what he calls lines and trees. I think we have those in all of our nurseries now.

The bottom left in Broward County is what most of our nursery looks like. Those are small artificial reefs; they are a meter cubed. They are nice, easy platforms to work off, because you can almost stand or just float above the bottom a little bit and they are nice, convenient working

height rather than kneeling right on the sand. I'm particularly happy about using that substrate as a nursery, because I built all those back in the mid-nineties for my dissertation work.

I'm glad now that they are getting used and continue to be used for another purpose. Then the other three examples there are different types of suspended platforms. They have proved to be very successful, very high growth. They also tend to be less susceptible to predation as the hard platforms are in terms of Hermodice and snails.

They are a little bit more fragile in terms of through storm events and such; but amazingly when you maintain them, and you keep the floats in good shape and the structures in good shape and you don't let the corals get too big, they are pretty robust as well. They are a very efficient use of space as well. That is kind of a direction that – I think in our nursery we like to maintain both types because they have their advantages, but I know Ken and others are going pretty heavy in those line- suspended platforms.

MR. BLAIR: I just thought we had Sandy, even though it wasn't a direct hit; it was a pretty good blow, and since you've started we've had a few tropical storms; what kind of impacts have you seen from that? I know you say they're resilient, but how resilient would you say they really are?

DR. GILLIAM: Well, I think we all had a lot of work to do right after Sandy. Although Hurricane Sandy didn't hit Florida; but I guess because it raced along most of the coast, it created these huge swells and a lot of work. For us in Broward, we essentially have three platforms in Broward. We have those cement platforms and we have line nurseries and we also have what we call PVC arrays.

I don't have a picture of it – I forgot to put one there – but essentially it is four PVC legs. It is like a table with then PVC horizontal. We have the cervicornis on the horizontal so they're open. Those survived. I guess because the energy can go through them, they did very well. Our line nurseries were impacted the greatest versus our other two. Even our hard platforms did pretty good; but all the nurseries had a pretty significant fragmentation after those events.

MR. BLAIR: Were you able to salvage from those that were fragmented? In other words, were you able to recover a fair amount of what may have been impacted by the storm?

DR. GILLIAM: We did okay. Our numbers weren't impacted too greatly, so it didn't really affect our ability to keep our operations going. Of course, we had a lot of fragments that we no longer could identify their genotypes, so we have a little section of our nursery that are like designated for the orphans. We know that they are from our nursery, but we don't really know what genotype they are.

I think all the nurseries ended up doing fairly well. The biggest impact to the nurseries in the Keys was the 2010, the winter of 2010 cold water event. Especially the Middle Keys nurseries, they are at the passes between Florida Bay and the ocean-side are larger, and that influence of that Florida Bay getting so cold and then that water rushing over; it really significantly impacted a number of those nurseries.

Up in Broward we weren't really impacted by that cold water event at all. We had our major out-planting events in 2012 associated with the 2009 and 2010 ARA funding. In order for us to do this and to get our permits; there were certain criteria that the fragments had to meet for us to be able to take them out of the nursery and plant them back onto the natural reef.

Again, we had to know the genotype of all the fragments from nursery colonies and the length of time they are in the nursery. We were able to do this in our nursery. I think in most of the nurseries, other than those that were in our little orphan section or colonies in other nurseries of fragments of opportunity; we can go from all of our nursery colonies and we can tie them all the way back to the donor colony.

We can go all the way from where the donor colony is located, genotype of the donor colony, and the size of the donor colony. We can follow it all the way through all of our nursery colonies. The nursery colonies had to have no visible sign of poor health, which is not always easy to define with corals. It is basically a visual assessment.

They had to have basically no discoloration. They had to look healthy, no recent mortality, no disease. They couldn't have been recently impacted by predators, no injury, microbial mats and seasonal bacteria, in essence, and then any type of growth anomaly. Essentially all of those were just visual evidence that they were healthy before we were able to take them out into the wild.

They had to be a minimum of 5 centimeters of linear growth. I wrote that generally for these, because we were taking – basically in the nursery, we're clipping off the branches off of these nursery colonies. In most cases, that 5 centimeters of linear growth is about a 5 centimeter fragment, but it doesn't necessarily have to be.

A linear growth is essentially the lengths of all the branches. Some of the fragments may have had 5 centimeters of linear growth, but they may have been only maybe 3.5 centimeters in height, but they also had a 2 centimeter branch coming off. In most cases, you didn't really out-plant something that small, but you could, and there has been a lot of success with that small. Some of the nurseries targeted more towards 10 centimeters of linear growth, but we had a minimum of 5 centimeter.

AP MEMBER: What was your reject rate?

DR. GILLIAM: Well, we didn't have any; because through the process of getting the permits, we wouldn't want to out-plant something that didn't look healthy to begin with.

(Question asked off the record)

DR. GILLIAM: I don't think I have that number in my head; but a vast majority of the nursery colonies would be fine to – now it is not 100 percent. We do have disease and predation in the nurseries. Those are natural events; but we didn't have any trouble taking enough fragments from any one genotype to populate all the sites that we wanted to populate within the funding and time that we had.

All the nurseries, at least ours especially, the amount of product in the nursery was more than adequate to get what we needed for the out-planting that was defined by the funding. This is just

minimally what was required as part of our funding. We wanted as partners – because we were able to out-plant – we had a number of nurseries along the entire Florida reef track – we wanted to have kind of as best we could some consistency. All the partners had to establish what we called core out-plant sites. We set up some minimum criteria for those core out-plant sites, each site a minimum 150 fragments.

We wanted to have some diversity within these sites, so a minimum of 10 genotypes. The spacing within these core sites, the spacing between the fragments needed to be about 1 meter apart. When you do anything out in the natural environment – you know, it is not empty rooms or an empty table that you can put these nice, convenient, evenly spaced grids – you have to work around what is already in your site.

Not all the fragments were exactly a meter apart, but generally that was something that we were targeting. That was based upon some discussions we've had with Nicky Fogarty and others that have been looking at reproduction in acroporids about – getting to your question earlier about how far apart would two colonies need to be to have any chance of their gametes finding each other and some successful reproduction; so we didn't necessarily at this point want them right on top of each other, but we didn't want them so far apart that they weren't essentially at the same site or wouldn't have any chance of interacting.

Site design; by definition it kind of had to be region-specific. The reefs in Broward County are different than the reefs in the Upper Keys or different than the reefs in the Dry Tortugas in the sense that you couldn't all put – you know, Broward County, we basically have a lot of continuous area to work with. We have these north/south running reef lines.

We did a pretty good job of having very consistent and our core sites all looked pretty consistent in terms of their shape and how far apart the fragments were. But in other areas of the region, along with these nurseries along the reef track, they couldn't follow our design completely. Each of the sites within the regions had to be somewhat tailored towards their reef environment.

MS. STILES: I don't have a lot of experience on restoration, but I'm wondering how you select the sites in terms of perhaps there is sparse coral there, there used to be coral there in the past, maybe there is not coral there for a reason because there is heavy traffic or sedimentation. You don't want to put the guys' right out in front of the figurative highway of continued impacts from whatever killed the previous coral.

DR. GILLIAM: No, that is right. All that went into consideration and into site choice. Much of the site choice was really based upon our collective professional experience and discussion and knowledge of each of the regions. All the sites had to be permitted. All those things went into consideration.

They had to pick reef sites where we thought they had the best chance of survival in terms of all those conditions; not being adjacent to something that would inhibit any stony coral growth, let alone cervicornis. In Broward we had additional concerns that we weren't allowed to pick sites that might potentially be involved in permitted offshore activities, much to my disappointment.

But we had to make sure that none of the sites that we chose might potentially be involved in some other activity. But especially this first go around, this first really large effort amongst all

the partners at trying to get a lot of fragments out; we really were targeting reefs where we expected there to be high success; and where if conditions were perfect and these species weren't listed, there would probably be individuals of these species there already.

We wanted to pick locations where we expected to have high success for all those reasons. In addition to these core sites, some of the nurseries established – I have experimental in quotes, because sometimes that word can propose challenges; but sites that were designed to be a little different than the core sites. Essentially the methodology exactly the same, but like in our case in Broward, our experimental sites, our first go around we wanted to look at really how fragment spacing density, if you will, impacts not only survival and growth of the corals themselves, but also how it interacts with development of the community; and then how the cause of mortality interact with density, if you will; settlement by damselfish and prevalence of disease and other predators. Not all the nurseries established these experimental sites, but a number of us did.

MS. PUGLISE: Margaret Miller back in the mid-2000's did some work at the Aquarius with restoration. Did any of that information – their findings out of that work factor into yours?

DR. GILLIAM: I don't know if any specific information came from it, but we've had a number of – through TNC, their kind of overall management of the effort, have had a number of meetings and workshops and conference calls and that type of thing. I know Margaret has been at a couple of those.

From the start of this whole process, there has been a lot of discussion within the partners and then bringing in people outside the partnership as well and kind of get the best available information at the time to help promote the success of this both in terms of survival and growth and production in the nurseries and then survival in the out-plant sites as well.

MS. PUGLIESE: I'm hoping that there has been some cross fertilization since some of the same people worked on both projects; because Ken was a factor in both as well as Iliana Baums.

DR. GILLIAM: Yes, absolutely. Ken is involved in a lot of these efforts, so, yes, absolutely I'm sure. For all the core sites and the experimental sites, really the way that these nursery fragments are secured to the substrate, out-planted, if you will, is pretty simple actually. Probably the most common method is what you see in the upper left there.

That is simply just using a small masonry nail and a small zip tie and maybe a little piece of epoxy right on the substrate will hold the fragment down for the couple months that are required for that fragment then to grow over the nail and onto the substrate and essentially create its own hold onto the reef.

In the past, little fragments have been secured with epoxy onto a puck, and then that puck is cemented onto the reef. Then sometimes as was generally the case with larger fragments – those small fragments like you see in the top left, that zip tie will be used; but if you are going to put a larger fragment on the substrate, a lot of times they just set it down on the substrate to where it kind of naturally would lay, and then you just put a little epoxy on the contact points with the substrate.

The colony fragment will then grow over the epoxy onto the substrate and then basically grow like a normal colony. The process itself is pretty quick and pretty simple. Like I said, these are pretty fast growing; this is a very fast-growing species for stony corals. In the right conditions and the right handling, they will grow over that nail and epoxy pretty quickly.

We have monitoring requirements for our out-plants. For the 2012 effort, we were required to go to all our sites one in three months as part of the permit, but we're all continuing monitoring at those sites more than just those three months, because we wanted to learn from this experience to increase success in the future; and then for us we just wanted to learn more about the species itself and the like. You will see numbers in seconds.

We out planted a lot of fragments, so we weren't able to really collect all that information on all of them. It just wouldn't have been possible. All of our effort and time would have gone into monitoring a few fragments instead of getting a lot of fragments out. At each site, for five out-plant fragments of each genotype, we had to tag or at least map the locations so we could go back to the exact same fragments at both monitoring events.

We had to photo document their condition prior to out-planting, and then during each monitoring event record condition, alive/dead, have they experienced breakage and any other type of condition that might be overgrowth or other things; presence of disease and/or predation. If any of those five fragments per genotype per site did have active disease at the time of monitoring, we had to then go and put an eyeball on all the fragments at the site to get an indication of the number of fragments within the entire site that had active disease.

We had to take photos of all of those. We needed to try to either seal with epoxy or remove the diseased portion. Then representative's disease samples were taken and stored. There was a fixation and handling protocol that was provided as part of the permit. In addition to that, I have "other" there. I think all the nurseries at all the sites did additional things, the noes in our ongoing – I know that many of us, after three months, they are essentially behaving like natural colonies; so any fragment events that occur naturally kind of record that and maybe map their location. We measure growth on a subset of our out-plant fragments.

That allows us to compare. It is really a neat dataset. We have the genotypes so we can compare changes and growth for genotype, and we can compare genotype growth as a donor versus as a nursery colony versus as an out-plant colony. Something that we're doing in Broward is we did fish and benthic assessment in all of our sites prior to out-planting.

We're doing quarterly fish counts at all the sites, and then we'll do some benthic monitoring at these sites just to look and see how the community changes as these colonies grow. Here are some summary data from that 2012 effort for each of the nurseries. The first column is what is at the end of 2012; the approximate numbers of corals in each of the nurseries.

If you look at the Upper Keys, I have a little asterisk next to all those just to remind myself and make sure I give Ken his due and point out that is his nursery; the Coral Reef Restoration Foundation. Those are all probably estimates for him. His nursery, as you can see, is much, much greater than all the rest of ours; but it just illustrates the effort he has put into his nurseries and the product he has available.

But the rest of the nurseries are the ones that really basically started in late 2009, early 2010; and you can see all the nurseries are doing quite well, quite a few corals currently in the nursery; quite a few genotypes have been included in the nurseries. Those out-plant numbers are associated with that 2012 effort.

Again a number of genotypes that were out-planted, and then the number of sites that was associated with that funding event. Again, I know Ken did his four core sites but he has obviously many more out-plant sites than those four that I don't really have. He's not here, which is unfortunate, but I don't really have too much additional information on that. A little bit of summary; so if you total up, over 35,000 corals are currently in our nurseries. The majority of that again is Ken.

If you subtract that, we have over 8,000 outside of his nurseries. That is quite a few. The nurseries have grown quite a bit in just two years. There is a mean of 36 genotypes per nursery, so our diversity is pretty good. Kind of getting at Josh's earlier question; survival in the nurseries is generally very, very good.

Taking these small fragments from donor parent colonies; and when your nurseries are located in appropriate locations and you have appropriate platforms, these things do very well. Some major sources of mortality; the major source of mortality is these natural disturbance events, storms, that 2010 cold event.

We do see disease, but from our data, looking at our monitoring of patches and individual colonies in Broward County, disease in the nursery is no greater, if it is not less than what you see in the natural environment. Fire worm predation is present in all the nurseries. It was a problem that we had in our nursery at the start because of those essentially little artificial patch reefs.

We had an ongoing, active fire worm removal program, and that reduced their predation quite a bit. The line nurseries see much less predation than the hard platform nurseries. Some other things that have – some nurseries have experienced some pretty significant hybrid overgrowth. Then we had an interesting even in the summer of 2012. That is the picture in the bottom right, where we had this; I don't know, what is the right word for jellyfish; infestation, bloom, I don't know; but it was amazing how many moon jellies we had.

That was actually a source of mortality in our nurseries. You can see a picture there. We would go to our nursery and we would see that. My guys; they would physically remove all the jellies from off the cervicornis. It was rare that we had complete mortality, but you did see some mortality from these jellyfish getting stuck on the nurseries. I don't remember ever seeing that many moon jellies as we did last summer.

(Question asked off the record)

DR. GILLIAM: Probably the line nurseries experienced more, but they're on the modules as well.

MR. BLAIR: I just over time remember periods where coming up you're playing Frogger to find a space to the surface. They are just a huge blanket. But it is like five, seven years,

something like that when you see something that heavy. I remember them occurring a number of times.

DR. GILLIAM: It's an interesting topic that someone could look into on that. I don't know too much about jellyfish, but we were surprised and it was a bit of a challenge. Out-planting summary, again this is from our major 2012 effort, over 5,000 fragments were out-planted at more than 30 sites. A mean of 16 genotypes were out-planted per nursery, so nice diversity. Survival per site; that three-month monitoring event ranged anywhere between 60 to 90 percent, which is actually pretty high for acropora cervicornis; that type of survival. Major sources of mortality are basically the same; storms – the passing of Isaac and Sandy had measurable impacts on all of our out plant sites – and then disease and fire worm predation, just like in the nurseries.

I threw this up there. This is just something to illustrate how quickly these things – how much product can be produced in these nurseries in such a short period of time. In January 2010 our two major nurseries now that were started with ARA funding; we had 180 that we brought in from new donor colonies, and we brought in 120 from our 2007 nursery.

In January 2010 we started with about 300 three to five or maybe seven sized fragments. By the end of 2012, we out-planted 1,200 and we still had 1,600 colonies in a nursery. That is a really conservative estimate that you can get four out-planted fragments per colony. In some of those you can get a lot more than four; but I just used four, so that equals 6.400 equivalent fragments.

In two years we've produced 7,600 potential fragments, which is quite a big increase in two years. Now, that's kind of a made-up number, 2,500 percent, but it illustrates that these things do well in nurseries. We're just taking advantage of some of their natural growth properties in terms of fragmenting and surviving from fragmenting and having fast growth.

Those five fragments you see on the left are the same five fragments on the right. That is two years later almost to the day actually those two pictures were taken, but that is actually after they've been fragmented in the nursery once as well.

DR. VAN DOLAH: Has anybody or is anybody actively trying to quantify the biomass change over time?

DR. GILLIAM: We get through that really with that linear growth measurement. Most of the time with stony corals, when you talk about size, you usually talk about they just measure a colony diameter. That is a challenge with cervicornis, because they are branching colonies and they fragment.

You can have a fragment event to where maybe those fragments survived, where it is essentially the same colony, but now it is growing right next to it, but it is not connected to anywhere. Acropora cervicornis staghorn coral is exciting and unique. It's a challenge. It is not normal like the other stony corals.

How we get to that biomass thing is really go into a colony like you see in the bottom right and taking calipers and measuring the length of each of those branches and then adding each of those

lengths up to get an estimate of the amount of tissue that is available for out-planting. That is kind of similar to a fish bio-math type of estimate.

DR. VAN DOLAH: Has anybody tried a displacement approach?

DR. GILLIAM: Yes, maybe in the lab, but I don't know in terms of in the field. Josh, you're shaking your head.

DR. VOSS: A number of studies have been done to correlate the kind of measurements the age group is taking with buoyant weights. It has shown fairly high concordance between the two. There has also been a couple of new techniques developed to model fragments; specifically branching corals using anywhere from 6 to 20 cameras, all taking a simultaneous image and building a little virtual 3D model of your coral. The problem with these guys is that they are likely to outgrow whatever apparatus you might have to take that image and quantify biomass to that level.

DR. GILLIAM: Well, I just have a couple more. Just to kind of get to the question Josh mentioned earlier, you know, researchers, we're interested more than just the growth in nurseries, but there has been a lot of research effort associated with these as well both in terms of student projects and other researchers that have taken advantage of this particular opportunity.

One thing that we want to do – and Cody, his thesis is looking at this – we really want to move towards not having these nurseries as being little individual isolated units, but have them be all part of an active interrelated program along the Florida reef track. Right now we don't have permits that allow us to take colonies from any one nursery and out-plant them to another region.

We did start a project between my nursery and Ken's nursery where we relocated – we looked at three genotypes in his nursery, a fast-growing, kind of an average growing and a slow-growing; and three genotypes in our nursery; fast, kind of average and slow, and we took fragments from each of our nurseries and we relocated into the other nursery.

We're comparing kind of growth and survival and then collecting some tissue for zooxanthellae stuff, Broward corals in the Broward nursery versus Monroe corals in the Broward nursery and vice versa. It is kind of the first step that it is going to allow us to be able to take advantage of all the genotypes amongst all the nurseries and all the product amongst all the nurseries so we can out-plant along the entire Florida reef track, increasing diversity and likelihood for success.

MS. STILES: I don't think I know the answer to this, but sort of balance to that would be that there may be some kind of existing diversity of the coral or the genotypes of the associated microbes, I don't know what, that you may wish to further by having some isolation between your different nurseries. Certainly, for aquaculture, I mean having isolation between separate projects can be a good thing just in case somebody's nursery has problems. I guess I'm saying it might not be a bad thing that your projects are isolated.

DR. GILLIAM: I think at this point the fear for not integrating them completely would be that those potential transmissions of a disease or pathogen or something that is in Broward that we don't want to get into the Keys or vice versa. There is really not much evidence at this point, but

one thing kind of the opposite of that is having genotypes along the entire Florida reef track present in multiple nurseries.

It is a bank; it is kind of a depository. It is a safety net so where if something like the 2010 cold event happens again or is maybe even greater, that we don't lose all the genotypes in the Middle Keys; those genotypes are present in the nurseries elsewhere as well. I guess I view it more as a positive thing to try to have the nurseries interact.

MR. BLAIR: Towards that end, I apologize, I probably missed this; how are you identifying your genotypes?

DR. GILLIAN: When the donor colonies were collected, we had to send samples.

MR. BLAIR: It's through genetic markings.

DR. GILLIAN: That's right, yes.

MR. BLAIR: How many genotypes? I noticed that each of you had specific numbers of genotypes. How many are common between the two sites;, do you know? Do you have a sense for that yet? I would agree with you that it would seem greater genetic diversity through the reef track would be a better idea than more regionally cloned. Even though you still have the diversity from the genotypes present within the area, but you still seem to end up with something that is more susceptible.

DR. GILLIAN: I don't know the exact numbers, and there might be some overlap, but most of the genotypes are unique. Essentially in Broward, the only time we ever had the same genotype collected is when we collected from those patches. Essentially all the samples from a patch with a same genotype, but any sample from individual colony was a different genotype.

DR. BANKS: The counter argument to that is that genotypes are selected for and they are given environments, because they're the strongest there. We have certain genotypes in North Broward, because they are the genotypes that do well in North Broward. And by doing the transplants, that is one of the ways you can test that.

You could potentially do it – and if you are worried about this idea of contamination or spreading a potential disease without some kind of quarantine; you could either set up quarantine areas or have common garden nurseries that are separate from the stock nurseries.

DR. GILLIAN: Yes, I think that would be ideal; it is just not practical of doing that.

AP MEMBER: Well, for the next proposal.

DR. GILLIAN: One thing that is interesting about the experiment that I just mentioned is the Broward fragments in Ken's nursery; in the Monroe nursery did better than the Monroe fragments did in the Monroe nursery. The Monroe fragments in the Broward nursery did better than the Monroe fragments in the Monroe nursery. I don't know why, but the coloration in our nursery tends to be more rich than in the Keys; very interesting.

DR. BANKS: You've got to be careful of snapshots in longer time periods, too. How Broward is today isn't how Broward is next week or last week. Talking anecdotally, we've had huge explosions of acropora in the seventies around certain areas that doesn't exist right now. That is a good point, but it is also hard to know what conditions are and how they vary over time.

MR. BLAIR: The corollary to that is there is a lot more acropora in Miami-Dade than there was 10 to 12 years ago as well.

DR. BANKS: Yes, Palm Beaches now, it has now showed up. I don't know historically what it has been in Palm Beaches.

DR. GILLIAM: That's always a tough thing, though, because is there more because there is more or is there more because we're looking for it?

DR. BLAIR: There is more because there is more.

DR. GILLIAM: If you're selling a dive trip, there is more because there is more, but I think because you're looking for it or there are more divers seeing it, there are more divers around to see it. That is a huge factor, I think.

MR. BLAIR: And with ours, and especially the three county areas. Our reefs are pretty well visualized both by divers and by our own work. We definitely are seeing it in much greater abundances in areas that we did not see it before. I do feel that in our area it is an increased abundance as opposed to a just not having seen it before.

AP MEMBER: But I still think your time shot is still only 20 years.

MR. BLAIR: No, agreed.

AP MEMBER: That is nothing, you know. That is a blink.

DR. ALEXANDER: Neither of those comments were Clark Alexander just in case anybody wants to attribute that kind of coral knowledge to me. I was curious about the success rate of natural propagation by fragmentation versus the success rate in your nurseries.

DR. GILLIAM: Well, the success rate in the nurseries is much, much, much greater. We've started to collect the past couple years some data on success of natural fragments and it is very low. It's almost – you can't track it, it is generally so low. We've mapped 100 fragments and you go back a couple months later and you can't find almost any of them. Success is low for natural fragmentation. Of course, that is very site dependent.

DR. ALEXANDER: That doesn't mean that they haven't successfully grown somewhere; it just means you can't find them.

DR. GILLIAM: Well, that's true, but they've moved. I think the likelihood of success is reduced the more that they are moving instead of staying in place and securing themselves. I don't think any of us have a really good quantitative handle on that. I think it is generally pretty low, but in an environment where a patch or a thicket or it has a greater density of larger

colonies; that likelihood might be greater because something about the environment is more conducive for it or maybe just the presence of it holds the fragments in place that they can become established.

Then lastly, there is a future, and we will continue to work in the nurseries. We want to continue to out-plant. We have to secure some funding for this year. We have submitted proposals and we're being creative in ways to continue supporting the effort, especially with these potential listings of more species.

It doesn't necessarily have to be just acroporids cervicornis nurseries. Then, of course, we all want to continue to collaborate and learn more about the science of nursery and propagating itself, but also more about the communities that these species live in and more about the species themselves.

MS. KARAZSIA: I know there was some talk about trying to make funding for the nurseries more attractive by kind of like expanding the scope to – like in particular to look at how the out-planted corals are providing essential fish habitat for federally managed species. I think that in particular would be really useful information for this advisory panel and the council and NOAA's Habitat Conservation Division. Are you guys doing any of that work now?

DR. GILLIAM: Yes. In our out-plant sites, we kind of started that from the beginning. Like I said, we did a benthic assessment and the fish counts before putting any out-plants out, and then we're doing that now. We'll be doing it in our future out-plants. But part of the work for this year is – to make that an official part of the out-plant monitoring is to look at the community, at the sites that the fragments are getting out-planted to. If you could get that exact same thing, it is a good thing and also opens up additional sources of support as well; kind of looking at it like a broader and bigger picture.

DR. ALEXANDER: I was wondering if anyone had looked into using these areas that you're developing at out-plant sites as they get larger and larger, using them as something like a mitigation bank to help fund the efforts.

DR. GILLIAM: Well, I think there has been some I guess starts of some discussion of that looking at nurseries as kind of that, but I am not aware of anything specifically occurring that way right now, but it certainly seems like a reasonable approach.

MR. BLAIR: Relative to some of the activities that are ongoing in the regulatory processes; agencies or individuals that are conducting projects that may impact acropora, and from our county perspective, beach renourishment projects and placement of pipelines; slurry pipelines to bring the sand up onto the beach, or other aspects of that; certain aspects are included into that.

It's part of these sites having the complete assessments for location and densities and size and so forth of the acroporids, and relocation of those away from the area of potential impact; there are also requirements to do clippings and contribute those clippings into the nurseries to be able to help serve those as well. Although discussion has been towards the – mitigation is more or less project-specific and detailed not necessarily towards the – at least at this point – towards any banking aspect of it.

MS. KARAZSIA: Actually, I have a slide on an idea we've been floating around, and then also wanted to mention that the state of Florida, for some unauthorized impacts that occurred with the beach renourishment project in Palm Beach County offer to Midtown Beach; they recently within the last couple weeks required as the compensatory action for the town of Palm Beach to do some coral nursery work and some out planting activity. I don't think anyone here has looked into that too much, but it is the first time that I think that this approach had been used as a compensatory action for a coastal development type project.

DR. GILLIAM: You know, one thing I didn't put up there was a table. We've been keeping track as partners of all the kind of outreach and education and media and all that. This is kind of a really tangible, public can understand, feel good type of effort that you can actually take something small and within this fairly short period of time see it get big; and then actually do something with it that has some real value.

I was on the plane with Ken this morning, and he bought a Florida Sportfishing Magazine; and wouldn't you know it that in that magazine is our buddy, Ken, and there is an article about our nurseries. That is actually one of my students right there, and two more of my students right there, and there is Ken again there.

Just right here today, just serendipity that here is an example of the outreach and education that is associated with this effort. I think it is something that – one of the other benefits that this type of partnership and this type of active effort is that it kind of gets more attention to the reefs in general and the threats and the things that we can do to help the reefs even above and beyond this particular species.

I don't know if you guys caught Ken in his CNN Hero Episode, which is really fantastic. We've been on NBC Nightly News and magazine articles. Another kind of benefit of this partnership has been this education outreach. It is one more thing we can do to get the Florida reef track into the kind of public view.

MR. BLAIR: Clark, one of the other things to your point, a perspective on the nursery aspects of it and how it has come along; obviously it has been ongoing and the science behind this has been ongoing for a long time. My perspective is almost proof of science behind the way that it works, and the idea of having it; because in the past there wasn't any sort of way to do compensatory damage for corals, but this is showing that there is a potential way. I think that that is a positive thing in the future in what we saw there where there is either direct funding to ensure from clipping to out-plant, that a certain amount is going to be done is probably something that will become more prevalent in the regulatory process.

DR. ALEXANDER: Right; and that was the thrust of my question, because as something like this gets bigger and bigger and it becomes more commonplace; it just becomes harder and harder to sustain for the long run, and you would hate to have it fall away just because of funding issues.

DR. GILLIAM: Yes, that's true, but also we have to remember that this isn't a panacea. It is just a tool, and we're never going to be able to grow enough in our nurseries to recover the species. It is just one thing that we need to do. Really, the problems and the threats that defined the decline to begin with need to be addressed.

It is really the only way that the species can recover; and again, it is through that sexual reproduction. It is just a tool that will help, and we have to be careful with that I think in terms of mitigation as well. It just isn't as simple; oh, we're going to do something that is going to affect a reef and its okay if we then grow 20,000 cervicornis colonies. It is a plus.

MR. BLAIR: The fact that it's one species, too, and more than that could impact it as well.

DR. VOSS: Don't sell yourself short. We as humans are incredibly adept at getting individuals to go way over their natural population numbers if there is money to do it. If we get to a situation where mitigation efforts commoditize corals such that when a ship runs aground they have to buy corals to plant back to that spot, we could very easily get to a position where you would be encouraged to grow many more than may have naturally existed in a given area.

DR. FEDDERN: Where mitigation is required and you have to move corals; is there going to be someone supervising this so that this business does not move diseased corals.

MR. BLAIR: There is a protocol that has been established and vetted as to both how it has to be supervised and done. The one aspect that I'm not sure is addressed in thinking of the protocols is explicitly exclusion of something that might – usually in general we're going to move the healthy colonies. We aren't looking to further stress a colony, so a bleached colony isn't going to be one that we're going to target.

I don't know that there is anything explicit in the protocols that explicitly address diseased organisms in a relocation program. I'm thinking of through the state-permitting aspects when people are required to remove corals, which is a good point to make sure that something is in there.

DR. GILLIAM: Well, generally when coral relocation is part of an impact minimization effort, more than mitigation, but there is usually a set of criteria, if you will, or a protocol; and usually a minimum size of the colony and they have to be visually of good health, free of disease. Cliona actually, body-robbing sponge, generally those colonies are excluded as well.

DR. FEDDERN: What is usually the minimum size?

DR. GILLIAM: Usually; in the past it has been like 15 centimeters. I think maybe some more recent ones have gone 10.

MR. BLAIR: It is getting smaller, yes.

DR. GILLIAM: Yes, we want 5; is that actually written down anywhere, 5?

MR. BLAIR: Yes, it has been 5 to 10, somewhere in that neighborhood; our last permits were in that neighborhood for relocation.

MS. KARAZSIA: That would be a good topic for discussion if we ever had some extra time, is to get some feedback from you all on that. We have seen like through monitoring reports that as a minimization, these are corals that are going to be impacted by your project. As a

minimization option, which would then reduce your compensatory mitigation requirement, because then you didn't impact that colony; but that would be a good discussion that I think if we ever had a couple extra minutes to discuss.

We've been recommending 5 now, and it sounds like you all have, too. Thinking that maybe anything smaller than that would be considered a recruit, that would maybe require a more specific demographic type survey to identify and applying the reasonable test and for practical purposes. Yes, it is small; but if it is possible, maybe it should be done.

DR. GILLIAM: I agree it is a very interesting topic. Obviously, it is going to be site-specific in some ways about what is there, but I'm all for it.

MS. STILES: Just a side comment; I had no idea that all these corals in Florida were moving around so much.

AP MEMBER: I was just going to respond to Henry's question earlier about disease. There have been a number of different efforts to try to standardize protocols for minimizing disease transfer. The issue is that just like in humans there are many microbes that are present in nonpathogenic states in coral mucus.

Even if you used a technique to screen for the disease, you might pick it up or not, and that may tell you very little about its potential transfer. One of the ideas has been to develop the screening technique that would look for kind of your top 20 most important pathogens as a quick-and-dirty method to see whether or not certain reefs have them or not or certain nurseries have them or not.

DR. FEDDERN: Especially be very careful about – if you see one, don't even get near it, because you don't want to contaminate your tools and your hands and your gloves. That would just keep transferring it.

AP MEMBER: Alternatively, if you see one, you could spend a day where you decide I'm going to be disease dirty today and go clip all of those out of your nursery.

DR. FEDDERN: Well, that's another thing. If you see a diseased one, in a mitigation effort where you have to move all the others, should you take that one and get rid of it or just leave it out there?

AP MEMBER: I think from my perspective and background in diseases, it depends on the disease. Harold Hudson tried this for years with black-band, trying to suck it off corals to get rid of it, and more of it got spread than removed through that process in many cases. My first answer would be we probably don't know enough about the etiology of some of the diseases to know what the mode of transfer is for all of them.

That being said, if we make the assumption that they are waterborne pathogens, and we know that many of them are, then removing diseased individuals from your population should presumably reduce the impact on neighboring individuals.

DR. FEDDERN: As long as you can get it by closing it and then moving it so you don't disturb stuff and get it into the water column.

MS. KARAZSIA: I also heard a rumor that the Habitat AP is developing policy statements, and one of the policy statements that they are looking at developing is a coral relocation policy statement. We might know more on what they've come up with later on today or tomorrow.

MR. BLAIR: Good tie in. Okay, thank you very much, I appreciate it; definitely a very promising topic and it is good to see success. It seems to be a very successful program. It also nice that it works throughout the reef track and not just the localized aspect and effort.

(Remarks made off the record)

MR. BLAIR: What we're going to do now is to move to our next item, which is an update from NOAA's Fisheries Habitat Conservation Division. Jocelyn will be providing that update for us.

MS. KARAZSIA: Every year I am asked to provide an update on some of the important coral-related essential fish habitat activities. Our office; one of our main responsibilities is in implementing the essential fish habitat provisions of the Magnuson Act, which means that if there is a project or some type of activity or funding being given to an entity by a federal agency, and then that activity might have an adverse affect on habitats that are designated as essential fish habitats; that a consultation has to occur with our office.

There are a couple activities that I've presented on at the past meetings, so I thought they would be of interest to the AP. That is the Port Everglades Port Expansion in Fort Lauderdale, Florida, and then a hydrokinetic project that is also proposed off the Fort Lauderdale area. Then also I have a couple slides on a grassroots coral reef conservation initiative that is going on in Florida that I also presented on at the last meeting that I'll provide an update to you all on.

You all have seen this slide before. I think I've given an update on the Port Everglades Project a few times now. It is probably particularly ripe now that it is looking like we might actually see an environmental impact statement soon. One of the things that the South Atlantic Council – that this advisory panel has done in the past in conjunction with the Habitat and Environmental Protection Advisory Panel is that they have worked to develop comments in response to environmental impact statements or other types of projects that have a pretty major impact on an essential fish habitat.

I foresee that the AP will be tasked with developing some type of a comment letter in response to this EIS. This is just an image of the outer entrance channel and the planned coral reef impacts. This is the outer reef. The darker colors are the direct impact areas. The lighter colors; it is a 150 meter buffer around the channel where we expect that there would be some indirect impacts from sedimentation or turbidity in addition to potentially some additional direct impacts from anchoring construction vessels.

Depending how you do the math, the impacts range between 15 and 20 acres. I'll get into some of the differences in how you do the math on the next slide; so depending on how you do the math. The habitats that the Army Corps is proposing to dredge; they are authorized to examine the feasibility of dredging to a depth of negative 59 feet mean low water.

There are coral reef habitats located within the federal channel that are connected to coral reef habitats that are within the direct impact areas, but are deeper than the authorized depth. This is just an update to the panel and maybe an analysis that our office has been doing to try to quantify these impacts and to develop a position on what type of injury would actually occur to these areas.

As of right now the Army Corps of Engineers has lumped these impacts in the sedimentation and turbidity impacts. They are included in the same injury category as habitats located up to 150 meters outside of the channel. We're taking a look at what's here. In addition, there is another injury category here on the – I guess that would be the western face of the outer reef that we're also looking at. These areas total about six acres. They won't be directly dredged, because they are deeper than the authorized depth, but we believe that the injury will be more severe than sedimentation and turbidity that would occur outside of the channel.

Some of the ways that we would characterize those impacts would be that we would expect that the reef framework would be fractured; there would be some substrate scarring, increased rubble, displacement or sharing of biota, rubble burial, reduced topographic complexity. Those are just some of the buzzwords that we're using to describe these areas.

We are kind of putting together a white paper based on a spatial analysis and a review of the literature to kind of characterize these impacts without having any real site-specific data; nor do we have a study of a similar type of dredging project that monitored habitats that are connected to habitats that are dredged.

We don't have a good go-to study, but we're producing a white paper that we also might ping members of the advisory panel to review; maybe do a technical review for our data quality purposes. Stay tuned for that.

DR. FEDDERN: What is the existing channel depth?

MS. KARAZSIA: Ken, do you know what it is?

DR. BANKS: It's in the 40s, generally low 40s, 42ish.

DR. FEDDERN: Only slightly more basically and wider?

DR. BANKS: They want to go to 50 for control depth.

MS. KARAZSIA: Well, at 50 NABD, or mean low water; 59 mean low water. This is just another view of the impacts. Just to illustrate this point, this is middle reef, linear reef that is 59 feet or shallower, and then here is adjacent and connected to linear reef, middle reef that is deeper than 59 feet.

Then similarly here we have some linear reef and we have some sperm groove habitat. Then this darker blue polygon here; potentially this could just be rubble or a boulder pile. We've been working with – Brian actually produced this map, Brian Walker from Nova Southeastern University.

We're trying to characterize what these habitats are and what type of impacts could occur to them. Then we also found these areas in magenta and pink that weren't included on any of the other previous reef maps that we've evaluated for the project, so we're taking a look at those areas as well.

The last presentation, there was a lot of good discussion on what should we do for compensatory mitigation. For this scale of injury what the Army Corps has proposed so far, which is kind of the standard for Southeast Florida projects, is the creation of these artificial reef, boulder reef type habitats to mitigate for the loss of coral reef habitat. We are not sure if that is the best mitigation option that we have on the table.

In response to that, we had a contractor on board who evaluated some restoration and mitigation options in Southeast Florida. He conducted several independent technical meetings with our resource trustees and with academics and kind of gauged everybody's temperature on the list of potential ways that we can mitigate for coral reef impacts.

This is a list of all the different types of activities that he examined in his report. Some of the ways that really rose to the top was this coral propagation and active enhancement, summarized as coral nurseries, water quality improvements or eliminating direct threats. The implementability – is that a word – we're not sure about – although we know we have land-based source of pollution issues, and we know that we have a lot of direct threats; we thought that those would be less likely to implement or at least at this stage with the resources that we have and the regulations that we have in place.

Coral nurseries; this active propagation and coral enhancement kind of rose to the top of the list; so could that be a better approach to evaluate or to mitigate for dredging impacts to 15 to 20 acres of coral reef? That is something that we'd certainly welcome any feedback from this advisory panel.

We have worked with our restoration center, so these photos – I'm glad Dave's presentation was before mine, because your photos were a lot better; but these photos were from – well, our restoration center has a coral nursery in Puerto Rico, the Talaboa area and it is associated with a ship grounding.

I know it's really hard to see, but these are the – what are they called, the floating – and this is only five months after transplantation; but they've had a lot of great success. I think they've found linear growth rates over 50 centimeters a year using this approach, 95 percent survival in the coral nursery, and then 90 percent survival after one year out-planting.

This approach; you saw what Dave presented; here is some additional information from Puerto Rico. This approach certainly has merit. We have prepared a proposal. We asked Dave for some input and some numbers on cost and existing nursery operations; but we prepared our proposal – that is National Marine Fisheries Service and our Restoration Center staff.

We're what is considered a cooperating agency for the development of this Environmental Impact Statement. Under the National Environmental Policy Act, agencies can serve as a cooperating agency. For years, maybe even a decade, the Army Corps has come to us and said, "Okay you don't like boulder reefs, what do you want us to do?"

As our responsibility as being a cooperating agency, we are obligated to spend resources to evaluate and to give them maybe what is a better option. What we've done is we've prepared a short proposal and recently shared it with them that evaluates or describes an approach to use coral propagation and active species enhancement to mitigate for the coral impacts, just the coral impacts alone.

I think based on the scaling, there are about close to 200,000 corals within the impact area. We've done that and we've shared that with the Army Corps just recently. This proposal is pretty generic at this point, but it would result in the implementation of a 15-to-20-year program. If we were looking to get 200,000 corals back, that is how long it would take.

I added up the numbers on your slide, about total numbers of corals that had been out-planted in Southeast Florida, and the number I think was closer to 5,000. We're looking at getting a number closer to 200,000. so this would be a much larger scale effort that would involve multiple partners; local government, academics, other federal agencies and something that potentially NOAA could provide some oversight on given that our Restoration Center has had a lot of success in Puerto Rico, Virgin Islands and Florida in these types of activities.

The proposal discusses an approach that would be predominantly cervicornis based just because cervicornis grows so fast. It is such an ideal candidate for a nursery, but we understand that it can't be all cervicornis based, so 25 percent would be other stony corals. That kind of gets into the need for a 20-year program as well, because those corals grow so much slower, so we would need more time to produce corals in nursery for those purposes.

The mitigation amounts were calculated using a resource equivalency analysis that our Restoration Center has been using in negotiations. They are the primary responders to vessel grounding cases in the U.S. Caribbean, so it is a resource equivalency analysis that they have developed and have been using in a lot of negotiations for those.

Like I said, this would be envisioned to be a partnership with local governments, universities and that is kind of what we've offered up. It certainly needs – if it is something that the Army Corps is willing to entertain and something that we need a lot more information on; we would need to further develop this proposal and reach out to more partners.

But one of the issues is it doesn't really get to the structure impacts. It gets to the coral impacts but not the structure impacts. We've kicked around a few ideas about that. Because cervicornis creates all the three dimensional space, we thought, well, maybe we could overbuild the cervicornis part of it to address some of the structural impact issues, but we're not sure if that is the best approach or if we need to add some structure to this proposal.

Any feedback anyone has on that would certainly be welcome or any other options. This is just one idea. There might be several other ideas. Maybe ideally is a package of restoration and mitigation options that is the ultimate mitigation plan for this project if it does go forward, but this could certainly be one component of it.

MS. STILES: Jocelyn, it sounds like a huge project with a really severe impact on corals. It sounds like there is not flexibility in the design. It sounds like you're doing a good job trying to

at least get some kind of benefit from corals out of it that otherwise wouldn't exist. It is hard for me not to have a strong bias against mitigation just on principle.

But as much as I like the nursery project, it is simply not the same thing as having a bunch of coral reef out there in a part of the country that is heavily impacted by many, many things. I would just try and get as much as you possibly can out of the project. It would be nice to see, in addition to the nursery work, some other kinds of efforts and research on enforcement of areas.

It would be great if they would protect some corals like natural corals elsewhere. Of course, there is the overlay of what the negotiation allows, but I would just encourage you in your efforts. The resource equivalency analysis is not something I have expertise in; but my understanding is that most of the mitigation work has taken place with things with seagrasses, with wetlands, with things that are quite different from corals, and then in the areas where there is a lot more experience of restoring habitats.

I guess I would want a whole bunch more restored coral area if there is kind of a ratio in there of area that is being affected versus area that is being restored. I just don't think we're as far along with the practice of restoration of corals as we are with other kinds of restoration; where there are many, many years of planting wetland plants and that kind of practice.

DR. FEDDERN: What types of boulders are you planning? The reason I ask is that on the Port of Miami, the underside of some of those granite boulders are being covered by the orange cup coral. You don't want to put down so-called foreign rock down there that might encourage that species rather than the native corals.

MS. KARAZSIA: I defer to Ken and Dave; you guys know more about artificial reef construction.

DR. BANKS: Well, I think the concept that the Corps is thinking is using rock from the channel removal. They save money on purchasing material and they can recycle the material they are excavating. We have artificial reefs in Broward of limestone that have orange cup coral, too, which totally baffles me why it is not on the reef yet right next door.

DR. FEDDERN: Probably because the orange cup coral prefers that type of rock over the coral one over the limestone substrate.

DR. BANKS: We have limestone rock covered with cup coral.

DR. FEDDERN: Right – oh, limestone too?

DR. BANKS: Limestone, yes; the granite I get, the limestone –

DR. FEDDERN: Has it encroached on the nearby bottom?

DR. BANKS: My wild speculation is there is an iron involvement here and the rock that it's on may be – some carbonates have iron. It is on steel vessels; it is not on our natural carbonate substrate. It is a wild speculation, because it is an Azoxanthellate, and the zooxanthellae would need the iron, so I don't know why, but it's a wag.

MR. CRAMER: Are they going to set up some coral nurseries and relocate some of this stuff and then reset it back once the project is done?

MS. KARAZSIA: Yes; so that part of our proposal involves doing coral relocation as the impact minimization measure, but also to help provide the coral source for the nurseries. The numbers in the resource equivalency analysis is based on relocating a certain amount of corals outside of the impact area. Does that answer your question? Was there another part?

MR. CRAMER: Yes; I just was thinking the staghorn is like the big thing now; but at one of our last meetings Dave Vaughn and Ken Nedimeyer were all saying you see how fast these things grow. Pretty soon they are going to have more of this staghorn than they know what to do with. They're talking 30,000 now, 300,000 next year. Ken was like the funding is what is preventing them from doing more, out-planting more or doing this.

Dave Vaughn was working with these with the brain coral and stuff using flakes of these things. It was pretty interesting what they were doing, because the boulder was going from a golf ball and that thing expanding out to something this big around that takes – I don't know how long, I'm not a scientist, but hundreds of years at least, I would imagine; and he's taking off – these things are growing pretty fast, these little slivers off the edges they are taking them off.

They got all this stuff from the Navy docks down at Key West. That is where they got their source material. They are tripling, quadrupling in one year, these flakes. One goes to four and they are envisioning – and what they're thinking is not growing it from that little golf ball, but actually there is so much from that cold weather event, there are so much of the boulders already out there that are completely dead, that they think these flakes, if they just put one every foot or something like that, that they will encrust that old coral head and it would take maybe ten years instead of hundreds of years.

It is pretty interesting that they are kind of looking down the road and saying, okay, this staghorn; we may get what we want out of that and then we're going to focus our efforts on these other corals, which at first they thought would just take too long to grow; this is a hundreds of years project. But this different technique that Dave was showing the presentation that was pretty cool, because if they have boulders. maybe they could attach these flakes with; you never know, you know. It is interesting.

MS. KARAZSIA: Moving on; that is it on the Port Everglades Project, so stay tuned for more updates on that. Another project that I've briefed the AP on and also pinged some specific folks for some help in reviewing the impacts associated with it is this Marine hydrokinetic testing platform that is being proposed by Florida Atlantic University's Southeast National Marine Renewable Energy Center.

The Bureau of Ocean Energy Management is in the process of finalizing an environmental assessment for a lease for this to construct 10 to 14 testing platforms on the outer Continental Shelf. Just recall that all three of the lease blocks that are under consideration are within the coral habitat area of particular concern. Those are these areas in black.

I presented some of this information last year. But just in case you forgot, there was a Department of Energy Study that John Reed was co-PI on that did a habitat mapping and characterization of these two lease blocks. In addition, there was a third lease block to the east here that has been ruled out of consideration; but we have no survey data for this northern lease block.

MS. PUGLISE: What is the depth?

MS. KARAZSIA: The depth in this area; I want to say like about 900 feet water depth. Here we saw this slide last year as well, but this was from that DOE study. There were some real prominent high-relief hard-bottom features that were discovered in this DOE Study that we definitely wanted to steer the development away from some of these sites. I don't know if you can see, but these are the southern two least blocks.

This was a third lease block to the east that was right there on the edge of the Miami Terrace, an escarpment that was ruled out of further consideration, which was good, because that is probably where some of the highest quality or more dense deepwater coral habitats are located. An update on the EFH consultation; this is just another map showing an area that we wanted them to avoid.

They did ultimately in the final environmental assessment; they have eliminated this area from consideration for the lease. That was helpful to get the advisory panel's recommendation for that. We had also recommended that they examine lease blocks further north, like north of the Miami Terrace and escarpment, like off the Boca/Palm Beach area. They weren't able to address that recommendation.

Another recommendation that came out of last year's meeting was for them to do some sub-bottom profiling, because we kind of went over the types of anchoring that they are proposing to use. There was some concern that just looking at the multibeam and the ROV work, that they wouldn't be able to determine the depth of the sediment that would be needed to hold these anchors in place.

If there was just a thin veneer of material over the hard bottom, that the anchors could slide and they could damage nearby hardbottom resources. We had recommended that – each of these areas is called aliquots, and we had recommended that they remove additional ones, but we did get this one removed from further consideration.

This right here is their first proposed mooring location, which looks like that might be okay, but we're going to get additional information on that site before they put anything in the water. Here is where we stand on the EFH consultation. What we agreed to do is a tier consultation. They wanted us to finalize consultation on the entire project, but we don't have the information that we need to do that, and we are expecting to receive that information.

Like I said, there are going to be 10 to 14 expected total deployments of this mooring and anchor system. With each of those deployments, there would be what Bureau of Ocean Energy Management refers to as a project plan. That project plan would have the habitat mapping and survey requirements, the results from those survey requirements, the monitoring. We had asked for some monitoring to look at fish interaction with the hydroturbine blades.

We'll have the monitoring protocols in each of those project plans. We'll have more site-specific information on the deployment locations. We'll have the outcomes of the sub-bottom profiling. Then through later consultation, we'll talk about recovery and decommissioning of these sites. That is kind of where we stand right now. We're expecting additional information and we'll review that as it becomes available.

Moving on; I threw this one in, we talked about this one a little bit last year. This is a local grassroots initiative that is being led by Florida's Department of Environmental Protection to develop recommendations for coral reef management in this area. It is referred to as the Southeast Florida Coral Reef Initiative Area.

It is these four counties in Southeast Florida referred to as the SEFCRI area for a variety of reasons, but these areas have been highlighted as a need for having a coordinated management plan, because they are located north of Biscayne National Park; they are located north of the Sanctuary; that those areas tend to have more dedicated resources and funding for coral reef conservation.

When I presented on this last year, the program was called MOIP, Management Options Identification Process. One thing that we've done since last year is we've tried to kind of brand this initiative, and this is what we've come up with. We're maybe hoping for something a little bit catchier, but it is better than MOIP, I think, maybe. You guys have been involved if there is anything you want to add to this.

Ken sits on the process planning team, and we've been helping to sort of design the process; and Steve does as well. We've been helping to design this process that would develop this list of coral reef management options. This is where we are right now. This is where we are in the process. We're about to present this process to the public with the hopes of garnering some interest and having community members participate in workgroups.

We're envisioning maybe one workgroup per county, we'll see, depending on the level of interest. If we have enough to populate four workgroups or if we just end up with two workgroups or ten workgroups, we'll figure it out. This is kind of where we are in the process. That Step 9 is essentially in 2016, which would be a document that contains these management recommendations.

Then that document would be presented to the appropriate entity or government agency that has the authority to implement those recommendations. Everything is on the table and nothing is on the table at the same time. It should be an interesting process. I think this is kind of the third attempt at identifying some conservation actions or implementing some conservation actions in the SESCRI area. The first two sound pretty good. Maybe the third time is a charm, but we'll see how it goes. I don't know if you guys want to add anything to this.

MR. BLAIR: A couple quick points; in the development of the process, we had a lot of interaction with and kind of used information from what the Keys did in their management process, as well as input and evaluation of some of the activities out in the west coast as well.

I think it is a pretty dynamic and a good process in the general aspect of it; to get up front what the public's anticipations, expectations, desires and needs are in order to come up with some

alternatives, as well as having them come through to help develop those alternatives so that there is a level of – which is always dependent on how much of the public actually participates, but a level of buy-in to begin with. I am pretty interested. It is kind of scary to have everything on the table and nothing on the table at the same time as we enter into it, but it is definitely a dynamic process that I think is going to be pretty interesting to watch unfold.

MS. PUGLISE: As I was watching this, I'm hoping that you are interacting with folks from the MARES Project, the South Florida project;

MR. BLAIR: Through the fact that a lot of us are also involved in the MARES process and bringing some of that aspect to it –

MS. PUGLISE: Well, the reason why is they actually did some interactive stuff with the Everglades National Park, which while it is still off the record, looking at some of their different management options and kind of doing an analysis of what would be a preferred option based on using some of the process. I've been talking with Chris Kibble at ALML and I recommended that he call you. I think that there might be some more. Now that they've progressed on some of the ways, they are finally getting together where they are finally figuring out where they are going and what they can add.

MR. BLAIR: Yes, Chris and I actually spoke yesterday on some of the things. We were at a meeting together. Yes, MARES is a different process really than this. It brings a lot of information resources to here, but, yes, we are aware of some of those things and to the extent that we can utilize them.

One of the first things in the public meetings is presentation of a lot of the conceptual models for how the systems function and work. MARES' conceptual models are going to be part or at least involved in some part of that; so, yes, we are trying to integrate it.

MS. STILES: I had two questions. One was whether it might be possible to get the Corps to set up a trust fund to fund implementations or recommendations from our Florida Reefs Project. It seems like one of the problems with the mitigation for the Port Everglades is that you have this time pressure to come up with some way to spend a bunch of money on corals in some ridiculously short time period.

Whereas, if there were some kind of mechanism that is set up that they could support something else that had a longer term vision, then that might help you do that. The other question I had was whether you have regulatory or political support for this effort. Do you see recommendations coming out from your process, if you think you will have that kind of backing to be able to do whatever you decide you want to do?

MS. KARAZSIA: I was going to punt to Ken, because he is kind of leading. This is the bottom-up effort and there is a similar top-down effort that hopefully they are going to merge at some point, maybe.

DR. BANKS: Funny you should mention that. We have another acronym group we just formed called the Coast to Ocean Task Force, and these are elected officials in our region. The idea was just as you said; that normally a bunch of staff people like us develop all these ideas, and we try

to get it implemented, and then it goes up against political officials who have to approve certain things, and it stops because they are not informed.

It doesn't coincide with their interests, whatever their reason. We formed this group to try to bring them into the planning process. By the time we get to something, they will be educated, number one. Number two, we hope to sway them so they see our point of view so they are more likely to approve the strategies that come out of all of this; if they show up.

MR. BLAIR: And if they behave and get interested in the topics we want them to get interested in.

DR. BANKS: So far they are behaving quite well; we haven't got to the dirty stuff yet, but so far so good.

MS. KARAZSIA: In response to your first question; we have some dedicated funding through FY16 for this initiative through NOAA's Coral Reef Conservation Program. They have a grant that they issued to the state of Florida to do coral reef conservation type activities. The state of Florida has said this is our number one priority.

They have dedicated funding – I will use that loosely but slightly firmly – to fund this. We have a communications contractor on board. A number of us have done some facilitation training. There are a couple other contracts that have been let to help support this process, and we'll have professional facilitators at these meetings as well.

Hopefully, that should help. Then in response to the Corps setting up a trust fund; I would need to look into the Corps' mitigation rule. They had a new mitigation rule in like 2009, the Corps and the EPA, and that kind of outlines their process for mitigation. I think that might be a stretch, but it is not something that should be completely taken off the table without looking into, so I'll look into that.

MR. BLAIR: Okay, we have just a couple other items that we want to go through. These should be relatively quick, and the first one is kind of the predecessor for tomorrow. We just want to remind everybody what Amendment 8 is going to be covering and kind of what the panel's actions have been to date.

This would be more a summary, as I say, of the status of the amendment as it is. Anna is going to go through it for us. She'll probably point out this activity was initiated a few years ago after identification and awareness of areas of more complex bottom and pinnacles and regions to be protected that were brought forward by individuals such as John Reed and Steve Ross and Sandra Brooke. It is something that has been going on for a while.

It had gone through a number of revisions and vetting through this AP in cooperation with the Deepwater Shrimp AP and the Habitat AP has looked at it as well. We've had some initial plans and alternatives and some modifications to them. What we are going to try to do is just go through it quickly to refresh our memories as to what is in the amendment and what the panel has already provided as the alternatives and our preference for the alternatives that are being submitted.

MS. MARTIN: Building off of what Steve mentioned, we thought it would be helpful to just kind of refresh everyone today about where we stand with this developing amendment. It has taken a few different forms. As you recall, when this first started it came as a recommendation originally from the Coral Advisory Panel during the October meeting back in 2011.

That was kind of the impetus for the actions that you see in the document. It was once part of the Comprehensive Ecosystem-Based Amendment 3 that our council was developing. Based on the timeline of events and having these advisory panel meetings, this did slow down somewhat after the public scoping process.

The council took these coral modifications to the coral habitat areas of particular concern out of that Ecosystem Amendment and placed these actions specifically into Coral Amendment 8. They were originally in that Ecosystem Amendment with a whole host of other things primarily pertaining to the snapper grouper fishery.

When this first started, I think the Coral AP was introduced to a different amendment altogether. It has taken some different turns. I mentioned to you earlier where we stand with the timing. Tomorrow will be a good opportunity for both the Habitat AP and the Coral AP to weigh in on final recommendations that they would like the council to take into consideration before they consider preferred alternatives and approving this document for public hearings.

We also have participation at tomorrow's joint session from Chairs of the Snapper Grouper Advisory Panel, the Law Enforcement Advisory Panel, and the Deepwater Shrimp Advisory Panel. It will be a joint session tomorrow with some extra participants as well that are involved in these issues, too.

On Thursday of this week we have a meeting with the Deepwater Shrimp AP. That group will be meeting in entirety, too, again, specifically because the council is interested in input from all of these groups one last time as a group before they take this up again at their next council meeting, which is in June.

Most of you were at that Joint Deepwater Shrimp and Coral AP meeting that we had last October down in Cape Canaveral. I think many of you would agree that considerable headway was made towards consensus and recommending to the council how these areas should be modified. The differences in the document that you see now versus the version of the document that we reviewed with you in Cape Canaveral last fall; we have received the updated VMS analysis, the vessel monitoring system analysis.

As you recall, these actions do pertain to – as far as fishery impacts, we're talking primarily about the rock shrimp fishery when we are discussing modifications to the Oculina Bank. That is the only fishery in the South Atlantic at this moment that is required to carry and utilize that vessel monitoring system equipment.

Previously we had data only representative from 2007 to 2011. Just a few weeks ago we finalized the analysis for the VMS dataset. We now have the complete suite of data since VMS was required for the rock shrimp fishery. That is helpful, because it really does kind of describe fishery impacts with each alternative scenario and how they affect the rock shrimp fishing activity in the proposed expansion.

Also because the rock shrimp fishery – all of those permitted vessels fishing for royal red shrimp in the South Atlantic also fish for rock shrimp; and so we have VMS data on the royal red shrimp fishery as well.

When we are discussing modifications to the Stetson-Miami Terrace Coral HAPC, primarily we're talking about impacts to that deepwater shrimp fishery and the royal red shrimp fishery specifically. Steve and I thought it would be a good idea to kind of update everyone on this amendment, where we stand and what the Coral AP last recommended as preferreds.

MS. KARAZSIA: Since we're missing John and Sandra and Steve Ross; I think a lot of us differ heavily to what their recommendations are, and I know that you guys spoke with them before the meeting. If you have something in particular that you know that they've recommended and could present that to us as well, I think that would be helpful for tomorrow.

MS. MARTIN: Sure, we did talk with them. Unfortunately, they are not here. I agree with your sentiment there. They collectively don't have any new recommendations to bring to the discussion tomorrow from where we left off in October. Now I do think that the Deepwater Shrimp Advisory Panel on Thursday is interested in tweaking the northern boundary of the Oculina Bank recommendation that they brought to the table last fall. That is the only new kind of recommendation that I've heard of. Steve, do you know additional information?

MR. BLAIR: No, I was just informed earlier that we will probably hear of potential suggestions. But just relative to John and Steve, just to remind you that when these subalternatives were done, and based on the recommendations from the panel that occurred at the joint meeting that everybody looked at; John was directly involved in drawing of the boundaries as they are presently presented.

Steve and Sandra also had looked at, reviewed and have not come up with, as Anna said, other alternatives or modifications of those. They have been vetted through the three of them and was drawn, and essentially with John being a major principle in that. But all of them have reviewed it and have not come back with any additional modifications beyond what has been presented.

This has been out and I believe has been sent out to the AP after these lines have been drawn so that we have all seen these. The things that are probably most updated in the present alternatives package is the additional VMS data. There aren't modifications of the boundaries beyond what was presented at the council meeting in December, which everybody would have with the exception of Josh, and I'm not sure if you have seen it. But everybody was sent those modifications that were presented at that time.

MS. STILES: I'm curious if you've had a chance to look at the VMS data for fishing activity since the Coral HAPCs were established to see if there has been any change in recent fishing activities compared to in the past. I don't know how much the fishery has changed.

MS. MARTIN: Roger will be getting into the VMS analysis in much more detail tomorrow. I wasn't planning to cover that with you today, but it does fluctuate from year to year, the fishing locations, and I think the points are representative of that. What you see in the document is not

separated out by year. You will just see the grouping of the years that have been analyzed, the entire time series; so I'm not sure; I would have to ask Roger.

MR. BLAIR: Just another point; remember, we're looking at areas that were not previously closed so we would expect to see – and I think we saw that in the last one we were looking at with the Deepwater Shrimp. You will see areas that were closed that do have dots in them that are considered transit positions, and some of those things led to modifications in protocol for the deepwater shrimp to ping rates and so forth to help ensure that those would be adequately shown and addressed.

MS. STILES: I think to be more direct; I am curious to see – you mentioned that the Shrimp AP is most concerned about the northern boundary of Oculina. Did they have specific concern with the Stetson-Miami Terrace Extension?

MS. MARTIN: Well, sure, they have concerns about all of the areas proposed.

MS. STILES: But no one area more than others?

MS. MARTIN: I think the impacts to the rock shrimp fishery are greater with the proposed modifications to the northern boundary of the Oculina Bank HAPC. I think that would be a good question to pose to Mike Merrifield tomorrow. He'll be participating in the discussion. That is my understanding.

DR. ALEXANDER: One recommendation that was made by several of the members of the Coral and the Shrimp AP at the last meeting was that we also evaluate the experimental area. I saw reflected in the minutes that there was a mention of that being expressed, and that it was due to be reviewed in 2014. Is that explicitly going to be looked at for the boundary and justification of the boundaries at that time?

MS. MARTIN: In December the council reviewed all the recommendations that came from the Joint AP meeting, one of them being – I think they called it a fishery access area within the existing HAPC that would open up the corridor to allow the rock shrimp vessels to trawl within the HAPC.

The council deferred to the evaluation of the Oculina Experimental Closed Area. An update on that is due to the council in 2014, and that is really kind of all of the guidelines that we have at this moment. We don't have a structured approach or plan for that evaluation update. I think as you all know John Reed has done a considerable amount of research in the Oculina Bank.

I know that when the evaluation team originally put that document together back in 2007, a number of pretty complex research priorities and projects were identified. Some have been addressed to some degree, but a large amount of them have not been funded. There is some uncertainty as to where we stand in that process.

DR. ALEXANDER: I think the point was that the deeper water areas that probably don't hold good coral habitat may not be needed to be excluded as an experimental area any longer; and as a nod to the shrimp fishery, that might be a way to make the changes that you are going to be

proposing now more palatable. It might be useful to at least keep that in people's minds that evaluation is going to occur.

MS. MARTIN: Well, remember also that the Experimental Closed Area was set up under a snapper grouper amendment; so it is specifically viewed as like a marine protected area for snapper grouper species. There are those considerations as well. I think there is some spawning activity for tilefish.

It is essential fish habitat not only for coral species but also snapper grouper species. The Experimental Closed Area does have a different definition than the overall Oculina Bank HAPC in entirety. It does lie within the HAPC, but it was originally established as a snapper grouper area.

DR. ALEXANDER: I wasn't aware of that, but, of course, that is not our purview at all. We are supposed to only evaluate things on the basis of whether it serves for coral habitat.

MR. BLAIR: Right; and I think we recognized that at the last meetings as well with that explicit request from the Deepwater Shrimp; that it wasn't just our say; that we could evaluate it relative to our needs or our purview, but definitely each of the APs would be evaluating it towards that. That would result in the outcome and not just explicitly just what ours would be.

DR. VOSS: One thing I wanted to mention to you; on some recent cruises targeting deeper areas in the deepwater habitat area of particular concern and filling in some of those gaps; we found shallower lophelia reefs than anticipated. In adjacent areas south of the identified lophelia reefs, there are bathymetric signatures that indicate they are consistent with lophelia structure in that area that we kind of previously thought may have been just soft bottom and okay to give away; so keep that in mind.

MR. BLAIR: Are these areas other than our extension areas in the CHAPC?

(Answer given off the record)

MS. PUGLISE: Are you talking about the area off Jacksonville?

MR. BLAIR: Well, that is more information to bring; essentially the premise for the western extension on the –

DR. ALEXANDER: John mentioned some shallow areas last time where excursions of cooler water come up. I don't know if that is the same thing. I couldn't tell you where it was.

MR. BLAIR: Coral Amendment 9.

MS. MARTIN: Yes, I know, my mind is turning. Okay, so I'm just going to walk through the alternatives. Action 1 pertains particularly to the Oculina Bank HAPC. Tomorrow we'll see some – Roger has all of the capability on his computer for kind of getting into the details with some of these charts.

But really what I wanted to just review with you is where the multibeam bathymetry took place, where the alternatives are situated along the depth contours, and what the Coral Advisory Panel has presented as a preferred during past meetings. This blue polygon here represents Alternative 2A. Alternative 2 and the two subalternatives that follow are the only two scenarios now for a northern extension of the Oculina Bank.

This is another change I guess I should have pointed out from the fall meeting when we met in Cape Canaveral. The council took your recommendations as well as the Deepwater Shrimp recommendations into consideration and cleaned up the document pretty significantly. We did have quite a number of scenarios for extending this northern boundary.

Now all you see in the document are two; so 2A, this was what the Coral Advisory Panel originally presented as a preferred recommendation. This extends that northern boundary of the HAPC along the 60 and 100 meter depth contour lines and adds approximately 430 square miles to the existing HAPC. You can see here the two areas where the mapping took place and the ROV dives occurred were off of Daytona and Titusville. Those have been overlaid onto the charts here to give you an idea for where those occurred. The recommendation was originally developed to include probable extent of habitat along these depth contours, so this is 2A. The Habitat Advisory Panel was presented with this as well, and they also originally recommended this as a preferred option for expansion.

This chart shows the dots there, the VMS points, and we will get into details with that tomorrow. Now this is Subalternative 2B, and this is the alternative that came out of the joint meeting last fall. At the meeting both groups were in agreement of this scenario and recommended to the council how a northern extension of Oculina should occur.

The difference here; this extends the boundary along the 70 and 100 meter depth contour line and annexes obvious hard-bottom features. This was an area of concern that was discussed during the joint meeting last fall; 27 Fathom Ledge, and it is a pretty significantly active, based on the VMS points, fishing location for the rock shrimp fleet. This was annexed out of the alternative. This adds approximately 329 square miles to the existing HAPC.

There is about a hundred square mile difference in the two scenarios. Now Alternative 3 is the one that considers a western extension of the Oculina Bank. This is a proposed extension primarily between the two existing satellite sites. There is minimal rock shrimp fishing activity based on the VMS data.

This was presented as a preferred by the Coral AP and the Habitat AP – the Deepwater Shrimp AP did not voice a preference of this particular modification – but it was based on the bathymetry data and also was included in that original proposal that John Reed submitted to the council when these areas were first introduced back in the fall meeting of 2011.

Action 2 is also associated with the Oculina Bank HAPC. I think previously this was an alternative under Action 1, but has been split out into its own action in the document. This considers a transit provision through the Oculina Bank HAPC. This came as a recommendation from the Shrimp and Deepwater Shrimp Advisory Panels.

Specifically because of the large amount of area that is considered for expansion to the northern boundary under Action 1; there was considerable concern about being able to access fishing grounds that the rock shrimp fleet is currently fishing off of the eastern boundary of Oculina Banks.

As you know, currently rock shrimp vessels cannot motor through the HAPC in possession of rock shrimp. This action specifically looks at allowing the possession of rock shrimp on board a vessel while in transit through the HAPC. Alternative 2 was originally recommended by the Law Enforcement Advisory Panel and references the transit regulations that are currently in place for all of the marine protected areas in the South Atlantic.

The difference between Alternative 2 and Alternative 3 is defining how you stow and store your gear and a minimum speed and a couple of other specifications. This was something that was discussed at the meeting last fall. The Coral Advisory Panel didn't necessarily weigh in on all of the nitty-gritty details of a transit provision, but I think the statement was that the AP did not have opposition to the specifications that the Deepwater Shrimp Advisory Panel came forward with under Alternative 3.

Alternative 3 was what came out of the joint meeting last fall, and it does have some very specific provisions for what a transit provision should entail; maintaining a minimum speed of not less than 6 knots. They identified that ideal trawling speeds don't go above 3.5 knots, so 6 knots is easily considered a speed that a vessel would not be trawling.

A ping rate acceptable by law enforcement – right not they are pinging hourly; and because the width is not that large, they have discussed modifying that ping rate to every five minutes and gear appropriately stowed. Alternative 3 specifies that the gear can be in the rigging and the doors do not have to be disassembled. That was another concern among the Deepwater Shrimp AP; the amount of time that it takes to dismantle these doors, especially when you are out there in turbulent conditions that tend to be present around the Oculina Bank.

MR. BLAIR: Just as a note on that; in Alternative 2 that cites CFR Section 22.35, so on and so forth, required that the nets and doors had to be stored below. The shrimpers stated that there was excessive or often extreme safety issues with pulling down doors and nets in open ocean conditions and requested that consideration of the definition of stowage of gear be that the doors and nets out of the water, basically, and not requiring de-rig them and place them down below.

MS. MARTIN: Thanks, Steve, for the clarification. They described it as like a two-hour production and particularly cumbersome and not necessary with a minimum speed and an increased ping rate. The Law Enforcement Advisory Panel was represented at the joint AP meeting and seemed in agreement with having a different case for a transit provision for the rock shrimp fleet as what is in place currently for the marine protected areas.

Our legal council will always advise consistency in the regulations; and in this particular case they agreed that some modification could likely be made here for this particular case. Action 3; again, this originally came as a recommendation from the Coral Advisory Panel, and Sandra Brooke and Steve Ross specifically at that October meeting in 2011.

This is the result of observations of a shallow water lophelia ecosystem occurring in waters off of Jacksonville in waters much shallower than previously thought that these corals could thrive. There was high-resolution bathymetry data that was obtained from the Navy in addition to the work that they were able to do during one of the deep sea coral research and technology cruises.

That is kind of the background on Action 3. The alternatives; there are only two here. The alternatives modify the western boundary of the existing Stetson-Miami Terrace HAPC. Again with this action, we're moving much further offshore than the Oculina Bank. When we talk about fishery impacts, we're specifically talking about the royal red shrimp fleet.

That is not a fishery that is currently within the council's coral fishery management unit; but again because all of the vessels fishing for royal red shrimp in the South Atlantic also fish for rock shrimp and are required to carry and utilize VMS, we have that VMS data on this fishery as well.

This shows you Alternative 2. This was the alternative that was developed during the joint meeting last fall. This is something that the Deepwater Shrimp and the Coral Advisory Panel came up with collectively. You can see the area down here where the multibeam bathymetry data; this was data that was obtained from the Navy there that currently lies within the MPA.

The Habitat Advisory Panel has also endorsed this alternative as a preferred in addition to the other two APs. This alternative scenario does release this portion of sandy bottom in the southernmost extent of this modification here. It did release a number of VMS points. The fishing activity is not as impacted with Alternative 2 as it was with Alternative 3.

This is the other scenario proposed for expansion under this action. This really is no longer applicable. This was something that the Deepwater Shrimp Advisory Panel came forward with after the Coral AP's original recommendation. What they did was kind of they went up from the area. The Coral AP had originally enclosed this southern extent here. There was, for the most part, a straight line across that 200 meter extension.

They originally responded to the Coral AP's first recommendation for this area and carved out that productive sandy bottom area where they have been actively fishing for royal reds. This alternative is something that based on discussions tomorrow we may recommend that the council remove this scenario from further consideration.

We have a considered but rejected appendix where usually most alternatives that are no longer applicable or that the folks that develop these documents don't need to further analyze; they go to this graveyard known as the considered but rejected appendix. This is again something that we may recommend the council do here.

MR. BLAIR: Just to kind of draw your attention to take a look and compare the two carefully, because this at one point was a strong consideration of the AP, because it was a joint-derived alternative; but when you compare it to the present Alternative 2A, you will see that those areas that are released here are also released to the greatest extent in Alternative 2 and actually releases more area to the south of the mapped areas. We are looking at areas where we are trying to provide the greatest ability or release of the areas that we can for those.

MS. MARTIN: Are there any questions on the Stetson-Miami Terrace proposed modification? The only other area included in this amendment is the Cape Lookout Coral HAPC Extension. This was again originally brought forward as a recommendation from the Coral AP and Steve Ross, specifically.

He came forward with that recommendation to extend the northern boundary of the HAPC by approximately 8 square miles, this little fingerling structure here, as a result of identification of 10 to 15 lophelia mounds in this northern zone and obtained from museum records and bathymetric data. Those were kind of the basis for his recommendation to the AP back in 2011.

Then the AP endorsed that recommendation and included that in the suite of recommendations that the council reviewed at their December meeting. We only have one alternative. That is the only option for proposed modification to the Cape Lookout Coral HAPC. There have not been any concerns from, certainly not the Deepwater Shrimp Advisory Panel, but no seemingly impacts to fisheries managed in the South Atlantic occurring.

This is the deepest of the Coral HAPCs and off of the Wilmington area. That is it as far as where the Coral AP stands as far as your previous recommendations for preferred measures for the council to consider. It just kind of introduces you all to what we will be discussing tomorrow.

MR. BLAIR: As Anna said, Roger will be giving us some more complete discussion regarding the comparison of the VMS data that was before and the new data that was added now.

MS. MARTIN: Yes, we have that. If you haven't had a chance yet to review the Attachment 4 in the briefing book; that really gets into the specifics with the spatial representation and the fishery activity as represented in the VMS data. We'll be getting to the details of Attachment 4 with the Habitat AP tomorrow.

MR. BLAIR: Any questions? Okay, thank you. Anna, I appreciate it. With that, there is one more item that we wanted to talk about. As you all know from numerous e-mails that were sent out over the past couple weeks, I really meant to bring my voting button here but I couldn't find it. I apologize for that little technical glitch that everybody had to work though, but I appreciate everybody's attention to following up and giving their votes. **The new Vice-Chair is Jocelyn Karazsia.** Jocelyn will be taking my seat tomorrow.

MS. KARAZSIA: Word on the street.

MR. BLAIR: I appreciate it; welcome, it was a very good and close race; I mean two very, very, very, very qualified people. The panel is definitely a winner overall with Jocelyn here, but with the additional support of Sandra, let alone the entire committee. It is a little kudos to everybody and to the panel itself for having such qualified people on it. With that, is there any other additional business to cover this afternoon?

(Whereupon the meeting was adjourned at 5:00 o'clock p.m., May 7, 2013.)

Certified By: _____ Date: _____

Transcribed By:
Graham Transcriptions, Inc.
May 29, 2013

South Atlantic Fishery Management Council
Coral Advisory Panel

Stephen Blair, Chairman
Department of Permitting, Environment & Regulatory Affairs (PERA)
Restoration & Enhancement Section
701 NW 1st Court
Miami, FL 33136
305/372-6853 (ph) 305/372-6630 (f)
blairs@miamidade.gov
(Miami Dade County DERM)
11/97, 3/01, 9/05*

Dr. David Gilliam, Vice-Chairman
Nova Southeastern Univ.
Oceanographic Center
8000 N. Ocean Dr.
Dania Beach, FL 33004
954/ 262-3634(ph); 954/262-4098(f)
gilliam@nova.edu
(Research)
3/03, 12/08*

Dr. Clark Alexander
Skidaway Institute of Oceanography
10 Ocean Science Circle,
Savannah, GA 31411
912/598-2329 (ph)
912/598-2310 (f)
Clark.alexander@skio.usg.edu
(SKIO-Research/Geology)
09/05, 12/08

Dr.Kenneth Banks
Natural Resources, Planning and Management Division, Ste 201
Broward County Environmental Protection & Growth Mgmt Dept.
1 North University Drive
Plantation, FL 33324
954/519-1207 (ph); 954/519-1412 (f)
kbanks@broward.org
6/09*

(Representative)
USGS Center for Coastal & Watershed Studies
600 Fourth Street South
St. Petersburg, FL 33701
727/803-8747 ext. 3088 (ph)
727-803-2030 (f)
(USGS – Mapping and Habitat Characterization)

Dr. Sandra Brooke
Florida State University Coastal and Marine Lab
3618 Coastal Highway 98
St Teresa, FL 32358
850/697-4093
sbrooke@fsu.edu
(Coral reef scientist)
12/08, 9/12*

John Cramer
7835 SW 124th Street
Miami, FL 33156
305/393-4049
Street124@aol.com
(Commercial fisherman)
9/10*

Dr. Henry Feddern
156 Dove Avenue
Tavernier, FL 33070
305/852-5459 (ph);
305/852-4335 (f)
hunter@terranova.net
(Marine Life / Octocoral Harvester)
11/97, 3/01, 12/04, 9/05, 12/08, 9/12*

Dr. Roland Ferry
USEPA REGION 4
61 Forsyth Street, S.W.
Atlanta, GA 30303-8960
404/562-9387 (ph)
ferry.roland@epa.gov
(EPA Region 4) *09/05

Minerals Management Service
381 Elden Street
Herndon, Virginia 22071
(MMS – Geology and Habitat Assessment)
*09/05

Jocelyn Karazsia
NOAA Fisheries
Habitat Conservation Division
400 N. Congress Ave., Suite 120
West Palm Beach, FL 33401
561/616-8880 ext. 207 (ph)
jocelyn.karazsia@noaa.gov
(NOAA Fisheries-Regulatory/Deepwater Coral)
*09/05

Greg McFall
Research Coordinator
Grays Reef NMS
10 Ocean Science Circle
Savannah, GA 31411
912/598-2416 (ph); 912/598-2367(f)
greg.mcfall@noaa.gov
(GRNMS – Benthic Habitat Characterization)
12/01, 6/04, 9/05*

Dr. Kate Lunz
FL Fish & Wildlife Commission
Fish and Wildlife Research Institute
100 Eighth Avenue, SE
St. Petersburg, FL 33701
727/896-8626 (ph)
Kate.Lunz@MyFWC.com
(FWRI- Ecosystem)
10/09*

Ken Nedimyer
P.O. Box 712
(212 Silver Palm Ave.)
Tavernier, FL 33070
305/852-4955 (ph)
sealifefi@bellsouth.net
(Marine Life / Live Rock Aquaculture)
8/93, 8/96, 3/00, 3/03, 9/05,12/08, 9/12*

Kimberly Puglise
Program Officer
NOAA's Undersea Research Program
1315 East-West Highway, N/SC12
Silver Spring, MD 20910
301/713-3338, ext. 140 (ph)
301/713-4044 (f)
kimberly.puglise@noaa.gov
(NOAA's Undersea Research Program)
*09/05

John K. Reed
Harbor Branch Oceanographic Institution
5600 US 1, North
Ft. Pierce, FL 34946
772/242-2205 (ph)
772/461-2221 (fax)
Jreed12@hboi.fau.edu
(HBOI- Deepwater Coral Research)
03/03, 9/05, 12/11*

(Continued on next page)

South Atlantic Fishery Management Council
Coral Advisory Panel

Dr. Steve W. Ross
UNC-Wilmington
Center for Marine Science
5600 Marvin Moss Lane
Wilmington, NC 28409
910/395-3905 (ph)
rosss@uncw.edu
(UNCW/USGS Deepwater Research)
09/05, 9/10*

Margot Stiles
2501 M Street N.W., Suite 300
Washington, D.C. 20037-1311
202/467-1901 (ph); 202/833-2070
mstiles@oceana.org
(NGO/Environmental) 12/06, 3/10*

Dr. Robert Van Dolah
S.C. Dept. of Natural Resources
Marine Resources Division
PO Box 12559
Charleston, SC 29422
843/953-9819 (ph)
vandolahr@dnr.sc.gov
(Research)
8/93, 8/96, 3/00, 3/03, 9/05*

Dr. Joshua Voss
5600 US Highway 1 North
Fort Pierce, FL 34946
772/242-2538
Jvoss2@hboi.fau.edu
(Coral reef scientist) 9/12*

* Denotes year of appointment

South Atlantic Fishery Management Council
2012 - 2013 Council Membership

COUNCIL CHAIRMAN:

David M. Cupka
P.O. Box 12753
Charleston, SC 29422
843/795-8591 (hm)
843/870-5495 (cell)
palmettobooks@bellsouth.net

VICE-CHAIRMAN

Ben Hartig
9277 Sharon Street
Hobe Sound, FL 33455
772/546-1541 (ph)
mackattackben@att.net

Steve Amick
6902 Sandnettles Drive
Savannah, GA 31410
912/429-3537 (ph)
912/898-0361 (f)
SteveAmicks@aol.com

Mel Bell
S.C. Dept. of Natural Resources
Marine Resources Division
P.O. Box 12559
(217 Ft. Johnson Road)
Charleston, SC 29422-2559
843/953-9007 (ph)
843/953-9159 (fax)
bellm@dnr.sc.gov

Anna Beckwith
1907 Paulette Road
Morehead City, NC 28557
252/671-3474 (ph)
AnnaBarriosBeckwith@gmail.com

Tom Burgess
P.O. Box 33
Sneads Ferry, NC 28460
910/327-3528
tbburgess@embarqmail.com

Dr. Roy Crabtree
Regional Administrator
NOAA Fisheries, Southeast Region
263 13th Avenue South
St. Petersburg, FL 33701
727/824-5301 (ph); 727/824-5320 (f)
roy.crabtree@noaa.gov

Dr. Michelle Duval
NC Division of Marine Fisheries
3441 Arendell St.
PO Box 769
Morehead City, NC 28557
252/726-7021 (ph); 252/726-0254 (f)
michelle.duval@ncdenr.gov

LCDR Scot Gibson
U.S. Coast Guard
Brickell Plaza Federal Building
909 S.E. First Avenue
Room 876/ DRE
Miami, FL 33131-3050
305/415-6768 (ph)
305/415-6791 (f)
Mario.g.gil@uscg.mil

Doug Haymans
Coastal Resources Division
GA Dept. of Natural Resources
One Conservation Way, Suite 300
Brunswick, GA 31520-8687
912/264-7218 (ph); 912/262-2318 (f)
doughaymans@gmail.com

John W. Jolley
4925 Pine Tree Drive
Boynton Beach, FL 33436
561/732-4530 (ph)
jolleyjw@yahoo.com

Deirdre Warner-Kramer
Office of Marine Conservation
OES/OMC
2201 C Street, N.W.
Department of State, Room 5806
Washington, DC 20520
202/647-3228 (ph); 202/736-7350 (f)
Warner-KramerDM@state.gov

Dr. Wilson Laney
U.S. Fish and Wildlife Service
South Atlantic Fisheries Coordinator
P.O. Box 33683
Raleigh, NC 27695-7617
(110 Brooks Ave
237 David Clark Laboratories,
NCSU Campus
Raleigh, NC 27695-7617)
919/515-5019 (ph)
919/515-4415 (f)
Wilson_Laney@fws.gov

Jessica McCawley
Director,
Florida Fish and Wildlife
Conservation Commission
2590 Executive Center Circle E.,
Suite 201
Tallahassee, FL 32301
850/487-0554 (ph); 850/487-4847(f)
jessica.mccawley@myfwc.com

Robert E. Beal
Executive Director
Atlantic States Marine Fisheries
Commission
1050 N. Highland St., Suite 200 A-N
Arlington, VA 20001
703/842-0740 (ph); 703/842-0741 (f)
rbeal@asmfc.org

Charles Phillips
Phillips Seafood / Sapelo Sea Farms
1418 Sapelo Avenue, N.E.
Townsend, GA 31331
912/832-4423 (ph); 912/832-6228 (f)
Ga_capt@yahoo.com

Tom Swatzel
P.O. Box 1311
Murrells Inlet, SC 29576
843/222-7456 (ph)
tom@swatzel.com

South Atlantic Fishery Management Council
Staff

Executive Director
Robert K. Mahood
robert.mahood@safmc.net

Deputy Executive Director
Gregg T. Waugh
gregg.waugh@safmc.net

Public Information Officer
Kim Iverson
kim.iverson@safmc.net

Fishery Outreach Specialist
Amber Von Harten
amber.vonharten@safmc.net

Senior Fishery Biologist
Roger Pugliese
roger.pugliese@safmc.net

Fishery Scientist
Myra Brouwer
myra.brouwer@safmc.net

Coral Reef Scientist
Anna Martin
anna.martin@safmc.net

Fishery Biologist
Dr. Mike Errigo
mike.errigo@safmc.net

Fisheries Social Scientist
Dr. Kari MacLauchlin
kari.maclauchlin@safmc.net

Staff Economist
Dr. Brian Cheuvront
brian.cheuvront@safmc.net

Science and Statistics Program Manager
John Carmichael
john.carmichael@safmc.net

SEDAR Coordinators
Dr. Julie Neer - julie.neer@safmc.net
Julia Byrd – julia.byrd@safmc.net

SEDAR Admin/Outreach
Andrea Grabman
andrea.grabman@safmc.net

Administrative Officer
Mike Collins
mike.collins@safmc.net

Financial Secretary
Debra Buscher
deb.buscher@safmc.net

Admin. Secretary /Travel Coordinator
Cindy Chaya
cindy.chaya@safmc.net

Purchasing & Grants
Julie O'Dell
julie.odell@safmc.net

PRESENTER

JENNIFER MOORE (NOAA)

RUSTY HUDSON
KATE QUIGLEY
Doug Neuroth
U.S. Navy