U.S. DEPARTMENT OF COMMERCE

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 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

 (NOAA)

 HYDROGRAPHIC SERVICES REVIEW PANEL

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 PUBLIC MEETING

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 THURSDAY

 APRIL 5, 2018

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The Hydrographic Services Review Panel met at the Atton Brickell Hotel, 1500 SW 1st Ave, Miami, Florida, at 8:30 a.m., Joyce Miller, Chair, presiding.

MEMBERS PRESENT

JOYCE E. MILLER, HSRP Chair

EDWARD J. SAADE, HSRP Vice Chair

DR. LARRY ATKINSON

SEAN M. DUFFY, SR.

LINDSAY GEE

KIM HALL

EDWARD J. KELLY

CAROL LOCKHART

DR. DAVID MAUNE

CAPTAIN ANNE MCINTYRE

CAPTAIN (ret. USCG) ED PAGE

CAPTAIN SALVATORE RASSELLO

JULIE THOMAS

GARY THOMPSON

NON-VOTING MEMBERS

ANDY ARMSTRONG, Co-Director, NOAA/University

of New Hampshire Joint Hydrographic

Center

JULIANA BLACKWELL, Director, National

Geodetic Survey, NOS

RICH EDWING, Director, Center for

Operational Oceanographic Products and

Services, NOS

STAFF PRESENT

REAR ADMIRAL SHEP SMITH, HSRP Designated

Federal Official; Director, Office of

Coast Survey

DR. W. RUSSELL CALLENDER, Assistant

Administrator, NOS

MIKE ASLAKSEN, Chief, Remote Sensing

Division, NGS, NOS

GLENN BOLEDOVICH, Policy Director, NOS PCAD

CAPTAIN RICK BRENNAN, Chief, Hydrographic

Surveys Division

CAPTAIN JAMES CROCKER, OMAO

VIRGINIA DENTLER, NOS

CAPT ELIZABETH KRETOVIC, Deputy Hydrographer, OCS

RACHEL MEDLEY, Chief, Customer Affairs Branch

LYNNE MERSFELDER-LEWIS, HSRP Coordinator

JIM RICE, NOS PCAD

DENIS RIORDAN, NGS

KYLE WARD, OCS

ALSO PRESENT

DAVID ANDERTON, Assistant Director, Port

Everglades

DR. SAMANTHA DANCHUK, Science Coordinator,

Southeast Florida Climate Compact;

Assistant Director, Broward County

Environmental Protection and Growth

Management Department, Environmental

Planning and Community Resilience

Division

THE HONORABLE KRISTIN JACOBS, Florida House

of Representatives

THE HONORABLE CHIP LAMARCA, Broward County

Commission

JAMES F. MURLEY, Chief Resilience Officer,

Regulatory and Economic Resources

Department, Miami-Dade County

ANTHONY REYNES, Marine Program Leader, Miami

Forecast Office, National Weather

Service, NOAA

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 (8:39 a.m.)

CHAIR MILLER: Good morning. I call the second day session of the HSRP here in Miami to order. This morning, we'll be providing a short recap of yesterday's session, which was we had a panel on the disaster response and updates from our HSRP Navigation Services Team, Juliana Blackwell, Rich Edwing, and Admiral Smith.

I think first of all what I'm going to do is go around the room to ask HSRP members to make any comments on yesterday's session. Oh, before I do that, I forgot. Could we have any visitors, any people who are here in our audience introduce themselves very briefly? So any of our public members. Do we have a microphone?

So this is for members of the public who have joined us today. I think there are two folks in the back row?

MR. REYNES: Hello everyone, I'm Tony Reynes. I'm going to be one of your presenters later today representing the National Weather Service. So thank you for the invitation, and looking forward to the presentation.

MR. DELLINGER: My name is Dave Dellinger. I'm the Port Meteorological Officer for South Florida. I've been here for the entire event.

CHAIR MILLER: Okay, thank you very much.

 MS. PLAFF: Hi, I'm --

CHAIR MILLER: Oh, sorry.

MS. PLAFF: I'm Lacy Plaff. I'm with the U.S. Army Corps of Engineer in the Programs Division.

 CHAIR MILLER: Okay, thank you very much. Starting with Ed. This Ed. I'd like for folks to give any important issues from yesterday and also say what things you think have sort of bubbled to the top for our recommendation letter.

VICE CHAIR SAADE: Thanks, Joyce. Good morning, everyone. So first thing relative to the recommendation letter, with time constraints yesterday, we never really got a chance to thank everybody on that panel for the quality of the work that they performed.

And somehow, I think we should acknowledge all that they did in terms of maybe saving people's lives and certainly saving people's economic lives by being able to bring all those capabilities to both the areas here around Miami in Florida as well as Puerto Rico and even with Harvey in Houston.

So, some words to that effect I think are important. And I wish we could have said it to them while we were here, but we should find a way to do it directly to them as well. I can't remember which panel member talked about the promoting the idea of doing exercise and training, and I thought that was a really good idea, especially in the context that most the people around this table in their day jobs have to be involved with those types of things relative to terrorist activity and all that.

Obviously these hurricane events equally got to the level of impact of a terrorist event that all the different agencies are more than happy to get involved with and practice for. So I'd say we should advocate to that. And that's enough for right now for me. Thanks.

MS. BLACKWELL: Good morning. I'm Juliana Blackwell, the Director of the National Geodetic Survey.

The one I guess takeaway from the discussion yesterday about emergency response efforts and opening up the port was the different groups that were up there that were commenting on how they would like to continue to be a part of the planning and probably some of the exercises that are conducted that were discussed and how there's just an opportunity for the community itself to bring other players into that planning process and preparation process.

So I think the takeaway is not only for the community here but for the NOAA entities that are involved, is to make sure that we have the right people that are a part of the discussion and are part of those types of planning and simulations so that we can all do our best when we're called upon. Thank you.

CAPT ARMSTRONG: Good morning. I'm Andy Armstrong, Co-Director of the Joint Hydrographic Center. I was struck by several things yesterday. First of all, how complex the problem is in planning for and reacting to -- thank you. How complex and challenging it is to react to and respond to the kind of sequence of storms that occurred here that we heard about.

And first of all, how well the people did in responding, but how there remains plenty of room for improvement. So it seems like there were not enough survey teams, not enough vessels, not enough gear, not enough staff to respond as fast as we all would like.

I also was struck at the value of the NOAA ship being able to go into a place like Puerto Rico, self-contained, without needing shore support. And then I was impressed at really the dedication of everybody involved in the process.

MEMBER HALL: Hi, I'm Kim Hall, because I know we have not been identifying ourselves for the court reporter here today. I want to kind of reiterate what we've heard. I think part of what we heard though yesterday as well was the NOAA products that were available for both planning, during, and post, were very valuable. So, from the HSRP-related aspect of what we heard yesterday, we have a lot of things that maybe weren't, but very interesting.

I think that kind of validates all the work that we do and that NOAA does. That these are important things. Faster is always better for people who need to make the moves, but not necessarily always better for the safety of what's going on.

I think the key thing, and I'm probably stealing Anne's thunder, is leveraging public-private partnership. And I think as we peel back the onion about what the Acting Administrator has talked to us about, it will be interesting to see how that plays a part for HSRP.

And yes, exercises are very important. I think sometimes the private part gets forgotten in public-private partnerships. So I'm not sure for HSRP, but I think that's a good just kind of general, let's see what the private industry is doing and how you bring that to bear, especially for the services that NOAA provides related to hydrography. Thanks.

MEMBER DUFFY: Sean Duffy of the Big River Coalition, Louisiana Maritime Association. So yesterday, I was listening to the recovery efforts, and I had the pleasure of taking over the steamship Louisiana the Friday before Hurricane Katrina hit and went from being a very happy moment to oh, crap, my life will never be the same moment within a couple of days.

So you know, I thought about it yesterday, and I remember some of those times, the recovery from Hurricane Katrina, we had a model in place that we have communications through telephone calls and were set up. Well, in Katrina, all the phone systems were wiped out.

 I also like to remember the humor in it, and over one of those calls, when we did get connected back together, the Coast Guard had no backup servers, so we were communicating to the Coast Guard with a young female officer who had to share her private email address that was tigerlilly965@yahoo.com.

And that is how we communicated with the Coast Guard. Of course, we learned a lot of lessons then, but I guess my point is the number of events that we've gone through with each hurricane, tropical storm system, the Deepwater Horizon event, a Tintomara collision. Each one of those, those are three events that really demanded a great deal of us to recover from, and they were all very different, and the response was very different.

But having those calls and communications with each one starts off with the Weather Service, giving an update on what's expected with the weather system, whether it's a high-water hurricane event, low-water event, the oil spill, a lot of the modeling of where the flows were expected to go was very critical in each one of those events.

But because each event is so different, the response is different, and the demands and the needs are completely different. But having the right people engaged and involved. And one thing that I can say is that through all those life was very different type events, we all came together and even competitors would send fuel to their competition if that's what they needed to get things going to recover.

A lot of assets deployment done through that model. So, I don't know what the next life-changing event for us will be, but I have faith that there will be another one coming and that we will try to get through it through that same game plan. Thank you.

MEMBER THOMPSON: Gary Thompson, North Carolina Geodetic Survey and North Carolina Emergency Management. Two areas yesterday. Exercises. I think they're very critical. We just completed a state-wide exercise in North Carolina and just received the kind of After Action Report.

So I think exercises are very, very critical to prepare yourself for any type of disaster, especially when you include your partners in the events. It helps you find out where you have weaknesses, not only in communication, but in procedures. I was glad to hear that yesterday about the exercises.

The other area was information about gauges. Many areas are installing gauges. We in North Carolina have a network that continues to grow, and it's very important to hear information about the latest technology that we can use. Thanks.

MEMBER LOCKHART: So I'm going to reiterate what Andy said about having the NOAA ship being able to go down to Puerto Rico and operate there. I think as people that run private businesses, when we look at hurricane response, it's really easy for us to stand up and say, oh, we can get a small boat into port. There's companies all over that have these small boats in ports.

And while that may be true, there is also a role for these larger ships that would be really hard to contract otherwise. So I think it's important to remember that there's a lot of different assets out there, and some of those are going to be government assets that can be replaced. So the fleet recapitalization is still really important.

MEMBER THOMAS: Julie Thomas with Scripps and Ocean Observing Systems. I was just going to make a comment, because I was thinking last night on this precision navigation and going forward, that the topics that we might address. And to me, that has been a real fun project to work on with LA-Long Beach just because it has highlighted the public-private partnerships, public being both NOAA and the Army Corps and private, many, many partners in industry.

And it's really taken us three and a half years there before the industry had the confidence in what we were doing as the public sector to use our data, our models, observations, et cetera. And I think that there is a big lesson there learned as far as how do we build up confidence with the industry that we can provide the accurate data and models that are necessary.

So it kind of ties in to what Rick said this morning. There was a lot of model validation. It's still going on. We still don't have a perfect system there by any means. But I just wanted to highlight the effort that's gone on behind that, because I think that that does tie in to lots of the topics that this FACA could address. Thanks.

MEMBER KELLY: Good morning. Ed Kelly, Maritime Association of the Ports of New York and New Jersey. The disaster response was quite interesting, and this is the first port I've ever come across where there seems to be an almost aggressive or intentional exclusion of the actual private industries from this whole thing.

That's, quite frankly, amazing to me. In our port, we grossly outnumber the public people with local expertise, et cetera. But that's not an HSRP problem, that's something to be addressed here locally.

What did drive is that once again, it came to the forefront, as experienced with everybody that's had a disaster, that the most critical component of preparation, response, and recovery are NOAA services and products. And we've heard that consistently every place we've been.

And I think we have to find ways to better engage for NOAA to probably, especially down here, engage with private organizations. We've seen all these cruise ships and headquarter operations with big ships, big concerns, massive economic impact with people, airports, hotels, provisions, etcetera, etcetera. And deep pockets, quite frankly, that could probably help to make this a much better response capability. And I think that's something we need to look at.

 One other thing that we heard here again, as we've heard in quite a few other locations, is running aground in the channel. We all kind of chuckle, we all say, yeah, that's an issue. We all kind of go, well, we're a little bit this and the Corps is a little bit that. And quite frankly, I think it's time we really found a way to address that.

 The whole concept of secondary channels, recreational boating, and reliability of charts and data is beyond just anecdotal at this point.

We've heard it in Charleston, we've heard it every place we go, and every place we go, we've heard about the expansion of recreational boating and the fact that those projects, for whatever reason, either with the Corps, NOAA, whatever, just never quite make it to where we're really going to address that, and I think that's a situation that has to be addressed and resolved.

MEMBER RASSELLO: Good morning. Captain Rassello, Nautical Director, Carnival Cruise Line. What I hear around the room is a common denominator, which is better communication, better stakeholder engagement among the relevant agencies and private sectors when we are talking about port recovery.

Each port act and react differently, each sector act and react differently. But at the end, the ports are important for the U.S. economy. And the faster they get going, the better it is for everybody.

To say faster and safe, they are not going along very well. So there should be a model structure in place to make sure that the survey is done in the due time and done well, even involving private sectors if it is necessary.

What we learn? We learn a lot from hurricanes. Every year, every year it is coming, every year we learn. And I think what we learned, especially in Florida last year, is better stakeholder engagement is necessary to planning.

And this is a very cost-effective effort, I think. It's not going to cost a lot to sit down and discuss and plan for what will be before to prepare and after to respond to open the port. And that's all I have to say. Thank you.

MEMBER PAGE: Ed Page from the Marine Exchange of Alaska. Now my microphone's on. I guess I learned that I'm sure glad I live in Alaska and don't have all these hurricanes. We're in a nice, safe, quiet place up there.

But I'm really still learning as far as, even though I started my maritime career 50 years ago, and NOAA's been part of that, I've always had a respect for NOAA and worked closely with NOAA all those years.

I guess I never had appreciation until I've been down here as far as the portfolio and impacts and this term of blue economy and then keeping ports open in a hurricane or whatever. So I've really been impressed as far as all the agencies get weighed in on that one.

But certainly NOAA was critical, that if NOAA didn't fulfill their function, and the other agencies, the Coast Guard, as many services, capable as they have, they don't have that capability and what have you.

So I think that you look around, and that's my background largely is Coast Guard, and so when you look around, you realize the impact of NOAA and look at the mission: science, service, and stewardship. And I'm just really getting an education of what your extensive portfolio is and trying to figure out where can, many of us are users of NOAA services, and how can we help identify areas that NOAA can weigh in and even further enhance their role or their mission, if you will, and also get the support they need from the administration and others to continue to do what they're doing.

So I guess what I've really learned over yesterday when I watched all those speakers talk about how everybody addressed these hurricanes and got this port running again, as I walked last night, again, looked at the port and how relatively small it is, but how impactful it is and how impactful NOAA is, that's what I'm really kind of appreciating from yesterday, and the last couple of days for that matter, is NOAA's role, and then trying to figure out what our role in HSRP to help NOAA succeed.

MEMBER MCINTYRE: Anne McIntyre, Columbia River Pilots. Yesterday, I thought we heard a lot of interesting information about again, disaster planning and also disaster response.

And what I took out of it is that you know, NOAA plays an important role in supporting the mission, but much of what I heard wasn't necessarily I think related to NOAA's primary mission, and I think that it's important as HSRP for us to focus on how NOAA can help in those efforts.

And so it seemed to me that the two important parts that I took away from that was timely surveys and perhaps there might be an opportunity to leverage some private assets to be able to respond to that more quickly.

And that the aerial mapping or, kind of, post-hurricane analysis of what the situation was on the ground was important. But I think more so than any of that is that it seems like those activities add to the pile of what NOAA has to respond to, and I think when we do the letter, as far as NOAA supporting FEMA's mission, or NOAA supporting the Coast Guard's mission, that it is important for us to make sure that NOAA is properly compensated for those activities, and that our core mission isn't impacted negatively by the response missions and the support mission.

I was also excited to hear that Secretary Ross had mentioned the precision navigation, and I think that it's important that we support that and mention that in our letter. And then again, I was just interested to hear more about the blue economy.

 And I think as we move forward to planning the Juneau meeting, it's easy really to get focused on regional needs and what's happening regionally, and that's a big part of why we go to all these different ports. But I don't think we should lose sight of kind of the big issues that provide continuity between what we do.

MEMBER GEE: Lindsey Gee, Ocean Exploration Trust. I think Anne might have read some of my notes. I think from the panel yesterday, I was very impressed, as always, in any disaster, and having been involved in some of those elsewhere, it does end up on the people. And I think they did an impressive job.

But it does also expose, I think, some of the areas where you can always do better. We've discussed about the coordination and the way with the Corps of Engineers and NOAA and the activities, and I think that's essential we're addressing that elsewhere, we've expressed that. But I think in a disaster, it kind of highlights it more and it puts it under pressure.

So I didn't get the feeling that -- and then there was the comment from the pilot, and I agree, and I said it yesterday, I think the private resources could be -- it appeared to be used better. I'm not quite sure why there was the request from the pilots to say they need to fit their boats out. That's a response from his perspective. I don't necessarily agree with that, but having more assets would be the thing.

But one of the concerns I had, and we didn't have the chance to have the discussion, was how that's coordinated and who really coordinates it? And it seems that with the airborne assets and the remote sensing that was done is fantastic. You applied a particular use of normally for coastal, the shoreline mapping, to a specific different task.

Well, you know, in opening a port, someone's got to take charge of that, I think, and it seems like NOAA has the expertise to work for whether it's -- I didn't get the feeling of how that was being coordinated, and I think as I say, in a disaster, people do their best, and they do a great job, and the job gets done.

But the communications and how it could be done better I think would be if someone was responsible working directly for the Captain of the Port. And I think that's where NOAA could play a really great role to coordinate that and bring the assets in.

One of the other things is like, okay, because I think from our role in that, I would support something like that, and I think it goes, and then they can coordinate use of private assets, Corps of Engineers, whatever it is here in your own resources. But of course, this needs funding. And so I would also say that I wouldn't want to see -- that should come from an area with disaster coordination, if that's FEMA or whatever.

So I would support NOAA looking to do that, because I would hate to see money that's used for general, all the other priorities of operational mapping, to be taken away, and those priorities lost because of the mapping. So yeah, I think NOAA plays a key role.

We saw that, I think, but it could -- the coordination and the communication could be much better done with the goal of getting those ports opened as quickly as -- and that's one of the things that I think was evident, that people kind of think, well, yeah, we can get the port opened quick, and let's do a survey, you know, while it's like they need to know how long that takes.

And it's like, in a way, the fact that the port didn't have any major obstructions, and it probably worked against now some of -- it's probably providing some of the criticism, right? That whether there's something there or not, you still have to clear it. And so if there was something there, maybe the criticism would be less.

But I think that in the timing, it's -- if there's nothing there, you still have to clear it. So I think that certainly I would support NOAA being a real coordinator in that and taking a role that would -- but it needs funding, so how that is pursued. Thank you.

MEMBER ATKINSON: Thank you. My brain keeps going back to seeing a 1,000-foot ship crab its way across a current and try and get into a rocky channel. So it kind of feeds off what Julie mentioned.

And talking to people, and actually the reason I wasn't in the room this morning is I was talking to Tony Reynes about the needs for observations in the Gulf Stream off here. So there may be an emerging topic just about how PORTS-type systems are going to be asked to provide more information like they are off here.

 And we were talking about buoys in the Gulf Stream and things. So this may be occurring in every port in one way or another off Long Beach and what's going on there with the swell conditions and here with the Gulf Stream and coastal currents and up off the other ports in the U.S. So we may want to look at just what those requirements are going to be, and a lot of them aren't going to be cheap solutions.

So I'd just like to see us go down that path a little bit more, and I think we can quite easily. Oh, and we have a great panel coming up after the break, so I want you all to be here, and you'll hear more about some of these requirements.

MEMBER MAUNE: I'm Dave Maune from Dewberry Engineers. You may not know that Dewberry is a major FEMA contractor for disaster response in three primary areas. Individual assistance. How do we get out there to do damage assessments on individuals' homes to help homeowners get insurance claims and get assistance?

And after Hurricane Katrina in 2005, we deployed 3,000 building inspectors from a firm that only has 2,000 employees. So that was kind of interesting, because we have on-call building inspectors with computers and stuff trained to go out and do that sort of thing. But it took time to do that.

We have engineers that specialize in public assistance to help get water supply systems and things back online that were knocked out, and we specialize in debris removal by estimating how much debris needs to be removed, because these local communities have to get firms under contract, and they want to know how much debris is it that we're supposed to remove. And that is a major cost of disaster response.

Sean may be the only person that ever heard of Hurricane Pam. Does that mean anything to you? Hurricane Pam? Has anybody else heard of Hurricane Pam? I doubt it. That was in 2004, FEMA had an exercise on Hurricane Pam. It was a theoretical hurricane that might exist if a Level 5 hurricane were to hit New Orleans.

And it happened a year later, almost a year to the date, from when that exercise was conducted. And became FEMA had done that exercise, they were better prepared than they otherwise would have had, yet they fell pretty flat. When people look back at it, they still consider it a disaster that FEMA didn't do their job very well.

And so what happened between 2005 and now is that I know in the case of individual assistance and damage assessment, we are now using more remote sensing techniques, and we're using some of the products that Mike Aslaksen and Juliana Blackwell produce to help us in expediting those damage assessments.

If you notice, after a hurricane hits, it will not be very long before somebody will say, this hurricane did so many billion dollars' worth of damage. Where does that number come from? It comes from some analyst who analyzed remote sensing data to try to determine how many buildings were damaged, how badly were they damaged, what's the value of those buildings in the damage zone, and having mathematical models in place so that the President and others can get some idea of how much work it will take to recover from this disaster.

So I really appreciated all these people talking today. Whatever problems we had this past year, they were probably less than the problems we had in prior years because each one of these disasters gives us lessons learned, and then as we go through exercises, we try to fix the problems that we had previously so that they don't recur in the future. That's the common theme in all these exercises.

So when the gentleman from Carnival Lines yesterday recommended that there be exercises, I was getting the impression that he was not a part of those kinds of exercises in the past and needed to be, and that's certainly a good suggestion that came to me out of this whole thing. Thank you.

MR. EDWING: Rich Edwing, Director of CO-OPS. So, two comments. With respect to the panel yesterday, I think people have covered pretty much all the observations from that. But the thing I heard yesterday, and I've heard before, is always the most cogent statement I hear, is if you're trying to figure out who to call and how to get a hold of them and what you need during the event, it's way too late.

You have to have that all figured out in advance. And perhaps even more importantly, have your relationship established with that person. That's where the drills come in like Gary's talked about just done in North Carolina and being conducted in other places. So it's always, to me, the most powerful statement I hear people make in terms of being prepared.

The other area is more broad. I mean, I'll pull a thread that Juliana and Larry talked about, and that's the models. I am really excited to hear about how much models have become a part of the discussion at the panel and in other places.

We first started doing modeling in NOS in 2003 when we had some models transferred to us from the Great Lakes Environmental Research Laboratory and Ohio State University for the Great Lakes. There's been a number of paradigm shifts in the modeling program as we've developed it, but it's really been only the last few years where I've heard people actually using the models and wanting more models and better models.

The first models were not very good. People tried them, and they walked away from them, because they weren't very good, understandably so. But we are now at the point where they are good, and these are really the future. We're always going to need observations, but it's really going to be the models that are the main delivery system, I think, as we move forward. So I'm really excited about that. Thank you.

DR. CALLENDER: Russell Callender, National Ocean Service. Well, since I'm the guy that's probably the closest to the Admiral, Admiral Gallaudet, I guess what struck me is he laid out very briefly and not in a lot of detail this idea about the blue economy, and I think there's three areas that he has been talking about that are directly relevant to this panel, and also directly relevant to the conversations we heard yesterday.

And that's absolutely the value of maritime commerce. And we all clearly get that. That's kind of the easy one for this panel. Secondly, recreation and tourism. You know, Ed, you were talking about the connections to the recreational boating community and the challenges that they have. And so there was a lot of discussion on the first day about that.

And finally, the preparedness and the risk reduction priority. And clearly, we heard a lot about that yesterday. And one of the things that struck me is that NOAA is an enabler of many different agencies, the Army Corps, Coast Guard, FEMA, enabler of ports, enabler and supporter of the private sector. So I think that was -- we don't own it, but we enable a lot of that work.

I thought what we heard a lot of tidbits, too, yesterday of how we, the NOAA we, can do better in terms of our products and services and our engagement with the community, ideas around the value of the NRTs or bringing these MIST systems in and training other folks to use them. And I think pulling that thread from this panel I think would be a pretty good thing to do.

And finally, just a plug, if you will. We've got a training facility, the Disaster Response Center, in Mobile that really is set up to train groups, not just NOAA but inter-agency groups and also do exercises.

So, training is great, exercises are better because then you can really see what you need to train on again. So I think some suggestions and thought about the value of training and exercises might give us some synergies with this DRC down in Mobile. Thank you.

RDML SMITH: Thank you to all of you. I took a lot of notes, both today and yesterday on a lot of things that I want to follow up on to try to figure out how to take the germ of a good idea and turn it into reality. And I particularly have a lot of things to talk to Captain Crocker about about NRT, some really great NRT lessons learned, some of which we captured before, and some of which came out here as a result of both your observations and the panelists' observations.

So I'm excited about that. I'm looking at my watch thinking about how soon June 1st is, as far as our ability to put some of these improvements in place before the next hurricane season. But we'll get at least the skeleton of it in place.

I'm also a big fan of exercises. I think particularly sort of when we can even just table-top it, don't even worry about the equipment or anything, how would this really work, and how do you think about this and what would we do in this type of approach, and what could we bring to the table if we need more people or what really is the timeline for getting these things done. I think we could do a lot of value. I hadn't even thought of the DRC. That's a really great idea.

The running aground in the channel, that very problem is really what inspired a lot of the National Charting Plan changes for larger-scale charts.

It's not that we don't know that that shoal is there. In a lot of cases, we have the survey. It's just that on the paper chart, it's two pixels wide, right? We just simply don't have the room to show what we know. And with larger-scale charts and more sort of modern ways that we can disseminate those quickly, a lot of those limitations of the paper chart system have now gone away. But we haven't fully internalized all of the new value that we can recognize from that.

We're pushing ahead on that as fast as we can, some of which is just getting our act together to know exactly what needs to be done, but we certainly expect to scale it with contract aggressively as resources are available and we can industrialize some of these processes of improving these charts.

Again, I don't want to repeat everything that you all said, but thank you very much.

CHAIR MILLER: Thank you, everyone. Just I want to highlight one or two things that I didn't hear. I think it was the Coast Guard captain who said the Nav Managers was the most valuable player in the whole thing.

And we have heard that again and again. And the role of the Navigation Managers, I don't know how you estimate value for dollar, but every time we've heard about a disaster, the Nav Managers were really a key player in all of this disaster response.

The other thing I'd like to say is the LA-Long Beach model, where a major corporation has taken lead in a lot of the precision nav. That's a model that was developed, and as everyone points out, every port is different. But if we've got working models like the oil company's in LA-Long Beach, how can we help to kind of move that model to some place like Miami where the cruise ships are the -- and very honestly, those companies have very deep pockets, and what to NOAA might be an insurmountable money problem to those companies, it's chump change, really.

I mean, yeah. Yeah.

MEMBER RASSELLO: Hi, this is Sal again. The port itself should have a fund dedicated to post-recovery. Why not? They are absent, I am sorry to say.

CHAIR MILLER: All right, I think NOAA can help and the NAV managers can help in saying we have a model here in LA-Long Beach. Let's see how that model could be modified to help the Port of Miami. Okay, we're behind time, as usual. Admiral Smith, do you have anything else you'd like to add at this point?

RDML SMITH: I do not.

CHAIR MILLER: Okay. I will turn it over to Ed Saade and Lindsay Gee who are co-chairs of our Technology Working Group, and they will report out on their progress so far and future plans.

VICE CHAIR SAADE: Okay, thanks. This is Ed. And Lindsay might as well get online.

MEMBER GEE: And this is Lindsay.

VICE CHAIR SAADE: Okay. So we set this up as a review of what's been going on in the last six months, and also to kind of stimulate a little bit of conversation on where we should go in the future.

So, we're going to review what's been going on since New Hampshire, technology related and input on issue papers, a couple of topics for the next five months. We'll start the discussion with the potential collaboration between ourselves and the Science Advisory Board as was suggested in the letter that was sent around. And, again, any ideas and topics and comments for the future, or pet projects, you name it. So, why don't you take this slide, Lindsay?

MEMBER GEE: So this is really just a review of what we did during that time. And there were three meetings that are down in the bottom, but we also got updates from OCS about the Autonomous Strategy that E.J. presented to us and the National Charting Plan.

I think we'd ask Admiral Smith if he's got any comments just now about any current updates just on the Autonomous Strategy, how you're progressing with that?

RDML SMITH: We are moving through the sort of steps that we outlined in there. First, one of which for this year was the conversion of some of our existing platforms to optionally manned so that we can help industry provide a use case for what collision avoidance really looks like in a hydrographic context and what sort of feedback mechanisms we need between the mission execution and the operation of the vessel.

We don't have any doubts about the ability of little yellow boats to drive themselves around on autopilot, right? Most of them don't have a convincing way of not hurting themselves while they're out there or running into things. So we need to help mature that.

And I'm not aware really of any that have a mature way of actually doing hydrography, right? If you were to give a mission to a launch crew to go out for the day, go investigate these things, if you find them, get the lease depth and move on. You can't give that sort of instruction to an unmanned vessel. You have to give it a bunch of lines and then you monitor it remotely. So we're trying to get to the point where we actually can recognize real value in increasing the number of platforms and reducing the number of people, and it's going to take a while.

I did go both to Oceanology, among others, and to the Canadian Hydrographic Conference. And, as usual, this is a very fast-moving field, and there were some significant new developments and some very interesting new hull forms for unmanned vessels that are less adapted from what a survey launch used to look like with people in it to something thought through from the beginning to be an unmanned system.

And those are pretty exciting developments that I would like to figure out a way to keep our program nimble enough to be able to engage with the cutting edge as it evolves. I'm really leery about the sort of usual big government impulse to create a program of record, you know, that has requirements that take three years to develop, a contracting process that takes three years to get through, and then, you know, a delivery cycle that takes three years to get through. And then you train and get people on the water with it, and pretty soon, a decade has gone by and we don't want what we just now have delivered.

We need to be able to get from what's available cutting edge to getting it in the water and getting it in use within a year. And that's not the way that the government contracting is normally set up, and certainly not the way DoD contracting is set up. And so we're really trying to push the boundaries and figure out how to retain that nimbleness, with the goal of helping to mature this technology so that it gets to the point where we can take it to scale.

So that's the heart of our strategy with the hydrographic program. I think many people overestimate how mature this technology is for this type of field. And if you all, like me, see the technological work that needs to be done, that would be helpful to help keep reflecting both the potential -- we're very optimistic about this -- but also a certain sobriety about where we are so that it doesn't just look like we're behind.

You know, if you guys would just move forward, you'd get rid of all your people and just use these robots instead. That's not where we are. And it's sometimes unhelpful to hear that description of us.

I'd be happy to take any questions or --

MEMBER GEE: I would comment, I agree. I think from a technology point of view is what the panel -- you're right, t's an evolving technology. These are not products yet. They're projects as we move forward. And as an example of the contribution of industry, NOAA's work already to industry, as I think you're aware, Damian Manda, who was a CCOM master's student, we see his work of the auto-following and planning of surveys is already in use in products and around the world.

So I think those little steps that NOAA does and the support of all those little things that get done have a big impact on industry, and we would certainly encourage. And, yes, you're not buying a ship that's a mature technology. This is definitely something that's evolving, and you need to have, I think, that acquisition process in place for OCS to be able to continue to do that.

VICE CHAIR SAADE: I was just going to comment on what you said, Admiral, that within our company I'm a big advocate of "don't buy anything," because it's changing so rapidly that anything you buy is going to be almost obsolete within a year, and certainly within two years. And that's a really interesting point.

And I'm going to take it back, because it's a big battle within our own company about people wanting to jump in all the way and start to put the fleet out there, and then all of a sudden there's a much better mousetrap coming around the corner and much more efficient.

RDML SMITH: Yeah, I think that's a great point. And if I were running a private business, I think I would probably not buy anything. But I think there is -- if nobody buys anything, though, then nobody's going to develop anything, right? And so I think there is a role for government here to periodically buy things to keep the pump primed, even if we don't really think that it's going to have a ten-year deployment cycle before it reaches technological obsolescence.

That buying things, using them, getting those lessons learned, honing the requirements, and develop, you know, providing the use cases for the next generation of technological investment is still a role to do. And it make look silly and wasteful to just buy a little bit now and again, but actually I think it's really strategic and smart and a way to help mature the industry.

And, to Lindsay's point as well, I think that's a really great point on the investment and the Damian Manda technology. The other thing that we're trying to do simultaneously is bring our people along. And the training program that USM runs with some investment from us annually on just bringing another dozen people or so into a higher level of expertise with operation and sort of understanding of unmanned systems will give us the foundation that we need once we start to be able to take these things to scale.

MEMBER GEE: Thanks, Admiral. Yeah, just as I'm aware -- I'd love to discuss this all day, but I'm aware of the panel that's following. I'd like to move this on. Can you just move to the next slide, please? Thanks.

Yeah, I was going to go through the individual ones that are on the next slide. So we heard -- Mike gave us a briefing on part of the technology panel. It was a precursor to what we've heard here, so I don't think we need to address that again. It was certainly the application of the remote sensing technology normal for one use was provided for the disaster relief, which we've heard. So, next one, thanks.

I do just briefly ask Rick if he could just give us an update at the stage. We had, for the bathymetric model, E.J. and Patrick had given us a presentation, but if Rick could also just give a brief update, it'd be great.

CAPT BRENNAN: So we started this. The Admiral talked about doing the chart re-scheming. We're now calling this the National Bathymetric Source. We've been doing this since Admiral Smith did his thesis. And no name ever stuck to the project. So, you know, we have a knack for coming up with creative acronyms, so we said, well, let's come up with this, and when we called it the BOMB, everybody freaked out about that. So it spurred us to a new name, which was the National Bathymetric Source.

So that's what we're calling it today. But the idea is that, in order to build out those new charts, you can't just draw a box around the existing data and expect it to miraculously become higher resolution. You need to have the source data from whence it was extracted. So that's really what this is about, is doing that.

So we're building this out mirrored by the Mapping and Charting Division's production branches. So we're currently building out Production Branch C, which is New England, and it goes from around Sandy Hook, New Jersey, to the Canadian border.

And within that area, there is a prototype test area which are those four squares there, those chart cells, those proposed chart cells that are right around the Port of New York that are being built out. So that's where the team is currently focusing their efforts on.

If we do this correctly, we will include in the National Bathymetric Source basically every stitch of bathymetry that is currently housed at NCEI, which includes all of our own bathymetry that we've acquired over the last 200 years, as well as all the crowdsourced data and all of the other external-source data that's been added there.

So that's currently what we're working at doing. In addition to that, the intent is that's also where all the Army Corps data would go. So, currently, all Army Corps data goes directly to the chart, and with varying degrees of supersession applied to that, because it's not done in the context of the other bathymetry that's known in the area.

So what we're hoping is that this will provide a more methodical and algorithmic way of taking the Corps of Engineers' data, applying it in, and then being able to provide better products than what there are currently being offered right now to the mariner and doing it in a quick and effective fashion.

So this is what we're doing currently. We have provided prototype products to MCD. And for anybody that is able to speak in the S57 language, that's basically soundings and depth contours that we've applied to that. So those are really the two primary products that will come out of this database.

The intent is that it be fully automated and that we would be able to just have a weekly production cycle that, since the last weeks' production cycle, we would add new bathymetry in, new surveys that have come in. That would get applied to the database. And at some particular point in the week in that production cycle, all new soundings and contours would get created, sent to the NIS, the Navigational Information System, or the Nautical Information System, that's at MCD, and then that would be applied to the chart. So that's the goal that we're shooting for.

We currently hope to have this one built out within, nominally, 18 months, but I think we're also hoping that as we build this out we're building automated tools to load, populate, do supersession, and validate the database against the current chart so that we can build speed with that. And there's hope that we might be able to start building out a production branch every six to eight months.

So this is hopefully maybe a five-to six-year project, not a ten-to-20-year project. So I'd like to see this in my lifetime. Maybe even before I retire. So that would be great.

MEMBER GEE: Yeah, thanks, Rick. And for those, I guess, in the panel, why do we choose this? This is kind of key to a lot of things we've discussed. And I'm really pleased, and I hope it has the funding to go forward. It was a really important project. We've got a paper coming out about the infrastructure.

This is part of a key part of the infrastructure, specifically for the charting. We can't move ahead with things like the precise navigation. Sal hasn't mentioned it this time, but I'll say it for him. It's like, you've got to convert to meters in the chart, so you can't do it without this kind of technology.

It also opens it up for the further blue economy to make the data more useful for others. So it's kind of the boring infrastructure -- well, not boring for some, but it's that infrastructure stuff that just has to be done, but it's not visible. So it is really key, so we're really pleased to see that morning forward. Yeah, Joyce.

CHAIR MILLER: Having been struggling to make a coherent map out of Honolulu Harbor, where there are thousands of ship lines, I hope that NOAA is making every effort to build upon previous successes like, for instance, the generic sensor format, to make this process less painful, because I can tell you, when you've got thousands of ship lines, figuring out which one is best is not an easy job.

CAPT BRENNAN: I don't think I ever said it was going to be easy. So, to Lindsay's point, I would like to say, I mean, we talked specifically about the charting value of this. I mean, I think the other end of this is that, well, first, to get to the point that we have consistent contours, and I think the Admiral pointed that out in some of the charts the other day, is that you'll have contours that just end at one chart boundary and then are basically not continued on the next chart.

So, in order to be able to provide that, this is critical. In order to be able to change tidal epochs, right, we have to have this to apply that to the soundings. To be able to go to meters, we have to have this. To be able to provide S102 products, gridded bathymetry products, you have to have this. So, to get to high resolution products, to get to products in the Intercostal Waterway, you have to have this.

So, I mean, this is really that critical piece of foundation that you have to have in order to move forward with all that. Once you have this, the other thing that's valuable is that then you can start supporting things like tsunami inundation, storm surge models.

This is the basic foundation for all oceanographic models, which what we're seeing, and I think Larry was saying, for the Arctic, you know, off of Barrow, this is the one thing for their ice recession models that they have, is that they don't have bathymetry.

So being able to help provide that in a way to the community, and nationwide, we feel like that's going to be a tremendous value. Navy as well, they've said that their bathymetry, particularly here in NORTHCOM, is limited.

So, to the extent that we can start to do that, because basically what they do every year is just go scrape NCEI for all the stuff within our EEZ. So, having it in a way that's, for them, easily digestible, they're very interested in it as well.

MEMBER GEE: Thanks, Rick. So then, yeah, the next brief we had was from Ed talking about the wind farm activity off the East Coast and the use of NOAA data and products out there. Ed, do you want to brief?

VICE CHAIR SAADE: I really appreciated the opportunity to present this. The only thing that I would add is it's even more busier than when I presented it a month ago. So if there's truly any kind of a boom activity offshore in the United States right now, it's offshore wind farm from an industry point of view. And it continues to accelerate.

And, again, everything does really truly start with a variety of NOAA data products, whether it's sea floor maps and soundings to any types of things that particularly have to do with weather and wind, of course, and all those types of ports capabilities. Yeah?

MEMBER KELLY: Ed Kelly. Surprisingly, there are not just wind farm plans out in the water. There's ships, commerce, economy, safety, security issues. We've seen BOEM actually trying to lease the seabed underneath an active federal ordinance explosives testing area, which, you know, the people that were planning to lease that had no clue was there.

We've been meeting with BOEM and other entities, and we've got a whole kind of laundry list of things that have to be taken into consideration from maritime commerce perspectives. And I'll send a copy of that over to you just so you can kind of incorporate that into the plan. A lot of people are saying, "oh, isn't this great, it's wide open," and not really. It's been in use for a couple of hundred years.

VICE CHAIR SAADE: So, for some contractors, when you go to an area where there is a lot of explosives, that's a contract of opportunity to go help mitigate it. So, it's okay.

(Laughter.)

MEMBER KELLY: Well, no, they were looking at leasing space under mandated international traffic separation schemes. And you know, it was just -- ignorance is a strong word, but it was a lack of awareness of what's out there, because you know, our commerce lanes and our shipping lanes, we don't paint double-yellow lines, we don't put out stop lights, so it's not as easily recognizable, but it's out there. So I'll pass that over to you just so you can kind of incorporate. There's room for everybody, don't get me wrong, it's just there are certain precautions that have to be taken to avoid some what could be potentially ugly incidents out there.

VICE CHAIR SAADE: Okay.

CHAIR MILLER: Sorry to the Technology Working Group. We're about five minutes until break time, and all our panelists are here, some of which are under very strict time things. Can I ask, we have an hour and a half for lunch, and we could certainly take a half an hour of that to continue the technology discussion, if that's okay with you. It might be from 12 to 12:30, and then we'd have lunch at --

VICE CHAIR SAADE: I don't know about Lindsay. I think that's fine, because we're done with the review. We want to talk about the future, which is mostly talking anyway. Right? So we don't have anything that's slide-dependent going forward.

MEMBER GEE: It's that request from the Science Board that probably needs some discussion, so I wouldn't want to cut that off.

CHAIR MILLER: I totally agree, Lindsay, I think that's important. So let's take a 15-minute break, and would everybody please be in their seats in 15 minutes. I don't mean standing, talking around. I mean in your seats.

(Whereupon, the above-entitled matter went off the record at 9:43 a.m. and resumed at 10:00 a.m.)

CHAIR MILLER: Okay. I'm really looking forward to this next panel that focuses on coastal and maritime community risk reduction. We have an impressive group of experts, and Larry will be leading it. I just wanted to say that Captain Sal Rassello had to leave for the airport, so he won't be here for this session.

So the moderator is Larry Atkinson, and I'll turn it over to you. He will be doing the introductions. Larry?

MEMBER ATKINSON: Okay, I just want a little primer here. Being from Norfolk, I can't resist putting up some slides of flooding, and we have a lot in common with the Southeast Florida region. I just wanted to put up the slide on the left is what flooding they get -- I shouldn't just say Miami, all over the southeast.

During King Tides, the picture on the right, is from a house that I drive by every day to work, and that's 3 feet above the 100-year flood level. It's pretty amazing. Those cars are -- the contractors' trucks are parked in flooded streets, raising a house up. It's kind of hard to reconcile, you're raising the house up but the street floods.

The next slide I just want to show -- this is the sea level rise rates for the whole East Coast, from Eastport, Maine on the left to Key West on the right. And the blue line is 1-foot-per-century, approximately. And just to make the point that the whole East Coast and the Gulf Coast, of course, also, if I put it on there, would look the same or even higher rates because of higher subsidence.

So we're all facing the same problem. Of course, the issue with our coastline down here and up in Norfolk and a lot of the East Coast is very flat. So 1 foot of sea level rise is a big deal, and even, 2 or 3 feet is even more important.

This is the Key West tide gauge. Two points here, one, this just shows the extrapolation of where we think sea level rise is going. This is the kind of stuff I do, and it's also, of course, done by Billie Sweet at the NOS. And there's a lot of products available, but the interesting thing is there's no long-term tide gauge around here. The oldest, I think, is back in 1994 in Virginia Key. So the only long-term tide gauges we have are at Key West and up at Jacksonville. So a plea for -- and now tide gauges are going in here, so you've got good data to work from.

The panel is a distinguished panel that we have today. The bios are in your packet, so I'm not going to go through those. I'm going to go ahead and start with the Honorable Kristin Jacobs from the Florida House of Representatives. Please go ahead.

HON. JACOBS: Well, good morning, everyone. It's really great to be here in a room full of so many smart people who know this issue inside and out. As a Florida State legislator, I often have to preface this conversation with an attempt to keep it non-partisan and talk about the science and talk about the economy. And I heard a new term today, the blue economy. So I'm eager to learn more about that because I think it's an interesting way to continue to get the politics out of the science, and the pragmatic approach that Southeast Florida has taken over almost 10 years now.

I was a county commissioner when this process started; the compact between Miami-Dade, Broward, Palm Beach, and Monroe Counties, and it's amazing to see the resources that have been put into play in this region, primarily because we figured out how to work together and speak with one voice, which is how NOAA was able to come and help us out.

We couldn't have gotten where we are today if it weren't for the federal resources that were given to us, and in many ways, the state resources, even though the joke is that you can't say climate change in the State of Florida. In fact, last year, I passed a major climate change legislation that was signed into law by our governor, a Republican, voted unanimously by every member of the Senate, a majority Republican; voted by all but one -- I did lose one guy on the floor of the House -- 120 members all voted for it. And that's a super-majority Republican body.

And so it passed; the governor signed it into law on the very day that President Trump walked away from the Paris Accord. So you can say climate change in the State of Florida, and in fact, one of the biggest issues that we have now been working on is the Florida Resilient Coastlines Program, which is a product of the governor and supported by his Department of Environmental Protection. And the head of that agency, Noah Valenstein, for a guy who just came along not too many years ago to lead this agency. I think he's been in place -- I say years, it's just been over a year -- but he has really been able to take this agency and point it in the right direction.

This year in the budget we were able to get $3.6 million to bump up the coastal resiliency program, and specifically to start to address the adaptation action areas, which was a legislative effort that was passed into law in 2011 by the work of the four counties through the Southeast Florida Climate Compact and adopted by the state.

So we do say climate change, and we have been saying it for a while and putting our money where our mouth is. The adaptation action areas are -- if you've been following what's been going on in the compact communities, most notable the work done by the City of Fort Lauderdale, but the office is now working on these projects for many other areas, including St. Augustine and Escambia County are also working on adaptation action areas. So it's an important step forward.

This year, just a couple of weeks ago actually, the governor signed into law a bill that I had been working on as a county commissioner and then the 4 years I've been in the Florida House. So a total of 9 years working on this project. And that was to set up a -- basically bracket the area from the Dry Tortugas all the way to the St. Lucie Inlet as a coastal marine sanctuary-esque set-aside or conservation area, because up to now, in the last 2 years, we've lost 21 of the 35 coral reef species, and we're not sure why, what is happening.

In fact, one of them that died was 330 years old. There were attempts to go out and harvest one of the oldest living corals before it was gone completely. Unfortunately, it died so fast that we were not even able to get samples so that we could reproduce it in a lab.

So we don't know exactly what's going on out there. Last year, I was successful in getting $1 million to begin monitoring it, and then this year, as you know, member-appropriations projects have a laser, especially if you come from the side of the aisle that I do, often when we're trying to cut dollars in a budget. So I was really happy to see the governor and the head of the Department of Environmental Protection move those monitoring dollars under their budget.

So that million dollars is now funded, and that effort will continue to go on. And as you know, the three-tier coral reef system that runs along the southeast part of our state is really important to resiliency, both to the coastal area, but also to the industry that relies on a healthy marine environment to continue going forward.

I know that we are going to be opening up for a lot of questions later on, and they've got a timer up here. So I don't want to go too far and get too specific on issues. So hopefully, if you have any other questions about that area, you'll be able to ask me as we move on.

I wanted to touch briefly on Hurricane Irma and the lessons learned in this state by a lot of folks that thought that because they are not coastal, they don't really have to worry about hurricanes. And as we saw, as basically the entire state picked up from wherever they were and moved to another part of the state, it's really important to understand what your evacuation plans are and your preparedness plans are. But as many counties learned, their shelters were overwhelmed when people that they never, in a million years, expected, moved into their counties, seeking support, water, supplies, shelter.

And their shelters were overwhelmed, their services were overwhelmed. And we got a real clear picture of what is happening to our utilities, as utility after utility did not have the infrastructure in place to make sure that they weren't having raw sewage overflows and many other calamities.

You all heard, too, about our nursing homes and what happened when the power was lost. And the idea that we needed to come up with some sort of priority system for how we deal with the loss of power in this state, and the special needs populations that are in dire straits when power goes down.

So the Speaker of the House put together a panel on hurricane preparedness. I was fortunate to be selected to serve on that panel, and I wish I could sit up here and tell you as a member of the Florida House of Representatives that we nailed this one.

We had the biggest example of what could go wrong in our state, and we are now moving in a new direction. Unfortunately, there was no similar effort that was put in place by the President of the Senate. And so all of the work that the Florida House did with hours and hours and hours of public testimony and a very nice, long report with almost 200 recommendations, that two bills came out of the House but never had a Senate companion. And so those issues pretty much fell flat.

There are some other things that were put into place that did manage to make it through, and we'll be happy to talk about those if you're interested at the end when we have some questions.

And with that, I've got about 6 minutes left, but I really would like to hear from you all about the issues that you want to talk about related to the state. So I'm going to stop at this point. I know that my colleagues up on the dais up here have PowerPoints that are going to be a little more time sensitive. So with that, I'm going to turn the microphone back over to our moderator.

MEMBER ATKINSON: Thank you very much. We'll take that time, you get 5 minutes of your own time later to answer questions. Next is Tony Reynes from the National Weather Service, here in Miami.

MR. REYNES: Thank you very much. Larry; good morning, everyone. First of all, thank you for the invitation. It's a real honor to be here talking with you guys. I represent the National Weather Service, part of NOAA, of course. One of the biggest lessons that we had in a long time was the visit of Hurricane Irma last year. So I'm going to be talking a little bit about the products and information that the Weather Service not only puts out for these kinds of events and situations in general, and what kinds of things we experienced last year that we probably need to work on a little bit on.

One theme that I saw that is recurrent from several people is communication was kind of a big issue during Irma, and one of those communication issues was for people to actually know where to go to get the information for them to be ready, to prepare, and to make decisions, decision-making, which is a big theme in NOAA right now, especially in the Weather Service.

So I'm going to be -- touching some of those points in my presentation, and hopefully when we come to the question session and any of you that need specificity in terms of where to get information, reliable information during the next big weather event, I'm going to give you some pointers on where you can get that.

I'm going to talk a little bit very quickly about weather hazards. This is an overall presentation in terms of weather preparedness and other stuff that we probably don't need to get into the details. I'm going to be skipping some of the slides. I'm going to get into straight -- the information that pertains to preparedness, to maritime operations, and to port safety.

We also have Mr. Dave Dellinger. He's our Port Meteorological Officer, he's sitting in the back, he also works with our office, and I think you have some quick information about where they can get port observations and data, right?

So the Weather Service office is open 24/7, of course. We are co-located with the National Hurricane Center on the Florida International University campus. We are the ones that issue all the marine products, and of course the Special Marine Warnings that the marine community needs to get ready and to respond to any emergency.

We have about 122 weather offices throughout the nation, but if you notice, there's a big concentration of weather services all around the coastline in the Atlantic, the Gulf Coast, and the West Coast. So those offices are the ones that have specific marine tasks and marine responsibilities.

It's all hands on deck every time we have a big event like Irma, for example, last year. That means that we are in lockdown, and we were in lockdown for almost 72 hours inside our office, with all the windows and doors completely locked. So those of you that have been on a lockdown situation for more than one day, you know how interesting that can get. But we need to do it; it's the only way to do it.

In terms of coastal responsibility, we have about 60 nautical miles out from the Gulf Coast and the Southeast Florida coast, that's the marine responsibility. We issue coastal waters forecasts four times a day, and we also talk about the surf zone and the responsibility in terms of the risk for rip currents every day, which is kind of a growing big deal here in South Florida.

So in terms of weather hazards, tropical storms, of course, always get the headlines. But a lot of people don't know that tropical storms can also bring what we call the whole package of weather impacts, which include thunderstorms with lightning, rough seas, and, of course, waterspouts. Waterspouts are one of the most underestimated hazards that we have in terms of maritime risks for people out there because they are not as innocent as they may look.

When it comes to thunderstorms and lighting, the most common time for us to have thunderstorms is in the summer, and they can develop really quickly and surprise boaters on the water. And for port operations, thunderstorms can be critical because they can seriously disrupt your operations. So thunderstorms should be part of your planning and your response procedures because they can really cause delays, they can cause economic impacts to your operations.

The winter/spring cold fronts, they can also bring strong winds with them, but it's mostly the summertime when we can have the really big thunderstorms affecting the area. For this kind of weather, we issue what we call the Marine Weather Statements and the Special Marine Warnings. These are the two products that we use for our everyday operations, and of course, we always tell boaters tips of safety in our products.

Where can you get these specific products? I'm going to show you the website on the next few slides. When we have rough seas in the area, we normally have either a cold front that is bringing northerly winds. We can also have north-northeast winds that come behind the cold fronts, or any kind of tropical system that could be in the area.

And then of course, one thing to keep in mind is that the Gulf Stream can produce and normally does produce much higher seas. And this is one of the most important issues that we have to deal here in the southeast coast of Florida, is how port operations need to interact and keep in mind that the Gulf Stream is there, and sometimes it can have a really, really significant impact, especially for the cruise line operations, big vessel operations, et cetera.

So the Small Craft Advisories that we issue are specifically designed to alert about hazards and dangerous winds and seas that boaters can face when they are offshore. Small Craft Exercise Caution, we normally issue those when we have events that are going to produce 15 to 20 knots, or seas around 6 feet. When we issue a Small Craft Advisory, it means that we can expect between 20 to 33 knots or 7 foot seas or higher.

And it's important because sometimes we confuse the Small Craft Advisory with a gale warning, which is a completely different product.

Tropical systems like Irma, for example, last year, well when it comes to the impacts over land during hurricanes, it's much easier for us to have a whole picture of what those impacts can do over land. However, it's not that easy, not that obvious, when it comes to port operations and port impacts.

This is Hurricane Charley in 2004, hitting the Punta Gorda coastline. So very strong winds and rough seas not only developed during the hurricane, but they also developed before the hurricane, and they can be resilient and stay in the area well after the hurricane forms.

It's critical for big vessel operations, for example, for cruise lines, your big vessels that are in your ports coming in and out, to make the right decisions and to be all the time aware of what the situation can be.

So when you have a situation like this, you normally have a chain of decisions that went the wrong way. You don't want to be caught in a situation like this because somebody took the wrong decision in terms of how to react to an event like a hurricane.

Normally when this happens, it's because you have a hurricane that is not coming directly to your location. That's when people normally take the wrong decision because sometimes we look at a hurricane that is X amount of miles away from your port or from your route, and then you assume that you don't have to worry about it, especially if you have a big boat.

And that's one point I want to go into details here with Irma because something like that actually happened here in Southeast Florida. When Irma was 24 hours away from our area, we started experiencing 1 to 3 feet storm surge, and it went up to 3 to 5 feet in the height of the event.

But the key is that Irma never made it to the southeast coast of Florida or to Miami. The closest point of approach was actually 80 miles to the west; that's almost 100 miles away from the Miami area, and it was actually you have the land mass of Florida between Miami and Irma.

Close to 1,500 vessels were reported lost in the Miami area, all the way to Port Everglades. How did that happen? How did we lose so many vessels if we have a hurricane that is so far away, and that's actually downtown Breckell? And for those of you who it's ringing a bell, the word Breckell, it's because that's exactly where we are right now.

So we had up to 3 to 5 feet of water inundation in Breckell. How did that happen if the hurricane didn't even get close enough to the Miami area? The key word is fetch. So hurricanes can build something that is called fetch, I know most people here know exactly that I'm talking about.

For those of you who have never heard the term, it's basically the interaction of strong winds over a big area, a big body of water, that then keeps building the seas and building the seas, up to the point where it starts creating long waves and coastal inundation.

The main factor for Irma was actually the track. The track was ideal to enhance and to maximize the time that that easterly component wind had to interact with the surface of the water. We're talking about 2 to 3 days that the hurricane had to build up those seas. And when it came closer to the coastline, it actually had enough time to block the Gulf Stream flow to the north, and then create a pile up of water right along the coastline. And that's why we had all those impacts that we saw in the Miami area.

A lot of people thought they were safe; a lot of people saw the track and saw the hurricane going west, they assumed we don't have to worry about this hurricane. It's the west coast's problem. And that's the kind of mentality that we cannot afford during big events.

Always cross-check any second-hand report of -- storm surge impacts could happen well away from the storm. Always keep in mind that a hurricane is not just a point. You need to take into consideration the entire structure of the hurricane.

Matthew came much closer in comparison, yet there were no major issues with it. Extremely important -- and this is the message that I want to emphasize today -- do not pay attention to rumors. Remain focused only on official information.

There were some waterspouts with Irma too, and one of the things that happens with waterspouts is that people don't move away from waterspouts; they tend to be attracted to them. It's very important to never underestimate waterspouts. This is the kind of thing that you don't want to be doing, and you don't want people to be doing nearby waterspouts, especially when they move close to shore.

When you have a waterspout touching land, we do have to issue a tornado warning. There's one key thing we need to keep in mind, especially for port operations; the Weather Service, contrary to popular belief, we normally don't have enough time to issue a tornado warning for every waterspout that forms. Most of the time, I am not going to even see the waterspout on the radar.

So if you are responsible for port operations for any kind of marine operations, how to respond to a waterspout must be included in your preparation plan, in your action plan. Because unfortunately, when it comes to a big waterspout that can cause significant damage, you're basically on your own. It should be part of your response plan.

How do we help mitigating for all these kinds of impacts, and decision-making for all our partners? Well, we issue the products that I mentioned before, but we also issue gale warnings for 34 knot winds or higher, storm warnings for 48 knots or higher, and then of course your tropical cyclone products.

This is a traditional text form of our product, the Coastal Waters Forecast. You can get it at any of our Weather Service websites, weather.gov, slash, the city of your location. This is the one for Miami, weather.gov/miami, and you can get a point-and-click forecast, which tells you specifics in terms of what kind of marine impacts we are expecting for the day and for the week.

We do a SRF product too, which you can also get at the weather.gov/miami, and we are now including rip current information in our products, which is one growing problem here in South Florida.

Finally, I keep emphasizing in these talks that for the next hurricane that we're going to experience here in South Florida, the product that you want to look first as a marine user, is the Marine Weather Warning, because the traditional hurricane local statement that the Weather Service issues is not going to include marine information anymore for your location.

Always look for the Marine Weather Warning, the MWW product, because if you have a hurricane that's going to have impacts on your marine zone and not over land, your hurricane local statement is not going to have that information.

So one more product that I want to show you before finishing the presentation is one of our brand new models in the Weather Service. This is called the Near Shore Wave Prediction Model, or NWPS, and one of the cool features that it has is, it allows you to have an immediate visual representation of where we think the Gulf Stream is going to be, and how far from the coastline it's going to be, and how strong it's going to be.

Right now we have -- we started by doing a four-set ship routes; this one, for example, is Miami from Freeport, and along the route, you can see what we think is going to happen within the next 3 days, in terms of the Gulf Stream impacts, winds speeds, wind direction, et cetera, et cetera.

You can also get this information at weather.gov/miami, and if you need more details, you can talk to me after the presentation. I can give you exactly the addresses where you can get this information.

The last thing I want to mention is, what do we need? What kind of support do we need in the Weather Service to keep working with these projects? Well, one of the things that we have in terms of needs is NOAA buoys. We don't have a reliable NOAA buoy source of observations in the area. And for us to keep doing this work and expanding, specifically, our model products, we need verification.

So we need NOAA buoys to actually keep comparing the data and keep fine-tuning the model so we can provide a much better service to the community and to our users in the marine community.

I think my time is up; that's all I have for you guys. Thank you for your attention.

(Applause.)

MEMBER ATKINSON: Thank you. By the way, when the Gulf Stream slows down, down here because of hurricanes, the sea level off Virginia pops up a foot or two. We just discovered this about 2 years ago. So what happens down here affects us a thousand miles away; it's pretty impressive. So we too care about what the Gulf Stream is doing. I love the Gulf Stream.

Our next speaker is Dr. Samantha Danchuk, who is Science Coordinator for the Southeast Florida Climate Compact, which we follow very closely, what you're doing down here. And she's Assistant Division Director of the Broward County Environmental Protection and Growth Management Department.

DR. DANCHUK: Good morning, everyone. Thank you again for convening in Southeast Florida. We really, really, as I'll describe, have benefitted from any sort of federal technical assistance and the attention that you've given us. So we really appreciate that, of anywhere in the nation, you're here today.

Today I'm going to discuss how the region -- really, the four counties: Palm Beach to the north, Broward to the north, Miami-Dade, where you are right now, and then Monroe County to the south, which is the Florida Keys -- have been working together for nearly 10 years on climate policy collaboration.

So what I mean by that -- and actually I'll give full credit to Congresswoman Jacobs initiating the Compact. The idea was, we really needed to collaborate to be able to communicate to the state our legislative priorities, to ensure that we were planning for future conditions related to sea level rise and ensuring that we were planning to reduce our emissions as a region, considering that we are nearly a third of the population of the state, and nearly a third of the gross domestic product. And we want to make sure our priorities are the state's priorities as well.

So one of the first steps was to kind of establish regional planning baselines. I'll discuss the Unified Sea Level Rise Projection. The four counties have agreed upon what we are planning for; we are planning for 2 feet by 2060, and actually have a projection that goes out to 2100.

Each of the counties has done a vulnerability assessment to understand what inundation risks we would be facing with sea level rise, as well as understanding what our emissions are, because we very much understand the loop between the more emissions that we produce, the more sea level rise we will have to plan for in the future.

We have just updated our five year plan, which is essentially our Regional Climate Action Plan. And if you're online, you can visit RCAP2.org, and you'll start to see how, no matter who you are within the community, you can pick and choose and develop your own climate action plan that will help us, as a region, get us towards our goals.

So just to highlight, because we're very proud, every year the Compact hosts a leadership summit, in order to organize all levels of government and align the elected officials, as well as staff, on our goals towards working towards implementing the RCAP.

Last year we hosted it in Fort Lauderdale, Broward County was the host, and the theme was business of resilience. So recognizing that one of your priorities is now supporting the blue economy, there could not be a bluer economy than Southeast Florida, right? Considering fisheries, the beach management, supporting our tourism, real estate values, all that really is very, very connected.

So one of the major requests or issues that came up at the summit -- just to highlight, because there may be some data needs, and there will absolutely be a request for a study for this issue -- is, we recognize that our community is very much dependent on flood management, both in the inland area as well as the coastal area.

So the inland area actually is protected by flood control canals, as well as control gates, in order to maintain -- or prevent flooding in the inland areas. That's an Army Corps project. And then the South Florida Water Management District manages those operations day to day.

Between the area between where the control gates are and the coast, there is actually not any flood protection. And then along the coast, we're facing issues which I'll describe and show you some pictures about, regarding sea level rise and increasingly frequent high tides that we're experiencing.

So as a result, we have some very real flood risks that will be increasing in the future, and so we are asking for federal assistance in order to analyze these problems and come up with some solutions.

We recognize that the responsibility doesn't just fall on the local government, and so we found that the business community is an essential and has been a very productive partner for us to begin to work together and align our advocacy both at the state and the federal level.

So let's show you what we're talking about. This is a community in Broward, the city of Hollywood. This happens to be adjacent to an open boat ramp. So while you may have heard about sea walls being overtopped, we have lots of areas that are just open to the water, to the sea, or the Intracoastal, where you have flooding coming in so quickly during the high tides that occur in the fall season, that we're not getting just 5 inches of water or a foot of water; in this case, actually nearly 2 feet of water had built up in the community immediately adjacent to where this open flow area was.

That has an effect on, you know, emergency services that can be provided. The community is screaming for solutions and support, and needs quite a bit of funding in order to be able to address these issues and maintain their property values.

Also to highlight, our infrastructure needs to be adapted. So you can see here, the sea wall, at this point in time, is providing protection from overtopping. But you'll see a lot of water inland to that sea wall, and that's because our ground is so porous that we have a great deal of seepage that occurs on the backside.

As a result, it requires a lot more maintenance for our roads. I just met with DOT last week, because we recognize that a lot of manuals need to change when you're designing roads that are going to be frequently flooded, when you're designing infrastructure that is very vulnerable to corrosion -- the steel in the sea walls was obviously not intended to be inundated with salt water every day -- so there's a lot of new kind of construction and design standards that we need to develop.

Here's another photo; the reason I like this is because it shows that it's not just the properties or the part of the community that's inundated immediately next to the sea wall. You can see that the water is propagated all the way inland, right, in this community.

 Additionally, you may have heard that we are putting a great number of storm water valves at the outfalls on the sea walls to prevent water from actually come in pipes that were intended for storm water to go out. And they can be miles inland, where you're getting flooding during a high tide, even though that community is not -- you wouldn't consider it surface-level connected at all.

Just to point out as well, with this picture, this community -- one, because they have not gathered the funds for a significant project, and it was the best solution -- they are moving around temporary pumps to pump those storm water areas into the Intracoastal. And if I showed you a picture of what this looks like today, this last season, it was actually very dry.

So there are solutions, and we are actively trying to address these issues as quickly as possible. But at some point, when we're talking about two feet of sea level rise, you know, a small, temporary pump is not going to address this type of issue.

So we are very fortunate in Southeast Florida to be going through another boom and redevelopment. What we recognize is that there is an incredible opportunity to build resilience into our community as this redevelopment is happening. We just need to develop the policy and the standards as quick as possible.

So this picture shows a brand-new sea wall and a community property that's about to be redeveloped; but in the case, at the time that this picture was taken, the city had a maximum sea wall height. So even if you wanted to put a brand-new one in, you couldn't go above this certain height. And so that hindered resilient redevelopment. So we are trying to look for all those opportunities and make sure we're updating standards as quickly as possible.

Just as I said, it's not just about sea walls. We also recognize that we need to look at future conditions when we're setting our base flood elevations, as well as considering all of our coastal infrastructure. And to help us do that, we use the Unified Sea Level Rise Projection.

As I mentioned, this has been adopted by all four of the counties, which is very significant. We have 109 cities within those counties, and we have, for the most part, gotten all of the I think coastal cities to adopt this as well.

It's really important to have consistency in infrastructure standards. Think about it; if someone was developing a road in one county to this height, and then the next county says, oh, we're going to build ours to this height -- that, hopefully, would never happen, but that's the potential, is that you would have complete inconsistency in what people are designing to or building to.

You may recognize, so the orange curve along the top of the graph is the NOAA high curve, or what was the previous NOAA high curve. We absolutely encouraged having a NOAA representative be part of the technical advisory committee for this group, as well as individuals from the Army Corps, experts from our local universities, as well as experts in engineering, and staff that had been working on this project.

You'll notice that we had previously -- this is actually the second iteration of these curves -- previously we had used what was kind of the low curve, maybe the NOAA low curve, and we've identified that, you know, in no case are we going to be following that curve. So you'll that the projection has actually moved slightly up, or, the bottom of the allowable design curves have been increased, because we recognize that under no emission scenario would we actually be following that curve. And I think that's consistent with what NOAA has found in their most recent report.

So just to highlight that we have done vulnerability assessments for each of the counties. You can see the areas in purple would be inundated by two feet by 2060. As I mentioned, seepage is a major issue, but really, this isn't just seepage; the groundwater is rising about a foot for every foot of sea level rise we have in the coastal areas, you can see that highlighted in red. Our wells have identified that we've had an increase in groundwater table over time.

We know that our emissions are completely related to the sea level rise we will see in the future, and so as a region, we have been discussing ways to reduce those emissions. And so the website that I mentioned in the beginning, the Regional Climate Action Plan, is our five year plan in order to address mitigation as well as adaptation.

One highlight from Broward County is that we have actually put into regulation already what the future conditions for the groundwater table is, so now all drainage infrastructure has to be designed to that future condition, not historic or even present day. I think we're the first to do this, and there will be many more, I think, communities that will follow suit.

Monroe County and the Keys is the first to really invest in adapting their road infrastructure with a solution that will allow them to adapt over time, as they already have roads that are regularly inundated, and they need to elevate them, but yet still provide water quality assurances so that they don't damage the valuable resources in the Keys.

You may have heard about the Miami Beach projects, where they have invested significantly in pumps, in order to maintain dry streets, as well as elevate some of their, not only the roads, but the adjacent infrastructure.

Miami-Dade County, which I'm sure Dr. Murley will talk about in just a moment, was the first to have to develop standards for a critical infrastructure, the wastewater treatment plants, so that now we're planning not just for sea level rise, but surge, and making sure that we are setting ourselves up for a point of avoiding failure.

And then just to highlight again that really we have shifted our perspective, now that we have vulnerability assessments, now that we are working towards resilience standards, we recognize that we need to shore up the regional economy as well, recognizing that we need to have these same conversations with the insurance industry, the real estate industry, and others, to ensure that we are mitigating losses at any particular -- wherever possible.

We have looked towards really creative designs for the future to try and envision living with water. We have invested in the NOAA PORTS system, both at Port Everglades -- our gauge just came online on March 2nd -- and as well, Port of Miami. Since you just went on the tour yesterday to see that, that is incredibly valuable to us, because as you will see, all our projections are based on Key West. That is because we did not have local data, and it does vary regionally.

In the study we're working on right now with the Corps, they did an analysis for us across the region, and there's significant variation across the county. So it's valuable to have that somewhat local data.

We've worked with the Nature Conservancy, that is a Compact partner, in order to put all of the data that we had available about shorelines and beach projects and environmental resources into a tool that's available online to promote shoreline resilience.

As mentioned by Congresswoman Jacobs, we are very, very excited that there has been a designated Marine Conservation Area. I think that's critically important to protect our blue economy and the fisheries, and the marine resources that we have.

As I've mentioned before, really our priority right now is developing these regional resilience infrastructure standards. This picture is in there just as, kind of showing that there will be a learning curve to this; this is an area that has a brand new sea wall, but you can see, because of the way the joint was between the cap and the panels below, we're getting flooding, even though it's brand new. So we recognize that there will be bumps along the road, but hopefully we'll be able to develop standards that will make sure that those investments are long lasting and long term.

This study is ongoing right now, working with the Army Corps of Engineers through their planning assistance for states. We are looking at King Tide flooding, sea level rise, and storm surge in two communities, Fort Lauderdale and Hollywood, to identify what really our sea wall height should be in the next few phases and the next few decades.

So in this modeling we are using the FEMA model that was used for the flood insurance studies, but we are actually looking at future conditions and different scenarios. And they actually refined the grid for us, so that we have a higher-resolution model.

So just to share what I think our regional priorities needs would be: as was also mentioned by Dr. Reynes was, we really could use help with active offshore wave buoys in monitoring the Gulf Stream. As our moderator mentioned, so as the Gulf Stream slows, that will really affect our sea level rise projections, and right now we're just using kind of an order of magnitude to factor that in.

It would be great to watch that over time, especially because the change in the short-term trends has been so volatile lately. So really being able to understand that would be helpful.

Nearshore current data: we have had, you know, maybe someone put something out there for a week to monitor, or a month. Having that data would help us, not only with beach projects and planning for the port, but it would really start to benefit our environmental resources now that we have this conservation area.

We need to have a better understanding of where plumes or sediment is moving, and current data would support that. As a way of having better and more recent bathymetry within the Intracoastal we'll really support the modeling efforts that are coming forward right now and our resilient studies, you can see they're at every level, whether it's county, city, and state. Everybody is using that bathymetric data right now, and in some cases, we're having to interpolate in order to answer the questions that we're getting after.

Any real time monitoring of the storm, as we're having more frequent, or at least more intense storms, we recognize that the more data we can have about the storm would be very helpful, whether it's high water marks or whether it's another way to kind of understand what the impacts of the storm were, other than me being sent out during the storm to try and collect some data -- which, of course, I would.

We recognize that issues that we haven't yet evaluated -- for example, scouring -- is going to change as the depth of water changes with sea level rise. So those are types of things that we could use technical assistance and data to help support. As mentioned previously, there has been a huge ask to the federal government, specifically the Army Corps of Engineers, to help us understand our flood risks across the county, with future conditions in mind.

 So that will hopefully be part of the South Atlantic Division Resiliency Study that hopefully will be appropriated soon, if it hasn't already. It was confirmed? Okay, good.

So we know that there will be data products that will be very helpful for that resilience study, because the same amount of work that's been done up north has not been done down here yet. So we recognize that will be an upcoming need.

As well, as I had mentioned, you know, working with DOT and other agencies as they develop their design manuals for these future conditions. They really will need the support of being able to -- whether it's just water level monitoring, whether it's other pieces of data -- as they update these design manuals, they may need some additional data from NOAA.

And then, of course, I know that all the agencies have set this as a goal and have been working increasingly hard after every storm to make this possible, but the sooner that we can get data after a storm at the local level helps us incredibly with planning, whether it's emergency projects, or if it's immediately just trying to get things back up and running. So we're very grateful, the more you can expedite post-storm access to data. Thank you.

MEMBER ATKINSON: Thank you very much, amazing.

(Applause.)

MEMBER ATKINSON: I noticed one thing that our cities have that you haven't done yet: we have no wake signs on our streets.

DR. DANCHUK: Did you see the wake?

MEMBER ATKINSON: Yes, I saw that. That's why I remembered it. Yes, this is amazing. The process with the Corps, I know in Norfolk, our 3x3x3 is all done, so we have a billion dollars' worth of construction projects just waiting to be funded. So that's what's been going on.

Our next speaker is Mr. James Murley, Chief Resilience Officer for Miami-Dade.

MR. MURLEY: Well, welcome to Miami-Dade County. I know you've been here a couple of days, and you were introduced to our mayor at the port and have heard a lot. I'm going to segue off of the remarks that Kristin made, and Sam, and maybe introduce a little bit more about how we use the term resilience here, in the context of some of what you guys work on, and I look forward to questions.

We've been at this for a while, going back in Dade County to the importance of our beaches. I mean, Florida is beaches, and beaches are Florida. And the entire sandy coastline of our county is a federal authorized beach nourishment project that we work in partnership with the Corps on, and we're having some problems, even today, from some of the storm events that have been experienced along the East Coast. So obviously, beaches play a big role in an area that depends on tourism.

We've just approached this from a number of different ways, and you'll see that some of the things that Sam has talked about, including the Compact -- here in Miami-Dade, we had a sea level rise task force that refined the regional recommendations, and we are a member of the Rockefeller Foundation 100 Resilient Cities Program, which I'll talk a little bit about.

This map, just maybe to orient you, again, we're really a strip of urban area surrounded by water: the wetlands of the Everglades to the west, and the ocean to the east. And you know, over a hundred years ago, that urban area wasn't there; it was just water and wetlands, and it wasn't a very pleasant place to be.

So the only way we've been able to be here over that last 100 years is, we learned to live with water, and we learned to manage water, and we made some mistakes. We're willing to admit those and go back and try to fix them.

The only way we'll be here a hundred years from now is to learn to live with water and to manage that in an active way, an iterative way, with partnerships and data and technology. It's just absolutely our destiny.

Our destiny is our geography, because of our proximity to tropical storms -- that's a given -- and our geology, which we've referred as to how porous it is; it's lime rock. It's very stable, so we're not sinking like Norfolk, but it's really porous, so bulkheads and dikes don't seal you off. And that causes all sorts of issues. But again, it's part of being and living in South Florida, and we assume that and adapt to it.

There are about 6 million people on the three counties, about 2.7 in our county. We're geographically the size of Rhode Island, and we have a county metropolitan form of government. So with 34 cities, the county has certain levels of activity that are only done at the county level, including our port and airport. And there are a lot of similarities between us and Broward -- some minor changes, but a lot of similarities, as we've developed these two large urban counties.

At the county level, really these are the focus of what we're trying to do in terms of our adaptation framework -- we have a real focus on infrastructure at the front end, dealing with the data that we receive from the region in terms of -- and from many other federal sources.

We have to keep our communities resilient in many different ways, which I'll talk about later; the importance of the economic activities -- if we don't have a strong economy, we essentially can't invest in the resilient activities that we need for the future, so they go really hand in hand.

And that map which I showed you a minute ago showed all that area to the west, which is essentially the Everglades and our water management areas. That is our green infrastructure; we need that to be vital, and we have to be able to manage it, because it's part of being able to be resilient and to protect the urban area.

In our county, we are a large county water and sewer district, so we have rate payers and tax payers. But the rate payers are responsible for pretty much all of the water and sewer conditions. So we have to maintain those; this is critical to us, and we are in the process of a large upgrade of that system. It will go on for a number of years, and it will cost over $10 billion.

But it is being designed -- because of the data from the region, and because of the county task force, it is essentially being designed -- and each piece of it factors in how long that piece of infrastructure is going to be expected to last -- but just for our purposes, about three feet of sea level rise and a hurricane five storm surge on top of it.

So that elevates a lot of heavy infrastructure at our three treatment plants, which out of a sense of legacy decisions, are all on the coast. So it means if we're going to keep those systems running, they -- we're going to be investing that kind of money and with that kind of data as we move forward.

Roads -- that is a road coming off the mainland and joining Miami Beach. That is a non-rain event, King Tide, flooding those streets. And now those streets have been elevated about 2 or 3 feet and are maintained by a system of pumps.

We're also looking at residential streets, following the lead of a lot of work that Broward's doing and trying to work at the individual neighborhood scale.

Using the experience we had at the water and sewer department, we've taken that information and now we've adapted it. We've essentially given all of our county infrastructure a stress test. And we've looked at what's their vulnerability and what's their criticality. Their vulnerability comes through assessing their location and their elevation and what is the infrastructure there. The criticality is the ability to come back online after a storm event.

So our airport and our port are a criticality 5; our parks are criticality 1, since we can leave them to hold that water and other things. But every piece of infrastructure now is getting prioritized. That goes into our local mitigation strategy, when there's money to distribute to that -- and now there is, because of the federal government, and also in our capital improvement's plans. And it gets very detailed data in what we call the Rapid Action Plan.

Now a minute about the resilience under the Rockefeller Foundation's work. They are in 100 cities in 6 continents. So this is an international experiment to think about how large urban areas deal with resilience -- not just climate resilience, and not just events, but basically a series of shots and stresses. And this is important to how communities which have varied interests, and climate resilience and climate impacts are very important, but so are the lack of affordable housing and a transportation system.

And what's really interesting, when you -- when I talk about this approach with my elected officials, is where sea level rise appears on that diagram. And you'll see it's in the bottom right, it is a stress, not an event. And this is constant education for elected officials, to understand how sea level rise is a constant change in the ambient condition behind the events, and it's making the events more severe.

They really don't understand until the event happens, because can't -- they will ask me, can I go out and see the sea level rise today? And of course you guys all know, that's not going to be happening in that way. But they need to understand how it is something that they are going to be living with for the next hundred years of the people who succeed them.

So this approach allows us to put all that into context and develop a strategic resilience strategy which is going to be looking at six discovery areas, including climate and the economy.

You heard all about the Port of Miami, so I'm not going to say much more. I hope you heard about the Port of Miami River. Did you hear about that yesterday? Because that's a very important part of the maritime commerce, because it's shallow water, and it is an authorized channel; it's within the City of Miami in Miami-Dade County.

But when the islands were hit by all the storms in the last season, the first relief ships came out of the Port of Miami, because they had the shallow water draft ability to go into some of those islands and unload before the airports were open. So it's an important link in our system.

I wanted to mention this: a lot of the data now has been picked up by commercial interests, and we have commercial firms here in South Florida that are, for a fee, telling people what their risks are in the future. So I think this is an important sign. When there's a business model out there that takes this risk information and takes the data, much of which comes from the agencies and from our work, and then they basically put it into a business model and they compete with each other.

They're using new technology, and they're employing people. And I think this is a very important signal, and it's very evident in our area that the private sector is going to play a big role in how people come to understand the use of this information.

And I'll close with the fact that there are, at the state level, organizations that are trying to look at this. There are cooperative groups; the Florida Ocean Alliance is one, Resiliency Florida is another, that Member Jacobs is very much involved in, at this point. So at the Florida level, our region is working with other regions around our state, cities, and private sector folks and our academia to try to solve and address these issues.

I'll look forward to answering questions in the future. Thank you.

MEMBER ATKINSON: And our next speaker is Mr. David Anderton, Assistant Director of the Port of Everglades.

MR. ANDERTON: And it's still morning. Good morning, everybody, thank you for having me here today. I'm going to sort of build off a lot of the things that have already been discussed and talk about the port in general: the economic impact of the facility, talk about some of our environmental initiatives that we have ongoing. And then I will also talk about some partnerships that we have with universities that are looking at sea level rise and different types of events at the port, and then what we're doing from an infrastructure standpoint, from a design standpoint, to deal with climate change, sea level rise, et cetera.

Jim talked earlier about east, the ocean; west, the Everglades. This is pre-port, 1925. Lake Mable, a brackish lake in South Florida, and that is what became Port Everglades. The port officially opened in 1928. That area that you saw that was just to the west of the lake, it was an agricultural area, the city of Dania Beach, a lot of tomato farming going. And that's what spawned the development of the port.

What you may not know about Port Everglades is that we are the number one container port in Florida. The overall economic impact of the facility is about $29 billion, based on our FY17 economic impact analysis. So it's a huge job creator, a huge economic engine for the region, and the revenue that we make at the facility we put right back into the infrastructure to grow the business, which in turn creates jobs.

Another important thing that I'll point out up here is, you see that we're the number two petroleum port in Florida. Port Everglades is a strategic port from that standpoint, in terms of providing petroleum products to South Florida, and we'll talk a little bit about that as well.

Very quickly, area boundaries. The facility itself is about 2,300 acres. We're a landlord port, so we're not an operating port. We lease facilities to different tenants from a container standpoint, and also cruise lines with terminals, et cetera.

Some of the other things that you see up here, you see our anchorage; we work with the U.S. Coast Guard -- I guess it's been about 6 or 7 years ago, to actually move that a little bit further out. Previously that anchorage had been located in between the second and third reef, and it's now been pushed out beyond the third reef.

You also see, at the bottom of the slide, the U.S. Navy area. Just on the south side of the inlet, the U.S. Navy has a small operation there, and they run submarine operations very frequently out in that area.

The blue area up to the right, that's the ODMDS; the smaller square is the current size of the ODMDS. As you probably know, we are working with the Corps of Engineers to deepen and widen the facility, and at the same time, we have an environmental analysis going on with the EPA to expand the ODMDS to accommodate for the amount of material that will come from the dredging event.

Population growth. So, juxtaposed you see the growth in population against the size of container vessels. They continue to get larger, and what's interesting about the population growth is that -- Jim, I think, mentioned that in the state of Florida, I think it's about 16 million people. But during season, that population grows to almost 100 million people.

So there's a lot of visitors who are coming to South Florida besides the people who live here permanently, and it creates a huge consumptive market, particularly in South Florida, hence the need for the ports -- not just Port Everglades, but Port Miami, and the ability to bring in that cargo to support that consumptive population.

Now we look at cruise vessels. The size of these vessels have grown immensely as well. Port Everglades is fortunate enough to have two of the largest cruise lines' home port at the facility: Royal Caribbean and Carnival. And the Oasis class vessel that you see at the very top and in the picture is actually the largest cruise ship in the world today. It holds about 6,000 passengers and about 700 crew.

So I briefly touched on petroleum, and so I talked about how we're a landlord port. Our petroleum facilities are actually privately owned. All of the large oil companies are at Port Everglades, it's not a refining port. We provide all of the gasoline to 12 counties in South Florida, and all of the jet fuel to Miami International Airport and Fort Lauderdale International Airport via pipeline, and we also supply Palm Beach International Airport as well.

Now I want to talk a little bit about some of the things we're doing from an environmental mitigation standpoint. We have a very large, intensive capital improvement program that we are currently implementing; our 5-year capital plan is almost a billion dollars. This is a project that we completed not too long ago, in advance of taking a one-berth facility and turning it into a five-berth facility to increase capacity.

So, this project, we planted about 16 1/2 acres of mangroves; I think the total was about 70,000 mangroves. And this allowed us to then expand our Turning Notch facility, which is currently in construction now, to that five-berth facility.

Just south of the port, we have one of the last, I guess largest-standing mangrove areas in South Florida. It's West Lake Park within in the City of Hollywood. It's actually where I reside. I reside not very far from this park itself.

And in addition to the mitigation that we completed in advance of the Turning Notch project, we have a project that we will be implementing in West Lake Park to enhance that facility to do additional mitigation for the Turning Notch, and then also mitigation related to our deepening and widening program with the U.S. Army Corps of Engineers.

Coral reef restoration. Speaking of the deepening and widening project, some of the mitigation that's proposed for the deepening and widening project includes the relocation of existing corals in direct impact areas.

And one of the innovative things that the Corps, in conjunction with other federal agency partners, are looking at is the ability to grow coral offshore in nurseries and then plant that coral in areas within Broward County. So it's sort of a unique mitigation approach; I don't believe there's been another deep-draft navigation project that the Corps has conducted that has gone down this route. It's a fairly innovative and new way of dealing with mitigation, in terms of growing coral in nurseries, and we're very proud, as Broward County, to be part of that sort of innovative approach to mitigation.

Within in facility you can see the canal up at the top of the slide there. We have a power plant; FP&L operates a power plant within the facility. That plant actually just switched to natural gas. It's been about 3 years ago now, I believe. And the warm water from the cooling of the plant attracts manatees, so during the winter season, right outside my office, I see many times, at this time of the year, up to 100 manatees in that canal, enjoying the warm water because they're attracted to it during the winter season.

Sea turtle nesting and stranding. As you see Hollywood just to the east there, with the beach; very, very populous with sea turtles, and the port has done things in terms of lighting, reducing lighting, switching to LED lighting, adjusting lighting, to benefit the sea turtles during the nesting season.

And one of the other things -- well, I'll get to the other slide about that in a minute. Upland habitat restoration -- we're taking a pretty aggressive approach at the port, in terms of beautifying the facility, and we're doing that in a way that's using Xeriscape and things like that, which is important.

This is a study that we completed recently in conjunction with EPA. It was the first study of its type. We partnered with EPA to do a baseline air emission study at the port, and it was really the first time that that had been done at a port.

We belong to a program that's called Green Marine. It's an environmental management program. We have belonged to that program for 3 years, and over those 3 years, we've had remarkable improvements in terms of the different areas of the program and improvements that we make from an environmental standpoint.

And this air emissions inventory gave us a baseline from an emissions standpoint. And we set standards, we look to improve using DERA grants, other things of that nature, in order to reduce emissions and also work with our partners in the shipping lines and cruise lines as well.

So we talked a little bit about the sea turtles, one of the things that I've been working with the staff on lately at the port is doing a full inventory of our lighting. I talked about some of the smaller things that we've done. But we also understand that we have a lot of high-mast lighting at the port related to our container terminals. Those high mast lights are the older type of lights that are high-pressure sodium, metal halide, very bright lights.

So, what I've asked the staff to do is, let's do an analysis of what we have. Let's figure out a program where we can systematically replace those lights to be more turtle friendly, if you will. And it's not only turtle friendly, it's also cost friendly as well, because LED obviously doesn't cost as much money as it does to burn metal haline, high-pressure sodium.

So that's something that's underway now. The inventory is almost complete, and then we will systematically start replacing lights within in the port with more friendly lighting.

I talked a little bit about the DERA grant; we've taken advantage of that over the years. The picture shows we retrofitted some pilot boats, we've retrofitted some vehicles, bought new vehicles and also bought new forklifts that are more obviously environmentally friendly, taking advantage of that program, and we continue to look for ways to improve in terms of those types of emissions.

We have a parking garage that's under design right now. We're going to be incorporating solar into that parking garage, and we will be powering all the lighting, et cetera, associated with that garage from solar power.

I talked a little bit about the study; this is the study that we are in the final stages of, with Florida Atlantic University. There's a few other folks involved as well, and this particular study ran different scenarios -- scenario planning, if you will -- on flooding and sea level rise, to give us an idea based on different, you know, levels of flooding and sea level rise, how that impacts the facility.

Samantha, I think, has been involved in part of that, and obviously we've collaborated a lot with Samantha and Dr. Jurado's group on those types of issues.

This is another assessment that was done with the University of Illinois, and this was more based on simulations related to terrorist attacks and things of that nature. The sea port being a hub, how does an event like that affect the downstream of the supply chain? So another example of scenario planning, but just from a different type of vantage point.

We continue to do internal assessments at the port using lidar data. We have an extensive security network at the port; I think we have over 150 miles of fiber within in the port that connects to cameras, etc. So we are looking at the elevations of those junction boxes and started to think about how and what we're going to need to do, because of sea level rise, to ensure that that type of infrastructure remains resilient.

So in addition to the billion-plus dollars that we're investing over the next 5 years, over the next 25 years at the port, just like most of America, we have aging infrastructure. And our aging infrastructure is our bulkheads, so we've come up with a replacement plan for all of our bulkheads within the port over the next 30 years.

The first project is actually in design now, and you see a cross-section of that now. And what we're doing is, we're designing the bulkhead, and particularly the cap log, in a way that will allow us to add linear footage to it over time related to sea level rise.

I don't know if there's a pointer on here or not, but if you look on the top left-hand corner, you can see the hatched lines. And those hatched lines would actually raise the cap wall in 2-foot increments as needed. So the rebar, everything else that's included in there would allow that to occur at a future time.

This is just a picture of post-Hurricane Irma. You can see the turbidity, obviously pretty significant. I talked about how Port Everglades is very strategic from a petroleum standpoint; we work very closely with the U.S. Army Corps of Engineers and the U.S. Coast Guard. We were actually prioritized as the first port, really, in Florida, that is benefitted with the U.S. Corps of Engineers coming down, doing their surveys, to get the port back open so fuel can get both in and out of the port via trucks and pipeline.

This is just an example of the collaboration that we are constantly doing. I talked a little about our deepening and widening program; we formed an inter-agency working group that is focused on the monitoring plan for the deepening and widening project.

And in addition to that, they actually helped develop the protocols for the surveys that were done as part of the pre-construction engineering design phase. That group is made up of individuals from National Marine Fisheries Service, NOAA, obviously, EPA, and various state and other federal agencies.

And with that, that's it. Thank you very much, looking forward to answering any questions.

MEMBER ATKINSON: And our next and final speaker is the Honorable Chip LaMarca from the Broward County Commission.

HON. LAMARCA: Thank you, sir. Well, good morning, great to be here, and I know that my position is between one of my favorite things in Broward County and the economic engine that is Port Everglades, and David's presentation and lunch.

 So I will try to be brief, and I want to give you a little perspective from the elected body's perspective, and I want to thank the previous work from State Representative Kristin Jacobs and our staff of Dr. Danchuk and Dr. Jurado, and our partners at, as David mentioned, Port Everglades and Fort Lauderdale International Airport, major infrastructure partners in our community, economic drivers in our community, and as David mentioned, a lot of -- some of their infrastructure work will be part of what the county is trying to achieve over time.

The unique position that I have, I guess, on the county commission that has been interesting in getting to know some of the projects that we're doing in and around sea level rise, resiliency, and dealing with our challenges with the changing climate, is that I worked for many years in the environmental and construction industry that was actually inside Port Everglades.

So I had worked with hydrogeologists, worked with water table maps, and designing ground water and soil remediation systems before I ever knew that I would be dealing with anything from the level of dealing with policy in Port Everglades, so it's very interesting to have put those two together.

One of the things that Jim mentioned -- we're turning a corner, I guess, from a perspective of the business community and science working together, when you have models and consultants and companies out there, they're developing models to measure the impact of what sea level rise will be with your property, with your investments, with your business assets.

One of the things that I've spent quite a bit of time outside of Port Everglades, going to many trips to Tallahassee and Washington D.C., advocating for our port projects, but also our beaches. Our beaches are a tremendous economic engine to our community. As Jim said, you can't have South Florida without beaches. He did forget air conditioning, that was also important too.

So we understand water, we also have to understand that we needed air conditioning back when. But he had a slide up that showed Miami-Dade had started their beach re-nourishment program back in 1975. And I recall 1973, in Lauderdale-By-The-Sea in North Fort Lauderdale, we had started doing similar projects.

So having grown up in this area and spent some time in different areas of business and watched that beach re-nourishment project happen, and then for 19 years, kind of went dead, and that's basically -- it took us 19 years to pull the permit through the state and federal agencies to re-nourish our beaches.

And one of the things I would say to the process is, we certainly appreciate the help our federal partners, especially in the technical area, and our state partners really starting to build up the beach program, but we were able to see the actual impacts. This slide here is right after, about a month after -- it was actually the day after Thanksgiving, which was a month after Superstorm Sandy, which was in October. And we had wave activity and storms that caused some very bad damage to our -- not just to our beaches, but also A1A along the coast.

And that is -- that's a side, almost cross-section of the road, where you see those concrete barricades under the water. Those were actually brought over from the I-595 project to try to keep some of the water out and save the road, and they weren't much of a match for it either.

As you see, that's just after the damage was done, and that's where we lost quite a few of the palm trees, and a few of the lifeguard stands went out to sea. That's Highway A1A, our Fort Lauderdale beach, and that sand that's piled up to the east is a lot of what was accumulated. And we were in big danger of losing that road from an integrity standpoint, and from a structure standpoint. And what we were able to do was to work with our state partners at the Florida Department of Transportation and reallocate some project dollars from the Orlando project in a different district and shore up that beach.

 Again, you never know where life is going to take you, but having spent quite a bit of time working in the construction side of underground fuel tanks, did a lot of sheetpiling and shoring in different areas, and that's actually what we ended up doing here to shore up the road.

Those are 45-foot-long into the ground sheetpiles, steel sheetpiles, and what we ended up doing is, after this half mile of road -- of beach and road were restored, looking down the road, we were waiting to do the Segment 2 beach project, which was, I think when I joined the county commission, was about a forty-million-dollar project, and when we did it, it was $55 million.

It also went from an ocean dredge to an upland truck-haul project. So this -- that sheetpiling there ended up staying in the ground to provide additional protection for that particular hotspot, and when we rebuilt the beach, rebuilt the sidewalk, that became what's known as the Wave Wall in Fort Lauderdale. It's a low-lying, decorative wall that has a lighting feature -- fiber optic lighting feature, but those sheetpiles are actually still in the ground.

As we go -- that's the process of putting that part of the beach together. And there was mentioned -- well, in this area, that's right about Sunrise Boulevard, if anyone has been to that area of Broward County, there's a state park there called Hugh Taylor Birch Park. And Hugh Taylor owned 9 miles of beachfront in Broward County at one point, all the way down to Hollywood. And that particular area was deeded and put in trust, and that's the other side of that road. Just the thought of losing, not just that road, but having impacts to the park.

One of the things I think is really important, when you go to your state capital or you go to your federal partners, and you ask them for money, your hand is out, you're always asking for money, and you're advocating, whether it's the agencies or the elected officials putting it into the budget, I think it's important that you go back to say thank you.

We did that here in Broward County in South Florida, not only because we appreciated what was done from the agencies and from the state and federal budgets, but we also have Segment 3 coming up, and our port project, where we're going to be doing a sand bypass, and then hopefully in my lifetime, getting Segment 1 into a public land.

So I think that, working with the agencies and working with the folks who appropriate the dollars, it's important to thank them for what they do.

So kind of going back into what we're doing -- as was mentioned, this beach project just doesn't affect the fact that we have pristine, healthy beaches, and we want to have a nice beach in Broward County; we have roughly $4 billion in upland infrastructure that's at risk if anything ever happens there.

One of the things that was very important is our tourism industry. Just like here in Miami-Dade, Broward County and kind of the Tri-County area is a big tourism destination. Outside of Disney World, beaches are our number one asset, and South Florida is where people come to get away from -- I think it's still snowing in parts of the Midwest and North, and people come here to enjoy that.

Well, part of this project wasn't just that, but in Broward County, we have about 15 to 16 million visitors who spend about $15 billion in our economy, just in Broward.

And the other part of this -- and you wouldn't think this would be an issue talking to -- I'd say landowners and condominium, so they all own a little bit of that infrastructure of the beach as their own back yard. But when we were putting this project together, it was tremendously important that we included a dune system along the beach.

And why that was important -- I don't have to tell anyone in here the scientific reason why it's important, but the areas -- there's only one building that did not accept the project behind their building, and they actually had some water damage, had some issues. Our goal was to have, I believe, about 80 percent of our shoreline, we have about 25 miles of shoreline in Broward County, and from north of Port Everglades to Palm Beach County is about 74 percent of that shoreline. So those beaches will continue to be maintained.

One of the things that was important to me from an economic standpoint is, in having spent some time, my entire life, actually, in the construction design industry is, if we fix the beach today and we have a bad storm and have damage, even if the federal agencies come in to rebuild to the template and the do all that's needed to be done to return it to what it was, what happens when we have small storms? What happens when we have weather events like after Superstorm Sandy?

One of the things that we did is we utilized some common sense in the building world and the engineering and science at the county, and we actually maintained at keeping that permit open for a period of 12 to 15 years. So that if we do have any issues of hotspots, we can come in and do a small truck haul in a half-mile area, whatever it might be.

We see a lot of that being a major issue down in Hollywood, near the Diplomat Hotel. There's constant erosion in certain areas, and I think we also know why that is. Other than them being hotspots, we've got some areas with groins and other things, that when they were put in they were probably a good idea, but somebody else is going to pay the price down south from the littoral flow. So that was important to us.

And one of the things I wanted to also highlight, the state of Florida did -- 3 years ago, almost 4 years ago -- in 2014 did an amendment on the ballot, a referendum on the ballot to put a percentage of our doc stamps into a land acquisition trust fund. And one of the efforts -- and Representative Jacobs has been very helpful with this, we're almost there.

We have now, as our state beach program, it's been determined that roughly the projects -- 100 to 120 projects are on that list a year. And as projects get completed, new ones come on, as you can imagine. But the cost of doing these projects is around $100- $120 million, so -- with the state match. So what the state has done, we've gotten to the point where we understood, we want to prioritize the projects, based on the science and the economics, so that member projects don't take priority if they're in one area or another, and someone's a senate president or someone's Speaker of the House. They should be based on the economic impact to the region, as well as the environmental impact and the science.

So we've gotten to the point where we have a $30 million recurring of that fifty. This year we were real hopeful we'd get to the 50, and the Senate was ready to do it, and the House would have even, but we had the tragedy in Parkland, so.

This is an effort that I think we all work together on. And one of the great things -- as you see that picture, that's just our beach, but we went to Tallahassee with the Florida Association of Counties group of members from all around the coast of Florida, so from Pensacola all the way up to Jacksonville and around through the Keys.

And what we found out, and what was very important, is one of the things that really makes an impact is if the group that you send to do your advocacy. And I found this after doing an excellent conference in Hampton Beach, New Hampshire. Unfortunately, it was late January, but -- so the amusement park wasn't open. But that particular get together, that symposium was specifically designed to be a very bipartisan group. It was supposed -- it was also a very diverse group from cities, counties, and state legislatures. And, you know, it included everyone from the Mayor of Hoboken, who dealt with all the issued from Superstorm Sandy, to a mayor from the Gulf Coast, where Mississippi sustained some major damage from Katrina.

So one of the things that was interesting, is all right, let's get everybody together and get it on the table. What is the key issue? Some of it came down to really, just the what we're calling it, how we're dealing with it. And I think we're past that; I certainly hope so, in Florida. One of the things that has been able to get us to that point is that we finally have federal partners and federal elected officials -- one from this region here -- on both sides of the aisle.

And one of the things that I'm proud of our delegation from the entire state is with their Climate Caucus. They have to bring people from both sides of the issue, because if we're going to fund these projects, I think it's most important that folks understand that, all right, well we have the data, it's scientific. It's not -- it didn't come from one news source or another. It's scientific data, we're going to implement it and we're going to put it in models.

As Jim said, and as Samantha -- as Dr. Danchuk put together, it's a whole lot easier to convince somebody on an investment level if they're going to develop a property, or redevelop a property, that this is going to be what the situation is in 20 years, or 40 years.

And one, you know, one of the things I thought was interesting, kind of on a local level, I have a -- I had a client, or a good friend that asked me -- I have a background being in power generation -- he said, let's put a generator in my house. It was after the -- Hurricane after Irma. And he lives -- they live in a place called Idlewild, which is right where those maps were, up -- that was in the dark purple area, that right now with King Tides and not the best stormwater infrastructure floods, and they get a foot, foot and a half of water. Literally, when there is no storm, it's just the timing, and we've actually sat in it. So during the storm, water in this particular case got right up to the top level of the front door.

So as this person's saying, well I'd like to put it right here. I said, well, you need to raise your pool pump, you need to raise your heat pump, and you need to raise both your air-conditioning compressors, and then the generator needs to be a foot and a half off the ground.

He said, why is that? I said, well, doesn't it make sense if you're going to make this investment that once you have flooding, or once you have sea level rise, or a bad storm, it doesn't matter if you have all this equipment, kind of like the pumps in Miami, if there's no -- if they're underwater as well, a generator's not going to work, it's mechanical. And to the point of the pumps that I noticed, one of the things that always needs to be maintained, whether it's cell towers, pumps, or gas stations after a storm with petroleum from Port Everglades is we need to have power to be able to pump it.

So one of the things we -- one of the things I would -- I would end on this. Storms are an awful event to have to go through. As the doctor said from NOAA, plan for it, don't listen to rumors, all those things. But one of the most important things we need to learn -- we need to take these as opportunities to learn from them. And I will end by saying, I am very happy to hear that the South Atlantic Division Resiliency Study is being done. I know that after -- it was 2012, I believe, that the North American was done, and we will have this information, it's very important for us. But our goal is to learn from these events and work with our federal agencies.

So I want to thank you for having me here, and certainly ready to take any questions at that point.

MEMBER ATKINSON: And thanks to the whole panel, those were great presentations. I'm going to go straight to questions, I think we probably have some. There was a lot of talk of -- I won't say any more. Let's start with David.

MEMBER MAUNE: Okay, thank you. I'm curious to know, some of you mentioned lidar; I'm curious to know who of you use lidar, what you use it for, and what benefits you receive from it.

DR. DANCHUK: Sorry. So, we use lidar in just about every study that we're doing. So you heard Dave mention that, for the critical infrastructure work that they are doing, even though they're working with, you know, the Department of Homeland Security, it's very relevant to understand what level their structures are at.

With the Army Corps of Engineers, we're using it for surge modeling. We have a new data set that's hopefully going to be ready in another month or so, that the Department of Transportation from Florida is collecting for us, just for a small study area, to test out some very high-resolution lidar. Actually, two different methods that will hopefully get us even more refined data so that we can see, like, the caps of the sea walls, you know, those types of really -- you know, very small structures that we're going to have to make major investments to adapt.

But obviously, we use the lidar data sets that are available from the federal government, which usually has been NOAA. The Army Corps also collects lidar data, which we use for the beach projects design and post-storm assessments.

HON. JACOBS: I would just add that the entire coastline of Broward County was divided into three phases, and lidar map is a part of the adaptation action area designation, so to understand what our vulnerability is and to begin to prioritize around that issue. We first did it in the north and then found the funding through -- I think it was a partnership with NOAA -- then we did the north section, and then the central, and then the -- finally the south, and that's Broward.

MR. MURLEY: Okay. We'd be remiss if we didn't also mention that to our west is -- for all the counties -- is a very large environmental restoration project, which we call the Everglades Restoration, which is in a Water Resources Development Act of 2000. And it's multi-year, very expensive, and they have a very extensive use of lidar data there.

They didn't really look at sea level rise in 2000 when some of the original studies were done, but I think the Academy of Sciences brought it to their attention a couple of years ago. So now you see a lot more information from that joint federal-state exercise.

DR. DANCHUK: We're very anxious to have another comprehensive lidar data set, you know, for Southeast Florida, because the one we're using is from 2007, so there have absolutely been changes, significant changes to the environment that we would want to recognize.

MR. EDWING: Hi, Rich Edwing with NOAA. I just have a specific question for Dr. Danchuk, and then a more general question, I think, for everybody.

On your last slide at the very bottom, your last bullet, you said you needed data more quickly. Can you be a little more specific about what kind of data you're looking for?

DR. DANCHUK: So my perspective is that there are federal agencies, and possibly even state agencies, that are collecting the same data that we are, post-storm. It's very expensive for us to have to go our immediately after the storm and do the beach survey, so if we could get the data that you're collecting, whether it's satellite images, whether it's lidar, whether it's bathymetry, as quickly as possible, you know, as soon as it's processed, that would be incredibly helpful, because then we don't have to duplicate efforts.

MR. EDWING: Okay, thank you. So I think the more general question is, is there a lack of a particular type of data or information that stands out above the rest that would really help you all with what you're trying to achieve?

HON. JACOBS: You know, I would just address something in general from a statewide perspective, and that is that we're very fortunate here in Southeast Florida to have four counties that are united with one voice, that have come together with a regional action plan.

 It started with 110 specific recommendations, and then grew into this plan and then got re-adopted. And it's really fantastic. There's so many PhDs here that they are like grains of sand in Southeast Florida.

However, you have areas all around the state that are lucky to have anybody in their staff that even approaches that status or that level of expertise. And so how do they -- where do they find that expertise? They're not exactly getting it from the state, either. So the federal government was so instrumental, NOAA, the Corps, in the success of the southeast region, by virtue of the Compact, is to understand how we can help NOAA, how can we either come together in similar compacts being created around the state to leverage the efforts that you have.

Because certainly NOAA and the other partners cannot come to every single city, but those cities are just lost right now. And so helping us come -- I would really enjoy a conversation or a workshop where we really drill down on how do we strengthen these partnerships, how we re -- or emulate what's happened here in Southeast Florida. There are fledgling -- there are seven of these that are in process right now, that I worked on through the League of Cities for the last 2 years. But they need to be bumped up to the next level.

So when we look at what would help NOAA and what NOAA could get back from us, I think we need to be more unified. We need to better do what's already being done in Southeast Florida.

MEMBER ATKINSON: Joyce?

CHAIR MILLER: First of all, I'd like to thank you all very much for coming. All I can say about the data you've presented is, wow. And I come from Hawaii, and we don't quite have our act together like you do. And sea level rise for us is a big issue, but so are tropical storms, et cetera.

I wanted to drill down on something with Mr. Reynes. You said that, you know, the data is available on a website; I used to work for NOAA in the coral program, and we mapped the coral areas in the Pacific that are U.S. territory. And at one point, we had to run our own website, because we couldn't get our data out fast enough, and we didn't have the problem of it being inundated by people.

So I wanted to know -- you gave us the website. During events, is that website overwhelmed? I mean, can you get into it when you need it? Because I've experienced things where you just absolutely can't handle the --

MR. REYNES: Yes. I would say that the main obstacle we had was when the Weather Service took the individual websites and centralized them, so it became sort of a regional pool of web management for the rest of the weather services.

I would say that these past two hurricanes -- Irma and Matthew in 2016 -- the website got much better. The only one that had problems was the Hurricane Center, which is the one that most people go into to look for information.

But it is my understanding that the band-width -- those band-width issues were addressed last year, and hopefully this year, we're not going to have any kind of issues with the website. I think, for this year, they kind of like revisited the capacity. And I'm not going to say that I'm 100 percent confident it's not going to happen, but I think we will have a much better band width available for this upcoming hurricane season specifically.

CHAIR MILLER: Okay, that's good. I mean, one of the issues the I've seen over the years is, there are so many websites; not just NOAA, but across the government, where you can get information. I think one problem is that knowing where to go and where to get the data you need is -- bathymetric data is -- there's probably 10, 20 websites where you can pick up data.

MR. REYNES: Right.

CHAIR MILLER: So I just think it's an overall concern, is getting the information out, and people knowing where to go.

MR. REYNES: Yes. The important thing is keeping in mind weather.gov, because that's kind of like the centralized umbrella for everything. And unfortunately, there are several -- a lot of companies that they use the word weather too, like weather.com is not the same. That's somebody else. So it's -- the first thing to keep in mind is to make sure information comes from weather.gov.

MEMBER ATKINSON: More questions, comments? Go ahead, Andy.

CAPT ARMSTRONG: I'm Andy Armstrong from NOAA's Joint Hydrographic Center up in sunny New Hampshire. I have a question for Dr. Danchuk. You mentioned some of the needs you had, and it included nearshore currents, Intracoastal bathymetry, and anticipated scouring projections.

So if I could ask you about the nearshore currents, are you talking about longshore currents, or are you talking about currents in a particular inlet? Maybe you could elaborate a little bit on that.

DR. DANCHUK: So longshore currents would be very helpful with understanding how to manage our sediment. We have a sand bypass project that is going in at Port Everglades, so we can capture sands in the north and move it to the eroded beaches on the south.

We have snapshots of currents from some of the modeling work that has been done recently in an effort to deepen the port and prepare for that permitting process. But if we could real-time monitor, we could have a better understanding of how things change during a storm. We would be able to validate some of those models, which has never been done.

Like I said, we'll put temporary, very temporary -- I'm talking about, like, days -- to get some current measurements in order to validate a model, but we know already -- we've had some permitting issues that have identified that we have a very ephemeral reef system that essentially gets covered by sand and uncovered, and that is just part of the natural process.

It would be incredibly helpful to be able to understand that, especially as we know our reefs are under even more pressure, not just from climate change, but from additional population pressure.

We need to figure out how to address those issues, and monitoring the currents would be the first step towards that. So yes, in the vicinity of Port Everglades would be incredibly helpful. Miami has a radar system that's right near the port that helps them at least capture in Biscayne Bay what some of the currents and wave heights are there. But yes, that's part of it. And then also further offshore, we very much would like to understand the speed changes of the Gulf Stream.

CAPT ARMSTRONG: Thanks, and if I could just follow up and ask a similar question about the Intracoastal bathymetry. So is that just in the middle, or are you looking for the whole profile all the way to the beach? What's the need for bathymetry in the Intracoastal?

DR. DANCHUK: As we've all noted, within the compact region, there are major adaptation projects and resilience planning efforts ongoing that focus on the Intracoastal. We know that we are trying to do some flood risk assessment that we hope will become a part of the federal project.

A lot of the data sets in the Intracoastal, further away from the inlet, are very, very old, and we know that there have been changes. It used to be that a canal didn't change, so why survey it frequently? But we know that there have been changes; there are dredging projects that go on in the Intracoastal, whether it's privately or part of a federal project, ongoing.

So we know that we need those data sets. There are many times that we have canals that we are just making assumptions on. We're just setting a single elevation for the entire canal, and then we're spending all this time to try and refine the sea wall cap to figure out how it's going to float over. But really we don't have a good assessment of what the bathymetry is.

And as you try to propagate waves or surge into those canals, I mean really you're missing out on what the real effects are on that local level. So having better bathymetry would be incredibly helpful.

MEMBER ATKINSON: David Maune?

MEMBER MAUNE: Dave Maune again. Dr. Danchuk, this question is probably for you. NOAA and the U.S. Geological Survey are embarking on a study this year called the 3D Nation: Elevation Requirements and Benefits Study. I don't know if you've heard of it.

But one of the goals of the study is to evaluate, nationwide, requirements for elevation data for the topographic service, inland bathymetry, nearshore bathymetry, and offshore bathymetry, and to determine what the requirements are in terms of accuracy, point density, and update frequency.

I think you mentioned about your data being old, and one of the questions is going to be, how frequently do these data sets need to be updated? And I don't know if you're participating in that study; I hope you are, because you seem to have a good grasp on how lidar data are used. But it's not just lidar, it's sonar as well.

And I don't know if you've heard about it, but I hope that you will be able to participate in that study.

DR. DANCHUK: I have not, but we would love the invitation. We can't emphasize enough, you know, when you invite the Compact, the benefit goes not to just one community, but across the whole region. Others are always looking towards us to share those examples, so we would love to participate in something like that.

I don't have a recommendation per se on how frequently the data -- but things are changing so quickly here. There's going to be -- for the next 10 years, there's going to be so much adaptation going on, and changes with the deepening projects, so as frequently as we can get it, until we can get to the point where we can go back to the decadal collection, would probably make sense.

MEMBER MAUNE: Yes, and the hardest part of the whole process is that you will be asked to determine what dollar benefits you receive, if you get what you ask for, because it's those dollar benefits that drive programs that say, In order to get this return on investment, you can invest so much in these different technologies.

And so that's the hard part, when people say, I've got all these requirements, but I don't know how to document what the benefits are, that makes it very difficult to do something with the information. But if you put your thinking cap on and say, how can we translate these requirements into benefits so that we can find some way of competing a return on investment, what's the economic value of our getting this data? It would be very beneficial.

DR. DANCHUK: We would love the chance to do that. We're actually very good at that.

MR. MURLEY: I'm not a scientist, but as a lawyer, I'll tell you, on the insurance side of the equation -- which is really important to us, and we've done a lot as a state on wind -- but we find ourselves in the morass of the federal flood insurance program. And we don't trust it.

So that kind of data would really be helpful, because insurance is one of the huge signals that comes -- that is a partnership with us in the private sector.

MEMBER ATKINSON: Any other comments? I was just going to say, we've got a few more minutes, and this is a chance for you to actually provide comment to the Advisory Committee on things you would like us to tell NOAA. You want to start? Just if you have a few words about what you'd like NOAA to do for you, or --

HON. LAMARCA: So unless it's changed, the National Fisheries is under NOAA, right?

MEMBER ATKINSON: Yes.

PARTICIPANT: Not us, though.

HON. LAMARCA: Not you? Understood, and this is not a criticism, other than to say that was one of the long, extended impediments to permitting a beach project after we had done everything that we needed to do. Again, as I talked to residents in the community, they asked me why it was taking so long?

I said, Well, we had to get a permit. It's kind of like after the hurricane, when you had to get a permit to replace your roof and take the blue tarp off your house; can you imagine if it would take you 19 years?

So, again, that was at the end of the process, but if it's a resource issue or an appropriation issue, I'm not sure; but that was one of the really frustrating parts of that process. Again, I know it's not this part of NOAA, but I do want to make sure that that's an area that if you could -- if you wanted folks around the communities to work with your agencies at the federal level, to advocate, we'd love to advocate for that, if that's something that can be solidified a little bit better.

MR. ANDERTON: So, I'm going to go back to the data. I think the port would very interested, just like Samantha, in having, if we could, real-time data near the inlet and even beyond the inlet, related to currents, et cetera.

I think we just recently worked with NOAA to get the tide gauge, which is a very positive thing for the port, you know, given our current depth of the outer entrance channel and the depth of our inner entrance channel. There's many times where the pilots are doing tide jobs, and the tide is not that great at Port Everglades. It's very minimal; it's not like the Northeast or other places where you have 6, 7, 8 feet; you're talking a couple of feet. So that real time data is very important for the port, for the pilots, especially from a safety perspective.

MR. MURLEY: I recently had the honor of being asked to serve on the Board of SECOORA, which you probably know the acronym, so I won't stumble through it. I find the regional approach, having been a federal employee working at NOAA decades ago, I think the evolution of that way of dealing with services and dealing with partnerships has really been positive.

One of the most positive things for Florida is that SECOORA is one of the few federal programs that doesn't split us in two. We're always on the South Atlantic region of somebody, and the Gulf region of somebody else, and SECOORA goes all the way around. So it brings everybody together. It's a strong program, it builds on our partnerships with universities. Dr. Dodge is a partner from NOVA, and also with the CZM programs, which are strong in the states.

DR. DANCHUK: I'll just say thank you for all the data products that we so heavily rely on. It's very easy for us to demonstrate the economic benefits, because they are used in ways you can't even imagine.

But I think my request would be to continue to support the technical assistance. As you mentioned, now we're starting to collect really high-density lidar data, and as Congresswoman Jacobs mentioned, we have an incredible amount of expertise in-house, but starting to be able to use tools to really be able to appropriately use that data -- we could use technical assistance with that. We're about at the point of hitting our limit.

Right, it's no longer simple to take those huge data sets and break them down into something that we can use, and NOAA has a great reputation for being able to provide workshops and technical assistance to kind of bring us to the cutting edge. So we would appreciate that.

MR. REYNES: Again, I want to say a big thank you for the invitation and for your patience, listening to our input. I just want to touch again on something we mentioned. We have basically a complete void when it comes to offshore data, because there are no -- we have no NOAA buoys here in Southeast Florida.

Before coming to Miami, I worked for almost 5 years in Hawaii, of all places, and in Hawaii there are at least five offshore buoys surrounding the islands. Before that, I worked in Tampa. There are two buoys there. So imagine my surprise when I came here and found out that there are no NOAA buoys in our offshore domain waters.

It's very important, not only because it helps to fine-tune the model data, which is crucial for the forecast, but it also gives us lead time to adjust the short-term forecast in terms of wave height, potential impacts on the nearshore time frame and the nearshore spatial resolution.

So I would say that my only request, if there's anyone here who can point us in the right direction of how we can make it clear that we need buoy data; not only nearshore, but also offshore, because it's a crucial component of both modeling for the future, and for the short-term issuance of warnings or verification when we have big events or are expecting hazardous surf or hazardous waves, especially in a place like Southeast Florida, that is so easy for our shorelines to be battered and sustain significant damage from big wave events and hurricanes.

RDML SMITH: Can you get just a bit more specific on the buoy? There are a lot of sensors you can put on a buoy; I think you're talking about waves, specifically here. Is that right?

MR. REYNES: Yes, wave height, periodicity to learn the size of the waves, that's crucial -- and wind, just the three basic components of buoy data, which are wind, wave height, and periodicity.

MEMBER ATKINSON: I think this whole thing is going to be a topic for a sub-group.

MEMBER THOMAS: Can I just say -- Tony, we just deployed a wave buoy off of Key West, off Pine Key three days ago. So that's a very high-resolution wave buoy; it's like Fort Pierce and Pulley Ridge. It's like the five around Hawaii, by the way, except for the one NOAA buoy.

Those are actually funded by the Army Corps in partnership with NOAA. It does not have met data, because it's very focused on waves. And we couldn't put it off Miami, because you've got that Gulf Stream there, and they don't do well before a strong current.

MR. REYNES: Right.

MEMBER THOMAS: So if you can find a place around here that we can get out of the Gulf Stream, we can possibly talk to the Corps about getting one offshore.

MR. REYNES: Fantastic. Yes, there's a whole group in the tropical analysis prediction branch of the hurricane center, the TAP-B, they cooperate with us. They have a proposal with SECOORA -- I don't know if you've --

MEMBER THOMAS: Right. Actually, I work real closely with Deborah, and I know she's getting one more wave buoy right now in the system. We're working on that; it'll be the same type. Once again, we have to find a place to deploy where we can't get in the Gulf Stream, because it will just pull it right under there.

MR. REYNES: Yes, certainly we don't want it in the Gulf Stream because of the problems. But having it upstream from the Gulf would be extremely --

MEMBER THOMAS: So we should talk about locations, and if you're working with Deborah, that's great. I communicate with Deborah a lot on it, so maybe we can follow up later.

MR. REYNES: Great.

MEMBER THOMAS: Like I said, these are just waves, they're not the ones that have met data on it -- those are really the NOAA buoys -- but maybe they can help you out in the meantime.

MR. REYNES: Fantastic, thank you.

MEMBER ATKINSON: Okay.

HON. JACOBS: And I'm going to be kind of a broken record on speaking with one voice. I've been operating from this for 20 years in public office, and at the very base of the success, the foundation of the Climate Compact here in Southeast Florida is that we started to talk to one another, and we took a practical and pragmatic approach to dealing with the issues that we were facing that were non-political.

There were a lot of voices trying to push us in that direction. I know as agencies, you tend to look at the science and do the work, but the real elephant in the room is the partisanship that is out there that can drive people away from the table, so you don't get to the change that you need.

The one connecting factor across both parties is the issue -- and I think Dave talked about this -- is return on investment. I am ranking member of the agriculture and natural resources committee, and I see bills as they come through policy and then through for financing, and then they go through the final government approval commitment before they hit the floor. So I'm in a unique position to see a bill four times along with the appropriations and be able of vote on them. So one of the things I'm continually asking for is, Did you come to the table with more than your appetite? What dollars are you bringing to the table?

And what you hear from a lot of communities throughout the state that have crumbling infrastructure and huge need is, they simply don't have the funds. We actually had a project recently that was a 99-year-old, clay pipe system that had crumbled to the point that the junctures where the pipe sections met had disappeared. Sections of it had actually crumbled and were going away.

They had no matching dollars, and when I said to them, We have a big budget here -- in that day, 130 water projects in front of our committee in one 3-hour period -- what are you going to do if you don't get funded?

And they said, Well, we'll just have to come back next year. So they had sewer water leaking, they had potable water that's being wasted, and they have no plans.

So what is the incentive for a state to get these communities -- 412 cities, 67 counties, and untold numbers of utilities -- all to start moving in the right direction?

One of those things is to foster unity and to foster miniature compacts. I think that for NOAA and other federal agencies, we need your technical expertise. These small communities do, but we can't ask you for it unless we take that first step, come to the table with more than an appetite to get ourselves unified.

But we need to know that when we do, that there is some sort of return on investment when funds are given out. So as a state, what I am working towards is that whenever we give dollars to communities, we're going to be asking, Are you working regionally? Are you looking beyond your current needs? Are you looking at future conditions, and not just the future conditions for your needs and your utility, but what about your neighbors'?

Because when your neighbors' systems fail or are inundated by salt water, and now they're coming to you for a potable water supply, that's something that you may need to think about, and you probably don't have the expertise to do that. But you would if you came together as a group.

So the issues are myriad, and I know that if we start asking the question, Are you acting regionally or mega-regionally, or certainly multiple cities within a county -- if we're asking that question in order for you to get funded, you know that to move to the front of that line, these are boxes we're all going to be wanting to be checking.

So to the degree to which you all are giving dollars away through grants, or looking at the merits of a program, is to start also asking that question, which helps us drive or underscore the point that regionalism and connecting together, speaking with one voice, assessing your regional vulnerability, and prioritizing what those needs are, are only going to make those communities stronger and make us better able to ask for, and you to give, dollars and technical expertise to a region.

There aren't too many efforts around the state that even come close to where we are in Southeast Florida, but they are happening. The Tampa region has begun these conversations. In Southwest Florida, those conversations have started, and certainly in Jacksonville, as a result of Irma and all of their multiple failings. They are also having the conversation, as well as other areas in the central-eastern side of the state.

So it's happening, it's fledgling; it's one of those issues that gets me out of bed in the morning to continue to create these things. And I'm not sure which of you can help me in that regard, but I would be very interested in trying to figure out what is an environment where we could do something like this and bring these partners together to help them understand the importance of resiliency and adaptation, and a foundation of trust built across party lines, across the jurisdictional lines and speak with one voice and get the resources that we need.

MEMBER DUFFY: I was trying to be quiet, but you inspired me with your comments. I'll say that this panel really struck me as excellent. I live in New Orleans, and I think it was that great environmental scientist, Dr. Mike Tyson, that said, Everybody has a hurricane plan until they get punched in the mouth.

(Laughter.)

 MEMBER DUFFY: Of course, we've all been punched in the mouth, and I think we have to learn to protect our faces. Some of the things that I heard about the deepening of the channel is something we can relate to. I like to come up with funny little catchy terms, so our beneficial use project we call Sediment Recycling.

So we're looking at restoring the coast. Our deepening project, if it ever does move forward, would create about 1,500 acres of land in the lower river. Hopefully some of the lessons we've learned will help maintain that acreage.

I wanted to thank the panel; I thought you did an excellent job, and I made a lot of notes. I really appreciate your time.

I think in porous soil -- we have porous soil, but we don't have anything resembling a rock. So it's a little different, just amazing, a couple of states over, the differences in the geology that make some of the lessons similar and some quite different. Thank you.

MEMBER ATKINSON: I'm going to thank the panel one more time for great presentations, thank you.

(Applause.)

MEMBER ATKINSON: Now I'll turn it over to Joyce.

CHAIR MILLER: We have time for discussion, but first of all, we are scheduled for a public comment period, and we do have one comment from the audience. He's with the National Weather Service, so can we have that public comment first?

MR. DELLINGER: Good morning. I'm with the VOS Program. I know that some of you have identified the need for offshore weather observations, buoy reports. Some of our local coastal forecast offices do run a VOS report. Every time a ship passes by their station -- for example, Key West -- they have a box that's outlined in one of their coastal zones, and every time a VOS ship goes by that point, they broadcast that ship observation.

Some of the observations are fairly high quality. Maybe the wave height, the viewpoint is a little bit different, probably less of a quality than you would get from a buoy, but it's a way to validate an observation or a forecast.

Some of our other forecast offices are going to start doing that; I know Miami has a plan to do a couple of different locations along their coastline. The only limiting factor is the observational accuracy, the location, is a little bit broad right now because we only record ship observations in degrees and minutes. So it kind of gives you a 36-nautical-mile square box; that ship can be anywhere in that box.

But in the coming future, we're going to increase the resolution to within 30 meters, so in the not too distant future, you can use those ship reports as a climatological study.

And to foster that, we've actually designated some ships as VOSClim, so the metadata that's collected from those ships is of such high quality, and the quality of observations from those ships, we QC on a very regular basis, we've determined that those ships meet the standards for climate research.

So when they pass a point that you're interested in, you can collect the current, real time, and historical data from NDBC and from NOAA.

CAPT. BRENNAN: Tell them what VOS means?

Mr. DELLINGER: VOS is the Voluntary Observing Ship program. We go out and recruit large commercial vessels and some private vessels, offshore production platforms, and they produce high-quality weather observations and a little bit of oceanography as well -- sea surface temperature, wave height, direction, swells -- things that are probably germane to what you all are doing on a daily basis.

There are 14 or 15 different PMOs along the U.S. coastline; we're in all the major ports. So if you had some research questions or you had a specific area you were looking for to get more data, you can always contact us, either at the local level or at the international VOS level, and we'll be glad to help you out with that.

There are some climate things that we are doing in order to help with the climate change research.

Oh, yes, my name is David Dellinger. I am the South Florida PMO, Port Meteorological Officer. We break ourselves into regions, so I cover all the ports from Tampa across to Cape Canaveral, south across to Key West and the Caribbean.

Almost every major port has a PMO; Charleston, New York, Baltimore, Houston, the Mississippi Delta area, and then also along the West Coast. We even have a PMO in the Great Lakes. So if you had a concern or a climate issue that you wanted to resolve in the Great Lakes area, we have a great network of about 850 ships in the U.S. and about 4,000 ships through the WMO programs for VOSClim.

So we are a resource, and if there is something that you needed help with gathering data in a particular region or area, we can recruit ships to take observations in high-density areas that you're looking to get information from. So we can get hourly information from some ships if that's something you're really looking for in the future. That's all I have.

CHAIR MILLER: One suggestion: I cruised in this area for 4 years, and there's a lot of bored boaters out there, I kid you not. And there's a whole weather reporting network that boaters sign in to. I'm a geologist, and I suddenly became the meteorological expert, because I had a good single side band signal.

But they report in on wind and wave conditions, and a lot of them have pretty sophisticated electronic collection systems now. It might be a resource that you could use, if the small boaters would be trusted sources.

MR. DELLINGER: There is a partnership -- the name escapes me right now, but there are sail classes of ships that do circuitous routes. They do it as groups, and we do recruit them not only to take weather observations, but also to launch ocean research buoys, especially along the Central Pacific, the South Atlantic. Whenever we find a group that's doing that, we'll get them to launch drifter buoys for us.

They do thermal sampling, salt sampling; there is a public-private partnership that has kind of been at the wayside for the last 4 or 5 years, just mainly due to lack of funding on the VOS side. But NOAA and the National Weather Service are starting to make a re-investment into that. So once we get the major shipping industry more on a stable basis, we're going to start utilizing the large sail boats and large private yachts for more information.

CHAIR MILLER: Are there other public comments at this time? Do you have anything from the webinar? Okay, time-wise, it's 10 after. We have 20 minutes, and we could continue the discussion during lunch if we need to, on the future for the technology committee.

MEMBER GEE: Yes, for the Technology Work Group, I think we got to where we are going forward. There were two issues, one where we're going forward with the group, and also the letter we have from the Science Board and talking about that.

So up until now, I think with the tech working group from the meeting last year, we were trying to do it every month, but that didn't work. Then there were too many meetings with the P&E as well. So it's now every second month, bi-monthly meetings, and really using the public meeting to review what we've done.

So I think that was what we're proposing, to continue to do at this stage as well.

VICE CHAIR SAADE: Yes, we wanted to put that in front of the panel, to keep up the routine of bringing new items two to three times in between these formal meetings, and then have a session like this, where everybody gets to do a data dump, and we can talk about what's been discovered.

So we'll do what we can to keep coming up with good ideas for the presentations, and we want to get agreement that everybody's happy with this format or not.

MEMBER LOCKHART: I am happy with the format, but I have a lot of problems with the way we do this, in that I have so many meeting invites to HSRP meetings in my calendar, and I know half of them are fake and half of them are real, and I don't know which ones I should be calling in to, and I don't have time to waste calling in to a fake meeting.

I don't know if there's a way to fix that, if there's a way to actually delete those that aren't happening anymore, or what's going on with that. But it really causes me a lot of strife, to the point where I just don't call in, because I don't know which ones are real.

VICE CHAIR SAADE: Okay. I'm not sure I --

RDML SMITH: I hear you. I recognize the issue, and I'm trying to look at Liz here, and Lynne, to work on the issue of scheduling too many HSRP meetings with too many different people, many of which are not relevant to them. Thank you for raising that.

CHAIR MILLER: I would also say that some of the meetings have been canceled because only two or three people would be coming, and I know everybody's got tight schedules. But if you can let Lynne know early that you can't come -- when she only had two people and we've got a speaker scheduled, it doesn't make any sense.

So I would encourage everyone to respond early, yes or no. And then we can know if that meeting will work.

MEMBER HALL: And I have one suggestion, because when we do get on those, sometimes it's somebody just talking at us, and I know that's what they are prepared to do. I guess my request would be that they be a little more interactive.

I know it's hard when you're calling in, and who gets to talk next; but we have the technology. The technology group did a pretty good job of it, from the couple of times I was able to call in in the last 6 months. It was more than just an hour of people talking at you. That was a previous HSRP administration, where we would get talked at, but just to continue that where it's more interactive, we're seeing some slides, there's a concept of what we're actually going to be doing.

I know that it was tough in the Planning and Engagement Group, because we never knew what we were going to be dealing with, and who was going to be on the call, and where NOAA was on the planning. So just a suggestion that we have an agenda, and that we do our best not just to have talking people at us. I appreciate that, thanks.

MEMBER GEE: Yes, we take your point. I think that was one of our concerns, that you have a 40-minute presentation and there's no discussion. So we would like to keep it down to short enough to allow people to engage with the subject.

I think from when we put our terms of reference in place, one was to try to look at interesting things that NOAA was doing, how we could contribute as a technology group; but also, I think we saw it as a broader education for our HSRP panel itself, to share the knowledge from subjects we weren't familiar with, so that when we get to the public meetings, we had a level of understanding so we could all have some input into that.

So if we're happy with the format, moving forward, we'll take note of what you say regarding that.

So to continue, Brianna Sullivan at CCOM is working on the supplementary data and things beyond just the charting, such as the Coast Pilot and all the other bits and pieces that go there, and how do you use the technology to spread that word and take it from a written publication that it's been for a couple hundred years, to -- a PDF really isn't a change, it's just a re-publication.

So using all of that data and making it more useful, and that does include standards, and she's working on that.

So that's our proposal for the meeting in May. I think the invite might have gone back, but it got withdrawn and put out again. We need to make sure people know when that is.

So that's our proposal; we've talked about Seabed 2030, and it has raised that. It sounds like it's going to be raised more generally as a subject with NOAA now, and as an operational, and we need to be careful in the technology group, I think we addressed the technology aspects of 2030.

VICE CHAIR SAADE: That would be the intent; there's plenty of good presentation material now that is strictly from a technology side, independent of policy types of things. And everybody is aware of this whole beginnings of getting aware of the tie-in to the blue economy and all.

So it seems like a good idea to talk a little bit more formally about what 2030 is, and how the process is going to work, then we can take it from there, relative to what the panel wants to do with that, or advise, or not get involved.

MEMBER GEE: So then more generally, I had some discussions here and some thoughts over the last couple of years, and they've all been basically Coast Survey-focused, all about technology input. And I was a bit concerned with that, and briefly discussed with Rich and Juliana is that any technology issues that you have, that you think we should be dealing with -- and one item I think I raised was, we saw you had a visit up to CCOM at UNH, and there was the success, I think, that Coast Survey has had from that.

So I would ask both of you, where is your equivalent to the Joint Hydrographic Center for NGS and for CO-OPS, and is that something that we should raise? Is it something that would be worthwhile to you? From a technology point of view, it's kind of a process that I would see that's not there. Maybe you don't need it, and it's just because it's a different organization. Then you have that internally, or you have informal relationships with academic research institutes. But that was just something I'd be interested to hear from you both.

MR. EDWING: So thanks, I've had a chance to think about that and speak with Andy. I don't really have enough of a requirement, and I wouldn't see a stand-alone center being needed. We get a lot of the technology we need from private industry and academia and other places. However, there are things that would be helpful.

And I think the better way to go would be to expand the mission of the Joint Hydro Center a little bit. At one point it was kind of billed as working with all three offices; it just never really worked out that way. That's not a criticism.

But I've had this discussion with Andy, and he's in full agreement, and I guess the grant's coming up next year for renewal. And that's the time to broaden the scope. They have helped us with a few things already, and I think there's other things that they could help us with.

But we don't have enough there for a whole new center. In fact, we're trying to integrate things, and having separate centers may not be helpful for that. So I think the real solution and the most cost-effective solution would be to broaden the mission and the scope of the Joint Hydro Center a little bit. I can't speak for Juliana, but certainly from my perspective, that would be very helpful for me.

MS. BLACKWELL: I'll follow up with that; this is Juliana. I think you were asking the question the other day about what is the equivalent? And no, we do not -- and I agree with Rich, we don't really need a separate center for that. But I do think that there are opportunities with the Joint Hydro Center. We did have an individual there who was focusing on some of the remote sensing aspects. We don't have an employee there at this time.

But I do think that there is an opportunity, especially in the remote sensing side, to work at JHU, maybe even on the geodesy side.

The bigger picture for geodesy and for us trying to work with academic partners and also look for recruitments to come and work at NGS, we've reached out to a number of institutions, but there isn't just one university. There used to be The Ohio State University, which was the place to go. We've been doing some work with Oregon State University; we've been doing some work with Ohio State University and others.

One of the things that I've been looking at is the whole cooperative institute structure within NOAA. We don't have a direct connection, clearly, with a cooperative institute that focuses on geodesy/remote sensing, although there are pieces here and there with the existing structure as it is now.

But I also understand that there's an opportunity in the future, maybe to re-craft that. I don't know if that's an HSRP topic or not, but I think it's at least good conversation to have amongst the people who are part of the HSRP, whether or not it's part of the official agenda or not.

MEMBER GEE: I guess raising that was just that on the tech working group, we're feeling guilty that we haven't addressed any of the things that seem to be appropriate to your groups. The first question was, Was there anything for that?

But then, broadening that thought is like, Well, yes, we're not quite sure. We've talked a lot about the UNH and the Joint Hydrographic Center, and it seems like we should be talking about some of that, because that is part of our role as the technology group for the HSRP. We should be addressing the issues you have.

That's what we were concerned about, were we doing that, and should we be doing more for you?

MS. BLACKWELL: If I could just follow up; I would feel very comfortable with saying there are some ideas that we have, as they come up in conversation within NGS or with some of our partners on some topics. So if we can keep that door open with suggestions that we have you to consider, I'd feel very comfortable just bringing that up as things develop.

VICE CHAIR SAADE: So the other idea is some of the information briefings that we've done, like geodesy and when Carol took the lead on all things coastal lidar. One of the things that popped up this week was maybe doing a session on subsidence, and whether anybody's interested in that, to talk in more detail about what's being done with measurement and the different types of research programs. So we'll throw that one out to the panel.

MEMBER HALL: I think one of the things that we're going to go through a little bit later, hopefully when we come back to the planning and engagement working group, I still have the list. So that top five is just our top five. That doesn't mean there aren't another dozen issues that we are keeping track of. And I'll make sure that gets put up on the screen, so the folks know that we're still tracking on those; those are just our top five, where we wanted to be doing something either at our meetings, the webinars, or be an issue paper.

So I'll make sure we have that, and then hopefully this afternoon we can add to that, and that will be part of this survey as we move forward to re-prioritize our topics of interest.

MEMBER GEE: I think we were very conscious of that, but it was trying then to address the -- it's hard to -- not all of those had technology issues. We're also trying to drag out those technology-specific things that the working group can deal with, and we had expertise that we could draw from.

VICE CHAIR SAADE: Go ahead.

MEMBER THOMAS: Are you looking for ideas for the technology working group to discuss? This operational forecast system; I'm always interested in the validation we had in these models. Things like that. I would have several ideas that could be discussed from the technology point of view. But they don't really fall in the charting area.

MEMBER GEE: That was my concern; it's not just charting. It's the broader -- we're responsible for, as an HSRP, that was my concern was just charting. So I am interested. It is moving up, probably you're leaving the technology working group eventually? You know, we will be looking for more members and co-chairs.

MEMBER THOMAS: Wait a minute.

(Laughter.)

VICE CHAIR SAADE: That's a good point. We didn't drag anybody into the technology working group who's new. We have to do that.

Julie, some of it is just for information and educational purposes, so some of the things that you do and that you're involved in would be probably pretty ideal to have as a breakout session or as a dedicated session.

MEMBER THOMAS: Okay.

VICE CHAIR SAADE: Okay? All right. Then before we break, to get this one back in everybody's head, I think everybody's read about it in terms of the SAB, which I never heard of before, has reached out to us to start a dialogue and see where there is overlap between what the panel is doing and what they are doing.

So I would say that what we want to do right now is bring this to everybody's attention. And before we jump too far into what all the good ideas are that there might be, we should actually talk to the SAB and find out what they are interested in, because we have not had any direct contact with them yet.

So if we can all agree that this is a good idea, and then whoever wants to reach out to talk to them, I'm happy to be the point to break the ice and see what they're looking for, or we can send a formal letter from the panel, I guess.

CHAIR MILLER: At any rate, I would say that probably since the letter was to you and me, that we should say, Yes, we are interested -- if we are interested -- and arrange a phone conference to talk about it.

A couple of things that I have learned from Larry Mayer; he's been involved with the Science Advisory Board for a long time. He said he wasn't aware that they had ever reached out to another FACA. They do have technology working groups.

And the other thing we did was, we looked at the membership of the SAB; there's not a marine scientist. They are weather people, they are satellite people, et cetera, so I think they've been tasked by -- if not Admiral Gallaudet himself, by the administration to look into these things, and have recognized that they don't have the in-house expertise. And perhaps they've been made aware of our issue papers and such. So that's just a little background. I'll turn it over to Russell.

DR. CALLENDER: So I get to leave beautiful windowless room Miami and go up to the SAB meeting on Monday, so I'm happy to raise this issue there. I will say my observations mirror your own, Joyce. This group is really focused on weather, it's focused on satellites, and they're not focused at all on any of the marine-related sectors, and I think the time is long overdue to push them harder. They can add some value to what this group does and find some synergy.

 So I'm happy to stir the pot and help you where I can to make those connections. I won't reach out too far; I'll get some ideas on maybe what you would want me to say specifically, but I'll be happy to be that conduit if that will be useful to you.

Secondly, one observation about the SAB that I just wanted to bring up every briefly: Over the last couple of years, what they have done is, they have brought in people that I would call futurists. They're looking at things like exoscale computing; they're bringing in the IBM Watson team to see what artificial intelligence things they can bring.

So what they've done is, they've brought some people in -- I wouldn't call it the fringe -- but they're on the fringe of some really cool thinking that might be useful to mirror that sort of approach here. You know, what are some of the trends in geodesy that we need to focus on? What are the trends in hybrid autonomy?

So we could bring in some of those kinds of groups, some of that futurist thinking to stimulate the thinking in this group. It might be a fun opportunity to scheme and to learn from those folks. It's something you could steal from the SAB that might be sort of fun to consider.

CHAIR MILLER: Let's maybe get together over lunch, you and Ed and I and talk about where we want to go. We need to go to lunch very soon; I don't know if anybody's starving yet, but I'd welcome other comments.

MEMBER THOMPSON: The AI idea is great; our agency is currently partnering with the University of North Carolina Charlotte and the North Carolina Department of Transportation to do an AI project involving lidar and bathymetric data. So I think that's a very good topic that we should look at.

CHAIR MILLER: We talk about the future with the prioritization and so forth; this should be added into the mix of what our priorities are. So we need to put that into the prioritization effort, because this could turn into work, and again, everybody has limited resources.

Time for a break.

(Whereupon, the above-entitled matter went off the record at 12:34 p.m. and resumed at 1:34 p.m.)

MS. MILLER: Good afternoon. This afternoon we're ‑‑ excuse me, I'm not very well organized right now.

This afternoon is mostly internal deliberations for anyone who are, who is here. We don't have many, we don't have any panels scheduled. It's mostly a conversation.

We're going to have an update. We're going to continue with the planning and engagement group discussions on priorities and recommendations. And we're also going to have a brief update from the newly reorganized emerging arctic working group priorities.

So Dave and Kim, if you want to carry on your --

MEMBER MAUNE: Okay, thank you. Can we call up the first issue paper, please? The Blue Economy. Okay, that's got ‑‑ can you make that wide screen, see as much of that as we can with the largest text? You can explain what happened.

MEMBER HALL: Let me just do a quick ‑‑ we had gotten a paragraph from Glenn as requested, it just didn't fit in this context. So Joyce did a little bit of rewickering to get rid of, to acknowledge that it's being acknowledged, but to continue to ask the administration, NOAA administration to stress the importance.

We added Blue Economy where we could and brought that bottom line up front, a little bit more up front. Much appreciated, Joyce. I appreciate it.

So it should have gotten sent to you all a little while ago. I know it's tough when we're in the middle of panels to read the papers as well. But I think it is very similar to what it was, but just takes into account the Secretary of Commerce's comments on the Blue Economy and the importance of precision navigation.

MEMBER MAUNE: Can I see more of the yellow text there? Scroll down a little bit, please.

MS. MILLER: Okay, the yellow text in the first paragraph is pretty much what we had before, but it was moved up to the first paragraph. Those two sentences are pretty much as they were before.

It's the next paragraph where we tried to use the Blue Economy and transformational infrastructure and other, other phrases that have pretty much recently gotten new meaning, I guess I would say. So it's the second paragraph people should probably ‑‑

MEMBER MAUNE: Can you scroll down so we can see that whole paragraph there? Scroll down, there, that's fine. Let you people read that.

We brought in the transfer, transformative infrastructure there.

MS. MILLER: Return on investment in the next sentence.

MEMBER MAUNE: Yes. Any objections to these changes?

MS. MILLER: I was writing this at midnight last night, so improvements are appreciated.

MEMBER MAUNE: Anybody have any feedback, comments? The rest of the paper is unchanged. Is that correct?

MEMBER HALL: The only question I had as we go farther down, so I think we can take some of the highlighting down. But if you could go down where you see highlighted text, down?

So there, I put "approximately." I couldn't find a squiggle on my symbols, so I thought approximately fit in that line. So I just made it "approximately."

MS. MILLER: I added, "depending upon the cost of oil," as Julie had mentioned.

MEMBER HALL: Okay, if we keep going down, please? I'd just, I'm curious as to how we're using bolding and italicizing throughout the paper because we had used that for our bottom line up front. I highlighted these because I saw that and I wasn't sure. I just wanted to ask the question.

MS. MILLER: We might want to make those italics, rather.

MEMBER MAUNE: Yes.

MS. MILLER: That was done in some iteration of the paper. I cannot, I, there is not consistency there.

MEMBER HALL: Okay, yes, I just wasn't sure what the, what we were trying to highlight because there's a lot of, kind of, other things with numbers and costs. And just wanted to make sure that we were, like I said, being consistent.

MEMBER MAUNE: And, Lynne, when you have formatting people look at this, do they decide what they think is appropriate to be italicized versus highlighted?

MS. MERSFELDER‑LEWIS: No, but I can help you guys do that.

MEMBER MAUNE: Okay.

MS. MILLER: I think italicized versus bolded would make sense that these are ‑‑

MEMBER MAUNE: Yes, it's too much bold there.

MS. MILLER: Yes.

MEMBER MAUNE: Okay.

MS. MILLER: Let's look at the final recommendations. I want to make sure those are ‑‑ the reason "marine" and "geospatial," that had been "marine and maritime" in one iteration. And I changed it to geospatial to be more consistent with the ‑‑

MEMBER MAUNE: And we made some other changes recommended by people at the panel yesterday. Okay?

MS. MILLER: Juliana, would you check that that bottom, the final reference is correct for me?

(Off mic comments)

MEMBER MAUNE: Okay, can we vote to approve this as written, as changed? All in favor?

(Chorus of ayes)

MEMBER MAUNE: Anybody opposed? Okay, let's move onto the next paper then, please.

Okay, and here I think most of our comments were on the second page. So we can move onto the second page to where we see some things highlighted in yellow. And that paragraph right there, that was where we had discussions on how are we going to rewrite that.

And Rick came in with the suggestion that we delete that entire paragraph. Do you want to make any comment on that, Rick?

(Off mic comments)

MEMBER MAUNE: No? You just recommend that whole paragraph be deleted. He felt it, he told me he felt it really wasn't adding anything to the paper. And that ‑‑

RDML SMITH: I haven't looked at the whole thing in context, but I agree with Rick that putting a specific performance measure in there that we have not yet vetted in the other places that we talk about performance measures would be premature, and we might end up regretting it.

So if there's a way to have some of the spirit of the paragraph without the specific performance measure against, I think that would be helpful.

MEMBER MAUNE: Were you, are you recommending that something be put back in there that represents the spirit of the thing?

RDML SMITH: I'm looking at Rick, and he's ‑‑

CAPT BRENNAN: I don't think so. I mean, I appreciate what you're trying to do, but at this point I don't think so. I mean, I, the only other edit that I had I was trying to do in the context of the online document and I, in the, it's in the digital files and I could not, but was at the bottom of the document where it says, "the HSRP recommends."

MEMBER MAUNE: Want to scroll down some to see that? Scroll down the page to where it says, "HSRP recommends that NOAA should..."

CAPT BRENNAN: It's a little more ‑‑

(Off mic comments)

MEMBER MAUNE: There's actually a third bullet underneath that, too.

(Off mic comments)

CAPT BRENNAN: So that, I guess what we were trying to say ‑‑ no.

(Off mic comments)

MEMBER MAUNE: Is that the part you wanted or the ones, prior page?

CAPT BRENNAN: The part above that.

(Off mic comments)

MEMBER MAUNE: Scroll up, please.

CAPT BRENNAN: Right there. So we are capable of surveys of a series of multiple launches. I think the only thing that I would like to add to that or supplement is that "multiple launches."

I think what we would like is we're, in looking ahead is that, yes, it may carry multiple launches but we would like it to be capable of carrying autonomous underwater vehicles, ROVs, ASVs, LMNOPs, PDQs, right.

We want all of that, not just launches. So I think we want to be a little more ecumenical about what it's carrying than just launches.

MEMBER MAUNE: I couldn't write fast enough to get what you were just telling me there.

(Off mic comments)

MS. MILLER: Well, I would say "and/or other" ‑‑

CAPT BRENNAN: Yellow things.

MS. MILLER: If you didn't hear it, his suggestion was "yellow things."

CAPT BRENNAN: So you can just say multiple launches and autonomous and remotely operated vehicles.

MS. MILLER: Okay, launches and autonomous or rogue ‑‑

MEMBER HALL: It just, it sent us to the next page.

MS. MILLER: No, if we take that paragraph out.

MEMBER HALL: I just took it out, ma'am.

MS. MILLER: Why?

CAPT BRENNAN: You just took out the other paragraph on the document, right? I mean, so that's ‑‑

MEMBER HALL: Right, but we're on the third page in this one. If I take that paragraph out, we -- can I add that line in when we go through the investigation?

(Off mic comments)

MS. MILLER: Well, okay, I will. I would add to that. I had one more question. Let's, okay, Lynne's working on that, or Kim's working on that.

MEMBER MAUNE: Multiple launches and ‑‑

MS. MILLER: And/or ‑‑

MEMBER MAUNE: ‑‑ autonomous and remotely operated vehicles.

MS. MILLER: Yes.

MEMBER MAUNE: Okay.

MS. MILLER: Can we go back up a bit? There was something that Admiral Hann said yesterday. Go up another paragraph, please.

Okay, what I heard from Admiral Hann last, yesterday, was that there was $75 million in 2016 and $75 million in 2017. And that figure had come earlier from the fact check I tried to do, I did with ‑‑ and it wasn't, Rick, you didn't ‑‑

CAPT BRENNAN: 155 is correct. The first year we got $80 million, $75 million of which was to go towards the, towards the vessel itself. Five million was to help reinvigorate the NOAA shipbuilding infrastructure that had, that had been emaciated over the last 10 years.

MS. MILLER: And 2017?

CAPT BRENNAN: It, no, that would, it would have, it would have been '16. So it was the very first installation that we got. I believe it was $80 million, and then the second one was $75 million. So that's why the combined is $155 million.

MEMBER MAUNE: No, we changed it yesterday from 155 to 104. So that was wrong?

CAPT BRENNAN: Yes, and I guess I can't put those numbers.

MEMBER MAUNE: Right now it says $104 million because we changed it from that, from $155 million yesterday.

MS. MILLER: Yes, someone had come back to me and said it was only, a smaller amount. But from what I heard from Admiral Hann yesterday, she said it was $75 million in both years.

And so I would say we need to change that back to $150 million in that she should be the knowledgeable reference.

CAPT BRENNAN: Yes, I mean, it's an accounting game, right. I mean, but yes, I think that the, I think the line that we have is $75 million per year ‑‑

MS. MILLER: Per year.

CAPT BRENNAN: ‑‑ that we're getting, and so that's what we've got to figure, so.

MS. MILLER: Okay, so we need to change it to $150 million. And I think we can deal with the length issue with NOAA editorial.

MEMBER MAUNE: We'll figure that out.

MS. MILLER: Yes, we'll figure that one out. Don't worry about the length.

(Off mic comments)

MS. MILLER: Yes, okay.

MEMBER MAUNE: Okay, and then if we go back down to the bottom of the three recommendations. The third recommendation on the next page, we changed that to integrated, did we not? Yes, integrated approaches.

And then we added the other reference at the bottom. And, Andy, I think you said there should have been a date on that?

MR. ARMSTRONG: There were several versions of that; 1974 is the last one. It has been amended several times since then.

(Off mic comments)

MS. MILLER: Yes, that's a, that's a check we can make through NOAA just to get the, make sure that we are correct, so.

MEMBER MAUNE: Okay.

MS. MILLER: Given those changes, I ‑‑

MEMBER MAUNE: Do we have concurrence with these changes, subject to minor wordsmithing? All in favor say aye, or raise your hand.

(Chorus of ayes)

MEMBER MAUNE: Opposed? Okay, thank you.

For the third of four subjects, I wanted to just let people know the status of the controversial topic we had yesterday on licensure of hydrographers and photogrammatrists, et cetera.

I'm sorry that I got us stuck in a, on a dime there yesterday in such controversy. I apologize for that. We spun our wheels for a long time and got nowhere. And I did an informal query of other members of this panel, and it was pretty unanimous that we should drop the subject.

I would also add that I've had discussions with Gary Thompson. He knows the concerns that I've had about the NCEES exams and the issues that I've encountered in some of the states.

He says that NCEES is responding to those kinds of issues, not just from me but from other people, and that this August, I think, there's going to be, there's going to be an exam task force responding to those kinds of issues, giving feedback to the public on that.

And from my perspective, if they can address those issues, a lot of the concerns that people here raised may go away. They're talking about having modular exams for boundary surveys separate from exams for hydrographic surveyors or photogrammatrists or what have you, or for the remote sensing technologies.

So with that, I think we had a good talk yesterday, Gary, and that there's a way forward here that might satisfy our needs. So I would like to just drop that subject now because I don't know that it's in the purview of HSRP to come forward with any viable recommendations to NOAA on that subject.

With that being said, unless anybody objects, I'd like to proceed to turn this over to Kim so we can address the issues of prioritization.

MEMBER HALL: I think my only question though, I think that Joyce owes an answer back or we, to that letter that we received from ‑‑

MEMBER MAUNE: Okay.

(Off mic comments)

MEMBER KELLY: Yes, I think we definitely need to reply, and perhaps just short and succinct. "We appreciate your concerns. We have taken it under considerations, and regret" ‑‑

(Off mic comments)

MEMBER KELLY: Yes, I'll just put some and send it over to you. Yes, and just, basically, "it's beyond the purview of the bounds of this panel," and ‑‑

(Off mic comments)

MEMBER GEE: So can I just comment? We spent a lot of time discussing that and there's obviously a lot of interest in it. But are we saying even in the final letter from the, normal end‑of‑meeting letter, there's no mention of it at all as well?

MEMBER HALL: I'm sorry, I'm just, I meant in, we need to write a separate letter in response to the Association because Joyce got one delivered to her.

So I think we need to answer that with a copy all. Not our purview, that there are a diverse number of views on our panel but this is not where we deal with it.

And then I think we do need to mention that that is something that the panel decided in our, in our summary. Maybe not the letter itself, but I know that you also attach a two‑page summary. To say, "Hey," that way there's some record that we have considered and moved on.

MS. MILLER: Yes, and I, as we are moving on, as Kim does the discussion of our priorities, we have the priorities of where we go next.

We also have to think of, as we're doing that, in the recommendation letter we try to have two or three very, sort of, consensus recommendations to the administrator. And that's, we probably ‑‑ so there's that, and that's in the letter.

And then the next two pages are a summary of the meeting. And what I may do, once we get ‑‑ so we need to think about not only what our next projects are, but think about, from this meeting, what are the three most pertinent ‑‑ they don't always have to be new recommendations, Lynne pointed out to me.

Sometimes it helps to reiterate things you've already said because it may take several cycles to, kind of, for things to bubble to the top if they really are important to us.

Okay, so we've got the fleet paper and the infrastructure paper that are going, and so those go as attachments. And then we have the two‑page summary. And what I may do, we probably, I hope we have plenty of time.

What I've done once before is once we've decided on what those top level projects were, I had people break out for a half hour in three little groups to, kind of, summarize.

For instance, we could summarize the main observations from the two panels and what we should include in the summary. And from that, then we bring out the top level things that we should make recommendations on.

So that's what I want to look at as Kim does the prioritization, and talk about.

MEMBER HALL: I think we have a list going up, or is that not possible, Lynne? Okay. Just make it all one page if you could. I don't want to go up and down. And it should be ‑‑

Okay, I think I need it tinier so I can at least ‑‑ and I can, I'll tell you when I need you to zoom in. How's that sound? Okay.

Okay, so this is just a view. These are things over the last two years, and really in the last meeting, that I have collected and that we have talked about when we go around the table. And so some of these are ones that, when I sent out that initial survey, these were the ideas that we talked about. But I asked for additional ones, potentially.

So I got a couple of others as suggestions, which I realize after the fact was a little unfair because you couldn't then go vote on the new ones. So they didn't float to the top.

So what I, what I, only thing I want to do today is talk about our topics and what we have brought up. And now we can take one off, which is nice, and think about it in different context than what we'd had here.

There's an instance up there that says "local stakeholder inputs." We are always going to have those at any one of our meetings. And so I might pull that out as an action.

Hey, so we want this idea, so the modeling ‑‑ and I was talking to Rachel at lunch. Is there something that's happening in Alaska related to the modeling that we've been talking about that we can get the context, but we're still interested in that subject?

So what I want to do today, give you all maybe 30 seconds to give me a couple of ideas if you don't see them up there.

And I'm happy for him to go ahead and now scan in there. And if you could blow it up?

And all we need to see is the topic, because I just, I started to put brief descriptions in and then that became not a labor of love, a labor of no fun. That's good enough, thanks.

So I put the numbers into anything that made it to the top five, which, again, I'm going to blame Mr. Thompson on giving us the idea that we do the top five, which I think was a great idea because it gave us somewhere to focus.

And the whole idea of doing this was to give us some idea of what we needed to do, as Joyce repeated yesterday, on the issue papers, but also interim, from between meetings, what we're going to do on telecons, where we can get some more information from NOAA, and then really what we want to see at the next meeting.

So I know we keep getting requests for what do you, what topics do you want. I think this should be also a tool, and for which, informs how NOAA helps us put together those panels.

So I'm happy to say, if you go down a little, or the certification of hydrographic surveyors, my plan is to remove that from this one, as well as the local area inputs, because I think that's just an action versus a, versus something that we actually focus on.

I'm going to let him scroll, let you all look and then, again, give you guys a quick round robin to give me some other ideas, if there are any. I think we have quite a list. Or if anything needs to be removed, we've dealt with it, or it needs to be, kind of, put to later.

And, Joyce, you'll notice education is up there. It was a separate issue from certification. I know you mentioned that to me the other day. So just wanted to give you guys a couple, minute, to look at it and then we'll start with probably not a new member. Or do you want to start?

MEMBER MAUNE: I have a question on the information infrastructure. How does that differ from the maritime and geospatial ‑‑

MEMBER HALL: It doesn't. It just, that was what we called it before we called it, we coined the term..

MEMBER MAUNE: Okay, so that could basically be written off too, could it not?

MEMBER HALL: I think it's something that stays on our list of items to keep track of. I don't think we remove it, but maybe it's not a top five priority anymore until we get feedback from the administration and we see something change.

But that's what they, that's what the survey will go on to do. Let's put these topics up there and if somebody thinks we need to do more, you vote in the top five.

MEMBER GEE: Your labor of love that you started I think is really useful to, probably for new members particularly, to ‑‑

MEMBER HALL: Indeed, and I would love anybody who wants to give me input. Wait, I'm sorry. Let me be like Dave. Give me input now.

MEMBER GEE: Yes, okay.

MEMBER HALL: And then I will make sure those go in there.

MEMBER MAUNE: Julie's got some ideas, I'm sure.

(Off mic comments)

MEMBER THOMAS: Okay, just don't volunteer me for anything now. So, to me, the USACE NOAA partnership, I look at that and there are probably four topics there that I see that would ‑‑ so I just wanted clarification.

MEMBER HALL: So that has been an ongoing thing. And if you look at the top five list, and I think it's been on all of our emails, and I apologize, I don't think it ended up ‑‑ or did it end up in ‑‑

MEMBER THOMAS: It did end up on them.

MEMBER HALL: So if you saw, it, what we requested was to get periodic updates from Shep. So we were doing a lot to talk about it, and Shep and his team have been doing a lot behind the scenes to improve that relationship.

But we don't ever want to lose track of it because there's a lot of important issues. There's not one specific to that.

But we weren't writing issue papers yet. We weren't, we were kind of circling, waiting for feedback from Shep where the panel could be helpful in improving or highlighting something.

So they're all a little different, that's why the action requested underneath them. But I'm happy to put a little bit more clarity in what that was.

MEMBER PAGE: I have a quick question, if you go back up, scroll up if you would. As Dave just mentioned here about this ‑‑ a little further up. Information infrastructure, I guess I ‑‑

(Off mic comments)

MEMBER HALL: I'm going to hold us to it. I want to make sure that Julie is happy. I know that you, we need more context. There's no context for you right now, I understand.

MEMBER THOMAS: Yes, I mean guess that's it.

MEMBER HALL: And so it, this was a, this is a, for me, it's a Bill Hanson issue. And I just, if somebody else can give me a couple of words to put there.

MS. MILLER: I'll take it, I'll take it.

MEMBER HALL: Yes, I appreciate it.

MS. MILLER: Okay, in specific, what we have been tracking is the issue of, it's in one of our issue papers and I wish I could remember. Sorry, I think I'm catching Andy's cold and my brain is not working.

The issue is that NOAA and Army Corps ‑‑ and we've heard it this week again, it's not clear, certainly not clear to our stakeholders, who is responsible for mapping what in our channels, and --

(Off mic comments)

MS. MILLER: But it's broader than that because Shep's been working on a Memorandum of Understanding, or whatever you call it, between the Army Corps and NOAA for a long time. It's a very long process. And, Shep, if you want to update us on that.

RDML SMITH: Yes, it's really, I mean, I think the short, brief description just should be surveying and charting in channels, period, right. Because there's a lot of other things that we could talk to the Army Corps about from modeling to CDIP and all this other stuff.

It's not, that's not the issue. It's about surveying and charting in federal channels, yes.

MS. MILLER: Yes, it, yes that's sort of what the issue paper is.

Even though I'm a hydrographer, it took me several years on this panel to understand that the standards for charting in our channels are not followed in the same way by the two organizations.

And if you haven't read it, I mean, it was very eye-opening to me that we may not be meeting the national, international hydrographic organization standards in all cases.

MEMBER HALL: Ed had a question. I can walk through these very briefly. I know there's folks in this room that are a lot smarter on what we meant by these.

But the first one there being autonomous vessels, that was the emerging technology. The technology group is looking at it, and we were asked by NOAA to look at the strategy. So that's something that's staying there. We've given those inputs.

Moving on, subsidence and sea level rise, that's a Larry one. Kind of got a little bit of that today. And are we taking it now towards the technology? Is there technology that can help with this?

Information infrastructure is what ended up turning into the marine geospatial ‑‑ what was the word that you guys came up with?

(Off mic comments)

MEMBER HALL: Data infrastructure paper, so we hadn't quite defined it yet. But we were asked because of the administration's look at infrastructure. So Glenn had given us kind of a, hey, let's think about infrastructure. And that's what that is.

Education is, again, kind of promoting the education of hydrographers, oceanographers, the, kind of the gamut. And I know Joyce knows more about that.

Enhanced navigational assistance is what we relate to the, kind of, the precision nav expansion of ports, so always on our radar if we need to update the precision navigation paper or not.

Crowdsourced data is a consistent one. Kind of how do you incorporate those non‑authoritative data sources?

Disaster response, which I think Glenn kind of answered for us in a lunch session. We were all very surprised in the middle of Irma, or Maria, whatever the one it was while we were in New Hampshire, that they were scrambling to find, kind of, sweep up funds because most of the hurricane season is at the end of the fiscal year.

And so how can NOAA do a better job or what else could they do to ensure that they have the money they need, especially if they're not going to get reimbursed by FEMA?

But again, something that I think NOAA has been dealing with, so not quite as big a question. We wanted more information to understand.

Offshore charting, that was always Lawson's, with regard to the kind of arctic offshore leases, specifically.

Managing big data and databases, which we didn't get to. And I think I actually got my one in the wrong one, because that was one of our top issues.

And that's just kind of exactly what it says. You're getting all these data sets. How do you manage that? How do you, are able to produce things out of it? And again, I think the technology working group was going to look at that if they haven't already. I can't remember. We had a presentation in the last few months on it.

Technology transfer, Ed talked about that. Ed Saade talked about that and the, kind of, the interest of what NOAA is doing and how you transfer that and how private industry can take it and move it forward, and the ROI piece there with making money off of it as well.

Stakeholder feedback for NOAA products is kind of a consistent thing that's ‑‑

(Off mic comments)

MEMBER HALL: That's kind of why, one of the reasons HSRP exists, right. We want to make sure we're getting feedback and looking for external stakeholders.

And again, I think that's something that's just always something we should be asking for in every meeting. So maybe it's not something here that we do something about, it's a supporting function.

I already talked about the local stakeholder input. We've talked about the Army Corps and NOAA partnership.

The offshore observing sites, so this came from I believe, Rich, about, kind of, how do we harden those sites given weather events, aging infrastructure, those kinds of things.

The public-private, or satellite‑derived bathymetry was something that got inserted into the initial survey which asks for other topics. I don't recall exactly who, and I tried not to actually track specific people's answers. I just tracked if you took my survey.

The public-private partnerships is something we've heard over and over again during this meeting. It's not new to this meeting. And I was looking for a little bit more clarity on how we wanted to, from the HSRP perspective, move forward with that.

And as requested by Joyce, I added the science advisory board, and I decided to call it cross‑pollination until we have a better idea of what exactly they're looking for from us.

So in a nutshell, that's been kind of all the topics over the last, at least, year, if not longer, I'm sure, that we have been talking about in some way.

And a lot of it we haven't done much with because we're just kind of waiting for updates. And some things, I think, other members would like to move forward and do something about.

MEMBER MCINTYRE: Kim, I think you've done a great job of pulling together that list. The one thing that kind of pops out at me with that is there are certain subjects that we just would like to be updated on, and kind of follow what NOAA is doing with them.

And then there's other ones that are, kind of, action items for the HSRP. And I'm wondering when we do, kind of, rank those priorities, perhaps if we pull them out into one of two categories, or maybe they're kind of in both categories. But that would just be my thought.

MS. MILLER: Yes, I think in many of those we can put a check mark that we've done something about them in the past six months.

For instance, we've got the two papers, we've got the, we have an answer, for instance ‑‑ let me say this. The Science Advisory Board, Russell Callender thought it was a very good idea that we respond.

They are meeting next Monday and Tuesday. Turns out Ed Saade is supposed to be in Washington on Tuesday.

And what we thought we would do was respond positively, if that's in agreement with everybody. And Ed would go and we'd send a brief memo. Ed and I would send a brief memo and say, yes, we're very interested. Please tell us more. You know, an informational request, and then we can figure out what to do from there.

MEMBER HALL: I think that's a great point. I think this needed to evolve. I was just trying to put something together, especially with a tool that, unless you pay for it, you don't get a lot of functionality. So I'm happy for, also, inputs on how we can do this.

But I think, yes, when I first put this list together, I think it's important there's kind of things that we're tracking and things that we're doing.

I'm going to go ahead and let Mr. Duffy, Senior start. And again, if we could do it just kind of quickly. And happy for a couple of words that I can put in there so that there is some context for folks who aren't here today, especially.

MEMBER DUFFY: So first of all, I appreciate trying to come in and comment. I realize it's easier to edit than to write. I will say that I saw a couple of things in the precision navigation paper that, I think Captain McIntyre used the term living document.

In one place it says, thereby ensuring safe and efficient operations. I don't think we can ensure anything. But I won't go into detail there. I think there's a couple places that I might be able to maybe revise that.

The partnership with the Corps of Engineers is very important for our operations. I've attended the Mississippi River Commission for many years, and I think that's a great benefit to our members and the NOAA perspective there.

There are places on top of charting that may also be interconnected. Air gaps on the Mississippi River are a huge issue. And between the two agencies there, in some places, different, low steel elevation. So I think that partnership is a good thing.

I know in different sandboxes they can look like, you don't want to tell the Army Corps what their mission is. And I know their, I've been in part of some of those discussions behind the scenes.

And I know you'll, Admiral Shep, will be cautious about keeping that in the we're here to help each other mode, and not be controversial or against.

The other thing that I would say off of what I saw, of course I live in a very mushy area, so subsidence is a big deal to us.

I will offer that, being in New Orleans in 2019, if you don't talk about subsidence, you may have people from the audience talking about it. So maybe getting out in front of that. It means a lot of different things to different people, even within the state.

But those were the ones that were really important to me. And beyond that, being the new guy, I can't comment on some of the other things. I trust the other panel members in their area of expertise to, kind of, chisel away at it. Thank you.

MS. MILLER: Each time, I would really encourage the new members to, and as you obviously have done with precision nav, to read. We have updates ‑‑ precision nav paper, because of the testimony of Secretary Ross, Commerce.

We just updated the fleet paper because it was not current. If you have suggestions for which papers could or should be updated, please do it. And probably we will then say to you, well, you're elected.

But no, I encourage you to read all of them and find out which ones are important to you and ‑‑

MEMBER DUFFY: I'll be happy to do that on the ones, as you said, that are important to me and just trust, again. Going off of something up on a screen is not a very good way for me to edit.

I'm not as brilliant as everybody in the room, but I like to see it on paper and play with it and understand it, if it's important to me. There are plenty of the papers that are important to me but that I will not understand or try to comment on. Thank you.

MEMBER MAUNE: Would you like to receive Word versions of an issue paper so that you can make track changes with recommended changes? I think we could work that out, right Lynne? Yes, the answer is yes. Thank you.

MEMBER THOMPSON: Yes, I'm on. AI, we're really interested in if there's any research being done in NOAA with AI, especially to, related to disaster recovery, using the imagery to plot our data. So that's my topic.

MEMBER THOMAS: First ‑‑ am I on? Yes, I just want to mention that Glenn sent an email to Joyce. He just asked me to announce, and to Shep, that he did write a little blurb on FEMA. And I think you might have got it to, I don't know.

But anyway, he did give us, and he's up in his room working. Said if there was any questions on that to let him know.

MS. MILLER: On what?

MEMBER THOMAS: On the FEMA ‑‑

(Off mic comments)

MEMBER THOMAS: Yes, letter for later.

MS. MILLER: Okay, okay.

MEMBER THOMAS: So gosh, looking at this list, I mean, I think you already know from my comments that I'm always interested in this public-private partnership, particularly as it pertains to the Blue Economy, meaning including precision nav, observation models, and also to resilience.

And so I'll just leave it at that because I think that many of these topics kind of fall into that category.

MS. MILLER: From discussions I've heard, I think we should add modeling to our list of interests, at least, of something to do. Maybe a seminar, maybe a webinar, maybe a session, something.

MEMBER THOMAS: Well, I would say modeling and validation if we're actually going to add it, because the interest should be in the validation, not the modeling.

MEMBER HALL: Can I just get a clarification? Because if I put modeling and validation that means, no, is this hydrographic modeling? Is this bathymetry? What is our qualifier?

(Off mic comments)

MEMBER HALL: Okay, I just want to make sure I have it in there.

(Off mic comments)

MEMBER KELLY: I guess my mic is on. Yes, I had a couple of things I think we ought to take a look at.

I think the disaster response is still a hot issue. Compounded by what we heard today, there is ample opportunity, and not, we have to stay away from local involvement and who talks to who, and focus on the NOAA function.

And I think there is tremendous opportunity, as I said before. The services and the products of NOAA are absolutely at the crux of a successful disaster situation, both forecasting, response and recovery.

And I think we have to find better ways to improve on what NOAA is already doing. And I think that can hang down from public-private partnerships. Contractors, perhaps even additional equipment, off‑season training for MIST systems or other.

So I think there's still room for us to get better at what NOAA is already doing, and recognized as doing an outstanding job. But when it comes to people's lives and property and the environment, it's still not good enough, probably.

I would think that we have to continue to find ways to stress the infrastructure aspect. This administration is very responsive to that. The Admiral was using those words. We need to use those words and back him up and give him the tools that he'll need as he approaches the Hill and also steers NOAA.

I think getting on board with the Blue Economy and stressing ‑‑ personally, from being on the commercial maritime end of things, the fact that it's being increasingly recognized that NOAA is a part of the Department of Commerce is very important.

And I think we're getting some political granularity and traction on that. We should find ways to continue to exploit that.

I think we need to concentrate on a little bit of how we can find ways to improve the charting of the secondary channels. I know there's stuff that's going on, but until it's fixed it's still broken.

And I think that's something that's been brought specifically to our attention as this panel in several locations on several occasions, and we would be remiss if, as a panel, we did not bring that and put it to the attention of NOAA.

Even though we know that there is some work underway, perhaps we need to speed that up or broaden it or find some other ways to make it happen faster.

Autonomy is just cool. I think it's cool, so I'd like us to continue working with that. Perhaps we could do something, and it was mentioned before. Let's get some smart people in here to talk to us about it.

I know Wilhelmson is really big on this. Norway is a leading entity on this. They're doing it with major, big ships. Should we be able to find ways of how they're thinking, what they're doing to make these smarter, to comply with coal regs and to, kind of, have UAVs that are actually going to be responsive to people that are breaking the rules, not just when they're doing what they're supposed to?

And maybe get some smart people in to talk to us about that. Maybe we need to find out from people with the smart, the unmanned taxi cabs that are busy running people over.

Maybe there's some thinking there that might help us to understand all the time and effort and the money and the brainpower that these people have already put into examining these things. Because if they think they can make something operate in New York City with the traffic and the people ‑‑ everybody prides themselves.

You never go on a crosswalk. You never cross when the light is green. I mean, they actually were trying to do a no jaywalking thing uptown in Manhattan one year. And they actually had to discontinue it because everybody in New York wanted to get a ticket for jaywalking that they could put on their wall.

I mean, if they think they can make taxis work there, why can't we do something on a relatively unobstructed waterway? So I think let's get some smart people in here to talk to us, and maybe make that a panel of people on innovation.

The other thing I had is we talk about public-private partnerships. And I think that we have been, at least from my perspective, and I hope I'm wrong, we have been remarkably disconnected from our own IOOS and our regional associations.

We occasionally have them sit in at a meeting. We don't have the local IOOS even at this meeting. And I think they have certain capabilities and opportunities, and I think we need to exploit that.

NOAA's spending a lot of money on this. I mean, there's 30‑something million dollars. Let's make sure they're doing what we want them to do. Let's hear what they have to say.

There's an awful lot of smart people in academia or in other areas that can hopefully help to inform us about what's out there and possible opportunities to use some of that.

And last but not least, modeling. I like that. I think that you will find, in most ports, operators will be very receptive to modeling.

As I said, we talked about precision navigation in New York. Very frankly, we don't care about waves. Not our issue. It's not like LA Long Beach where it's a straight shot and we're looking to go deep.

We have very narrow waterways. We have issues that, these ships are now 1200 feet long. Our channel is 800 feet wide. We cannot turn around.

So once you commit to go in, you've got to go, that's it. And if you're driving into, trying to find the right word other than a shit storm, but something along that line but more polite. If you're driving into something like that, that the potential hazard to life, property and the environment is ridiculous.

If you took the Exxon Valdez, and I've seen this happen, they take that track and extend it from New York. It goes to Hampton Roads. We can't have that happen again.

So modeling on, not 90 days, but what's going to happen four hours out. That type of modeling would be very useful to us. So that's my laundry list.

MEMBER HALL: Does anybody have anything to add? And you don't have to add if you don't want to. It's okay.

MEMBER PAGE: You must have an industrial‑sized washing machine at your house or something. Anyway, that's quite a laundry list. I'm still getting up to speed.

What confused me earlier and one of the things I think has merit to be on the list, but maybe defined differently, this information infrastructure.

When I think of, which was ‑‑ obviously someone else had a different definition in mind when they said information infrastructure. And you said this takes the place of that.

When I'm thinking of all the stuff we're doing, NOAA is producing all kinds of information. Charting, weather, currents, tides, Coast Pilot, whatever, and all that has to be disseminated.

And that's the information infrastructure in my mind as far as, it could be apps, it could be, it could be websites. It could be radio transmissions, a VHF radio. It could be Notice to Mariners. It could be EIS transmission, whatever.

But there's an infrastructure to get that information out. And so, and I'm not so sure we're taking full advantage of all the new technologies, the internet of things and what have you, to get this information out.

Because many different people want different ways. Some people just listen to the radio. That drives me nuts, and maybe it's because I don't hear that well or whatever.

And where other people like to see it on their app on their phone and select things, not listen to the whole broadcast, and wait until they get to the area they want to know. They just say, I just want to know what the weather is here.

So I think information infrastructure might be worth keeping to some extent or revisiting and that should be ‑‑

MEMBER HALL: And maybe we call it information sharing or something a little bit different than information ‑‑ I know what you're talking about, but I think ‑‑

(Simultaneous speaking.)

MEMBER PAGE: But I'm thinking along the lines is NOAA is providing all kinds of -- data delivery, but, you know, mechanisms and there's a process and what have you. So when I thought infrastructure, information infrastructure, I was thinking it was totally different than what you were thinking of -- obviously.

But I think that is a core component is, what good is all this information if you can't get it out, okay. Dissemination, okay.

I saw the discussion on the offshore re‑leasing charting for the arctic. Of course we want that.

(Laughter.)

MEMBER PAGE: No, actually I think it needs to be updated. I don't think that's really an issue anymore.

I realize it's still going to have some leases, but I think that, I think Shell kind of stubbed their toe enough and others looked at this and said this dog won't hunt.

And I think that maybe we want to modify that because since this paper, the Arctic, NOAA's Arctic Action Plan, which was 2014, which was good, good document I might add.

But since then the Polar Code came in line and there's some expectations, requirements internationally as far as how we're addressing polar operations. And is voyage planning required of vessels, and polar operations and information on ice and whether it can go, no go depending on ‑‑ that's all new stuff that didn't really exist beforehand.

And so we're not so much, at least I'm not, being from Alaska, not as much concerned about the charting where there might be a lease somewhere and which lease is going to be exploited.

I'm really now more concerned about the tankers that are, today, are going across the top to Canada, and the cargo ships and the large passenger ships that are going across the Arctic waters. I think that's a bigger concern than saying let's chart where the leases might be as opposed to where's the maritime activity right now.

So I'm going to kind of look at that and maybe suggest some changes to that subject, and saying we still want charting in the Arctic, don't get me wrong.

But I think it's not focused on the leases anymore as opposed to the new, the current emerging operations, because now that Alaska is talking about developing LNG. Could very well be shipped out by tanker from North Slope with the cheapest device, building a $65 billion pipeline back down to Valdez. They're talking about that.

Certainly, ANWR just got opened up so that's a different, again, that's changing the shipping activity up there. So I think we need to update it to current events.

The Polar Code expectations, requirements and coastal state fulfillment of the Polar Code and providing information so these other vessels not engaged in U.S. trade don't end up on our beaches or cause environmental harm.

And also there's a lot of people who have fought for many years against doing any development in Alaska because of pristine North Slope or whatever. We need to show that we can do it right, basically, is what it comes down to.

So I think there's a very low tolerance if we stub our toe. We can't wait and do the Exxon Valdez and come afterwards, and then maybe we should go a little further and fix this. We need to fix it first and be proactive.

So I think that's a role that, if you want to take advantage of the blue economy we've got to do it right and we've got to make sure we have the infrastructure or tools or whatever in place so that we don't have an accident and we don't set things back.

And I think that's, basically, the accident in the Shell, the two accidents, between the Kulluk and the grounding of the Fennica, those accidents basically killed that program. There's no doubt in my mind that that's what killed that whole opportunity. So those are the things I'm thinking of.

MEMBER HALL: Is it good for me to change that to Arctic charting? And then my comment is, charting for Arctic vessel traffic and Polar Code needs.

MEMBER PAGE: Yeah, that's great. And then I can help flesh that out with my work group and what have you.

I have a shorter laundry list. I'm done. This is the long talking Ed and the short talking Ed.

MS. MILLER: All right. And this is the Ed that's not here. I would say welcome as our new Arctic working group chair. And that's exactly what we're hoping for, is that we get update, that that's what the working groups are for.

And one other thing. We can have a working group that's one panel long and then get rid of it. But we also have some standing working groups. And so our hopes are that you provide us with excellent advice on what needs to be done or what needs to be considered in the Arctic. And I'm sure we'll hear about that in Juneau.

MEMBER MCINTYRE: I think I'm on. I'm just going to endorse the two Eds' laundry lists. I think they've covered everything pretty well.

I, the only thing that I wanted to add is the thing that is, just is really popping out at me from the meetings that I've had with the new Admiral is that I think everything really is going to change in how we approach the blue economy and commercial maritime infrastructure.

And I'd like to continue to be updated on what, how that is evolving, I guess. And also as we look at these new topics, how those integrate into the plan so that we can best support it in the direction that it needs to go.

MEMBER GEE: Yes, I totally agree with that. I think that now is, the Admiral's comments kind of focused us more again. It's given us an opportunity to focus a bit better on what we, how the, how it relates to these topics.

Going back, I know, I see Kim making changes to information infrastructure down there. But I kind of still consider the information infrastructure the right, because when I think of the topics, it's how these affect the, in our role, how they affect the ‑‑

MEMBER HALL: I just added, I actually left information infrastructure ‑‑

MEMBER GEE: Okay.

MEMBER HALL: ‑‑ alone because I think that that is something specific that we've talked about. And maybe I'll change it to the -- and our term of art marine and geospatial infrastructure so that we have that.

But I've added in information dissemination and that's the, kind of, getting the wealth of data information collected, aggregated, analyzed, et cetera, et cetera by NOAA and NOAA entities, how we get that out and kind of the feedback ‑‑

MEMBER GEE: Right, yes so ‑‑

MEMBER HALL: So it's a separate one.

MEMBER GEE: And that kind of relates to public-private partnership because the, a lot of that sharing and the way it gets disseminated, as Ed's talking about, is actually not NOAA.

So I think what we're, our role is to making sure that NOAA has that infrastructure in place that are, then allows that efficiently or moves with the technology. And so that, this would be my view.

I don't know how ‑‑ but I see the infrastructure is, needs to evolve from the paper charts. That's done, or it's still moving from paper charts to the paper products to the infrastructure that now supports the new technology to be able to disseminate the data.

So that's my view of where I think, and I think we're in line with that. One of the things I think in the, you've got crowd-sourced data.

It's almost, I think the comment you have there is what we're talking about. It's non‑authoritative data sources. And I would actually swap those over and have, it's kind of the non‑authoritative data sources, and that includes crowd-sourced data, nontraditional hydrographic surveys, and satellite‑derived bathymetry.

So it's kind of saying okay, anything outside those would be ‑‑ and I'm not sure who did the satellite‑derived bathymetry, if that was a specific task. But I see it under those.

It's sort of how do you incorporate those other other data into ‑‑ and it's kind of being addressed by what we saw from Rick with the data modeling. And so that's part of the one thing, I believe.

What's the other one I was looking ‑‑ oh yes, the big data. I think managing big data data sets is, I think that's where the artificial intelligence belongs. It's managing and use of the, these volumes of data and how we better use it. I think they kind of go together.

You can't do the artificial ‑‑ well, the artificial intelligence becomes much more worthwhile if you've got the big data or the data volume that you need to produce so that's, I would suggest we put those together maybe. I don't know. That would be my view on that.

So what else did I have. Oh, on autonomy, yes, I agree with Ed, his laundry list. And I think, again, we need to think about the reason we get those experts in to tell us what they're doing is more, again, to assist in giving advice to NOAA to know in the future what the type of products you'll have for, to support that.

Whereas, if they're autonomous that means there's no people there so why do we have a ‑‑ you base it on a ECDIS in standards. It's all visual. It becomes different with autonomous charting and then it brings in the, obviously, other things, artificial intelligence and all of those things.

So I would, yes, I would support doing that. And just keep plugging away at autonomy, noting again also the Admiral's comments about the autonomous, the importance of autonomous systems.

RDML SMITH: Can I just ask for a clarification of terms here? Because I think we're slowly mixing up autonomous shipping from autonomous surveying.

And I think we have a very clear role in using unmanned systems and advancing technology for surveying. And we have some role in providing information in a way that can be used by unmanned shipping. But that's, but it's, one is a tool and one is a client.

MEMBER GEE: But you're ‑‑

RDML SMITH: So I think it's, both are important. But I, just for the sake of clarity here, I think let's not put those under the same heading.

MEMBER GEE: But except that in using them in an autonomous surveying capacity, you're still dealing with the same things about the coral regs. And having something that can operate autonomously, as you said, is one of the important things that hasn't been addressed now, and those are the people that are addressing that.

So I think they go together. But there's definitely the two different requirements of you providing product to support autonomy, but also then the use of autonomous technology in the other aspects of the role. Yes, they, they're two separate, but obviously overlapping, so.

MEMBER ATKINSON: First, I didn't get to thank Lynne this morning for helping put that panel together. Thank you, and whoever helped you. It was a lot of effort in making that happen. Yes.

I think subsidence or subsidence, whichever you want to, however you want to say it, should be a split off on its own because it's, involves some technology, the remote sensing technology and the GPS stations. So maybe that's a separate topic. Just a suggestion.

And that leaves, leave sea level rise on its own, which is both by gauges and satellite altimetry and subsidence.

Kept coming up, these observations off ports, I don't ‑‑ that's a topic now? It seems like it. We kept ‑‑ the observations off ports like the currents mentioned here and, maybe that's a topic to ‑‑ what kind of observations are needed to facilitate safe port operations. Just to make our list. Is it already there?

(Off mic comments.)

MEMBER ATKINSON: Okay. Yeah, sure. Yeah, fine.

MEMBER MAUNE: Okay, I have two topics. The first one would be the 3D National Elevation Requirements and Benefits Study. It's a question on whether we do anything about the study with the HSRP or just track and make recommendations on what the study results come out to be.

But one member of the HSRP asked me if there was a role for HSRP members to play in that study. And I sort of said thumbs down because I was a little concerned it might be too incestuous that the HSRP was doing something to come up with benefits.

But other people might disagree with me on that, and maybe HSRP. So I thought I should perhaps raise it to see if the Admiral or anybody else feels it would be appropriate for HSRP members to participate in that 3D National study.

We pretty much progressed along the lines that we've got the stakeholders identified, excluding anybody from HSRP. So the different federal agencies and the states are having state coordinators for the topographic side and state coordinators for the bathymetric side to come up with people who should participate in a questionnaire process to identify what the requirements and benefits are.

And I, personally, didn't think it was appropriate for HSRP to participate in that questionnaire process, but I could be convinced otherwise if people here wanted to make a counterargument to that.

Nevertheless, I think that is a subject that we will want to track, the results of that study on. And so it can go up there as an item on the list.

The other topic, I should probably have talked to Mike Aslaksen offline on this subject.

But when there were references to single point of failure on his airplane, on how close it could have been that he wouldn't have had any airplane to fly some of this stuff post‑disaster, would you be receptive to having alternative sources of private sector airplanes that report weekly on the status of their availability and who have been previously contracted to respond within 24, 48 hours kind of thing?

Are you even receptive to having a backup capability? Or is that just a nonstarter?

MR. ASLAKSEN: Absolutely, Dave. In fact, we've done similar arrangements with Dynamic Aviation in the past, knowing that that's a possibility.

Typically, we try to plan with OMAO on identifying a backup aircraft during hurricane season at all times. Sometimes that works, sometimes that doesn't work just depending on schedule.

But typically we will call when we know we have a gap and talk to Dynamic or other providers.

MEMBER MAUNE: Yes, I was thinking along the line of the contract that FEMA had that's ending next month. That FEMA has had a five year contract for -- with four prime contractors.

And I know that my team had 120 airplanes with cameras, and which the subcontractors reported to me and I reported to FEMA on a weekly basis which of those airplanes by tail number and camera type would be available in the coming week in case there was a disaster.

And we did that, we've done that. And I, typically, on any typical week had between 20 and 30 airplanes stationed around the country that were available on short notice. And there's three other prime contractors that also had major assets available. And yet we were never used in the last four years of the contract.

But that kind of capability does exist if you are interested in having a backup capability with, not just airplanes, but with different kind of cameras and lidar sensors as well.

MR. ASLAKSEN: Right, I think the only issue there, really, is the systems we fly and our work flow are very unique. And that, to have that redundant capability would be something that we'd have to scope and/or have a capability to, a backup system in order to install in a contractor's aircraft would probably be the best way ahead.

MEMBER MAUNE: Okay, that's all I had. Yes?

MEMBER GEE: That kind of fits under the disaster response, doesn't it? It's the details of, I think we talked about maybe that's kind of public-private partnership and disaster response. I guess, maybe when we flesh out that details, that's probably where it fits, right? I guess.

MEMBER MAUNE: Okay, that's all I have. Thank you.

MEMBER HALL: I think I'm going to actually skip the directors because I think this is for the voting members. There we go, I think that we're all members.

So, Joyce, and then I still haven't given my feedback.

MS. MILLER: There's such, I'm trying to focus on what we're going to put in the letter and what we've heard this week, since I'm the one that usually writes the letter.

Okay, we've heard this week blue economy and how that relate ‑‑ and the transformational infrastructure.

We have, and in particular, precision navigation. And so I think that's an element of either the recommendation or the letter.

Another thing we've heard, and I, it has been so strong in almost every HSRP meeting that I've gone to, particularly in the disaster response areas, NOAA's contributions, what stakeholders need, et cetera.

It is not uncommon if we have heard something that is very specific to an area, while it may not be a broad recommendation, if there was a, if there was an overwhelming ask at a, in an area. And what I heard from this last panel, they need offshore buoys.

MEMBER HALL: I guess the question right now, is that something that we're going to do when we're talking about the letter? Because I'm not sure everything that was said here was related to exactly recommendations or the letter.

MS. MILLER: Right.

MEMBER HALL: I think what we're trying to do is just, kind of, have a path forward as we move forward. And some of it's obviously based on what we heard today.

So when it comes to what goes in the recommendation letter, I think that's here. I was trying to make this a little bit faster. I'm glad that people have had an opportunity to talk because I know we kind of chomp at the bit sometimes to get our spear time.

But I guess my question for you is, especially, I know we talked earlier this week about the education piece. And I know we didn't hear anything about that, but that's still an ongoing concern and issue. And is it something that we need to be paying closer attention to, I guess, Joyce?

MS. MILLER: I wouldn't put that as a very high priority at this point.

MEMBER HALL: Okay.

MS. MILLER: I would put, and there's many things ‑‑ what I want to say is there's many things on this list that we can put a check mark. We've done something about it, let's keep listening, but it's not the highest priority at this point.

MEMBER HALL: My plan is to try to find a way to do that with a survey where, hey, these are things we have agreed we're tracking. These are things that we think we need to do some activity on. Here are the types of activities we want to do, and let's prioritize those activities.

So it will be a little bit of a different order this time. It might be, hopefully, still less than a handful of surveys. But I'm going to work on that, and there might be a better way to do this, but I agree.

But I don't want to lose track but I don't want to take it off, because there's still things that, it will pop up in a year and we'll need to make sure we're tracking.

MS. MILLER: Well, so what I'm prioritizing is important things that I've heard this week that I think may be because we've heard them this week. It's not just the letter.

But I kind of reorganized my priorities, basically, what, from what we've heard in a week. And it's not just from the stakeholders. We heard from Admiral Gallaudet that the blue economy and ‑‑ so I would say that ‑‑ and the other thing I heard very much here is private public partnerships, and how NOAA can facilitate that because they're the big players, one of the big players in the disaster response. They have many of those good relationships, and perhaps NOAA can help to facilitate partnerships across many agencies and the private industries.

So I'll have to review my notes more thoroughly, but those are things that I heard at this that we may want to address further, or we may want to address in our letter and comments.

MEMBER HALL: Sorry, he's my ride to the airport. I wanted to make sure I've still got a ride.

I think, following on Joyce, I think yes, it's great to get those ideas out of this. And today ‑‑ what I heard yesterday was a lot about public-private partnerships, and the day before. Today was, to some extent.

But there was one key thing that Dr. Danchuk said, and that kind of, a little bit different than I think what Ed Page was talking about. But the information sharing and that attempt to avoid duplication of effort. And I think that that's something, too, as it goes into public-private partnerships, but it's also public-public, right.

So she's doing it on behalf of the state of Florida, you're all doing it on -- based on what FEMA needs, and that's not always, sometimes it's federal versus state.

I think there is this kind of, this ongoing theme of information sharing, but with the idea towards getting rid of those duplications of effort and having a unity of effort wherever possible so that you can go do the other side while they're doing this side, and that you're getting more coverage.

So that was kind of the key thing I heard today in the meeting and something that I've heard over and over again that I'd like to include in our list.

And other than that, I've tried to take as many notes as possible. I will be pinging a couple of you because I was typing and trying to listen. So if you get a note from me, it's just looking for a little bit more clarity. I'll need Dave to actually give me the full title of that study. I didn't get all the words.

But I'll send you each individual notes. What my plan is to send this out just for you all to look at. I don't want this to be paragraphs of written words, but if I'm missing something and there are a couple places where I could use some more, two or three words to describe the issue.

And then what I will do is work on developing kind of the best way forward based on everything we've talked about, again, with regard to these are topics that we're tracking, these are topics we'd like to take action on, and what actions we'd actually want to take.

And so I tried that a little bit with the first one. And I'm hoping it's just a process that evolves and doesn't get too much more complicated, but that still helps us and helps Lynne and the team help get those topics of interest regardless of region that we're in.

And I, yes, the regional flavor always is helpful and the regional context is helpful, but sometimes we need it brought up a little bit higher so that we're not missing the common thread.

So that's my key thing. I am happy to continue, as I said, to do this portion of it and feed the committee members or the leadership. And so hopefully you'll see something with me in the next couple of weeks. You'll definitely see this list from me in the next day or two. And then we'll work on that.

And just bear with me as we figure out the surveying process. And if anybody has an account they'd like to let us borrow that is the full Survey Monkey, that would be extremely helpful. I'm just not at a point in my business's maturity to be paying that kind of money.

So again, any help we can get on that side of things would be greatly appreciated.

MEMBER THOMAS: I just have one idea. That enhanced navigational assistance, do you think we could just put enhanced navigational assistance to support the blue economy, just so we get the blue economy in there?

Did you? Okay.

MS. MILLER: I would also say you need to put in what's been done, something like infrastructure paper.

MEMBER HALL: It's in the full. I hid a couple of columns just so we had that up there. So there's a column that says that.

MS. MILLER: Or webinar was done. And the new members may not have heard that webinar. So, but ‑‑

MEMBER HALL: I could use NOAA's assistance on tracking that. I am not going to be a meeting tracker, what got talked at whatever if I didn't make it on to a webinar. So I don't know if that's something that Lynne can help us with because she's on every call.

But I would ask for a little bit of assistance. My, I don't want to be tracking every single thing that the committee does. So, yes.

MEMBER MAUNE: Is that it, Kim? Is that it? I think that's all that the Planning and Engagement Working Group has, Joyce. You wanted to go over to the Alaska working group, did you?

MS. MILLER: Ed, is there anything that you'd like to ‑‑ I know you don't have anything to actually report at this point, but.

MEMBER PAGE: No, we're just starting to get -- anyone else interested, I do have ‑‑ Julie Thomas has enthusiastically agreed to serve on it.

I got Larry Mayer, I got Andy. Is there someone I'm missing? I feel like I'm missing somebody. But in any case, anyone else who wants to participate, and I'm certain we'll keep people apprised over position papers, what have you.

But I don't, we'll just call the meetings when it's appropriate to put something together. I don't, I'm not, I don't want to put in a schedule thing.

And I did disseminate kind of like a draft summary of the issues and points in bullets. We can start that dialogue and others can add to it and then we can wordsmith the heck out of it and come up with a position paper and kind of give update ‑‑ this thing, talk about blue economy, talk about Polar Code, all those kinds of things and the role that NOAA has.

Kind of fulfill those new expectation requirements and what have you, so. And then I'll be surprised that NOAA just kind of reinforced where I think that you're going anyway, but kind of tuned it to what's going on.

So I think we're off to a slow start, but we're moving. We're getting traction, moving forward.

MS. MILLER: You are aware that Lawson and the working group did submit a report three years ago, would be my guess. So revisiting that might be useful.

Okay, it's ten to three. This is a good opportunity. How many people are leaving early today? One, two, four ‑‑ okay, I need everybody to really dig in at 3 o'clock. Let's take a 10 minute break.

We have one hour to decide at least what our recommendations should be and what ‑‑

(Off mic comments.)

MS. MILLER: Okay, Lynne tells me a lot of people are leaving at 3:00. Those who are leaving ‑‑

(Off mic comments)

MS. MILLER: Okay, listen up, please. Those who are leaving at 3 o'clock, I want you to tell me what recommendations you think we should give, recommendations we should give to the Admiral, or to the Administrator based upon what you've heard today. Give me two or three. You can do one as well. So, Kim, you're leaving?

MEMBER MCINTYRE: I can go here. I'm ready because I'll be leaving early as well. Whenever you're ready.

I, the one thing I think to include is the, for lack of a better word, I'm going to call it the reciprocity with FEMA when NOAA is providing support to other agencies' missions.

I think it was good that we learned about the blue economy and the infrastructure, and that we'd like to hear more on that.

MS. MILLER: So reciprocity, do you mean funding?

MEMBER MCINTYRE: Yeah, I mean, I guess reimbursement. I mean, it was what Glenn had covered in his lunchtime presentation. That, I just view that as a big issue because it seems to reallocate NOAA resources to projects that are very important and need to be taken care of very timely. But it does seem that it can detract from the budget and other missions that are important.

And then, again, just the follow‑up on the precision navigation and the fact that Secretary Ross was mentioning that, that HSRP continues to support the precision navigation.

MS. MILLER: Should I perhaps ask how many people think we should talk about the reimbursement from FEMA? Hands? One, two, three, four, five ‑‑

MEMBER HALL: Lynne has provided us with a paragraph on that.

MS. MILLER: Okay.

MEMBER HALL: Yes. No, so he's giving us something so that's why, yes. I totally agree. No, that's agreed.

MS. MILLER: Hands again, how many, everyone? One, two, three, four, five, six, seven, eight, nine, ten, eleven.

Okay, not voting.

Okay, so that's 10 out of 10, or 11 out of 11. Okay, precision navigation in the blue economy.

It should be included as a high level recommendation.

MEMBER MCINTYRE: That's my question, I mean ‑‑

MEMBER KELLY: To maximize the awareness of the products and services that contribute to this economic engine that spans ‑‑ okay, I think that the thing that we're doing is to recommend that the blue economy discussion be progressed as far as possible in light of the services and products that create the economic engine across the United States, both commercially, environmentally, recreationally, and that this is, you know, needs to have a broader recognition of the value of these and should be aimed toward creating funding and support.

MS. MILLER: May I ask you to write me a sentence on that, please? But actually, we already have a brief paragraph from Glenn on that.

MEMBER KELLY: I think it just never hurts to repeat the boss's phrasing, including the blue economy.

MS. MILLER: So were we all agreed on that? Okay, all right. Lynne, or Kim?

MEMBER HALL: So less of an actual recommendation bullet point, but I think one of the things that we can stress in here, and I think it was great to hear again from Dr. Danchuk about the ‑‑ and actually Congressman Jacobs ‑‑ the idea that these kind of extra‑regional or less than going local and staying local, that we actually, as HSRP, are a great conduit for NOAA to get that exposure.

So when you're looking at, and I know poor Lynne has to count how many recommendations we have, so I've just taken one away from our metrics, our cruddy metrics.

But I think one thing that we can say to, that we add value, is that we provide a venue for that. And I think we should continue to ask for that when we go into panels. Where it's not just somebody in their gweduc or whatever the issue is, but that we look at it more regionally, or more at that level where the compacts and the other agreement, because I think that's very, very helpful.

We have Sal on the committee and we always hear about the cruise lines, which is one of the reasons when I was with CLIA I joined too so that it could be a broader swath of what people are asking for.

And so I think that we need to do the same thing as a panel. And I think that we can stress that in a letter as kind of a pat on the back for both NOAA and the HSRP, that we provide that venue and that we applaud those efforts in some way.

MS. MILLER: I guess I would say I think that's more for the summary than a high level recommendation.

MEMBER HALL: It's not a recommendation, but there's context that happens in these letters, right. So I can send you a sentence on what I think as we set it up, because not the, the whole letter isn't just a whole bunch of recommendations.

But HSRP was great to, happy to hear from these kinds of organizations because it provides this kind of access for NOAA, for the panelists and kind of recognize what Ms. Jacobs said to us.

I think that's actually a really, I think that happens in all of our meetings. And she just said it succinctly for us. So it's not a recommendation, but I think it's, it gives some context to our meeting and what, and to the recommendations themselves.

MEMBER MCINTYRE: Here's a way, maybe, that you can tie it into a recommendation is maybe something along the line that the panel was pleased to learn that regional planning authorities use NOAA expertise and products in responding to disaster response and planning, and we recommend that NOAA continue to develop and participate in those relationships.

MEMBER KELLY: And I would take that even one step further, that the recommendation to enhance NOAA's response capability.

MEMBER HALL: I'm just going to clarify. That is absolutely spot on. But part of it was that the acting locally but thinking globally concept that she was talking about is what I meant, in that, we can do a great job of making sure that we're exposed to, and that NOAA's exposed to that, through our panels and through our work.

And I think to tell the Administrator that we aim to do that and we accomplish it to some extent at this meeting and that we will continue to pursue opportunities like that, and yes, NOAA should as well.

But part of it is showing our value, right. And I think our value in providing a great platform for these folks and that we're listening and we're engaged really is something.

We're not going to recommend that, we're just going to tell Admiral Gallaudet that we've done it and that we should take some credit for it.

MEMBER PAGE: Can I just add, I think I heard the word "resilience" a lot. And the blue economy, basically, was broken for a couple days until NOAA fixed it, or instrumental in fixing it.

So in this context of, if we want a blue economy, we didn't have a blue economy for a couple days. You know, Mother Nature decided to disrupt that and NOAA decided to get ‑‑ well, not decided ‑‑ jumped in along with many other people and restored it.

So that nexus, I mean, the resilience is important. And I never really got that whole, that context until I listened to those people and realized how they scrambled to get everything back online again. And every day that's broken that's a major environmental ‑‑ not major. Well, environmental impact, but, I mean, really it's, it impacts our economy.

So if we can get that little ‑‑ the capture I get from that is how instrumental NOAA was and the resilience thing. And I never put that, I never saw that.

So it's not a bad thing to showcase to others, another value added of what NOAA does. It's not -- happens every day. And I'm not even worried because I'm from Alaska. I don't really pay, you don't really have the -- in Brazil. We don't have all, we have a very calm, easy environment and that's why I live there, because I'm a wimp.

But no, these horrific events are basically, are really a thing that happened down here a lot in the Gulf and the eastern seaboard. And we're probably not as much aware nationwide, right, as Portland. So that's one of my takeaways, that maybe we could mention that.

MS. MILLER: No, I agree that it's very important. It's just that I have been, essentially, browbeaten into a one‑page letter to the Administrator with our highest recommendations, and then the summary. And so ‑‑ yeah, so that's the reason for my hesitance to put that as a, as our highest level recommendation. And let's continue the conversation. I mean, how many people think that should be one of the highest level recommendations from this?

RDML SMITH: Can I jump in here just a little bit, because I did happen to review our, sort of, terms of reference this morning. And I think that hydrographic services can be stretched pretty broadly.

But, and I love the panel today, and there's a lot of good use of our information. But it's really not for the application for which this panel was put together.

And so I'm a little leery of us diverting too far off into resilience applications of our data, considering that they're not strictly hydrographic services as defined in the statute.

MS. BLACKWELL: This is Juliana. So all the information about where the land meets the water and what the levels of the water are and what the heights of the things on the shore, and whether it's lidar through imagery or through update of the datums, all of those things connect.

And I think that it wasn't, but little, short time ago we were calling things differently. We weren't saying blue economy. We were talking about coastal ‑‑ there was coastal resiliency ‑‑ coastal intelligence.

And whatever you call it, I mean, it's the same basic data and information that we are trying to provide and trying to improve. And coastal resiliency, I think, is absolutely within the purview of what we do as our mission, whether it's the primary or whether it's the secondary application of the data and the information that we provide.

Maybe in Shep's world it's about the chart and that's it. But all that data that's collected is used in so many other ways. In particular, I think from my perspective with NGS, focusing just on the coast, that is where we see a lot of the connections here with the other offices that are involved in this panel.

I could go on and on about what the impacts are of geodesy and all this information inland with inland hydrography and flood plain mapping across the United States. I'm not going to go into that as far as resiliency, not just on the coast, but everywhere.

But I think at a minimum, that this panel should definitely be interested in coastal resiliency.

MS. MILLER: Rich?

MR. EDWING: No, I think Juliana said it very well. I don't agree with the Admiral on this. In fact, in the HSIA there's a provision there that encourages us to use our services for coastal resource, in support of coastal resource management. So it's right there in the statute, so.

Now I think it's not our job to ‑‑ they were talking this, the panel this morning was talking about they're looking for groups to be set up elsewhere. That's more of an ocean and coastal management office responsibility.

But we certainly provide the data and a lot of the tools that they need to do what they're doing. So I think it's within the purview of the panel.

MS. BLACKWELL: And I have one other follow‑up on that. I'll tell you one thing that's going to happen. When we roll out these new datums in 2022 or whenever, depending on how soon we can get them done, all those people up there that have geospatial data and all those people that we have not heard from, they're all going to be, or at least the federal, the federal entities and probably a lot of the state entities, are going to be required or encouraged strongly to have all of that information on the new datums, which are going to be much more accurate and it's going to make ‑‑ it's going to make life much better in the long run.

But they are all going to struggle with getting their data sets transformed into the new datums and integrating all that information they have. That is going to be a huge lift.

And it's a little too premature to be telling everybody and scaring them right now. But the tools are being built by NGS to help them.

And we're working with the private sector to make sure that the information, the geodetics behind the, in the black box are going to be available for software and private sector companies to include into their technology and into their software.

But everybody who's doing geospatial data is going to be affected by the new datums. So I think that that is also something, as ‑‑ maybe a year from now, maybe some time at some point, we're going to have to step up that education, especially in this environment to educate those who have data that there's going to be a change coming, and that there's going to be a massive, a massive change in the datums that they're going to be using after 2022.

MS. MILLER: And I would add to that the paper that all latitudes, longitudes and heights will change. Those of you who haven't read it, it was an eye opener for me. That was for sure. And Gary was a major, he ‑‑ and, of course, Julianna and so yes, I agree.

On this topic, does regional partnerships, coastal resiliency and tying it with private public partnerships, does that make sense? Or is private public partnerships a separate issue?

MEMBER THOMAS: So my tagline has been federal, state, academia, and industry partnerships as far as the private public sector in Long Beach. That kind of covers, because we get state government, which actually contributes to our LA Long Beach.

And so I don't like to leave them out. And so I, that's why I don't just say government or public. I think it's really important sometimes to spell it out. But there's so many different ways to acknowledge that.

RDML SMITH: I think we need to be clear on our definition of public-private partnership, because in the Trumpworld that means toll roads. Right? That means public service provided at private expense with a revenue stream that doesn't come from the government.

And that's not good stakeholder coordination, it's not giving grants to academic institutions, it's not contracting with government funds to accomplish a government end.

That has a very specific meaning and think toll road, right. And so I think if we're going encourage all those other things which also are good, we just need to be clear on our definition so that we're all not thinking about what this is in a different way or that we don't toss it up as a great example to the administration in a way that they would then say, what are you talking about? This is not what we meant, because there's very specific meaning to that.

MEMBER KELLY: I would suggest, and similar to what you said before, Admiral, we have to use a very sharp pen because the role of this panel is advising NOAA regarding their role, not -- and I think the services and the products that we do how NOAA can use contractors, other things, that's all germane to our mission here.

But when we start talking about how the counties work together with this guy, I think that's beyond our purview, and we need to leave that alone. So I think we will be most effective if we can kind of get that laser type of targeting on the responsibilities of this panel to advise NOAA.

And I'd say as far as this response capability, I would try to keep it as narrow as that it's highly essential to everyone else and therefore no one needs to up their game as far as faster, better, cheaper ways to pre-train, ways to pre-position that we need to improve that.

You know, how these other groups are going to interface or who gets invited to their MTSRU or anything else is interesting but -- my daughter has an expression, not my monkeys, not my circus. And I like that, you know, we'll stay away, it's not our problem.

RDML SMITH: I just was -- I guess on the issue of scope here I think it's, I would just invite you all to look at what I'm looking at which is the law that authorized this panel.

And it's not that I -- I don't disagree with Juliana that all of that stuff is important, nor that our services in some ways are related, particularly geodesy but I'm not sure that that's the central focus of this. If you look at NOS and you start to think about how NOS is usually thinks of its buckets of focus areas, when they talk about the resilience programs within NOAA, it's usually not us.

And it usually is Coastal Zone Management, it's usually resilience grants, and those are not our programs. So I don't -- I think that it's important for us to talk about these things but if we start to talk about ourselves as a resilience program, we really should be including all of those programs in this conversation as well because that's the larger context within NOAA.

And if we're going to advise NOAA on those programs, then those programs should be included in this conversation.

MEMBER KELLY: I think we're really restricting to the data and the services, products themselves, not how they're used but in recognition that they're used we need to find better ways to refine those products and services.

So you know, like I say, I don't want to get involved in recovery. I don't think that's our game. But I do think the products, the services, the data that we make available is what we should be talking about. So I'm, you know, kind of agreeing with you.

We shouldn't go past that line, but we do need to look at internally the NOAA functionality. How it's used, we have to be cognizant it has value because it's used and the quality and the timeliness are therefore important, but we don't want to get involved in any of that other piece of it. So I think we're really saying the same thing.

MR. EDWING: Well, I was going say, yes, I don't think either Juliana or I are saying we're going to refer to ourselves as resilience programs. But those resilience programs can't do what they need to do without the geospatial information data product that we provide, and that's what we need to emphasize, just what -- yes, right.

CHAIR MILLER: So based upon this NOAA provides products, data, and services or NOAA Nav Services, writ large, all of you guys provide services that -- to disaster response, which was one panel, and coastal resilience. What would be our recommendation there?

MEMBER KELLY: That because of the criticality of that, it's imperative that NOAA find ways to improve the timeliness and the quality of the data and services that are made available and that would include training, exercising, public/private as far as training people, making contracts, contractors available, secondary, tertiary backup units. And, you know, to perform that function to insure that those tools are available, not how they're going to use them but that we make the tools and the capability available, and we've heard that because it's so critical we probably need to up our game for timeliness and accuracy on that because we know they're critical tools. But not get too deeply involved.

We just say we know these products and services are essential to the folks who are engaged in recovery, response, and planning, and it is therefore incumbent on NOAA to improve the --

CHAIR MILLER: Up the game.

MEMBER KELLY: -- the deliverable.

MEMBER PAGE: Well, if I could add something. You know, I'm the one who unfortunately brought this up, the resiliency thing and I'm starting to realize, I'm seeing where the Admiral's coming from. And unfortunately the last two days, so much of this discussion is about the storm and resiliency and what NOAA did in that capacity. But the first day is probably much more relevant to HSRP's role, and that is with respect to the PORTS concept which is just providing that information to facilitate the blue economy.

So I can see where, I can see your apprehension that really, you know, if you look at HSRP and our role or focus or whatever, I just got so overwhelmed, we're like, oh god thank you for saving our lives, or whatever, getting our port operational but I guess as a practical matter, I mean, your service is certainly a component of that but it's not your core thing.

And it's just one of many that showed up, and you know and obviously, we heard how your forecasting service did a great job, but that's not really your, our bandwidth. It's great, but we don't really, not here to endorse or give suggestion to the National Weather Service. We're here really to talk about hydrographic services so I can understand, well I'm kind of going down this road listening to all this stuff. I'm kind of getting focused on it.

So maybe we're diluting our, you know, what we should really looking at and reinforcing and advocating for is more tools to facilitate the blue economy, so you get the bigger and bigger ships without incident, you know, flying all over the United States and Alaska. We're part of the United States aren't we, I'm not sure, are we in Alaska?

CHAIR MILLER: Ed Page.

MEMBER PAGE: Just something to do with the -- is this, we're just debating whether we should have a recommendation or not about this? What are we -- we've kind of gone --

CHAIR MILLER: Yes, I mean it started out when Kim said regional partnerships, and we should make a recommendation about that. I think this subsequent discussion has said that you know, and the resiliency, and so forth.

That's not our role, that the role is provide products and services that help with disaster response and coastal resiliency, and one of the concrete things I heard in this was we need more current meters, and we need assets, which is appropriate, I think.

MEMBER KELLY: So I think, you know, the return on investment is that we're collecting this data and this data is being used by many people for many different functions. So the return on that investment to place those sensors and to have the people analyzing that data that it can be used, yes, to bring in big ships and handle more cargo. It can bring in cruise passengers, it can increase safety, it's keeping the environment happy, and it's also being able to be used for you know, disaster recovery and response.

It means the return on the investment is multi-fold, multifaceted here and that it just further justifies moving this program ahead with PORTS, which is infrastructure, and we can justify it by return on investment. I mean, they were two buzzwords the Admiral said, and by god, we have exactly what he wants. Let's put it in his lap and let him run with it.

MS. BLACKWELL: So along those same lines, one of the things we talked about a few years ago was socioeconomic studies, and we didn't really have expertise on the panel although we had an economist come in and talk to us about some studies that had been done. I'm just throwing this out here for the awareness of the new panel members.

I'm not saying do a socioeconomic study, whatever, but I think getting real numbers that talk to the value of the products and services amongst our offices is something that maybe you all would want to consider and come up with some ideas about, you know, what should we be doing on those numbers.

And I think we all have been involved in different studies, but maybe that's something that we could bring up again. Not as a recommendation for this letter or anything like that but just maybe as a topic for a future webinar or future whatever.

CHAIR MILLER: In fact, that recommendation is the last one in our infrastructure paper, is conduct studies to, you know, to give the return on investment numbers. Yes.

RDML SMITH: And I think that's what this 3D Nation study is intended to do, so if we want to call attention to that I think that would be helpful because we are at the point of trying to get participation and credibility to that study.

CHAIR MILLER: So as Ed phrased it, NOAA products and services -- Nav Services, products, services, et cetera, the importance of that. Quantify return on investment such as PORTS, et cetera, and maybe including that more sensors are needed down here, and we got direct requests for particular types of sensors, just as a -- maybe as part of the summary rather than as part of the recommendation. There was a hand, yes, Ed.

MEMBER PAGE: About that, I mean, part of what's driving PORTS for Miami is larger ships. Well, that's not unique to Miami. There's larger ships that are going to every port around the country. I guess the point of the fact is it is showing it's valuable. We heard that -- you know, everyone thought this was the best thing since sliced bread, whatever.

But in reality, many other ports have the same challenges. The ships are getting bigger, the tolerances are getting less and so this model, you know, has obviously proven itself, you know, in Miami and we can fully --suggest this continue on around the country because these ships aren't just going to Miami, they're going to many other ports. Something along those lines.

CHAIR MILLER: That actually is in the precision navigation and blue economy because that is already at the Secretary's level so, yes. Okay, so what we have on the table right now is reimbursement from FEMA, which was Anne's suggestion. Precision navigation and the blue economy, economic engine, et cetera.

Generally, NOAA products, written larger than just precision navigation, the products that co-ops and NGS and Nav Services such as the NRTs and things like that, provide during disaster response and provide services for coastal resiliency, so those are the three broad topics, anybody else leaving soon? Well, Anne has already spoken. Okay, who -- I mean, we can have more than three, and then we'll just have to whittle it down so would anybody else like to propose another high-level topic?

(Off-microphone comments.)

CHAIR MILLER: Oh, break. Well, I was trying to get people, I was trying to get things in -- okay. (Whereupon, the above‑entitled matter went off the record at 3:23 p.m. and resumed at 3:45 p.m.)

CHAIR MILLER: Okay, let's try to bring this to a close. I'd like to do our -- get our letter set. Lynne wants to talk about where the next meetings are and Lynne's gone, so let's get our letter settled.

Okay, the three suggestions I have right now is the FEMA reimbursement, precision navigation and the blue economy, NOAA products data services, et cetera that we just discussed. I'm open for other suggestions and we can -- and if it doesn't go in as a recommendation, it can go in as part of the discussion, later.

What we do is we put the three recommendations first or two or three, mention the issue papers, and then we provide a summary of the meeting. And by the way, usually by this time we're well along on both of those, but we are not this time so, suggestions. I'm very much open for suggestions.

MEMBER KELLY: Joyce, I don't know about secondary channels and charting, the secondary channels that we've heard about.

CHAIR MILLER: Going aground in the channels?

MEMBER KELLY: Yes, yes being aground in the channel and the concept that there are many, we've had many reports of secondary channels with -- I don't know what's the best word, I don't want to --

RDML SMITH: In smaller ports.

MEMBER KELLY: -- yes, or Intracoastal waterways. I mean, that's pretty significant. You know, we heard about that in Charleston. You know, where everybody knows where the island in the middle of the channel is. And you know, and say that, you know, out of date or insufficient charting that needs to be addressed and rectified.

Now, we know there's something already underway but, you know, it just needs to be a deliverable. It's something that we've been made aware of that is potentially dangerous even, and you know, we just should be on record with that. And I don't know if that makes recommendation or just part of the summary. I can go either way with that, but it's got to be.

CHAIR MILLER: I agree, we need to saying something about it. It goes back to an existing issue paper about -- well, it was about charting two standards in ports, but it's very much a similar issue in that the Army Corp is technically responsible for the ICW. So, but we will put it in for sure.

MEMBER KELLY: The maintenance of the channel is one thing, the charting is another and it kind of goes hand in fist but I think, you know, we have to focus on the NOAA piece of it, the charting of all of that.

CHAIR MILLER: Right.

MEMBER PAGE: Another issue I was thinking of was the other day when we did the PORTS, and I think, I know this obviously is something NOAA's also interested in so I'm not trying to push for something that they're not interested in. But I think some discussion about -- and let me frame it for a second.

You know, when I ask, you know are you using AIS to get this information, I kind of get a blank stare from the pilot and from the captain of the port, and so what bothers me and which I've seen in other places is that you really, I think we've all heard the bridge team management concept that not one person has all the information, that basically the bridge team is used.

And what we're finding out and I've been seeing in Alaska anyway is that the pilots will have their little iPhone with more information than anybody else on that bridge on currents and tide and wind or whatever, because this information is not integrated into the display system. And right now that would be AIS as a way of providing that, there are other ways of doing it in the future, what have you.

But I think that -- but I know the Corps of Engineers has been working this really hard, this issue. And I've had some -- Brian Tetro who I'm sure you know, Rick, right. And so -- and in other areas I know that down in San Francisco they're doing the America's Cup and now we're doing up in Alaska but I think, you know, some pressure, you know that NOAA should engage the Coast Guard in moving forward and providing the capabilities for them, for NOAA, for the PORTS system to utilize the AIS system to transmit information.

That's the intended application of this technology, and the Coast Guard's just been dragging their feet, oh, I don't have protocols. You don't know, but they shouldn't drag their feet anymore. Europe's ahead of the game, other parts of the country are, and here's an agency that's trying to disseminate information to the maritime community, and that's one of the efficient ways, more efficient ways actually, in some cases, to get that out to the bridge teams.

So I can come up with a sentence on that, but I think that, you know, that NOAA should urge the Coast Guard to move forward and take advantage of this AIS technology and provide that as the capability for you getting information out to aid the blue economy.

MEMBER THOMAS: Can I just say I second that? I've been dealing with the VTS in San Francisco on exactly that issue for two years now. So they are dragging their feet.

MR. EDWING: I was going to second the motion, but now I'm going to third the motion because -- and, you know, we've been working with them for years, we've been, on our side we've been ready for years and my understanding is that they are very, very, very close but I just don't know why they're not taking that last step.

MEMBER PAGE: Well, an anecdotal one, in LA/Long Beach at one point they had all that capability to do that and they were trying to get a hold of a ship that was steaming through and basically turned off their VHF radio because they had all the chatter, and they could not get a hold of the ship to give them information as they were making an approach that was going too fast or something was of concern to them, to the point where they finally got frustrated and they said, I know we're not authorized to do this but they sent the message to them on AIS.

They answered right up. You know, because they didn't have all this noise and clutter with AIS, it showed up. The Coast Guard wants to know, you know, contact me, you know. So, I mean, it's time.

MR. EDWING: And we have new leadership on both sides now. So it may be very timely to remind. And we have a very enthusiastic acting head of NOAA, I think, who would actually take this and run with it so and do so, yes.

MEMBER DUFFY: I have a question, so the -- I want to make sure I understand the status of what we prioritized earlier, like the partnership or the collaboration between NOAA and the Corps of Engineers. Is that recommendation for future studying, preparing a paper, or -- I'm suffering, I call it MBS, mush brain syndrome from being in a meeting all day long and had I not had that cup of coffee I'd have probably been quiet.

The datum conversation scares the tar out of me for a lot of reasons on the Mississippi River, but that's the one question that I want to ask just so I understand as, you know, I can throw the new card up a little bit. I'm a little lost in the direction, and I would just like to understand. Thank you.

CHAIR MILLER: Okay, what Kim did was review things that are sort of on our, if you will, our bucket list, you know. Okay, these things have then come up. Both the datum issue, and by the way, I just noticed all the papers, if you've got a nice long plane ride back, all the papers are in your package. Okay, so pull them out before you throw everything else away. But, so both the datum latitudes, longitudes, and heights will change.

That's the one and let's see, I'm suffering from senior moments and mush brain as well. And the other one that you mentioned, the Corps partnership, that is also, and that is something like -- I'd have to look it up. It's there; we have written papers on those. We can update papers. We can bring it up as a recommendation. Usually, those things have been a recommendation as well as a paper in the time we made them.

There is nothing that says we can't re-recommend something if we think it's important enough, okay. What we're working on right now is what we're going to put in this letter, okay. Does that help clear it up? Okay.

MEMBER THOMAS: So I just have two comments as far as the letter. One is, do we want to put in a statement that says we're pleased that the Ocean Forecast System has been developed and look forward to its release around the country or something, I don't know. Do we want to make a comment about the model that's coming out from Coast Survey and CO-OPS?

(Off mic comment)

MEMBER THOMAS: Right, and nobody's been --

RDML SMITH: Want me to say it again? Some of the OFSs have been around for ten years or so, the WCOFS which is the data assimilation which is very exciting but maybe, may I suggest that --

MEMBER THOMAS: We -- I know it may be just a West Coast thing, but I think that that hydrodynamic modeling will be really good for going through the precision nav as we go forward, and so I see it being actually tied into that and maybe it's because I'm West Coast and we haven't had a really good hydrodynamic model there, but I think that that will be a really positive thing going forward. So, I didn't know if we wanted to just include a bullet on it.

CHAIR MILLER: Since it really wasn't discussed much in this meeting --

MEMBER THOMAS: Okay.

CHAIR MILLER: -- what I would suggest is hydrodynamic modeling seems to be like a new exciting topic.

MEMBER THOMAS: To put it on for the next one?

CHAIR MILLER: Well, it may be worth a webinar. I don't know anything about it, you know.

MEMBER GEE: I think that's something we can take onboard, I was -- we were really looking for -- that's July I guess, as a technical working group. But that would be interesting, yes. So if maybe, between yourself and Rich, that would be great.

MR. EDWING: So one way we could handle it is, for the directors' updates at the next meeting we could go through that because I've said there's been a number of paradigm shifts as we've developed the models. But also we do have a five-year plan, but we've really never made the five-year plan public. So we could update that and provide that to the panel and have you guys provide feedback. So I think it would be important to kind of have that briefing along with that five-year plan, so you have the full context.

MEMBER GEE: And we have had some -- John Kelly gave us a brief, the technical working group, it was like, I think, last year sometime gave us a brief on nowCOAST and what.

MR. EDWING: The nowCOAST, yes.

MEMBER GEE: Yes, all the --

MR. EDWING: So we don't really include the nowCOAST along with the hydrodynamic models.

MEMBER GEE: Right, no, but it was kind of --

MR. EDWING: Okay, yes.

MEMBER GEE: Something that we hadn't totally forgotten --

MR. EDWING: Okay.

MEMBER GEE: General comment now for the letter, we talked about the other day about how we're all pleased, I think, to hear Admiral Gallaudet and hopefully, that's kind of this is just the things that go in the letter, but we'd said at the time as we were really excited about his vision and enthusiasm, we'd like to see more details eventually.

Now I don't know how we kind of will you know, is it worthwhile putting that into the letter when it comes to we, you know, the panel would obviously like to stay engaged in any new developments on the, you know, further details. We would like to be, you know, aware of them if they can, certainly. Whether that's in the letter or not, I mean, I think we would. That's what we discussed.

RDML SMITH: Can I make a suggestion on that and that is by way of a free invite to the next meeting to appreciate his participation here which I know we would do that anyway. Appreciate him here and also say that we look forward to further discussions with him at later meetings.

CHAIR MILLER: And we have learned in past, you do not put that in your recommendation letter, you send an invitation letter because there's an invitation letter bin and there's a recommendation letter bin, and you don't want your recommendations to go into invitation letter bin. That's just history, and so I wish Ed were here and I could tell him that but that's just a fact.

So we can certainly write two letters saying we really would like to hear more of your vision for the blue economy and how it's developing, and please come to the Juneau meeting or some subsequent meeting.

MEMBER PAGE: I think it's good that we're taking note of that, I mean we've mentioned blue economy I think somewhere in this letter, right? So the good thing is that we're paying attention to his vision and embracing it, not like we're rolling our eyes, we're okay, we like that.

We're all kind of circling the wagons and saying that's our new course, so that's good, it really got us motivated. I haven't heard anybody say anything other than, yes, we're going in that direction. No one says, that's silly. So that's good.

CHAIR MILLER: Well, and it's very refreshing because pretty much there has been no enthusiasm for our purview for a while. So other ideas please -- so here, I'll read what we've got.

So we'll do an invitation letter, one, and we'll say we'd like to hear more about your blue economy, et cetera. We'll mention blue economy in several places in the letter for sure.

So here are the five we have right now and I don't want to put five in. Reimbursement from FEMA; precision navigation and blue economy, the economic engine, too; NOAA products and services for disaster response and coastal resilience, how valuable they are and, you know, we need to up our game. That's three. Secondary channels and going aground in the channels, ICW, and smaller ports, four. Information integration, the AIS topic. Okay.

So are there any further ones and then we'll decide which ones go into the recommendation letter and we'll decide which ones we put into the --

MEMBER GEE: The information sharing I agree and is there some way to spin that into the infrastructure and kind of -- because we did talk about that and how that's the underlying, again the blue economy, the underlying infrastructure to the --

CHAIR MILLER: Yes, but that's a collaboration with Coast Guard. That's trying to get him to say something to the Coast Guard.

MEMBER GEE: Oh, sorry. That one?

CHAIR MILLER: Yes.

MEMBER GEE: Okay, sorry, yes.

CHAIR MILLER: Yes.

MEMBER GEE: I guess I missed the point then. I heard something else.

CHAIR MILLER: Additional ones that you think are important? Okay, vote for only three, okay.

Reimburse -- let me, I have to change my -- I wish I could write them on a board but I can't. Okay, reimbursement from FEMA.

(Off-microphone comments.)

CHAIR MILLER: Yes, I want three to go in the letter, and we'll put the others into the meeting summary. You want to write them down and then -- yes. Okay, reimbursement from FEMA, one; precision navigation and blue economy. Okay, NOAA products and services upping their game, and you know, for both PORTS and so forth. And I mean it is for -- yes, PORTS more, yes.

Secondary channels and small ports ICW, basically charting thereof. And that one really gets into our relationship with the Army Corps. Information integration, AIS and Coast Guard. Is that five? Let me check. Secondary channels, one, two, three, four, five. Okay, that's only five, I'm sorry. It's not --

MEMBER PAGE: To provide him things that he would engage on, right? That's what we're trying to figure out. What are things that -- three things we'd hope that he might take and run with it.

MEMBER THOMAS: Actually, that AIS problem, even though it's a real pain in the neck, I don't know if that's really an administrative -- because that's really a Coast Guard issue, I think, and as long as you both are aware of that and can discuss it and take it -- I know you've been trying.

So you think that it is worth sending it to the NOAA administrator?

MR. EDWING: I think it's the most actionable --

MEMBER THOMAS: Okay, I just wanted to make sure you thought that.

MR. EDWING: I think it's the most actionable, easy thing for him to do, and it could have a huge payoff.

MEMBER THOMAS: Okay.

MR. EDWING: The blue economy one, he's already running with.

MEMBER THOMAS: It's not really --

MR. EDWING: I mean we're really just kind of reinforcing where he's already going with that. You know, I agree it should be in there. But -- I think the AIS is the most actionable one with the biggest potential payoff.

MEMBER THOMAS: Okay.

MEMBER PAGE: If he sat down with the Commandant and I asked him that, he would see it's a win-win for the Coast Guard and for NOAA, I think he'd do it. But it almost takes that.

CAPT ARMSTRONG: So when we came here, and particularly on our first day and some yesterday, we heard quite a lot about the fact that folks here in South Florida would have liked, while they were appreciative of everything we did, they would have liked for things to have happened faster.

So I don't -- I haven't heard anything in these recommendations about addressing the post-hurricane response. I don't know whether we feel that it's -- yes up, yes, I didn't hear that in upping our game. I didn't -- maybe it just went over my head but -- yes, perhaps I didn't hear the whole context on the upping the game.

CHAIR MILLER: I've been told that there's a speak-in ready thing here -- unfortunately, my vision is optimized for very short vision, and these things are for distance, and that's the distance I can't see.

MEMBER GEE: So if we're talking about actually the faster and doing things better, I mean does that tie to the first because you need funding for that, as I -- does that relate to the FEMA funding as well?

CHAIR MILLER: Not to the FEMA funding, it ties to funding, you know. The FEMA funding is a separate issue, and Glenn's said he is going to be working on that but we can support, we can provide Glenn support, for sure. Let us vote.

How many think reimbursement from FEMA should be among the top three? I will -- we actually could kind of make that a subset of the NOAA -- okay, lump.

MEMBER THOMAS: So now we're down to three.

MEMBER KELLY: Issue number three just became one item. Now we only have to kill one.

MEMBER THOMAS: No, we're going to roll it --

CHAIR MILLER: Well, actually Rich just pointed out that the information, getting information out quickly -- okay, then I won't write a summary letter -- no I will, we will write it. And by the way everybody gets -- we send that out, and you get a chance to edit it, agree with it, add to it. We do try to keep the letter to one page, and everybody keeps on telling me, nobody reads more than one page, and you got to put your bluff, you bottom line up front so -- yes, and I will as you noticed, I fall asleep if I don't take notes so I took extensive notes.

I will try to -- like this afternoon or this morning's session I -- there were several themes that just kept coming back and kept coming back in that I agree with, you know, we have to watch what our purview is but there's no reason in our summary of our meeting that we cannot step a little outside of that. This is what we heard, not that it's our responsibility, but this is what we heard.

So I will take those notes and try to craft them into something that's, you know, that's coherent, to talk about the meeting and the comments. It's basically a brief summary and our comments on it. So this allows us to, you know, we say we're really grateful for, you know, honorable so and so on the panel and things like that.

MEMBER DUFFY: I just want to make a comment on the going aground in the channel, although in a lot of places that almost sounds kind of funny. On the Mississippi River we have dynamic shoaling of five feet in a 24-hour period at times, and it is something that happens. So I'm trusting that the ICW focus will take that away but that's the only thing that gives me concern is, you know, professional mariners looking at the latest surveys may indeed go aground in the middle of the channel.

It's happened probably once a year for the last 20 years or more, so just with the connection of representing the river there I would like to, and I'll review the language, but that's the only one that really gave me any concern.

CHAIR MILLER: Wait until you get to Alaska and the pilots tell you they go aground regularly, thank you very much. I was just like, my goodness what you're talking -- where Hawaii, is that's deep, and if you're in twenty feet of water you're in real deep problems. And in Alaska, they go aground all the time.

MEMBER DUFFY: You will often hear the term soft bottom, and we have a very soft bottom.

CHAIR MILLER: We do not. Okay, so any other -- yes, I encourage you -- okay, and the other thing that we've established, if you don't have time to get to something or you don't have any comments, don't not answer. Answer and say, it's fine. I don't have -- or I don't have time, you know, you're not going to get anything for it. Everybody really appreciates that because then you aren't sitting there waiting and saying, oh, I've only gotten three comments. What's the problem? So, please.

Okay, let's talk about next meeting places and hopefully, we will get out of here by 4:30 and I'll meet you all up at the bar.

(Off-microphone comments.)

 CHAIR MILLER: No, this is --

MALE: Oh, future meeting, oh.

CHAIR MILLER: Okay, and I'm going to, and we have on the -- another, the second page of that where we've been in the past. It's in your package, so on the back of that is where we've been in the past and when. I am not going to engage in this because I'm not going to be here.

We -- I think it's -- here's my experience, it was very useful for me to go to Washington D.C. as a new panel member. I got an orientation, you know, and got some idea of -- so these are the meetings to date so these -- scroll down to the last of them, would you? Okay.

MS. MERSFELDER-LEWIS: So we cycle through the regions, like it's approximately every five to seven years, so we haven't been -- at the last meeting we decided we would go to, we picked four cities, and we included New Orleans and D.C.

There are pluses and minuses about going when we -- the week that Glenn would like us to go is the week after Easter if we go to New Orleans in April. If we swap it with D.C. in April or D.C. in March, probably, that's a different story, and that's something that the Admiral will talk to you about if that's his interest. The D.C. meeting, we are looking for your recommendation about like would we have it in D.C, would have it in Annapolis, would we have it in Baltimore?

And we are looking for your recommendation about dates; if we have the D.C. meeting in September, there are three possible weeks. There's one best week, you know, it's hard -- sometimes it's harder for us to do it the last week of the year because of fiscal year, and issues for some offices.

So those are some of the considerations from our side and then the week of April 22nd, which is the week after Easter. So Easter is the 21st, that week is spring break in New Orleans, and so we are a little worried about could we, can we get congressional or Senate representatives to come and so Tim Osborn is our nav manager there, he asked us to check in with Sean Duffy about that. So if Sean wants to weigh in, I would like him to weigh in.

MEMBER DUFFY: So what I would say is spring break for many of us means our kids are going to Florida and I've reached out to a couple of the members of the delegation and in all honesty, they've all said check with me about the end of the year, it's the kind of thing I'd probably be interested in, and projecting my calendar is really hard.

I just looked to pull up, so the date for Mardi Gras Day in 2019 is March 5th, so you know, keeping it after Easter, I don't see the spring break as being a big challenge. You know, we may catch people who are traveling, but I do envision there being a pretty robust interest in New Orleans and you know at the end of the day whether it's in April or in the fall, I don't want to make that decision.

I think we could do well with either. I'm not all that crazy about meeting in D.C. since I spend about 40 days there a year, but outside of D.C. would be better for me. But other than that, I'm done. Happy to help in either way.

MS. MERSFELDER-LEWIS: So that -- so Admiral I think you might have comments, and Juliana and Richie might have comments. And then also, the members have additional comments. I know Easter was a hard -- it's hard to meet the week after Easter, but Glenn asked if we could try to do that.

CHAIR MILLER: And one of the things, the reason the week -- Glenn recommends that week is whether congressionals will be in town or not, if that's not clear to people.

MR. EDWING: So I just wanted to point out, yes, we try to get back to all the regions over some regularity, every five years I think you said, Lynne, but we have made it back to I'll say Washington a little more frequently than that, Silver Spring or Washington, that area I think for a couple of reasons.

I think one is that it's a chance to meet with the major associations, you know, AAPA, APA you bring in, and also you have a better chance of getting some of our higher level people in. And then it's also an opportunity, although, we've never really I think been very successful at it is I think, and as Julie can attest, you know, March Madness is when all the big associations come into town, because that's when the big decisions are starting to get made on the budget and you know, after they have their meetings they all go downtown to talk to their representatives and, you know, that would be an opportunity for members to do the same if they wished to do so.

But that would be in March, I think, and not in April, so I'm just putting that out there because we have talked about it. We've never really been able to achieve it, at least achieve it on a regular basis but that at least was the rationale. So it's up to you all if that's how you'd like to structure this, but I just wanted to provide a little bit of that background and context.

MEMBER KELLY: The nice part about meeting in the D.C. area and we leave it really up to NOAA where you could provide the best of your staff. I think it might be a great opportunity to have meetings with actual modelers and have some back and forth a little bit, some demonstrations and some of the people that you would not otherwise really bring on a travel or out-of-town trip.

It gives access to a lot of the NOAA staff that we normally wouldn't see at this type of a meeting. So I mean, whether it's in Baltimore or Annapolis or D.C. or Silver Spring, you know, it's all the same neighborhood as far as I'm concerned. Wherever you think it would be propitious to bring your people to.

RDML SMITH: Yes, I mean, I have to say I've not been to an HSRP in Silver Spring, so those of you who have maybe could talk about what worked and what opportunities were there, but I envision an opportunity -- that it's not really about meeting with stakeholders directly there.

It's about meeting either with subject matter experts that we can't afford to bring because we have a whole lot more of them there. Other federal agencies at a senior level, right, if we go to the regions we get the -- we might get the colonel, right?

If we go to the D.C. area, we might find a general and same thing with the Coast Guard. So I think there's an opportunity for senior level interagency as well and if we're lucky maybe some policymakers downtown.

So I think that's the opportunity, the question in my mind is when is the right time to use that opportunity, and to be the most effective. And I would ask the same thing about New Orleans is that we do have some projects planned there, and we may not be on, if it were a year from now we may not have as much to show as if we waited a little bit longer, and so that's just a little bit of a tradeoff there. But I mostly wanted to make sure that we didn't do a fait accompli on the scheduling here and that this really is up to the panel and NOAA can support what the panel wants.

MEMBER KELLY: Yes, I would say it might be good to juxtapose the New Orleans and D.C., reverse that and there are stakeholders. I mean there's a lot, as you mentioned, associations, I mean, it has value to us as HSRP to make sure our story is being heard by the people at AAPA, at the AWO, there's a bunch of, you know, trade association people. BoatUS, there's, you know, the insurance people, there's a ton of high-level stakeholders that, you know, could then put the word out to their membership and I think it would be worthwhile to meet with those types of people and also the opportunity to go do a deeper dive into your staff and actually see some stuff that's being done.

CHAIR MILLER: Yes, the last meeting -- Ed do you want to take off your mic? Yes. The last meeting that I attended in D.C. we had, this was our only opportunity to talk with Dr. Sullivan, Jeremy Weirich, who at that time was on the Senate Appropriations Committee, came. And we talked to Anita Lopez who was Admiral Hann's predecessor. I found those extremely valuable insights.

And Manson Brown, so we had four major players in the NOAA hierarchy. They only came for an hour or two, but it was very, very invaluable to me to under, you know, to get a better picture. You're off.

MEMBER THOMAS: Andeavor has two great lobbyists in D.C. who I've met with. They'd be great on a panel for an hour talking about what was actually needed for the precision nav.

MEMBER MAUNE: And in that session in D.C. we tried to get the General from the Corps of Engineers, and we never got a colonel either we got Jeff Lillycrop who was representing the hydrographic services for the Corp. We tried to get generals and couldn't, and we got Paul Rooney from FEMA, we couldn't get any of the top leadership at FEMA to come either.

MS. BLACKWELL: Just quickly, I think the two locations are great, I would recommend switching them and doing a D.C. meeting in the spring.

MEMBER GEE: What -- yes, I agree with that as well but, from listening to you all, but what defines the time in the fall? The date in the fall?

MS. MERSFELDER-LEWIS: No fall recess, that we -- we would have to go in August. It would be the end of August which is kind of a terrible time in New Orleans, but you know it's, that's when -- it would be about the last week. Yes, you'll just be in an air-conditioned windowless room.

MEMBER MAUNE: Now in D.C. in the March/April timeframe we deal with cherry blossoms. There are hordes of people that come to D.C., and there may be hotel limitations at that time, I don't know.

MEMBER DUFFY: So I would just throw out, thinking about swapping also maybe being a good idea, the National Waterways conference will be in New Orleans in either August or September of this year, and I will say that when it comes to the Corps in New Orleans or headquarters, I have a feeling we'd be able to pull somebody.

We've had a pretty good relationship with a lot of the senior staff and have been able to get some of them to NAMO meetings and a lot of stuff in New Orleans as well. So hopefully that rapport that we have with each other would help on those.

RDML SMITH: I'm hearing pretty broad consensus for swapping these two, and Lynne says it's up to me and Joyce and we just discussed it and concur with that spirit. So, Lynne, I think we have a decision.

MS. MERSFELDER-LEWIS: Would you please look at your calendars and we will look at calendars too, but it's almost for sure the last week of August, that's when recess is for Congress, for New Orleans, and it's -- we'll just make sure -- it's actually not good to do it the week of March Madness.

I think we like, overlap with too many other things, so we'll -- I'm guessing it will be the second or third week of March, just as a guess, but we'll do a Doodle poll and we'll try to get more information.

MEMBER KELLY: Yes, and I personally, I prefer the late August period, it's easier for me to skew my vacation than it is to change my world. You know, like right now, there's emails and business going on, and it's tough to extract myself from that but late August is kind of a quiet time. It's much easier, just personally, for me to schedule that, than it is to try to do it during September when everybody's just back from the summer and, you know, and we're in demand a lot more for our day jobs.

MS. MERSFELDER-LEWIS: Okay, I think we'll table that for right now, and I'll try to get you a better idea about dates.

CHAIR MILLER: We have three minutes left.

MEMBER GEE: Should we have public comment time or not?

CHAIR MILLER: No. It's only once a day. Okay, unless, I mean, I don't think we have any public at this point. Attrition. Okay, thank you, everyone, for a really good meeting. A little tiring but I think we made it, and we'll see you in Juneau, I guess.

(Whereupon, the above‑entitled matter went off the record at 4:28 p.m.)