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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WEDNESDAY
SEPTEMBER 17, 2014
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The Hydrographic Services Review Panel met in the Courtyard Marriott Grand Cypress Room, 125 Calhoun Street, Charleston, South Carolina, at 8:00 a.m., Scott Perkins, Chair, presiding.

MEMBERS PRESENT

SCOTT R. PERKINS, HSRP Chair
WILLIAM HANSON, Vice Chair
ANDY ARMSTRONG*
RDML KENNETH BARBOR
JULIANA BLACKWELL*
RICHARD EDWING*
RDML EVELYN FIELDS
ED J. KELLY
DR. FRANK KUDRNA
DR. DAVID A. JAY
DR. GARY JEFFRESS
CAROL LOCKHART
JOYCE E. MILLER
SUSAN SHINGLEDECKER
MATTHEW WELLSLAGER
*** Non-voting members**

ALSO PRESENT
REAR ADMIRAL GERD F. GLANG, HSRP Designated Federal Official
CLARK ALEXANDER, Jr., Ph.D., Professor, Skidaway Institute of Oceanography
MICHAEL ASLAKSEN, Chief, Remote Sensing Division, National Geodetic Survey, NOAA
PAUL BRADLEY, Policy Advisor, National Ocean Service, NOAA
CAPTAIN (sel) RICK BRENNAN, Chief, Coast Survey Development Laboratory, NOAA
RUSSELL CALLENDER, Ph.D., Deputy Assistant Administrator, National Ocean Service, NOAA
MARGARET DAVIDSON, NOAA Senior Advisor for Coastal Innundation and Resilience
CAPTAIN JOHN CAMERON, Executive Director, Charleston Branch Pilots Association
LARRY DORMINY, Senior Editor, Salty Southeast Cruisers' Net
NICOLE ELKO, Ph.D., Coastal Geologist, Executive Committee on the American Shore & Beach Preservation (ASBPA)
TIFFANY HOUSE, Project Analyst, Remote Sensing Division, National Geodetic Survey, NOAA
RACHEL MEDLEY, Chief, Customer Affairs Branch, OCS, NOAA
LYNNE MERSFELDER-LEWIS, HSRP Coordinator
BYRON MILLER, Vice President, Marketing and Sales Support, South Carolina Ports Authority (SCPA)
PATRICK MOORE, Environmental Stewardship Manager, South Carolina Ports Authority (SCPA)
BRAD PICKEL, Executive Director, Atlantic Intracoastal Waterway Association
CAPTAIN (USCG ret) RUSS PROCTOR, Chief, Navigation Services Division, OCS, NOAA

NICHOLAS "MIKI" SCHMIDT, Chief, Coastal Geospatial Services Division, NOAA Coastal Services Center
KYLE WARD, Southeast Navigation Manager, NOAA
DAVID WARREN, PE/PMP, Project Manager, Civil Works, US Army Corps of Engineers
KATHY WATSON, HSRP Coordinator
BRIAN WILLIAMS, Chief of Programs, US Army Corps of Engineers
PHIL WOLF, Chief, Spatial Data Branch, US Army Corps of Engineers
DARREN WRIGHT, Maritime Services Program Manager, Center for the Operational Oceanographic Products and Services (CO-OPS)

T-A-B-L-E O-F C-O-N-T-E-N-T-S

P-R-O-C-E-E-D-I-N-G-S

(8:07 a.m.)

CHAIR PERKINS: Good morning. Welcome to Day 2 of the Hydrographic Services Review Panel Meeting here in Charleston. As a brief recap of yesterday, we had excellent keynote presentation opening lead-in remarks from Dr. Callender, fruitful afternoon amidst the rain. We had a nice tour of the Wando, you know, dock site port facility. And we were able to have a nice visit to the port pilot house.

Yes, they're not on. Are they on? Test. Great.

So with that, we have a very packed agenda today. We have a series of what I'll call rapid fire brief presentations followed by questions and answers. And then we have a period for deliberations for the panel later this afternoon.

So without any further ado, I would like to introduce Mr. Byron Miller who

is going to be filling in for Ms. Barbara Melvin from the South Carolina Ports Authority.

MR. MILLER: Good morning.

CHAIR PERKINS: Good morning. Welcome.

MR. MILLER: So rapid fire, right? I've got the hint, rapid fire. We had RCO Jim Newsome speak yesterday. So ditto. I'm done.

CHAIR PERKINS: And that's rapid fire by government terms.

MR. MILLER: Got you. Well once again, thank you for the invitation. And do the slides advance? That's all right. If I give this presentation, it will go very fast. So let me think about what Brian talked about.

CHAIR PERKINS: Mr. Miller?

MR. MILLER: Okay?

CHAIR PERKINS: They do have the mic at the podium live for you.

MR. MILLER: Okay.

(Off microphone comments)

MR. MILLER: So how many of you here went out to the Wando yesterday? All of you, almost all of you? How many of you was that your first time at our Wando terminal? Very good, excellent. Well, glad to have had you.

We're doing a lot of work, I mentioned over on the side over there, eagerly typing on his little iPad is Jim Van Ness, heads up our engineering and construction efforts and chief money spender these days for the port. Got a lot of improvements ongoing at the Wando and our facilities, and appreciate him being here.

So what I thought I would do is just, and some of these are duplicates of yesterday with what Jim said. So I won't go too far into this, but what I would highlight on this chart really is the bottom numbers. One in ten jobs in our state are port-related, and the huge economic impact of our port facilities.

At the same time, while we are State Ports Authority, as most port authorities have some local jurisdiction that they're accountable to, the impact of the Port of Charleston, and all the facilities here, not just our facilities but the private facilities, the government facilities, extend well beyond our state.

Frankly, only about a third, or less than a third of the cargo that we handle originates from or is destined for South Carolina. Most of it is from outside of the state.

This is a national artery. It is vital for our national economy, both exports and imports. We actually handle periodically more exports than imports through the Port of Charleston. And it's a vital resource for our country.

You were around yesterday in the harbor over at the Wando terminal. We have five marine terminals that we operate here in

the Port of Charleston. These are our general use facilities, public marine terminals.

There are also several private facilities over which we have no jurisdiction, so they're handling a lot of bulk commodities, petroleum products, chemicals now again in greater quantities. And so all of that makes up really what is the Port of Charleston. It's not just those public marine terminals that we have.

And really, the markets that we serve fall into those three categories. Most of what, you know, our focus and effort is on is on the container trade. That is the merchandise traffic, that's the highest dollar value amount of our cargo that we handle here in the Port of Charleston. And it's been the fastest growing.

On the break bulk side, you might have, if you drove around Charleston you might have seen at our Columbus Street terminal we're handling BMWs for export, made in South

Carolina, made in the United States. We'll export probably close to 200,000 United States- made BMWs this year.

Every morning, a train arrives here in the Port of Charleston with over 700 new BMWs for sale around the world. It's a phenomenal growth of this manufacturing that's occurring increasingly in the United States and in South Carolina.

And they're all really important to the future of the port. The cruise business is a moderate, you know, small sector but also important to our earnings profile. But the container business has been the focus of our investment and growth.

And we have been a very rapidly growing port. We've grown about 16 percent from 2011 to 2013, and year-to-date, calendar year-to-date we're 11 percent over the same period last year.

We have a board meeting today, we'll report our August numbers. We're

growing at more than double the pace of U.S. trade growth right now. So that's positive, and a lot of that is, I think, related to some of the market share gains that we've earned, but also the southeast. This is a very attractive place for manufacturing and distribution, and we're taking advantage of that.

All right. So Jim I'm sure talked to you at some length yesterday about the size of ships. This is the biggest issue in global shipping today --- is the size of vessels that are serving world trade.

In 1966, the Port of Charleston handled its first container ship, and that ship held 600 boxes on it. There are now ships on the world's oceans that hold over 18,000 twenty foot equivalent units.

There's talk of a ship of up to 20,000 TEU being constructed. So the size of these vessels has increased dramatically over that 50, 60 year period. But most

importantly, the pace of that growth has increased over the past three to four years.

So today if you look, and this is a lot of numbers and probably more of an eye chart for some of you toward the back, but if you look at the bottom line, so by the end of 2016, all of the vessels in that category of 5,100 TEU and larger is 59 percent of the world's container capacity.

So, well over half of the world's shipping capacity, total global shipping capacity will be in ships too big for the Panama Canal currently. Once the Panama Canal expansion is completed some time in 2015, '16, whenever they get that done, knowing the Bayonne Bridge is raised, you're going to see these vessels in increasing numbers coming to the U.S. East Coast.

At the same time, those vessels that are just smaller than the existing Panama Canal locks are only 21 percent of the total capacity.

And really, to give you one economic metric for why this is happening, Mediterranean Shipping Company, they're the second largest shipping company in the world based out of Geneva, Switzerland, huge port city in Geneva, Switzerland. They're based in Geneva for a number of reasons, Italian company, but they have a major office here in Charleston.

And the head of their vessel deployment group is based here in Charleston, a British guy. And his numbers were this, and average vessel burns about, on average, around 200 to 220 tons of bunker fuel a day while it's sailing, these big container ships.

The cost of bunker fuel is about $600 to $700 a ton. So every ship in the world's fleet that's out there on the oceans is burning over $125,000 worth of fuel every day.

Now, when you move to these larger vessels, greater than 5,100 TEU, the fuel

savings for each one of those ships in that category is about 30 to 40 percent per unit. So you can see why they're building bigger ships. They're able to save 40 to $50,000 a day for every vessel they have in their fleet.

MSC has about 500 ships, so the economics are just quite compelling. They have to scrap all these older vessels, smaller ships, and they have to use larger, more modern vessels to be able to compete.

And they're not waiting on the Panama Canal. Here you'll see a selection of various images of ships that are too big for the Panama Canal coming into the Port of Charleston today.

We have an average of seven post-Panamax ships a week, I think, Captain Cameron? These vessels are not waiting on the Panama Canal. They're coming today, and they will come in increasing frequency with the canal expansion.

And I'm not sure mathematically

how this is possible, but you'll see here an image of a ship at 14.5 meters, so roughly 47, 48 feet sailing in the Port of Charleston. Our project depth here is 45 feet. So obviously this is tidally constrained, it's moving around those windows. But we are handling and seeing these ships with increasing frequency today.

And of course, we're investing for the future. I mentioned the capital expenditures that we're doing here in the Port of Charleston along with the State of South Carolina, we're putting about $2 billion into our facilities. And of course, a large part of that is going to be our next harbor deepening project.

The new terminal construction on the former Navy base is advancing. We're anticipating Phase 1 of that to be complete in 2019, adding about 50 percent capacity to our container handling abilities here in the Port of Charleston.

So really, it's a tremendous investment, and it's one that is hinged on what you see here, which are three post-Panamax ships. And we appreciate all that you can do to help us make this a successful project both today and into the future.

Is that short enough for you?

CHAIR PERKINS: It's perfect. Thank you sir.

MR. MILLER: Very good. Thank you. I'll welcome questions, I guess, at the end, is that correct?

CHAIR PERKINS: Yes, we'll save the questions for the end collectively, please.

MR. MILLER: Excellent. Great, thank you.

CHAIR PERKINS: Great. Our next speaker is Mr. Brian Williams, Chief of Programs for the U.S. Army Corps of Engineers Charleston District.

MR. WILLIAMS: All right, well good morning, and thank you for the invitation

to be here this morning. I know our commander, Colonel Litz, talked yesterday and got quite a few questions. And some of the other presentations, also touched on harbor deepening.

I'm going to try and avoid most of the topics that were discussed yesterday, maybe just some slight overlap, and run through this pretty briefly. But I'll be available for questions, and will try and be here as much as I can today.

Charleston Harbor has undergone quite a few deepenings in its history, starting at around 12 feet of depth back in the 1700's, and progressing to our current authorized channels, which are 45 feet interior and 47 feet in the entrance channel.

Most folks probably here are aware of the layout of Charleston Harbor. I really put this up just because of these two numbers.

It's kind of a misconception amongst a lot of the general public when we

talk about federal channel in a harbor is that well, gosh that must be the whole area. And so what we did, early on, was try and figure out exactly how much of the area of Charleston Harbor is touched by the federal channel.

And it's not pictured on here, but we do have a federal channel up the Ashley River. So that's where the 17 percent number comes from. So that's, really, only 17 percent of the total bank-to-bank area within the footprint of the federal project is actually channel.

And if you take the Ashley River out, it's only 11 percent. So that's, for those that are uninitiated with Charleston, a pretty powerful set of numbers.

So why are we doing the study and what are our constraints? Well, the federal objective for water and land related resources are to identify the national economic development plan and make sure that plan is consistent with protecting the nation's

natural resources.

So why are we doing a study? If there's a need for deeper harbor, then there must be some problems with the current one. Currently, we have light loading of vessels, or they are waiting to take advantage of favorable tide conditions.

We have restrictive channel widths that prohibit two way traffic in some areas. And some of the turning basins are currently too small to handle the vessels that will be calling Charleston in the future. And so with problems come opportunities.

So one of the opportunities that we have is by making modifications --- we can bring in the projected future cargo into Charleston on a fewer number of vessels. And that has cost savings, but it also has environmental considerations with it in reducing the number of vessels transiting the harbor.

And the other main thing to touch

on here is improving navigational safety by reducing congestion. So we do expect in the future we will have more vessels without Charleston Harbor if we do nothing. If we have a project, we will reduce the number of vessels that would call in the future.

So the number of vessels are going to go up, but they will go up by less if we deepen. And that may be clear, it may be counterintuitive. But Jim had a better graphic on big ship evolution and Byron did, too so I'll kind of bypass this one.

So we had some preliminary alternatives. We studied a range of depths all the way from 46 feet to 52 feet in one foot increments. And we quickly realized that we could reduce that number. And this was part of the Civil Works Transformation, doing things faster, smart planning, trying to reduce duration and cost.

So what we did was as quickly as we could, we got down to three different

alternatives for the Wando Welch Terminal and what will be the new Navy Base Terminal. And those are 48, 50, and 52 feet of depth. And for the North Charleston Terminal, 47 feet and 48 feet.

So what we're currently doing right now, and folks are hard at work back at the District today and will be for the next few weeks is polishing the draft report which will ultimately give our draft recommendation on the future of Charleston Harbor. That literally will be coming out within weeks. I would love to give you some more information now, but that would be premature.

We're not doing this alone. We have a host of stakeholders, non-federal agencies, federal agencies that we've been working with. One of the things we did at the very beginning was to bring in all of those agencies and what we call an interagency coordination team.

And we have met with them

countless times, both in person, on the phone, and by communicating by email to basically share, get their ideas, get some feedback on our process, our individual pieces of the study.

And we think that's been hugely beneficial and would like to say thank you, especially to the pilots, but also to NOAA and all the other agencies that have participated in this because it has been a value added for us.

Civil Works Transformation, basically we had to change. That's the bottom line. Things were taking too long and costing too much. So we had to figure out how to do it, and the result is smart planning and some of the initiatives to focus on a risk-based decision making process and reducing some of the things that inherently have been a part of these types of studies in the past.

Which has got us to this time line, and as I mentioned, we're kind of right

here, right now. Weeks away from release of a draft report and a draft environmental impact statement.

That will go out for simultaneous headquarters USACE policy review, our agency technical review which is an internal technical review of our document, independent external peer review which was, I believe, part of Florida 2007, and also public review, and the agencies will also have a chance to look at it at that time, as well.

So all of that is going to kick off as soon as we get this released, so we may have a week to catch our breath, and then we'll have a public meeting and solicit input. So of course, looking for input during that meeting, but also by email, mail, and several different other options.

I'll breeze through this, but because this is a technically oriented group here, some of the technical things that we did, we had the USGS collect quite a bit of

information on salinity, currents, water levels for us at prescribed locations.

And we used those to put into the EPA's Environmental Fluid Dynamics Code model. That's kind of a mouthful, but basically that gave us projections of currents, salinity, devolved oxygen and other parameters with which we could evaluate our project alternatives.

We also had the Joint Airborne LiDAR Bathymetry Technical Center of Expertise. That's a mouthful too, but we've got a handy acronym for it. It's called JALBTCX, that's better.

But they helped us out in doing some LiDAR surveys and some light reflectivity surveys on the plant communities within the area, which really helped us to get some really fine resolution on the types of vegetation that make up the wetlands, which is a very key piece of this study.

And then, to give some kudos here

to another one of our partners, Coastal Carolina University, they have quite a bit of expertise and capability. And they helped us with some magnetometer and sidescan sonar surveys.

This is not something that we captured here, but this is kind of an example of a historic vessel called the Patapsco that is in the Charleston area.

And then South Carolina DNR helped us as well with some sediment composition stuff and ANAMAR Consulting did the bulk of our sediment chemistry analyses with bioaccumulation evaluations, basically to make sure the stuff that we will be dredging is not harmful to the environment.

Breezing through this, we like to focus on the three E's: engineering, environmental, and economics. Engineering, can we build it, is it feasible and, you know, what is the cost?

And environmental, basically

taking comments we received during our public scoping on what are the concerns out there; bringing together the agencies to figure out what are the agencies' concerns, and then really focusing in on the important parts of those for our study --- water quality, salinity, wetlands, all those being major focus areas.

And then finally, economics is basically quantifying the benefits versus the cost. And what we're doing to capture benefits is the reduction in transportation inefficiencies.

So getting those, primarily containers in this case because those are the big drivers, getting those containers from their origin to their destination, their destination being here in Charleston, what kind of savings can we realize through reducing their inefficiencies in that path?

So finally, just to recap what's next, we're going to have that draft report in

a couple of weeks. We will incorporate, review, compile all the comments we receive, make any adjustments that are necessary. We will go to a final report next spring.

And then by September 2015, we will have a completed Chief's report, which is the report from the Chief of Engineers for the Corps that basically says that this is our recommendation for the future of Charleston Harbor.

And then the Colonel discussed preconstruction engineering design and construction yesterday, so I won't cover that unless there are questions. That's it. I could talk for 12 hours about this, but hopefully I stayed somewhere within my 15 minutes.

CHAIR PERKINS: Very good. All right. Our next speaker is Mr. Justin Wolf, Cartographic Technician from the U.S. Army Corps of Engineers, Charleston District.

Did I just --- I just did that

wrong here, just said Justin Wolf, so I mixed first name and last name. My apology. Justin West.

MR. WEST: Good morning, everybody. Unfortunately, Phil couldn't be here this morning. So I am Justin West. I'm the Cartographic Technician at the Corps of Engineers, and I was asked to come here today and give you guys just a little local overview of the software that we've been using to create some of the channel condition reports and products called eHydro.

I don't know how many people are familiar with the eHydro software package. It's a headquarters level initiative to create a repeatable and standardized process for creating chart products, channel condition reports, and several analysis products that we use internally to help us with quantifying some of the material that's on the bottom of the channels.

One of the reasons that this

software was created was a lot of time was being spent manually sifting through a lot of this data. So we would receive the surveys from the survey teams, we would process it in-house.

And then we would have an engineering technician or a cartographer manually going through a lot of these soundings, picking them out visually as far as the shallowest point, and then plotting them on a chart and entering them into a report.

What the software does is because everything is automated, it reduces the possibility of human error. Once you look at a chart long enough, all the numbers start to look the same. If you've been doing it for four hours, every number looks the same. So you got to get a process in there that's going to pull the information out that you want and leave the information that you don't.

It also reduces production times. Again, you know, you had one person that would

sit there for a couple hours and just look at lines on a chart. And now that this is all automated, it reduces that time from hours into sometimes minutes, 20 minutes, 30 minutes compared to, you know, half a day.

Another thing is the software allows us to reconfigure all of the parameters on the fly if we need to. So if a channel depth changes, all we have to do is go into the back end of the software to make the change, re-run the report, everything comes out exactly like it did with the shallower depth.

eHydro produces several products. Some of these are for distribution, like our charts that we have as well as the channel condition reports. And the channel condition reports, if you're not familiar with it, it's Excel-based background, so everything is kind of in fields. And I'll have an example of that here in just a minute.

And then planning analysis, we

have channel availability reports, and what this does is it generates a value for each channel based on historical data that you've run through the process.

So what you can do is you can look at historic shoaling rates, you can look at what the depths were at the same time last year when they did the survey for your annuals, at the same time when they did their quarters.

You can also do channel availability by quarter, and what that does is that's going to spit out a percentage of availability. So for the time period that you're given, it will say that 100 percent of the channel was available for 60 percent of the time during the survey.

And then there's the channel condition index. This is a mathematical equation, and it basically is just an estimate by the software as to the amount of material that's actually in the channel.

These are not hard numbers. It's basically the computer saying this is what it's supposed to be as the maintained depth, this is what the survey's saying, this is what I think is in between. So these are to help our planners with kind of getting a determination of what to expect once they actually get down there.

The channel condition report, it's a standardized form, it's a 4020 or a 4021. Each sounding is identified by the software and automatically populated within the chart. Again, this is to reduce the human error of somebody manually rolling through and saying okay, well that's the shallowest point.

The base data, as far as the seeding within the software, can be changed. Again, if your depths change, if your widths change, all of that can be modified on the fly inside the software back end.

And then this is one of the primary products that we distribute to our

customers such as NOAA. We posted it on our public website, so if anybody needs to see these and say hey, you know, what's the shallowest point within this reach, they can do it.

Unfortunately, we are limited on the CCRs because it is not a geographic product. All it says is it says that there is the shallow point of this depth somewhere within this quarter of this reach. So you know, mariners really need to be advised that this is not the end-all be-all. This is a, you know, be aware for this.

Our chart products, all of our chart products are standardized on the eHydro output level. So what we tried to do when we designed our chart was we wanted every chart to look the same, the same symbology, the same output so that everybody, no matter if you're looking at Charleston Harbor, if you're looking at the Ashley River, if you're looking at Shipyard River, if you're looking at Shem

Creek, all the symbology and everything is going to be the same so that you can at least take a look and know exactly what you're looking at.

Right here we just have an example of Anchorage Basin. As you can see, this was a combination of the multibeam surveys, as well as the single beam surveys after the dredge. So the red is going to be indicative of that is under 30 feet, and then it goes up to a white where that's actually above project depth.

Our chart products, again, they depict the channel geometries as well as the soundings within those channels. The templates are created by project area, so each project area actually has an individualized template which is going to have all of the correct marginality and all of the correct projection information, as well as the date of the soundings.

And again, all of those templates

are customizable. So any time that our project changes or our geometries change, those can be modified as it happens.

And anybody that doesn't have ArcGIS or any type of mapping system, these could be output in both an ArcGIS format or a PDF format. And with those PDFs, we can actually add the geographic information, as well as the layer information onto those PDFs.

With some of the larger channels in some of the larger sounding surveys, that becomes difficult because it actually inflates the size of the PDFs to the point where they're a little unmanageable.

eHydro, because it is a headquarters solution to one of the common problems of just time management within the groups, it is moving towards an enterprise solution for data delivery.

And what that means is, at the local level, we are providing all of our survey data through eHydro up to headquarters.

What they're doing is they're actually creating a data warehouse of all of the eHydro data and merging it all together into one giant data warehouse so that it can be queried out as needed and then distributed to the customers.

What that's doing is it's keeping it so that we don't have to maintain 1,000 copies of every survey on ten different systems across the Corps. So it's reducing the resources that are needed at the local level by allowing us to process it and send it up. And then if the customer needs it, they can request it from us, or they can request it from headquarters.

Right now, the enterprise delivery method is still in testing. They are having some issues with it. It's not getting 100 percent of the data that it needs.

It is something that they're working on, and we have a really good group of developers that we -- I mean, these guys, I

can call them up, they're in Portland, which makes the time zone a little different, but I can call them up and tell them that I'm having a problem. They can usually give me an answer within a couple of hours, if not, you know, by the end of the day.

Any change requests that we have, any additional functionality that we request, these guys are really receptive as to, you know, addressing those issues or making the changes that we request.

Questions, I guess we're saving until the end?

CHAIR PERKINS: Yes, please.

MR. WEST: So I'll be here probably until a little bit after lunch if anybody has anything specific. Thank you.

CHAIR PERKINS: Great. All right, our next speaker is Captain John Cameron who we met briefly yesterday afternoon from the Charleston Branch Pilots Association. Good to see you again, Sir.

CAPT CAMERON: Thank you for having me. I hope ---- out of anything you might take away from me, I hope you learn that this is truly a public/private partnership around this port. Everybody that you've met in Charleston, we spend a lot of time together.

For example, this panel this morning, we know each other so well that all of my colleagues on the panel knew that if they left ten minutes on the table, I would have no trouble putting us back on schedule. And we didn't plan that.

Anyway, yes, thank you for coming by yesterday. And I'll jump right in and I'll talk about the navigational challenges, especially focused on post-Panamax vessels, and there's a variety of them. And I won't spend a lot of time on the ones you've already heard about.

(Off microphone discussion)

CAPT CAMERON: Okay, so you've

seen this graphic over and over and over, but when you run around, you hear people talking about depth all the time. We like to point out that the largest dimensional changes occur in the Panama Canal from the old locks and new locks is the width.

Ships are getting 55 percent wider. And that is, of course, driving the market for vessels. It's not that every ship is going to go through the Panama Canal, it's that every ship can. And therefore, the resale value for large ships is -- you know, is completely different than it was a generation ago as far as shipping is concerned.

And then the second project, which really has exactly the same effect as the Panama Canal, is the Bayonne Bridge. Once ships can trade on the East Coast, and they have to go to New York to make it worthwhile, they will trade on the East Coast.

Charleston is already in a

position to handle 13,000 TEU ships, and we're handling the ships smaller than that right now because they're already on the ocean. Twenty eight percent of the container ships that came to Charleston last year were post-Panamax.

As soon as the Bayonne Bridge is raised, we'll be seeing the 13,000 TEU ships here. The reason we need to dredge is we can only handle one or two of these a day on high tide, and we're going to be able to need to handle them all day long.

So to get into some of those details on the width -- a ship takes up a lot more space in the channel than its width at the dock. A post-Panamax ship, the path it sweeps through the waterway is three and a half times the width of a Panamax ship.

You know, instead of 105 feet, which is the beam of a Panamax ship, it's sweeping 350, 375 feet as it moves through the channel. So the channels have to be much wider to accommodate two way traffic.

Back in 2004, in the dredging project that Brian mentioned, we paid for the width, and we have all the width that we need. You'll see a lot of channel projects around the country that are focused on depth and not focused on width. And traffic flow through those channels will be a challenge.

It's really two different channels. There's a channel inside the harbor, there's a channel outside the harbor. They do two different things. Inside the harbor, ships are moving slower, there's no waves, and the currents are hitting the ship head on or right on the stern, so the current is intending to push a ship out of the channel.

Offshore, you've got currents that are lateral, you've got ocean waves, and you actually need more speed so that you can manage that crab angle that I showed you a couple of slides back.

So you need to be able to go

faster, and you need deeper water. As a ship goes through a channel, it squats, the water underneath it literally sucks it to the bottom, and you get to a point where the ship just won't go any faster, and it becomes a downward spiral where you can't go fast enough to maintain control.

So you need more depth for all of those reasons. A post-Panamax ship 160 feet wide, if it heels two degrees, that adds a meter to its draft on that low side. A meter's a lot, you know, when you're trying to get by on 10 or 20 percent of under-keel clearance according to your draft.

The Army Corps Design Manual talks about channels in the harbor allowing for 10 percent of the draft of the vessel as under-keel clearance, underneath the vessel, and 20 percent offshore.

We haven't been able to afford to build a channel to meet those standards since I don't know when, Brian. The Corps, the last

couple of generations of channels have made those offshore channels two feet deeper in the ocean than in the harbor.

Two feet isn't enough anymore, but we've got ourselves into this mindset that, you know, we're going to spend enough money to make it two feet deeper. We're going to have to reevaluate that here with one of these upcoming generations of increased shipping.

You've seen references to what this all means, a foot here and a foot there. Well, it all adds up. On a 13,000 TEU ship, if you can sink that ship into the water another foot, the cargo value that will do that is $15 million. So $15 million for every available foot of draft.

The day after we dredge five feet, the first ship that comes in will be carrying $75 million more imports on the way in, another $75 million on the way out for a $350 million project. You heard Jim mention yesterday that the Corps has a very

conservative guideline for how they account for the value of a project.

So there's several other features to channels. Right now, the difference between the Port of Charleston handling a 13,000 TEU ship and a 15,000 TEU ship is only the turning basins. Turning basins are a cul de sac at the end of a channel where the ship can turn around and go back out.

Ships are longer than channels are wide, so they can't turn around wherever they like. And you wouldn't normally think that, but all the shipping lines that trade here that have large vessels have called us and asked us what's the largest vessel we can handle, and that's the reason. We can't turn around a bigger ship than a 13,000 TEU until Brian finishes his project.

When you improve a harbor, the ships get bigger, you do need to take some of the corners off at the junction to the channels. Flare the entrances to channels and

things so you have room to turn a larger vessel.

And then the ranges, no matter how much electronic navigation you have and all the technology, there's nothing like a range which is two points, two towers lined up with the channel, one in front, one in back, front one lower and the back one higher. When you're on that range, you're on the channel. No doubt about it.

These larger ships, as you're swinging from one leg of the channel to the other, you need to know when to stop your swing. The problem we're having is it's typical for a range light to flash every two and a half seconds. That's two long for a big ship. If you've got to wait two and a half seconds until your next reference point, that's too long.

We've asked the Coast Guard to go out and shorten the interval, the flashing interval on the ranges here because with that

much ship in front of you, two and a half seconds is too long to see if you're there yet.

Charting is also an issue. As you dig deeper, you have to dig farther out into the ocean. And prior to Kyle finishing a project, this was a scenario where you would get to the end of the channel while you were at the edge of the chart, and you either went onto this chart or this chart and immediately upon getting to the end of the channel.

And we couldn't do any plotting of the area where the ships congregate to the end of the channel. So Kyle reconfigured this. This doesn't look like a big change maybe in the back of the room, but now there's seven miles there.

So after you get out of the channel, you've got seven miles of chart to work with before you're in your ocean transit on the next chart. That was a seven year project to get that done, and that's fine. We

knew it would take a while, we wanted it to be done before the next deepening extended the channel further.

And I can't thank Kyle enough for getting that done. I can't imagine how hard it was to do.

Port systems, very important. This is last night. The red line is the actual depth in Charleston and the blue line is the predicted depth. If we didn't have a port system, we would have thought the water was nine inches deeper than it actually was last night.

So when you're working with four feet under-keel clearance, nine inches is a lot. It's much more important on the bridge. Last night, at the same time that I pulled that -- last night is probably about six and a half hours ago, actually.

The clearance on the Don Holt Bridge was 160.7 feet. If you didn't know that the tide was nine inches higher than

predicted, then you would have thought you'd have about 161.5 feet of clearance there. And our clearance under bridges is two feet. So the bigger the ships, the more important those sensors are.

What we don't know is the salinity. And the salinity of the water makes a big difference as well. You'll hear all the time, you know, the Panama Canal can handle 50 feet of draft, and that's true.

But the Panama Canal is a fresh water body. Gatun Lake, that 10,000 TEU ship in Gatun Lake drawing 50 feet, when you put it out into the ocean, it's going to draw 47.5. When you go up a typical river port in the Southeast, that ship is going to sink another foot. It would be about 48.5 feet.

Charleston Harbor is a salt water body, so salt water drafts apply here. So the same ship in our harbor that floats at 47.5 feet will float at 48.5 feet in another harbor. But those salinities change, you

know, with weather events and so forth, and we don't always know exactly what that salinity is.

So the rest of the time, I want to talk about a regulatory issue. And this is actually our biggest challenge for navigational safety in the Port of Charleston.

Back in 2008, the NMFS portion of NOAA, and I hear all the time that's the other NOAA. And I was in an agency that had -- you know, when I was in the Coast Guard there was the other Coast Guard all the time, too.

But with all good intentions to protect right whales, NMFS promulgated regulations to slow vessels to ten knots for periods of time in the Atlantic Ocean along the coast for up to six months at a time. And it had to do with the migratory patterns as they had studied.

When I was captain of the port here in Charleston, I wrote a letter to my chain of command saying that, that's great

except in the entrance channel. Ten knots is just too slow to manage that crab angle to keep directional control and to keep control of your vessel.

So NOAA has -- or NMFS I should say, put a deviation clause in the regulations. So the regulation reads, a ship shall go no faster than ten knots from November 1st to April 30th within 20 miles of the coast of South Carolina unless they are severely restricted by hydrographic, oceanographic or atmospheric conditions.

So I'll go into the details of why that's problematic. But, first of all, when you're in the ocean -- when you're in that ocean entrance channel, the current is hitting you from the side and that's when you're having those largest crab angles.

To stay in the channel, you have to maintain a certain amount of speed so you can manage those crab angles. It's kind of like if you're riding your bicycle with a

friend and you want to hand them a piece of gum, if you're going too slow, you're going to crash into each other.

You put a little speed on, and everything is stable. Everything is predictable. If you go too slow with a ship trying to stay in a confined channel, eventually you'll lose control. And it happened with the Bahama Spirit in 2004. But I'll get to that in a second.

The Army Corps has since studied this issue that we brought up back in 2006. Last year, they did a study of the Charleston Channel in typical weather conditions, and they found that when you slow a ship down from 15 knots to 10 knots, and 15 is even slower than we typically go in the entrance channel, the space that you have available on either side of the ship in the channel is 50 percent less. You have a 50 percent smaller margin of safety at 10 knots than you do at 15 knots.

Then in February, the Corps did

another study about navigational precision. If you're trying to hit a target, speed is your ally up to a certain point. What is the effect of degrading speed on your navigational precision?

And they found that every five knots in the range from 20 down to 10 costs you 20 percent in your navigational precision. So hitting that target, dropping speed from 20 to 10 knots, getting the ship through that door, you're going to have 40 percent more error in that evolution.

So here's the scenario. For six months of the year, we can go as fast as we need to, to maintain control of the vessels, we can pass vessels, and everything's fine. But for the other six months of the year, we're trying to meet vessels and pass them while we're going slower. And the effect is that we're working too close to the margins.

At ten knots, those crab angles just become debilitating. So that deviation

clause -- that deviation clause, we apply it on every voyage, but it's applied after a long argument with the master.

For six months of the year, when a pilot climbs up onto the bridge of a ship, the master invariably says, my company told me don't go over ten knots no matter what. We'll have to send our logs in, we'll have to document everything, we're not -- you know, I can't do it.

And we're telling them then we can't take your ship in because we can't move your ship safely at ten knots. So you end up on this compromise. The objectives of the master and the objectives of the pilot are bifurcated when normally you would want them focused on exactly the same thing, what's the safest way to navigate the vessel.

So when it goes wrong, it can go very wrong, of course. And we've had ships where the master was pulling back the throttles without telling the pilot.

We've been going along in the channel after we reached some compromised speed of 14 knots or whatever and the Coast Guard will get on the radio and say, you're in the right whale speed zone and you're exceeding ten knots and you need to slow down.

And now when you want everybody on the bridge focused on navigating the ship, now you're having that argument again when you're already in the channel.

So going back to that time where we tried to go ten knots in the channel and it didn't work was 2004. And it was the day after a tropical storm had gone through, and there were winds in the 20 to 30 range, which isn't all that unusual off of Charleston.

But the ship had mechanical issues, we shouldn't have taken it. Again, this was back in 2004 and, you know, we hadn't really studied this issue to the point we have now. But anyway, the more the currents were affecting the vessel, the pilot tried to put

on more speed and more rudder.

He didn't have more speed to work with because the engines just weren't up to it. So the increased drag of the rudder slowed the ship down, and it became a downward spiral. And when I say that it stalled, it stalled like an airplane stalls when it's trying to climb too quickly.

It couldn't overcome the drag of its rudder that it needed to turn into the current, and they lost control and they went up against the bank of the channel. And the port was closed for the rest of the day.

Fortunately, it was a self-unloading vessel carrying granite pellets, and we were able to jettison 5,000 tons of cargo on the next high tide, and we pulled it off with five tugs and you never heard about it in the news.

When we bring that up to the NMFS folks that we have a case study on what can go wrong, they say well, that was a bad day.

That was the day the margin of safety went negative.

Pilots are charged with keeping the margin of safety as positive as possible all day long. We don't ever want to be anywhere near a neutral margin of safety, and certainly not a negative margin of safety.

So this year, NOAA has accepted a petition from American Pilots Association to exempt only the dredged channels from the right whale speed rule. So why now? You know, we brought this up in 2006, but you've seen several graphics on the size of ships.

And ships are 30 to 50 percent larger now than they were when this rule was promulgated. It's a real problem now. Now this is -- I mentioned to some of you last night, the last time I put this slide up.

What this is is these are right whale sightings in northern New England from 2002 to 2011. So roughly half of this period before they promulgated the regulation, and

half of this period after they promulgated the regulation.

These are locations where right whales were sighted. Every one of these little diamonds might be one whale, it might be 12 whales, it might be some -- you know, some number of whales, but a sighting happened at that place at a point in time.

Those are by aerial overflights or by vessel reports. In that period of time, there were 16,010 sightings over those ten years. These are just the 3,989 of them that are outside of the protected areas where these speed limits apply.

This is the boundary of the speed limits up in New England, and it's cut up into three sections. This one's in effect for four and a half months of the year, this one's in effect for two months of the year, this one's in effect for four months of the year.

So when you see sightings in here -- what's noted on here is this is a sighting

that happened in a month when this speed zone isn't in effect. So this two month box here, this is the route that the ships take in and out of Boston. Here's the separation zone.

They moved the separation zone, as a matter of fact, to facilitate this program. This zone's in effect for two months of the year. Over a ten year period, 40 percent of the right whales that were spotted in this box were spotted in months other than those two months.

So when they designed this speed management area to protect right whales, they only targeted 60 percent of the risk. Out of this whole area, 3,989 sightings are not protected by current regulations. They're either outside of the geographic boundaries of the box or they are in a month or a year where those boxes aren't applicable.

So 25 percent of the sightings over a ten year period are not protected by the right whale speed rule. So the point is

if NMFS is willing to accept that level of risk tolerance to the species in northern New England, why do we over regulate 6.7 square miles of channels throughout the eastern seaboard where there really is a good reason to maintain safe speed and navigate vessels safely?

So these are the nine channels where there is a speed management area, and you can see the boundaries of them. Some of them are a 20 mile line off the coast, and some of them are just a bubble around the port.

But that's the square miles of each of those channels. The two channels in New York, you add up the area between the dotted lines on the chart where it's dredged and it's 9/10 of a square mile.

So there's 6.7 square miles of regulated channels on the East Coast where it's dangerous to go 10 knots. The right whale speed rule covers 17,600 square miles of

ocean. And it's only targeting 75 percent of the known risk in northern New England.

So it just doesn't make sense to so rigorously regulate those channel areas and introduce an environmental risk from a shipping accident when your targeted protection of the species is a completely different parameter elsewhere along the coast.

And we now -- the Army Corps, having studied that your navigational precision drops. The Army Corps has studied that your dimensional margin of safety drops significantly at ten knots.

NMFS has never studied whether those nine ports with those ten channels can handle slow speeds. They've also never studied why the Port of Boston and the Port of Canaveral, whose entrance channels are not in a speed management area, they haven't studied why those channels can't be regulated and run ships at ten knots.

There's been no navigational study

by NMFS at all on the impact of this rule in confined channel.

The petition, we understand, is going to be denied by NOAA. Office of Management and Budget, or OIRA, has gotten involved because it's a safety issue. If there's a shipping accident and there's oil on the beach and it's because the ships were following the rules, obviously that's a problem for the administration.

The Army Corps has backed us with the concern and done the studies, and NMFS is holding the line. So this is a significant problem that affects very few -- you know, very few ports, looking at it nationally. And I appreciate the opportunity to talk about this with you.

Unfortunately, this afternoon, I can't be here for the break out sessions because I'm getting on a plane to go to Baltimore to a NOAA focus group of our right whale reporting up at MITAG this afternoon.

So for me, it's all NOAA all day, and that's fine to me.

So anyway, thank you. Thank you for listening.

CHAIR PERKINS: Thank you, Mr. Cameron. I want to ask a question. Have you done a presentation like this to the Coast Guard's NAVSAC FACA?

CAPT CAMERON: I have not. I would be delighted to be invited to NAVSAC. I would be delighted to be on NAVSAC, frankly. But I have not.

And the Coast Guard -- I was pleased when I was Captain of the port that my letter to my Admiral did make it to NOAA, and NOAA has told me that that's why the deviation clause is in the regulation. It's just not effective.

Since then, the Coast Guard has not wanted to have much involvement in that issue. They provide NOAA with AIS data from ships so that NOAA can electronically enforce

the regulation. But that's been all we've gotten out of the Coast Guard last year.

CHAIR PERKINS: Yes. It sounds like a topic that would be perfectly suited for presentation to the NAVSAC FACA.

CAPT CAMERON: I'll be there if you can arrange that, sir.

CHAIR PERKINS: You know, I've only attended one of their meetings, the Admiral and I had the opportunity to attend together last year, but I will take that action item to try and determine when their next meeting is and try to facilitate that.

CAPT CAMERON: Thank you, sir.

CHAIR PERKINS: Great. Justin, the eHydro tool?

MR. WEST: Yes, sir.

CHAIR PERKINS: So is that intellectual property? Is that licensed software? Is that Army Corps developed software?

MR. WEST: It is Army Corps

developed as far as the licensing. I don't have an answer for you, I would have to get in contact with the developers and see exactly how they are working that piece.

CHAIR PERKINS: I'm just curious, you know, whether other agencies or whether the public can utilize that tool.

MR. WEST: I could get back with you on that. Again, I would have to get with the developers and see exactly how their playing that piece. I know they're still working on some further development within the software itself, so that may be in the future plans.

CHAIR PERKINS: Okay. And the software development's taking place in Portland District, is that correct?

MR. WEST: The major development is taking place in Portland with the cooperation of some of the other districts. Charleston was one of the major testing facilities for the software.

CHAIR PERKINS: You mentioned that the CCRs, the Channel Condition Reports, that they're ---- you're not distributing that data spatially?

MR. WEST: The Channel Condition Report itself does not contain spatial data. All it is is just a report indicating the depths --

CHAIR PERKINS: Why is that? I mean, you've got the spatial data in your hands, it's in your data set. I'm just wondering why isn't that a fully spatially enabled -- you know, data set that's being distributed?

MR. WEST: The CCRs are designed to be used in conjunction with the standardized chart that we would produce that would actually show the soundings. Unfortunately, because the CCR reports are standardized forms throughout the Corps --

CHAIR PERKINS: So that's a Corps of Engineers chart that you're referring to?

MR. WEST: Yes, sir.

CHAIR PERKINS: Can you export an XML so it can be used with Google Earth or, you know, with a public domain viewer?

MR. WEST: As far as the spatial data that's being output by eHydro?

CHAIR PERKINS: Yes. You know, that nice colored chart, the SAC. You had your depth code colored slide and it said SAC was the acronym. Is that available as an XML or for something that people can use without having to buy licensed software to view it?

MR. WEST: That is an option to be output with the eHydro software. It is not something that we have explored sufficiently yet. Charleston is prepared to start putting out the KMLs to be used with Google Earth.

CHAIR PERKINS: Okay, great, great. And I filibustered, so I apologize.

MR. WEST: That's all right, sir.

MR. WARD: Actually, I had a follow-on question to that. That eHydro is

built on the Esri platform, is that right, in your developing that product, or am I misunderstanding?

MR. WEST: eHydro is actually developed using Python script.

MR. WARD: Okay.

MR. WEST: Which is integral the Esri GIS platform. It does require either a CAD input through like, Microstation or something like that, or also a geo-database that is created in the Esri GIS format.

MR. WARD: And also, the CCR is a product that is on the nautical chart, as well. So Channel Condition Report shows up.

CHAIR PERKINS: I don't want to -- I really do want to filibuster this, but we could schedule it -- I could come back to Charleston and meet with you guys separately, too. So are there other questions before I run the gauntlet? Yes, Frank?

MEMBER KUDRNA: Regarding the deepening of the channel by the Corps of

Engineers, and I recognize based on yesterday's presentation any federal construction funding would require an award authorization for that. But what would the cost sharing be under the current rules of the Corps for federal participation?

MR. WILLIAMS: Right. So we've had some adjustments in the Water Resources Reform Development Act of 2014 with regards to how we cost share as depth changes. And so it would be premature for me to answer you with utmost certainty on that one until we get some implementation guidance from our higher headquarters.

It used to be that anything below 45 feet, there was a different cost share. And that mostly had to do with our operation and maintenance of the harbor in which the federal government paid for 100 percent of the operation and maintenance for a project 45 feet or less. And anything greater than that, the non-federal sponsor had to kick in some

amount.

That's now changed to 50 feet with the latest WRRDA, but we don't have implementation guidance on down to our level on exactly how you slice that pie. So more to come. We'll get back to you as soon as we've got some --

CHAIR PERKINS: Joyce?

CAPT CAMERON: Byron, how much did the State set aside?

MR. MILLER: The State of South Carolina, in recognizing that as a nation we are somewhat constrained these days, did not wish to have a lot of doubt surrounding our portion of the share, whatever that share may indeed end up being.

So the State of South Carolina went ahead and set aside $300 million toward the project. It's not the State of South Carolina's intention to cover the federal share, but perhaps to cover in advance, seek reimbursement.

I know there's lots of details to be worked out surrounding all of those opportunities. But at least, the State share, we would hope, has been fully covered in advance, which you know, frankly is kind of unusual.

We had, as a State, about a $550 million budget surplus in 2011, and they set aside $300 million of that toward our next project. So I guess the question is answered about the local share. The question about what that share will be is, I think, not.

MR. WILLIAMS: Right. We should --- in the draft report that comes out, there should be, you know, clarifying language on how to share.

CAPT CAMERON: I think it's interesting to note, though, that 95 percent of the maritime commerce in and out of this country occurs through 15 ports in 12 states. So 12 states are paying 50 or 60 percent of the cost of deepening to serve all 48, and the

other 48 share the other 50 percent.

CHAIR PERKINS: Okay. Joyce?

MEMBER MILLER: It's clear there's Governmental support. I come from a state, Hawaii, where there's a huge environmental lobby. And I know your public comment period is coming up.

What are the primary environmental concerns, and do you anticipate there will be strong pushback from any sector of the public, and that's to anyone who --

CHAIR PERKINS: Do you want to handle that one first?

MR. WILLIAMS: Yes. So we had a public scoping period that was part of our process, part of the National Environmental Protection Act process for coordination. And we solicited comment.

We received somewhere around the order of 100 comments from public and other interests. And a lot of those focused on salinity intrusion into the harbor, and

whether or not that would have any effect on groundwater.

Lot of comments concerning erosional areas within the harbor, so shoreline erosion both for the, you know -- basically contiguous land bodies but also for the small islands within the harbor. We have Crab Bank, which was originally constructed by the Corps of Engineers using dredge disposal back in the '70s. That has experienced some erosion over the past two decades.

And so that was a concern along with Shutes Folly Island, which houses the historical fort, Castle Pinckney is currently located on, and then also Fort Sumner, which is, you know, historical resource within the harbor.

So I would say, you know, probably the main comments we received during that public scoping were centered on those types of concerns. And our draft report will address, you know, those concerns and the steps we took

to investigate them.

As for any potential -- how did you say it, opposition, you know, that's really yet to be seen. It would be really kind of premature for me to make any guesses on that one. But you know, just following the kind of undercurrent within the press and kind of general feelings around Charleston, I don't get a strong feeling that there's strong opposition to this project.

MR. MILLER: And the only other thing I would add, which is more general than technical because I have no technical skills in my body, as it comes to environmental or others. You know, if you look historically and sort of within the context of other projects' order of magnitude, Charleston on one of the early slides that Brian referenced, because 11 percent of the waterway is the channel, that number is reversed in a lot of other port environments.

River ports that are very narrow,

that number would probably be 60, 70, 80 percent would be within the channel. So generally, order of magnitude, deepening projects here in Charleston are -- I won't say it's an easy pull because that's discounting environmental impacts. These things have to be evaluated.

But in the general scope, it's not as significant as many other deepening projects. Our last deepening project was completed in 2004. Is that right? And I'm not aware of any significant environmental concerns that arose with that evaluation.

Conditions change. This project is different from that project. It has to be evaluated fully and fairly, but in the order of magnitude of other projects within both this region and nationally, I would say it's not simple, but it's a much narrower field of potential impacts.

It doesn't reflect on opposition, it reflects on real impacts.

CHAIR PERKINS: All right. We are perfectly on schedule, so I compliment our panelists for, you know, using their time well. If we can, to stay on schedule -- you know, we're right at 9:16. Oh, we have 15 more. Okay, I'm sorry. So Gary. Be advised, we have 15 minutes.

MEMBER JEFFRESS: I had the same question Joyce had.

CHAIR PERKINS: Okay. Susan?

MEMBER SHINGLEDECKER: I'll pass to Rick.

CHAIR PERKINS: Yes, Captain?

CAPT BRENNAN: So for Captain Cameron, I was curious. You mentioned salinity as being an issue for bringing ships in. I'm curious what would be a valuable way to the pilots, or any mariner coming in and out, to display salinity for you in some format so that that was useful to you.

I mean, if you had a direct salinity value, does that have any meaning to

the general mariner, or is it a unitized value as far as your Plimsoll marks, or what would be helpful there?

CAPT CAMERON: Well, it would be very helpful in the upper harbor. We have a bridge up just below our North Charleston terminal, it's 155 feet. And that terminal is probably never going to handle ships larger than 8,000 TEU. There's a few of those ships going up there. But we're really literally squeezing them under that bridge and we're timing them with the tide.

The last time I rode a ship up through that bridge, we knew it was going to be very tight. The crew took a radar unit off of the mast to get them another nine inches to squeeze under.

And the ship had come from overseas, so they had estimated their fuel burn and they had estimated their draft. I calculated that we should have cleared that bridge by two feet, nine inches. And I was on

the mast when we went under the bridge, and we were about two feet, two inches.

And I was pretty upset with myself that I had miscalculated by that much, because that's just too much of an error. So as we got to the dock, I went down on the dock and read the draft readings, and the ship was floating seven inches higher than they reported.

So I don't know whether that was due to salinity or due to inaccurate program that calculated their fuel burn on the way over, but a few inches matters. I don't know what the status of the technology is to measure and provide that, but that's one point where it would be very useful.

In the lower harbor, we're pretty much ocean salinity all the time. So it's just where you get into the farther reaches of the harbor where you're trying to wring out every bit of capability the waterway can give you.

VICE-CHAIR HANSON: Captain Cameron, we ask this question in every panel on every port. Who pays for ports in Charleston?

CAPT CAMERON: Byron paid for the bridge sensor, and ---- well, the not the marketing department, I suppose, but the Port Authority paid for the bridge sensor, and I think it was a $60,000 purchase.

And we really will need another one on the Ravenel Bridge, another bridge sensor. We understand the maintenance runs around 25 percent of the purchase cost per year.

For the Ports Authority it was, you know, either get the ships there or not and that's what it took. So you know, that's how it fell to them.

The tide gauge that we have in the port had been here forever and I guess was absorbed in, and I don't know that any of those costs are being pushed to the port

community. Is that true, Kyle? Darren? Oh yes, Darren's here. Sorry.

MR. WRIGHT: It's one of our NWLON gauges which NOAA funds. However, there's a I think a $5K emergency maintenance fee that the port is paying. So if it were to go down, we can get somebody there, you know, a contractor there a lot faster.

CAPT CAMERON: Yes.

(Simultaneous speaking)

CAPT CAMERON: The Port Authority is also paid to have laser surveys done at the bridges. You know, you read the chart and the chart says that the bridge is 186 feet high, that's right at the edges of the channel. It's the worst case.

The Coast Guard requires you to plot or chart the worst case. Well, the bridge has camber, it has a maintenance scaffolding car on it, that's all built into that 186 feet.

So our bridge is really about 200

feet over the channel, but we don't know exactly how much. And the Ports Authority has talked about doing a laser survey of that so that we know exactly. We haven't been challenged on that bridge yet, so you know, it hasn't come to the forefront.

VICE-CHAIR HANSON: Okay. And also, I was interested in the salinity discussion, as well. That sounds like it will be the next marketing ploy. Maybe Byron, start using that -- my port is saltier than yours.

CAPT CAMERON: I do that all the time.

VICE-CHAIR HANSON: But just for Brian, does salinity factor into the Corps' modeling as well, in terms of drafts and economic benefits?

MR. WILLIAMS: Yes, that is way above my technical knowledge. As you may or may not know, we use a standard modeling suite called HarborSym. It was developed by the

Corps by a third party contractor with heavy influence from the Corps.

I can ask our economists who generally, you know, run that model and know its ins and outs. But that's above my knowledge.

VICE-CHAIR HANSON: Well, it's also a physical issue too because we're seeing some ports around the country with salt water intrusion, and actually building salt water barriers as part of the channel design.

MR. WILLIAMS: Right. Now our hydrodynamic modeling that I talked about oh so briefly using the environmental fluid dynamics code, that does take into account salinity.

So we did have a validated, calibrated model for existing conditions. We did project out into the future for without project condition, and then compared that to our different alternatives.

So salinity and its potential

changes, and therefore impacts on the natural environment, definitely are taken into account in the study. As for salinities effects on drafts and air draft, you know, that's something I can get back to you on.

VICE-CHAIR HANSON: And then one final one. I, like you, could ask questions for probably 12 hours. Mr. Newsome said yesterday that he expected mitigation, for the project to be on the order of five percent.

And I noticed throughout the whole discussion that the competitive discussion between Charleston and the port to the south, River Port in terms of --

MR. MILLER: Fresh water port, fresh water port.

VICE-CHAIR HANSON: -- Savannah, it's also a river port. And their mitigation, of course, was 60 percent of their total cost, a $700 million dredging project, and actually $400 million of it is mitigation.

So five percent seemed really kind

of optimistic at this point. Are you far enough along to say that, or is that -- have any mitigation plans in order yet, or is that still under discussion?

MR. WILLIAMS: Right. We do have a draft mitigation plan that will be part of the Draft Report and Draft Environmental Impact Statement that is released in a couple of weeks.

You know, so we've got, there's elements in that draft mitigation plan. But you know, I would say that the details we can share with you in a couple of weeks when that draft report comes out. I will never contradict Jim.

MALE PARTICIPANT: Neither will I.

CHAIR PERKINS: Mr. Cameron, the Admiral has been able to do a little research while we've been here, and has information on the NAVSAC next FACA meeting for us.

RDML GLANG: Yes. So the U.S. Coast Guard's Navigation Safety Advisory

Committee, I asked last month when their last meeting is. And it will be in San Francisco in the first week of December. And the designated federal official is Captain Scott Smith, and Mike Sollosi is an organizer on that. I can get you their emails, and we can get you connected on that.

CAPT CAMERON: Thank you, sir.

CHAIR PERKINS: Yes, Gary?

MEMBER JEFFRESS: Just on the salinity measurements, my institute's been measuring salinity in Neuces Bay in Texas since 1991.

For the City of Corpus Christi, which regulates fresh water inflow into that bay, and that data is used for that. Our sensors are not that expensive, I guess about $5,000. But they have to be calibrated in the summer about every two weeks, and in the winter about every four weeks. It's pretty labor intensive.

CHAIR PERKINS: Rich, is salinity

something that COOPS provides for the --

(Simultaneous speaking)

CHAIR PERKINS: It is?

MEMBER EDWING: -- as Gary said, it is a maintenance intensive sensor. But we do offer it through the PORTS system. And actually I had a -- along those lines had a follow up question for Captain Cameron.

So are there other environmental parameters in the Charleston Harbor area that might be helpful to navigation? You've mentioned the salinity. I was wondering if currents were at issue down here?

CAPT CAMERON: Currents are strong, but they ---- I don't know the history of this project, but there was a diversion project that merged two rivers a few miles inland. I think it was completed in the '80s, is that right?

And that had a great benefit to us on mitigating the currents through a bend just above the Ravenel Bridge. We do have an issue

there where the Wando River -- there are channels basically a Y. The Wando River and the Cooper River meet just above the bridge.

And as you're going one way or the other, you'll have half the ship in one river and the other half in the other. And you know, the pilots have figured out how to deal with that, but when you drive over the bridge, you can see that tide line, and it could be on -- anywhere on the river on any given day.

So you know, I've had freight pilots explain that navigating a ship is kind of like the dime-a-dance hall, you got to figure out how your partner responds as quickly as possible.

And before they get to that point, they have some idea of how that ship's going to handle and how much power they're going to need to get through those bends.

So you know, if there was some way to predict that, it's very dynamic. You know, currents change minute by minute, and

especially when you have two currents meeting each other. If the technology could do it, it would certainly be beneficial.

You know, the pilots, they know where the ship is. The big problem is figuring out how to get it to where they want it to be, you know, two minutes from now. And that kind of information would be fantastic for that if it were available.

The wind driven effect on tide here is also kind of a wild card. That draft I showed you about the tide gauge last night, that seven inches was due to the weather patterns, and you know, all the water has to flow in and out between the jetties here. So you get, the wind can literally hold the harbor, or hold the water in the channel in certain conditions.

So you know, you don't know what that effect is going to be in advance, of course. If there was some way to predict the wind effect on tide, that would be helpful, as

well.

CHAIR PERKINS: Andy, did you have a question?

MEMBER ARMSTRONG: Yes, Captain, not to be too defensive about that other part of NOAA.

CAPT CAMERON: That's fine.

MEMBER ARMSTRONG: Up in Massachusetts, our center is working with others there on a whale alert software package. I don't know if you're familiar with that.

CAPT CAMERON: I think that's the focus group I'm going to in Baltimore today. It's about --

MEMBER ARMSTRONG: So the idea of being, you know -- if whales aren't around, then the speed restrictions might be relieved. And so that involves a hydrophone on a buoy and a transmission ashore, and then back through the AIS system that essentially clears the radius of it. I wonder if you've

considered that?

CAPT CAMERON: We would certainly like for that to be considered. Those 16,000 sightings over ten years, 1,600 a year off in New England, in the 40 mile band from the shore out to deep ocean off of Charleston on average 30 whales a year are sighted.

So NOAA did an extensive overflight program here that was funded by the Port Authority. It was the largest source of non-federal money that supported the right whale overflight program, $1 million from the Port Authority over five years.

And what NOAA learned from that period of study is that it's not worth conducting overflights here. The overflights have been cancelled here. So we're not even looking for the whales off our coast.

Of the 22, I believe it is now, documented right whale strikes attributed to -- or right whale fatalities attributed to ship strikes since 1970, none of them occurred

in South Carolina.

So we have achieved the objective of the regulation since the species was begun to be studied. And the density of whales here doesn't seem to indicate that our channel is a real threatened area for them.

MEMBER ARMSTRONG: So perhaps, I guess what I'm suggesting is an alert system would give you clearance almost all the time to proceed at full speed.

CAPT CAMERON: If there was such clearance. If there was such a system. But when I speak to NMFS groups, you know, and I put that slide up where the sightings, a woman from the wildlife ---- I'm sorry, the humane society got up and said, don't listen to him, he's not a scientist, he has no business reporting biological information.

You know, and I've also heard comments about it could happen. If it could happen, then it should be regulated.

CHAIR PERKINS: All right, we're

right at 9:30. So I'm learning how to manage the time. Thank you very much. We would really like to invite you and encourage you to participate in the break out sessions if you can.

If you need the Admiral to call the Colonel, you know, he would be glad to do that to try to facilitate that. But thank you so much for your contribution to the meeting this morning.

All right, we'll do a quick change of the presentation table and try to get back on track here in two minutes.

(Whereupon, the above-entitled matter went off the record at 9:31 a.m. and resumed at 9:41 a.m.)

CHAIR PERKINS: All right, next on the agenda we have our panel on the Atlantic Intracoastal Waterway and Recreational Boating speaker's panel. So I'm going to, for the sake of time, I'm going to introduce all four speakers right now, just so that we can flow

maybe a little smoother.

So first up will be Mr. David Warren. He's project manager with the Civil Works Branch, U.S. Army Corps followed by Mr Brad Pickel with Atlantic Intracoastal Waterway Association.

Mr. Larry Dorminy, Senior Editor with the Salty Southeast Cruisers' Net. And then we'll conclude the panel with Dr. Clark Alexander of the Skidaway Institute of Oceanography. And reading is fundamental, right?

Thank you very much, welcome, and we look forward to your presentations.

MR. WARREN: Since we began, I'll go ahead and go a different way. I can answer a couple of those questions you asked last time. We do have salinity gauges on the Cooper River because we're managing the salt water/fresh water interface at a water treatment unit area.

So what can happen is if we get an

alarm, then we work with our partner, Santee Cooper, to vary the amount of flow into the Cooper River to manage that wedge. So we do manage with salinity gauges that way. So that's just a little bit more information for you.

You always want to have a hook when you talk to a group, and I thank you for allowing me to do this. I've got three. First, you don't realize it because John Cameron's not from around here, but the Atlantic Ocean forms at the confluence at the Ashley and the Cooper River. Let's get that straight, sir.

If you're from around here, you know that. That's cast in stone. Secondly, you know, we're glad the magenta line is disappearing from the AIWW charts, that's a good thing.

I'm trying to figure out my presentations, who's ordering me. I have 34 years civil service. Anybody got more than me

right now? Am I going to win? Good, good. I'm not the oldest guy, because what you're going to see is Justin represents the new guys. I think I kind of represent the somewhat progressed old guys.

I don't know the technology. As a project manager, I spent a lot of money on it with these young guys in GIS, LiDAR and all that kind of thing. So it's good we have them around. But it's good they got the old folks like us that kind of remember the way things used to be done.

So I'm the project management basically for anything salt water in the State of South Carolina. So I have Charleston Harbor, Georgetown, and the AIWW.

From the perspective of the state, I have the two losers, the Port of Georgetown which gets zero funding and the AIWW. Charleston Harbor, we do a fantastic job every year. We pretty much keep this harbor 100 percent of depth all the time.

Sometimes we have to skimp on the entrance channel, but I think we do one of the best jobs on the east coast of keeping vessels moving.

One thing I'd like to talk about, inter-agencies, is we work hand in hand with the pilots. They are totally integrated into our design team. So when we make a decision on what we do, the pilots are constantly consulted.

So on the AIWW, same thing with the dredging community, and the towing community. These guys are constantly giving me input. And Brian over there from the Coast Guard, I got a nice letter from the Coast Guard a few weeks ago telling me that the Anvil will not be able to do its mission because we're not going to have enough water for it to get down the waterway. So we know. So here we go.

In South Carolina, we have 235 miles of the ditch, as northerners like to

refer to it. We have 210 miles we're responsible for. We have three regions.

Basically from South Carolina/North Carolina border about a third of the way through the state, another third to Charleston, and then the bottom third to Port Royal. Actually, the Savannah district has some of the AIWW that's actually in our state.

So okay, this is where I'm talking about the old guy. I like these old graphics, okay? They take about two kilobytes in a slide. They're not like eHydro where it melts most people's computers or their GIS system.

Yesterday when I was trying to do something with the Wilmington real estate guys, it was crashing his brand new Dell computer, it just was refreshed. So mine work. Okay, they're not pretty, but they work.

It just kind of shows you the upper reach from North Carolina. We have several inlets along the way, Little River,

Murrells Inlet. They're all Corps maintained, jettied harbors. So that kind of represents separate part. You all know the drill, it's 12 feet, 90 feet wide.

This represents in the Charleston area. This is where we really have the major problems in the AIWW for us. The big joke was when they did a survey the other day just because we needed some adjustments to some of the equipment, they came back and said David, we have negative numbers on the AIWW.

I said okay, what does that mean because, you know, low tide we've got sand bars across the channel now. So anyway, we've got some big problems. And we know that we're tide restricting our clients in the towing industry and the dredging industry, and now the Coast Guard which is one of my clients.

So Brian and I are missing the kick off meeting to dredge their pier this morning. They might be done by now, but we know we've got a big problem here.

Down towards Port Royal in the lower part of the state, there's just not that much commercial traffic that we deal with from that standpoint coming in and out. But there are still some restrictions down there.

We're fortunate that the one restriction we have in the lower part is mud, so they just power through it. It's not sand, so we don't get too much grief about that.

Okay, I took out -- I usually have about 13 slides in this presentation. And Brad and I, you know Brad represents what I'm going to call the lobbying group. It's kind of when we give a presentation together, we have to get together to make sure we don't cover the same thing.

So I took about three of my slides out. This showed you the funding levels from about 2000, which kind of peaked during the ARRA era. We got a big chunk of money then, and were successful doing a lot of work in the waterway. But basically, it's a stepchild in

the funding arena.

'14 had zero and '15, woo hoo, I got $500,000. What do you do with $500,000? Last time I had $500,000, it was three years ago, I was able to build one rock sill, 255 feet long standing underneath the nationwide permits. So you can't do much with a half a million bucks.

So I've got a plan for my navigation branch on what they're going to do. And we're going to try to prepare shovel ready projects in case all of a sudden the state of South Carolina comes up with some money.

That's what we're really working with local governments and the state trying to do contributed funds agreement because they understand as long as the tonnage is as low as it is which is the measuring stick for the waterway, we're not going to get any money. So I'm thinking, we're hoping these states and local governments step up to try and help us with that.

Problem areas, McClellanville, South Carolina which is probably the last major fishing village in South Carolina. These guys, they can get out but there's trouble getting in. And pretty much every time we have a vessel transiting the waterway that doesn't know the water there, they run into problems.

And I, by the way, I'm the guy who gets the phone calls. My number's out there, so you know, it's there. Sullivan's Island, that's where we have the negative numbers right now.

We've had at least two severe injuries of recreational boaters in that area of hitting sand bars at mid tides. There is a way around it, but obviously if you go from daymark to daymark in that area, you're not going to find a deep water.

This Ashepoo-Coosaw cutoff, about a quarter of the waterway in South Carolina was dredged from scratch. The rest of it's

fairly natural. This is one of these tiny cuts which is basically cut through the marsh in the '40s, and it's a tough one.

And it's mainly because we're having problems with the bank erosion, and it's just the bank just keeps on sloughing off in the channel. We've been exploring with South Carolina DNR setting up some long no-wake zones, but we're getting some pushback from them and we kind of gave up on that, trying to do it that way.

But you know, that's the story. South Carolina's in tough shape. I think we're an important part of the industry and we're probably impacting them because we haven't had any federal funds, at least didn't get federal funds in over ten years.

If we got the money, our district is ready to go. We can do the designs, we can award the contracts and we can get it done. We have the disposal areas to handle it. So all we need's money.

And it's just like I was telling Mr. Hansen is that I now have a standard letter that I send to Senator Scott and Senator Graham and Congressman Rice and all those guys because about every two weeks, there will be a letter through the CW chain at headquarters down to the lowest guy in the food chain answering these letters, and it's the same one every time.

And you kind of wonder, okay guys, you're the guys with the money. I'm the guy down here. But you know, anyway, we work good with our local Congressmen. They understand our problems and, you know, they do the best they can within the framework they have to operate.

That's all I've got. Brad, I'll let you come on up, taking questions at the end.

CHAIR PERKINS: Great. Yes, we'll hold questions until the end.

MR. WARREN: Sure.

CHAIR PERKINS: Great, thank you, Mr. Warren.

MR. PICKEL: I'm going to step in here and do my presentation.

CHAIR PERKINS: Make yourself at home.

MALE PARTICIPANT: He must be one of the young guys.

(Off microphone comments)

VICE-CHAIR HANSON: Hey, Dave, is --

MALE PARTICIPANT: We're going to do this the old fashioned way. I'm just going to stand on ---

VICE-CHAIR HANSON: Hey, Dave? Dave?

MR. WARREN: Yes, Bill?

VICE-CHAIR HANSON: Has Brad confessed to being the author of those letters you get from Senator Scott?

MR. WARREN: Thanks, Brad. I appreciate that.

CHAIR PERKINS: If you can give a quick answer, what's your budget need? I mean, what's your annual budget needed to solve that problem on that chart 11.5.18?

MR. WARREN: Well, we request $14 million a year on capability. And what we'd have to use that 14 is to get us back there. And in a perfect world, if I had 5 to 6 a year, just to keep up, that would be the perfect world for me.

CHAIR PERKINS: Thank you.

MR. PICKEL: Thank you all. My name is Brad Pickel, I'm the Executive Director of the Atlantic Intracoastal Waterway Association. I do want to thank you all for having us.

Just to let you know, real quickly, who we are. As David pointed out, we are definitely not the lobbying arm of the Corps of Engineers, but we do advocate on their behalf, and on behalf of all of the users of the waterway to try to get federal

funding to maintain what we consider to be a vital marine highway, the backbone to all these great ports that we continue to hear that are being expanded.

You know, we have the philosophy of build the port and they will come, but yet it's being lost in the fact that we don't have the connector between those ports. Even though we have about 1,100 mile highway, if you count down to the Keys, it's right at 1,200 miles, that connects all the areas that run pretty much in the areas that we focus on are from the Norfolk, the actual authorized projects from Norfolk all the way down through Miami to the Keys.

As David pointed out, in most areas it is authorized to be 12 feet deep and 90 feet wide. However, I want to take a few minutes this morning to highlight, not just in South Carolina, but a lot of the other critical shoaling areas along the Intracoastal Waterway and some of the facts that relate to

those, and then I'm very happy to answer any questions that you guys have.

First off, though, is I always like to start with the users of the waterway. It often gets considered as just a recreational highway, and it is. The majority of our users are recreational. And as David points out, the Corps allocates their dollars based on commercial tonnage, completely understand that.

However, we do have others. I do start off, though, with our commercial shippers. We do have commercial shippers up and down the waterway that deliver a variety of products, everything from feed and seed to different chemicals to equipment that can't even be shipped by rail or truck.

A lot of people don't realize that, but there's some pieces of equipment that are either too heavy to be shipped by truck or too big, or there aren't enough rail capability, there's not enough rail heads

nearby to ship some of the products that need to be moved along the waterway.

So it's not always just about tonnage and weight. It also has to do with the ability to get materials from where they are to where they're needed. We saw that, a lot of people don't realize that early on the Boeing fuselages here in North Charleston -- that can't come by truck. Some of those are way too big. So they had to come by the waterway.

And one of our members, we're a membership organization, one of our commercial shippers, Stevens Towings, has been in business for 100 years out of Yonges Island. And I know David hears from Bos pretty regularly. They'll be the first one to tell you that there's a lot of tricky issues.

And since Mr. Hanson's on the panel, I had to throw in also that dredging companies utilize the waterway not only to maintain it for us, but to move their

equipment up and down.

Some of our other members are dredgers, and they have to move their equipment as they're doing projects, not just along the waterway but in other areas they can ship their equipment by the waterway because it usually is safe passage, but not always.

As David mentioned, now we have areas that commercial fishing fleets. The town of McClellanville is a very good example of one with Jeremy Creek that ties right into the AIWW. They can't really get out that well anymore. I just got another call just the other day, and we're working closely with them.

I'm happy to point out that Charleston County council decided just in the past few months, voted to approve submitting up to $500,000 over the next two years for waterway maintenance. Will that $500,000 go very far? Well, as David pointed out, it doesn't go that far. But $500,00 plus

$500,000 plus if we can get $1 million here and $1 million there, then we could actually do some work along the waterway.

But it's not just for the commercials. As I mentioned, we definitely have recreational boaters, current estimates. We don't have great estimates, somewhere on the order of about 12,000 snowbirds coming down, spending roughly $300 on an average day using the waterway, which leads to a lot of economic support for small communities. We've got a number of small communities along the waterway.

And then the last one which is becoming even larger, I hate to say I'm happy to hear that the Coast Guard is having problems, but that actually is good news for my efforts because it is a strategic corridor for national defense.

A lot of people don't realize it, but the F-35B, the plane that has slightly large cost overruns, but's being flown by the

Marines. We're based out of Beaufort, South Carolina, that's where I live. The training for that is being done at Beaufort Air Station.

All of their jet fuel comes by the waterway, comes from Jacksonville up through the waterway. That's the only way they're getting it right now. So it's for training missions, it's also for the Coast Guard, but it's for a variety of different groups that use the waterway for national defense.

And even ATF uses it in Georgia for training missions. There's a lot of use of the waterway that it's becoming more and more important for national security.

Real quick, I did want to point out one state from an economic impact. Florida has done the best study most recent, or the most recent best study. And they looked at the current economic impact of the waterway to their state.

As you could see, and I won't read

the numbers except for the two that I think are the big ones, is first off, the overall economic impact as it is, approximately $11.86 billion. This is in 2011.

But I think the 66,000 jobs is really what we're talking about here, it's over 66,000 jobs. But if they would actually be able to maintain it at the authorized widths and depths, what would they be looking at? They did that scenario and they came up with $13 billion. That's another $1.5 billion. That's huge numbers.

But once again, you're talking another 8,000 jobs, which is really what we're trying to talk about here is economic resilience. I think that's a point that's lost on the discussion. We think about it as a recreational use. We don't talk about economic resilience of an area.

And if you start losing these jobs, you're going to have big impacts. Dave had mentioned that verbally on sand bars in

the channel. I have to give credit to Troup Nightingale. This picture's actually taken in Georgia.

And I know Clark is very familiar with these areas. I think this was Jekyll Creek. But we have a number of those areas.

So real quick, what do we do? As I said, we pursue additional funding for the marine highway, and we're also looking at a maintenance needs assessment. And that's where I think you all can help, and I hope you all can help because Kyle Ward has been very helpful so far.

But as Dave had mentioned, we usually have, we could put years and years of showing no money. But there is a little bit of money coming to the waterway. I need to stress little bit.

The one big difference that changed between 2014 and the 2015 budget is now every state's getting a little bit of money. The President's budget in '14 was

right at $5.3 million.

With the work plan, plus up, which is the way that Congress does earmarking now that doesn't exist, they were able to add another 54 percent or just under $3 million to the entire waterway stretch.

But this year we're happy because the 2015 President's budget is coming in almost double what we started '14 with. We hope we can actually see some more material being moved out of the channel. And once again, we would love to see that number get plussed up, and we'll be working diligently to do that.

And that's the reason why projects like David mentioned about having shovel ready design projects ready to go, we can go and advocate on behalf of the waterway to get money to then go do those projects because it's easier to say hey, they got projects ready to go in South Carolina.

When we do that, though, we have

to know what's needed. And we actually worked also with water resources reform and development act, got a section included, Section 2008 where now, the Congress is requiring the Corps districts for the Corps of Engineers to submit to them on an annual basis the operation and maintenance needs of the waterway.

Even though David knows what his capability is and what Charleston District needs to do in Charleston District, that information doesn't always get transmitted up through the four levels of command, through Office of Management and Budget to Congress.

So this will not only help Congress have a better understanding, but this will be a huge tool that now we can go to the states with and say hey states, if you wanted to maintain the three areas that David pointed out, this is how you can do it.

And so that's what we're using as a tool to get with our state and local

governments, is to try to get that information. We're also, when that extra money comes back to the Corps, it actually comes back not just for commercial usage, it comes for low use in shallow draft harbors and different waterways.

So they have different metrics that they then assign to how they allocate those dollars. And so we're working to try to supply additional information that will make the Intracoastal Waterway stand up stronger.

Finally is a big issue that we've been working on is with the governor of the South Atlantic Alliance, and actually, I didn't know she was going to be here, but Kristine Cherry is with the Governor of South Atlantic Alliance is here.

And we worked with them as part of their working waterfronts technical team. The Governor of South Atlantic Alliance, and I won't want to shortchange them, in trying to describe what they are, but it's alliance of

four states, North Carolina, South Carolina, Georgia, and Florida working together to identify regional issues that they can work together on.

We, at the Working Waterfronts technical team believe that the Intracoastal Waterway is one of them. And they supported us in producing a report to identify the critical shoaling areas of the Atlantic Intracoastal Waterway.

We got this information showing where those areas are from the Corps of Engineers first, from those CCR reports and through communications, through our next speaker, Larry Dorminy with the Salty Southeast Cruisers' Net.

We've had a partnership with them for a number of years, really close for the last couple of years, so from the recreational user's side. We also work with the Coast Guard, our shippers, dredgers, and others to try to find out where are the trouble areas?

And David talked about South Carolina so I won't hit those. But just running quickly, you can see we've got approximately, what is it, seven in North Carolina. The dates on those are some of the dredging periods.

You'll see North Carolina does dredge a good bit. 2013 and '14 they also have a state funding source to offset the federal cost. So it's probably the reason why they're dredging a little bit more.

South Carolina, I have one more than David only because I break out Jeremy Creek. Jeremy Creek is part of the AIWW, but it's a little bit more inland. It really is kind of the McClellanville portion. But as you can see, there hasn't been a lot of work done in the last few years.

Georgia's running into a similar situation. They haven't had a lot of dredging in their areas. They also have environmental challenges in that there's not a lot of places

to put the dredge material once it's taken out of the channel. But you'll see there's a number of areas in Georgia that we've identified and gone back to our partners to look at.

And then also in Florida. Once again, Florida has a state funding source to help augment the federal budget, and they're doing dredging a good bit. But they also have areas that have to be maintained.

And the reason why we named these critically shoaling areas is because they're not ephemeral in that they don't just pop up every once in a while. Yes, we get areas every once in a while. We know these are going to be areas that have to be maintained.

So how can you help? These are the three main areas that our organization thinks that we could have some synergy in working with you. First off is to try to increase the resolution in those critical shoaling areas. We know where they are. We

have a lot of people that can tell you, you know, these are the trouble areas.

We've got 1,100, 1,200 miles, however you want to count the waterway. But these are the areas that until we can get the money to dredge and maintain the waterway, you can help us with this, especially starting with an area like Georgia that's not getting money, an area like South Carolina that's extremely limited. If you've got to ask us where to focus that money and get that resolution, please start there.

Second is, and the magenta line definitely came across our bow, and we like it to be maintained as a reference line. But identified as such, we do have those users that like to try to follow the line exactly and they get stuck and spend a few hours on a sand bar. But we do like that.

And then also, and I don't want to go too far down this road because Larry may touch on it, but identify opportunities for

crowd sourcing. We know your sources are limited, we know this is something you're working on. We just want to let you know that we do support it.

I know that the ARGUS system is used by Salty Southeast Cruisers' Net. So these are the three main areas where we think that you all could definitely work closely with us, trying to move through that quickly.

Just showing some users on a waterway. I have a new one now that I need to include of a ship being pushed down near Jupiter, Florida. They say that you don't ship down in the Florida Intracoastal Waterway, but they actually had a shipper in Jupiter, Florida we got a picture of.

With that, thank you. And I will be charging for my audiovisual skills. No, I'm just kidding. But we do have individual boater memberships for $25.

CHAIR PERKINS: Is Larry ready? Okay.

MR. DORMINY: Is this on? Very good.

CHAIR PERKINS: You might move it just a little closer.

MR. DORMINY: Oh, dear. How's that? I'm Larry Dorminy. I'm Senior Editor for Salty Southeast Cruisers' Net. And before I begin, I would like to take the opportunity on behalf of all the staff at Cruisers' Net for the hundreds of expressions of sympathy that we received following the death of Claiborne Young in June of this year.

I'm also happy to announce that Cruisers' Net has now been successfully, after much wrangling, successfully purchased by the team of five members who were running the Cruisers' Net with Claiborne. So as of Monday of this week, Cruisers' Net is now official and back up online.

We mentioned a lot of the issues. When I first read my topic issue, I had to laugh because there are many of us who think

that the Intracoastal is a navigational issue.

We have on our website, we have 18 areas that we have designated as problem stretches where shoaling is continually and annually, perennially reported.

We are crowd sourced. We use reports as they come in, we will put up shoaling reported. And then when we get a confirmation of that from someone that we know or from a local marina or from the Coast Guard, then we put it up as confirmed, and we will put, at that point we will put a navigation alert.

I'm sorry that doesn't have the whole screen here. But one of the areas I'd like for us to look at, and it was mentioned earlier, that's already up.

(Off microphone comment)

MR. DORMINY: Oh, okay. That's a little better. To look at the Ashepoo cutoff. This is an area, and as you can see, we have received so many reports that we post, then,

a navigation alert, and I'm sorry that's not showing there either. Let me try this.

So the issue becomes here, there is an alternate route that avoids this. And what we would like for NOAA to consider, and that they're thinking about, is how do we, or should they mark and present an alternate route to recreational boaters?

Are all of you familiar with Umbrella Cut south of St. Andrew Sound?

Umbrella Cut, as you come south of Jekyll Island, the St. Andrew Sound, depending upon the wind and the tide, can really, really get rough. And as you leave, if you follow the Magenta Line, then you end up being rather exposed quite out in the Atlantic at that point.

So Umbrella Cut, as you can see, this again is the tip of Jekyll Island and here is the Magenta Line that takes you quite ways out into the ocean. So the question is how to avoid that. And it's through this

Umbrella Cut.

The Army Corps, as I understand are the ones who did this, have marked this with a dotted line going down, and it connects all the way down. It goes up through the Little Satilla River, comes down and crosses and comes back through Floyd's Creek, and connects back.

And the question is should we be doing something like that at Ashepoo Cut. It has been recommended and by documents from boaters, experienced boaters who will turn and leave the waterway either here at 515, Mile 515 and come down to the Combahee sand bar and turn and then go back northwest to rejoin.

Also, it's possible to leave the waterway just south of Fenwick Cut and come down that way. And the question is, and we would like for NOAA to consider is, should that area also be marked with a dotted line?

There are spaces, if we go back to St. Andrew Sound, there are areas here that

could be marked as alternates. For instance, here again depending upon what the weather conditions are doing, the Magenta Line, as a dotted line, could leave also at this point and come across this area.

Can all of you see that dotted line? Yes, you see that. But those are two of the areas, and there surely are other areas where alternate routes might be possible. And the question is should NOAA be involved with doing that?

I don't know how my time is. All of you know that we have a lot of tools now available to us. We look at this, we can add ARGUS to the chart. We simply do that. And you can see, all of you have seen ARGUS, right? You know it gives you, when you plug into it, for instance a red spot here. It will give you the lat/long for it and it will give you the depth at that point.

Obviously these are much more legible when you scroll into them. Don't lose

them like that. So that was really the point of my presentation was to --- have you consider whether or not those areas, whether alternate routes should be offered when they're available.

CHAIR PERKINS: Great. Larry, that's compelling presentation. And the breakout sessions that we have scheduled for this afternoon are exactly the forum to, not to say to get into the grassroots, but that's the type of discussion we hope to have.

MR. DORMINY: Right.

CHAIR PERKINS: The specificity like this, like you've presented in these breakout sessions. So thank you.

MR. DORMINY: Just a note about Salty Southeast Cruisers' Net. This is not designed for the professional boater. This is designed for the absolute novice.

Some of our members have said gee, why do you put up there important or crucial or caution? Well, it's because it's so easy

today to go down and purchase a boat with thousands of dollars worth of equipment on it and simply start following the Magenta Line without having any knowledge of currents or how to read the markers that are placed there.

And all of you know that almost every intersection is constantly shifting. We will have an area dredged, and within four weeks we'll have cautions saying shoalings appearing at that spot again.

So we try to aim at the novice recreational boater. And if you think there are not a lot of those, you haven't been out there for a while. And as Brad had, there are lots of photos of the boats who just went their way and not thought about what they were doing.

When I first did the Intracoastal Waterway, it was with a paper chart and a compass and a depth finder. And you had no help like we have now. But you had to learn about how to read the marks, how to look at

the flow of the water, you know, to try to read where the currents were.

And I still remind myself as I cruise some of the back alleys around Charleston here in my 15 foot center console that the deep water's on the outside of the bend.

But anyway, it's wonderful the issue. I didn't get to show you we have surveys on Cruisers' Net that you can go to. The Army Corps surveys are available, and they look very much like ARGUS. They have the same kind of notation in terms of depth color-wise, depth-wise.

CHAIR PERKINS: Thank you, sir.

DR. ALEXANDER: I guess while she gets my presentation up, I'll just come right out and say it. I'm from that area with that fresh water river port.

What we've heard here today is a lot of talk about Charleston and South Carolina issues. And with my discussion here,

we're going to move down into Georgia, although we will start at the Georgia/South Carolina border. So that's okay.

And what I'd like to do today is tell you a little bit about work that I've been doing over the last, well, maybe six or seven years, work in the Intracoastal Waterway, in the near-shore waters to mostly do mapping.

I'm a coastal geologist by training. I've been on the Georgia coast for the last 25 years, and as I say, in the last seven or eight years, I've been doing a lot more mapping and management-related mapping kinds of work.

So what I'm going to tell you about today are a few issues. Do I need to speak into this?

CHAIR PERKINS: If you would, please. We do have an audio, you know, webinar piece going concurrently, so that would help. Thank you.

DR. ALEXANDER: And I have a control here. So what I'm going to be talking to you about today are a couple of mapping projects that I've been doing. I'll also tell you a little bit about some work that I've done a few years ago looking at physical processes and its impacts on the Intracoastal Waterway as well.

So the thing that has propelled me into doing a lot more detailed surveying kind of work, stuff that is much more pertinent to the goals of this group I think here today is that two and a half years ago, the Skidaway Institute of Oceanography purchased an interferometric sidescan sonar system which allows up to map bathymetry in shallow coastal waters.

We bought an interferometric system as opposed to a multibeam system because you get an effective swath of maybe 10 to 12 times water depth with the interferometric system as opposed to three to

five times water depth with a multibeam system.

The system consists of the multibeam system. The interferometric system is deployed off of an arm off of this 28 foot Parker. It has a dual antenna navigation system for heading and for navigation, and all the data is processed in HYPACK, which should be near and dear to everybody's heart who's a surveyor here in the room.

And we have a sound velocity probe that we use to get water column velocity. So we've been using this system to map regions in Georgia. As I said, we've only had it for two and a half years. But as you can see, in this figure here which shows Georgia from the Savannah River at the north to the Florida border down to the south.

The areas that we've mapped so far, we've mapped the five Georgia rivers in a reconnaissance mode. And then we've spent a lot of time up in Wassaw Sound up there in

the northeast of the map. And that's where we've been spending most of our time.

As many of you know, a lot of the bathymetry for estuaries in the southeast is quite old. The NOAA high resolution bathymetry on the NGDC website is basically a result of 1933 lead line soundings. And so, you know, things might have changed a little bit since that time.

And in fact, we didn't even have one of those sorts of data sets for Wassaw Sound. I just wanted to show the river surveys that we've done as part of a project where we're trying to understand the bathymetry a little bit better in Georgia rivers, we have done reconnaissance surveys.

This is a typical data swath. One pass up the river, one pass back, and we've done that on all five of the Georgia rivers now, the St. Mary's, the Satilla, the Altamaha and the Ogeechee. And we're using Corps of Engineer's data, of course, for the Savannah

River because they've mapped that river at a much greater density. And so we have the whole river in that case.

These bathymetric data are being used in updating some ecological modeling, the SLAM model for those of you that are familiar with that. And so this sort of data is something we've collected.

But we've been spending most of our time in Wassaw Sound. As we were funded through our Coastal Zone Management program to develop a new bathymetric model for Wassaw Sound because 1) there wasn't a high resolution data set available even from 1933 data, and because these sorts of data are important for both recreational boating, Wassaw Sound, as you can see, has some very shallow areas and very large bars on its flanks, which cause problems for people all the time, and we also wanted to be able to provide better bathymetry for storm inundation modeling and those sorts of efforts.

With our --- we use the interferometric system for the bulk of the survey here. In areas that were too shallow, we either used a terrestrial laser scanner, a LiDAR instrument on the bottom here, at low negative tides so that we could get a lot of the very shallow areas, or we used a single beam echo sounder hooked to an RTK GPS system to do some of the flanks of the system.

And this is the sum of that survey. This project is just coming in to an end now, and we're going to be reporting that data and providing it to NOAA if the levels of accuracy and documentation are up to their standards.

We certainly have been able to see both fine scale features, here's one of these deep holes that you get near confluences of channels, and there's also some very large features associated with confluence of channels.

You can see these little green

dots on this map down here. These are pinnacles that are 20 feet tall in a much deeper channel that's between 45 and 60 feet deep. So there's a lot of detail, a lot of features on the bottom that we didn't know about in a lot of the waterways in Georgia.

We've also been collecting sediment sampling and trying to work on developing methods for developing a textural map. I know that NOAA is interested in characterizing what the bottom is like.

We're trying to take the data that we get from our discreet sampling and use sidescan sonar imagery that is collected by the system as well, and use the intensity backscatter patterns to create grain size maps can be used to provide a more widespread knowledge of what the bottom is like.

And we're working with our DNR, our fisheries division in Georgia to put this data in formats that can be helpful to them to better interpret their kinds of surveys that

they do annually in the sounds.

The next up for us, we've been funded through our CZM program to move down the coast to the next sound down, the Ossabaw Sound. And so that will be the next sound that we start working in.

The Wassaw project was projected to be a one year project. We thought we'd go out, we'd map that thing, and we'd be done. It ended up taking us two years because there is a lot of issues associated with pitch and roll of smaller vessels when you're trying to survey, and that's something that I would like to talk about in the breakout groups in terms of perhaps sharing expertise or equipment that will give us better capacity.

For Ossabaw Sound, we've already proposed that as a two year project because we know there's a large part of the year when we just can't operate given the motion reference unit that we have with the system.

As I've mentioned, we've done some

surveying in the rivers. This is the St. Mary's River on the Florida/Georgia border. The hotter colors are shallow areas -- the purply colors are deeper areas.

And so these are the kinds of data that we're producing from the rivers. And we've been working already with Kyle here in the navigation branch to start looking and comparing older data with this newer data that we're collecting.

There was a request from, I guess, City of St. Mary's for NOAA to go out and survey the river. And since we had just done it, you know, here's an opportunity where we can share data that's collected with updated systems, and we can share it with NOAA and let them better leverage and use their resources in other areas as long as they can document that the data that we're producing is up to the standards that are acceptable.

So these are the kinds of collaborative mapping efforts that I would

hope that we would be able to expand on in the future.

There are other kinds of mapping that we've been doing around in Georgia. Skidaway Institute, my institute is located here on Skidaway Island. City of Savannah is up in the southwest here, and there's a small marsh here that we've been working on as part of a pilot area working with DOE. Why we're doing that, I can talk to people about.

But we've mapped that area using our -- that's interesting. Can you do something about that? I don't think I'm going to try to explain this figure, let's just move on.

Yes, so this is much more in my wheelhouse. So we've mapped this salt marsh at very high resolution to develop a DEM that can be used with circulation models to start studying the flow of water and nutrients and contaminants throughout marshes to develop better models.

But we've mapped with various different methods using our interferometric system for the deeper channels. We have very small boats with RTKs and high resolution echo sounders in the smaller channels, and then used pedestrian surveys for the upper part, and then used LiDAR on the upland to get that interface.

So there are these kinds of mapping efforts that can go on, and which can characterize banks and the channel edges along the Intracoastal if that sort of work was of interest.

A few years ago now, I think this was in 2011 that we did this work, we actually went out and mapped erosion rates of the Intracoastal Waterway and documented, and the Intracoastal is shown there in purple through Georgia.

The two areas that are the worst in Georgia, in case anybody cares, Hells Gate up here, and right behind Jekyll Island right

there, those are the two areas that really need to be dredged every year if you want to enhance recreational boating.

But we've been looking at the Intracoastal Waterway from trying to develop data that's useful for managers. So we went out and mapped historic shore lines and calculated erosion rates and accretion rates on the Intracoastal Waterway.

This figure on the right is showing a high resolution classification of the undercoastal waterway. We have georeferenced video imagery of the Intracoastal Waterway throughout Georgia, and we're extending this work into the rivers this year.

But we've mapped in detail the character of the Intracoastal Waterway, whether it's marsh, whether it's armored, whether it's oyster beds so that managers can have a better idea. And of course, this will be very useful for recovery if we were to ever

experience a large storm.

We also were interested in, well that's interesting, everywhere there's not a blue dot along that shoreline is supposed to be red. It's always interesting how these things change, yes.

So basically we've mapped out the erosion and accretion patterns in the Intracoastal waterway. Where you see blue dots here along that black line, which is the Intracoastal Waterway, those are areas that are accreting, or growing.

Everywhere else, where there's a black dot along there it should be red, but where those are red, that shows that the channel is eroding. And these data are very consistent throughout the Georgia Intracoastal Waterway.

And what that's telling us is that both sides of the Intracoastal Waterway are eroding. So first, that tells us that these systems, as opposed to our meandering tidal

creeks, are not functioning like normal tidal creeks.

So that makes you want to ask the question why is the Intracoastal Waterway eroding on both sides? So obviously, you know, the big factor is boating activity on the Intracoastal Waterway.

We know from the Corps of Engineers, here's the data for the Savannah district on the top, that tonnage and number of vessels using Intracoastal Waterway has been going down over the last ten years. I don't have data beyond 2010 right now.

But recreational boating, it has been going up. There's two numbers at 2008 in there because Georgia changed how they do their boating registration. But certainly, recreational boating has been increasing over time. There's a lot of heavy usage, and we find higher erosion rates in areas that have higher populations along the coast of Georgia.

So it's pretty clear that

recreational boating is a major impact on the Intracoastal Waterway. So if you're looking at loss of marsh from a management standpoint, that is something that you need to consider.

And where that yellow dot is on that figure, there is a marina. And we looked at erosion and accretion patterns above the marina and below the marina, and this is the direction that everybody goes to get out once they put their boat in the water.

You can see those are all black, so those dots should all be red. So basically, the channel below the marina, the direction everybody goes when they put their boat on the water is dominantly eroding.

The channel above the marina where nobody goes is accreting on one side, eroding on the other side like a normal tidal channel system should be. So there is evidence as well that recreational boating is a significant impact on salt marsh systems in the southeast.

And then I just wanted to mention that there is an online portal, the Georgia Coastal Hazards Portal which holds erosion rate data for all the major barrier islands in Georgia. Again, the black dots should be red.

All that data is available. The Georgia Coastal Hazards Portal, anybody can go in it. You can look at erosion rates at specific sites. You can look at general patterns such as here, and there's a lot of other information in there, as well about coastal hazards in Georgia.

And lastly, I wanted to mention that the governor of the South Atlantic Alliance, which we've heard mentioned here already, has been developing tools to help regionally assess coastal vulnerability to storms right now.

But the tool that was developed over the last few years, the last two years with NOAA funding, is something that can be put together and used to assess coastal

hazards and vulnerability from other factors as well, if there was an interest from a group such as this for specific hazards to be integrated and looked at.

So basically what it did, we had four pilot sites in each of the study areas, one pilot site from North Carolina, South Carolina, one in Georgia, and well, two split in Florida.

And what we did was develop a tool that combines innundation, shore line change vulnerability, and social vulnerability from the University of South Carolina Social Vulnerability Index data into a single composite map so that you can look at your relative vulnerability to coastal hazards.

And what those hazards are are easily changeable using the tool that we have. So I just wanted to let this group be aware of that and know that this is something that NOAA has put significant funding over the last two years into.

All right, thank you very much. I hope I didn't overdo my time.

CHAIR PERKINS: Thank you. Our apology on the projector, Dr. Clark. We're going to get it swapped out here on the next break. Apparently, we've wore this one out.

MR. MILLER: I'm Chief Michael Miller from Coast Guard Station Charleston. I just wanted to point out a couple of examples from the previous slides. Talking about shoaling, and this is just from my experience. I'm a boat driver, okay.

And I heard the examples of, you know, obviously commercial and recreational traffic going through specifically Sullivan's Island up to McClellanville. And I just wanted to point out something that's pretty important as a response standpoint.

I can speak from experience from a response standpoint where I should never have to worry about what's underneath my boat when I'm responding for a search and rescue, ever.

Especially in the Intracoastal Waterway.

And I could give an example specifically responding to a search and rescue case where we had to stop. I had to stop. Now fortunately, I had another boat that was coming from outside the jetties coming in from the ocean side, and I was specifically going up the Intracoastal Waterway.

But I actually had to stop in the middle of the day, in the middle of a search and rescue case because I didn't have enough water. And that's just something I wanted to point out just to give you an example of.

CHAIR PERKINS: Great, thank you. We've got 15 minutes for questions, and Susan, we'll let you go first.

MEMBER SHINGLEDECKER: I'm Susan Shingledecker with Boat U.S., and I just want to thank you all for being here. Sometimes I feel like the recreational boater in the crowd, so it's nice to have a whole panel with that perspective.

Brad, I really appreciated your pointing out all the users of the waterway. I think sometimes people, especially who don't live on the ICW, think that romantic notion of cruising down the ICW for the first time.

But this is a really active, working waterway. And as the gentleman from the Coast Guard pointed out, from a safety perspective, the maintenance both on the Army Corps side and on NOAA's side as far as charting, is really vital.

And when it isn't maintained, as we pointed out in the discussions with maintaining the magenta line, waterway users from a safety perspective, either they'll run aground, or they'll be forced outside of the waterway into the open ocean where, as Larry mentioned, these novice boaters, they're probably better off not going.

And so it is a really, really vital element. And while there is this romanticized version of the ICW, it really is

a working waterfront that's vital to maintain.

I had a couple questions for Larry. And you mentioned the ARGUS system, and I actually think this panel hasn't heard that much about the system in use.

We've discussed crowd sourcing kind of generally, but I would be curious if you could tell us a little bit about how many units your community has out, how long you guys have been using them, and what kind of the response has been to that data?

MR. DORMINY: I wish I had John Hersey here from Survice.com who does develop the ARGUS program. ARGUS is crowd sourced, and it is applied, the equipment for the use is put on private boats so that as vessels pass through a certain area, they will transmit that information back to Survice.com, and then Survice.com provides it to whomever would like to have it. And we're contracted with them.

I cannot answer you specific

questions about how many vessels are involved or how many units are there. It's interesting because just yesterday in thinking about what I wanted to say today, I asked John Hersey if he had an ARGUS printout of Umbrella Cut, which is used a lot and discussed a lot on our website, and he said he didn't know that any of the vessels had gone that way. But I'll bet you next week, we will get it.

MR. WARD: John Hersey is actually on line.

MR. DORMINY: I'm sorry?

MR. WARD: John Hersey is actually on line.

MR. DORMINY: Oh, he is?

MR. WARD: Yes.

MR. DORMINY: Hi, John.

CHAIR PERKINS: Yes, can we patch Mr. Hersey in for an answer?

MALE PARTICIPANT: This might not work.

(Off microphone comment)

FEMALE PARTICIPANT: Could somebody speak into the mic and tell me if I'm muted?

CHAIR PERKINS: Testing. Yes, no this is live.

(Off microphone comment)

CHAIR PERKINS: John? John, you're unmuted. Can you hear us? John Hersey?

MR. HERSEY: Yes, can you hear me?

CHAIR PERKINS: Thank you. Yes, we can.

MR. HERSEY: Okay.

CHAIR PERKINS: So the question was can you tell us --

(Simultaneous speaking)

MR. HERSEY: -- the question was about how many units do we have on the active units. And right now we have about ten units. And these are just recreational boaters that are, you know, going from the north from the south to make the trip in one direction, then

they make the trip in the other direction.

So pretty much a two transit per boat per year in addition to some that kind of just do some local transits, as well.

CHAIR PERKINS: Great, thank you.

MS. MERSFELDER-LEWIS: Are there any other comments you want to make, John?

CHAIR PERKINS: Okay, great. All right, well we'll continue the questioning.

MR. HERSEY: You know, the only comment, like, I think Brad and Larry both suggested is that I think that the crowd sourcing of the bathymetry data would be a good way to address the magenta line issue. So I presume in the breakout session this afternoon, some of this can be dispelled.

CHAIR PERKINS: Okay, very good. Thank you. Brad, I have to ask the question, and I don't want it to seem like I'm trying to defer everything to other FACAs, but there is a FACA specifically for the marine transportation system. There's an MTS FACA.

The question of the lack of funding, you know, for the dredging on M95 on the designated marine transportation highway, have you had an opportunity to put this question in front of the MTS FACA?

MR. PICKEL: I've talked to individuals at MARAD and different organizations, and definitely working hand-in-hand with the Corps. But no, sir, I have not had that opportunity.

As the gentleman said earlier, I would love to, you know, because we do see it's vital highway that mirrors I-95, and we don't have enough capacity to move all of the trucks we have, today on I-95, I tried to get up here. But yes, we would love to do it.

CHAIR PERKINS: Yes. Well maybe we can help facilitate, you know, with that. We've been asked to try and find other FACAs that have common interest in work for, you know, those points of common interest and cooperation. So we'll try to do what we can

to help you with that. Yes, Joyce?

MEMBER MILLER: I just, I'm not up to date on the magenta line. And I have personally gone down the ICW, so I know what it is. What is the current status on charts and so forth? I'm not 100 percent up to date.

RDML GLANG: Gerd Glang from Coast Survey. So about a year ago we put out a federal register notice asking for input from users of the AIWW on their views and the usefulness of the magenta line.

As you know, the magenta line, we started putting on our charts back in 1912. And it really hadn't been updated or maintained in 70 years, so it was not useful.

And the other thing is how boaters use the magenta line has really changed, especially in this age of modern electronics. So what was meant to be sort of broad directional guidance, follow this line generally for where the Intracoastal Waterway goes, was being used literally as a navigation

track line. And so that was leading to some unfortunate situations.

So we made a decision to remove the magenta line, lacking any information to improve it. And we certainly didn't have the resources, nor do we now have the resources to go resurvey the way it was done in the 1930's.

But we went through a public process, we heard from boaters. And so we as a policy decision decided we would restore the magenta line where we had data to support it and to maintain it.

And that's a considerable effort, and we rely on our navigation managers in the regions, like Kyle, to provide that first hand information. And I don't know if you want to talk about it some more, Kyle. But there are places where we have put the magenta line back based on corroborating information on where we can show it correctly. Kyle, do you want to?

MR. WARD: Yes. And I wanted to highlight too that the Army Corps of Engineers

as a caretaker does throughout this region survey the ICW once a year. And we have taken that data into the marine chart division and updated the nautical chart to the extent we are able to at the scale of our product.

And most of the charts along the Intracoastal Waterway are at a 1/40,000 scale which limits our ability to put a lot of detail in there. But a lot of, you know, those surveys from the Army Corps do get submitted to NOAA for the update of that line, and they were used. And as they're being put back on, it's largely their data that we're using to put that in the right spot.

CHAIR PERKINS: Are you accepting data from any other sources, Kyle, besides the Army Corps like we've heard about here in this panel session?

MR. WARD: We are looking into and we have access to data such as ARGUS. There's also another, a group out there called ActiveCaptain where we're looking at those

reports.

And when we're seeing significant and really hot topics or hot issue areas that we could make a change on the chart, we are engaging those groups and putting information on the chart to at least have the chart reflect what those reports --

You know, you could put a report at shoaling from anybody calling up the Coast Guard or our office at any time. So we are looking at those crowd-sourced sources for that type of information. But whole scale application of the chart, no.

CAPT BRENNAN: Well, that's not exactly true. I mean, we have taken them on a case by case basis. So we did take some interferometric data from USGS up in Woods Hole for Cape Cod Bay.

And we processed all of Joyce's surveys for the Hawaiian islands through to the chart. And so, you know, as we find them and when we can overlap that with need, we do

do that.

RDML GLANG: Yes, we're talking about the magenta line, in taking --

CAPT BRENNAN: Yes, particularly not there on the magenta line. But I'm saying --

RDML GLANG: I think that's what Scott's question was, using outside source data for the purpose of rescheming the magenta line. I think that's the context that Kyle was answering.

CAPT BRENNAN: Certainly.

CHAIR PERKINS: Yes, Ken?

MEMBER BARBOR: Do you have an estimate on how much of the magenta line you've returned? You know, you said you've put it on where you have data available.

RDML GLANG: I can get you an update by tomorrow. But I think our plan was it would take us about three years to scheme it all, if I recall correctly. And we made the decision back in January, February to

rescheme it.

CHAIR PERKINS: Yes, go ahead, Frank.

MEMBER KUDRNA: Question is for Dr. Alexander and for NOAA. You had mentioned that for use of your surveys by NOAA, it would have to meet NOAA's data standards. Do your surveys meet NOAA's standards, and have they been used in any revisions by NOAA?

DR. ALEXANDER: They do meet the surveying standards that I understand NOAA uses. And we're right now in the process, at least the way I understand it. We've submitted some data, that St. Mary's River data for evaluation just so that there can be a level of comfort that it's been looked at and it passes that kind of standard.

MR. WARD: Yes. For the specific case of that St. Mary's data, the data that had been collected, even without review by NOAA, was provided to the requester because at the point, we really didn't have any

information except for a 1930's survey from NOAA.

So the information actually, there were about four track lines from the Army Corps of Engineers from the previous four years, and then with the interferometric data lining up really nicely with that, with the Army Corps of Engineers data that we were able to provide that product as stated, you know, that it came from those sources just as a graphic to the requester.

And at this point, because there's no actual navigation on that river, all of this is for proposed action, that that met their needs for the moment. We are planning to follow up with a survey from our navigation response team, but that hasn't taken place yet.

But as we collect data as well, I think that will be the impetus for reviewing the data that we have received from Dr. Alexander.

MEMBER KUDRNA: I would just add, I think this is an important issue because in many of these waterways, these are recreation only and they're not going to meet the high level of commercial priority of a Panamax deepening type system that would go to the top of NOAA's priority. So this could be a very effective tool, not only in this case but others, to provide input data to NOAA.

DR. ALEXANDER: And that was really always our goal was with any surveying that we do, we do it to the survey quality standards because we want it to be more broadly useful and not just for this study.

CHAIR PERKINS: Okay, great. You know, we're going to have to compress our upcoming break a little bit to get back on schedule. Mr. Warren, the LiDAR surveys that you mentioned coming up for the confined disposal areas, are those topobathymetric LiDAR surveys?

MR. WARREN: They're topo. We'll

do a fly over next year with that $500K, start at the state line and run our way down. And then we have a new mobile LiDAR system that we can either use it, we actually use it on an ATV or we can mount it on our boat.

And it's good enough quality where I can run the boat down the waterway, and we get about a 95 percent good picture of how the dikes are behaving, the amount of material inside.

So you know, like with Kyle, I mean, Kyle and my guys, they work together like this every week. And whatever data we have, we use it, like, for example I just finished Folly Beach renourishment project. And to set my baseline survey, the way you normally do that is you have your contractor's final slices down the beach.

In this case, because when I'm dealing with the mayor and his assistants, nobody understands that. So I had my guys do the run of the beach in LiDAR. And so every

same sectioning that we used for the beach renourishment.

And I got them to put the house numbers on it, too. So now I can sit down with the public and say yes, it's seven and a half feet high, the storm protection berm at your property.

So you know, it's become my tool with the public to one, convince them we actually did the work because nobody believes you when they get out there and look at it.

And I think, like, in dealing with Bill's crews, you know, we're using the multibeam exclusively for everything we do with the commercial guys now. So it's just to the point where, you know, they'll ride our vessels, we'll ride their vessels to make sure when we're having discrepancies to work things out.

So I think we pretty much got Charleston Harbor covered from top to bottom. There's not too many unknowns for us there.

CHAIR PERKINS: Okay, great. Well, we're going to have a short five minute recess and try to reconvene on time at 1100. So thank you very much.

(Whereupon, the above-entitled matter went off the record at 10:55 a.m. and resumed at 11:03 a.m.)

CHAIR PERKINS: Okay, before we start the next session, for the Panel Members I do have a reminder that Tiffany would appreciate if you would be, attempted to getting your time and attendance reports filled out and turned in so that she will be able to process your payroll and expenses and take care of, you know, that matter. So please don't leave that until the last minute.

All right, thank you. Our next session is going to be on Geospatial Modeling and Coastal Resilience and the speaker panel begins with doctor --

MEMBER WELLSLAGER: Doctor, wow.

CHAIR PERKINS: - with Mr. Matt

Wellslager. Former chair of the HSRP and the director of the South Carolina Geodetic Survey. So, Matt, the floor is yours.

MEMBER WELLSLAGER: Thank you, Scott. Well I take great pride in being able to lead off this group with the geospatial modeling and coastal resilience and having a chance to come back the Charleston to do it as well.

It's kind of a swan song that's, it's been a good one. Now that it's not raining let's hope it stays that way.

But I would like to address with the Panel what is, what I would consider to be one of the more important parts of coastal resilience and that's going to be a preparation, a study, of the first line of defense for coastal natural disasters. And that would be the beach, the barrier islands and the primary dune line.

I would also like to thank Jessica Boynton, whose is here in the audience, for

helping me present, or prepare the slide presentation that we'll be using today in this presentation.

So this whole endeavor began in 1988. And in doing such, monuments were created so that studies could be done to determine where sediment was moving, whether it be on the primary dune line or in the water, and it was mandated, 400 monuments were select or created between '87 and '88.

Well Hurricane Hugo came through and did a few things, and we were tasked with my office coming through and doing the reconnaissance from Waties Island, which is at the Northern end of South Carolina, the North Carolina-South Carolina border, down to Daufuskie Island to see what was destroyed and what was still in place.

And that information was given to the National Geodetic Survey who then came in and did a survey, using GPS at the time, to re-monument all of these monuments. And North

Carolina then followed through with post Hurricane Hugo disaster relief fund and ran at least third order, but usually first order levels, to establish strong accurate morphometric heights on the monuments.

Jessica is tasked with undertaking this project now and bringing it all into a database and using it in a current format with ArcInfo and has asked my office to go and verify, what is on the beach, what needs to be replaced, what needs to be destroyed, and put the database in a format that NGS will use and make available to the user in the National Spatial Reference System.

And the step ahead to the future, the Office of Coastal Resource Management will monitor these monuments and make applications available to the public to use for future endeavors.

All right, so what we've got are now about 560 monuments. In the developed areas, here, this spacing originally was about

a 1,000 feet. In some of the barrier islands and less developed areas, the spacing was extended out to 2,000 feet.

But historical data existed from the '87, '88 and latter surveys. So when we went through and reestablished the monuments, great care was taken to try to replace the old control with new existing control in the same location so that the data that we had would still be usable for future surveys.

Technology has changed since '88, '87 and '88. The first type of survey was done within the littoral zone and it really only went from the primary mark out to low tide, as indicated here.

And you could see in that littoral zone where some sediment transfer had taken place. And levels were run from a transit out to, well this is actually a little bit later, but someone with a level rod as they migrated out into or away from the actual site.

Jump ahead now to post Hurricane

Hugo when NGS came in, and they use this new technology called GPS, you know, it's like wow, that was then wasn't it, okay. But GPS positioned the monuments and they stepped ahead and decided now is a chance to really see where the change is taking place.

So OCRM contracted with Coastal Carolina and wanted to take it to the next level and started doing surveys out into the water and migrated into a bathymetric system using a buggy. And, you know, necessity is the mother of invention.

It's funny what we can determine to use or to contrive in times of desire and drastic need.

We've got a prism up here but this is what was taken off and, you know, I'm not sure how plumb it was while it was in the water, but it served a purpose and they were able to do surveys with it. And here you can see a rigid frame skiff taking the buggy out through the surf zone as measurements were

being recorded from the monuments.

Did they pass the Coast Guard driving safety classes before doing this? Maybe, not sure, but I don't think these are recreational users, Susan, not really. It is.

So now jump ahead to today. We're using GNSS global navigation satellite system receivers with the Real Time Network that we have in South Carolina for the land base surveys. And then that transfers to vessels using HYPACK and the profiles are taking place.

The profiles are surveyed following significant storms to see where we have areas of erosion and where we have areas of deposition.

But for every kind of survey that you have you need to have a point of beginning. And the point of beginning for these are the 560 marks.

They all look very similar to what we have here. You have a four number

designation. The new points have an E designation on the bottom.

Post Hugo, some of these may actually have an A or an, I'm sorry, a B or a C on them, and we'll talk about that in a minute. But besides what OCRM was using these for, the surveying community had a use for them.

Land surveyors could transfer elevations because we had elevations assigned to these to first floor certificates. Planning areas within the coastal counties would have boundary surveys or platted surveys tied to State Plane coordinates that were transferred from these.

So we're talking spatial data. We had accurate elevations, accurate coordinates. And these were made available either through OCRM speech jurisdiction web application or tools provided to us from NGS, like DSWorld to get the coordinates.

So here's the project. We

received 560 monuments, well actually coordinates for 560 monuments, and we, in ArcInfo, laid it out onto a map, decided that for project management it would be best if we broke this into three projects, the Myrtle Beach area, Charleston area down to Edisto Island, starting in probably Dewees and then the severe low country going from Hunting Island, Harbor Island, Hilton Head and Daufuskie.

My field crew had coordinates loaded into the data collectors and we went and recovered or did reconnaissance for all these sites. We would go the coordinates and if the site was there we would occupy it, not once but twice for ten minutes, with a separation of either 21 or 27 hours.

If they weren't there we would mark that, that would be a place where we would have to contact with OCRM and see if in fact this would be a new location or if we would just discard them and move forward.

So our first job was going to be the Myrtle Beach area. All right, for this project to really take off and work we used the Real Time Network in South Carolina. This is another part of what my office manages and does.

It is our own PORTS system, if you will. We do not get state funding for it so we have to charge the user community an annual fee of $600. But by having that fee we are able to pay for maintenance, hardware, servers and software support.

So I mean it's become a beneficial tool for us to use with this as long as you have a digital connection to the internet. I have real time corrections that can be applied to receivers.

And you can pin point your location, under good conditions, to within a tenth of a foot. Let's just say two centimeters horizontally and about five centimeters vertically.

So this is what we used to facilitate this project. We also have 13 CORS sites in this state.

Unfortunately one of those sites, at the College of Charleston, had to be decommissioned the first part of this month. The building that it was in is being renovated and it had to be removed from the 4th Floor. It was at the Physical Science Building at the corner of George Street and Coming Street.

But we have another site, S-C-H-A, which is at the Port Authorities Administration Building. So we've got, you know, Charleston area covered with CORS and then they're interspaced at about a 70 meter space in, commerce spacing, I'm sorry, throughout South Carolina.

Those that are not CORS sites are height modernization. So they are in the national database and will be readjusted when readjustments occur.

And using the 2011 epoch

coordinates, broadcast corrections are sent to the users in that format as well.

So back in around 2010, 2011, NGS, with the help of Bill Henning and Dave Doyle and some others of us that weren't part of NGS, had a collaborative effort to put together a GPS derived heights webinar. And in doing so put together specifics that were the, this is how to make it work type of thing, if you want to do real-time kinematic work and you want to be out in the field and get accurate data, this is the menu to follow.

And this project is challenging because we're having to worry about multipath, we're having to worry about, in places, tall tree canopy and tall buildings. But for the most part we're able to do just about everything else.

Dilution of precision or PDOP, which if you've worked with GPS you probably heard the terminology, has been reduced significantly if for no other reason than the

fact that we're tracking two constellations now. We have the GPS constellation, which has a heavier weighting in the solution when it's determined, but we're also using the GLONASS constellation which is provided by the Russians.

So this is what we used for our check sheet when we're out doing work. And in the same webinar we have these kind of accuracies that we should expect to get.

In the survey part of what we're doing with the Real Time Network and the ten minute observations with the two occupations for redundancy, horizontally this is what we're looking to try to find as agreement and vertically this is what our guidelines are to try to find as agreement. So that's what we have.

Now with the specifications in place, here's the project. Now take in mind it's been 25 years give or take for some of these sites. This is using a tool called

DSWorld that you can download from the National Geodetic Survey that uses the National Spatial Reference System or the National Database of Passive Monumentation and overlays that information onto Google Earth.

Well, you know, my guys weren't interested in swimming so they didn't go out and try to find these points out in the water. But you have one that was set originally as 5,900 and then a second one which is 5,900 B. So these were two points that were probably on dry ground back in the mid to late '90's. Well 2014 that's not the case.

There are other sites here that we recovered and again, you got the B site and the original site. So one of these, if it were to be used, the second one would need to be destroyed. We would give that information to OCRM and they would tell us which to use and which to remove.

Now here's another situation that we had and it was very beneficial because for

this work to actually have any merit, when the beach profiling was done, the profiles went offshore at kind of a perpendicular, but what we needed to do was, if a site was destroyed, we had to either find a new location either beachward or landward of where we could put a new monument.

And my guys would go out and survey the area. This was the closest location that we could find that would meet the needs. It was on the backward Azimuth of the forward that was provided to us.

We would try to get to within roughly a couple tenths of a foot or better on that Azimuth, create a coordinate here and send to Jessica, on the OCRM, that for verification. If we get a thumbs up, that's going to be a new monument. If we didn't, then we would have to find another location.

So we had some exchange back and forth on what we would be doing for new monuments.

So not every place that we went to was easy to get to. Some were not, some were. And the monuments were where they should be.

And this is a good GPS location. You get a little bit of a deception here. Yes, you had some blockage with trees, but for the most part it was in a good place.

But often times when you mention the term Myrtle Beach to somebody they either think of one or two, well three things. T-shirts, golf or condominiums.

Well welcome to our other nightmare. You know, we think back to that checklist, you said multipath, yes, we've got multipath here.

These are 20, 30 story condominiums. Blocked horizons, yes, we've got that problem too.

This site was destroyed, this site was no longer there because of construction or something happening. So, you know, we're tasked with trying to find a new site so that

we can use this historical data here. And the best possible position would have been, and is, within the parking lot in the median.

If we went landward you've got an inlet that's not going to work, in this area is tidally influenced so we really couldn't do anything there.

But this brought about another challenge that we're having to contend with and that was within the observations. And we'll talk about that in just a second.

But, you know, truth be told these were conditions in the Myrtle Beach area that we had to deal with. As we move south, this isn't going to be as much of a problem, this will probably be more of what we're looking at. But it was a challenge, we needed to make it work.

And the final output for the Myrtle Beach area, you can see here, these are all newly set marks for this part of the project. All of these were dual, if not three

occupations, with the Real Time Network.

But here's the problem that we encountered, we had two observations. You do the Pythagorean Theorem, A-squared, you know, the differences in A's, the difference in B's, add them together, take the square root of it and we had a value.

Well that value had to be within six hundredths or thirteen hundredths, six hundredths are coordinate horizontal, thirteen hundredths for elevations. And there were times when the two observations did not agree, here. So we ended up having to do a third observation.

And with what I've been able to see in the data that we have in South Carolina, I mean the Myrtle Beach area, the third set of observations, that third observation either agreed with the first observation or the second observation close enough to provide us the accuracy and the coordinates that we had and the elevations

that we needed. So that was finished.

For the Grand Strand area, this is what we now have for a project. We have a 172 monuments that we have occupied, at least twice if not three times, we have 73 new monuments that were done with the Real Time Network and doing two, possible three, ten minute observations.

Now without the Real Time Network, and this is, this was done in about five months, maybe. Without having the Real Time Network we would have had to do this with static observations and real time kinematic observations, it could have easily take a year. Maybe a year and a half.

So using technology that we have, the Real Time Network that we have, we were able to knock this out in very short order.

For the second part of this we have 22 of the new e-stations that we're occupying with height modernization. These will be used to check the ten minute

observations as well when we have that.

And this was just finished this week. So we have the height modernization project to complete. That will be adjusted and sent to NGS for placement into the National Spatial Reference System.

So from this, now, we're moving down into the Charleston area. But again, this is all done for beach fund surveys. This is all done to help regulate where, I mean where houses can be built, where sediment transfer is taking place, what is going on with the dynamic situations of the beach, the littoral zone and offshore slightly, your near shore surveys.

Time, okay, I will be quiet. Monuments, this is a duplicate slide, I thought I had deleted it.

The data in the past had been in the State of Beaches Report. That allows the effects to be seen on what nearshore alterations, including some erosion devices,

actually do.

What the future is going to be is a application that's being created by OCRM. It will look like this, the data will be made available from the South Carolina DHEC OCRM web page.

If you have questions about any part of this, Jessica Boynton, who is here in the audience, Bill Eiser and Dan Burger also work with OCRM, they can provide information to you. If you want to bring it over to the Real Time Network or the survey side of things, I or my GIS manager would be more than happy to help you with that, and I'm done. So thank you.

CHAIR PERKINS: All right, our next speaker is Dr. Nicole Elko with the American Shore and Beach Preservation Association.

DR. ELKO: Thank you. Thank you for having me here today, I'm honored to be here presenting to you.

I am actually a local consultant, I have a business called Elko Coastal Consulting out of Charleston, South Carolina. And I'm also, I serve several roles with the American Shore and Beach Preservation Association, I'm their secretary, one of the officers and I also am chair of the Science and Technology Committee.

So today I'm going to talk to you a little bit about the American Shore and Beach Preservation Association, a little bit about National Advocacy and our role in community resilience. And I might be able to get us back on time too.

All right, so the American Shore and Beach Preservation Association was founded in New Jersey in 1926. New Jersey was the first shoreline to be developed in the country, therefore it was the first shoreline to experience erosion issues and the first to have federal reports written about it.

ASBPA has published the journal,

Shore & Beach, since 1933. Our first issues were essentially proceedings from the early meetings of the organization and they revealed that ASBPA, the Corps and NRC, the National Research Council, were close allies.

The guys you see standing here are both politicians and academics. And that's still very important to us today. We have community representation as well as technical expertise.

ASBPA also helped to found the CERB, the Coastal Engineer and Research Board, who, as you may know, is the Army Corps of Engineers Advisory Panel on research topics.

So, oh, and here they are, this is the original Beach Erosion Board, the CERB. By contrast to the stodgy guys on the previous slide, these guys sort of look like the coastal mob, right?

So who is ASBPA? Well we represent more than a thousand members around the U.S. and the globe, oops. And as you can

see our tag line is Advocating for Healthy Coast Lines.

Our members are communities. And the technical experts trying to help those communities deal with beach erosion issues. So these are communities that want to be more resilient.

We've been closely tied to the Corps for decades, as you saw, but our partnership with NOAA is not as strong. However, I see that changing.

We've been interacting more with Miki, and Margaret speaks to us from time to time. Our President Harry Simmons is on the National Sea Grant Advisory Board, and Brad Pickel is also one of our officers.

We hold a couple conferences each year. Our technical conference will be this year in Virginia Beach, the week of October 13th. We also hold a policy and advocacy meeting in Washington each year.

We support a number of chapters

around the country. So we really are a national organization, not just an East Coast organization as some people think.

We also support a number of student chapters. I think we're trying to get one at Texas A&M because we believe in representing the next generation of coastal managers.

So along those lines, there are other similar beach advocacy groups around the nation, in Florida, in North Carolina. FSBPA, NC Byways, and we're all active in those as well.

I'm proud to announce that during a meeting held in this room last month, elected officials and technical experts from South Carolina's beach communities agreed to have a similar advocacy group for this state. In fact we're having our inaugural board meeting this Friday to elect officers and establish the organization.

So as I said, ASBPA has a really

strong technical side of our organization. We advocate for research funding and I feel that in order to do that we need to know what the research questions are. So we're taking a more active role in trying to organize the nearshore research community.

Earlier this year I helped organize this meeting, the past and future of nearshore processes research, which was held in Kitty Hawk. And this was a really nerdy technical meeting organized by the nearshore research community to discuss the direction of their research over the next decade.

It was organized on the premise that societal needs could be identified as specific data gaps that were needed to improve coastal resilience. So we're in the process of publishing our findings, but this is sort of a quick preview.

There were three major findings of the direction that our research needs to go. This is more of the extreme events direction.

We also had a research goal along the lines of, long term coastal processes focused on future changes in sea level rise.

So we identified that we've made great progress. Our predictive skill is very good at doing things like wave transformation models.

We're much better at understanding currents. We're great at observation. NOAA is great at observation.

But we're not as good ---- as Hurricane Sandy reminded us, at predicting flooding, shoreline change and breaching. We're not great at post-storm recovery either, which is pretty interesting.

So we really need measurements, we need low cost ways to measure things during extreme events like slosh isolations, overwash and overland flow, sediment transport, rapid barometric change. We don't have the ability to measure those things during extreme events right now. Particularly low cost ways to do

so.

So the outcomes of this meeting are generating a lot of interest. I presented to the CERB last week in San Francisco on them. And the white paper, which will be published in Shore & Beach, will identify the needed tide, current and water level observations that NOAA can be of great help with.

Okay, onto the topic of my presentation today, which is Resilient Coastal Systems and Community Planning. This was a white paper published by the ASBPA in our journey, Shore & Beach, earlier this year.

By the way, if you don't get Shore & Beach, if you don't get a paper copy delivered to you, you're not a member of ASBPA, so if you would like to become one, this our website, and you can also find this white paper on that website.

So if you used to know ASBPA, or you think you did, I think you'll be

pleasantly surprised by what you find in this white paper.

We get into resilience. First we define it, we adopt the national academy's definition from their 2012 study, which states that resilience to extreme events can be categorized into four phases. The prepare and planning phase, absorbing the disturbance, recovering right from it and then adapting.

Julie Rosati, with the Army Corps of Engineers ERDC, Engineering, Research and Development Center, took that definition and created this schematic out of it, which I think is quite useful.

So you can see that we're preparing for the disturbance, which happens, then we resist or withstand it. And we lose some level of functionality after which we can recover and then begin to adapt and evolve coming back to that 100 percent functionality before the next disturbance, to which we hopefully loose less functionality and recover

quicker, therefore becoming more resilient.

In this paper we break resilience down into three categories, engineering, ecosystem and community resilience. And I just wanted to show you this slide which are recommendations for engineering resilience.

We provide recommendations to communities on each of those three categories, because as I said, if you knew ASBPA before you might be surprised that our recommendations for engineering resilience do not say beach nourishment, beach nourishment, beach nourishment, right? We actually say things like, replicate nature, right, we say recognize risks, we advocate for providing multiple levels of protection.

So if you have a community that was fronted with sea walls you want to restore a beach in front of that and then you want to build a dune and populate that dune with native species, providing multiple redundancies and protection.

Moving a bit beyond our white paper, the Corps is developing some interesting concepts. And they've done this since we've published the white paper, and they're getting a quantifying resilience, which is really where we need to go.

Julie presented this matrix to the CERB last week and it, among other things, it's helping us to identify partners to improve community resilience. So in other words, what agencies can be helpful in achieving -- improving the capacity of these parameters on the left side as we move through those four phases of resilience?

And you can see that NOAA is included here in the data analysis capacity under preparations. So basically they're saying, you're useful to coastal communities here as they're preparing for disasters.

I think an interesting exercise or question to present to you would be, you know, where do you think NOAA's expertise might be

utilized along this spectrum? I would think that certainly your tools -- your planning tools would help communities to adapt and evolve.

All right, I'll just kind of skip over this one. This is something that was published by ASBPA, we do a beach news service press release bimonthly that goes out to small community newspapers, and essentially what I was going to get at here was that the country realized that dunes are very helpful in coastal resilience as a result of Hurricane Sandy.

This is one of the dunes that absorbed the waves during Hurricane Sandy in Avalon, and sure they may have been engineered dunes, but as soon as you plant them and walk away, they begin functioning as natural systems. So we recognized that understanding and restoring natural ecosystems is key to community resilience.

Just another example of a federal

protection project, actually at Ocean City, New Jersey, that doesn't include dunes, but the community planted the dunes. This is the picture after Sandy, the dunes are gone but the boardwalk is still there. So the dunes are much easier to rebuild then the upland infrastructure.

So in terms of my suggestions for future needs, our observing capability is excellent. What we need now are better observations, especially during extreme events for nearshore processes, and we need to utilize our existing data sets to answer some of these fundamental research questions.

So our need here would be that, you know, we have excellent data sets, now we just have to put that data to work with some research funding in order to improve the models that we're putting out to our communities for them to use to improve their resilience.

So in summary, ASBPA's members are

coastal communities who want to become more resilient. We also had strong technical ties to the nearshore research community.

So, you know, NOAA and ASBPA clearly have a natural partnership to identify how are member communities use NOAA's datas and products and we can provide suggestions and recommendations for improvement. Thank you.

MR. MOORE: All right, good morning everyone. Good to see everybody again, thank you all for having me here today.

For those of you who were not on the tour yesterday, my name is Patrick Moore and I'm the environmental manager for the South Carolina Ports Authority. I know the topic on the agenda is coastal resilience in South Carolina, but because that would be a 12 hour presentation, I'm going to primarily focus on how we address and approach storm preparation and flood preparation and then talk a little -- since I covered some of that

on the tour yesterday, I also want to talk about some ongoing issues in South Carolina, coastal management issues and resilience issues that I think you all might find interesting.

To start off, we kind of have a three-legged stool that we think of when we are dealing with these issues. The first is are hurricane and flood plan. This is our planning document.

And the next is the emergency action plan. And this is our plan for the 48 to 72 hours where we assume that we're just going to be on our own after a major storm event.

And then there's the continuity of operations plan for the Port of Charleston. And the goal of that is to get business back on track and things functioning properly.

I'm going to talk about each one of the terminals individually, but before I do that I want to fly around the harbor here. So

this is Union Pier, the southernmost terminal. That's cruise ships.

North of that is Columbus Street, it's our railroad terminal. If you jump across -- if you jump across to the Wando, where you were yesterday, it's our biggest and most efficient container terminal.

Jumping back over to the Cooper, that's the new Navy Base terminal. And then Veterans is above that in yellow, and then under the Don Holt Bridge, passed the air gap sensor, you've got North Charleston. The Northern most facility on the Cooper.

My point here is that each of these facilities are very different. They move different commodities, they operate differently.

They were designed for different purposes and may or may not now being used for the purposes for which they were designed. So the emergency plans address each terminal individually.

An example of that is, so an empty container might fly at 45 miles an hour sustained wind. A BMW does not fly at 45 miles an hour sustained wind. So you can move BMWs -- you know, not ideally, longer at higher winds then you can containers.

And that's just one real world example of how the plans differ by terminal. And I'm going to move through the terminals pretty quick.

Veterans terminal, this is our bulk terminal. We lease it, it's our one terminal that we don't own.

In the event of a major storm, all of the ships would be moved away. The equipment we could move inside would be moved inside and we'd batten down the hatches on the warehouses.

This particular facility is old Navy Base property. It has all sorts of flooding issues, and buried medical waste and all sorts of things that somebody is going to

have to deal with.

It is, the docks are 12 feet above mean low water. And as sea levels rise, as you look out 50 to 100 years, the easiest solution would just not be to lease this terminal anymore because we don't own it, we don't have to think on that sort of time horizon.

This is Columbus Street terminal. At any given moment there are three to 7,000 BMW SUVs on this terminal. Every BMW SUV in the world is made in Greer, South Carolina and delivered to Columbus Street via train.

We also have some container handling cranes here and I'll talk about how we lock those down in just a few minutes after we talk about Wando.

To sustain the weight of all these BMWs we had to go in and do a bunch of work across the terminal. And while we were doing that we raised it a foot. It was 12 feet above mean low water and now it's above 13

feet mean low water.

And that's kind of how we look at these things, is if you're already doing work on existing terminal, and you can do it and afford it, go ahead and raise it. And if you're designing a brand new terminal, like the Navy Base terminal, you have the opportunity to look farther into the future and consider issues that may have not been considered when the other terminals were built.

This is Union Pier terminal. The new cruise terminal is going to be right here. This is the existing one.

So when a cruise debarks, we have the cars of all the cruise passengers on the terminal, and so if a storm pops up and they're on a seven day cruise to the Bahamas, they might not be able to get back and get into their cars and get off of the terminal in time. So we park the cars, as many as we can, inside of the warehouses. And if a storm

comes up, that gives some protection to the passengers' automobiles.

And this terminal is also used to offer safe harbor to any passing cruise ships should there be storms off shore.

This is the North Charleston terminal. Yes?

MEMBER BARBOR: Height of those?

MR. MOORE: Oh, 12 feet. Twelve feet, thank you. This is the North Charleston terminal also 12 feet from mean low water. The most significant thing about this terminal is this is where our purpose built IT center is, and I'll show you some pictures of that in just a moment.

And this is where we all were yesterday, the Wando Welch terminal. And we talked a lot about what we do and how we do it there.

This is the Navy Base terminal. It's the only permitted green field container site anywhere on the East Coast or the Gulf

Coast.

I've got my head engineer in the room, Jim, so if I misspeak definitely speak up. It's going to be about 280 acres, you're looking at three 13,000 TEU ships at dock. And it is going to be significantly higher than the rest of the terminals.

And just to show Wando. Wando is 16 feet compared to 12 of the others and 13 at Columbus Street. So this will be out most resilient facility when it's constructed.

Not much to look at, but still very impressive.

CHAIR PERKINS: Looks like a container box.

MR. MOORE: It does, it does. There's a theme here. So it's windowless, it is, you know, higher than the rest of the terminal, it's got redundant air conditioning, it's got redundant power and an elevated fuel source for the generator. That's the inside of it.

And this is significant because often times we're dealing not with purpose built buildings. It's a building that was built along time ago that you're trying to use for something else.

And this represents a significant investment and a significant amount of forward thinking on the part of the authority that maybe hasn't always been there.

So a storm is coming, you can't move all the containers out, you can't move all the container handling equipment out, so what do we do? We anchor it. You've got -- you find the heaviest 40 foot box you can and you lock your container moving equipment to it. And then you take the trucks of the RTG, the rubber tired gantry crane, and you turn them at a 90 degree angle so that it's pushing against itself and it won't roll one way or the other.

These are the hurricane tie-downs for the ship-to-shore cranes that we all saw

yesterday. There are three levels of locking down a ship-to-shore crane and this is the most -- the strongest. It gets you through a Category 3 hurricane. Category 4 you're rolling the dice.

And hazardous materials, you want the ones you have off your terminal and you don't want any more coming in, if you know a storm is coming. And so we reduce the gate time that products are allowed into the yard prior to the approaching storm.

The ones you can't get off the terminal you elevate and get out of a flood permanent area. And you barricade and segregate what you do have on your terminal in a way that protects it from flying objects should they -- should that occur.

So is this an academic exercise, does it really matter? It absolutely matters.

In 2012, some guys went to lunch and did not follow the procedures and lock down the ship-to-shore crane adequately. A

microburst storm popped up and blew one of the cranes down the dock at Wando and hit the other three cranes to the tune of $7 million. The technical term for this in the maritime industry is a really bad day.

And here you can see --

PARTICIPANT: Without a couple words.

MR. MOORE: Yes. Here you can see the three that were hit and the one that was blown down -- down the dock. Some photos of the damage, that's not supposed to happen.

Hurricane Hugo. So the $7 million, avoidable. Hugo, not avoidable.

Category 4 hurricane that made landfall just North of here, I was 10 years old, I slept in a bathtub, I was a hundred miles inland and all the trees still got blown over around my house. It changed the face of the area comprehensively and permanently.

You can see these warehouses functional to useless after the storm. That

crane standing, this one is not. This is called the southern end of Columbus Street, the South Carolina Aquarium is now there. Obviously Columbus Street was a container terminal at the time.

Steve Conner, whose is our Senior VP for Risks and Claims, who I am standing in for today, told me that he went out there and the crane landed on this guy's really, really nice boat. And obviously he was very upset about that and he asked Steve, you know, what's the port going to do to fix my boat? Steve said, well we'll take the crane off of it. The guy wasn't very happy with that answer.

And so like I said, I'm standing in for Steve, and if it's not already painfully obvious, I am the least technical person in the room. My background is in environmental law.

But Steve knows this stuff inside and out and if there's any questions that I

can't answer or if you'd like copies of the plan or more intricate details, I'm happy to get those for you, just let me know.

This is -- I'm going to move onto some coastal management issues in South Carolina and I'm going to go quick because I know we're short on time.

This is the High Battery, it's one of the most visited tourist's spots in town, it is South Carolina's first coastal resilience measure. It was built in the early 1800s to protect the houses behind it from the ocean.

The windfall urban recreation benefits of rising season change in climate did not immediately occur to me. But these guys are way ahead of me.

This is the actually slave market, the Old Slave Market on Market Street that people -- that's another one of the biggest tourist attractions in town. And they are kayaking through the middle of it.

This is Kevin Spacey up here on the left, he sent this out on his Twitter feed standing on Wentworth Street. This is a bad day for that Mercedes owner.

And I like these guys on the mattresses, they drew the short straw on the beer run. Looks like they're having fun though.

So what are we going to do about it, what is the City of Charleston going to do about it? This is the Market Street Drainage Improvement Project. Multimillion, multi-phase, multi-year attempt to address the flooding problems in downtown Charleston.

This is a ten foot in diameter tunnel 160 feet below the ground. Because the first 150 feet is loose, not very stable material.

And I should have mentioned this when I was talking about the terminals, but not only are the sea levels rising but my terminals are sinking. So it's kind of

getting us on both ends.

So you have these drop shafts that come from the street, and then the water is pumped to a pump ---- or flows to a pump station and is pumped to the Cooper River upstream.

This is great when it just rains. But if you get a high tide and a bunch of rain and you're pumping the water upstream, you just get it again, over and over again. So it's a needed project for sure but it is definitely not a long term solution to the problem.

In South Carolina when your property is threatened by the ocean you have to get an emergency order from the state. Sea walls are illegal. New sea walls are illegal and if you have an existing sea wall, if it's 50 percent or more destroyed you can't repair it.

Just running through some of these. This is DeBordieu Colony, it's in

Georgetown County. It's one of the most high-end resorts in South Carolina.

When, 40 years ago when they were building it the developer thought it would be a good idea to put some fill on the active beach to get that on the ocean feel, and now they definitely have the feel for better or for worse.

This is a picture at low tide, you can see that the water comes over the wall at high tide. They can't repair it, it's beyond 50 percent destroyed.

They went for a legislative change to change the law and were not successful and at the last minute they were able to get a proviso in. In South Carolina you can change the law with a budget proviso for one year.

So they do have one year, probably nine months now, to fix their wall. And my point here is, everybody is always on the same page when you're at 90,000 feet when you're talking about retreat and resilience, but when

it comes down to individual properties it politically becomes a very different situation.

Another picture of the wall. And my other point with this is that this is the only situation I can think of, the re-nourishment, fixing the wall, would cost about $15 to $20 million and that would -- you'd be okay for ten years. So this is one of the only situations where relocating the houses might be the most financially feasible thing to do when you look long-term.

This is a wave dissipation device. A fellow on the Isle of Palms invented this. And the idea is the water gets through but the energy of the wave is dissipated.

It's removable for turtles or public access when you're not worried about high tides or storms.

And then right next to this is another set of folks who are in trouble. They started with little sandbags.

This has been controversial for years, the waves tore up those and spread them all over the coast and all sorts of issues with that. So the solution, bigger sandbags. And they work, sort of.

And the last time, this is from probably three days ago in the newspaper -- the last time the DHEC inspector went out there, he noticed there was some wood underneath one of the walls. And it turns out that two years ago they had surreptitiously installed an illegal sea wall and then covered it up with the giant bags of sand.

So the lawyer for Wild Dunes was clearly not present when this inspection was taking place because whoever was escorting the regulator promptly admitted that they had installed it two years ago, or a little more than two years ago.

A $1,000 a day fine, these folks are probably looking down the barrel of a seven figure fine, six weeks before they go in

to get their emergency permit renewed.

So try not to blatantly break the law six weeks before you need permission to continue taking care of your building.

Briefly this is a slide of the Town of Bluffton's transfer development rights program. And the idea here is to take the density out of the head waters of the May river and put it into downtown Bluffton.

Now they're doing this for water quality concerns, and also marsh migration -- habitat migration concerns.

In a place like South Carolina this is positively visionary. You don't see this sort of land -- using land use to address these issues. And the Town of Bluffton is doing it.

So if you're born and raised in South Carolina, you're born with a fundamental distrust of the government. And if you aren't born with it, they will beat it into you.

And so the private sector plays a

huge role in anything good that happens. And resilience and coastal protection is no different.

What you're looking at here, just for reference, Charleston, Beaufort, Myrtle Beach, Columbia is up here. The red represents developed area and the green represents permanently protected land.

And I'll go ahead and say that the red does not change over time here, what we're focusing on is the green. Almost all of this is federal or state land. National Forest, National Parks, State Parks.

All right, in 1985 conservationist agencies got together and all got on board with a vision -- oh, time, okay. Watch, there we go.

The idea is to surround the urban areas with permanently protected land, thriving urban corps, working rural landscapes, and this is what you'll eventually have. You protect your coastal marshes, you

protect your critical wetland habitat.

And I think when, a hundred years from now when people look back on our efforts, this will probably be the most significant and noted portion of our efforts.

And I've got a couple more things but I don't want to -- I want to stay on schedule. So thank you all very much for your time and attention.

CHAIR PERKINS: Great. Last speaker on the Panel is Mr. Miki Schmidt with the Coastal Service Center.

MR. SCHMIDT: I guess I could have started with that picture. Thank you everybody for inviting me to share some resources and visualization tools that our office has been working on for awhile in support of the coastal resource management community.

There are many challenges that local and state organizations face when trying to adapt and protect from floods and become

more resilient as, you know, all the discussions have been this morning.

We were established 20 years ago to support those local communities around the country in helping them address those issues and become more resilient.

So I'm going to use my 15 minutes to do a quick drive by on the Digital Coast, an overview for that, and then step you through some tools that are available to visualize the data and hopefully help communities prepare and plan and become more adaptive.

How many folks in here are familiar with the Digital Coast? All right, I see you, now I appreciate that. How many would be users of the Digital Coast resources? All right, that's where we want to see more and more folks.

You know, it's one thing to be familiar, what we really want to see are more and more folks using the resource. And we

have a good track record of more and more folks using the resource, we just want to continue to see more of those hands go up as we develop this for the community.

We surveyed, we interacted with the community over the years and identified barriers that they had in addressing their coastal issues. And these are barriers that kept coming up time and again that we framed the format of the Digital Coast to support.

For example, coastal data availability. Back in the day people couldn't get to the data. Now they have too much data to worry about.

And so we were addressing the issue of providing access and the integration of those data with each other. That was a big, big barrier in the past and continues to be.

It's one thing to have one set of data but how's it relate to others? So we really focus on addressing those barriers.

Then a lot of frustration across the user community on the -- what's perceived as a federal government, a state government not being coordinated. And so we worked very hard in establishing those partnerships working across agencies to address this barrier through the efforts that we have with the Digital Coast.

There are a lot of technical tools, very technical tools for users out there. But community -- if you want to get to the management community, you need to have those non-technical web-based tools.

Those kinds of things that allow a broader constituency to take advantage of all the data and technology that is out there. So we wanted to address that barrier.

And then once you have all the data and the tools, well so what? All right, if you don't know how to use them you need to provide the capacity building component of training folks how to use those resources.

And then how to build the awareness of how this technology and all the data we're providing is making a difference in the coastal community.

So these were the barriers that were identified. And then we came up with a framework working with a broad constituent group, bringing the policy makers together with the technologists.

A lot of times those techies will sit in the room and think of a great idea, a great tool, but if you don't have the management or the policymaker in the room with you to identify the requirements, it's not going to be used, ultimately, to help enhance communities' resilience.

So we brought the communities together through various associations and formed the partnership that we now have an outcome where we believe that the Digital Coast has evolved into a truly constituent-driven enabling platform that is being used.

And we used the terminology, enabling platform, because it's not just a data portal. And I hope you see that with some of the resources I'm going to demonstrate.

All right, so there's not enough time to go through everything, but the tag line here for the Digital Coast is more than just data. Data is very important and provides the baseline and the framework for everything, I think as all of you know.

The key is taking it from the data in and out to that decision and the outcome in the end. And so with a lot of resources, many data sources are accessible through the Digital Coast, a lot of NOAA data, but also other federal agencies data are accessible.

I'm going to focus on some of the tools and basically just give you a taste. There are a lot of sweet things in the toolbox, so I'm going to give you a little sampling and if you want to really dive in and

taste one of these boogers, I'll be happy to show you in detail some of the tools I'm going to drive by.

All right, so if you go on the Digital Coast, you go to the tools page, this is the standard splash page for any tool that we have on the website. And there's a title, obviously this is the Sea Level Rise and Coastal Flooding Impacts, probably one of the most popular tools available. It's taken us -- we've been developing this for three years, it's out there, it's gotten a lot of attention.

Which is the pointer, red? Okay. The standard format here is, the people can come in and get a quick overview of a tool, they can understand how it's been applied through this interaction button, get technical support and -- or just download and launch the viewer.

We give a brief explanation what the features are, but then also link on the

right side -- link to other resources on the platform that enable a user to understand the data that went into it, training that's available and use cases and so forth.

So Sea Level Rise Viewer, if you haven't seen it, this is zoomed in to the Peninsula here in Charleston. There are various tabs in the upper left hand corner, sea level rise, confidence, marsh migration as impacted by sea level rise, the confidence of the mapping, integration of social vulnerability index data, that was mentioned earlier by Dr. Alexander, and a flood frequency tab which helps visualize the trends in tide -- from tide gauges, from CO-OPS and for particular geographies.

So they're displayed, you can zoom in, typical zoom in features or you can use the drop down menu on the right to select by state or territory.

We also incorporated visualization tools for local landmarks, like here in

Charleston, the customs house. So when one moves through the scenarios of visualizing potential sea level rise, they also see a local landmark and what that potential rise may look like.

So it bring the -- this tool is being used to start the conversation with local communities. Understanding and gaining an appreciation of their potential risk.

And so we incorporate various technologies and various data sets to try to simplify that awareness building. So all the way out to six feet, for example, in the Charleston Peninsula.

This is just, again, it's based on the -- these are visualizations of the IPCC projections of potential sea level rise by the year 2100. So all the details and methodology and mapping is all inherent within the tool and the user can read all that information for background.

Now, so it took us three years to

do this. The Sea Level Rise Viewer, we heard from our partners in the great lakes, what about us? Okay, we don't have sea level rise.

So we just last week released this Lake Level Viewer. URL is csc.noaa.gov/llv, for the Lake Level Viewer.

You know, lake levels fluctuate up and down. All right, so it's not the sea level rise aspect.

So we worked with many partners in the Great Lakes to incorporate the same functionality -- similar functionality as in the Sea Level Rise Viewer. And it's hard to see, I know, in this room, but this is lakes -- all five lakes.

They have different gauges, different lake levels. So selecting on Lake Michigan going to Green Bay, you can get a feel for this new tool and it has -- it looks different but it has a lot of the same capability that the Sea Level Rise Viewer has.

So in the upper left corner, this

is Lake Level Change tab, it will step you through. We also have a Mapping Confidence tab.

And then we bring in the socioeconomic data that you can overlay on that. And then of course, those people that just want the data, can download it.

And on the left-hand side are real time lake levels being served from GLERL. They're brought in.

And then the legend has the historical high and the historical low. And user can go in and, again, visualize the coastal flooding at various levels, two and five feet, but also we have topography data.

So we've also brought in the factor of, or the ability to visualize water depth in the same manner, but then also lake level drop. And this is what the community and the Great Lakes really wanted to do, is to be able to visualize that because of the potential impact.

And we also brought in the visualization capability of CanVIZ again, putting local landmarks into the tool. So again, a visualization tool to enable communities to better plan and become adapted.

This is a map just showing you where the data gaps exist in red. So a huge need for more data in the region. But all the green areas have been visualized and mapped.

All right, another very popular tool within the community are our Coastal County Snapshots. We worked very closely with the National Association of Counties to get their feedback on what their county commissioners -- how would they use geospatial data and tools?

Well they don't need even that visualization that we -- I just showed you, they want a PDF. So we created three snapshots so far, Flood Exposure, Wetlands Benefit and Ocean and Great Lakes j]Jobs.

One on Flood Exposure snapshot,

you'll see it's just what the name says, a quick snapshot, a PDF. A county official really is interested, okay, what is my exposure from my constituency standpoint? So these are data that show the percent of his population, of a commissioner's, who live inside the FEMA flood zone.

Or vulnerable populations like folks aged over 65 or in poverty. So this is what a county commissioner's level of data that they would be interested in.

We also bring in critical facilities data, as well land covered data. So it's a integration of various data sets in a simple format to convey the issue of flood exposure to the local community. Lots of data behind it, lots of databases behind it, but a simple format of visualizing the flood exposure.

And we also bring in a lot of other economic data from our Economics: National Ocean Watch project. Which really

focuses on the ocean economy.

Many of you probably are very familiar as well, but we have the six sectors within ocean economy and all of that mapped and people -- county commissioners can compare their county or parish to their state and to the nation.

Last tool I want to quickly step through is a Port Resilience Planning tool. We developed this tool as a prototype a couple years ago. It hasn't taken off yet and it hasn't been resourced, but I think it's relevant to the issue at hand of resilience in our port communities.

And what -- this was done in the coordination with the Port of Tampa and we are trying to provide the type of information that helps visualize and plan for resilience. We work very closely with develop -- with the community to develop checklists of resilience factors. And then we looked 26 ports around the country and mapped those risk factors.

So we have three tabs, Marine Transportation is one of them. And it starts with a statement here, to be resilient port communities should have the infrastructure and resources needed to sustain safe, secure and economically viable marine transportation operations. No duh, right, to you guys.

But the -- you know, what questions does a port need to ask to become resilient to marine transportation. All right, these are common questions that all of you are probably are very familiar with and have been dealing with for years.

When you start bringing the resilience part of the community aspects, this was -- these were less familiar, this was less familiar territory for the groups we were working with. You know, what about natural resources.

Does the port and surrounding community collaboratively address marine transportation system impacts on the health,

function and sustainability of critical natural resources. This is less evident across the community.

And then also from a hazards perspective. You know, to be resilient port communities should be able to keep marine transportation moving, businesses open and people working despite the impacts from hazardous events. And then looking at an index that maps hazard risk, community vulnerabilities and disaster response aspects.

So we created this, a list of potential risk -- hazard vulnerabilities. We looked at 26 ports, did some quick statistically analysis as the prototype began.

So for example, what's the most the frequent disaster here in Charleston? Well a hurricane or severe storm. How many presidential disaster declarations have occurred, what's the probability of low water level events, it's high.

In addition, looking at the

demographics of the geography. What's the population change over a period of time, the vulnerable populations again, how much land is lost to development. Because those factors -- those are factors in really understanding the local community's resilience around the port.

And then the last part of this prototype, was to integrate all the mapping behind it and display that as well. So for example here, we only did Tampa as a case study.

This is the sea level rise over the Port of Tampa and then bringing in land cover change for that geography. So all the areas that popped up in red are natural areas converted to development, and if you have more development you become less resilient and down the pike. So that was the concept behind that.

All right, quick drive by, which is get the message that Digital Coast meant to facilitate use in application. Whether you

come in from a person who just wants the data, you can come in and get various data sets, you can download them and map them and your staff can create great maps.

Or you can come in from the other end of understanding how others have used these resources to address their coastal management issue and learn what resources were used. And so we see this as a continuum that goes both ways from the data in, out to the outcome, and back.

And that's the platform we've worked very hard with our partnership group. We're working very closely with American Planning Association, the National Association of Counties, the Association for State Flood Plain Managers, the Urban Land Institute, the Coastal States Organization and down the list.

These organizations represent hundreds -- over a 100,000 members around the coastal landscape to provide input into what resources should be provided.

I know you guys have access to the presentation so I listed a bunch of URLs if you want to share them. I didn't hit all these tools but this is a list of resilience related resources that you can get access to.

And here's -- there are many ways to get in touch with us. For those that actually still like to talk on the phone there's my phone number. It's right to my desk, so if you have any questions I'd be happy to ask ---- or answer them. Thank you very much.

CHAIR PERKINS: Very informative panel, thank you. And when is Coastal Geo Tools?

MR. SCHMIDT: Our partners at Association State Flood Plain managers is hosting Geo Tools and it's March 30th through April 2nd right here in Charleston.

CHAIR PERKINS: Okay, great. If you haven't attended that's an outstanding conference, a good exchange of information.

So earmark that and put it on your calendars if you can, so. Yes, Gary?

MEMBER JEFFRESS: Miki, is FEMA involved in that?

MR. SCHMIDT: We are part -- we partner with FEMA in many ways.

MEMBER JEFFRESS: Okay.

MR. SCHMIDT: But whether it's data -- we use their data in many of the tools, the flood zone mapping tools. A lot of their data. Now we also have coordination issues that we work through as well.

CHAIR PERKINS: I know that we're looking at lunch in our future. Yes, Mike?

MEMBER EDWING: Miki, you mentioned you had some data gaps up in the Great Lakes still, what kind of data gaps are they though?

MR. SCHMIDT: Yes, I breezed over that. That's topobathy data.

MEMBER EDWING: Topobathy data.

MR. SCHMIDT: Yes. Where all

those redlines were on that map --

MEMBER EDWING: Right.

MR. SCHMIDT: -- where we don't have the shallow bathy --

MEMBER EDWING: Got you.

MR. SCHMIDT: -- to help model what lake drops would look like.

MEMBER EDWING: Great, thank you.

MR. SCHMIDT: And a lot of those gaps are in the ports as well.

MR. ASLAKSEN: Kind of a two part question, Mr. Chairman. One, Miki, if you could, you know the background of most the folks here and what the purpose of the Panel is, but maybe explaining some of the data that's provided by this activity and how that's worked into Digital Coast because I don't think people are aware of that.

MR. SCHMIDT: Oh, okay.

MR. ASLAKSEN: Second part would be like to Nicole and to Patrick, of Corps data sets you might see gaps in that this

Panel -- knowing that we're kind of mainly focused on mapping chart and geodesy-type activities, observations, you know, what you see as gaps and maybe that NOAA can provide and maybe target more for influencing how you guys do your work. Start with Miki though.

MR. SCHMIDT: Sure, I appreciate that, Mike. Many contributors to the tools and the resources available in the Digital Coast.

We, from Mike's shop, all his remote sensing data, orthophotography -- we, are accessible via the Digital Coast. FEMA data, Corps of Engineers data are all accessible.

We use, as I mentioned in the Sea Level Rise Viewer, we use the CO-OPS tide data to portray flood frequency.

So many assets across the agency are incorporated. We're not duplicating the distribution of a lot of NOAA resources and other agency resources, but we are pointing to

make sure that the user community can come in and get access.

For example, all of this imagery data -- we don't do that, that's, you know, out at NGDC. You know, they archive and distribute those data.

But we just provide the link to make sure that the user community can get another entry point into getting to those data. It's not the only one.

The data that we do house are focused on LiDAR. So all of NOAA's LiDAR data is housed within our servers. The orthophotography, that NGS collects. As well as imagery and land cover data.

Those are only data sets that we generate and ---- as NOAA, and serve up. The rest we provide -- are provided through map services and web services to gain access to those data. It's just an entry point into that.

MR. ASLAKSEN: Okay, thank you.

DR. ELKO: All right, in terms of our coastal communities use of the data, as I suggested on my future needs slide, we think that you all did a great job collecting data and would really like to see is more application of the data sets.

You know, we've been collecting LiDAR data for decades now in this country and there's not a lot of great applications -- well there's lots of great applications, but there could be so many more fantastic applications for it. Especially in terms of coastal resilience, you know.

If you look back at the early 1960s in our coastal communities, most of them didn't have beaches. The developed communities, especially in Florida, New York and New Jersey, those early developed communities just had sea walls.

So it would be very interesting to create a time series, similar to the one that Steve showed here, of the land use overtime

around Charleston. Well what is the -- what did coastal communities look like and can we take our original maps and then blend that with LiDAR data we've collected over the last several decades to show how much our resilience has changed or, you know, we think improved because of a lot of restoration projects around the country.

CHAIR PERKINS: Okay, great.

MR. MOORE: I'll just echo what Nicole said, we think you all are doing a great job on the data collection side and I'm not aware of any specific port-related gaps that I can let you all know about.

CHAIR PERKINS: Dr. Elko, you had mentioned in your remarks needing better observations during extreme events, can you add a little more color to that? What type of observations would be most useful and what do you see NOAA's role in potentially providing that?

DR. ELKO: Right, that would, you

know -- we're looking at some interagency collaboration there.

We think back on experiments that were done over the past several decades, particularly at the Army Corps of Engineers Research Facility at Duck, North Carolina. They did the Super Duck and the Sandy Duck experiments that provided our community with a lot of information about coastal change.

And, you know, now we're envisioning, not necessarily storm chasing, but perhaps identifying those areas along the nations coast that we know are frequently overwashed or inundated.

Highway 12 in Rodanthe in the Outer Banks gets washed over all the time, so it's an ideal area for us to initiate an interagency collaboration to instrument it and measure water levels and tides and more specific current measurements and sediment transport measurements in a collaborative way to give us some more data about extreme events

and coastal processes during events.

CHAIR PERKINS: Yes, Frank?

MEMBER KUDRNA: Miki, regarding Great Lakes, your example in Lake Michigan, some of those storms in Lake Michigan create elevation differences from one side of the lake to another, several feet.

Does your tool recognize that from elevations and provide information for planners concerning flood impacts?

MR. SCHMIDT: What it does is visualize what a rise in lake level would look like. So if it's known what the rise in that water would be, it visualizes where that water would go at a certain height at a certain lake level.

The current lake level feed from GLERL, is where that scale bar on that left -- whenever you log in, that realtime lake level is what it's visualizing off of.

So it incorporates it, but as far as projecting, you know, overall inland, you

know, infrastructure impacts or so forth, from a surge event, it doesn't do that, but it helps the community at least visualize what a high water event would look like as far as what geography it would cover.

So it doesn't go -- there's not a detailed modeling component in there, other than the adding the water level and the how that would lay over the topography. Does that make sense?

MEMBER KUDRNA: Yes.

CHAIR PERKINS: Great. All right, any other questions, any public questions? Yes, Lynne?

MS. MERSFELDER-LEWIS: For Patrick. Do you have a lot more paving going on and a lot more hurting of the coast going on in your new facilities, how are you alleviating the damage?

MR. MOORE: So the new facility, we had to fill in 60 acres, or we will be filling in 60 acres. Right now we've just

built the wall.

We had a comprehensive mitigation package and several components to that is a community portion and then there's the wetland portion. We've protected over a thousand acres of wetlands in the watershed.

We, there was several -- and this isn't just water but we had to install a continuous air monitor, $4.08 million in community mitigation to address environmental justice issues.

We were the first project in the country to include community mitigation in our record of decision. So it had several facets to it, does that answer your question? Was it the wet lands portion you're asking about?

MS. MERSFELDER-LEWIS: It was the whole big picture of that issue.

MR. MOORE: Right, right. Yes, and I don't think there's any good really long term solutions right now, honestly.

CHAIR PERKINS: Okay, great. Well

we're almost right on schedule. We do have a lunch time speaker scheduled, you know, Margaret Davidson, NOAA Senior Advisor for Coastal Inundation and Resilience is scheduled to start speaking at 12:30, so that will require a fairly rapid procession, you know, through the lunch line to get back in here and be in place so we don't have to hold Margaret up because of our inability to maintain schedule. So please do all you can to support that.

Thank you, Panelists, I hope you can join us for the breakout sessions this afternoon.

(Whereupon, the above-entitled matter went off the record at 12:18 p.m. and resumed at 12:45 p.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(12:45 p.m.)

CHAIR PERKINS: All right, if I can have your attention please, we'd like to proceed with our luncheon speaker, so give us just a second to turn the projector back on. Great. All right.

MS. DAVIDSON: So for those of you who are still eating I apologize for disrupting your digestion, blame it on your Chair.

Okay, and they won't care. So I'm Margaret Davidson and for those of you who don't know me well, I used to be involved with the coastal part of NOAA, well I guess I'm actually still involved with the coastal part of NOAA, but I actually hadn't seen Miki Schmidt in months.

I used to work there at that joint, but I was always messing around in, as everyone sitting over there would tell you, I was always messing around in the business of

my colleagues who work on PORTS issues inside of NOAA. And I look at Frank Kudrna and he knows I've been messing around with PORTS issues almost as old as he is.

And there's Bill Hanson who bumped me off with the CERBs, so the Great Lakes guys know that I'm PORTS booster. And anybody who's ever been a NOAA knows that I'm a big booster for coastal mapping and charting and kinematic GPS and all those kind of things.

And so let me tell you a little story about me first. I got this new job, I'm no longer in charge of people or money, I'm kind of like a Quaker and on my best days I'm kind of like Rasputin. But it's really very great.

And not being in charge of people or money or things is wonderful. I can't begin to tell you how many IT and security briefings I'm missing. It's delightful. And the amount of garbage you have to keep track of decline significantly.

This is actually a brand new position and it's a little more complex than it looks. That's what I'm like.

First of all, you know, those of you who don't me, I'm professional veneer. My background is in law and economics and any expertise is only by osmosis.

But since I am professionally trained as a lawyer, to sound as though I know what I'm talking about even when I don't, do worry, I'm certified. And licensed.

And my position inside of NOAA is actually unique in that it's actually, I'm supported by two different parts of NOAA. So I'm supported by the part of NOAA you know best, the ocean service at the headquarters level, but I'm also partly supported by something called the climate program office over in the office of research.

And that's because I have no expertise so I work on all geographic and timescale's. Okay, so it gives you lots of

degrees of freedom.

And here's a true confession. When I first came to NOAA, almost 20 years ago, one of my very first meetings I was sitting listening to a bunch of very intense people talk about data and I asked the crowd if I was the only one in the room that knew what metadata was and there was such a chorus of yes back to me and I was kind of humbled. And as I say I became a geospatial and metadata advocate.

And as Andy Armstrong will attest, I also immediately started poking my nose into shallow bathy issues. So I think in fact I feel as though I had something to do with coast survey map once used multiple times sometime back when Eveline had a real job working for NOAA.

So I feel like you're all friends even if you don't know me. But I'm also a failure somewhat after 20 years because why we do at least have a plan, the integrated ocean

and coastal mapping plan, we don't actually have a national coastal mapping program. And I will come back to that.

Of course there are at least three or four agencies who will tell you that they have a national coastal mapping program, and they do have the elements of a national coastal mapping program, but we the country, that has so much money and so many people on the coast, don't have a national coastal mapping program and it's actually an embarrassment, to me.

So briefly, because Gerd had said he wanted me to say something about climate so I will. Climate, I'm not going to talk too much about this because Miki actually talked a little bit about it. What I do want to tell you that I'm personally proud of, is that I had a big role in the first ever coast chapter of the National Climate Assessment.

And more than that I actually had ports people on my team. Not capital ports,

small pea ports.

And there's actually a whole section in there about Maritime Commerce. Duh.

Anyway, so for those of you who are not as familiar with the National Climate Assessment it is online. I refer to it as IPCC-light, the Intergovernmental Panel on Climate Change.

For those of you who are, think that climates like the tooth fairy are religion and you don't believe in it, that's your privilege. But let me also say to you two things as my observation.

When I first became a lawyer the joke was, one lawyer in town starves and two do a great business. And lawyers make the business off of distinguishing each case from each and every other case.

Well frankly that's how most PHDs make their money too. Is showing how their stuff is different than everybody else's

stuff. I mean after all we always need more research and how are you going to have it if you don't have this.

So I think it's highly remarkable that 97 percent of the scientists who are actually trained in climate, as opposed to something like marketing, because there are some PHDs trained in marketing who are climate experts, like I'm a climate expert. But 97 percent of climate scientists, people trained as climate scientists around the world, actually agree on something. That's phenomenal.

And let me say, when you get 7,000 people to agree on anything, you know what it is, it's the lowest common denominator. And oh by the way, let me tell you how this process works.

So when we do IPCC at the international level or we do the national climate assessment at the U.S. level, we only look at stuff that's been published in peer

literature.

Now if you got a PHD and your graduate students are going out and collecting whatever for you and coming back and doing the analysis of the lab and then writing up the paper and it goes through iterations and submissions to a journal, the time between stuffs collected in the field and it's actually in the journey, could be anywhere from five to ten years. And that's the stuff we're looking at.

So it's five to ten years old when we're looking at it and we take three to four years to get it done and to a consensus document. So by the time you're reading the National Climate Assessment or you're reading the IPCC, it's at least a decade ago. It's based on data that we knew about stuff a decade ago.

So first let me say, anything I say today after this point probably is not anything that Kathy Sullivan, Russell

Callender, or actually anyone but the White House, would necessarily agree with, but this is all crap. And the best part about it is on the web so we can be more dynamic, but anything you think you know about it, it's actually quite dated. And that sea level rise stuff is actually real. And let me say for the folks from the West Coast, you know, 15 years ago there were only a few geeks who even knew what ocean acidification was.

And yes it does reduce the incidences of toxics that scrapping in boatyard and shipyards, because barnacles can't form, but it has other profound environmental consequences.

And frankly I'm much more concerned about ocean acidification. After 35 years of being focused on flooding and sea level rise, I'm far more concerned about ocean acidification. But since I don't live on the West Coast, it won't be in my actuarial lifetime.

Okay, so climate change effects everyone. And in fact we need everyone to put their shoulder to the wheel.

The stuff that Miki was talking about, frankly is cool and jazzy, but it couldn't have been done with the right data. Preferably more better shallow bathy, come back to that one, kinematic GPS, vegetative change, you name it, all these people over here who do incredibly geeky things, it wouldn't be possible to put this stuff out on the web, onto mobile apps if we weren't doing it.

And one of the great things that's occurred in my time in NOAA is that, I think at least within the ocean service, there's a great deal more communication and complementarity then there was 15 years ago. And of course that's like light years in the government.

So we've made great progress. But unfortunately changing environmental weather

and climate conditions mean we need to do more stuff.

Now one more thing about the climate thing. This redline is changes in seismological events, volcanos, landslides, earthquakes, over the last 40 years.

The green stuff is meteorological events, storms, storm surge, that kind of stuff. Oh, it's on a growth curve.

Blue stuff is flood. Think of flash floods for instance. And the yellow stuff is stuff we can actually attribute to climate, which is hard.

As I like to say to the graduate students, that weather and climate stuff, it's a growth business. Hot, cold, wet, dry, whatever, more frequent, more severe and, is costing us more money which puts pressure on the budget in other ways. There's not a single one of us inside the government who aren't feeling like we're that rock we're trying to squeeze blood out of.

Disasters are on the rise. It occurs principally, though not solely in coastal areas. And if you don't think you're not concerned about drought then let me remind you that there's this really perverse cycle between drought, flash flood, landslides and flooding downstream.

So my colleagues who are in the ports in Maritime Community, in Florida, in California, know exactly what I'm talking about.

And that's the reason why it was so important that the CERB work on getting the Corps to have new sea level rise guidance, which was a very painful experience.

And I was just writing Heidi this morning, Bob, about, I mean Bill, how glad I was that finally a decade later we had gotten that report out. Because that was something that started when I was on the CERB. Bill replaced me on the CERB. They actually wanted somebody who knew something about the

business.

But we still got sea level rise guidance out of the Corps. And not the stuff that they wanted to do originally which was, well let's just say, it wasn't based on better, more current data.

Anyway, so why should we be concerned about this? Because first of all we all represent very expensive infrastructure. Much of which is aging, much of which is in vulnerable areas.

This is the reason also why the big boys, as I like to say, the reassurance community, the really large casualty loss insurers, the Urban Land Institute, the big developers, they're all on the weather climate train. And I think it's really important that we, in the Maritime Community, figure out how we get from more better data to actual information, which is what we kind of been working really hard on over the last 15 years, to maybe knowledge and, dare I dream, wisdom.

But we made a lot of progress over the last 15, 20 years. As I said, in a -- not just inside of NOAA but we do have the integrated ocean coastal mapping, whatever it is, and a real plan. And maybe in another decade we'll have real money.

We actually have the Joint Hydro Centers so we've significantly improved our mapping capabilities. Particularly in the next decade.

We actually now have several mapping centers, thank you congress. And the world of census is changing, the world of data analytics is changing.

I'm actually going to a meeting at the end of this month on big data and climate. I'm the only public sector person going to be a in room with three dozen CEOs from around the world on a panel hosted by some guy name Gore.

I had to go out and buy the Big Data for Dummies Book. There is one, I highly

recommend it to you.

It's changing our lives. In the Maritime Community it's going to change our lives in things we didn't think we were concerned about.

Like the social economic vulnerability in the surrounding communities. I got to say, first of all, I was glad to hear my colleague from the Ports Authority talk about how in South Carolina they just beat the crap out of us until we don't care about the government.

So as a crap -- my most favorite word of the federal crap is efficacy. Efficacy is that thing that hits the sweet spot between efficiency and effectiveness.

And when I think about what we need to do in Maritime Commerce we need to be more efficient. So let me be very specific.

We can do things, but as I alluded to, we have a lot of infrastructure, we have a lot of challenges. Storm surge or even for

the southeast, tsunami warnings.

Well I can go on about tsunami warnings but for the people in the Jacksonville, anybody here from Jacksonville? Who cares about Jacksonville? Miami, care about that? Okay.

Well let me just say tsunami warning charts are based on the shallow data that was pulled off of the NOAA nautical charts which wasn't some extrapolated data when it was put on there 40 or 50 years ago. And I do believe when you extrapolate extrapolated data that makes it crap.

But I will tell you that 386 years ago a tsunami caused by slump on the Puerto Rican side, overran, over washed south Florida in about 90 seconds.

Now Miami-Dade is not a very big port in the scheme of things, it's just an important port. So we need to understand that. We need to better understand shallow bathy so we can do a better job on both the

ocean basin coast as well as the lake basin coast.

And I am going to leave my thorough career not yet seeing a shallow bathy mapping program. We do it now after incidences so that Mother Nature kicks the crap out of us or we dump a bunch of oil in someplace we shouldn't, we actually get some shallow bathy done unsigned in navigation channels. That's good. It's juiceful stuff. It will help us with community resilience.

One of my favorite colleagues over the last decade has been the U.S. Chamber of Commerce. Why you say.

Well besides the fact that they run our communities, as everyone at Maritime Commerce knows, on the Gulf Coast they discovered that if they had continuity in business it really didn't do them much good if there was nobody around to buy their goods or services.

And the one thing that's happened

in that community over the last decade is, the chambers like us Feds, they have to sing for their supper too. And I watched three dozen corporate foundations, ranging from Coca-Cola to Home Depot to Office Depot go from nothing to funding either community or disaster resilient portfolios.

So there are a lot of private foundations in this space. Rockefeller has just joined with HUD to put up the first $100 million of a billion dollar tranche for a rebuild by design. So we're going to live in stupid places let's figure out how we can at least go smarter and not cost so much money the next time around.

Because it is going to happen. And since we're on the post it's not a matter of when it's just a matter of where. This year, next year. And that aging infrastructure that is at risk. And economy deal with it.

So it's a function of where and

how we build, how we design the infrastructure, the inner mobile system, the water management system. It's also how do we take advantage of the natural defenses that Mother Nature provides us if we haven't already harmed it or mitigated it away.

These are the key messages from the coastal part of the National Climate Assessment. I think you know each and every one of them, but of course the ones that are most of interest to you are coastal lifelines at risk and economic disruption.

Oh, oh, what is that? Oh, that's a map of truck loads from PORTS. In fact one of my most favorite slides, I'm hoping is on the next one, no, it's not.

And for those of you who don't know that, that's the road Highway 1 in south Louisiana where they don't care about climate but they totally get that flood and rising water level issue in south Louisiana. Even we can't say climate. Even if we can't say

climate, sorry, Lynne.

Let me back up. It's not on here but let me tell you about my favorite slide. One of my favorite slides to show at audiences that don't know anything about a coast is a map of the truck flows out of New Orleans. Why do I show it? Because it's everywhere, all over the country, if you've ever seen this slide.

And not only that, and by the way, I got my friends at DOT to make this for us for the National Climate Assessment. But it looks, if you squint your eyes, it looks almost like a USGS hydrology map, that's kind of cool, but it also shows people in Nebraska and Iowa that we are a coastal nation.

Be you on an outward facing coast, be you on the Great Lakes or be you on the Great Inland Coast, there are these ports on the Great Inland Coast, you know, we have a lot of issues in common.

So let me talk some trash now,

like I haven't. So we are just almost two years out from a changing administration at the national level.

And the one thing I do know is, no matter who wins, it's going to be a new set of 25-year-olds in the White House and at OMB and on the Hill who think they know everything and they're looking for the newest low hanging fruit to be all that about. And I think we should be ready for those 25-year-olds.

And I think what we need is a true national coastal mapping program that's actually resourced. And includes a lot of the elements that we want.

I believe, Joyce, that you say you do something with corals.

MEMBER MILLER: Yes.

MS. DAVIDSON: Right. So you're big on shallow bathy mapping too.

MEMBER MILLER: Yes.

MS. DAVIDSON: Right. So, you know, what I've discovered with my Army Corps

friends is that over in the Philippines they would actually love for us to come and do some shallow bathy mapping in the Philippines. And they have some USAID money to do that.

And what a sad thing that maybe the south of the Philippines is going to get a comprehensive shallow bathy mapping set before the south of the U.S. Just saying those shallow low lying shelves, everything about that shelf not only has to do with how we move congress along but it also has to do with how flooded our facilities are going to be.

So I think that thinking ahead this FACA is a great group to be thinking about, how do we take stuff that the Corps does for which we are all very grateful, even if it's outrageously priced, how do we take the stuff that FEMA is doing, and they themselves are trying to figure out how they actually come into the GIS decision support tools, seriously, how do we take the stuff

that our geeky colleagues at USGS do and our colleagues, you're geeky too, at NOAA and how do we actually have a real coastal program?

We are almost 50 percent of the population, we are almost 60 percent of GDP on the coast and we're everything that everybody cares about. Even if they don't live here they want to get here, they want to vacation here or they want to eat our seafood, or they want to wear the goods and services that come through our ports.

So if we're really about Maritime Commerce, then we actually have to be about a true coastal intelligence program. And my colleagues at NOAA would like for it to be about them, and of course it is about them, but it's not just about them. It's not just about us. You know that.

Some of you do a great job of playing the agencies off against each other or getting the best you could squeeze out of each of us.

But I submit there is a bigger view and there's a more comprehensive strategy. And if we start it now, talking about that transition strategy, and we actually had it kind of framed up in two slightly different ways, depending upon how things roll, people like you or whoever succeed you, are just the kinds of people that we need to be pimping in it in the new White House and with the new people in the House of Representatives.

And we might actually get this done. Because no matter who the new people are in the White House and on the Hill, I think we got to have a big infrastructure bank. And you all have seen this, push through this.

You know, DOT's actually doing pretty good on this angle. HUD final gets this angle.

But I think that we could also be a small part of that party. The Maritime

Community.

Yes, we got some lip service for Blue Highways, that's nice. But if we're really going to do this intermodal hookup thing, then we need a comprehensive strategy.

And I think you guys working with other like-minded groups, and don't rely on the interagency community for marine transportation systems because, well that is a lot of process with some outcome. But you have the potential to be just a wee bit of process with some actual outcomes.

Anyway, that's not what Gerd asked for, he wanted me to be more respectful and more polite. Of course you did, he wears a uniform. But Eveline could have told him that wasn't going to happen.

So I think I should stop there, haven't I about used up my time? Questions, refutations?

And anyone that feels that I acted prejudicially towards you, I apologize, I've

actually been off the road about six weeks and you're like one of my reentry points, so I was feeling a little giddy here.

CHAIR PERKINS: Got no questions. This is too good of an opportunity though.

MR. ASLAKSEN: I have something, ma'am, just to give you highlights, there is actually now an national crystal mapping strategy.

MS. DAVIDSON: Yes, yes, I do know this.

MR. ASLAKSEN: Okay, ma'am, just making sure.

MS. DAVIDSON: I do know this.

MR. ASLAKSEN: We've worked pretty hard at that and it is, it's been a well-documented effort of USGS, NOAA and Corps.

MS. DAVIDSON: And let me say on this resilience flavor, so, why Mike's been an IOCM process weenie. One of the things that happened when I took this new job was Russell decided I needed to be tortured so I do NOAA

budget process crap.

And I am delighted to say though that one thing that has resulted from this is I've been involved with a coastal resilience thing, any of you have ever seen me, I've been revolved with coastal resilience since the Art of War was written. But we now have, in the Department of Commerce Strategic Plan, two important elements of NOAA.

One's called environmental intelligence, and of course in the ocean service we rip it down to be coastal intelligence because we are the most intelligent part of NOAA. But the other part is this community resilience stuff which is really our stick. Your stick, my stick, all of our stick.

But we've actually got both of these things in the Department of Commerce Strategic Plan. And more importantly, we've got it cross threaded with NIST, the engineering geeks who are trying to figure out

how new construction could actually be more resilient.

They're the guys who prove that old joke that the extraverts are the ones that look at your shoes instead of theirs.

But more importantly our colleagues at the economic development authority who have a $100 million to give away to things like infrastructure for ports and other such political acts of kindness.

So we're cross threaded inside the commerce plan, which is also a lot of process with very little reward, but that's a useful place to be documented going into this transition too. So there's that out there.

I mean the road to hell, as well as progress in D.C., is paved with a lot of reports and claims and strategies. If you don't have them you're toast. So you got to have them. You got to have the road littered with them.

But that's only just your hunting

license. You actually then got to go out and bag yourself something. Or build.

VICE-CHAIR HANSON: Margaret, you are missed on the CERB by the way. Not nearly as exciting.

Question for you, because you bring up the advocacy piece and how do we --

MS. DAVIDSON: No, no.

VICE-CHAIR HANSON: -- advocate --

MS. DAVIDSON: No, no, I think you can just educate and inform.

VICE-CHAIR HANSON: Sorry about sore with advocacy, but that's okay.

MS. DAVIDSON: I don't think I used that word.

VICE-CHAIR HANSON: You did not.

MS. DAVIDSON: Well I did say the word pimp. That might be mentioned --

VICE-CHAIR HANSON: That has many definitions for sure. So how do we get Secretary Pritzker or her successor to consider coastal issues to be a priority --

MS. DAVIDSON: Well great news about Secretary, a.k.a Hyatt Hotel Heiress Pritzker, is she actually does get the coastal economy thing and our administrator, and I'll be respectfully for a moment, Kathy Sullivan, and Secretary Pritzker have actually formed a warm one around community resilience as a matter of fact.

So I think there's a rare and unique opportunity. In fact they're having a meeting later this week and the one thing that I was, on a quick turn around this morning was, they wanted to know the exact nature and extent of our conversations with NIST and ADA. I sent you a note on this, Russell, last night. The exact nature.

Because we're talking about a commerce wide performance metric on community resilience. Which would be a first ever.

Usually people in commerce, well my joke about commerce is that a lot of people come into the secretary's office thinking that

they're going to be hanging out with guys in custom suits and Italian loafers and going on trade missions. Then there's agency called NOAA that's full of 12,000 geeks that clogs up their fax machine and, it's a pain in the ass.

So, and it's usually a real problem for us in the budget process. This is a unique opportunity with Pritzker. And I think there's a unique opportunity working both the current administration but also taking the longer view, which politicals never do, for over a four to five year educational effort.

Because that's what it's going to take, you know. The window of opportunity is in two and a half years from now. With a year and a half after that. That's the window of education that you have.

VICE-CHAIR HANSON: Okay. There's a follow-up, because Secretary Donovan, when he was with HUD.

MS. DAVIDSON: Yes, and he's now

in charge of OMB.

VICE-CHAIR HANSON: Exactly.

MS. DAVIDSON: The place that divides up all the money.

VICE-CHAIR HANSON: Exactly, so --

MS. DAVIDSON: Yes.

VICE-CHAIR HANSON: -- is that going to be a, we usually --

MS. DAVIDSON: Well it's a great thing for NOAA because usually it's not. I mean most people think NOAAs over there with all those other environmental agencies, like EPA and Interior in the same part of OMB.

We're not. We're in the economical development part of OMB. Now, which is fine for commerce, hadn't worked out so well for NOAA.

But the 800 pound gorilla in our part of OMB is this little group called HUD. And let me say that if Administrator Lubchenco had known that, when I was still the director of the Coastal Services Center, that I had

placed an embed over at HUD early in this administration, to drag him kicking and screaming into the geospatial era, she would have asked me, what in the world was I doing that for. Because the first time she saw me at the chamber she asked me, what in the hell was I doing there.

Well I always thought if you were in the Department of Congress maybe you ought to know the Chamber of Commerce people, duh. But that's just me.

But if HUD is the 800 pound gorilla in OMB, I'm like thinking to myself, well HUD owns a lot of real estate and a lot of that's coastal. And after the real estate crashed they even came to own south Florida practically.

So wouldn't it be a good thing to be on good terms with HUD? Well right after Sandy that turned out to be a really great thing. And there was this science work group, first ever after a disaster, for the Sandy

Task Force.

Some of that stuff Miki showed you, we worked with our colleagues inside NOAA, the Corps and USGS and rolled out flooding and sea level rise tools in the Sandy effected area. But more importantly, not only is that still a big deal at HUD, but Donovan is now at OMB and I think that's a great window of opportunity.

And you can go there and you can educate Mr. Donovan, the head of OMB, about these issues. And I think he'll get it.

Oh, that's right, he's from New Jersey. There's some little port, New York, New Jersey, that he's very familiar with. He actually came out of the transportation community.

So I think there are many educational opportunities that we're squandering by not raising our sights high enough.

And, you know, I'm going to die in

the next decade. I sure would like to see some shallow bathy happen. Do this for me.

CAPT BRENNAN: I'm going to try. Tell us where?

MS. DAVIDSON: Shallow bathy or my death?

(Laughter.)

MS. DAVIDSON: Well if Alaska were to come back to the coastal management program I'd say we should even do some in Alaska. But that's all right, they don't need any of us, right Scott?

CHAIR PERKINS: Yes. Margaret, you've had the opportunity to observe and be aware of many FACAs.

MS. DAVIDSON: Yes.

CHAIR PERKINS: And if you were going to give a report card --

MS. DAVIDSON: Yes.

CHAIR PERKINS: -- on FACAs in general, you know, their usefulness to congress and to administrations and on this

one? And I don't think I have to say, speak freely.

MS. DAVIDSON: Well I will just say I have seen more effective FACAs at DOT and one at DOI that I am familiar with. How's that?

You know, you're job should be to kick our ass, but our job should also be to push you harder to kick our ass. And together we should be advancing marine commerce in the largest sense of that.

And I don't just mean for people who drive ships. Although I know that's what most of you guys care about and you are important, you really are.

But there's a whole much more to it, you know. I mean if you want to talk about Pacific Island or Caribbean Islands, yes, the place we dock ships is important but so is the whole ecosystem.

You know, we're all connected to each other no matter what at the end of the

day. And we have found out that buck heads aren't all that and why we may disagree on what a real living shoreline is.

My friends from the Corps think it's concrete you put grass on top of, I think of something that's a little more dynamic, but you know, that's a semantical difference.

I'm delighted to say my colleagues at the Corps actually have a budget initiative on what we call natural infrastructure. It's only taken us a decade to get that there, but you know, there are some real opportunities.

I think my challenge to you is to be more. I mean I know you get paid the big bucks to come and eat this really great food, but I think you could be more and I think the opportunity transition, in times of change and transition, is always the greatest opportunity.

That's why that old Chinese symbol is like crisis and opportunity. It's the whole thing, it's the same thing.

So if you want more out of us, frankly you got to kick our ass. Some of it's resources, some of it is that we're comfortable doing our stick in maybe just a new improved version.

It's hard to leap frog inside the federal government. You're not rewarded for being innovative. Let me tell you, I know about that.

You're not always rewarded for being imaginative. It's not the first thing that gets you the right kinds of performance appraisals.

Now I will actually say, I'm very fortunate Russell likes me a lot, but I've known him since he was 25 years old almost.

Yes, Frank? And Frank will tell you this is not behavior on my part either.

MEMBER KUDRNA: We want you to be candid.

MS. DAVIDSON: Yes, sir.

MEMBER KUDRNA: We've been

discussing in the FACA how we move forward and one of those topics is, educate and inform.

MS. DAVIDSON: Yes.

MEMBER KUDRNA: And I guess from your message you're clearly indicating that's a principle role you see FACAs doing?

MS. DAVIDSON: Well I think first and foremost, the role as envisioned by congress, remember I'm a layer, of a federal advisory committee is to make sure that we're executing our mission with alacrity and integrity.

Then I think we have to look at the efficacy. But I think you can help us be all that we could be. Not just what we are. Yes, sir?

Advisory? I mean I look at the National Science Foundation. Oh, now you want a FACA that kicks ass, the National Science Foundation FACA, now it actually does kicks ass.

And that's why when the rest of us

are sucking wind in the budget process, NSF, even when its curve slows down, they think they're having a bad year, they only got a five percent increase. That's a bad year for them.

And I guarantee you every one of those pointy headed people on their FACA are out educating and informing their elected officials at home and elsewhere.

CHAIR PERKINS: All right, thank you.

MS. DAVIDSON: Sure. It's, I'm glad you're here. You know, Charleston is where the Ashley and Cooper River meet to form the Atlantic Ocean. So it's appropriate that you'd be talking about these important issues here. Thank you for having me today.

CHAIR PERKINS: Excellent. Next on our agenda is our breakout sessions. So the Port and Harbor Expansion breakout session will be in the Ashley Room.

The Atlantic Intracoastal Waterway

and Recreation, thing that needs dredging desperately, breakout session will be in the Magnolia Room.

And the Geospatial Modeling and Coastal Resilience will be in the Cooper Room. So breakout sessions will go from now until 2:30 and then we'll reconvene back in here for a report out from each of the breakout groups.

MEMBER MILLER: Scott, where are these rooms?

CHAIR PERKINS: Somewhere here on the property. Yes, we're at the end of the hall, so they got to be the other direction.

(Whereupon, the above-entitled matter went off the record at 1:21 p.m. and resumed at 3:02 p.m.)

CHAIR PERKINS: We'll try to get reconvened here and begin with the report outs from the breakout sessions, and then after the report out of the breakout sessions we'll have a presentation from Dr. Jeffress.

So with that before we start the

formal, I don't know if all of our non-panel participants from the breakout sessions are here but wanted to ask them, you know, to speak freely about were the breakout sessions beneficial.

Did they find the time, you know, useful and beneficial, but I'm not seeing a lot of them in the room. But if we can get that feedback or that input that would be beneficial.

All right, moving right along then.

MS. WATSON: Scott?

CHAIR PERKINS: Yes?

MS. WATSON: I think some of your panel members had a couple comments regarding that process.

MEMBER SHINGLEDECKER: I guess I said something to Kathy. I appreciated in past breakout sessions panel members had been asked to be the facilitators and the scribes, and I found this time having NOAA staff play

that role I think allowed the panel members to engage more actively as participants. So I appreciated that support.

CHAIR PERKINS: Great. Thank you for that feedback. You know, Bill and I decided to spend 20 minutes each in each of the three breakout sessions and rotate through, so I just want to extend my sincere thanks to both our facilitators for each session and for the scribes.

You know, it looked like it was working. Each of the three that I visited looked like they were actively engaged in, you know, working towards that goal of giving us the feedback and the input that will help us formulate, you know, an input for our recommendations. So from my observation it looked like it worked. Bill's not here so I'm going to say I'm sure he agrees.

So do we want to do the report outs in the same order they're listed on the agenda beginning with Port & Harbor Expansion?

Or would you like to go in the opposite order?

CAPT BRENNAN: I'd be happy to go. Do we have the, we'd sent in our notes. Were we going to display those? Or do we have the ability to display those?

CHAIR PERKINS: Lynne, are you prepared to display the info? Because we can take them out of order if you need time.

(Off the record comments)

MS. WATSON: Well, Scott, while Lynne is getting that ready, I would like for the panel to recognize our nav manager here who was a key essential role in bringing the guests in for these speaker panels otherwise.

CHAIR PERKINS: Thank you, Kathy, yes. And Kyle hit a home run.

(Off microphone comments)

CAPT BRENNAN: So we spent the first 30 minutes of our breakout session just kind of talking roundly about products, what some of the capabilities were for some of the products and then what that meant for the port

expansion. You know, because as we discussed, clearly NOAA doesn't have a role in making the port deeper or doesn't have a role in making the channels wider and it doesn't have a role in expanding the port facilities.

But what we do have a role in is how we can provide data about that in a meaningful fashion that allows decisions to be made in a timely fashion. So after we identified that we talked about that. We talked about how we might possibly be able to do that.

So there was some questions that we wanted to have answers, and first I'll try and run through those and then kind of come back around to some of the notes that Rachel captured as far as some of the value added things. But the first question was what does NOAA need to get right in order to meet the needs for this port expansion?

And the first one was make sure that the new approaches once they're surveyed

that they get chartered as quickly as possible. That the most recent surveys get onto the chart as quickly as possible, and in that regard we're particularly talking, I think, about the Corps surveys. So once we get a Corps survey in, getting that from the Corps through eHydro onto our chart products as fast as possible.

And then the channel frameworks as they are modified, particularly we were talking about if they widen the channel they would have to then adjust the channel framework, that that channel framework also get reflected on the chart as quickly as possible.

So basically, you know, just that we get the as-built conditions represented in the chart products as quickly as possible is the big one.

Are any additional port sensors needed to meet the needs of these larger vessels? One topic that did come up was just

about the additional air gap sensors which go off zorbee, we got it scheduled in, I guess, July 2015.

The other question was Thomas Jefferson is scheduled to be surveying in the approaches to Charleston in 2015, and is there anything that they needed to address in the ports.

And so the word that we got back from the constituents, the Charleston constituents that were in the meeting, was that they were happy with working with Kyle, that Kyle knew everything and that we didn't have to do anything. So I'm paraphrasing but that's basically what it was.

So I think the one issue was, specifically, was just about the unexploded ordnance that were in the Navy anchorage which I don't think that the TJ has any capability to deal with, but that's the only thing that they were, I think, seeking our help on in that regard which is not necessarily related

to the TJ's work.

There was a question about the new chart and was that meeting the needs, and from what we gleaned I think from the presentations in here and in this group as well was that yes that the chart was meeting the needs and it had enough expansion capability that even if the port decides to expand the approach channel that there's plenty of excess room offshore of the existing location now on the chart to successfully represent that.

Will greater positional accuracy be needed in the future? And so the pilot that we had in there I think said that it scared the shit out of him when he had to dock the ship. I'm quoting. Sorry. That it, you know, when he had to dock the ship in the fog.

And so we translated that and that said yes that he would like some additional capabilities, some higher accuracy information about the pier facilities when they go to dock.

If anybody that was in there read that differently, like I said I may be paraphrasing a little bit too much on that. But we said, you know, ultimately a Band 6 ENC harbor scale chart.

We just, you know, one of the things that we did discuss is one of our speakers today mentioned about salinity probes. And so I've got some work to do when I go back to the office to see, you know, are we making use of those? Do we have access to those salinity probes?

And so is there some way that we can make meaningful use of that in a navigation product to help the pilots decide where that salt wedge begins and ends so that they know where when they cross it they're going to gain draft.

So, and then the final question was is NOAA taking the Army Corps data and using it in the best way? And this highlighted a problem or an area, I guess, of

growth for us that when we talk with all the pilots, most pilots don't understand the full capabilities of an ENC or an ENC's that fully flushed out.

And when we started to, I think, you know, explain what the capabilities were for an ENC that was fully populated, the pilots were like, well, of course, that would be like gravy. We would love to see that.

And so one of the things that was discussed was having a demonstration project where we actually took high resolution data from the Corps and put it into the ENC and provided some different display options for the pilots so that they can begin to make use of that. And so as, for example, to color map the bathymetry so they could see where the deep areas were and where the high spots might be.

And, Andy, you can tell Larry that one of the things that he says, wouldn't it be great if you were like in the seagull view

where you're flying back behind the ship? So a pilot actually said that and Larry Mayer would love that too.

So value added things that got discussed was what we talked about, the salinity probe data that the Corps of Engineers has.

And apparently they populate them not only for their own use but I guess they buy them for the USGS so that they've got a whole network of these at least within Charleston to manage the outflow from the dam, from, I guess, tail race. So that was interesting at least for this port here.

There was some discussion about dropping the channel condition report or the channel tabs and just providing that data, you know, actually geographically on the chart. The push for S102 formats to be available so that you can better ingest, you know, overlays into the data.

So that was an item that was

discussed. It's good to have John Dasler in your meeting when you're going because he brings all those to the table for you.

Talked about Band 6. One of the things that was requested from the POS was whether or not we were reaching out to app developers, because that was one of the things that we found out yesterday was that they were actually using a tablet app for their portable pilot unit there.

And so we did discuss that and we have a vendor day at the Annapolis Boat Show. So we're already on that.

Expanding our web services and the types of data that NOAA makes available in more usable formats. Overlays for the Corps data. Having the ability to show soundings in the federally maintained channels in areas where there is depths deeper than the project depth was one item that was discussed. Because the pilots said that they'd like to know where there was, you know, they want to

know how much depth they have and where that is. So that was one that was discussed.

And then the potential for, you know, that went along with these higher resolution Band 6 charts was the need to put a higher resolution shoreline on that.

So that's the distilled version of what we discussed in our breakout. Any questions? Any clarification on my shorthand? All right.

MEMBER KUDRNA: Let me ask you a question. If we were looking to bring some recommendations to the administrator, what couple of these could elevate to something that, if any, that would raise the depth level?

CAPT BRENNAN: I'm filtering. So I'm trying to think about, make sure I'm giving you --

MEMBER KUDRNA: Don't answer it now, but we'll need to do it before we get to conclusion if you'd prefer.

CAPT BRENNAN: I would prefer to give you what I got out of this as opposed to my opinion, so giving me a minute is probably a good thing.

MEMBER MILLER: Could you possibly group some of them into a larger --

CAPT BRENNAN: I think clearly there's some opportunity to group these. I think, you know, I mean the one thing that's clear and I think that's exciting from our end is the eHydro, and I think, you know, being able to make use of that tool that the Corps has created to streamline ingesting data into our pipeline, and that's huge.

I mean because the Corps data is the biggest source of data that we get, you know, in mapping and charting. So being able to get that through and in a format that's consistent is absolutely critical.

So that's a huge thing right there for us to be able to provide products quickly. So I mean that's ripe for the picking in my

mind. And so Phil and I had some discussions on that. So yes, grouping is good.

CHAIR PERKINS: Great. Thank you, Captain. And the spokesperson for the Atlantic Intracoastal Waterway and Recreation desperately in need of dredging breakout session is?

MEMBER BARBOR: After having sat next to Ed for a day and a half, I have to say our number one recommendation was federally fund ports. I was actually amazed that, you know, ports did not come up in the Intracoastal Waterways. But I had to say that.

Actually we tailed in very closely when you, what I got out of your presentation, Rick, and our discussions. And our discussions were very active and occupied the whole time on, you know, what can we do to solve this huge issue of a very important artery being clogged and make it a useful, you know, artery again.

And like I say, and encapsulated very closely was the number one thing we felt of importance was the ENC first production line be adopted, implemented as quickly as possible.

That was a recommendation from the New York breakout panels and we felt it needed to be reiterated here for the very same reasons you highlighted too. Because when you have that ENC production then you can relate to eHydro and ingest that information and get it onto a navigation surface as quickly as possible. And so from that standpoint we felt that to be a priority issue.

And going hand in glove with that is the liaisoning with Army Corps to ensure that that hand off to eHydro, one, you know, we wish eHydro to be standardized and implemented as quickly as possible, but that's not our bailiwick that's Army Corps'.

But that the Office of Coast Survey or the administrator or whatever level

we wish to take this liaises with the Army Corp to ensure that eHydro is implemented as quickly and in a manner that will provide for as seamless an integration into the ENC as possible.

And with those two things we start picking up again the same sorts of things that you brought up, Rick, is that by and large the depiction of the Intracoastal on NOAA charts is a 1:40000 if not smaller, and you don't get many numbers, you know, 1:40000 in a 90 foot channel.

And therefore it's going to have to be compiled at a much higher band and then the ENC is going to be the preferred method of depiction so you can, you know, zoom into the appropriately scaled product, but it has to be appropriately compiled too.

And so from that standpoint we don't know what the workload impact on the chart division would be and that's probably something worth getting a report back on is

that, you know, have we just asked for a far heavier workload being implemented on the chart division?

Okay, so there was clearly some, not misunderstandings but just lack of clarity on the status of the magenta line and what is the way forward, so we would request an update at a webinar or the next available opportunity to get an update on the magenta line.

And of course we couldn't, we started off with crowdsourcing. We had John Hersey on the call-in in our group, and clearly there are other avenues of data and Service Argos is one.

But we felt that, you know, we do have indeed a trusted partner in the Army Corps that performs a survey of the Intracoastal at least once a year and has those data available.

And those are the sorts of data that we should be implementing into the chart pro forma, and then we have to continue to

investigate how crowdsourcing can best be used to provide the appropriate products for the navigator.

Is that all we have or were you typing this out as I was saying it? Okay, I think we've given it, I think that's what we got. So federally fund ports, right?

MEMBER KELLY: So until I read it.

CAPT PROCTOR: Mr. Chairman?

CHAIR PERKINS: Yes, questions for Ken or for --

CAPT PROCTOR: No, sir. But if I may, first I want to thank Admiral Barbor for stepping in and briefing out. As my first rodeo with this committee and that workgroup, it became quickly evident to me that, you know, much of that discussion was a continuation of a lot of great dialogue from previous sessions. So it was very enlightening to me personally, so I appreciate the lively exchange that the members shared.

But I also want to state my

appreciation for, we had three of the four presenters from this morning's session hold over this afternoon to participate as well.

So although Mr. Dorminy could not stay after lunch, we did have Mr. Warren from the Corps, Mr. Pickel, as well as Dr. Alexander, so it's very appreciative that they stuck around and contributed to the discussion as well.

CHAIR PERKINS: Great. Thank you for that input.

MEMBER MILLER: I'd like to add that we discussed a lot of problems that really weren't NOAA problems and it's a bit frustrating. I mean, you know, obviously dredging is what's needed but, you know, what can NOAA do about that was the difficult problem.

CHAIR PERKINS: All right, any other questions for the Intracoastal group? All right, that leaves us with the Geospatial Modeling and Coastal Resilience.

MR. ASLAKSEN: So we kind of did something different. A shocker to you all I'm sure. We had some suggested topics within that that we had to kind of cover, but being resiliency is much broader we got off topic and really had, I believe, some real priority talks from there.

Foundation data, that's a lot of what we provide here but that was very evident that that's an important data set, and more importantly, poor resiliency and assessment of resiliency is the more frequent collection of those data.

In some cases taking about imagery and LiDAR and probably hydrography as well on a yearly basis and really emphasizing that the importance of having this data collected pre-event to really do assessments as far as damage assessment and then having post event collects to really then look at, you know, then assess resiliency.

So having these foundation data

sets from a more frequent basis and event driven was a priority to the group.

Education at all levels, we had some really good direct experiences from Dr. Jeffress and after Hurricane Ike in Texas in which he and the university tried to pull together all the local decision makers and they didn't show up, and versus we had some local sea grant doing some climate impact assessment studies here and education of the local in which they had a lot of interest on.

And so the recommendations coming out is that we need education at all levels, but a real strength at the local level. Folks really want to know how does it affect the, what's going to happen and how do we live more resilient. The examples I heard were like, for instance, roadway elevations and when are they going to flood and those type of, and tying things like coastal flooding and water quality was another important issue we brought up here in South Carolina, as well as

modeling.

Resiliency. The whole local product, what is the plan for the U.S.? Is there a consolidated plan? There doesn't really appear to be one.

You know, and there, really, from the discussion needs to be a collective plan involving government, NGOs and industry, as well as looking at and prioritizing R&D efforts to assess resiliency. What works what doesn't work and then help develop policies from that.

In addition, there really needs to be metrics of resiliency. How can you measure that? And in conjunction with those metrics of what is sustainability and how do you define that?

Tools and developing tools. A lot of, I believe, what we heard from experience at the local and large levels like tools like the Digital Coast are important.

But as important is that, you

know, which I wasn't aware of that an example, New Jersey and what is now called the New Jersey Flood Mapper is that, you know, CSC was able to transition that tool that you saw from Miki's presentation to the state of New Jersey, and they were able to develop a tool at the local level in the applications at that level.

And so as a federal developer to develop something from a regional level, it should be able to be transitioned easily to the local level so that they can refine it and really understand what's happening in their backyards.

And in addition it was pointed out though that, you know, there's things like my coast app Storm Reporter which looks at beachfront damage and into the King Tide Reporter which looks at capturing and collecting photos of super high tides.

And then finally, data and tools that capture the entire effects and how to

design community resilience not just at the individual entities or interests but broadly.

I think we've heard a lot of what folks are doing with their direct interest areas whether that's a port or the pilots' operation center that we saw yesterday or people's homes, but we don't look at the connecting infrastructure and the supporting elements that pull that together. So a more broader look at resiliency and what that means across the board.

And that's, everybody participated. We had a lot of folks. Anybody want to add anything or reinforce anything?

Okay, thank you.

CHAIR PERKINS: Thank you, Mike.

Well, we have a break coming up. I would like to take this opportunity just to ask if there is anyone who would like to make public comments at this time.

So I'm going to take that out of order just so that I don't hold someone

hostage from the public that wanted to make an official comment for the record. Don't want to make you stay here until 4:45. The sun's actually shining and it's not raining outside.

DR. ALEXANDER: I'll make a comment.

CHAIR PERKINS: Okay, great. If you'll go to the mic and identify yourself just for the record please.

DR. ALEXANDER: My name is Clark Alexander. I'm from Skidaway Institute of Oceanography.

And there was very wide ranging discussions in a number of these breakout groups, but one issue that I wanted to bring up that really wasn't covered in any of these is that NOAA collects a lot of hydrographic data. They collect a lot of multibeam data, but it all doesn't get collected in a quality form that can be put into hydrographic data sets and made available to the public and researchers like myself.

I just wanted to encourage NOAA that if they're going to collect hydrographic data with their multibeam systems that are already on their ships that they should have someone to collect it in a way that it's able to be processed and able to be used and delivered to the public in a usable form.

Examples. There was a resurvey of Gray's Reef done off of the Nancy Foster and so they spent a significant amount of time resurveying the reef and we were very excited about being able to do a, 2001 we did an initial survey of Gray's Reef, and I think it was 2009 or '10, something like that they did a resurvey.

But there wasn't anyone of NOAA's staff assigned to watch that data coming in. So there were some problems with the data, and in the end there was some sort of a tilt that wasn't able to be removed from the data set. So we weren't able to use the data to do the kinds of science that we would have liked to

have done.

So I would just encourage that there be NOAA people assigned to really collect this data and do it in a way that makes it usable.

And I'm all for collecting data and letting it go to educational activities. I think that's very important for building the next generation of survey people.

But at the same time, I mean they can use the data for their educational activities but it can also be used by a much broader community. And given the cost of vessels and what it costs to collect that data, it doesn't make any sense to waste any of it, in my opinion. Thank you.

CHAIR PERKINS: All right. Thank you, Dr. Clark, for bringing that to our attention. All input and feedback is appreciated and valuable.

Yes, Ken?

MEMBER BARBOR: Let me ask Andy.

Yes, isn't there a multibeam group or something out of UNH that, I know they do it for NSF and it might address some of those concerns.

MEMBER ARMSTRONG: Yes, there is a multibeam advisory committee that operates under a grant from the National Science Foundation to support the UNOLS of multibeam capable ships.

We've had discussions about the possibility of extending that to the non-hydrographic NOAA vessels, but we've not sort of ever reached a conclusion on how to do that.

But I think those, in fact NOAA co-survey has one of their hydrographers conducting a study now on multibeam management procedures. And so I think there at least is some effort going on in that regard now.

Admiral, did you --

DR. CALLENDER: I'm just trying to figure out how to be diplomatic and not throw

the other part of the NOAA organization under the bus on this.

So Dr. Alexander's point is spot on. There was an issue with the multibeam sonar that was actually a flaw in the way the system came from the vendor, if I recall.

And so the other challenge is that we often don't have enough hydrographers to farm out to support other vessels. When we work with the non-hydrographic vessels we do have a process we put them through, a readiness review to assess at the beginning of the field season, are their systems configured, have they done their patch test, all those kinds of technical things.

And then when we do have hydrographers available to work with them during the field season of course then they're all well versed in the standards. So that's the challenge when we have ships where we don't have enough expertise, and that's something we work all the time to try and

overcome.

So yes, you're absolutely right. It's a darn shame. And certainly the IOCM program has made tremendous progress in the last couple of years trying to educate the other parts of NOAA that their data has value and they need to collect it to a known standard.

CHAIR PERKINS: Yes.

MEMBER MILLER: I would say that out in Hawaii we have a multibeam ship that a group I was associated with ran for several years. But then there was no more money for that and that system essentially has not been run since 2008 for any significant surveys.

And it's a waste of money and it's a shame, but there just aren't the personnel to do it and with no funding for it, you know, you just can't send anybody out. They could have been collecting very valuable data since 2008 and they haven't.

CAPT BRENNAN: This is Rick

Brennan. One thing I would like to say is at least for all the, to make clear is that all the NOAA hydrographic surveys that are done are made available. They are found on NGDC.

And particularly the Nancy Foster, typically her data we get once a year in a once a year chunk, at least the stuff that is not acquired by the Biogeo group within NOAA.

We get a download of all their hydrographic data that comes to our hydrographic branches. It's reviewed for quality and everything else, and if we can update the nautical chart with it we'll do that. And if we can't, either way that data will also go to NGDC to be made publicly available.

So if that data was not made publicly available then my guess was that there was something critically flawed in the data that just, you know, that we felt it was just not valuable or shouldn't be made public. So I can't address what happened on that

particular cruise but certainly we can find out about it.

DR. ALEXANDER: Can I make one more comment?

CHAIR PERKINS: Absolutely.

DR. ALEXANDER: This is Clark Alexander again. And in no way was I impugning NOAA hydrographic services. And really this is my own ignorance that when I think about NOAA I think about one big monolithic entity.

And I have to remember that there is a group that does the high quality hydrographic work and there are other groups that collect multibeam data that don't have the same quality standards for collecting that data. And I think it was that group that more of my comments were directed towards. So please don't take it as an indictment of anything that you're doing here.

DR. CALLENDER: No, I look at it as a challenge, Dr. Alexander, and something

that we have to keep working at improving.

DR. ALEXANDER: Thank you.

CHAIR PERKINS: Great. Any other public comments at this time? Do we need a break or do we -- okay. I'm getting that look that -- okay. So we have a break on the schedule and then we reconvene and work on consensus in developing our recommendations.

(Whereupon, the above-entitled matter went off the record at 3:36 p.m. and resumed at 3:58 p.m.)

CHAIR PERKINS: All right, if we can get reconvened. Thank you. Gary, the floor is yours.

MEMBER JEFFRESS: I appreciate this opportunity to get to share with you a little bit about what I do and thank you, Scott, for putting me on the program and also thank you, Kathy, for putting me on the program and also the great food you're organizing for us.

I'm going to talk to you a little

bit about the importance of accurate tidal datums which is one of the products that CO-OPS produce for the nation and also how that integrates with the National Spatial Reference System which Juliana is responsible for and how it all comes together with coastal flooding and also the role of the surveying profession in this mix.

Firstly I just want to, we run a Tide Gauge Network for Texas in cooperation with CO-OPS. And if we go to our website, this is the front page of our Texas Coastal Ocean Observation Network and it's an active map.

If you hover over any of the blue stations which are TCOON stations, it does show you the latest set of observations from each station.

And the primary water level elevation's on a graph at the bottom there but you need to slide it over a little bit to see the whole thing.

The red stations are shown there, the NWLON stations which we help NOAA maintain through a contract.

And all our stations are constructed and managed and maintained and operated to NOAA's standards, and because we've been doing that since about 1988, CO-OPS has accepted the fact that they are to their standard and they help publish the data so it's published through NOAA's website as well as our own.

But the primary reason why I got started, because of our surveying role in determining littoral boundaries, the legal littoral boundary between the privately owned uplands and the state submerged lands.

And Texas, the state of Texas extracts a lot of royalties from oil and gas from their submerged lands and they're quite often in court over where that boundary is.

And so the data has to be first-class international standards and that's why

we follow CO-OPS' rigorous science behind the measurement of water level. So if we move back to my PowerPoint please.

We're also involved with height modernization, which is another program through the National Geodetic Survey, and I should also add that we do also support a State Geodetic Advisor from our campus.

The Conrad Blucher Institute, which I'm the director of on our campus, is an endowed institute.

Conrad Blucher was a county surveyor in Nueces County where Corpus Christi is the county seat and he was the last of three generations of county surveyors going back to 1848 and he didn't have any children so he left his estate to the university to foster surveying education and that's how come I'm here and we have this program.

Anyway, so we've been involved with height modernization since it almost began back in the early 2000s and we've

created within the Blucher Institute a Texas Spatial Reference Center under the height modernization banner.

And we've been doing several projects. Some of the recent ones, 2012/2013, was a project funded by the U.S. Army Corps of Engineers to link all their traditional and historic water level benchmarks which were associated with their old Tide Gauge Network which was a series of staves bolted onto bulkheads up and down the intercoastal waterway.

And their old historic tide gauges connect those in a vertical sense to our modern tide gauges as well as to the National Spatial Reference System.

And we did that using height modernization techniques with network GPS and so we connected all our tide gauges and also the NWLON tide gauges through a series of GPS campaigns using up to, like, 10 or 12 GPS receivers continuously and following height

mod standards. And the result of all this was all the information was blue booked and is part of the National Spatial Reference System.

So we're tied in a vertical sense, and also horizontal sense by the way, accurate observations from our tide gauges so we, and link that to the National Spatial Reference System in a vertical sense, so that's good.

Anybody who wants to do a survey now along the coast of Texas can tie into NGVD 88 quite precisely and also relate that to mean sea level if they need to do that.

At the same time, we're using some height mod money to expand a number of tide gauges in Texas that have CORS stations on them, Continuously Operating Reference Stations, using GPS.

Before we started this exercise, we had four in the yellow, four stations already in place.

We also have in Texas in place right now two of these Sentinel of the Coast

tide gauges which were designed by CO-OPS after Hurricane Katrina. They're capable of withstanding Category 3 or 4 hurricanes.

We have two of those in Texas and they are up in Sabine Pass which is on the Louisiana border and also Galveston and that was funded by the Corps of Engineers following Hurricane Ike which I'll mention again a little later.

And also under height mod we put in five CORS on tide gauges and that's the, which color is that, the white ones. And they have gone in just recently. So we're going to have a total of 13 tide gauges in Texas of a total of about 36 tide gauges which have CORS on them.

Also one of the reasons for doing this is that the Corps of Engineers is interested in using machine control using this GPS to control dredging as well in Texas, but that's in the future.

So when does this all come

together as coastal flooding? And the way we look at it in Texas, the way that I look at coastal flooding, it happens over short-term events.

And this is an example of one which is Hurricane Sandy which we saw the remnants of last time when we met in New York City.

But it's a challenge to all these folks who live along the coast and enjoy the coastal environment. When the coast comes up and bites them, they need to be prepared for that and that's what resilience is all about. So that's the short-term effect of sea level rise.

But we also have this long-term effect of sea level rise which, again, the tide gauges measure pretty well in a local sense.

And this is the longest tide gauge record for Texas. It's at Galveston. And since 1909 roughly when the gauge went in and

up to 2013, we've seen a fairly constant, steady rise in the sea level at a rate of about 6.39 millimeters per year which is a total of about two and a half feet, pretty substantial. And so that's the long-term sea level rise we need to be dealing with.

But where does all this hit the road? For those of us that live along the coast, we want to insure against these events and so you all know that FEMA is responsible for the Flood Insurance Program, both the river systems in the United States and also along the coast.

So it's their responsibility to come up with the assessment of risk of living along the coast in terms of elevation relative to sea level and figure out what are the risks and what should be the cost of insuring yourself against a flood event along the coast.

And so they've taken it upon themselves to update their actuarial situation

which they, after the last series of hurricanes, decided that the income that they derive from flood insurance policies is not going to cover major events like Hurricane Ike or Hurricane Andrew or Hurricane Katrina.

And so they've had a fairly rigorous campaign of redoing a lot of the flood insurance rate maps and that's a responsibility for FEMA and turns out they also have a FACA which controls that and it's called the Technical Mapping Advisory Committee and Juliana has just been made a member of that, right?

MEMBER WELLSLAGER: Our condolences.

MEMBER JEFFRESS: Okay, and so FEMA's been doing this for some time, ever since their program was started. No, I can't recall when that was but -- Sorry?

MALE PARTICIPANT: Sorry.

MEMBER JEFFRESS: And so this, for example, what one looks like. This is the

flood insurance rate map for the campus that I work at, Texas A&M University-Corpus Christi, and this is the latest existing map which all surveyors and flood insurance rates are dictated by.

Of course the date of this map was 1985 but back in 1970 the university changed its name from the University of Corpus Christi to back then Texas A&I University-Corpus Christi so the map's a little bit out of date even for 1985.

But what it shows you on this map using contours is zones where you can build and what elevation you need to be above in order to get flood insurance.

And so on our island, Zone C, it's okay to build directly on the ground there. Zone B is you need a one-foot height above the surface to, your floor level needs to be one foot above the surface to get insurance. In Zone A15 you need to be 11 feet above mean sea level and Zone 18 you have to be 13 feet above

mean sea level.

And the elevation we're referring to here is called the coastal base flood elevations apply only to landward of 0.0 NAVD 88.

So that's the datum which surveyors have to adhere to for establishing elevation relative to these contours which determines how much elevation you need to get flood insurance.

So this is the whole point of these flood insurance rate maps, is to dictate what elevation you need to be at before you can get flood insurance and what locations.

And it's up to the surveyor on the ground to establish elevations for floor levels, particularly in coastal flood areas, to prove to FEMA that your property has a floor level above a certain elevation which is dictated by the map, the flood insurance rate map.

And we do that in the surveying

profession traditionally using terrestrial leveling or more often these days we directly use GPS and tie that into a CORS station or some other known benchmark with a GPS base station.

So surveyors are paid to produce these what's called elevation certificates, which becomes a legal document because the surveyor signs and seals this document.

This is the form that's filled out to indicate what the floor level, the finished floor level is on a building that relates mean sea level or NGVD 88 or some other source.

In actual fact there are three datums which they accept, NGVD 29, NAVD 88 or other. All right, the "other" could be mean sea level datum from a NWLON station or a TCOON station for that matter.

And so this is the actual form which is available on the web for surveyors to download to fill out all this information to prove to FEMA that you can get the floor level

flood insurance rate map.

But if you're below these elevations, then the premiums, the cost of the insurance will go up substantially and it's actually been in the news fairly recently, over the last couple of years, that FEMA is adjusting their rates to take into account the actual risk of living in these coastal areas.

And the flood insurance rates are actually being prepared to skyrocket and if you know just recently Congress and the president decided to delay the introduction of these new rates till after the next election.

So it's going to be hard hitting to a lot of coastal residents that they find out they're going to be in flood zones and their rates are going to go up.

But I have an example here of a property that I came across on Galveston Bay that is critical in terms of where this property is located relative to the actual existing flood insurance rate and a revised

map which was done in 2012.

This house, that's a actual photograph of the house at sunset, is in a place called League City. It's on a little estuary off of Galveston Bay and it's in a gated community.

And it's on the market, this is about six months ago, for over a million dollars, and this is one of thousands of homes in this same area. It was brand new. It was constructed in 2011 but was still on the market six months ago.

This is the entrance, the street view entrance to the property which is gated and this is the Google map which shows, the X shows the location of the property right on that point in that estuary and this is the satellite image of the same area.

Now, I want you to keep in mind the geography which is depicted on the Google map and the satellite imagery. Keep that in mind.

This is what the flood insurance rate map looks like. Do you recognize the topography? The main feature is that big, long canal there. If I go back, that big long canal there. That'll pick that up in the FEMA map, the flood insurance rate map.

But the rest of the topography does not look like what they've mapped here, but this is the existing map, the current map, and it was produced in September 1999.

And if you look at the rough location where I kind of eyeballed it on this map, the elevation floor level should be 12 feet and if it's above 12 feet then they can get flood insurance at the nominal rate.

But anyway, since 1999 we had, Hurricane Ike came through in 2008, and as a result of Hurricane Ike, FEMA decided they'd better remap the flood insurance maps based on what they saw, the elevations of the flood waters.

And so they did remap it in 2012

but this is part of the preliminary mapping that is in place for this increase in the rates, right?

And if you try to establish where this house is on the same map, and you notice the topography didn't improve much from 1999, was it, to 2012, it still doesn't represent what is actually on the ground.

So it doesn't give you a lot of confidence as a cartographer or a surveyor or a mapper that the information is very accurate when you see such gross errors in the topography.

But you'll notice that the elevation has now moved up to 15 feet to fit in more with what actually happened with Hurricane Ike.

So now I'll show you the survey of the property. This is the as-built survey by a surveyor. It's a pretty good survey actually, and it shows the floor level. The finished floor elevation is 13.86 feet, and

that's it blown up.

So this elevation I know, I'll show you the datum which the surveyor uses to establish that elevation, it's NAVD 88 value and so it complies right now if you're using the September 1999 flood insurance rate map. It's only 1.86 feet above the contour which is the cutoff for the insurance.

But if you use the updated map which is already out there but it's still preliminary, it's not been fully accepted by FEMA as to going into effect but it is out there, the elevation is now 15 feet so it doesn't comply with the new map.

And so there's another quirk into this little formula is the fact that mean sea level -- We have a tide gauge at Morgan's Point which is not far from the site of this. Mean sea level on the datums for the tide gauge is different from 0 NAVD 88.

So if you want to relate, mean sea level is actually 0.61 feet above 0 NAVD 88.

So you need to take that into the equation too and so you need to subtract 0.61 feet from the finished floor level and it gets even more critical.

And this is where the surveyor extracted his elevation. He obviously used a GPS because he quotes the geoid model, and he can't spell by the way, and shows you, he used an NGS benchmark and he did a base station transfer to the job site using GPS.

But you can call up right now and get under the old map, get flood insurance for $457. After this second map gets accepted, that's going to skyrocket into the thousands of dollars.

But this whole exercise is to show you how critical elevations are along the coast, how critical it is to measure the tidal datums accurately and how critical it is for surveyors and the liability that's attached to it to establish these floor levels relative to the flood insurance rate maps. That's all I

have.

CHAIR PERKINS: Thank you, Gary.

(Off microphone discussion)

MEMBER JEFFRESS: No, but they are published I think online but they're astronomical for these areas.

MALE PARTICIPANT: Yes, I'm sure they are.

MEMBER KUDRNA: And if this house sold, they require it for a mortgage from any bank that has federal funds within them.

MEMBER JEFFRESS: Well, actually I tried to look it up just before I came and I couldn't find it so I assume it has been sold.

MEMBER BARBOR: The issue is whether it's grandfathered or not and that's -- I live in a V21 zone so that's, you know, breaking waves at 21 feet. I'm 25 feet in the air so I'm insurable but it could be astronomical if they do it.

CHAIR PERKINS: All right, I'll do one more early call for any public comments.

Okay, great.

Well, what's on the agenda in front of us is, you know, discussion and deliberations. I've done my part. I read the agenda.

Maybe taking a moment to discuss prior recommendations or lingering recommendations. You know, it came up in one of the breakout sessions that, in the report out from the New York breakout session, about putting ENC first and that has come back up. And in the process of handing out those summary sheets, Susan, I've lost mine.

MEMBER SHINGLEDECKER: I lost mine too.

(Laughter)

CHAIR PERKINS: Well, then you're off the hook. Great, I was just wondering what the NOAA response to the recommendation of putting ENC first was.

DR. CALLENDER: You'll get it tomorrow.

MEMBER MILLER: This was from New York.

CHAIR PERKINS: From New York.

MEMBER MILLER: Yes.

(Off microphone discussion)

MEMBER BARBOR: So the recommendation was accelerate the transition to a database-driven workflow for ENCs for modern and efficient method of chart production.

And the response was NOAA is accelerating its transition toward a modern and efficient ENC production process. NOAA will continue to implement database production changes.

The transition will require retraining of the workforce, major upgrades in internal databases and technology improvements for chart production systems. Did that give us a warm fuzzy?

DR. CALLENDER: So, I mean, there's a lot more to it but the term ENC

first didn't exist until after February so the term ENC first is the term we're using to drive that change in our organization and in our culture and I can get into that in however much gory detail you want but --

MEMBER BARBOR: Yes, the issue is, I mean, and it was brought up in February, I mean, that's the term we use and the recommendation was meant to stir some sense of accelerated action and I don't know whether that response captured that accelerated action or not or, you know.

CHAIR PERKINS: And, you know, the bullet point below that, "Coordinate with the Army Corps of Engineers to develop an efficient mechanism for delivering channel depth," and we've learned more about the eHydro or learned a lot about eHydro in the last 24 hours. So those sound like good places to start our discussion.

MEMBER MILLER: Well, and there's a response to that too.

CHAIR PERKINS: So I guess the deliberative part, are we as a panel happy with what we've seen and the progress of, you know, the implementation in launching eHydro or do we need to reinforce that recommendation?

MEMBER BARBOR: I mean I guess, yes, I'd probably throw it back at the admiral and say, you know, are you resourced sufficiently to execute a greatest possible speed of that implementation? I mean, you can't, yes, you can't do things overnight. It doesn't work that way.

DR. CALLENDER: That's a softball.

(Laughter)

MEMBER BARBOR: I mean, yes, but that's, you know, what I see the purpose is. We can do, you know, a couple things.

One, we can listen to you and hear what your biggest sob stories are and try to go to the administrator and say we need to correct those sob stories and maybe this is

one of them, you know.

You know, you didn't, you know, necessarily bring this forward as a sob story but, I mean, that is what our purpose is. If there are resources needed to execute a program that from our deliberations, you know, is sorely needed, then, you know, we should be requesting that resources be made available to the best capability.

DR. CALLENDER: So in us going to ENC first, there are things that we recognize we have to do and get done before other things and so we are reprioritizing work internally in order to get this done.

So one example are the new charts, producing new charts to meet customer requests which, by the way, we're more actively managing now than anybody can seem to recall.

So we're not going to be able to produce new charts at some, probably at more than one and a half new charts per year because we're trying to focus on getting the

database started so, you know, it's just that simple.

You know, we've got an envelope, a budget envelope that we're working within and we're just reprioritizing things in order to make that ENC first a reality.

But there's more to it than just resources. There's also retraining the workforce. We did some functional reorganizations, I was going to get into this tomorrow, and did some realignments internally and there's a culture change that's happening with our workforce and they're actually pretty excited about it.

MEMBER BARBOR: You know, I guess if two groups in this session, you know, came up with the, independently came up with this idea or this recommendation, previous meeting in New York had this recommendation, either one, we need to reinforce it to try to spur some action or we need to take it off the list because if we've done all we can then that's

all we can do. I mean, yes, we probably ought to, you know, spend time harping about something else but --

MEMBER MILLER: We could reinforce by saying, you know, two previous recommendations were again, you know, shown to be very important in a different user community or something. I mean, you can say that.

I don't know if it does any good or not but, you know, it was two different discussions here reinforcing the need to do this quickly or as quickly as possible.

CAPT BRENNAN: This is Rick Brennan. If I could just draw one distinction. I mean, so there is the, you know, there is the actual database of chart data and then there's all the data that's coming into the chart so, you know, because what's on the chart is, you know, grows stale very quickly and every day we've got gigabytes of data that are coming in from our in-house

data sources as well as external partner agencies, et cetera.

So, you know, a lot of times it's that data that takes the longest because you have to transform it, load it and do a lot of that stuff.

So that's certainly why internally the eHydro, you know, the fact that it can come in digitally is such a huge move forward to us.

So that, you know, I think there's certainly something that, I mean, that's an area or that's a intersection it didn't sound like it was enunciated in that previous recommendation. That is an area that I think, you know, provides, you know, real benefit and value to us, yes, so.

MEMBER MILLER: Another, I don't know, well, another thing we heard in the session was that all Army Corps is required to give you in eHydro is the deepwater port data.

And from the discussion on the

IAWW, or whatever it's called, it's clear that the Army Corps has a lot more data than that and the shallow-water data is probably, I don't know, just as important as that deepwater data.

So part of the recommendation might be to make sure that eHydro incorporates all the Army Corps data versus just a small portion of it and I don't know if that's too --

DR. CALLENDER: I think you misunderstood, Joyce. I think he said that initially they would only have the large, deep-draft ports loaded in. I think their plan is to eventually load all of it, isn't it?

MEMBER SHINGLEDECKER: It seemed to be district by --

MEMBER KUDRNA: I got the impression it was up to the district.

MEMBER SHINGLEDECKER: District by district. My question, I guess, was since the

scope of this panel doesn't, we don't really have, I guess, influence over the Army Corps, is there any recommendation that we can make that could help facilitate the coordination? Is an MOU or an MOA necessary to help facilitate the communication between the two?

Is there anything that we could recommend while not having purview over the Army Corps that might enhance cooperation, coordination and speedy delivery?

MALE PARTICIPANT: Good point.

VICE-CHAIR HANSON: Certainly. We might be able to help with that if we could find out which districts are causing trouble here --

DR. CALLENDER: So, all right, I got an update on this. We have one person who works full-time interacting with the Army Corps at the headquarters level and they are essentially part of the team in Army Corps' development and implementation of eHydro and from our perspective, from the NOAA

perspective, eHydro's kind of split into three major components.

The first are the channel frameworks, so this is the digital data that describes the actual limits of the projects and it's those channel frameworks that we show on our charts so getting those right is really important.

And at this point, 14 of the 23 districts, so we're a little bit more than halfway here, have provided those channel frameworks.

And so we're giving them feedback to make sure that we understand that correctly because there may still be some issues with the data and that the alignments appear correctly on our chart so there's some back and forth there.

The second piece is the survey data output, and at this point my understanding is there are five districts that are starting to use eHydro at the district

level to produce some survey products.

And as that data becomes available, we're working with it, grabbing it and evaluating it so there's, you know, there's some learning that we're doing as well.

There's metadata that gets built out by them. We want to make sure we understand that and that the formats are workable for us, and so we're providing feedback to the Army Corps on that.

And then the third component is access to the data and I think this one there's still some question about what the best method of access to the eHydro data will be, whether they provide it as a web service or whether they push the data directly to NOAA, so there's still some discussion on how to put that back and how to best put that in place.

So, you know, this is an ongoing process. Army Corps is working it out and

we're right there alongside them plugged in.

MEMBER MILLER: Does this in any way relate to the MOUs or MOAs between agencies and what we were talking about, the partnership issues, the funding issues, et cetera? Is there any connection with that?

DR. CALLENDER: I mean, there could be. So generally speaking, we have agreements with other agencies when it comes to sharing data where it's clear that the one agency has some responsibility to us and we have some responsibility to them, and I'm thinking specifically of NGA. We have a whole series of agreements now.

We've talked with Army Corps about putting an agreement in place. I think if we wanted to develop one specifically on eHydro, it's probably too soon.

You know, we mentioned yesterday our broad umbrella agreement between NOS and Army Corps, that that has expired. I think that, you know, periodically we revisit that

to see if now is the right time to put a new agreement in place.

I don't think eHydro in particular is an issue where transfer of funds would matter. So I'm not sure we're ready. I don't think we're ready yet for a specific agreement on eHydro since there's so much of this still in development.

Once it's up and running, I think having an agreement is worth putting in place because it describes who has what responsibility.

MEMBER MILLER: But don't you have to have that larger umbrella agreement in place before you can do a --

DR. CALLENDER: We don't have to but it certainly would be helpful.

MEMBER MILLER: Well, that's what I was wondering, is having a broader agreement certainly facilitates getting the individual agreements, in my experience, in place.

MS. MEDLEY: So, Joyce, just one

thing. The Army Corps is federally mandated to provide us with these specific datasets. The issue we've had for years is that because each district works completely autonomously of the other one, there was no consistency in how we were getting the data.

So the Army Corps was aware of this and they created the eHydro system essentially to be able to standardize the process by which they deliver the required data to NOAA as they are federally mandated to do so and then also within their whole organization give that transparency for them as well so they know exactly what the districts are providing.

So I think the MOUs and the MOAs is a good idea but for this specific issue it's already part of the federal mandate so it wouldn't necessarily apply.

CHAIR PERKINS: So what does the umbrella agreement, I mean, what has not happened since it's expired? What peril is

there with having that agreement expired or what driver is there to get it renewed?

DR. BRADLEY: The reality of the umbrella agreement expiring is that it doesn't really mean anything because the umbrella agreement itself is more of a representation of the collaboration that we would like to do with the Army Corps.

My understanding from the people in my office that do the agreements, having talked to them about this, is that even though we had that umbrella agreement in place any time we wanted to set up individual projects with Army Corps on specific work it still required a separate agreement.

So that umbrella agreement, you know, did nothing to actually serve as, you know, well, we can do this work because we have that umbrella agreement in place and, well, now it's expired so we can't do this work because in reality we needed to write individual agreements either way.

MEMBER MILLER: But if you wanted the smaller piece and the umbrella agreement weren't in place, would that make a difference?

DR. BRADLEY: I'm no expert but I don't think so.

MALE PARTICIPANT: No, it doesn't.

MEMBER BLACKWELL: No, it doesn't.

MALE PARTICIPANT: Just write a new agreement for the smaller piece.

MEMBER BLACKWELL: It's just start all over again. You waste a lot of time doing an umbrella agreement. It has no meat to it. It's so broad in nature that you can't get anything specific through just having a broad, I mean, so it's just --

MEMBER MILLER: So you don't need the umbrella?

MEMBER BLACKWELL: You do not need the umbrella.

DR. BRADLEY: The umbrella is really a chance for leadership and politicals

to get together and kind of agree on some general sense of collaboration, to say, you know, we both think resilience is important. Let's, you know, plan to work on resiliency. But it has no real meat to the bones. It's just more of a figure piece of, it's, you know, a promise ring of sorts.

MEMBER BLACKWELL: Right. And if I could just add, another thing about the agreements is they're only good for five years.

We used to have a bunch of open-ended agreements that people couldn't even keep track of. Every agreement has got a five-year life span. Then you have to renew it.

If you're doing a bunch of separate agreements, it's just easier to have a project or a focused arrangement because people change, people lose track of what the commitments were.

And so if you can be targeted and

specific in what you want to do together, I think that should be the focus in any of the recommendations that come from this group or from other stakeholders.

I think that we can certainly find a way to get an agreement through if there is a need to have an agreement to spell out who's responsible for what, what the benefits are, if there's exchange of funds, so I don't think that we need to worry too much about agreements.

I think we need to focus on what is it that we want to do? What are the recommendations? What, you know, we can figure out the administrative things that have to happen, and as inefficient as it is to get it through our bureaucracy to get it done, it can happen.

But I think we need to focus on what it is that we need as a group, as a panel to, you know, what are the big-picture things that we want to get done and not worry as much

about the administrative MOAs, MOU and I'll stop there.

CHAIR PERKINS: That's a good comment. What is it that we want to get done? You know, maybe we need to have that macro-level discussion for, you know, a little bit and try to move forward from that because we have been engaged in micro-level recommendations, you know, for quite a while.

DR. BRADLEY: Yes and I think, I guess if I could speak to that, Scott, and to echo the point Juliana made, this gets back to Russell's presentation in the last slide where, you know, he urged the panel to think about the partnerships, think less about the administrative actions needed to, you know, fulfill those actions.

So this is a chance to think about how can we partner better with Army Corps, things that we're not doing yet, and don't worry so much about how we're actually going to do that, you know, to the extent that it's

actually feasible.

MEMBER MILLER: Well, but I was talking to Russell last night and he specifically, I mean, he indicated that, particularly, and I've got this in front of me, and the two questions, what opportunities might exist for new business models, e.g. PORTS, and are there opportunities for new partnerships?

And part of the discussion that we had yesterday was from experience of many of us it's very, very difficult to get money into NOAA even if there are possibilities.

And so that's the reason I was thinking of the MOUs and MOAs, was, I mean, you know, yes, there's opportunities for partnerships all the time but if people just throw up their hands after six months of trying to get an agreement into place and say it's not worth my time, then how can you do your partnerships?

How can you -- You know, PORTS is

a great example. You know, how can you get the money to NOAA that's needed to maintain and develop PORTS systems?

So, I mean, that's the reason I was asking about MOUs and MOAs, is, you know, it is an administrative task but in order to do the boots on the ground thing with PORTS you've got to have something in place that money can flow into NOAA or it's not going to happen, so.

MEMBER SHINGLEDECKER: What I was seeing in regard to these questions were where are the gaps in NOAA's products and services? And I see that in a lot of the shallow water. I see it in the charting of the AIWW. I have to get used to saying that too.

And we have been pushing on that crowdsource catchphrase and, I mean, and frankly I was really encouraged to hear the quality of data that the Army Corps has and that NOAA is working with the Army Corps to get it in there.

I guess my question would be, is what kind of recommendation can we make to help make it happen faster? Because I do see, one of the big gaps is there just isn't the resources to survey everywhere we'd like to, so how can we get that other data that's out there in somewhere to fill that gap?

MEMBER KUDRNA: Scott, may I add to that, and this is not a criticism of NOAA or the NOAA staff because I think you're doing efficiencies as much as practical with the resources available.

But I go back to the top ten report or critical ten issue report that talked about the 100-year backlog of charting at a level of funding that's never been achieved since that report was issued.

So clearly if you do the easy math, the backlog is significantly greater than that and now with new sources of data entering your information stream there's more work and that seems, to me, to be a critical

point.

I know as staffers of NOAA you live with the budget you get and you do as efficiently as you can with it, but I think it's a real issue that that high point recommended in that report, that there was a 100-year backlog based on a level of funding that's never been achieved, has slid further because of lack of funding. And I think that's a point that's worth carrying forward.

CHAIR PERKINS: Yes, I mean, that's a complex equation to compute the remaining backlog and the necessary funding level needed.

The efficiencies in conducting surveys have improved. I mean, you're getting more kilometers surveyed per dollar than when that report was written. Is that a true statement?

DR. CALLENDER: Yes.

CHAIR PERKINS: Do we need data metrics? Do we need to know what the current

backlog is and what the current cost per kilometer is to, you know, or do we make a blanket statement, beg for more money?

MEMBER KUDRNA: Well, I guess if we're talking to sort of communicating the need, there's a need. There's a need for more resources here.

And that point contained in the report hit home with me, that it's a significant need. And I, you know, I'm not sure that after a period of time from the first report that's clearly understood to maybe the administrator or the secretary of commerce or the Congress.

CHAIR PERKINS: Other comments?

MEMBER SHINGLEDECKER: One thing that stuck out at me at the end of our last, at the end of our breakout session, we were talking about thinking about capital infrastructure improvements and how, I think someone said that's the job of Congress. And it took me back to the who is our target

audience, the administration or the Congress?

They were making, I don't remember who was speaking, if someone else in the room can remind me, the person was making the case that it's the Congress's job to fund the infrastructure.

And so it just got me back thinking about our recommendations and our audience. I mean, it seems like recommendation letters go to the administrator. If we want to reach Congress, we probably have to have a product.

CHAIR PERKINS: Paul, help me out if I screw this up, but our role is to advise the administrator and the administrator takes that information and that helps in their support or it helps them get support in the president's budget for the programs and items that then go to Congress to get funded.

So we make an advice to the administrator, the administrator uses that, you know, to get more out of the president's

budget and then they defend it at OMB and then it goes to the Hill.

DR. BRADLEY: Yes so, I mean, at a basic level that's true, yes.

CHAIR PERKINS: Yes. So we need to hit it at both ends, right? Our messaging, if we're really successful, will be both supportive to the administrator and will be substantial enough in nature that it defends itself on the Hill, right? I mean, is that impossible to do? It sounds like we feel like the most wanted list hit that mark.

DR. BRADLEY: You know, the interesting thing about the budget process between the executive and legislative branches is if -- It's a double-edged sword.

If you ask Congress what they think about the president's budget, they say it's meaningless. It's dead on arrival. But if you ask them, well, why don't you put money in there for PORTS, they say, well, the president hasn't requested the funding yet so,

you know, why are we going to, we're not going to put it in there until the president requests it.

So I guess you have to pick which one of those approaches you're going to, you know, put more faith into. Either way Congress, you know, what they don't know can hurt us.

(Simultaneous speaking)

MEMBER KUDRNA: I wouldn't completely agree with you. Clearly we provide recommendations to the administrator from it but in the other FACAs I've been involved in we've developed work products from working groups and that work product could be something like the ten most wanted list to talk about needs.

Those things then, after being adopted by an independent FACA, are public record documents that, you know, that are shared that express those needs.

Now, it's in the hands of the

administrator to take the action through a NOAA commerce president's budget chain of command.

But in terms of, as Margaret described, education and information, that's a routine item to be provided by federal advisory committees and I think it's legitimate turf.

And it has been in the science advisory board, it has been in the Sea Grant federal advisory committee in the past, products that are conveyed up but also made public.

CHAIR PERKINS: This is supposed to be a bit more multifaceted dialogue here.

MEMBER MILLER: Actually, Scott, should we perhaps look at what, and see if there are issues that we have addressed among those issues? I don't know if that's --

CHAIR PERKINS: Well yes, or we can have a conversation about, you know, the bullet points that have been put in front of

us. You know, are we at a point where we can advise on where the science is going?

MEMBER BARBOR: I mean, I think you could extemporaneously, you know, start a discussion on each one of those bullets.

Now, whether they end up in the realm of recommendations, you know, clearly -- Where's science going? It's, you know, autonomous vehicles is where science is going.

Is NOAA, you know, Office of Coast Survey embracing autonomous vehicles? I doubt it. You know, that's not a hydrographer's mindset because of a number of things. Other areas probably are and is that, you know, whatever the cutting-edge, you know, technology.

Again, the business model I think, I don't know if somebody's got a good discussion there. I think that really sounds like you could come up with some good meat in that if you have it, but I'm not a business major so I don't know anything about business

models, so.

MEMBER MILLER: Well, in terms of what we've discussed here, cutting-edge technology, about the only technology thing we've discussed is the eHydro and the ENC production, I mean, really in the scope of this panel I would say.

MALE PARTICIPANT: Topobathy LiDAR.

MR. ASLAKSEN: And I agree. I think that's, you know, and these are areas that, yes, I think Office of Coast Survey has, reluctantly isn't, I'll say cautiously, maybe overly cautiously, you know, investigated.

MEMBER BARBOR: I think the technology is improving much faster now than it ever has. It was very cautious previous because the density data wasn't there to support application to the chart. Now we're seeing that so we have invested heavily and I'm looking at us fly right now in Key West so, I mean, it's happening.

MR. ASLAKSEN: But, I mean, I think those are the sorts of things, you know, and I'm sure we could have made a more forceful recommendation to move more quickly into that, you know, in earlier boards. Maybe that's something worthwhile.

But, again, I struggle with the sort of thing that, you know, what do we want to tell the administrator that gets your job done better, more efficiently, you know.

CHAIR PERKINS: Sure, go ahead.

MEMBER KELLY: I, in fact, do have an MBA, not that I'm that good at business models, but from what I'm hearing with 100-year or more backup in surveying capability and the idea that we need to get data into the system to make that work, we're talking about cutting-edge technology.

I think we need to look at overall -- Really the bottom line I'm looking at is partnerships. Who has data? There's an awful lot of people and organizations that have data

that may or may not be at the quality that we need it to be but there's an awful lot of data out there.

Certainly eHydro is a technological advance that is going to allow us with technology. We have more capability to bring in data, manipulate that data and make use of it.

I think we should be taking a better look at crowdsourcing. It's out there. What quality is it? I don't know. Some people might do it better than other people but it's a way to have other people provide us or NOAA with data that we can then manipulate to improve our products.

Are we ever realistically expecting to get a budget to, you know, backfill the 100-plus years of surveys that need to be done? Absolutely not.

But if we can get shallow-water data through eHydro, the technology and the computing capability is allowing us to accept

other people's data and manipulate that at a faster, cheaper rate.

There's more standardization and I think, you know, even devices themselves, the price continues to go down, whether it's sensors or technological capabilities.

And I think the key thing we have to look at here is for partnerships to find ways so that we can get the products that we need without needing to specifically expend NOAA resources to get them or at least have a very lower resource just in the obtaining and refining of data that's out there, whether that's from academic organizations, eHydro, other governmental agencies or if it's crowdsourcing.

Perhaps we can help to steer that into a beast that will be productive for us because, you know, when we say crowdsourcing I kind of see a snicker and it's a bunch of clowns on boats someplace and the data's not that good.

But the whole idea in crowdsourcing that I understand is that, you know, if 80 percent of it is good, then it has value so, you know, there's going to be a couple of bozos out there that are going to have bad data or something.

But I think the key to this is partnerships. How can we create partnerships so at a very low cost, high efficiency we can get the resources we need from other people who have already invested money?

It's making maximum use of existing resources that are out there right then, to find them and finding ways to bring them in and make them useful for us.

So that's a little bit of what I'm hearing. If we don't have more money, let's try to find ways to pick other people's pockets.

You know, somebody spent money and developed some of this. I mean, all the stuff you put up there, you know, each time we hear

these presentations I keep seeing new groups and people that have data that seems to be pretty sound to me, again, not a scientist.

And how aggressively can we, should we reach out to grab that stuff and make it ours so that we don't have to go out and do it ourselves? There seems to be a wealth of fairly accurate data that's out there.

CHAIR PERKINS: So two years ago our report out said investigate the possibility of developing a suite of tools that could be used to collect bathymetric data and meteorological data with the aim of creating trusted partnerships for crowdsourcing.

New partnerships, crowdsourcing, a succinct recommendation. Do we need to re-message that? Can we improve the messaging of that and can we --

MEMBER KELLY: Well, perhaps we need to drill down on it a little bit. That's

a very high-level thing.

Maybe we need in continuing discussions to hear from the NOAA folks, you know, what assets or possibility for partners are out there?

Can we at least identify who's out there, who's doing what, what format is it in and is it valuable to us and, you know, start making a list of potential partners to then see what progress we are or are not making, whether it's a trial period or we just say, you know, this stuff is really not what we want, it's not valuable to us or that it is valuable and we should find a pathway to make a partnering agreement?

CHAIR PERKINS: Great. In response --

MEMBER KELLY: I think we might, you know, to be productive, you know --

CHAIR PERKINS: And the response --

MEMBER KELLY: Kumbaya, you know?

You know, it's easy to say peace, love, understanding and the hard part is that you get down into the details where, you know, it's not as easy to do.

And I think we need perhaps to be more productive to start keeping detailed targets, like for our next meeting we would like to have feedback for what types of products, who are the partners that might be able to provide that, is it possible to do, is there a potential cost factor so that we could move on that track, but that's a concrete result not just a kumbaya statement.

CHAIR PERKINS: Yes, yes. And the administrator's response, the OCS seeks to build similar routes for receiving bathymetric data to what is seen for weather data from external sources like the voluntary ship observing program.

Due to the concerns that the data applied to nautical charts be accurate and authoritative, NOAA will proceed carefully to

establish trusted partnerships with the U.S. Coast Guard for track line sounding data.

So Army Corps, we have a trusted partnership with. Have we met that mark? Is the Army Corps --

DR. CALLENDER: So we have a long-standing relationship with the Army Corps. We get their data. It's going to our charts. We're not getting maybe all of it in all the areas but we're working on that. Think identifying the new, the availability of their survey data in the intercoastal waterway is an example.

What was the other one on that response? Oh, so we have the relationship with the Coast Guard on their track line data. We are exploring the use of Healy swath bathymetry for instance. That's a recent effort, evaluating the quality of that to see if we can apply that to our charts in the Western U.S., Arctic west of Alaska.

We are funding the crowdsource

bathymetric database in collaboration with the IHO so this'll be a new database run by the National Geophysical Data Center. They're the ones who administer the database for the GEBCO. Help me with the acronym, Rick.

CAPT BRENNAN: Is it GEBCO?

DR. CALLENDER: General Bathymetric Chart of the Oceans. So IHO, together with the International Ocean Commission, they have a standing group that looks at bathymetric data from all the oceans, primarily focused on the bathymetry or the deepwater but underneath that's funding a database that will be tailored to receive data from the crowd, from open sources.

And we happen to think building a bucket first where that data can go and have metadata and be attributed is a good first step. So we're doing that. That's with the international community.

Under the IHO, they're looking at setting up a trusted system model with the

Professional Yachting Association.

And then there's going to be several efforts to develop kind of a cookbook so that there are many different kinds of crowds or interested groups collecting data and the cookbook would be a broad way to set standards and provide guidance to these several different kinds of users on what's important in collecting their data.

So, you know, we're making some progress here but especially when you're working with the international community these things could take a year or two. Hopefully by next year they'll be actually demoing that database. What else we looking at, Rick?

CAPT BRENNAN: At least internally the Coast Survey Development Lab has developed a program where we're able to get bathymetry from the ME70 which is a fishery sonar. That was in work that we did in conjunction with UNH.

So at least internally the fishery

ships should, you know, their swath bathymetry systems that were focused on water column data should now be able to produce bathymetric data so that's getting rolled out to all the new FSBs that we got. So at least internally we're getting that.

The LA/Long Beach project that we're working on, Long Beach I believe has their own survey vessel and so moving forward with that project we're working with them to be able to bring their data in as a port authority and get it onto the chart and updated because they're surveying much more frequently than we're able to survey.

So as far as a, you know, public/private partnership with them, I think that's an exciting area where we can keep those charts, particularly in those areas where there's low under-keel clearance, keep those as up to date as possible by working with them to develop their data to meet our standards.

And so we've sent folks out there, our own hydrographers to sail on their boats with them so I think that's another area that you know, shows some benefit.

MEMBER BARBOR: Along that same line, Rick, is we had a brief from Clark here. Here's a guy that, I think, grasped the issues of accuracy and standards and the like but he's got financial issues and he doesn't have a sufficiently sophisticated IMU. Well, partners, got any laying around that would make his data survey capable?

CHAIR PERKINS: Can we take the IMU off of that multibeam system that hasn't been used since 2008 and send it to them?

MEMBER MILLER: Yes, I mean, it was paid for by the coral program, you know. Well, it was actually paid for by Senator Inouye.

But, I mean, we have been loaned, well, we've got an older system that is not out of date but it was the workhorse for

years.

And as the NOAA ships have stopped using those, mostly the small boats, the system out in Hawaii now has three transducers instead of just one in case we land on a coral head, and so that partnership has been going on for a long time.

You know, a lot of it is, you know, we worked with NOAA for a long time. We were part of NOAA in that system and, you know, inside NOAA that's not hard to do.

Whether that's possible to do -- I mean, I know for instance this year I've been told that the hydroships don't really have full schedules at all, and that means there's hydroships and lots of launches that are, you know, are they laid up? Are they being used, you know?

Could you create a partnership with the guy that spoke, that you could give him a hand and, by the way, send a hydrographer out to make sure he's doing the

right thing? But I know that interferometric systems aren't looked upon that well but ---

MALE PARTICIPANT: Cutting-edge technologies.

MEMBER MILLER: So I don't know. You know, there has been a lot of partnerships and a lot of crowdsourcing data. Certainly the data I've supplied over the past ten years has been looked at as crowdsource and, you know, I'm a trusted source, as is Ken's program, as is many programs.

But, you know, do we need more of that I guess is the question. Would that clear the backlog or would help to clear the backlog?

VICE-CHAIR HANSON: Well, not only that, I think you'd help some of the shallow issues as well.

There's a lot of ports because they're doing their own projects these days. It's not all Corps of Engineers funded. There's a lot of consulting engineers. A lot

of projects like that are doing work.

There's a lot of coastal restoration projects, particularly in the Gulf, being undertaken by non-federal groups and state level and even universities. It's another source.

Whether or not it's quality, that's a different discussion but just to kind of follow up on Ken's point about other sources.

CAPT BRENNAN: The IOCM, I think the original vision for the IOCM was it just wasn't us within NOAA making sure that we were coordinating our own work. I think the ultimate end state was that it was the entire ocean-mapping community writ large that was organizing their work.

And so in that regard, you know, I think we would welcome people like Clark who are acquiring data to be a part of that because we would certainly like to know about that.

And, you know, same with, like when the state of California decided to undertake their mapping initiative and there's been a number of them around that we'll hear about.

The State of Florida acquired, you know, large chunks of LiDAR data that we were able to tag on to and get that data and we brought that in and applied that to the chart.

So I think that there's a number of cases like that where we know about them but, again, it's understanding that they're there.

And so that is the -- I think it's that coordination effort and the mechanisms for that coordination that we continually work towards. But, you know, it's like herding cats at some level, right, so --

RDML GLANG: There's another partnership that's worth mentioning. It may sound really small but it's not costing us anything and we're actually getting a lot of

benefit out of it and that's we've signed an agreement with Jeff Siegel and his company called ActiveCaptain.

And ActiveCaptain is essentially a social media mechanism for the yachting community, the boating community to share information.

And that information is classified in different ways. It ranges from -- here's a good restaurant or you can get fuel here but it also includes information about navigation hazards.

So boaters can report through their personal devices, cell phones, tablets and so on where they had problems on the chart.

And we engaged with Jeff back in the winter on this and we've been regularly using that as another kind of crowdsourced information to help inform us where we have problems with our charts.

So there's a range of information

that we can get from the crowd. Obviously, you know, we can only manage so many relationships at a time and once they get spun up and the processes are in place to absorb that then we can go move on and look at other sources, but I did want to mention the ActiveCaptain one.

CAPT BRENNAN: Admiral, I think the other part to that that I think that we've been talking about internally is being able to put that ActiveCaptain and interface that with our relationship with the U.S. Power Squadron because a lot of times, at least in the past, the U.S. Power Squadron, they got points for going out and finding benchmarks, which was great.

But what would be more meaningful is if they could go out, you know, in some of these areas where there's --- you can look at these ActiveCaptain responses in a heat map, so to speak, and you can see where there's a large density of them.

And so if we can start to direct our Power Squadron partners to go to those particular areas and get us some definitive measurement at that -- those are places that we wouldn't normally be able to go.

So, you know, at least for us putting those two together, you know, we haven't had those meetings yet to try and make those connections but that's the intent, is that we put those two together because they're complete freebies for us.

RDML GLANG: Could we make more progress and go faster if I had more people focused on this? Yes. But I still got regular business, regular surveys coming in, regular charting work to be done so there's a balancing act here.

MEMBER KELLY: Understood, but again, our role is to make these recommendations that may result in resources back to you if it's deemed valued so otherwise we're just at status quo and trying to do the

best we can, so --

RDML GLANG: Can I ask for more money, Paul?

DR. BRADLEY: Can you ask or can -- There's a budget process.

RDML GLANG: Yes well, you know, we struggle because IOCM, we take out a hide, and it's largely a relationship-building activity and an awareness activity although there is a tool we're building, that we've been building.

We're taking advantage of it. It was actually developed at UC California or UC Santa Barbara that we're leveraging a SeaSketch tool so, but otherwise, IOCM is not funded.

It's not like we've got a large staff that can go out and scrape the world for existing datasets. So I think we're slowly making progress on this but --

MEMBER ARMSTRONG: Yes. I'm sorry. I wasn't trying to interrupt.

RDML GLANG: Was that an amen?

(Laughter)

MEMBER ARMSTRONG: Well, I think the biggest problem with other sources of data, crowdsourced, other agencies, is handling it on the end when we get it.

Every kind of data is a little bit different and we have to find a new way to handle it, both on input and in funneling it to our products.

And so I think that's one of our big challenges, is managing that data and using it to the best degree we can and I don't think we've completely figured out how to do all of that yet.

And I think that's --- my personal opinion is that's where we need to spend most of our time on crowdsourcing, is figuring out how to handle it more than figuring out where to get it.

MEMBER KELLY: I would just think it would be more efficient and cost effective

to spend effort figuring out how to use or incorporate that data than to try to create it yourself.

And, as I say, there will be obviously those cases where it's just not worth the effort or would not be and throw it out.

But I think there's value when continued and not to be critical, I think you're doing some great stuff, but how to keep moving in additional steps, I think the key can be in partnerships.

There seem to be a lot of people out there that seem to be doing things and, you know, not going to get 1,000 new partners in a week or two, but I think that's a goal over a period of time, to try to find ways to incorporate existing datasets into the product, the NOAA products.

CHAIR PERKINS: You know, Matt and Gary, you guys are the experts in this and Juliana, but on the geodetic surveying side it

wasn't that long ago that this thing, OPUS, didn't exist, right?

And surveyors were out there struggling, you know, to collect and process reliable and authoritative data. It was a mess, all kinds of bad project work being done, cost of resurveys, additional design costs for the A&E community, right?

And then this magic called OPUS came along. Yes, and several iterations later, right, there isn't, I don't think there's a professional surveyor in practice now that doesn't use OPUS in some manner.

And we don't spend our time going to the NGS website and trying to download data sheets and going out and recovering existing monuments, right? There's a parametric or a paradigm shift in how that technology, that enabling technology, you know, was used.

So we have people at the table, right, and that's an NGS and a CO-OPS, right, solution that's made that work so well for the

surveying community so how do we repeat that success with wet side data?

MEMBER MILLER: Could eHydro somehow be used to -- You're talking about bringing in Army Corps data that hopefully will be in the same format, but might that be a way that, you know, is that, I have no idea. I've never really looked at it. But is that a possibility, that you look at eHydro for ingesting crowdsource data in some way?

MS. MEDLEY: So eHydro isn't really functional yet but also I don't think that it's for public consumption. I literally think it's a medium between Army Corps and --

CHAIR PERKINS: Yes, but OPUS wasn't originally either. There's an evolution that took place there.

MEMBER JEFFRESS: OPUS is not a crowdsourcing tool. It's just a tool for surveyors to get differential corrections for their job site related to a CORS station, right, for their GPS. CORS does not absorb

the data. It actually, well, it does absorb their data, but it spits it straight back to them with a result.

CHAIR PERKINS: Yes, takes their local observation and does the hard part.

MEMBER BLACKWELL: So at a high level, we used a processing software that we developed for geodetic purposes to position the CORS network and we said let us develop a way for surveyors to instead of going through a whole bunch of hassle to get their data submitted to us, if all they care about is a coordinate on a station, let them make use of our software through this online positioning user service.

And so we developed the software where they could upload data that we used our internal processing to spit back out through an email position elevation for them.

That evolved into, well, what if they want to share that information, which is kind of where the crowdsourcing, whatever,

comes along.

And we developed a separate database that allows people to share that information along with the metadata about their station so that other people can benefit from that work that was done and that people can check on those stations and see if things are the same, if they're moving or if they want to use that station.

And that's all hands off, mostly hands off from NGS. We do a little QA/QC but it's minimal.

But we don't think of that as authoritative. That data that's shared in that separate database is not authoritative because it hasn't met our stringent requirements so we're still trying to find how to bridge those two things together, okay.

And I'm going to talk tomorrow briefly about this next evolution of OPUS through our CORS processing which is called OPUS-Projects which allows, again, the user

community to make use of our software in a much more rigorous way and provide an entire project unto us that's a lot more hands off for them but then can actually contribute to improving NSRS but making it minimally, you know, minimal work on their part to do it with software that we find is authoritative software because we developed it and we've, you know, we've run it through its tests.

And so I think what we need to look at is if you're going to ask people to share their data that our federal role is to make sure that however they're submitting it we provide, you know, the background checks or processing or, you know, they have to jump through certain hoops.

But it has to be easy on them to do that so that when that data comes in then we can use it in the proper way. Just getting data in by any way, shape or form is not helpful, but we need to be able to develop the process or that business model that allows the

different types of data to come in that will meet our needs, that we can then, you know, use to support our mission and share back out with the user community.

So each set of observations is a little bit different in what it has to go through, but I think there is an opportunity for those types of things to happen.

We just need to focus on what the federal role is in trying to make that process efficient, effective, whatever the right word is, efficacy, whatever Margaret's word was but there are opportunities there.

CHAIR PERKINS: OPUS H2O. I mean, I love it. I love the sounds of it.

CAPT BRENNAN: I believe that, at least talking with Sue McLean at NGDC, I mean, they are developing, right, Admiral, a portal to bring in crowdsourced data so --

MALE PARTICIPANT: Some specific.

CAPT BRENNAN: -- some specific crowdsource data. At least that will start to

open the door and allow us to, you know, to see it and get some experience with it.

The one thing that, you know, to speak to Andy's comments that have been the thing that's leveled the playing field, at least from the hydrographic survey standard, has been uncertainty.

And so when we started to apply uncertainty to our data and we started to calculate uncertainty to our data, that was the thing that we could then assess the quality of the data with.

And that's been the thing, that's what allowed us to bring Joyce's data in because there was a uncertainty that was attributed to that and when that's there, it provides you a level of confidence that's there.

And I would say certainly with this crowdsource data if you get enough of it, you know, we should be able to begin to look at standard deviations and that sort of thing

and look what the spread of it is and make some assessment.

But, you know, in that case it would be on an area-by-area and case-by-case basis. I don't know that we'll have large swaths of sea floor that we'll be able to accept from swath bathymetry but it certainly would, you know, highlight areas that need some attention and I think that's our hope, is that we can look at that and use it as an alerting tool, but ---

CHAIR PERKINS: So we did receive a public comment which means that this session is still public which I had kind of forgotten.

(Laughter)

CHAIR PERKINS: But Mr. Hersey submitted, how to handle, use and incorporate crowdsource data into product workflows absolutely needs to be done but needs to be funded.

And I think he's hit the nail on the head so thank you, Mr. Hersey, if you're

still listening.

So we need an enabling technology to make all this H2O work and I'm going to copyright that or something, because --

MR. ASLAKSEN: And policy, you know. Policy is always part of all this.

CHAIR PERKINS: So what would a recommendation from this panel look like that would help facilitate that?

DR. BRADLEY: Specific to OPUS H2O or --

FEMALE PARTICIPANT: I'm not sure that's --

MALE PARTICIPANT: Third party data.

FEMALE PARTICIPANT: It's third party data ingested.

MALE PARTICIPANT: I'm glad to hear you say --

MALE PARTICIPANT: Yes, I don't think OPUS H2O --

(Simultaneous speaking)

CHAIR PERKINS: But it's an enabling, I mean, digitally coached, right, and Mr. Schmidt described it as it went from a website in a data warehouse and evolved into an enabling platform, right?

So if we can create the portal, the enabling platform, the OPUS H2O that that data can go into and couple that with a virtual chart tool like an eHydro, you know, what the user, what the public wants out of this agency is access to the data and the tools to make the data intelligible for their need and their geography.

RDML GLANG: So are you talking about bathymetric data?

CHAIR PERKINS: Yes.

RDML GLANG: So we're building that. That's that crowdsource bathy database. That's being built and it'll have a front end where the layperson can come and upload their data, provide a minimum amount of metadata and then that data will be freely available to the

public.

And that database, because we're building it under the construct of the IHO, will be available to anyone in the world and it will be able to take up data from anywhere in the world so --

CHAIR PERKINS: So how do you process it like you do the GPS data and have confidence in it?

RDML GLANG: So I think the notion here with the way this crowdsource Bathy DataBASE would work is that any boater or mariner has the ability -- They all have an echosounder of some sorts. They're all running with GPS.

There are either build-your-own or off-the-shelf solutions available for connecting all that data together and logging a georeferenced depth measurement.

And you have to be able to tell something about it, the offsets, so that dataset would be uploaded by the user to the

database and when you pull it down, you would essentially have a depth measurement with a time stamp and a position on it.

The processing is sort of the next step, and I think that's what Rick was talking about and certainly we've seen that in the service engineering model that they briefed us on in the past.

In their model they work with the value-added provider, CARIS, to do that analyses but there's a whole range of analyses.

The trick is to get enough data in one place so you can start doing some statistics and make a determination of how good or how bad is this data or how good or how bad is my data compared to what I've received from an outside user?

So I think the Bathy DataBASE is the way to start that but you got to get enough data in one place to start building these analyses.

There really isn't a need to do any processing to produce a depth solution I guess, provided the data is caveated with we didn't apply tides and we didn't apply sound speed or we did apply sound speed and we did provide tide so it's sort of left up to the user prerogative.

The cookbook will hopefully help narrow this down a little bit so you can have, you know, a broad set of standards but it's a little bit different than what's going on in the positioning world where you're really uploading raw or receiver GPS observables and then marrying those observables with what is provided from NGS for their CORS system. It's a little bit different.

CAPT BRENNAN: And where you could apply process though since there isn't going to be tides is, you know, where we are able to use our model data and be able to go back and look at the time of acquisition, assuming all that's correct, and at least do some sort of

a model data reduction on it.

That's the only thing that I think you could possibly do once you've uploaded that data to it because otherwise there's too many other parameters that you're not going to --- I mean, that's the only one that I can think of that you could apply post-processing and used, you know, hindcasted model data in some form to make a correction based on a location of where that's at.

But even that, I mean, I'm just thinking the Intracoastal Waterway. I don't know that we have even zone descriptions for the Intracoastal but, you know, we could probably come up with something I guess depending on where it's at.

MEMBER MILLER: Well, it also depends greatly on how deep it is. I mean, the data I submitted, most of it, the nearest tide gauge was 500 miles away and that's really useful, but --

CAPT BRENNAN: But your range of

tide was a foot.

MEMBER MILLER: And we were generally in water greater than ten meters deep, so.

RDML GLANG: Can I make an observation here? We're way in the weeds here, and as much as this appeals to our inner geek, and as much as I appreciate you all working with us to come up with solutions, that's really not the purpose of the panel. You know, certainly I helped drag you down into the weeds so I apologize for that.

But we started out with looking at your past recommendations and you asked a few leading questions which we felt compelled to answer, that, yes, we think we are working on things that will broadly address the recommendations of the panel.

So my question to the panel is just based on this conversation, do you feel satisfied that we're addressing that recommendation and should we maybe move on?

Does this recommendation rise to the level that you still feel you need to bring it again to the attention of the administrator or should we move on to something else that we heard here?

I'm not sure what it is you want to hear from me so, you know, I'm happy to fill the air. It's not my role.

MEMBER SHINGLEDECKER: I guess I would say that it seems, when I hear things that are encouraging and make me say, okay, that's good to know.

But a lot of it is news and new to us and so we're not, we don't necessarily know the progress that has been made because we're not living it every day, so we're unaware of some of those developments.

It seems when we suggest broad, big-picture possible recommendations, the response is we're working on it, it's going to take time or we need more money and we know we can't really ask for more money. And then

when we make specific recommendations, yes, those are too specific.

And I guess -- and then it seems that I think people are being a little bit politically correct when we say what do you need to help overcome your obstacles?

I think there may be some answers to those questions that people may be afraid to say out loud. So Margaret Davidson's saying we should kick you in the ass, to quote her.

(Laughter)

MEMBER SHINGLEDECKER: And I think we're having a hard time doing that. But at the same time I think we want to support you and help you overcome obstacles that you have, but if we don't know what they are, we can't make the recommendation to help you overcome them. So I don't know how to reconcile that. That's just being totally blunt.

MEMBER KUDRNA: How would this be, at our next meeting, give us a game plan first.

MALE PARTICIPANT: Tomorrow?

(Laughter)

MEMBER KUDRNA: Well, I mean, I think it's going to take you a little time. The next time, the next formal meeting we have, give us a game plan for a strategy to move forward with this issue of crowdsourcing and added data.

I liked your idea of engaging the Power Squadron after you have some hits. Let's talk about how that might work, about bringing some other players into the process and moving forward. You know, that might be a useful thing to bring forward and have a continuing dialogue.

CAPT BRENNAN: I'd like to address Admiral Barbor's comment.

RDML GLANG: Well, wait. Do you want to agree with Frank first?

CAPT BRENNAN: I do agree with him, yes, sir.

(Laughter)

RDML GLANG: Give him an amen.

CAPT BRENNAN: Amen, sir. Did you have an additional comment, sir?

RDML GLANG: It's the panelists time, Rick. I just --

CAPT BRENNAN: Well, I mean, I'm addressing Susan's comment and I guess so one of the, trying to tie the two together.

The issue is about our pursuit of AUVs. We are pursuing AUVs. We hope to do a trial for our 600 REMUS this month. But as the Navy has, you know, said, there's the 6 or 7 Ds, you know, the dirty, deep, denied, et cetera, and a lot of the places that we're working aren't in that.

But for autonomous vehicles, I think we've been playing in the AUV arena for ten years now and I think we just keep beating our head against the wall, realizing that we may be in the wrong environment for that tool.

But there is another autonomous tool which is the surface vehicle that we are

looking to move into and certainly, you know, that's an area that we have interest in and that we hope to make headway into both from, you know, larger and smaller surface vehicles because of all -- they bring at it.

You know, there's certain benefits that they have over something that's submerged, particularly the fact that they can position themselves with a traditional positioning system that can aspirate air and many other things, so ---

MEMBER MILLER: I'd be interested in hearing a little more about that maybe tomorrow but -- if there are avenues that you're interested in that we could, you know, the question is -- where's the science going and what cutting-edge technology should you explore?

CAPT BRENNAN: I mean, to be blunt, a lot of the areas that we have are blue tint areas, right, I mean, the shallow-water bathymetry, right?

And so do we want to send, you know, three people in a 30-foot launch into that area, let alone a ship, to go try and gather that data? No.

But you might have a one meter long autonomous vehicle that you wouldn't mind sending in, and if it hit the rock, oh well. You know, you drag it off and you change the prop or the whatever on it and then you send it back out again.

And they certainly end up being cheaper because you don't have all the machining necessary for that you have in an autonomous underwater vehicle, which has to have much higher tolerances.

There's also -- one of the things that we've been looking at as a force multiplier is having ones where it would shadow a surface vessel that we already have working.

So, for instance, if we have a launch that has a moving vessel profile on it,

that vessel can run long straight lines and you can have another autonomous vehicle that can keep foot with it and acquire data that would take two launches to acquire and you can string as many off of them as you want and run those simultaneously. So that's an area that we would like to get into.

We don't have any of those assets but I know one of the things we've talked with Andy about is maybe we can get one of those at the summer hydro class next summer at UNH and maybe at least begin to check that technology out and see if our theories about it hold true or not, so --

MR. ASLAKSEN: An alternative to things that float or sink, we're doing a lot of stuff with sensing technologies including satellite-derived bathymetry.

We funded a demonstration this year with DigitalGlobe in two different places. One is in the Massachusetts area, to look at and really looking at it from a

reconnaissance and where we should go do hydrographic survey there and in Alaska in addition to the, you know, the topographic LiDAR CLICKs that we're doing.

So there's no silver bullet, but I think we're using a mix of technologies as they come widely available in approaching the harbor.

MEMBER MILLER: One comment I'd like to make is when I first joined the panel, often the entire first day was spent learning about what NOAA was doing and we thought that, I believe, was a little long.

But in some ways, particularly with, say, the Nav Manager and so forth, I'd find it useful to get, say, a broad overview from NOAA of what's going on first, and then go into the stakeholder section.

I just --- particularly in areas where your Nav Manager is sort of your bridge, if you will, it would be useful for me to know what the Nav Manager, you know, what the Nav

Manager sees sort of in the broad scale, as well as just brief updates like you're giving tomorrow on what each of the groups is doing, but not a whole day of it.

CHAIR PERKINS: Yes, and Joyce, thank you for bringing that up. The planning committee and with Kathy's help we had intended to have a few informational webinars --- go to meetings in advance of the panel getting together.

And, the thought was can we accomplish that in advance of actually convening? Can we get the updates from the tri-service offices in a form, you know, that satisfies that need so we don't have to take time away from these meetings.

MEMBER MILLER: However, I think it's useful for the stakeholders too to hear, okay, NOAA's already doing this. We're already doing that. We're looking into this. We're getting that.

You know, that gives the

stakeholders some baseline to know what this panel is about and what NOAA's about.

CHAIR PERKINS: Yes, I don't disagree with that but we have a difficult time keeping the stakeholders captive through these meetings. Yes but thank you, Jason. Glad to see you're still here.

(Laughter)

CHAIR PERKINS: Yes. But yes, we did shuffle the cards. The format of the meeting is in a different order than before and so that's good feedback.

If this structure isn't working, then that's why we have a planning committee and we can work collectively to put the meeting format in the best possible structure going forward.

Margaret's remarks over lunch, I think she challenged us with two things in more shallow-water bathymetry, right?

How do we feel about that? Do we want to craft that into a recommendation? Can

we miss that? She was passionate about it and I respect that.

In a national mapping strategy, right, is a recommendation from this panel appropriate, that it's time to move forward with defining a national coastal intelligence mapping strategy or a national mapping strategy that contributes to greater coastal intelligence?

MEMBER JEFFRESS: Scott, with regard to the shallow-water bathymetry, I think that's where the AUVs come in, the surface ones.

For lack of hardware to teach hydrographic surveying in our program, we don't have a boat with all the gear on it, our exercise in actually collecting data is that we go out and buy from Toys "R" Us model radio-controlled boats, small echosounders you can possibly buy from West Marine and a GPS receiver and we get the students to put all that together and they go map my pool.

(Laughter)

MEMBER JEFFRESS: And it works. It works.

(Simultaneous speaking)

CHAIR PERKINS: You know, the small autonomous surface vehicles being used for pipeline crossing, between bridge piers and you don't have to launch a vessel with people in it.

MEMBER JEFFRESS: Right, and it's cheap.

CHAIR PERKINS: Yes and then the other end of that pendulum swing is the program that the remote sensing division is standing up and using with the Sandy Supplemental with the topobathymetric LiDAR from an airborne platform so maybe, you know, and it probably needs to include all of those tools in the toolbox.

MEMBER JEFFRESS: So is NOAA looking at developing these autonomous systems for hydro yourselves or are you working with

a company, or is anybody investing in this technology?

MEMBER ARMSTRONG: I couldn't hear.

RDML GLANG: So he's asking if NOAA's looking at developing or working with a company on small autonomous surface vessels. I think we are looking at what's on the market commercially, certainly for the purposes that Rick just described.

But go back to the other question, which is really where I think the panel should be going, is should the panel make a recommendation to the administrator that we look at supporting shallow-water bathymetry requirements?

You don't have to tell us how to solve it though. There's a range of tools that we could probably figure out how to use. I think the topo-bathy LiDAR, they've made significant progress in that new technology.

There are still places, though,

where unfortunately the bathy LiDAR won't quite get us what we need so we still need something that's on the surface of the water --

MEMBER JEFFRESS: Texas.

RDML GLANG: Still going to need -- So remote sensing may not be the right, or at least LiDAR may not be the right tool.

But if we have --- if the panel's recommendation to NOAA were tell us what you're doing about the shallow-water bathymetry problem, or something to that effect, we would probably undertake a bit of a study to understand how big the problem is and whose requirements they are.

And then we could start making an assessment of finding partners who may already be working there, if your students happen to be running their Toys "R" Us boats in an area.

There are other partners. We just heard from Dr. Alexander. So I think that's pointing us in a direction that is probably

pretty productive I think.

MEMBER KUDRNA: And the standard of accuracy may not be the same as the standard of accuracy for a commercial port for some of this information.

RDML GLANG: Well, that's right. What Margaret said was, she used the term shallow-water bathymetry. She did not say this is for charting.

You know, so you're exactly right, Frank. The quality or the standard of the data, what's the requirement? What is that data for? Is it for modeling? Is it for coastal zone processes or, you know, whatever?

MEMBER MILLER: However, the priority, looking at the --- the 100-year backlog in just the priorities to map, I mean, we heard this in New Orleans. The recreational boaters are in areas that are not surveyed channels.

How does NOAA --- does hydrographic services or should hydrographic

services -- up to this point the priorities are always the navigable channels.

MEMBER BARBOR: And I think --- we started this conversation off with the ten most wanted and a 100-year backlog that has been underfunded. And so now we want to throw a whole new thing when ---

So I think it has to be caveated, somehow, and then we've just deleted everything. You know, it's a big wish list and, you know, I --

MEMBER ARMSTRONG: Well, and maybe the panel can do some thinking about what the relative priorities are.

MR. ASLAKSEN: The good thing about the shallow water is that we share that responsibility with many other agencies and we try to coordinate those activities, so that is a force multiplier there.

But this National Coastal Mapping Strategy is something to be looking at and understanding that but it's the areas where

some of the technology, the LiDAR technology, doesn't work is where we need to focus, so what technologies do we bring to bear there? That's the, or, how do we do that? How do we do the stuff in the shallow, murky water where you need that data?

MEMBER WELLSLAGER: But the recommendation is to go towards that. It's not how to do it. The question on how to do it is something to throw out and let the research determine.

MEMBER JEFFRESS: If it parallels the development of --- autonomous airborne systems, it's going to rapidly become very accurate and very cheap.

MR. ASLAKSEN: There's unlimited restrictions that I'm aware of that there are on the airborne ---

MEMBER JEFFRESS: That's the FAA's problem. But the rest of the world, Australia included, they're using unmanned systems all the time for aerial mapping and it's really

cost effective and it's amazingly accurate.

MR. ASLAKSEN: I agree. We have a very structured approach to UAS technology -- and the proof of process and oversight.

MEMBER JEFFRESS: But I think the hydro could follow the same model.

MR. ASLAKSEN: I think there's a little more flexibility there.

MEMBER JEFFRESS: Yes.

MR. ASLAKSEN: From my limited understanding, I think there's more flexibility there.

MEMBER JEFFRESS: And it'll boil down to the software. The electronics to make it work is fairly simple and it'll boil down to the software to keep track of the collision avoidance with other vessels, getting too close to the rocks or the surf and getting to come back and download the data.

So it's all going to be software driven and that's what we're seeing with the UAS systems too. The ones with the best

software get the best results.

MR. ASLAKSEN: Sometimes you just want them to come home.

CHAIR PERKINS: Well, a good conversation with no results. It's 5:45.

MEMBER JEFFRESS: What we should encourage now, to explore autonomous systems for not only shallow water, but all depths of water bathymetry.

CHAIR PERKINS: Would that be part of a national mapping strategy?

MEMBER JEFFRESS: It should be, yes. It's a way to gather more data, more accurate data with less cost.

CHAIR PERKINS: Yes, and less risk of life and --

MEMBER JEFFRESS: Right. Yes, yes.

(Off microphone discussion)

CHAIR PERKINS: Yes, Jason.

MR. CREECH: Is public comment period still open because if so --

CHAIR PERKINS: I am willing to interject a public comment period any time.

(Off microphone discussion)

MS. WATSON: Please speak in the microphone.

MR. CREECH: Jason Creech with David Evans and Associates.

MALE PARTICIPANT: Microphone.

MR. CREECH: Jon Dasler's not here so I'll try. So I guess just a few suggestions.

1) I would explore ways to facilitate data transfer from industry partners like myself. We frequently perform surveys for private clients. The data goes nowhere. A lot of times that is based on our client's request but I think trying to find a way to facilitate that data transfer would be beneficial.

2) I just wonder is there --

CHAIR PERKINS: One second, Jason. Lynne, are you, are we recording? Who's

capturing Jason's comments?

MS. HOUSE: Yes I'm, oh, you mean writing it down? I'm writing it down.

CHAIR PERKINS: I don't want to lose --

MS. WATSON: It's being recorded by the court reporter.

CHAIR PERKINS: Okay, got it. Thank you. Just want to make sure we don't lose them.

MR. CREECH: So, I guess survey backlog is enormous so there are really no other large surveys going on in the U.S. other than NOAA really that are hitting on survey backlog. Small surveys aren't going to do this.

So how can we get at really getting some data? And I think two recent projects were California and Oregon where there was a cost share. The states funded some of the surveys.

And I was just wondering is there

a future for that, for cost share where the states and federal government survey the territorial seas to NOAA standards and update the entire state's charts?

And then also wind energy on the East Coast is really big right now and over the next ten years it's going to be even bigger.

So BOEM is either contracting surveys for offshore sand resources, or through other lease blocks and, again, these are going to be the biggest surveys on the East Coast in the next decade and how to take advantage of that and get ahead of it to make sure that these surveys meet NOAA spec and get on the charts.

And then finally, I was just wondering, I think there should be an initiative to address chart clutter.

There are many position doubtful/position approximate reported features on the charts -- reported in 1973,

and I think it does a disservice to NOAA and the mariner for those to still be on the chart, and that's it.

CHAIR PERKINS: Great. Thank you for your input. I don't think we give you a response directly, right, but I hope that we have a response for you before the next meeting.

RDML GLANG: Thank you, Jason. Some really good suggestions.

MR. CREECH: Thank you.

RDML GLANG: The chart clutter one in particular, if I can just -- on it for a moment. We actually are looking at how to use that as a mechanism for evaluating our charts so use it as a measure of, what are we calling it, health, chart health I think.

We've been talking with Canada about ways to sort of standardize this. We use the word health but we could talk some more about it offline.

MR. CREECH: Sure.

CHAIR PERKINS: Admiral, you know, unless there's an objection from you, I think we're at a reasonable point of adjournment after a full day of activity. Any objections to concluding today's session?

MALE PARTICIPANT: Second it.

CHAIR PERKINS: Thank you. All right.

RDML GLANG: Motion carries.

CHAIR PERKINS: Motion carries.

(Whereupon, the above-entitled matter went off the record at 5:51 p.m.)

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C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Hydrographic Services Review Panel

Before: NOAA

Date: 09-17-14

Place: Charleston, SC

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

Neal R Gross

Court Reporter