SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

JOINT GOLDEN CRAB & DEEPWATER SHRIMP ADVISORY PANELS MEETING

Radisson Resort at the Port
Cape Canaveral, FL

January 28, 2008

SUMMARY MINUTES

Golden Crab AP:
Gary Graves, Vice Chair
Robert Palma
William Whipple
Chip Bethell
Howard Rau, Jr.

Deepwater Shrimp AP:
Fred Dennis
Tony Herring
Marilyn Solorzano
John Williams
Warren Gautier
Woody Moore
Rodney Thompson

Council Members:
Duane Harris, Vice-Chairman
David Cupka
John Wallace

Council Staff:
Gregg Waugh
Julie O'Dell
Myra Brouwer

Observers/Participants:
Tom Jamir
John Reed
Catherine Stolk
Sherri McCoy
Carlos Rivero
Mr. & Mrs. J. W. Wise

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The Joint Golden Crab and Deepwater Shrimp Advisory Panels of the South Atlantic Fishery Management Council convened in Salon 3 of the Radisson Resort at the Port, Cape Canaveral, Florida, Monday afternoon, January 28, 2008, and was called to order at 1:40 o'clock p.m. by Mr. Gregg Waugh.

Mr. Waugh: This is the Joint Golden Crab/Deepwater Shrimp AP meeting and unfortunately, the chair of the Deepwater Shrimp AP will not be here and we're still waiting to see if the vice chair is going to show up. For this joint session, Gary Graves, who has been running the Golden Crab AP meeting, will continue to help run this and I will as well.

What we would like to do is go around the table with just identifications. I would just remind you when you go to speak to press the talk button and the red light will light up and if you will just say your last name that will help Joe Graham with the transcriptions. Duane, if we could start with you and work around the table, please.

Mr. Harris: Duane Harris, council member, Georgia.

Mr. Cupka: David Cupka, council member, South Carolina.

Mr. Manchester: Randy Manchester, golden crabber.

Mr. Thompson: Rodney Thompson, Cape Canaveral Shrimp Company.

Mr. Herring: Tony Herring.

Mr. Bethel: Chip Bethel, golden crab fisherman.

Mr. Rau: Howard Rau, golden crab fisherman.

Mr. Whipple: Bill Whipple, golden crab fisherman.

Mr. Graves: Gary Graves, Keys Fisheries.

Mr. Waugh: Gregg Waugh, South Atlantic Council staff.

Ms. Brouwer: Myra Brouwer, South Atlantic Council staff.

Dr. Reed: John Reed, Coral AP for the South Atlantic Fishery.

Ms. Solorzano: Marilyn Solorzano, rock shrimp/red shrimp boat owner.

Mr. Dennis: Fred Dennis, Deepwater Shrimp AP.

Mr. Moore: Woody Moore, red shrimper.

Mr. Williams: John Williams, Tarpon Springs, Florida, Deepwater Shrimp AP and Southern

Shrimp Alliance.

Mr. Wallace: John Wallace, council member, Georgia.

Mr. Waugh: We've got the -- Everybody should have a copy of the agenda. We've got some additional copies if anybody needs one. What we would like to do is shuffle this around a little bit. We've got John Reed here and we would like for him to go through his presentation and we can come back and then reiterate the areas that we're proposing for the deepwater coral HAPCs. That will come out of the short review Myra does.

We're also hoping to have Tom Jamir here to talk about the VMS information and so I'll go see if I can track him down. The two main things we wanted to get done this afternoon, while you all are together, are to hear the information from John, who is here representing the views of the Coral and Habitat APs. He's not here to sell this idea, but he's here to present you the scientific information that they used.

Then the second was we want to make sure there's some time here for these two industries, actually three fisheries, to talk. There's some concern that at times there may be some gear overlap in areas where the golden crab guys are fishing, where you all may be doing some trawling. Those are sort of the things we wanted to cover this afternoon, between now and three o'clock. If that's okay with everybody, what we'll do is go ahead and start with John, if you're ready, John.

Dr. Reed: Thank you very much for inviting me. I have just a PowerPoint presentation just to briefly tell you about these deepwater reefs primarily off the eastern and southeastern coast of Florida, our discoveries and what we know about these reefs that have been discovered, primarily in the last ten years, even though we do have some research going back thirty years, and just kind of explain how these deepwater reefs are comparable to the Oculina Reefs off the east coast of Florida.

In fact, they're very similar, the oculina and deepwater lophelia, that's in deeper water here, and it's rather a remarkable habitat that we have out here. Not many places in the world have such an extensive area of deepwater coral reefs right in their backyard and so let me just show you some of the pictures that we've taken out there with submersible and how we got to the state of knowledge that we have right now.

For the first part, I work as a Senior Scientist at Harbor Branch Oceanographic Institution in Fort Pierce, Florida. Just recently, we merged with Florida Atlantic University and I've worked there for thirty-two years, primarily studying deepwater coral, deepwater reefs, and also with our biomedical research division.

Most of the work that's been accomplished on these deepwater reefs is a collaboration of probably forty or fifty scientists from around the country. Specifically, many of these scientists are on the South Atlantic Fishery Council Coral Advisory Panel. That's what I'm on and it was a collaboration of these scientists that developed this state of knowledge about the deepwater reefs off the southeastern United States.

These are just a few of the ones I work closely with, but again, there's probably forty or fifty scientists that are studying various aspects of reefs, whether it's -- It's very basic biology, studying the coral and studying how does it reproduce, how long does it live, what's associated within the coral habitat, what lives there? We're just at the very beginning of understanding these deepwater reefs compared to what we know about shallow-water reefs.

We do know that in the western Atlantic, off the southeastern U.S., there's three types of coral that form deepwater reef structures: oculina, lophelia, and enallopsammia. They're all similar in that they form these bushy colonies, or thickets, from the size of a soccer ball all the way up the size of an SUV, three to six-foot tall. They kind of grow together in large thickets, but they may be isolated in individual coral heads, also.

Typically, we know over hundreds and thousands of years that these coral heads capture sediment and grow up and form mounds that are as tall as 500 feet tall. Some of these mounds may be only three foot tall, but there's thirty, sixty, a hundred, and then the tallest ones are 500-hundred foot tall.

We do know if we drilled into the middle of one, which was done recently, it appears the entire mound is a buildup of coral over thousands and thousands of years. This is the general region and these all merge together, but this is from the basic research done off the southeastern U.S., from North Carolina to south Florida.

We know on the eastern side of the Blake Plateau that we've done some work out here, called the Stetson Reefs. On the western side of the Blake Plateau, we have what we call the Savannah Reefs and these all merge together. It's just kind of terminology of different geographical regions and these kind of blend into what I call the East Florida Lophelia Reefs and these blend into the Miami Terrace, off of Miami, and then down to the Florida Keys the Pourtales Terrace and then inshore, you see the Oculina Reefs.

Most of the work we've done has been with the Harbor Branch vessels and submersible. The four-person sub dives to 3,000 feet and so you're in a bubble that gives you 180-degree visibility and has video cameras and digital still cameras and a manipulator and buckets for collecting samples. We know the Oculina Reefs are the shallowest of what's called the deepwater reefs.

These grow in about 200 to 300 foot of water off of central and eastern Florida. These form these thickets and what's different about these, as compared to a shallow-water reef, is a shallow-water reef, like in the Florida Keys, may have dozens of species of coral, whereas your deepwater reef usually is only made of one species of coral, plus they're pure white, because there's not enough light for algae to grow.

These deepwater reefs have to rely solely on plankton filtering down the water column for food, because they don't have algae within their tissues like a shallow-water coral, but we do know the deepwater reefs, just like a shallow-water reef, provide habitat for hundreds and thousands of little critters that are living within those branches that's forming the habitat for the whole food chain. It's like a little condominium there and, of course, right on up to the larger fish for the

Oculina, the gag and scamp grouper, snowy grouper, and speckled hind.

We do know a small coral head the size of a soccer ball contains up to 2,000 animals, little tiny shrimps and worms and crabs and fish, and these are the basis of the food chain for the larger critters out there. These are some of the animals that live within the coral, various clams and crabs.

We also know these corals; deepwater corals in general, grow very slowly, about a half-inch a year. A large coral head six-foot tall could easily be centuries years old and the reefs themselves are thousands of years old, based on carbon dating. In deeper water, at depths down to the deepest depths of the Straits of Florida, 800 or 900 meters, or almost 3,000 feet, are the Lophelia Reefs.

Lophelia is another coral, like oculina. It forms these thickets that are very fragile. The branches are about the diameter of this pen and within those thickets are all the little animals living. Other what they call live bottom habitat is basically where you have benthic organisms, like sponges, sea fans, black coral, hard coral, growing on the bottom. That's what they call live bottom or hard bottom habitat.

It's because these sponges, coral, gorgonians, and black coral, provide habitat for the other stuff, the little shrimp and crabs and the bottom of the food chain. Some of the stuff that grows in these deepwater reefs, like this bamboo coral and various anemones and lots of different sponges and, of course, stuff living within the coral itself, the shrimps and crabs and smaller fish. There's a number of sharks out there and we see golden crab out there, both in muddy areas as well as right on the reef itself and various types of red shrimp.

The royal red shrimp are kind of difficult to identify visually from the sub, but we've seen a number of shrimp out there associated with both the soft bottom as well as the reefy bottom. Further south, we have a thing called the Miami Terrace and this is different than the lophelia reefs.

The lophelia reefs, which I showed you previously, basically go along the axis of the Gulf Stream at the foot of the slope and then in the deep part of the trench between Florida and the Bahamas and Florida and Cuba.

There's this rocky feature called the Miami Terrace that goes from about Boca Raton up here and this terrace -- This is just the bathymetry. It shows this oval structure. That bathymetry was mapped in 1971 and is still the best bathymetry that we have out there and that's the bottom line, is we have very little good bathymetry for this whole region. We have better bathymetry of the surface of Mars than out here and that's the truth.

Anyway, this is a rocky feature and spatially along the eastern edge of this is a very sharp drop-off and this is where we've done most of our sub dives and this is where we find a lot of what I call live bottom with the gorgonians and sponges and coral.

Then up on top of the terrace -- I believe the proposed HAPC comes right along this edge here

and then to the east of that. On top of the terrace, from about 500 or 600 feet out to here, which is about 900 feet, is a various rocky bottom and sediment, but less live bottom up on top. There's less coral, in fact very little coral, up on top that we know of, but we've done very little work on top, except for a proposed pipeline, for a natural gas pipeline.

There was a large survey right in this area, where they wanted to put a deepwater port and so we surveyed this area, a little box about like that, extensively, because they paid for it, to do a survey, and we found both rocky hard bottom and sandy muddy bottom, but virtually very little coral or sponges or gorgonians. Even though it was a hard bottom, there wasn't a lot of stuff on it, but that's outside of the HAPC.

Secondly, this shows the eastern edge of that drop-off of the Miami Escarpment. This is a fathometer over a very wide area, but it's fairly steep and rocky, probably a twenty to thirty-degree slope, and then at the base of it, you get into the lophelia mounds, down here at 1,800 feet, and out to 2,700 feet is where you get the lophelia and also up on the top edge, but up on top of the terrace is more of a rocky bottom and I've seen a lot of golden crab up there. I'm not sure about the shrimp.

This shows the edge of the terrace with black coral and various types of coral growing there, lophelia. There's lots of these little crabs called galatheid or squat crabs and different types of sponges and most of these dives, again, are on the slope of the Miami Terrace. That's where we did most of our work.

I did not work on top of the terrace, except for that pipeline survey, but it is a very rich area for lots of stuff and to tell you the truth, I saw a lot of golden crab crawling right up these ninety-degree rocky walls. There's wreckfish out there, too.

Further south, the Pourtales Terrace, you're down off the Florida Keys, from Key Largo and through the whole Florida reef tract, all the way out to the Dry Tortugas. This Pourtales Terrace is similar to the Miami Terrace, that it's more of a rocky structure. It's not the lophelia mounds. It's a rocky hard bottom that's supporting some coral, but more gorgonians, sea fans and sponges and so forth.

A lot of our work was on this upper part, kind of the northeastern part. That's where I did most of my work, but I've done a few dives along this edge, where we found a number of deepwater sinkholes, and then up here, in the shallower parts, you see lower relief hard bottom. Basically, if you look at the bathymetry of this region, this is from 200 to 400 meters, and so 600 feet to 1,200 feet, this part right in here is what that proposed MPA is and this right there, where that A and B and T are, right through here, is where our proposed HAPC overlaps.

This is where we found the highest relief hard bottom. They're big mounds, big rocky features, and lots of live bottom there. It would be very obvious from your fathometer or from the bathymetry.

Now, on the center part, you'll see on a bathymetric chart that it also looks like rugged bottom, but it's lower relief, maybe one to two-meter relief, for the most part, but that's still a lot of kind

of a rocky bottom, but we haven't worked that much there, mostly in this western part. Mostly I've dove on the sinkholes.

This called Marathon Sinkhole and Jordan Sinkhole, Key West Sinkhole. Those are about the -- The top edge of the hole is about 1,200 feet deep and they drop down to about 1,800 feet deep. It's probably not a good place to do a trawl or something if you want it back. It's very rocky and sheer vertical wall.

This is some of the relief that we see on the Pourtales Terrace within the zone that we mapped for the HAPC, from 130 meters down to 212 meters. This just shows a schematic of the sinkhole and it is a very sharp edge and vertical relief and the Pourtales Terrace habitat, we do not see the lophelia coral, but we see a different type of coral called stylaster and very likely that would come up on trawls or dredges down there, is the stylaster coral. It's usually pink or white and lots of sponges and gorgonians and so forth and quite a few fish, larger fish, like your snowy grouper and some tilefish down there, too.

Some of these sponges we're actually using for our biomedical research that are showing promise for cures of cancer, breast cancer and colon cancer and pancreatic cancer. There's a little snowy and tilefish.

Anyway, we've found that these deepwater reefs, in general, have a high diversity of animals associated with the reef itself and with the coral and the sponge habitat. This is a general food web and this just shows -- This dotted box is called the Coral Refuge. Within that box are the animals that live within the coral and the sponges and so forth and those are the small fish, the macroinvertebrates, like the crabs and shrimp and so forth, and outside of the box are the larger animals that rely on that for feeding, like your migratory pelagic fish and finally, your humans.

Right now, our research priorities, which were developed by the South Atlantic Fishery Council and our Coral and Habitat APs and Ecosystem AP, we worked up what's needed, what do we need to know for both the lophelia reefs as well as the oculina, because we're really just beginning to understand these reefs and just starting to know where they are.

In the last ten years, it's where we've discovered the majority of these reefs and so our number one priority is mapping and habitat characterization. We just started using AUVs, which can start mapping wide swaths of the bottom. It's just like your fathometer that has a single ping, but this AUV, in a multibeam, pings out like a hundred pings in a wide swath, so you can get a 3D image of the bottom. It's a wonderful thing.

Over the thirty years that I've worked on the Oculina Reefs, we just finished mapping the entire reef system with this multibeam and so we can see a good image of the entire bottom. What's incredible about that, doing that, is we just discovered up in here, between the two satellite zones, over a hundred reefs, these high-relief reefs, that are outside of the HAPC that we never knew about.

Right now, the majority of the knowledge of the east coast reefs, deepwater reefs, are from either individual fathometer transects -- This shows a single transect from Jacksonville to the left,

number one, down to St. Lucie Inlet, or about West Palm Beach, and we were just going over hundreds and hundreds of bumps from three to ten-foot tall up to a couple-hundred-feet tall.

The big bumps look like this on the fathometer and basically, up until recently, the geologists thought those bumps were sand dunes and that's why nobody ever went out there to look at them. They said these are sand dunes and we started looking and every one that we've dove on so far is a living reef.

In addition to our individual sub dives, which can only look at a very small percent of the bottom, we rely on other data, such as historical data in the literature, and so I've gone back, in compiling this data, and the people that worked on this project, we went back through the literature and looked at the research, the research by geologists and biologists and so forth, going back a hundred years.

This is from my paper that was submitted to the South Atlantic Council in 2004 describing the status of knowledge about these deepwater reefs and in this is a list of publications that were used to gather the data of what's out there and I think in this list I came across that we went through over 200 different publications that go back to the 1800s to the 1970s, where there was a lot of trawling data being done, up to the present. These are all either geological or biological in nature.

A good portion of the data we have out there is from previous research, either historical or recent, to give us an idea of where coral or reef has been found previously and then we also have -- Our data more recently is with these AUVs. So far -- This was the first deepwater multibeam mapping completed in this entire region of the southeastern U.S., where these guys, the geologists from the University of Miami -- In 2006, there were six areas we mapped with an AUV.

Each of these squares was a one-square-mile or not even a square mile, but about a half-square-mile box. This little mapping venture cost $100,000 and this stuff is expensive to do and nobody is paying us to do it, unfortunately. I'm not paid. I'm just like you guys. As a Coral AP person, I'm not paid to go to the meeting today. I'm paid for my travel to come up, but this isn't my job.

The fishery council and NOAA doesn't pay me to go out and collect this research and so it's tough to get money to go out there and do this research and I'm with you guys. I want to know where the reefs are and the only way to do it is to collect the historical data and to collect the data that we know from previous research. Also, we have a lot of data from museum records, where coral was collected before, and so we know where there was coral, because they collected it there, as well as visual observations.

The main thing to consider is there's no way to visually look over this entire region. It would take the next hundred years diving every day of our lives and so we'll never do that. Multibeam is a good help.

In this survey that these Miami guys did, we said, okay, what can we tell with multibeam bathymetry? Can we tell where a reef is or not? That's exactly what we did in this paper that

was published last year. Certainly where we see multibeam and you see a high-relief reef like this, something that's on the order of ten-feet tall to a hundred-feet tall, in absolutely every case that we've ground-truthed that -- By ground-truthed, I mean we had a bump from the bathymetry and we went down and looked at it with an ROV or submersible and we said yes, that's a reef.

In every case, it was a reef and not a sand dune and these little dots are where we took the submarine and dove over it. It was great to have this 3D image of the bottom and then be able to take a sub or an ROV and pinpoint, say I want to go from here to here to here to here, and we've never had that capability before and so this is incredible.

Certainly high-relief features, whether it's from a current bathymetry chart or from this new multibeam, high-relief equals reefs. This is some moderate relief, from one to three-meters, so three-foot tall to ten-feet tall. Each of these sites that we dove on were live bottom, you know reef, sponge, coral type habitat.

The higher relief -- Like up here, these are about three-meters. The lower relief down here probably wouldn't even show up on your fathometer. That's only about a three-foot bump there, but that was -- All this little stuff out here are less than three-foot and it was all live bottom.

Then we went to -- This is an area at the foot of the Miami Terrace. These are all very small relief and you see almost like a washboard pattern. This is all less than three-foot tall bumps that are picked up by the bathymetry. It would not show up on any surface fathometer. This is done with an AUV flying very close to the bottom.

This whole area here, which was miles in coverage, was 100 percent live bottom that I would have never dived on in the sub. I would have never picked that site out to dive on, because I'm trying to find a reef and said that doesn't look like a reef to me, it looks like sand dunes. When we ground-truthed it, especially this area here, this looks like nothing and it all turned out to be 100 percent live bottom or habitat. It's difficult.

All I can say is with the bathymetry and the multibeam, when you see a bump, it's probably a reef and if you don't see a bump, I can't tell. I'm sorry to say that, but that's the truth. If we see where it is pure mud, like on the Florida-Hatteras slope in north Florida -- You get on that Florida-Hatteras slope, because I used to do a lot of work in the late 1970s, where we did transects from a hundred-foot to a thousand-foot, Cape Canaveral to West Palm Beach, mapping the bottom, and I guarantee you in that zone, once you got outside of that Oculina Reef at 300 foot, you're on that muddy slope is where the tilefish are.

From that 300-foot, out to a thousand-foot or 1,200-foot, up there is mud and that's golden crab mud or maybe royal shrimp mud, I don't know, but certainly tilefish mud. Further south at those depths, you're running into the rocky bottom, which is the Miami Terrace, and the same with Pourtales Terrace.

These are just some other sites where we predict hard bottom, based on museum records from the Smithsonian Museum. We went through thousands of records and all those little dots are where I would go with the sub to ground-truth that yes, there's probably reef there, but I haven't

been there yet. The red dots are where I've been and all these other dots are where I would like to go, if somebody wants to give me a billion-zillion dollars. Unfortunately, there's no funding to do this.

All the funding for the research we've done the last five years has dried up, with the war and the trillion-dollar debt we have. It's virtually impossible to find a grant to go out that will pay you to go down and look on the bottom with the sub and the ship and all that stuff. It's expensive, very expensive. I don't know where we're going to go from here to get more data and that's the unfortunate part.

Just for a comparison, because the Oculina Reefs are a perfect model for the Deepwater Lophelia Reefs, they're exactly the same and we know -- The world is looking at the Oculina Reefs as a model, the Europeans and the New Zealander and the Australians, other countries that have deepwater reefs and that are trying to protect them and allow fisheries, but to do it safely for both. They're looking to the Oculina Reefs as a model.

Here's what we knew about the Oculina Reefs in 1980 and this box right here was a box placed around the known extent of the Oculina at that time, in 1982. That was based on the best available science at that time. It was strictly on the research that we had done at Harbor Branch with the sub. There was no historical data there and there was no museum data there.

There certainly wasn't any multibeam data and so we looked at that and said, okay, here's the known extent where that coral occurs, from north to south to east to west, and certainly we have gaps in data, where we don't have data, and so it's very likely -- We know there's reef here and we know there's reef there and it's very likely there's reef in between and that's what was given to the council.

Unfortunately, that's not what was passed and if you look here, the reef actually shows it going out to 80°03. You look at what happened and the HAPC, in 1984, was this portion down here, about one-third of the known reef, and the rest was left outside. Also, the HAPC went right up the eighty-degree line and did not go out to the 80°03, as was suggested.

We left all of that out and unfortunately, we found that there's a lot of reef up there and a recent study that just came out this year showed that that northern area got hammered in that twenty years open to fishing and trawling, primarily. It was completely overfished and the entire habitat is about 99 percent dead and we saw evidence of nets on the bottom and longlines and traps and lots of fishing line and we know the fisheries collapsed by the late 1980s.

Taking historical data, we knew, where like the reef off of Cape Canaveral was and have historical photographs from 1978, and compared that with -- This is how it looked in 1978. That area was left open to fishing and primarily trawling until 2000 and this is what that same reef looked like in 2001. There's nothing left.

The hill was there and you still had a sixty-foot high hill, but there was no habitat for anything to live. The coral is absolutely decimated and crushed and you can see trawl lines and this shows the percent of coral loss in the unprotected area. There's 98 to 100 percent coral loss in the

unprotected from Cape Canaveral, Cocoa Beach, Eau Gallie, Sebastian, compared to the protected area down here off of Fort Pierce and Vero.

It just doesn't affect the coral, but it affects the whole fisheries. Here's for specifically for scamp grouper. Scamp were totally connected with the intact habitat, where you had standing coral and sponges and sea fans, compared to the rubble habitat.

It affects everything down the road and so we have to find out a way to -- We're only going to be able to find -- Utilizing all the data that we had, the Coral AP and all the scientists said that based on the best available data that we have right now, this is where we draw the line around the existing coral. Certainly the southern end, there's a gap there and it's not a gap in coral, but it's more a gap in data, and it certainly extends to the south there, but that's the best that we could draw it right now.

I don't know, but I think as far as the Coral AP, all we can do is define, based on the best available knowledge to date, this is where the coral occurs, from the deepest to the shallowest, north and south, and to realize that even within the Oculina Reefs where we've studied for thirty years, visually we've been on the bottom with ROV or sub, we've covered less than one-half of 1 percent of the bottom out there, in thirty years.

This area is huge and so with the multibeam, it's certainly going to help in avoiding the high-relief and moderate-relief areas where we know there's reef. The other areas where it's flat, we can just give our best guess and say, okay, what do we know from fisheries, for the flat areas, but I can't tell what the bottom is like, unless we know it's a muddy bottom.

If it's muddy and flat, it's likely okay to fish on, as far as the benthic critters and habitat damage from pots or trawls going on the bottom. I'm totally supportive of fisheries and we just need to find the best way to protect the habitat that we know and that's where we drew the boxes and I think it's up to, I guess, the fishery management council to figure out the fishing regulations that can occur out there that are most likely to protect the habitat.

We know for a fact, from previous data, if that live bottom is trawled or dredged or dropped on that it will damage, probably irreparably, that habitat. It will take thousands of years to come back. I guess that's all.

Mr. Graves: John, thank you. That was a great presentation. We would like to open it now to the panel members for questions or comments.

Mr. Solorzano: I was noticing on there when you had the red shrimp, of course, he was in muddy bottom. A lot of our trawl area goes over what you're showing being possible coral formation. You say you've checked just a little tiny bit of the area. Our meters -- I know you all have got all this expensive equipment and you go out and you see this and with our machines, we can see hard bottom and soft bottom and we're not setting out on hard bottom.

My question to you was when you have -- You seen the red shrimp on the softer bottom and you have our information from thirty years of experience, from Woody and other people, that's going

to go over where you're saying there's coral and we know there's not. We're not catching and we're not finding any. We're getting clean shrimp with very little other stuff.

You all want to close all this area up, because you say there's coral there and we know there's not. How are we going to come to an agreement on that? We've given you our bottom to lay over what you already have. We've given you all the information. I was also going to ask you, on the colors, when you dive down in water, red doesn't show, right? Like if you're diving, you don't see the color red.

Dr. Reed: Without lights.

Ms. Solorzano: I noticed in some of those pictures it was showing the color red and when you were drilling into that tall area with all the coral in it, was the coral inside that dead or alive? Like when you drilled down into this coral bank with all the --

Dr. Reed: Within a mound, where they took a core through a mound, which was actually about -- This was a big mound that was I think 120 meters, and so like 300 or 400 feet. The mound itself is a buildup of coral debris and skeleton that's all dead, the mound itself. It's like a hill or ridge. Living on top of it is the live coral, standing coral, sponges, habitat, and so forth.

Ms. Solorzano: You're saying dead coral will have live coral come back on top of it?

Dr. Reed: No, I'm saying the habitat itself is built up over thousands of years, as far as we know. What the theory is you start it out as a single coral head on a flat sandy bottom and a little tiny coral polyp might have landed on a seashell or something. It started growing up and formed a coral head.

As the coral grows, it's producing sediment, because its capturing sediment that's flowing through the water column and the sediment builds up and the coral keeps growing up, over thousands of years. It's as the coral grows up, its capturing sediment and producing sediment and it keeps going up and up and up.

As far as what -- The difference between hard-bottom echo on a fathometer and soft-bottom is not always obvious, even with a multibeam, where we have an AUV flying close to the bottom. Some of the live bottom that can have very low relief, or no relief, can be actually an intermixture of mud and coral rubble and small corals that aren't showing up in the fathometer or in the multibeam.

Even the best multibeam is only going to pick up features that are like three-foot tall and probably just an individual head it's not going to pick up, but we've seen on these flat areas, where it's not a hill, that would show where -- A fathometer would show the background scatter as like the mud, as soft-bottom bounce back.

When you went there, what we were finding was like low-relief features, less than a meter that was a combination of mud, coral debris, small coral, sponges, and all the habitat producers, the sponges and gorgonians and fish and so forth. I'm saying where we know that there's mostly

soft bottom, pure soft bottom, just the mud, is on this Florida-Hatteras Slope.

I've been there and I've seen it and that's where you get that green ooze, which is primarily clay, and we know that, from central to north Florida, is probably occurring from your shelf-edge break, like a hundred meters, 300 feet, and so east of the end of the Oculina Reef and then as you go over the slope, the Florida-Hatteras Slope, you're on that green mud, down close to the bottom of that slope, where it starts flattening out again.

Anywhere on that slope north of the Miami Terrace that I know of, and this is primarily based on our studies in the 1970s, was just green mud and I never saw hard bottom there, from this 300-foot to 1,000-foot zone, once you get north of the Miami Terrace, because the Miami Terrace is like this rock feature that's just kind of sitting on the slope there, but north of it, north of Boca, I guarantee you that's mud, at least from the north end of that Terrace up to Jacksonville. I don't know about north of Jacksonville.

I know the HAPC line on the western edge followed the 400-meter line pretty much down that west side. That was based on the shallowest where we found reef, was 400 meters. On the eastern side, it was basically the EEZ that we found relief in the Bahamas waters. It goes to the Bahamas and so we just drew the line along the EEZ.

Ms. Solorzano: What I'm asking though is have you took the material that the fishermen gave, where they have been trawling, and matched it to your stuff yet? Have you looked at where we work versus where you're saying there's coral?

Dr. Reed: For which fishery?

Ms. Solorzano: We turned in some bottom from the red shrimp fishery.

Dr. Reed: Some bottom?

Ms. Solorzano: Yes, off the computers where we trawl. I think there's VMS data to document that. According to our records and what you all show, we trawl and do not find coral in the areas where you're saying there's coral and you've got studies from thirty years back and we've got trawl bottom from thirty years back. Has anyone given you the fishermen's data to match up to what you have?

Dr. Reed: Recently, I saw the overlay of -- Yes; I've seen the overlays where they had the boxes along the eastern coast and south Florida for both the fisheries. I think it was in that package there.

Ms. Solorzano: You've seen what we have, but you're telling us there's coral there, but we work there all the time and know there isn't coral there. So every little bump and hill means there's coral?

Dr. Reed: I'm certainly not saying within that entire box there's 100 percent coral, no, within the box. That box was drawn on the best available knowledge of where coral exists and it exists up

to the 400-meter line.

Ms. Solorzano: Generally, when a fisherman is trawling, he'll find a certain depth and he'll stay in that depth and it may be different drags or different places, but he drags quite a ways straight in a certain depth and you're going along and going spot, spot, here's coral and here a little further and then there isn't and there is and there isn't. They're going straight up from West Palm to St. Augustine, in the very same depth of water and finding no coral.

Dr. Reed: In what depth?

Ms. Solorzano: It can vary from 1,200 foot. It can vary from different regions. They might start out in 1,200 foot and go to 1,800 foot. It's going to vary where they're working on that trip and different times of the year and different -- They have different areas that they'll work, but generally when they get in a depth of water, they'll stay in that depth of water. They'll move and out a little bit, but not a huge distance when they're dragging. It's going to be straight with the currents and the depths.

Definitely from West Palm north there, to Jacksonville, when you're on that -- If you did a whole fathometer transect east to west, from Florida side to the Bahamas side, as you come off the slope, when you're on that steep slope there, for the majority of that area, it's going to be mud and as it flattens out, which it varies around about 1,600 to 1,800 foot, it starts flattening out in the valley, in the Straits of Florida there. When you're up on that slope in the 400-meter zone, 1,200 feet, you're likely to be in mud up there.

Mr. Waugh: If I could jump in a second, we're going to get into some more detail, certainly, looking at the VMS data later today. We're going to get Tom Jamir in a few minutes to give a more general presentation, because we wanted to get some VMS information to the golden crab fishermen and then later this afternoon, we'll be looking in more detail at the VMS data and showing where at least the VMS data, since VMS was required, is showing where you all are fishing.

I don't know if any of the golden crab guys have some questions, but one of the questions they had before, this morning, was when you go down on a submersible, do you just look at that spot where you go down or are you looking around in an area?

Dr. Reed: It depends on the dive and the objectives. Our sub dives are funded by various agencies and so some people may be just studying the coral and some people may be studying fish and some people may be studying geology. When I do a dive, I try to cover the largest area possible and it's usually on a transect. If we know there's a bump, we may land maybe a half-mile away and so we'll go over the bottom on a transect. On a typical sub dive, we may cover a half-mile to a mile.

Mr. Wallace: A half-mile radius around the bump or just a half mile from where you land compared to the point of --

Dr. Reed: A sub is like driving -- In the sub, you can see very limited space, because it's dark

down there. You can see about sixty feet and then we have our video cameras that are pointing down and out. Again, it depends on who is in the sub and the objective. If it's a guy working on fish and he's looking at the reef fish, then he's going to go right to the bump and dive around the bump.

If a guy is interested in fish that are not associated with the live bottom, he's going to stay out in the flat bottom. Typically, you would do a transect. Let's say if you had a hill and you're going to map it, like you would do any hill, you would come up one side and go up to the top and go along the top and go down the north side. We try to get all sides of it, if we had time, like the north slope, the south slope, east, west, top, and a variety of habitat surrounding that. A typical sub dive is three hours, surface to surface. In 2,500 foot of water, we'll get about two hours of bottom time.

Mr. Williams: Mr. Reed, first, I want to thank you for the very powerful and impressive presentation. I think it was amazing. I do have a couple of questions. One is I thought I heard you say you've mapped 1 to one-and-a-half percent of the bottom of the HAPC and is that right?

Dr. Reed: For the Oculina Reefs, we've just finished -- We, NOAA NURC primarily, finished the multibeam for 100 percent of the Oculina Reefs, which is 300 square miles, just this last year. For our sub dives, where we've gone down either historically in the 1970s and 1980s or recently to ground-truth the multibeam maps, we've probably covered about 1 percent of the bottom.

Mr. Williams: That is for the proposed HAPC?

Dr. Reed: No, for the proposed HAPC, the only multibeam high-definition mapping was the five little sites that the University of Miami did, which is five square miles, and then last year, NOAA NURC had one cruise where they did a single transect like north to south. I think there's a map over there, but it's a very limited area. For multibeam, as far as sub dives we have, probably more extensive sub dives there than probably anywhere else in the world, but we probably have a couple hundred sub ROV dives put together for the entire area. That's over like ten years.

Mr. Williams: I thought you heard you say also, and you can correct me if I'm wrong, that we need to protect the habitat that we know. Is that correct?

Dr. Reed: The Coral AP put together the box of the HAPC based on the best available science that we know. It would be a mistake, the same mistake that happened with the Oculina, to say we saw that line of coral up off of Cape Canaveral, because there was a transect there, and we saw one at Cocoa Beach and there was no data in between the two and to say because we don't have the data we'll make each little circle or each individual sub dive a coral HAPC, that's not reasonable, because the coral is within that zone, based on all variety of data, based on looking at the literature, geological literature.

There's 200 publications and the museum records, as well as the individual sub dives, which verify that yes -- The reason we selected a sub dive was based on that data. We said here's our best available data and I'm pretty sure here is going to be reef and in every case, it has been. That box that was drawn around there is saying this is where we know there's coral within this

box and outside of the box, there could be coral, but not likely or we certainly don't know.

Mr. Williams: I understand and believe me, I think what you've done with Oculina is special also, but I don't think you can compare what's happened with Oculina to what we're trying to do today, based on what we've heard from the golden crab fishermen and what we will hear from the royal red fishermen.

What appears to be happening today, there is a good chance that you may put two fisheries completely out of business. In Oculina, you just restricted a certain area for the fisheries, but moving on from that, you had one slide up there, and it went pretty quick, but I thought I tried to read it right, where it said the Magnuson-Stevens can restrict destructive fishing practices in known coral habitat and is that right?

Mr. Waugh: Let me jump in here for a second, please, because I think the APs don't have to try and get into an argument with the scientists over the data. The scientists have made their recommendation to the council and what we're here for, yesterday with the golden crab fishermen and today with you all and tomorrow with you all, is to get your recommendations now, based on that recommendation, as to what impacts this has on your industry.

Then the council will decide what goes out to public hearing in March. I think rather than getting in an argument over what the information supports, the Coral and Habitat APs have put together a good scientific rationale for creating their recommendation.

The council is concerned about what impacts that has on several fisheries and they've told us to meet with these fisheries and that's why we're here, to get you all's input on what impacts this is going to have, because then they'll modify their recommendations before they go out to public hearings.

Then we'll get into the justification of whether we can justify the council's actions when we have that document going out to public hearings, not now. It's not John's role to try and make that argument. It will be the council's when they approve the document in March.

Mr. Williams: I'm certainly not trying to get in an argument with Mr. Reed. I appreciate everything he is doing and I respect his job, but what I'm trying to do is trying to gather information so we can have enough information to make a recommendation from this panel today or tomorrow.

Mr. Graves: This is the first time we've had the opportunity to sit down and ask the questions and not as an argumentative point, but for an information point. I think that's what most of here are trying to find, how this box got so big out of seventy-five dives. We've got 24,000 square miles of bottom and maybe it's justified and maybe it's not.

We as fishermen and people in the industry are just trying to find out how this box became. That's what I think we're all trying to do and so please, anybody else that has comments or questions on John's presentation, please ask now or if you have a comment.

Mr. Wallace: Dr. Reed, you said you may start out at a half-mile from a known bump and what kind of bottom is out there at a half-mile away from it? Does the coral start at that half-mile and work all the way to the bump or does it turn into mud or sand or what's the bottom like?

Dr. Reed: It varies. Each site is quite variable. For example, the one multibeam map I showed you off the foot of the Miami Terrace showed virtually flat bottom for miles. We made like three sub dives. This is a huge area. It was probably ten-by-ten miles and we made several dives on this last cruise within that and you could say okay, here's the multibeam feature that we're looking at and we're seeing these little bumps and we made sub dives at several sites within there and each site was similar, that it was live bottom.

By live bottom, I mean that it provided habitat for corals, sponges, gorgonians, black coral and so forth that we absolutely could not pick up on the surface fathometer. We have a really good surface fathometer, echosounder, just a single beam on the ship, and it showed basically that it would have been soft bottom.

That dive, I would say 90 percent of that dive was live bottom. Other sites I've been on, the surrounding area could be muddy and other sites, the surrounding area could be like flat rock pavement. There's a lot of variability down there. You could be going along a muddy bottom and then find a reef area in the size of this room that's maybe two to three-foot relief.

I understand the difficulty of trying to say within this box where you can fish that's not going to harm coral. I think everybody realizes it's an impossibility to visually map out that whole box with submersible or ROV. You could spend the next hundred years with a fleet of ROVs and never finish.

All we're saying, the Coral AP is saying, is these boundaries are based on the best available data from like fifty scientists, historical documentation of the geological papers, biological papers, museum records, as well as the ground-truth of several hundred sites within there that is probably better mapped out than probably most any other deep reef in the world at this point.

I certainly can -- I think I can certainly show areas that we're to avoid within that HAPC and suggest areas to look at, either with future funding, or possibly opening up within that HAPC, especially that northern mud slope. I say anything shallower than 400 meters, 1,200 feet or so, north of Boca -- I haven't dove that entire area, but I would pretty much guarantee that that slope out to 400 meters is mud. From 100 meters to 400, I would say it's a pretty good guarantee that it's mud, from north of Boca to Jacksonville, at least. I haven't dove the entire area. I've made a few dives.

As compared to Boca to Miami, Boca to South Biscayne Bay, in that same depth zone, 400 meters to 600 meters, then you're on that steep rocky Miami Terrace slope and I guarantee you that's hard, live bottom, but it has lots of crab on it and I don't know about the shrimp. I've definitely seen a lot of crab out there.

Then you get to the foot of that and then you're into the lophelia zone, all the way out into the EEZ, and then down off the Pourtales Terrace, that's a little different too down there, but where

we put the HAPC was primarily just on the terrace and not in the deep lophelia zone at all. That little box down off the Pourtales Terrace is solely that 200 to 300-meter water hard bottom and we didn't even touch upon the -- Let me just go through a couple sites that I know of.

I presume we're just talking from Florida south. I have personally less data for Georgia and the Carolinas. Most of that was done by people from Georgia and the Carolinas. The data that I'm most knowledgeable about is from Florida south. This inner zone, the west side, was the 400-meter line, as I understand, and that was based on the shallowest that we are seeing reef on the west side. There's nothing that we came across in shallower than 400 meters. Your shelf-edge break, which is about a hundred meters, is probably right in here somewhere.

Mr. Waugh: John, we have that same figure with all the dive sites.

Dr. Reed: It's not so much the dive sites. It's just where -- There's a lot more data than dive sites and we can't just go on a dot here or a dot there or we're back to the Oculina, where we didn't interpolate between the dots. That muddy slope, which is tilefish, probably royal red shrimp, as well as golden crab that I've seen out there in the 1970s and I assume they're still there, certainly come down to the Palm Beach area.

Then you have where the State of Florida cuts in very directly there south of Palm Beach. Right in here, you start getting into that Miami Terrace zone and that western edge of the HAPC is like up at the top edge of the terrace, but most of the terrace is here and outside of the HAPC and that's hard bottom and certainly habitat for both the golden crab and the royal red shrimp fish.

This 400 meters here is close to that top edge of the escarpment and then as you drop off, then you're into the lophelia coral zone here and down to here. Then we have that gap, which is not intentional, but it was just -- We've just had very little data in here and then this is on top of the terrace, but the EEZ comes down about like this.

All of this I would say is potential coral habitat, in this gap here to the southeast of the Pourtales Terrace, where you're in the Straits of Florida, going down to depths of 3,000 foot, which is down to the EEZ. I would say that's all potential coral habitat that was not included here.

I would love to work with you to say okay; up in this zone, where I know there's not coral, up in here and down to here, and the zone for Miami Terrace, where we know there's hard bottom, I would say for that to just avoid that steep, rocky slope. Once you're on top of the terrace, at 600 to 800 feet, you're probably okay. It's going to be hard bottom, but there's not a lot of coral habitat there that I saw.

Mr. Whipple: Would you comment on the differences, if any, in the abundance and diversity of creatures that are within using the areas as habitat, between the shallower and the deeper areas? In other words, is there more diversity, for example, in the shallow areas as opposed to deeper? If so, where does this transition take place?

Dr. Reed: By shallow, you mean what, like how shallow?

Mr. Whipple: To simplify it, let's say the Oculina area as opposed to --

Dr. Reed: From what we know, which, again, is very limited, we know the highest diversity is where there's standing habitat. I guess what I'm saying is where there's habitat is where you have three-dimensional structure. That three-dimensional structure can be rock ledges or it can be standing coral, either dead or alive. It doesn't matter, as long as it's standing.

It can be sponges, gorgonians, things growing on the bottom that provide living space, where little critters can crawl inside and live there and get off the bottom, because most of those creatures on the bottom are either filter feeders, they're catching plankton out of the water column, or they're carnivores eating each other and so they need to get off the bottom.

Whether it's shallow water in the Oculina, at a hundred meters, 200 to 300 feet, or this lophelia down to 3,000 feet, we see the high diversity where there's standing habitat, coral, sponge, gorgonian. We see less diversity where it's kind of a flat rubble area. Rubble could be rocky rubble or coral rubble intermixed with mud and the lowest diversity in the sand and mud, where you have no hard bottom. It goes from low diversity and muddy habitat to a rubble habitat to standing habitat and the depth doesn't really matter. We see a high diversity at both.

Ms. Solorzano: Woody, the area he's talking about that he says is clean, muddy, soft bottom is not an area that's fished for royal reds or rock shrimp, is it?

Mr. Moore: If I understand, you're talking about off of Miami, north of Miami?

Dr. Reed: No, I believe the mud area that I'm talking about is from the shelf-edge break, so 300 feet, from Jacksonville down to West Palm Beach out to the 400-meter zone. Based on our knowledge of these fifty scientists that worked out there, we've never found reef, lophelia reef, shallower than 400 meters in this northern zone.

When you talk about Miami Terrace, off Boca to Miami, the Pourtales Terrace, those are different habitats. That's rock reef and that's different, but as far as this mud reef -- These lophelia reefs are mud reefs. They live on muddy bottom. They don't live on rock and so the mud zone where I've never seen coral would be from 100 meters, 300 feet, out to 400 meters, 1,200 feet, from Jacksonville to West Palm.

Then once you get south of West Palm, down to Boca, then you start picking up that rocky bottom in those depths. The Miami Terrace rocky bottom goes from about 200 meters on the western side out to about 300 meters on the eastern side. It forms like a terrace up there, from Boca to Southern Biscayne Bay.

Your 200-meter line, off of like Fort Lauderdale, that's the shallowest that the terrace extends and you're probably five miles offshore and the eastern side, before it drops off the drop-off, is about 300 meters. Then you have that sharp drop-off going down to about 1,800 feet and then you start hitting the lophelia at the base of that, all the way out to the EEZ.

Mr. Moore: I agree with you on the mud from Jacksonville south. Where you're talking about,

it's so steep in that area, off of say St. Augustine and Daytona, that you can hardly mark it with your fathometer. It just falls right down.

Dr. Reed: The area I'm talking about, again, from 300 feet to at least 1,200 feet, is a very gradual slope. It's about a three-degree slope. It's called the Florida-Hatteras Slope and even though you're off the shelf-edge break -- You're coming off the shelf here and here's Florida and you come off the shelf out to 300 feet and it's very gradual and then you have a break there and then it goes down the Straits of Florida and then it starts coming up on the Bahamas side. This slope is the mud slope. Overall, it's only about three degrees, unless you're going really fast.

Mr. Moore: I'm not familiar with degrees, but I know you can be in a thousand feet and you can pass a boat two-tenths of a mile and he's 200 foot deeper in the area that you're talking about. That's the steepest. If you go north, it flattens out. Straight off of Fort Pierce is not -- One mile, you might not deepen up but a hundred feet straight off of Fort Pierce.

We fish in mud. If it's not mud, we don't want to be there and we can tell if it's mud with our meters. I know our meter is not as good as you all's, but we sit there twenty-four hours a day looking at them.

Dr. Reed: For that mud slope, most of my dives were back in the 1970s, when we did those transects from a hundred foot to a thousand foot. That was up to Cape Canaveral and so I've done very few dives from Canaveral to Jacksonville on that mud slope, at least out to 400 meters. Most of the -- I just have not read, out of all the literature -- I've never seen any hard bottom up there in that zone.

Mr. Moore: I do know that the mud will change from year to year, because we've been there for thirty years dragging also. This week -- Just the other night, straight off of Fort Pierce, you've got a six-mile area that's so muddy you can't stop when you go through there. If you want to pick your rigs up, there's a six-mile area that you can't stop. It's that green mud and you'll just mud up and you can't stop there.

Dr. Reed: That green mud is soft, because we used to do -- We actually did a lock-out dive back in the 1970s in 600 feet of water, where we set the sub down on that mud. The diver swam out of the back of the sub and he was on an umbilical for oxygen and so forth.

By the time he came back in, the back of that sub had sunk down into the mud and he had to dig a trench to get back up in the hole there, but that's where the tilefish live, too, because of that very cohesive -- It's clay. It's about almost 100 percent clay and the tilefish make a burrow, some of them as big as this hole here, maybe ten feet across, kind of scoured out.

Then the bottom of that scour zone, they'll have their hole that goes straight down, but that clay is so cohesive that their hole stays intact there. They just sit in that like a little prairie dog and you see their heads sticking up.

Mr. Moore: I've seen those before.

Dr. Reed: They're in that same zone, like 300 to 800 foot out there, the golden tile.

Mr. Bethel: John, I'm a little confused on the range of the oculina coral. How deep do you find that? Is that within the proposed area also?

Dr. Reed: There's two ranges of oculina. The Oculina HAPC goes from 27°30, which is about Fort Pierce, the southern end, up to Cape Canaveral, which is 28°30. It goes from the eighty-degree longitude line out to the 600-foot zone.

Mr. Bethel: Out to 600?

Dr. Reed: The coral only lives within a depth zone of sixty meters to a hundred meters. The oculina coral does not grow, in this area, deeper than 300 feet.

Mr. Bethel: There's no oculina out there in that proposed area?

Dr. Reed: No.

Mr. Bethel: The corals that you're finding out there are basically one of two species?

Dr. Reed: The coral out there -- Side-by-side, they look almost identical, but it's called lophelia, but it's a deepwater coral that has the growth form as oculina. The oculina we know forms these high-relief structures from Fort Pierce -- It's protected from Fort Pierce to Canaveral, but we know it grows at least up to Daytona and as far as we know, this is the only place in the world where this oculina forms this deepwater reef structure. It's very exclusive to that shelf-edge break, right at sixty to a hundred meters. It's certainly not deeper than a hundred meters.

Mr. Bethel: The deeper water coral is more spread out through a larger area. Is that a good way to look at it?

Dr. Reed: That deepwater lophelia coral and habitat goes from North Carolina down all the way through South Carolina and Georgia, east coast Florida and around the Florida Keys and actually goes up in the Gulf of Mexico on the west side of Florida. There's a large area off of Mississippi called Viosca Knoll, or Alabama. That's at deeper depths. The lophelia is occurring at depths from about 400 meters, or 1,200 feet, and it goes very deep. It goes beyond 3,000 feet deep.

Mr. Bethel: It's spread out over a large range and it's certainly abundant. There's no shortage of it.

Dr. Reed: Relative in this area.

Mr. Bethel: It would be literally impossible for any type of fishery to wipe this coral out.

Dr. Reed: I can't say that.

Mr. Bethel: You can't say that? With this whole area?

Dr. Reed: We said that for the Oculina and it pretty much --

Mr. Bethel: Oculina you just told me was much more confined than this deepwater coral.

Dr. Reed: I don't know. It's not up to the Coral AP to define the fishery regulations. It's up to the South Atlantic Council to --

Mr. Bethel: No, I just meant the geographical conditions of existence of the coral. It's everywhere and it's abundant and there's no shortage.

Dr. Reed: The Great Barrier Reef extends about 1,200 miles. I don't think fisheries -- The fishery should not destroy the habitat, regardless of how extensive it is.

Mr. Bethel: The Great Barrier Reef, you're talking about Australia.

Dr. Reed: Yes. It extends 1,200 miles. I don't think they allow a fishery that's going to destroy one mile of that habitat.

Mr. Bethel: Right, but its one solid structure, so to speak, compared to individual --

Dr. Reed: No, it's not. It's all broken up. It doesn't matter, but the important thing is the fishery should not be destroying hard bottom and I think that's within our fishery management council and the fisheries essential fish habitat, that you're not allowed to destroy live bottom. That is part of the Essential Fishery Habitat Magnuson Act.

Mr. Bethel: Don't get me wrong. I didn't mean that anybody wanted to destroy the bottom, but I just meant if there's plenty of it and it's pretty safe at this point. Have you noticed any threat to this coral, this deepwater coral?

Dr. Reed: We've seen extensive areas that are dead.

Mr. Bethel: That are dead? Do you have any idea what killed them?

Dr. Reed: We don't know what kills coral. We certainly know what can kill coral.

Mr. Bethel: Right, I know, but in this case, it could have been an organism, right?

Dr. Reed: There's live and dead --

Mr. Bethel: That's not important, but let me ask you one other question. What commercially important species of seafood that people might eat or use depends, that you know of, on this deepwater coral for habitat?

Dr. Reed: I'm not a fishery biologist. I know Steve Ross, who has worked extensively from like north Florida, Georgia, the Carolinas, is a fishery biologist and he just had a paper that looked at

the fish associated directly with the coral and tried to look at how different fish were associated with the habitat, either directly associated with the coral, associated with marginal areas, or associated with the mud non-coral areas. I think in his paper he showed a number of finfish that have the potential -- They could be a fishery that are attached with the coral habitat. You have stuff like wreckfish and I don't know different finfish.

Mr. Bethel: Is there another one besides wreckfish that is a commercially important species that uses this deepwater habitat?

Dr. Reed: Yes, I think he listed a dozen or more species of finfish in his paper.

Mr. Bethel: That are actually out there in 2,000 feet of water using that habitat?

Dr. Reed: Yes.

Mr. Bethel: And that people catch and eat?

Dr. Reed: I know the wreckfish they are.

Mr. Bethel: I know the wreckfish, but I was wondering if there was anything else, that's all.

Dr. Reed: I don't know. I don't know what the fisheries are.

Ms. Brouwer: I'm just going through the paper that John just mentioned and I'm looking through it and I can provide it to whoever is interested if you want to read through it, but just off the top of my head, the species that do come to mind that I have heard mentioned that have potential for economic use are the blackbelly rosefish and there's another species called red brim and these are two that are found very commonly in the deepwater coral reefs, at least off of North Carolina.

Dr. Reed: They go all the way down.

Ms. Brouwer: This is based on the sub research and observations of these two species. Of course, the wreckfish in addition to that and those are the ones I can think of.

Mr. Wallace: Dr. Reed, when you all were -- When the AP was setting up the boundaries for the HAPC, what was your criteria? Did you go strictly on the 400-meter line or did you use your dive sites to do some different lines? Can you explain the criteria of setting up the boundaries and did you put a buffer zone in there in setting up those boundaries?

Dr. Reed: There's how many people on the Coral AP, twelve or fifteen people? The data that was compiled over the last ten years, the shallowest we found the deepwater habitat was 400 meters and so that's -- 400 meters was drawn based on that, down to the Miami Terrace, where you have different habitat there and it actually comes up to like 300 meters there.

On the eastern side, it was based on the EEZ, because it actually extends into Bahamian waters

and goes beyond the maximum depths there of the EEZ, which is about 800 meters off of eastern Florida and down to a thousand meters off of the Florida Keys.

Mr. Wallace: My understanding is you basically followed the 400-meter contour of the break here? I know the outside is --

Dr. Reed: Yes, that northern -- Like from the north part off of Carolina, I'm pretty sure that followed the 400-meter contour as you come down there. That was like Steve Ross and that group up there off of Carolina and Georgia. Again, all of his data showed nothing shallower than 400 meters and that's where they drew the line.

There might have been a few that came inside shallower than that, but I think by and large they thought the 400-meter line was reasonable to put it at. They could have been 350 or something. There might have been one or two outliers there.

Mr. Wallace: There was not an intentional buffer? Let's just say you went 400 meters and five miles inside or -- There was nothing?

Dr. Reed: I think originally, at one point when they were drawing that boundary -- I think at one point they were doing a straight line and they figured -- I know with the Oculina Reefs and other MPAs, for enforcement reasons, a lot of times the enforcement officers -- They told us at our Coral AP meeting, there was an enforcement person there, FWC or Coast Guard, and he was arguing for straight lines.

He said we need a square box that we can see and it goes from here to here to here to here. Originally, they were drawing the lines straight up on the western border, straight up from like Miami north to Georgia and then straight over, and that took out a heck of a lot more habitat and the same with the Oculina.

I argued the coral is following the depth contour and not the straight line and so we put the western edge on the depth contour of 400 meters and that was the same argument for the Oculina Reefs. I said the shallowest of the Oculina Reefs was fifty meters and I said put it on that line and they didn't want it. They just wanted to run it straight up the eighty-degree line and I said the deepest it goes is a hundred meters, but for other reasons, it was taken out to a hundred fathoms, but that's not where the coral is.

The line was drawn the best possible way to do it and the coral tends to follow a depth contour which is actually more of a temperature contour. The coral doesn't care about depth that much. You can take a deepwater coral and put it in a tank right here and it would be happy if the temperature is right.

Most of that deepwater lophelia needs temperatures of pretty much about twelve degrees Centigrade, down to about six or seven degrees Centigrade. It's like in the forties, forty degrees or something like that. It can't take sixty-degree water. Pressure and depth is not that big of a deal for it. That's where that 400 came from.

Mr. Herring: I think, John, that you just answered the questions that I was going to ask, because I thought I understood you to say the original Oculina box, experimental box, which you say the oculina coral is between fifty and a hundred meters and you had said that was the parameters where that should have originally been and the area of particular concern now is somewhere along a 400-meter contour that you're speaking of.

That area, in effect, on the western side of the box that we closed to a hundred fathom is actually part of this three-degree slope that you're talking about, the muddy bottom that's a slope that should in fact should probably have never been closed to begin with.

Dr. Reed: I'm sorry?

Mr. Herring: That should probably have never been closed to begin with.

Dr. Reed: For the Oculina you mean?

Mr. Herring: Yes.

Dr. Reed: I wasn't on the council when they expanded it to the west side and so I wasn't privy of what the discussion was.

Mr. Herring: I was on the Rock Shrimp Ad Hoc Committee at that time and the discussion was -- The information we had, with the best possible scientific data available at that time, was that we needed to close that out to that hundred and you're saying something completely different and along with enforcement issues at that time, which makes us all, in some of the questions you're being asked, some hesitance in saying we just need to close this whole area.

It's kind of like us throwing the baby out with the bathwater that the whole thing needs to be closed. This is a perfect example of an area that was closed that now for the first time someone from the scientific community is coming here and told us, you know what, that's bottom you could be dragging on and there's rock shrimp on that bottom and its bottom that we could be using. We were told it was bottom that we shouldn't be using. It makes us have some concerns.

Dr. Reed: I don't know what the -- I'm pretty sure the council, when they made the expansion of the Oculina HAPC expanded in 2000 -- They went from Sebastian up to Canaveral and all of the data -- I mean nobody ever suggested that there was coral out to 600 feet there. Every paper that was available to the council that I wrote, which is the majority of the papers about Oculina, specifically said it's from fifty meters to a hundred meters, period, and said it went to Daytona and not Cape Canaveral.

It's my understanding that their reasoning to go out to 600 feet was for the royal rock shrimp -- Not the royal rock shrimp, but for the rock shrimp fishery on the east side and to give that some sort of a protection for the shrimp itself. I don't know what the reason was. They didn't ask me, I guarantee that. I would have said no that it had nothing to do with coral.

Mr. Williams: Dr. Reed, on following that 400-meter contour, I assume that that was not based

only on dives, but also on the multibeam research, where the hard relief goes. You didn't find anything than shallower than 400 meters, but it was up to 400 meters and is that right?

Dr. Reed: There's no multibeam data there. The only multibeam data I have is off of Miami, in that one little stretch that NOAA did last summer, which is straight down the axis of the Gulf Stream, I think about 2,600 feet of water. I believe that's where that went. As far as I know, there's no multibeam data on that Florida-Hatteras Slope.

Again, the data came from review of the historical literature in the geological papers and other papers, the museum records, as well as fathometer transects, as well as submersible dives. I had never seen any hard bottom, rock or anything, north of West Palm at depths shallower than 400 meters, 1,200 feet, until you hit the Oculina Reef, which ends at about 300 feet.

Mr. Williams: I apologize for that. I would like to ask Woody one question, Mr. Moore. What is the smallest hard bottom relief that you can drag without tearing your gear up?

Mr. Moore: Like six inches off the bottom.

Mr. Williams: Would that damage your gear or would it have to be something you -- Can you even drag six-inch hard bottom relief?

Mr. Moore: No, you can't drag it. Our nets is made out of eighteen-webbing twine, about a sixteenth-of-an-inch in diameter. The breaking strength is 300 pounds on it.

Mr. Williams: One other quick question. Do you fish deeper than 400 meters?

Mr. Moore: Occasionally, but it's not much more than that. 400 meters might be twelve-hundred-and-something foot. Most all our dragging is 1,200 or less.

Mr. Graves: Any other comments?

Mr. Bethel: John, don't misunderstand me now. I want to protect this coral as much as you do, but we've got an air about this council where there's some form of immediacy to do this and you've told us basically there's no immediate threat to the coral at this time. It's pretty diverse and spread out and there's plenty of it.

Dr. Reed: I never said there's no threat.

Mr. Bethel: You said there's no immediate threat. You said you found some dead coral, but --

Dr. Reed: I didn't say that. I didn't say that whatsoever. Yes, there is a threat.

Mr. Bethel: What's happening to the coral that you're concerned about right now? What is actually happening?

Dr. Reed: The threat to deepwater coral is worldwide. We've seen from around the world -- Off

the coast of Florida, we've seen absolutely what happened to the Oculina Reefs. We've seen lophelia reefs from around the world that have been damaged by overfishing, by bottom-tended fishing gear that's destroyed over 50 to 80 percent of the deepwater lophelia reefs in other parts of the world, off of Norway, off of Scotland, off of New Zealand, off of Australia.

We know people can and do fish, trawl, deepwater high-relief hard rocky bottoms. I don't how they do it, but they're doing it. They've destroyed over the majority of the deepwater seamounts between New Zealand and Tasmania and these are rugged, rocky mountains in depths of 300-foot of water. People do and can fish those.

The concern is that these areas are now known. Prior to this last couple of years, people didn't know about them and now they know and what's to stop anybody from going out there and just dragging the whole length of them? Nothing.

Mr. Bethel: Is anybody doing that? The question is anybody doing that at this time?

Dr. Reed: I don't know.

Mr. Bethel: In all of your dives --

Mr. Waugh: Excuse me, Chip. Time out. The answer to the question is the same one I gave you this morning. We have no documented proof that there's been any damage.

Mr. Bethel: My question is --

Mr. Waugh: If we've got questions to ask, ask the question. Don't play an attorney and try and set our scientist up. If you've got a question, ask it. We have no documented damage.

Mr. Bethel: My question is why is there such an emergency to take shortcuts in the Magnuson Act to get this --

Mr. Waugh: It's not John's purview to answer that. I'll answer it. We're not taking shortcuts. We've been working on this for a period of several years and again, if you've got questions, let's ask John the questions. If you've got questions about why the council is doing something, that's more appropriate to ask of us or council members.

We don't have a document that the council has approved for public hearing yet. We'll have that in March. What we are here for is the council has asked us to meet with the fishermen to present the recommendations of the Habitat and Coral APs and get you all's input on what the impacts are. If we could, let's focus on that. We still want to give you a presentation on VMS and also for you all to talk some about potential gear conflict.

Mr. Herring: I want to ask you one specific question then as far as the recommendations in the briefing that you gave us. Under proposed deepwater coral areas of particular concern, I understand this to be the recommendations from that Coral and Habitat Committee. The second item says that it should be, along what he's saying, adopted and implemented as soon as

possible. Growing pressure from new and more intensive uses of the EEZ and including emerging deepwater fisheries requires rapid designation.

I would ask what information that came from and what did he base that criteria on that those emerging fisheries are growing and how did they come about that statement? That is a particular statement that they put out and where did the information come from and how did they derive that?

Mr. Waugh: My understanding of the basis for that is part of what John has already cited in other parts of the world, that there have been efforts to fish on this area.

Mr. Herring: Gregg, we're not talking about other parts of the world. We're talking about here.

Mr. Waugh: Tony, can I finish answering your question? We've got fisheries here, wreckfish and rosefish. We are in an area -- You all have got to wrap your minds around the fact that the Magnuson Act has changed from being responsive to damage to being precautionary. Wrap your minds around that, because this is our first step in it.

We are required to take action before things happen. We talked about this some with the AP this morning. There's no doubt if you took a piece of trawl gear through this lophelia coral that you would damage it. I don't think there is anybody in here that would dispute that. If you set golden crab traps on top of it, you would destroy it. Do you want us to sit around twiddling our thumbs until that happens? No.

We're taking action and what we need to hear from you all is -- The scientists have made their recommendation and now we need to hear from the fishermen within that area where do you all fish and what are the impacts on you all's operations and then the council will modify their position and then we'll have something to argue over.

Mr. Graves: Any other comments? Let's move on. We'll talk about the gear impact between I think it would be the royal red fishermen and possibly the golden crabbers. Do we have an overlay? We had one this morning that kind of showed where the traditional royal red fishermen were working. It was on one of the charts.

Mr. Waugh: That's based on interviews that Oceana conducted with the fishermen. We'll get that projected up here.

Mr. Graves: Let's go ahead and take a five-minute break while Myra is setting up.

(Whereupon, a brief recess was taken.)

Mr. Graves: If we can, let's go ahead and take our seats and we'll go ahead and reconvene.

Mr. Waugh: What we're going to project here -- I don't want people to come up out of their seats. What this is are the results of interviews with fishermen that Oceana conducted and provided this information in a final report and we're using it here. We recognize that some of

this area may refer to fishing areas a long time ago and so this is not saying that this is where you all are fishing now.

When we get later into the presentations today, we'll get into a detailed VMS presentation that will get into where you all are fishing now. Mr. Graves wanted to use this to talk about where there might be potential impacts between the trawl fishery and the golden crab fishery and unfortunately, the fisherman, Nuno, who fishes in the most northern area, is not here anymore. They had a previous conflict that they had to head to, but I'll turn it back over to Mr. Graves.

Mr. Graves: Thank you, Gregg. I think the first question that I would like to ask the Deepwater Shrimp Advisory Panel members is has there been any conflict with golden crab traps that you all are aware of?

Mr. Moore: No, not none that I know of.

Mr. Graves: As far as we know on the golden crab side, we haven't had any conflict either and so that's just a good point to start with. I think now we can verify that the top, in yellow, is supposedly or is the information that they've accumulated and is that pretty sound as to where you're doing most of the fishing?

Mr. Moore: Which colors is the red shrimpers, the royal reds?

Mr. Graves: It's pointing out on the chart that the pale yellow that Gregg is highlighting is the area of information of where the royal red shrimping is occurring now or has in the past. Is that a correct statement or a correct chart?

Mr. Moore: It looks too deep. It looks like we do not go that deep. It looks way offshore of where we fish.

Mr. Graves: You have to make trip tickets and you make land reports, right?

Mr. Moore: Correct.

Mr. Graves: The numbers that are on there I believe are the numbers that would be used for reporting landings.

Mr. Moore: We don't put our positions on landings.

Mr. Graves: You use the box, the number? No, you don't?

Mr. Moore: No, we don't. We just turn it in at the fish house and tell them what waters we was in. There's no position given.

Mr. Solorzano: We only give one depth, a round-off. That boat might have worked, on the whole trip, in five or six different places. On that trip ticket, we give one depth and we might have wrote 1,400 foot or 1,200 foot. That's all that's written. You can't base that trip ticket to

say it was this whole overall area, because you don't know where that guy was working for the thirty days he was in the ocean. You've got to write one number and that was it.

Ms. Stiles: I just wanted to comment that when you start with literature and interviews, this is based on where the shrimp might be living and also based on interviews of people saying where they're fishing. I know that we tried to reach Woody briefly, but he was not there and so I'm sure that he can add to and improve on this map.

It's not the same as when you put up a VMS map and you would expect the information to be the same. I would expect that having more people, such as Woody and Marilyn here, you would expand on this map. It's not unusual that there might be some difference and that they might have additional areas that aren't there.

Mr. Graves: Thank you. Fishing for the royal red is mostly inside of 1,200 feet?

Mr. Moore: From 1,000 to 1,300 or 1,350. This year, it's been 1,100. A couple years ago, you couldn't get less than 1,250. It's just different years. This year is around 1,100 feet.

Mr. Graves: Mainly it's towards the north of I guess the Cape here?

Mr. Moore: It's thirty degrees north, down to West Palm Beach.

Mr. Graves: That definitely would be Nuno. Are you fishing inside of 1,200 or 1,300 feet, Bill?

Mr. Whipple: No, we're not, but for a good reason. It's not to have a conflict. That's why we're trying to talk, to see. We have a lot of confusion as to where you folks are.

Mr. Moore: There's only two of us that fishes down there and we're lit up and there's no problem. We do not want to catch no traps, believe me. We have enough problems as it is.

Mr. Whipple: Let me just say why we're talking about this, is because if we have a collision, we both suffer and we have a lot of uncertainty as to where you people go. Thus far, we've been very, very conservative; to make sure we're as deep as we need to be. There are times when we would like to get up into that 1,200 foot area, but we had had rumors of you being down as deep as 1,800 feet or even more and coming pretty well south. This is strictly preventive.

Mr. Moore: I can see your reason for it and our reason is not to get involved with you, but we're not no threat.

Mr. Whipple: The question is, I guess primarily, is there some way that we can have a contact person on each side, so we can verify from time to time that everything is okay and that things haven't changed?

Mr. Moore: Call us on 16 if you see a boat there. You know we move and we don't stay on one spot, but --

Mr. Graves: Let me answer that. The problem is we can set gear where you're not even there. That's what we're trying to do, is avoid setting gear where you want to fish. That's what the dialogue is -- After the fact is too late. What Bill is saying is they could go into 1,200 or 1,300 feet and try to see if there's golden crab, but we don't want to go in where you're fishing, but we don't know where you're fishing. We need to somehow -- If we can extrapolate that, then we know to stay away from where you want to fish. That's what we're trying to do.

Mr. Moore: I understand that, but I don't know what you could do if you set your traps today and then tomorrow we come along. If we knew you was there, there would be no problem. We've just got to know that you're there.

Mr. Whipple: That's just the point. If there was a way that we could alert somebody that we are in a certain area, we would feel a lot more comfortable. That doesn't mean we have to stay there and if somebody says hey, we really want to be there too, then we can work it out. We'll move or whatever, but as Gary points out, once we set a trap, we're going to be there for at least two weeks.

Mr. Solorzano: Do you guys have VMS onboard? There's email on these VMS that could be alerted to the vessels or you could have someone at your office or whatever email and say we're setting traps blah, blah, blah in this area and they'll be down for twelve hours or I don't know how long you leave your traps down, but then it would be notified to the vessels that traps are set between Point A and Point B and they'll be down for twelve hours and making sure that no one is in the area or are you going to be trawling this area between such and such time.

They don't work out there all year long, generally, as a rule. It's more of your wintertime months and it can vary. It can be spring and summer, too. You could do it via email. Of course, they only let you send so many characters and then it shuts you off. I was going to ask that, how long do you all keep your traps down when they're down?

Mr. Whipple: At least two weeks at a time.

Ms. Solorzano: You leave them for two weeks?

Mr. Whipple: Yes, between hauls.

Ms. Solorzano: Do you guys set traps down in -- There is royal red bottom in the Keys, on the Atlantic side. That is a little deeper than 1,200 foot and am I right, Woody?

Mr. Moore: Yes, that's 1,800 feet.

Ms. Solorzano: That's the 1,800 foot that had came in. That is why it is said sometimes we are in 1,800 foot of water and that is because of being in south Florida. Sometimes that's worked by boats from the Gulf and not necessarily the Atlantic boats, but it is still in the Atlantic. My boats haven't worked that in a couple of years, but not to say that they won't. They might go down there two weeks from now, I don't know, but that is an area where it is deeper. Do you all set traps in that area? You do?

Mr. Graves: We've seen the boats at night. If there's only two fish -- You're saying there's two boats, basically, or three or four, and there's five or six here. We just need a clearinghouse, because it's very simple, I would think. We need somewhere to be able to contact, because when we do set traps, like Bill says, it could be two weeks.

If we pull them and there's crabs there, we're only able to move them a hundred feet. When we're in an area, we might be in an area for quite a while if the fishing is good, the same as you would be. If we could just figure out a mechanism to talk -- There hasn't been a problem, but as we're moving further north and trying different areas, we want to eliminate a problem.

Ms. Solorzano: Other than a sideband that you couldn't always guarantee would work -- The email system on the VMS, because they have them on them all the time and that works whether the phones are down or whatever. If they're out working, it's going to be working, but you guys don't have VMS onboard and so that would eliminate that means of communication.

Mr. Graves: Bill, maybe this is something we can work out amongst us. I think it's small enough that we can talk among ourselves and eliminate this problem, I believe.

Mr. Whipple: We can do that after the meeting, yes.

Mr. Wallace: I have two questions. One, have you all ever lost any traps to a trawler that you know of? I know you --

Mr. Whipple: Not to our knowledge, but we're just trying to avoid having it happen. There's thousands of dollars to maybe tens at risk here and if you make an oops, you're in trouble.

Mr. Wallace: On the same hand, with the trawlers, if they catch five miles of your traps, they've got five days to get it cleaned up. They don't want to catch it by no means. The other is, Myra, if you could put one of the charts up maybe showing the VMS tracks, like you had up back on the table, it would give you a better indication of where these guys are trawling.

This is not a good representation of where they're trawling. The other will show you that they are strictly -- There is it. You see the purple or lavender, or whatever color that may be, is the proposed HAPC. Those green dots right there, that is where these guys are trawling and that's their VMS points. It goes right along that western boundary.

Everything that I saw from what you all were doing is east of that, far east of that, of where they're trawling. Now yes, you may want to explore that inshore reef and that would be something that you would work out between yourselves, but right now, from what I've seen from you all's presentations and you all's readings, compared to theirs, there has been no interaction between the two of you.

Mr. Graves: No, not that we're aware of at all. The dots are by color by speed? Red is moving at a quicker speed coming and going and green and blue are slower speeds? Okay.

Dr. Reed: What's the maximum speed you're trawling?

Mr. Moore: Two-and-a-half knots.

Dr. Reed: We're looking at the first two dots on that little ledge in there, right, whatever that is?

Mr. Moore: I don't understand what --

Mr. Wallace: To that, this is what Tom is going to present to us and so this may be a good lead-in to what Tom is going to do. We might want to go ahead and listen to Tom's presentation and then we can get some more questions from there.

Mr. Graves: We'll go ahead and let you go ahead with your presentation.

Dr. Jamir: This is among the initial draft that we sent as an update. We have better colors and consistency in this and Carlos is also here and so we can actually zoom in or out on particular areas, if you wish. We can have an interactive look at all of these maps later on.

Good afternoon, everybody. I'm Tom Jamir and with me is Carlos, our GIS as well as VMS expert at the Miami Lab of the Southeast Fisheries Science Center. What we will present here, this will be a tag team. I will present sort of a brief overview of what we have done, what the council asked us to do, in terms of the vessel monitoring system with respect to the shrimp fishery of the South Atlantic Fishery Management Council.

I will give a brief overview, plus some of the major slides that would serve as a template or reference, and then I'll pass it on to Carlos for a more detailed sort of searching or queries that you may have. We have basically two purposes here. One is to present you the updates of what we have gathered so far to help you in your deliberations, but also we want to solicit input and feedback from you in order to improve a lot of what we are doing and for a good reason.

First of all, I would like to acknowledge a lot of people that one way or another contributed to this presentation, data and research papers and so on, and these are the group of people that helped us. We have also a lot of assistance and input from the industry, who also were kind enough to provide us some of their own information, so that we can actually validate and synchronize a lot of our information.

If we are working on geographic systems, we want to make sure that we have basically the same map and that we are basically getting the same coordinates, so that we can have inter comparability and better accuracy in our data and the more information we get and feedback from you, the better.

This is basically, in general, what the council ordered the Southeast Fisheries Science Center. What they wanted was basically a plot of all shrimp trawl vessel monitoring system tracks in relation to the proposed habitat area of particular concern to help in FMP planning decisions.

During my first update to the council last December, I showed them some of the results,

basically what was ordered, and there are a number of problems here, basically deficiencies. One, the VMS tracks overlap, thereby muddling any useful information that we could gather from the system.

We cannot also discriminate fishing from other non-fishing activities, for example a vessel in transit, if the vessel is making gear adjustments or repairs. The fishermen also told me that sometimes they're drifting with the current and so they're not necessarily fishing. It also does not basically provide useful information for decision makers in its almost raw form.

Knowing a lot of the concerns that you have and in consultation with different sectors and stakeholders involved, we tried to give as much information that might be useful to you. Basically, this is what the Science Center is going to deliver and this is the sort of official batch of deliveries that we have made, sort of the first iteration.

Basically, for this presentation we'll be delivering two things. One is we want to show you the base maps and the templates that we came upon and in the second part, we want to further improve this by having an interactive development of GIS input with basically the clients and stakeholders, you and the council being among the major stakeholders and clients for this.

For developing the base map and templates, we made sure that we screened for data errors and to make the data processing easier, we also transferred them into a Microsoft Access database format, because there's a problem when we simply have a GIS system, which is a database, but linked with a mapping program.

It slows down the processing and if you just want certain statistics about the fishery, if you do it through the GIS system, sometimes it even crashes, because you have millions of data points that we are processing here. In fact, we did have a number of crashes and we have sometimes to rerun everything, thirty-six hours or more every time it crashes, and start back from zero.

We also compared and geosynchronized these base maps with the South Atlantic Council's maps and GIS system, as well as with independent industry GIS maps, and then we sort of had a number of meetings. I was fortunate enough to have the industry group to basically get together and give us a call and then we basically exchanged notes to try and get things synchronized and in proper order.

We also incorporated bathymetric data and extracted a best estimate of depth for each VMS point and the reason we have to do this is because VMS basically gives you position and time by which those positions get recorded. Technically, it doesn't have any other information except for that and so in order to make sure that it's plotted properly, we have to geosynchronize it with the database systems and the maps that we have and also we need -- Since we're talking a lot about depths and depth information, we need to put another layer, which is the depth layer, and see where those VMS points actually -- What depths do these VMS points correspond to?

We have to estimate the specific depth for which each recorded VMS was during the particular time of transmission and so we have to work with some of this bathymetric data. We also tried to look at probable fishing versus other non-fishing activities, based on vessel speed statistics.

The reason is because, as I said, when you have only locations of points at different time periods, the most that you can get directly out of that trawl data would be the speed of the vessel that's recording that VMS, but there are certain fishing characteristics that could give us an indication as to where it is VMS are going and what their particularly doing during those time periods, but, of course, you're dealing with estimates and so there are always a lot of wiggle room.

Initially, we had a number of comparisons and consultations with industry and knowledgeable people and that helped a lot to improve the analysis and today, we also want to get some more feedback to you, saying here's what we got and is this reasonable enough? That's what we need, because we need to work on this together.

Aside from that, we also incorporated boundaries of proposed habitat areas of particular concern, the EEZ and South Atlantic Fishery Management Council boundaries, as well as the state water boundaries. This could be useful in terms of geographic statistics or comparative statistics. By the way, Carlos will be here. I'll be here for a short while, because I still have to go to the Gulf Council meeting afterwards, but Carlos could work with you after the meeting, just to get a lot of information and get things done with you along these lines.

Here are some examples of the base map and this is the scale by which I'm going to present this. It's a relatively small scale and it covers all of the South Atlantic Council states and waters and use this as a reference point and to that, I have some handouts and you can just mark some of this on the handouts. This will be to facilitate when you ask questions to Carlos. You can just refer to base map so and so and blow up certain areas, so you can go into more details of the analysis. This will help you, as well as give you an overview as to what we have done so far.

This base map shows the bathymetry and not all of the contour lines are shown, just the major ones, and also the different boundaries that are color coded. It has the Gulf Council waters, the EEZ water boundaries, the South Atlantic, and especially the proposed deepwater HAPCs marked here.

This is essentially the same as what I have shown you earlier. It's essentially the same with the VMS tracks, all of the VMS tracks that we got from the Office of Law Enforcement, plotted in the same base map. What you will notice here is that it's really not very useful at the moment, as almost raw data, because it doesn't show you much information that I have mentioned before as the deficiencies. I think this is a five-year period of accumulated data. It's 2003 and thereafter.

What we did was we looked at daytime, all speed classes, as well as nighttime, all speed classes, and basically to look at other differences, major differences, or are they almost similar, because later on, if they're almost all similar and we agree that we can lump them together, it may be better to lump them altogether, instead of two separate day/night subdivisions.

This is your nighttime all speed classes and what we did was to give you a range of choices, we looked at zero to two knots, two to three knots, three to four knots, four to six knots, and greater than six knots.

We suspect that most of the trawling activities actually occur between two to four knots, but there may be significant differences between the royal reds as well as the rock shrimp and so this will help. In the analysis, we can look at each slice and then you can look at instead of just big slices, we made it into smaller slices, so you can sort of tell us that I think this is what represents our industry more than the other slices or maybe the two slices are the same. We can look at it in more detail later on. Now, if we just look at the two to four knots --

Mr. Wallace: Just to clarify a little bit of what Dr. Reed was asking, 2003 was when VMS was required in the rock shrimp fishery, right?

Dr. Jamir: Yes.

Mr. Wallace: That would indicate why you used the 2003, but what I was wanting to know is are those tracks specific to -- When you had all vessels, are those tracks specific to the people that have the South Atlantic VMS or is that all VMS, including any of the Gulf VMS or any other fisheries VMS?

Dr. Jamir: I think these are all VMS.

Mr. Wallace: All VMS?

Dr. Jamir: All shrimp VMS. They can have multiple permits and that's why the graphs -- We just cut it off at the South Atlantic Council, but this goes all the way from Gulf all the way up to the Northeast. It includes even scallop fishers, I suppose. If we just look at the two to four-knot class, and assuming that most of the fishing occurs within this range of values, this is what you get.

Basically what we did is we have this bundle of data points from the VMS and we separated or we basically extracted out those that are not within the two to four-knot speed limit and this is what you get. It becomes more useful data than it was before and so it's more cleaned-up data.

The question now is out of this, which ones are potential royal red shrimp fishing vessels and which are potential rock shrimp fishing vessels? As I mentioned, what we get are just data points from VMS, which are longitude/latitude positions and time. This requires a lot of, in essence, what we call in the field ground-truthing, but we don't have actual ground-truthing information and so the best that we can do is basically go to the fishermen and ask them what are some of these parameters and give us a clue.

We asked John and the Southern Shrimp Alliance and they gave us a number of feedback about this and so this is what we got and we can improve on it today and later on. Just looking at the two to four-knot class, this is what we got and then this is just for day and nighttime.

Now, we were told that for royal reds that most of them occur in deep waters of greater than 160 fathoms and so we said let's look at a sorting algorithm where we basically say get all of those VMS tracks that are below 160 fathoms, so that you only get tracks that are in the 160 fathoms or greater.

For all VMS tracks, this is what we basically got as the tracks and so it's basically a very narrow swath of points, series of points, that basically when you look at it, it's falling within the slope, the continental slope, area. It's very narrow. We have both daytime and nighttime for this and you will notice here that there really isn't much difference on this.

Then the Southern Shrimp Alliance was also very graceful in giving us a subset of the data that they have, so we can use it as sort of another way to geosynchronize it, as well as ground-truth a lot of the information, and this is how a subset of shrimp vessels plotted, with respect to this sorting parameter, and I'll go flip back and forth, daytime to nighttime.

These are all tracks and if you compare with the Southern Shrimp Alliance, they basically fall within the same area and so we're confident that we're not missing anything and we're not -- We are well within the ballpark of where this fishery might occur.

This is now -- We said let's look at ninety to 160 fathoms and so this is sort of covering all of the bases and see where the possible fringes of this fishing might be, because you may have errors in reporting and so this is the ninety to 160 fathoms and you will notice that it basically follows the same pattern as the greater than 160 fathoms. There isn't much that's added beyond that and this is the daytime for ninety to 160 fathoms, two to four knots.

For the rock shrimp fishery, we depended on two basic datasets. One is interviews with the fishermen. Basically, they told us that they're basically in very shallow waters. Most of them fish during the day, although there's occasional fishing at night, and that fishing is around thirty to around sixty or eighty fathoms.

We looked at the survey that was conducted by the Galveston Lab and they only did surveys with VMS with the fishermen, primarily off of Florida, and they had an average depth of fishing at about thirty-three fathoms, with a range between eight to eighty fathoms. This is what that eight to eighty fathoms is at a speed of two to four knots, which could include most of the rock shrimp fishery, but we suspect it also captures some of the fishery that are not necessarily the rock shrimp fishery, especially those that are closer to state waters and with the state water boundaries.

Mr. Dennis: I can't hear you very well and so I may have misunderstood you, but were you talking about the daytime rock shrimping fishery?

Dr. Jamir: It's both. What we did here is we looked at both daytime and nighttime possible rock shrimp VMS tracks.

Mr. Dennis: There is no daytime rock shrimp fishing.

Dr. Jamir: We were told that it's mostly nighttime, but for the purpose of this analysis, we also looked at both the daytime and the nighttime and the reason is because we were also told that most of the fishery now has shifted from a daytime ice fishery to a cold storage that they can stay longer, a week or two or more, and so we want to make sure that we have captured a lot of the

fishery signals, but, again, as I mentioned earlier, we showed both day and night.

You look also at the data and say is it acceptable that this is just a nighttime fishery? Maybe there's some daytime fishery and if there's no daytime, we can basically eliminate the daytime part of the VMS and that's one of the reasons why we're here, is we want to get your input on this.

Ms. Solorzano: There would be no daytime rock shrimp fishery, but there would be day and nighttime royal red fishing.

Dr. Jamir: Royal reds, yes.

Ms. Solorzano: That's probably where it's getting confused. There's not any daytime rock shrimp. It's solely done at night. You might see people drifting or moving around, laying to or whatever, and it just looks like they're moving.

Dr. Jamir: This is basically the nighttime and most probably represents more of the rock shrimp fishery and we -- I only show here the nighttime, because this is what we got from the industry, but we also have the daytime, in case you want to look at it, and what is surprising is that most of the depths and the distribution of depths in the daytime are almost similar and so I don't know how to explain it. Maybe they're just in the same area.

Ms. Solorzano: You only used May to September? Our royal red fishing season is more dominant in the winter months, like from November to April would be more of that season. You may not be getting a whole lot of your royal red shrimp trawl marks on that data from May to September.

Dr. Jamir: This is for the rock shrimp, because what we asked also is what are the peak seasons for the rock shrimp fishery, and the consensus that I'm getting from various sectors is between May and September. What we're trying to do here is define the extent of the royal red shrimp fishery and the rock shrimp fishery.

The goal is to look for ways by which we can separate the two fisheries and so just for this set of data, the parameter that we used would be depths less than basically eighty fathoms and at those speed and at nighttime. Even then, I don't know if there are some -- Especially on the coastal areas, there's some data points that you can see there and so if you think that they're not representative of the rock shrimp fishery, then we can develop also algorithms to basically clean up that section, because if you say that the rock shrimp fishery is mostly deeper than certain depth ranges, then we can basically filter out that envelope of depth ranges, to make us give you a better map of the distribution of the rock shrimp fishery.

Ms. Solorzano: I was under the impression that we were looking for the royal reds that would go into that closed area where we trawl. That's why I was confused. You keep doing the rock shrimp thing and I was into the deep water, where the golden crabbers and the shrimpers royal redded into that zone. We're back to rock shrimp now? Okay.

Dr. Jamir: I think the reason why they asked us to look also into rock shrimp is because they're going to use some of this information later on in other ecosystem management plans and so they also want to look at both -- They basically asked us to look at both the rock shrimp and the royal reds.

Let me go back as an example here. If you look at this map, you basically get a cleaner version of the regional map that I showed you, with all of the different colored lines, points, but nevertheless, this still doesn't give you the intensity or the frequency by which a VMS track frequents particular areas, simply because you can have layers after layers of the same tracks on the same spot, or close to the same spot.

For planning purposes, you may also be interested in looking at sort of the frequency by which a track is being fished or essentially, the density by which these dots are found in a particular areas. What Carlos did was he created grids, or basically squares, and then a simple way to look at fishing intensity would be to basically count the number of dots that are in each square.

Since 2003, up to the latest data that we have that was furnished to us, Carlos plotted all of those data, with this filter mechanisms to separate the different fisheries, and did frequency counts of how much of these points actually lie within specific squares. That becomes sort of an indication of the fishing density, if that's what you want to call it.

This is what we got and essentially, some of the information that this could provide you is that it can show you most frequented areas, sort of the hot spots, as well as other areas that have VMS tracks that might be shrimp fishing, but are not frequently visited enough. We thought this might be one of the tools that could actually help you in your decision making and I asked Carlos whether this resolution extends all the way down when you zoom in and he said yes, when you zoom in, it extends all the way down to large-scale maps.

The question, of course, here is what is the size of the grid? What we have used here is a ten-minute-by-ten-minute grid, which is about ten-nautical-miles-by-ten-nautical-miles. The question is whether you can go smaller than that and now you're asking the question of how small can you go and it's a data accuracy and precision problem, because you can go as much as you could, but you'll end up with basically the same as individual points and so you lose the utility.

Again, it's one of those recommendations that we want to work with you in terms of what would be the best one that might be useful for your purpose, because a lot of these maps are done for particular purposes and they're not necessarily good for everything maps.

This is shrimp fishing density for two to four-knot speed class for all of the VMS vessels that we have. This is just for the nighttime. We just want to look at nighttime and daytime and this is for the daytime fishing density distribution. Basically, they have almost the same pattern in terms of the location of hot spots, as well as the location of least frequented areas.

The only reason why there's less red here is because you eliminated -- From the whole database, you only extracted certain numbers and these are counts and so the counts basically just went

down, but the pattern remains the same and so at least the integrity of the pattern is consistent.

With that, what we need basically from you, especially when you work with Carlos after this, is we need a number of things. Among others, we need validation of the speed class intervals to sort fishing from non-fishing tracks. We also need a validation of the speed classes and depth ranges to sort probable royal red shrimp trawling activities and the same -- We need the speed classes, depth ranges and day and night trips to sort probable rock shrimp trawling activities.

We also need to ask that -- Some of this data might be consolidated. Some might be that we don't need to separate day from night and they may look the same. Some of the depth ranges may be grouped together and some of the dates, meaning seasons. Those are the inputs that we need from you.

Geographic area needs to be emphasized, to help the South Atlantic Fishery Management decision making, and also your AP decision making, maps that the AP and NMFS need to make for your presentation to the South Atlantic Council with respect to your recommendations, because I think your recommendations will involve a lot of maps like this, to serve as your basis for recommending those things, and other constructive feedback that you may have. If you don't have any questions on the general background, I'll pass the baton from Carlos and he can go from there.

Mr. Dennis: I hate to be a pest, but back up one, please. You've got all these squares from two to 1,000 and I am looking at this thing straight, to say a lot of that is inshore of three miles, the readings you're taking and the information you're getting?

Dr. Jamir: No, it's just an artifact of when you make those squares.

Mr. Dennis: I beg your pardon?

Dr. Jamir: It's just because when you make those squares it doesn't fall right on the specific depth contour.

Mr. Dennis: True, but you're showing a lot of this activity inside of three miles or along the three-mile line, along the Georgia coast there and on up into South Carolina, are you not?

Dr. Jamir: No, it's just a representation of the squares. Basically, when you zoom in, you can basically look at a more precise location of where those are. It's an interpolation of the whole fishing within that area.

Mr. Rivero: If you referring to the squares that are within the three-nautical-mile line, for the most part, those points are representative of simply being within the speed of two to three knots, three to four knots. That may not be indicative of any fishing behavior whatsoever, simply given the environment, of course. That just might be you getting out of a port somewhere or just kind of chugging along at a low velocity. That's just simply saying that's what the speed was.

We're not saying that those are areas that you're actually fishing in. What we're saying is that's

representative of the velocity. From here is where we're going to go forward and say now based on this information, this is where the velocity says -- I'll show you in the presentation, when I get my computer up, where we got the values for the actual trawl speeds or what we thought the trawl speeds were, how we generated those values. That will become a little bit clearer and I'll give a full explanation of how we got to this point.

Dr. Reed: I would just like to -- Is there any way you can zoom in? How about like zooming in from like central Florida, just north of Cape Canaveral, down to Miami?

Mr. Rivero: As soon as I plug in my computer, I'll be able to do that.

Dr. Reed: Overall, it seems like most of the shrimp fishery, just based on this VMS data going two to four knots, very little is going into the HAPC. The biggest stretch that's well within the HAPC looks like from Canaveral to Miami, in this stretch here. I'm not sure which fishery that is. Do you know if that would be the royal red?

Ms. Solorzano: That would be the royal red.

Dr. Reed: The majority of it is like right on the edge of that western boundary. If you could go to the first chart, first or second chart, there's -- I'm kind of confused and can you just show the HAPC and the bathymetry without the overlay of the fisheries?

Dr. Jamir: Let's wait for Carlos to set up, because these are JPG images and you cannot work with them.

Dr. Reed: If you turn the fathoms into feet, which is what I think in, our 400-meter line, which I believe is the western edge of the HAPC off of Florida, 400 meters is 1,312 feet, which is equal to your 219 bathymetry in fathoms. That would be your 400 meter line, I believe, and it's not lining up with the -- It doesn't look like it's lined up there with the 400 meter line. I'm not sure what's off there, but the HAPC should run along the 400 meter and I'm not sure why it's not according to your bathymetry.

Dr. Jamir: It does in most areas, actually, except that the -- It gets mixed with the yellow bathymetric line and so it gets confused, but when Carlos zooms in, I think it will be shown more clearly.

Mr. Williams: Dr. Reed, I just wanted to let you know that looking at the charts on the table up there today, it shows the HAPC western boundary well inshore of the 400-meter depth contour.

Mr. Rivero: We'll be able to zoom in now, as soon as I get set up, and I can answer those questions.

Mr. Wallace: Tom or really just to the golden crab guys, this type of information is what they're going to be requesting of you all once VMS has come in and the types of things that it will show, if you all are required to use VMS. This is the type of information that's going to be showing over time and so it will give you -- These are the concerns that maybe you're seeing that the rock

shrimp guys are having with the speed/depth relationship that we were talking about earlier. It's what we will be getting out of VMS from you guys. When you're looking at this presentation, try to relate this to where and how you are fishing.

Mr. Rivero: Just to start off with, when we first received this VMS data, we really had no indication of what kind of activity was associated with each record and we received over 1.6 million records to process and start working on and initially, the first thing we did was try and identify patterns in the data, to see what exactly constituted what kind of behavior. These are the types of patterns you'll see.

We have about forty-seven pages worth of these graphs, but we looked at histograms of activities and identified -- Based on the information that we received, this is what it presented, that the majority of your behavior was between two to four knots. Not knowing anything about your industry and not having any idea as to how you guys work, it seems, from the conversations you guys have had, we pretty much got the data represented really well, the types of activities you had.

In addition to that, we also see an additional bump here in the higher velocities, meaning you're in transit somewhere and going somewhere, but the majority of your activity was within the two to three or three to four knots and so based on that is where we originally started with the mapping of that kind of behavior.

As a result, you have this representation, which, of course, at first glance, it really doesn't seem like much. It just seems like a lot of dots everywhere and you're not really getting any information, but as soon as we start to remove the other velocities and focus in on the two to three and three to four -- We're looking specifically at two to four knots.

There are a lot of records. At this point, there's about 929,000 records that it's processing at this time and so just bear with it for a second. In essence, what it's trying to do is get rid of all those velocities and speeds that are not within that two to four-knot range and what it ends up looking like, as you'll see in a second, is those yellow and orange dots that we had in the other presentation, which showed along the shoreline and then close to the HAPC, which you guys have been talking about.

Obviously the ones close to the shoreline, as we discussed a little earlier, are not going to be fishing activity, but they are going to be in transit, where you're actually traveling at that velocity, but have no real indication of fishing whatsoever. That just happens to be another fact of the data analysis as a purely objective look at it, without putting in our own information or any ideas of where we think you're fishing.

Now you see a little bit clearer picture of where the activity, the two to three knots and the three to four knots, are actually occurring. Mind you, as we mentioned a little while ago, those things along the shoreline we can immediately discount, because we know that that's not going to be fishing activity. However, that activity which occurs closer to the HAPC, in bathymetry and areas that we know you guys are actually working, we can zoom into those areas and identify patterns within those.

One of the things that we did in the grid is a product of that. We're trying to aggregate the information so it becomes more meaningful, so you can identify hot spots within these zones, because at face value, these dots really don't give you a good idea of how much is occurring where. You can see the dots and you can appreciate the dots, but you don't really get a true sense of how much is occurring in these areas.

To that end, we created the grid to aggregate this information up and we looked at fishing density overall and this is simply a matter of how many times a particular VMS record appeared within one of these grids. I'll turn off the dots, because if not, it gets kind of clouded. You begin to see a little bit of where the hot spots are and this is just fishing density overall.

We're saying fishing density because we're assuming that the two to four-knot range is where fishing is actually occurring. We can, once again, discount all these shoreline values, because they really are meaningless at this point. They're really no indicators of fishing activity. However, these that are along the fringe of the HAPC are a pretty good indicator of fishing activity and in addition to that, let me go ahead and highlight the HAPC and bring that to the forefront, so that we may be able to better discern its boundary. There you go and I'll move it higher, so you can actually see it.

Mr. Graves: Can you plug in night?

Mr. Rivero: Yes, I can. We've broke this down into various slices. I looked at daytime versus nighttime and I cut it up by various speed intervals, zero to two, two to three, three to four, four to six, above six. I looked at -- In addition to the daytime and nighttime and speed, we also looked at depth and we crosscut it by depth as well and so we tried to characterize this in as many ways as possible to get a better feel for what's actually going on.

At this time, I'm going to go ahead and bring up the nighttime and get rid of the overall and let me get rid of the inside of the HAPC. Those are you hot spots at this point and where the areas of higher density or higher amounts of VMS activity occurred, in these areas right here. If you would like, I can go ahead and zoom into these areas. Does this seem to make sense to those of you out there in the field actually doing this stuff? No?

Mr. Moore: It means nothing to me. This ought to be the best you could get with the VMS, but it's all Greek to me. It's nothing.

Ms. Solorzano: We could blow ours up at home and I can actually get all the -- You can draw lines and connect it and there you go. It would hook itself up and it's like not the government's. Well, maybe it is the government's, but it's a lot easier for me to read at home than that.

Mr. Rivero: The thing about it is that if you -- With one trip -- We didn't have trip information, by the way, and so we had no idea what constituted one trip, two trips, three trips. We pretty much had to take this at face value for individual points as what they were and you know the trips you're taking and you know this is one trip and how you're going about it.

When you're looking at this many records for 140 different vessels at one time, it's kind of difficult to tease out what's a trip and what's not a trip and when were you fishing and when were you not fishing. As a result, we tried to put this together to make sense in terms of these are the points that we have, this is what we characterize or we assume to be the fishing behavior with respect to the information we had, which was in this case average speed, and based on this, is where we saw the most activity and this is where the data shows us that the most activity is occurring using the VMS as an aggregate.

Ms. Solorzano: You couldn't take certain vessels that you know fish certain fisheries and pull up their specific data and be able to tell?

Mr. Rivero: We did and once again, we don't really have -- We can draw the line, just like you would draw the line, but where a trip begins and ends, we would have to go in and individually look at the daytime stamps and for the amount of records we had, it's just impossible, but in addition to -- We did do that and we did that for the royal reds and that was a smaller section that he showed on the PowerPoint earlier, which I can show that to you as well, since we're here, so you can see what it actually looked like. That's what it looked like.

Ms. Solorzano: You don't have any of it though for the Keys area, I see.

Mr. Rivero: We do have some data for the Keys area, but it didn't fall into this, into the vessels that we were given. They did not fall into this. We have some points here, but that's about it, although here we did. You see we do have activity down here in the Keys as a result.

Dr. Reed: I understand the difficulty of trying to tie in VMS data with actual fishing and that you have to take certain presumptions that anything going between two and four is fishing and so forth. I think the critical point for this meeting is how the apparent fishing occurrences are in relation to the western border of the proposed HAPC.

If you go back and zoom in there, between like -- It looks like the big overlap we're looking at is from Canaveral, central Florida, to Miami. It looks to me that the big fishing zone is well west of the proposed HAPC and based on these data, it looks like there's just a very little limited overlap that's pretty much parallel with that western edge of the HAPC, at least in this zone. Put the dots on where there's actual fishing. If you have a dot, it makes that huge square -- That square is probably, what, five-by-five miles?

Mr. Rivero: Ten-by-ten.

Dr. Reed: Ten-by-ten and one little dot in there -- It's hard to look at those squares, but okay, so we look at the western edge and can you bring the HAPC boundary up on top, so you can see that? Get rid of the squares. They really don't do anything for us. We want to see where the boat is. If we could have your data on top, it would be wonderful, actual fishing data.

Ms. Solorzano: All of the royal red fishing is in the western edge of that box.

Dr. Reed: Let me see the HAPC.

Mr. Waugh: Carlos, where is the HAPC boundary there?

Mr. Rivero: It's coming up. It's going to be the last one to draw, because it's the one on top, but it's drawing all the data down through the Keys right now.

Mr. Wallace: I think what you were seeing is you had that high-density area and it's really your rock shrimp area. You're getting the high density because there was more rock shrimpers fishing than there was royal red fishermen. Your lower density, out to the eastern, is basically your royal red fishery, while this real heavy concentration just inshore is your rock shrimp fishery.

Mr. Rivero: You can definitely see -- Like you mentioned there's this line along here and then you have this other line on the inside here and so those are primarily the two areas that stand out, to me. This area obviously and these areas don't mean anything.

Ms. Solorzano: Those areas are white shrimp areas. They're on the beach and they're white shrimping. The more heavily offshore is going to be the rock and the furthest offshore is going to be the red.

Mr. Rivero: I hope you guys can appreciate the fact that we're just taking a stab at figuring out what you guys are actually doing without any real knowledge of the different types of activities you guys are participating in and the fact that the data shows it pretty cleanly is an attribute to the data. That's not to say that the VMS data cannot be improved. It can.

Dr. Reed: Can you turn on the bathymetry, too?

Ms. Solorzano: This is actually great, because last time we had a meeting and a gathering with them, they didn't have any data at all. They said there was no royal red fishing that went on and no rock shrimping going north of the Cape or anything. At least you bringing this in does show them that yes, it's been going on a while.

Mr. Wallace: Can you turn off all of your inshore depths that's within 200 meters and shallower? Give some depths, Woody and Marilyn. What would be the appropriate depth to where we just are seeing -- Again, I would ask the royal red fishermen to give us a depth range that would be appropriate that encompasses all of the royal red fishery. Right now, we're only looking at what it is in relationship to the HAPC.

Mr. Moore: It would be a thousand feet to 1,350.

Mr. Wallace: Is that the shallowest depth? Could you go in as shallow as 900?

Mr. Moore: We work fathoms and so it would be about 170 fathoms.

Dr. Jamir: Is that meters or fathoms? Please state whether you want fathoms or feet and we can convert.

Mr. Moore: Fathoms.

Dr. Jamir: What's the range that you want to look at?

Mr. Moore: 160 to 250.

Mr. Herring: Carlos, did I understand you to say right that you had input from 140 different vessels and was that correct?

Mr. Rivero: Yes, there 140 distinct vessels in the original VMS dataset. Mind you, as you mentioned, as he asked earlier, was that for all the VMS dataset, and it was for New England all the way through the Gulf of Mexico. Those were all that were rock shrimp permitted, apparently, from what the VMS record set. That's what we had, 140 distinct vessels. That's not to say that that's how many fished. Obviously not, but that's the universe that they gave us and from there, we had to dwindle it down to what actually occurred within the South Atlantic area. Let's look first at anything deeper than 160 fathoms, which 292.6 meters.

Mr. Waugh: While that's doing that, I think just to highlight what we need to hear, particularly in terms of royal red, because there doesn't seem to be any interaction with the proposed areas from rock shrimp, but it's for you all, the AP, to work with Carlos and figure out what is the best presentation of royal red fishing and then we need to look and see what proportion of those trips are inside the proposed HAPC and you all's recommendation on how that western line might be modified to accommodate the royal red fishery.

Mr. Rivero: That's everything deeper than 160 and if you wanted to look and see what's inside or outside -- I can quickly tell you through here -- We can do a selection and identify of these points that are showing right now how many of them are inside the HAPC and how many of them are outside. If you want to do that, we can do that right now.

Mr. Waugh: Not the South Atlantic, but I'm thinking more of the area where there appears to be some interaction, like is it off of the Florida coast? Maybe just look from northeast Florida down.

Mr. Rivero: I'll just give you a quick view of how these points overall -- Then we'll zoom after this completes drawing, but we'll look at what the northernmost extent of the interaction is with the HAPC. We can see it's about right here and we have some points, but that's nothing and so from here down, we'll take a quick look and then we'll further define the area, if you will.

As you guys mentioned earlier, it's down just north of Miami, Broward, all the way up to Cape Canaveral or Jacksonville. Do you guys want to take a look at this area and see what's in here and what's outside? Okay. I'll zoom out, once I can get a good depiction of it and I'll tell you how many points are within this area right now, as soon as I get the selection up.

Mr. Wallace: What does the points represent, each time it is recorded or --

Mr. Rivero: Each VMS point, each VMS location.

Mr. Wallace: These points are once an hour?

Mr. Rivero: Yes, once an hour.

Mr. Wallace: You could actually tell us how many hours he was out there fishing?

Mr. Rivero: Yes, exactly. That's essentially what I'll be telling you, is the number of hours that have been defined here.

Ms. Solorzano: We get hit more than once a -- Sometimes we get hit two or three times in an hour and then we'll go a couple of hours where we don't get hit and then boom, boom, boom, I get hit more often than an hour.

Mr. Rivero: The records that we received from the Office of Law Enforcement gave us the data at a frequency of once every hour.

Ms. Solorzano: Sometimes when we're on anchor or we're stopped, it might not hit me but two or three times and then when it gets cranked up and going and if we're near the Oculina Bank, it hits more often.

Mr. Rivero: It will start hitting more often?

Ms. Solorzano: Yes, it will hit a lot more often.

Mr. Rivero: The way they collect it and the way we receive it are completely different and in this case -- Every record we had was once every hour. We had a time stamp for every hour and it would be great to have higher resolution, obviously, in those areas that are of more significance, but at this point, it's pretty much, like you mentioned, a good indicator of the number of hours, essentially, given in this area.

Dr. Reed: Do these records look real to you as far as where the royal red are fishing? Does this data look good?

Mr. Moore: It looks real good.

Dr. Reed: We're really only talking about like that real slim area of the western boundary, the 400-meter. Now, as I said, if you could overlay that with your bathymetry, because when I looked at it, it didn't look like what they had for the 400-meter line was jiving with the western boundary there.

It could be off a little bit, but more importantly, if we draw a line along that eastern edge of where you're fishing, within that area, from central Florida to Miami, that's the area of contention. What is the maximum bathymetry, maximum depth that you're fishing there, based on this data -- What's that bathymetric line there and how does that compare to what the actual 400-meter line is?

Some of these charts are not that accurate, I guarantee you. I see stuff where we have the best bathymetric charts available from NOAA and we dove on -- Just this summer, we dove on a mound off of the Pourtales Terrace that did not even show up on the best bathymetry of the NOAA chart and this mound was 200 feet tall and it was like a half-mile in diameter.

Ms. Solorzano: That's what we were getting at with your --

Dr. Reed: If you could do the bathymetry at least of the 400-meter line, which would be the 219-fathom line, that would be the west edge of where the border should be, at least down to the Miami Terrace and then it changes there, because it's all rocky there along that western edge.

Mr. Rivero: The first thing I need to do is select those records and what I want to do is select them -- Just to give you an idea, these are in fathoms, but actually they're meters and so we had to translate them over and so I'll give you what they are in meters in parentheses, so you guys can have an idea.

Mr. Waugh: Carlos, can you show the 400 and 300 only?

Mr. Rivero: Yes, absolutely.

Mr. Waugh: The southern part of that area does come into 300 meters and so if we had those two, you could see.

Mr. Rivero: 300 and 400 only, correct? The dots, once again, cloud it and so we would have to zoom in. This is the 300 and this is the 400 and then this is the HAPC boundary.

Dr. Reed: Let's just start at the northern end and keep that scale and just take your hand and move it down, so we can look at each area, like north Florida and central Florida and south Florida, and see where we're overlapping.

Ms. Solorzano: Also, is this May to September, in the summer?

Mr. Rivero: No, this is all time.

Ms. Solorzano: This is all time? Okay.

Mr. Rivero: The purple is the HAPC boundary and the blue is the 500-meter line, which is also the 219-fathom line, and then the black is the 300-meter 164. It's 400 and 300. I misspoke. Do you want to just start cruising down? Okay.

Dr. Reed: It looks to me that right about there is where the fishery goes over the line and what's that area? Then just keep working down, so we can see the coastline in relation to that.

Mr. Waugh: From the royal red shrimp fishermen, does this look accurate to describe where you all fish?

Mr. Moore: It's hard to tell without the longitude and latitude. I would hate to say. I could really tell you if you had the lat/long readings up there.

Mr. Rivero: I'll go ahead and put a lat/long grid on top.

Dr. Reed: Let me just point out where West Palm is. Right here in the north inlet of West Palm. This is West Palm Beach here and down here, you're about Boca.

Mr. Moore: I don't think you're right about that. I don't think that's West Palm. You might want to check that.

Mr. Rivero: How often do you want parallels and meridians, every ten minutes or so?

Mr. Moore: Thirty minutes.

Mr. Rivero: This is the eighty west and 26°30 north.

Dr. Reed: Scoot back up so we can see Canaveral and then start working our way south.

Mr. Rivero: Do you want to go a little further north or is that about right? We'll start going down from here.

Dr. Reed: Just to me, in the northern part, from Cape Canaveral north, it looks like the fishery is primarily between 300 and 400 fathoms and then in the central region, like Cocoa Beach to just south of St. Lucie, it goes deeper than 400 fathoms and right there about West Palm, it's dropping back into 300 to 400 fathoms again. For some reason, that central area, from St. Lucie Inlet to Cocoa Beach, is going deeper there and I don't know why that would be.

Mr. Moore: It's just not accurate. We never change depths like that. There's something wrong with what's up there. We don't even have the cable nor the winches to go as deep as some of that is showing.

Dr. Reed: What's the deepest you fish?

Mr. Moore: 1,350 feet, say 250 fathoms.

Dr. Reed: A fathom -- 400 meters, or that western edge, is 1,314 feet. You're right on the edge.

Mr. Moore: Yes, if we was right on the edge all the way up and down, but some of those is not right. I can look at that and tell, because I see it every day of my life. Something has gone wrong with how you did it or something.

Mr. Rivero: These were the points that were given to us by the VMS and the points are only accurate to two decimal places and so it's really -- As you can see, if you notice the pattern here that they're all very well aligned and everything is nice and straight, it's only because they're out

to two decimal places. However, if the western edge of the HAPC is based on -- What is that exactly based on? Is that based on bathymetry or -- Yes?

Mr. Moore: I would say that the dots would probably be right. It's the boundary line that looks crooked or wrong.

Mr. Rivero: Which one, the HAPC boundary or the bathymetry?

Mr. Moore: The dots look more in line, because we drag like north and south right there. That looks right.

Mr. Rivero: The only issue here is that the bathymetry -- With the variety of sources of bathymetry and the fact that when you generate these types of maps, when you're trying to generate estimates for bathymetry for these locations, you have to take whatever is available, whether that comes from the National Ocean Service in terms of soundings or if it comes from the NCDC as far as the contours are concerned.

You have to work with that and then interpolate between those points. There is some degree of error associated with what the bathymetry is going to tell you, what the depth is actually listed here, and the best thing we could possibly do is correlate that with whatever you guys have on your depth soundings.

Mr. Moore: Right, but it's -- Like on our charts, our computer water depths, it could be as much as 300 feet off when you're talking about fathoms. You can't even go by it. You'll be in 200 fathoms and it will show you in 160 or 240 or something. If the blue line was drew with the fathoms on the chart, that's the reason it's not right.

Mr. Rivero: One of the things that I would like to recommend is that at least at some point there would be some consistent standard of what bathymetry is going to be accepted. If not, you're going to have issues like this all the time, where you're going to have one contour line saying it runs like this and the other one is going to be just slightly different, as you can see.

A variety of things could go into how that occurs and whether the algorithm that you use or the data points that you have as your source. If there's going to be consistent dialogue or language going on, one of the main things you should agree upon is some kind of bathymetry data source, so that when you make these types of decisions and define these boundaries based on depth that you're all speaking of the same lines. At this point, that doesn't seem to be clear.

Mr. Moore: No, the depths is wrong.

Mr. Rivero: I could definitely redo this. It's not a problem. The issue here is whether or not we can find a bathymetry source that will be acceptable for everyone, to say this will be the standard and then assume the depths from there. At this point, we have the western boundary of the HAPC being the 400-meter line here, but then the algorithm that I used showed it to be here.

I'll be the first to tell you there's error associated with it and I totally stand up for it and I know

that exists and it's going to occur in any dataset that you incorporate and use, whether it's directly from the NOAA nautical chart, which has its inherent flaws.

Those charts are primarily made for navigational purposes within channels and hazardous areas and when you're out in 300 or 400 meters, I don't think you're going to be dragging bottom anywhere near there with your boat. There are issues associated with bathymetry, no doubt, and I think the first step is if we're going to resolve this issue is identify what standard we're going to use and then go from there.

Mr. Williams: I agree there's no way you can box us into a bathymetry line, because of the margin of error. We're going to have to have distinct lat/long to do this and these VMS marks, they are readings. They're not bathymetry readings.

Mr. Rivero: If you look at this, as you mentioned, they're based on the HAPC boundary, or the proposed HAPC boundary, and the VMS readings that you have, there is considerable overlap here and how you're going to deal with that and whether or not it's going to be bathymetry based or simply redraw the polygon to fit not just a bathymetric contour, but an actual real world coordinate line that you define as a boundary, that's up to you guys to define.

Dr. Reed: I think if the fishery is stating that they only fish to like thirteen-hundred-and-some feet, that's 400 meters. As far as the coral is concerned, we never found the lophelia coral north of Boca shallower than 400 meters. We didn't base that on the bathymetry of a chart. That was based on real data, that the coral is deeper than 400 meters. If they can state that they'll fish shallower than 400 meters, then we're not really having an overlap there. What's going on here, I don't know, but -- I don't know how you would regulate that with the Coast Guard, other than the depth of your depth finder.

Mr. Wallace: Tom, have you -- I'm looking at the chart and is this one still greater than the ninety fathoms, like you've got on the chart, or is this showing the marks between 160 and -- What was the maximum depth?

Mr. Rivero: Here amongst these, I'll tell you exactly what the depth was, the maximum depth.

Mr. Wallace: I guess my question is really, while Woody and maybe Marilyn says they're not fishing in greater than 400 meters, do you all have any vessels that appear to be in this speed category that is fishing over 400 meters?

Mr. Rivero: I believe we do. We'll look at it and I think it goes up to 400, but not too far above 400, I don't think.

Mr. Williams: Carlos, can you give me a mileage between the 400-meter line and the most eastern VMS data point on one of those vessels?

Mr. Rivero: Yes, I can do it interactively right now, just eyeball it and -- Not eyeball it. I can calculate it.

Mr. Williams: Something reasonably close. That way, we can see just how far east some of those VMS data points are from the 400-meter line.

Ms. Solorzano: This VMS data is only from 2003?

Mr. Rivero: 2003 to 2007.

Ms. Solorzano: We have about twenty-five years prior to that that may not be showing on here. There is a little bit of deeper trawling done. As you've seen in Key West, we've brought up that it does go to 1,800 feet in Key West. There is some bottom here that's used, even though you don't have track data showing it. It's just simply that the vessels haven't fished the area. There was a year or two when we didn't have a big -- We had some many rock shrimp that there wasn't a big market for royal reds and so one year, we didn't even really produce hardly any.

We do go into that area a little bit further than what it's showing on there, occasionally, from time to time. There is a little other deeper information that's not necessarily on there, from previous years. Wouldn't you agree, Woody, that there would be some on there that's not showing on their VMS data?

Mr. Moore: Yes.

Mr. Rivero: Here's your distribution of the data between 300 meters to it looks like about 450 meters and so the majority of the points that are greater than 160 fathoms. Yes, you do have a considerable amount above 400.

Dr. Reed: Can you go ahead and just take that chart and move down through the Keys, to your southern -- Just kind of move it like you did before? Is that fishery they showed between Key West and the Dry Tortugas -- Is that the royal fishery right there?

Ms. Solorzano: No, some of that is the pink shrimp fishery, but the deeper is going to be royal red, yes, but some of it could be the pink shrimp fishery, Key West pinks. The deep is definitely going to be red.

Dr. Reed: All of that is outside the HAPC.

Mr. Waugh: Carlos, can you draw a line north and south that would encompass all the VMS data to the west of it?

Mr. Rivero: To the west of the HAPC boundary?

Mr. Waugh: Separate from where the west boundary is now, but just give us a north/south line that would encompass all of the VMS data, exclude all of it with the north/south line.

Mr. Rivero: Should I just zoom out?

Mr. Waugh: Actually, it's not here. It's up on the east coast, back up on the east coast.

Mr. Rivero: I'll zoom out and get the whole thing and then we'll zoom back into the area that you want. I'm assuming this area right here, from here to here?

Mr. Waugh: Yes, the area along the Florida east coast is the one where we see the overlap and just to get an idea of if you had a north/south line specified in the regulations, where it would be that would exclude all of the trawling.

Mr. Rivero: Let me zoom in, because this apparently is the cutoff point here. We'll zoom into that area. Does that look good to you, about there? I can tell you the coordinates of that line in a second.

Mr. Waugh: Yes, that's looking good, but we may need a larger area, from about -- I can look on the chart and give you the rough area.

Mr. Rivero: How is that?

Mr. Waugh: Where we need is about 26°30 up to thirty degrees.

Mr. Rivero: Here's 26°30 right here. That's 28°30 and so I'll zoom out a little bit. This is 26°30 here and this is about thirty right here.

Mr. Waugh: Is it possible to -- Where does 26°30 start, somewhere down here?

Mr. Rivero: Right here at the base of this line.

Mr. Waugh: Right here? Okay. You can see that all the effort is very close to the line here. It looks like we've excluded it all here. Can you then, up at about this area, draw it more so that you're just shaving where all the trawling activity is occurring, like a straight line from somewhere here and going up here and then continuing up like that?

Mr. Rivero: If you would like, we can go ahead and draw a polygon to start it.

Mr. Waugh: Are you going to be here tomorrow as well or --

Mr. Rivero: I have to leave tomorrow morning, but I can stay for a couple of hours.

Mr. Waugh: You could be here a couple hours in the morning?

Mr. Rivero: Sure.

Mr. Waugh: I don't want to speak for the AP, but this is the type of recommendations that you all may want to present to the council as a way of accommodating your area where you fish. The Golden Crab AP is making a similar recommendation in terms of some allowable areas, but it seems more practical for you all to come up with a recommendation shifting the western edge of this boundary and picking some points like this that come closer to excluding, that come closer

to putting all your fishing outside of the area.

Should you make that recommendation, then we have to go back and see what the habitat distribution is in some of these areas, to make sure that we're not excluding prominent areas, but if you're putting this line in very close to where you've been doing all your fishing since 2003, there's not going to be any interactions with habitat there, because you've been trawling in that area. Just something to you all to think of in terms of what sort of recommendations you all might develop.

Mr. Wallace: To that, while you were getting real close to where they're actually fishing, I would, just for enforcement's sake and to keep for these boys for accidentally going across the line, give them a little extra room, if you can. If you do drift across the line, for whatever reason you go across the line, you don't want a ticket for just because you accidentally got there. You would request just a little bit of a buffer outside of the line that you've drawn there. You don't want to go right to where you've got a dot.

Ms. Solorzano: It's going to take about forty-five minutes just to pick up. It takes a little bit of time and you're out of gear or you're slowed down a lot and you could be moved over into that, if you're too close and that could be -- We wouldn't want for that to happen.

Mr. Rivero: On the map itself, it looks really close, but we might be talking about a mile or half-a-mile or something to that effect. I don't know if that is what you guys were referring to or if you're referring to a couple of meters or a couple hundred meters. As we zoom in, we'll be able to see better the distance between each of those points and how close the boundary is actually drawn in terms of a real-world distance.

Dr. Reed: I do have a little concern about just taking the western edge of these data, because we're looking at the data and the fishermen -- From what I understand, you fish a contour, right? You're fishing along a depth contour or in an area. Like if you're fishing off West Palm, you're following the 160-fathom line or whatever it is. Is that correct?

Mr. Moore: The shrimp move more in water temperature. If you find them in one depth in West Palm, they'll be --

Dr. Reed: We're following contours, the northern part of that data, from right about Cocoa Beach there. It's very strict right within that 300 to 400-meter line, contour, and then something happens with the data at around Cocoa Beach, the Sebastian area. All of a sudden it shifts over outside of the 400-meter line and it just doesn't make sense why it would shift there.

I just want to be careful not to be redrawing lines based on inaccurate data, because let me just point this out here. Here's your 300 and from here north, it's kind of working -- Here's your 300 and 400-meter line and that 400-meter line is supposedly the edge of the HAPC. Again, this line is drawn in Arc View, based on the bathymetry that they have in their database. There's not a real depth there. The western edge that we gave, that the Coral AP gave, was a true depth, the 400-meters. That's the shallowest we saw coral. I'm not sure if these data out here are correct.

Dr. Jamir: In terms of the relative accuracies, the VMS data point, I can assure you, I think it's more accurate than the bathymetry. What that means is I would trust the data points from the VMS as to where it's falling, because it's the actual lat/long and the error within that position is actually very small compared to the possible variation in the depth readings.

The depth here are mostly interpolations, because as you go in deeper waters, outside of the shipping channels and hazards of navigation, there is much less soundings and so the question we're actually -- Within that, I would actually question all three of them, because you would rarely find a straight line all the way for miles and miles of bathymetry.

That in itself is an interpolation and so what I would -- In terms of relative accuracy, I would put the VMS data points as much accurate than the bathymetric contour lines compared to the interpolations of the bathymetry, in that order.

Mr. Rivero: I want to say another thing. When you guys are fishing, you're actually looking at your depth finder and not at the actual chart. The chart is just a general this is where I'm going to go more or less, but when you're actually running the line, you're running the line based on what the depth finder is telling you. To me, that's much more accurate than the chart or any data that we're going to present here. As Tom mentioned, the VMS data -- I have full confidence in the VMS data telling me that that's where it's happening, but the contours at this point are just for general reference and they have a much higher degree of error associated with them.

Once again, what I would recommend is that we all get on the same sheet of music as far as the bathymetry is concerned, because it seems to me it's all bathymetry driven; however, one line is drawn one way and another line is drawn another way and how do you discern which one is correct or which one is more accurate, especially since you guys are actually doing real-world bathymetry.

You're going out there and you're running a line on what your depth finder is telling you, as opposed to what -- As Tom mentioned, a few scattered points out in the middle of the ocean are interpolated and calculated and so that's not an easy problem to surpass.

We have to figure out how to translate what you guys have out there in the field, in terms of your depth findings, and when you're out there, maybe getting that information and relaying it back or incorporating with the VMS, to send it back and say these are the actual depths that we're working in and these are the actual depths out there and this is how it translates to the boundary and this is how the boundary should be defined. That, to me, makes more sense than trying to argue about which bathymetry line is more correct. I can guarantee you that none of these lines are correct.

Mr. Waugh: Carlos, can you give them that line you drew, give them the location of that? Then they could check that against their charts as to where they're fishing.

Mr. Rivero: The blue line? I can tell you.

Mr. Wallace: I agree with what Tom and Carlos has said, to probably the inaccuracy in the

bathymetry charts. You're never going to get the Coast Guard to enforce a depth, because that means he's got to be sitting there and just like Woody said before, you could go over 200 feet and go down 200 feet in depth. You're never going to get them to enforce a bathymetry number. We rely on lat/long through GPS and that's the proposed HAPC that's got to be there. While Dr. Reed keeps alluding back to this 400-meter as being the magical 400-meter depth, that's not enforceable.

Mr. Waugh: That line is seventy-nine degrees, forty-three minutes, 47.4 seconds?

Mr. Rivero: Yes.

Mr. Waugh: You all can check that on your charts, just as a way of verifying the VMS data.

Mr. Williams: Read that number again, please.

Mr. Waugh: Seventy-nine degrees, forty-three minutes, 47.4 seconds. It's right down at the bottom right of the screen. Up top is decimal and down on the bottom is degrees, minutes, seconds.

Mr. Rivero: The decimal is 79.732686. The degrees, minutes and seconds is seventy-nine degrees, forty-three minutes, 47.4 seconds.

Mr. Moore: What do you want to know, how deep it is with our meters at that reading?

Mr. Rivero: I'm assuming that he wants to make sure that none of your points are east of that line, that if all of your points are west of that line, then what we have here is an accurate representation of where you're fishing. I think the biggest concern we have, as far as I'm concerned, is the accuracy of the bathymetry.

Mr. Moore: I would say that the VMS has got to be right and it's the blue line was took from numbers on a chart and they're so inaccurate that we don't -- You can't go by that.

Mr. Rivero: As we mentioned earlier, even in the navigational charts, they just give you a general idea of where things are, but they miss a lot of things. You mentioned the 200-foot mound, I think someone mentioned that, and that's primarily a case of how many points are they actually sampling out in the open ocean and when you get out there, it's very sparse. You're not going to sample every hundred meters or every 500 meters. They're lucky if they get one every five miles or so. They're going to miss a lot.

Mr. Moore: The only place I see as accurate are shipping channels, Mayport and Savannah. The rest of them, they haven't surveyed the 1960s or early 1970s.

Mr. Rivero: Even then, those surveys are -- It's very -- The density of the points is not conducive to picking up on these large scale relief patterns that you guys are looking for for habitat. My next question is on the habitat maps. How did you guys define the bathymetry line when you guys went and did your dives?

Ms. Stiles: Carlos, can I interrupt and make a suggestion? It's not really my place to interfere with your work, but I feel like people are getting tired and I just wanted to make the suggestion that we do have the option of making a recommendation to staff and asking Carlos to prepare things for you.

It's not required that you actually do the exact drawing now. You could say something to Carlos like we would like to have all the VMS points included. You could say something generally like that and you don't have to do all the work right now. Maybe I'm just being a little lazy, but I see people getting tired and trying to actually draw the actual line right now and you can give him very specific instructions so he'll do what you want, but like at another time and not at 6:00 P.M., when everybody is tired. I'll just let it lay at that.

Mr. Waugh: I was going to make the exact opposite recommendation. Carlos, can you close that box, please? This is serious business and we're on a relatively tight timeline and so what I was going to suggest is that Carlos is here tonight and has to leave in the morning. He'll be here for a little while.

I think now is a good time to break, if we don't have anything else, and we'll go and leave you all here with Carlos and you all talk about what recommendation you want to make for the western boundary of the HAPC.

You all spend some time with Carlos tonight and you can get together tomorrow morning and then when we reconvene, you all have a recommendation to give us. Obviously this is very controversial and I don't want to go away with some general directions to staff to put something together. You've got the information here that you can draw this.

What I would offer as some suggestions is in your zeal, don't try and create a lot of blue area in this area. I would try and keep this western line as close to where it encompasses you all's fishing and develop a recommendation that we can then work up and present to the council.

Ms. Solorzano: I just had one final thing to say before we leave and back to I believe it's Chip across the way. What is the rush? If there's nothing being -- If nobody is damaging this and we have to make a decision tomorrow, what is the rush if there's no rush, you all tell us?

Mr. Waugh: The council has been working on this FEP and FEP Comprehensive Amendment for probably three or four years. We've known about these coral HAPCs out here for several years. While we don't have any documented evidence of damage, we know the potential is there.

There's a very real risk that if the council doesn't develop some management actions to protect these areas that it will be done through the legislative process and you'll have a lot less involvement in how that turns out.

Mr. Williams: Carlos, can you give me an approximate distance between the proposed western boundary of the HAPC in that area and the new blue line you just drew?

Mr. Rivero: Sure. I'll go ahead and zoom into this area right here, so we can get it a little bit more precise. Would you say from about here to here, from the existing boundary to the --

Mr. Williams: Yes.

Mr. Rivero: Let me change the units of measure. That's not going to be very useful to you. Let's do miles. Miles or nautical miles? You get to pick. Nautical miles, okay. It's about 0.06 and so it's about -- I think in order for me to get that in -- Right now, it's in decimal degrees. It's all in GPS format and so it's going to give me every measurement in degrees and so what that actually is is just a unit of measure for the angle of where it's positioned on the Earth, but not -- I'm going to try it again one more time.

I changed it, but the true way of doing it is to re-project it and put it in a different coordinate system, so that the measurements are -- It's not going to give it to me in meters. It's down here at the bottom, but that's just the positioning. Let me go ahead and I'll try one more thing. Maybe if I specify. The coordinate system is specified and it's not going to give it to me in nautical miles. It's 0.06 decimal degrees and so --

Dr. Reed: The GIS data, they showed the histogram of the depth range of where these points were, between 300 and 500 meters for the majority of them. I would say the majority were between 300 and 400. Just based on the data, depending on how good the data is, just say to put your easternmost boundary at like the 99 percent -- Where you had 99 percent of the fishing west of that.

What's the deepest point you went to or you could say what percent of the fishing is less than 400 meters? What percent of the fishing is greater than 400 meters and what percent is less than 400 meters and how much are you leaving outside if you brought it into 450 meters?

The Coral AP did the same thing in trying to draw straight lines, based on the westernmost knowledge of the coral reef. That brought it into to 400 meters at the westernmost position where a 400-meter bathymetry was and that brought it way in. We're talking you would have -- I don't know, but it just made more sense to the Coral AP to run it along the bathymetry, because that's what the coral lived on and that's what the data is based on.

When we tried to draw a straight line from the Miami Terrace north and stay to the westernmost area where there was a 400-meter depth reading, that just opened up the area twice as large and I'm afraid we're doing the same thing trying to do it this way, when I think the fishery is really -- The majority of it is between 300 and 400 in this zone.

Dr. Jamir: I think there's one way to resolve this. If you resolve it based on depths and if the accuracy and precision of the depth measure is not good, then your point of reference is a shifting reference. You look for a base by which you can compare both and which they have a similar measure and the way I look at the similar measure is your lat/long position.

If you can synchronize the latitude and longitude of the VMS with the latitude and longitude of

the coral surveys, then the depth is -- If both of them did a good measure of where they are, which most probably both did, they you can easily correlate them together and then the depth will correct itself. Do you see what I mean?

Both are accurate measures and they use the same GPS or same chart and then if one said this is where I am, based on lat/long, and this is where I am, based on lat/long on the Coral AP, if you put those two points together, then you have a similar reference point that's agreeable to both systems and then the depth becomes the depth as to which one mentioned the depth the most. If you actually measured it by echosounders at that point, then that's the depth for that point.

Ms. Solorzano: I think the coral people are speculating where coral is and I think we know where we shrimp at.

Mr. Williams: Gregg, I think it might be a good idea to let the Deepwater Shrimp AP work with Carlos tonight and accept your recommendation to try to work out something tonight, seeing as how he has to leave in the morning.

Mr. Herring: I have a couple of questions for Gregg before we go. In the handout that you gave us, you said that there are also considerations for further areas of particular concern, habitat areas. Are those primarily things that have to do with the Bahamian boundaries and that area down there or are there -- I couldn't tell by the little chart that you had on here. It was not distinguishable to me. What are the other areas that you're referring to in the handout?

That's number one and it will be a two-part question. Secondly, Tom mentioned -- Because someone had asked about all of the information was on there for the rock shrimp fishery, when it looked like what we were looking at primarily here was the royal red fishery, in the depths there. I think Tom made a comment that the council had asked them to put that there for further consideration of other things that might be coming down the road.

If there are other things that are going to be affecting the rock shrimp fishery as well, can you tell us what those are, whether it be oculina or -- He spoke about some of the lines weren't right with that and are there other considerations that the council is looking at that affects the rock shrimp fishery as well?

Mr. Waugh: Not at this stage. The proposals are for the HAPCs that we have here. What I think you're referring to is some of the recommendations from the Habitat and Coral APs for other areas for research, to look into. Those are certainly there for research recommendations.

What we heard from Dr. Reed are that they have discovered new points in between those satellite HAPCs. That may be something that the council looks at in the future, but there's no plans right now to look at any HAPCs for coral other than those that we're talking about now. A year from now, they may have some others that they're looking at, but right now, those are the only ones that we're looking at.

Mr. Herring: You say further research and the things that you are talking about is having to do with Oculina? Did I understand that to be a yes?

Mr. Waugh: No. What we're focusing now are on these deepwater coral HAPCs. That's it. It appears, from the VMS data, that there's no interaction with those areas from the rock shrimp fishery. Maybe I'm not understanding your question, Tony. Do you want to ask it again?

Mr. Herring: Maybe I'm asking it wrong. I'm not sure how to rephrase it, but at this point, there are no other considerations of other areas of particular concern, other than what we're speaking of, at this point?

Mr. Waugh: That's correct, yes.

Mr. Graves: Any other comments or questions?

Mr. Rivero: I would like to ask about the deepwater corals and the points that you guys have for those. I think the issue here is we're talking about the bathymetry lines like they're exact and that the 400-meter contour is the same one for you as it is for you and that's not the case. I think the best thing that we could go about doing is if we had locations of some of these deepwater reefs.

We can overlay them onto this and that would give us a better representation as to whether or not there is any potential for interaction. I don't know to what extent they've been mapped or does anyone have any layers that we can add to this to make it something that's more visible than trying to define it by the contour line itself that I happen to know is incorrect and it's not precise and it's inaccurate in many locations.

I think it's best to put both of those -- Those are what we really want to compare. The bathymetry line is just a reference and so what we want to compare is where the locations of the habitats are compared to where the locations of the fishing are. If we can plot those two together, then that would bring us a lot closer to where we need to be, as opposed to continued discussions on where the bathymetry line may or may not be.

Mr. Graves: I guess we'll move for adjournment until tomorrow morning. The AP is going to work with Carlos tonight or have some discussions.

Mr. Williams: I would certainly like for the AP to work with Carlos tonight.

Mr. Graves: Carlos, you said you've got a couple of hours in the morning and then you have to leave, correct? You're available tonight?

Mr. Rivero: That's correct. I'm available tonight.

Mr. Wallace: To that, I think the -- The Golden Crab AP is not going to be here in the morning?

Mr. Waugh: Correct.

Mr. Wallace: Based on these -- These are the recommendations that you are sending to the

council or --

Mr. Graves: No. At this point, we're going to try and get back together within two weeks, when we get the rest of the data, so we can put exactly what we want to recommend for the council. That is something that we've talked about and it was typed up for us to look at. At this point, there are no recommendations, but we will have them way before the March meeting.

Mr. Wallace: That's what I wanted to know.

Mr. Graves: We're adjourned.

(Whereupon, the meeting adjourned at 5:50 o'clock p.m., January 28, 2008.)

By: _____ Date: _____

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March 2008

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National Marine Fisheries Service
Southeast Fisheries Science Center

VMS Analysis of South Atlantic Shrimp Vessels in Relation to Proposed HAPC

Joint Deepwater Shrimp & Golden Crab AP Meeting
South Atlantic Fishery Management Council
Radisson Resort at the Port
Cape Canaveral, FL 32920

January 2008

Dr. Tom Jamir and Carlos Rivero

VMS Tracks for All Vessels

Key Deficiencies:

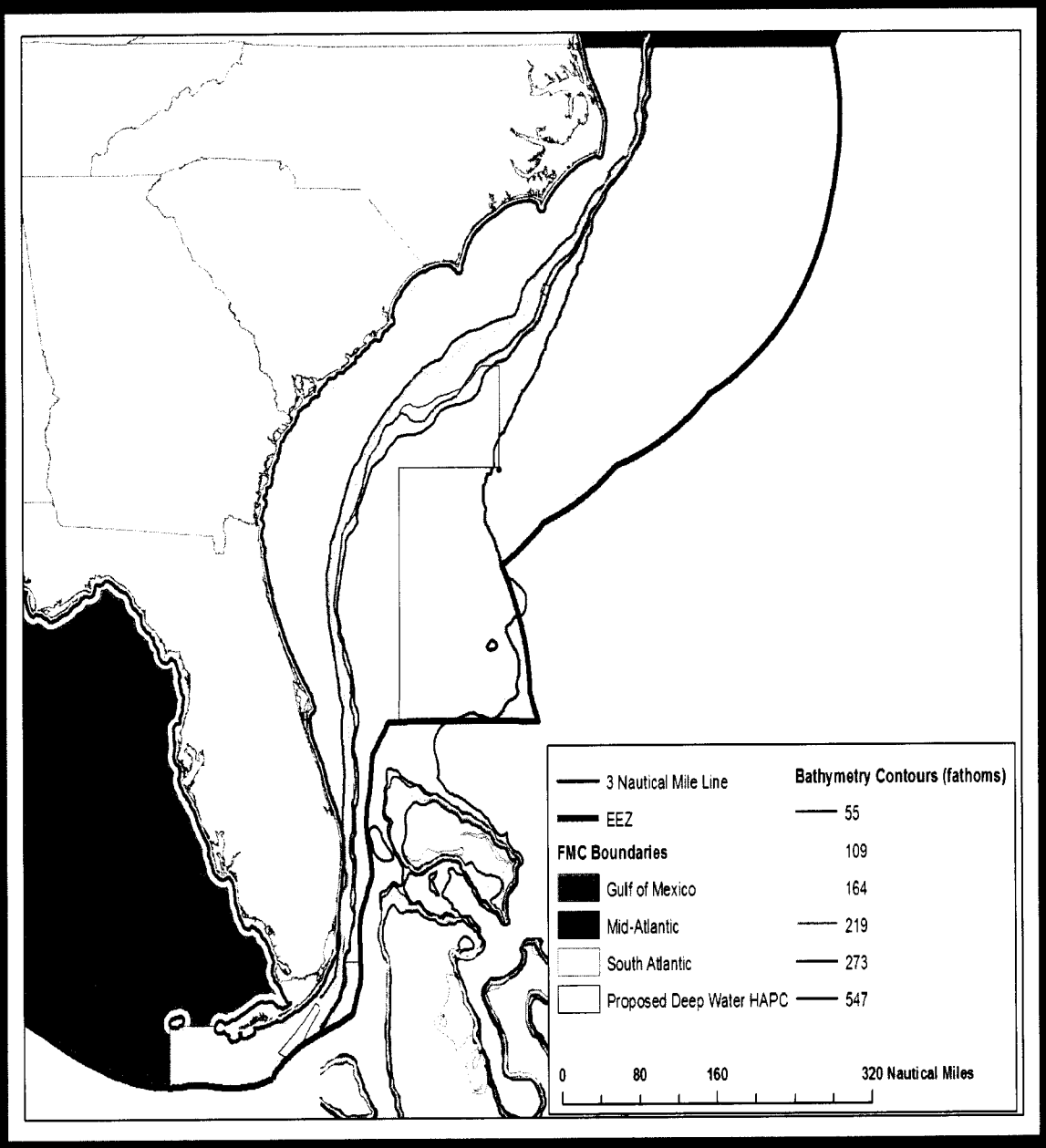
- VMS tracks overlap, muddling useful information
- Cannot discriminate fishing from non-fishing activities (e.g., transit, gear adjustments, drifting, etc.)
- Does not provide information useful to decision makers

What the Science Center Delivered:

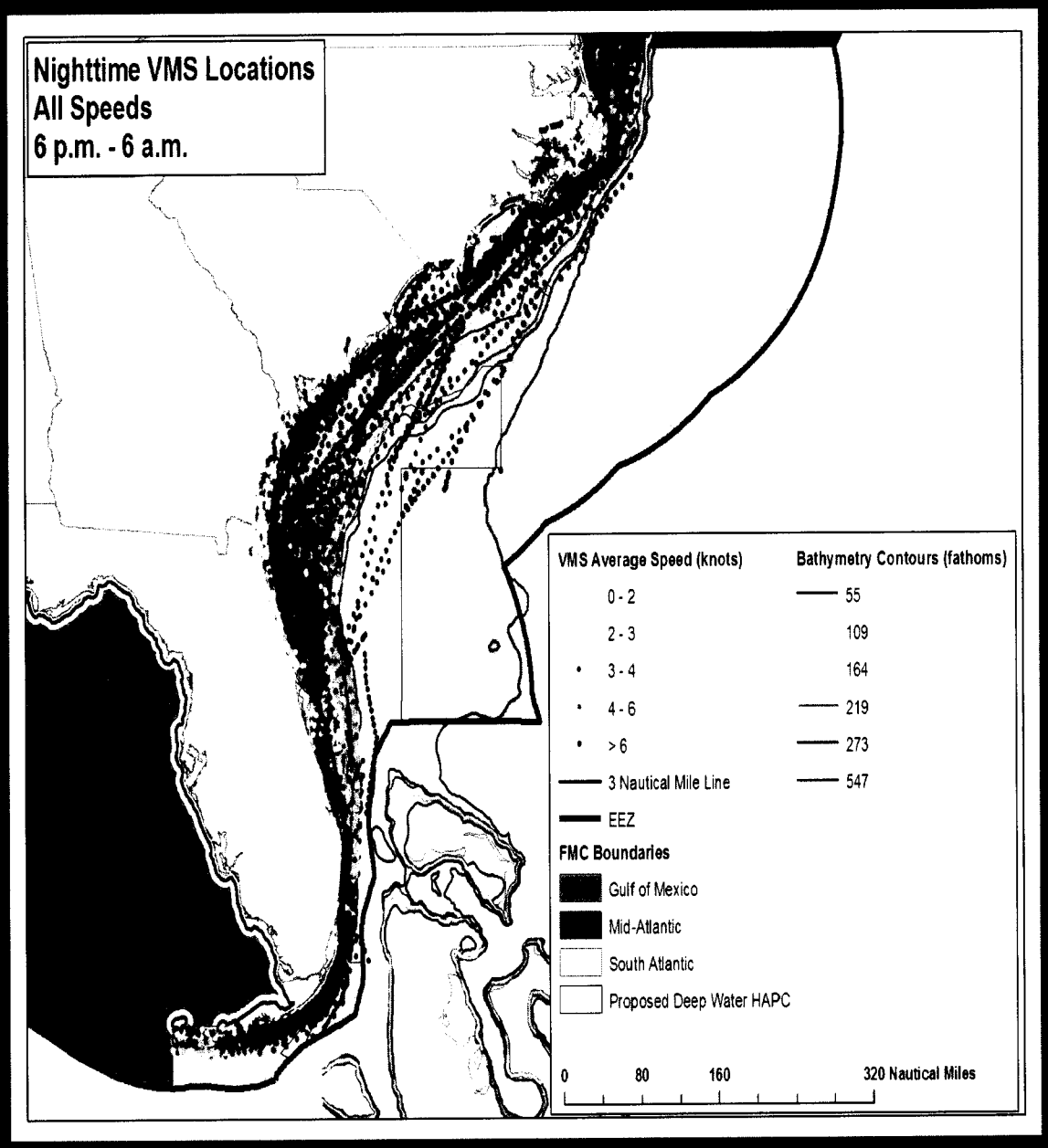
Developed Base Map & Templates:

- Screened for data errors & transferred into Microsoft Access Database format for ease & speed of querying.
- Compared & geo-synchronized base map with SAFMC & independent industry GIS maps.
- Incorporated bathymetric data & extracted best estimate of depth for each VMS point.
- Sorted probable fishing vs. other non-fishing activities based on vessel speed statistics.
- Incorporated boundaries of proposed HAPCs, EEZ/SAFMC & State waters.

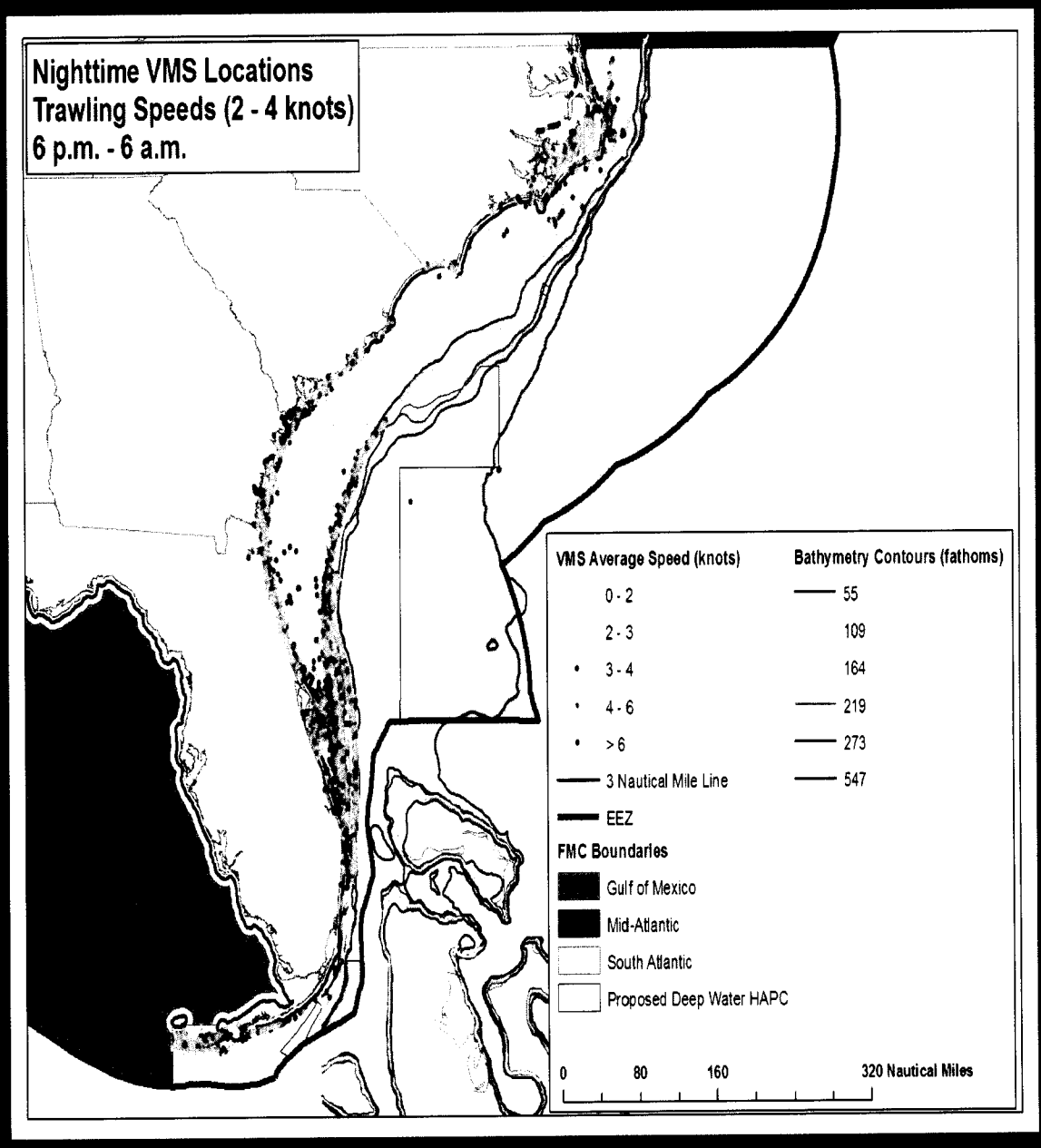
Base Map (with bathymetry & boundaries added)



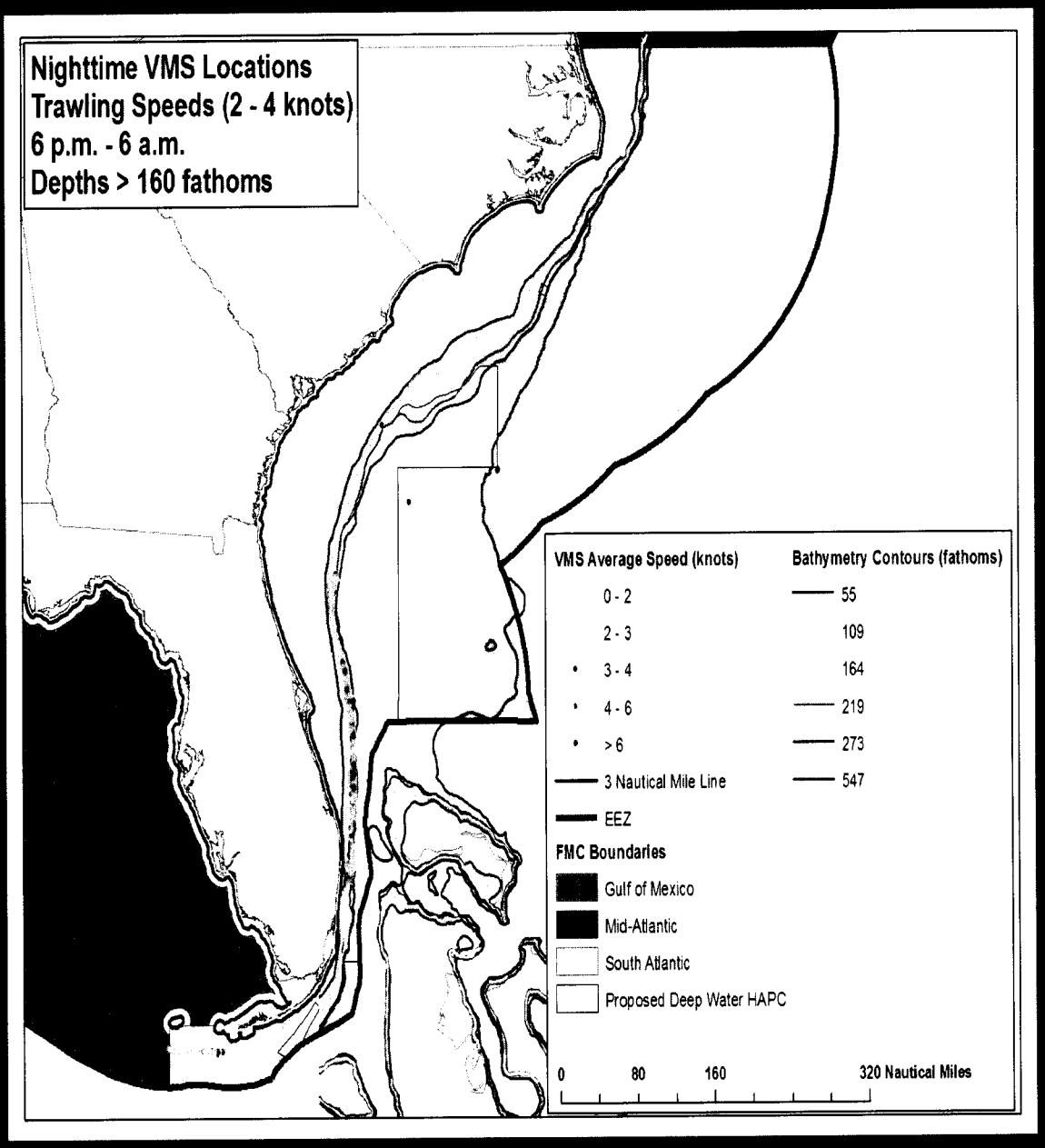
All Vessel VMS Tracks (nighttime, all speeds)



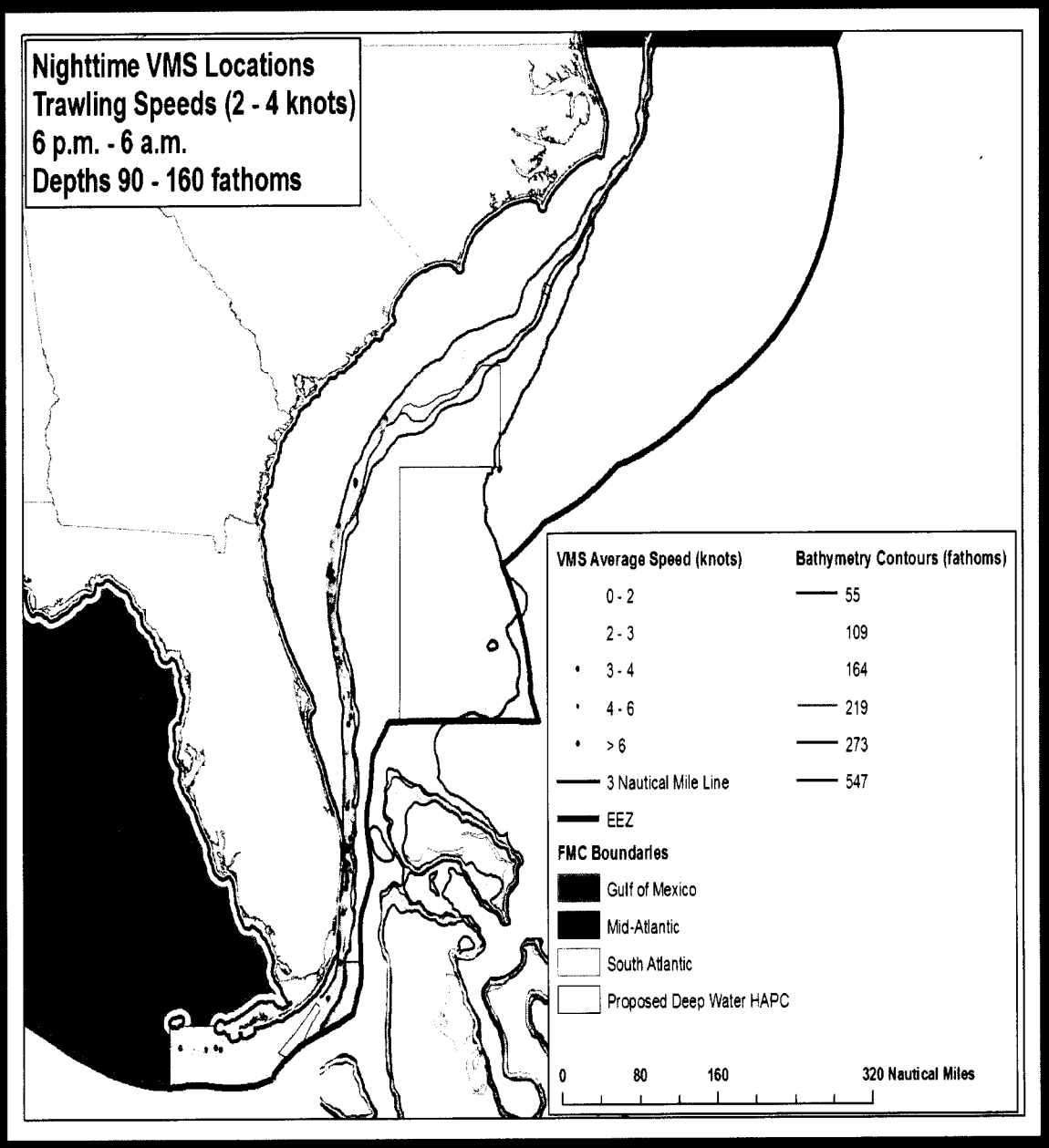
VMS Tracks (nighttime, 2-4 knot class, all depths)



VMS Tracks (nighttime, 2-4 knot class, >160 fms)

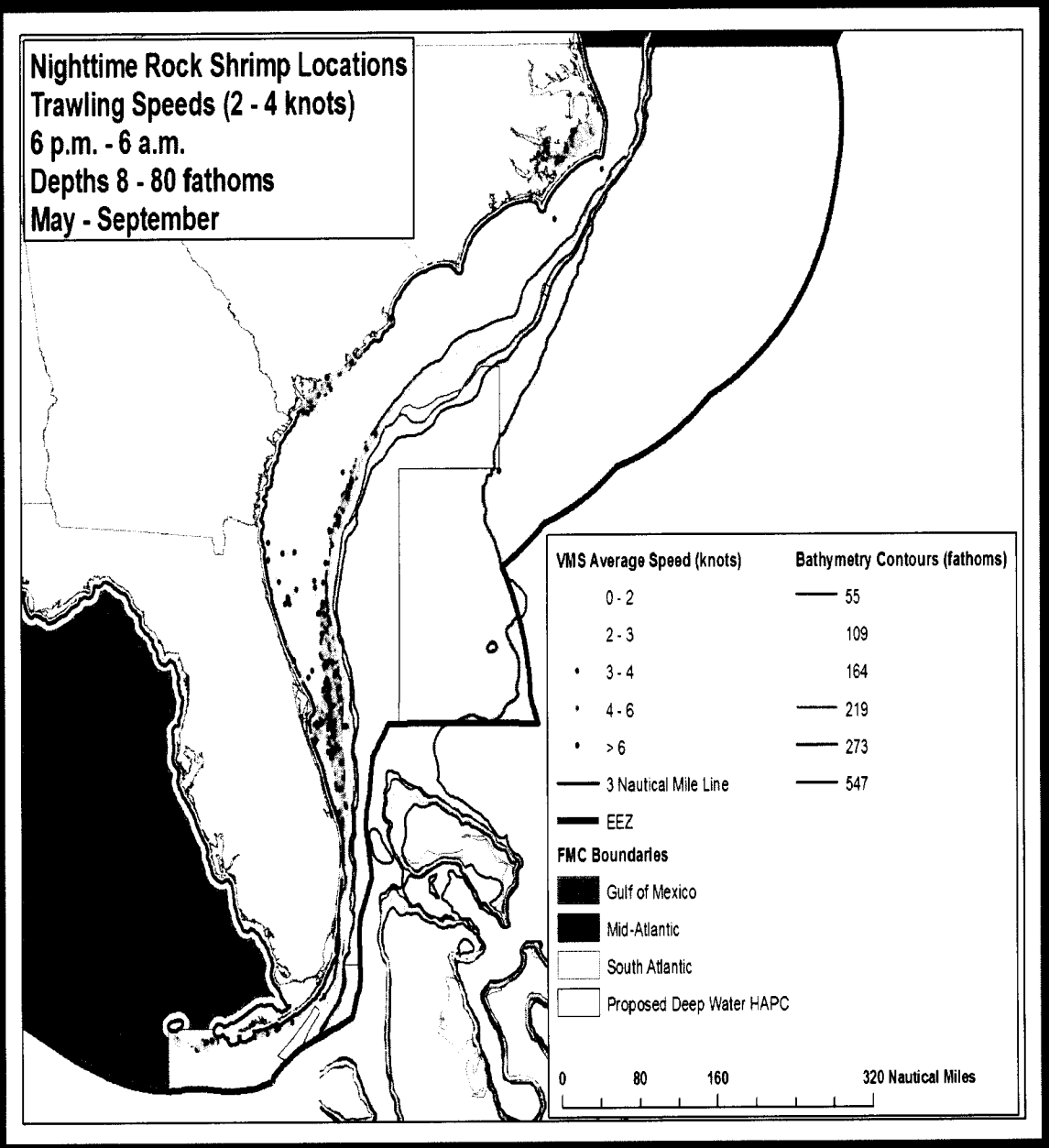


VMS Tracks (nighttime, 2-4 knot class, 90-160 fms)

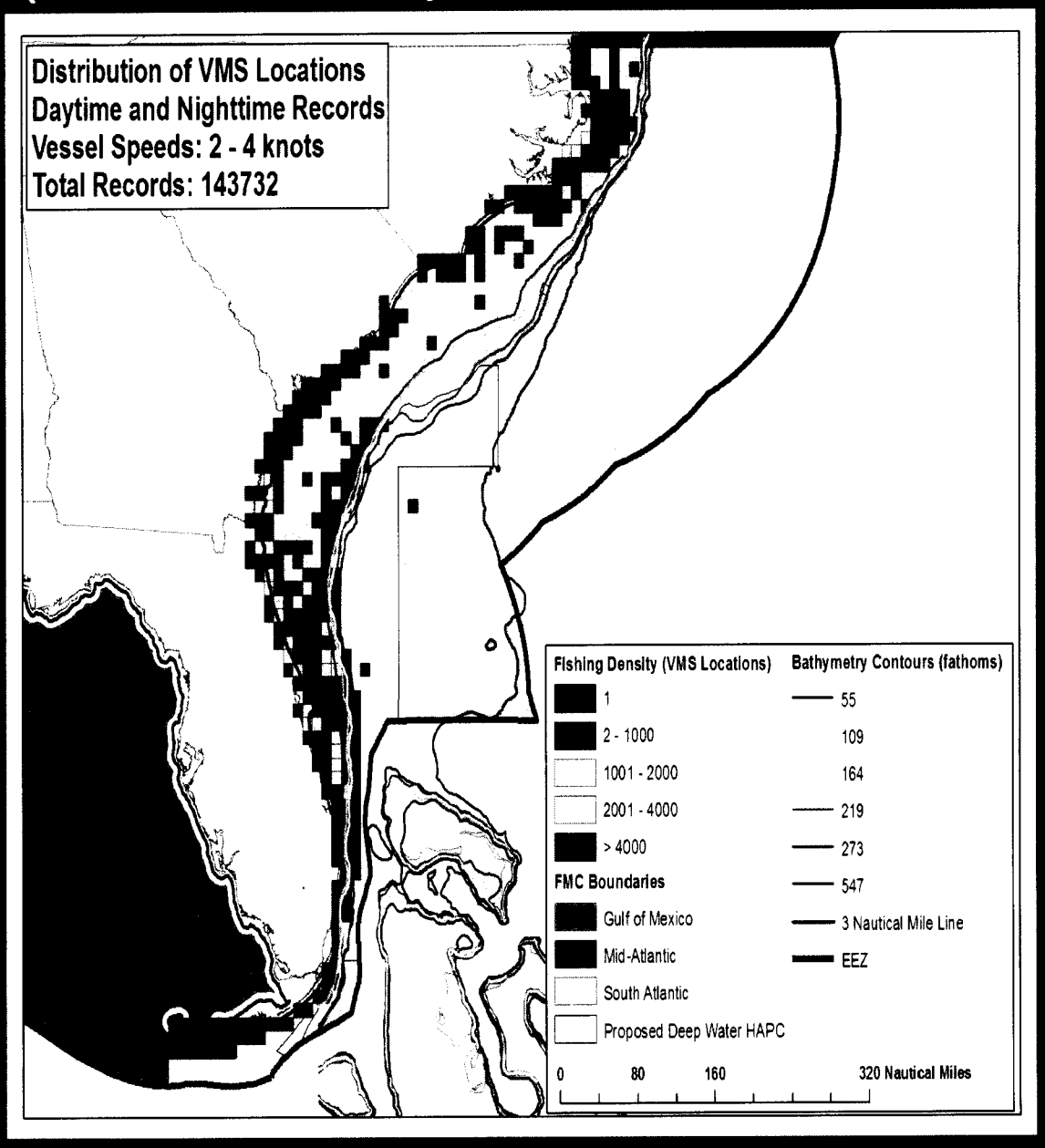


Probable Rock Shrimp VMS Tracks

(nighttime, 2-4 knot class, 8 - 80 fms, May-September season)



Shrimp Fishing Density Map
(2-4 knot class)



PLEASE SIGN IN

So that we will have a record of your attendance at each meeting and so that your name may be included in the minutes, we ask that you sign this sheet for the meeting shown below.

Joint Meeting Golden Crab and Deepwater Shrimp
Cape Canaveral, FL
Monday, January 28, 2008

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