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
MARCH 6, 2024

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The Hydrographic Services Review Panel met via webinar, at 8:30 a.m. PST, Sean M. Duffy, Sr., Chair, presiding.

HSRP MEMBERS PRESENT

SEAN M. DUFFY, SR., Chair
NATHAN WARDWELL, Vice Chair
DR. QASSIM ABDULLAH
MARY PAIGE ABBOTT
CAPTAIN ANUJ CHOPRA
DR. NICOLE ELKO
SLOAN FREEMAN
KIMBERLY HOLTZ
DEANNE HARGRAVE
CAPTAIN CAROLYN KURTZ
ERIC PEACE
REBECCA QUINTAL
JULIE THOMAS

NON-VOTING HSRP MEMBERS

CAPTAIN (NOAA, ret.) ANDY ARMSTRONG, Co-Director, NOAA-University of New Hampshire Joint Hydrographic Center
BRAD KEARSE, Deputy Director, National Geodetic Survey (NGS), National Ocean Service (NOS)
DR. LARRY MAYER, Co-Director, NOAA-University of New Hampshire Joint Hydrographic Center
DR. MARIAN WESTLEY, Director, Center for Operational Oceanographic Products and Services (CO-OPS), NOS

NOAA LEADERSHIP PRESENT

NICOLE LEBOEUF, Assistant Administrator for Ocean Services and Coastal Zone Management, National Ocean Service
RACHAEL DEMPSEY, Deputy Assistant Administrator, Navigation, Observation, and Positioning, NOS
RDML BENJAMIN EVANS, Director, Office of Coast Survey (OCS), NOS, and HSRP Designated Federal Officer

NOAA STAFF PRESENT

AMBER BUTLER, Office of Coast Survey
ASHLEY CHAPPELL, National Ocean Service
ROBIN CZERWINSKI, National Ocean Service
VIRGINIA DENTLER, Center for Operational Oceanographic Products and Services
DR. RACHEL FONTANA, National Marine Fisheries Service
NATHAN LITTLEJOHN, National Geodetic Survey
AMANDA PHELPS, Office of Coast Survey
MEGAN SCHWINDEN, Office of Coast Survey
GALEN SCOTT, National Geodetic Survey

MODERATORS

ERIC PEACE, HSRP Member
NATHAN WARDWELL, HSRP Vice Chair

SPEAKERS

ROSEMARIE FUSCO, Marine Affairs Department,
University of Rhode Island
JUSTIN LUEDY, Senior Environmental Specialist,
Port of Long Beach

C-O-N-T-E-N-T-S

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

(8:31 a.m.)

RDML EVANS: Well, good morning, everyone. Or good afternoon, depending on your location. Welcome back for day two of the spring 2024 Hydrographic Surveys Review Panel. Excuse me, Hydrographic Services Review Panel.

As mentioned yesterday, my name is Ben Evans. I'm the Director of NOAA's Office Coast Survey and I am the Designated Federal Official.

I'll be joined here momentarily by the HSRP Chair, Mr. Sean Duffy. But before we start this morning, I just wanted to offer just a couple of technical updates and then I'm going to turn it over to Ms. Amber Butler for some administrative reminders before we get into our round robin this morning.

So again, thank you to everyone for making the pivot to the virtual environment. One thing we noted yesterday was that it was challenging to balance having multiple people onscreen and engaging in dialog while at the same

time ensuring that there was adequate band width for the ASL interpreters, for the Court Reporters to do their work and provide the access to the full range of participants.

So in discussions prior to starting this morning, what we thought we would try is for the purpose of the round robin and the round robin only, we'd like to have all the HSRP Panel Members come on camera if you're able.

And just to provide that, a little bit more of a face-to-face as we go around the room, to make that more as if it were -- as if we were all in the room together as we wish we could be.

And if that doesn't work for the ASL interpreters or the Court Reporter, we'll revert back to just one person on camera at a time. So we'll be very mindful of that, of course.

But we're trying, again, trying to balance the providing access to all attendees and participants with ensuring or facilitating as robust a discussion as we can.

So as I said, we'll try for the round

robin with cameras on. If that doesn't work, we'll revert back to single cameras or just a couple of cameras on. So hopefully that works for everybody.

And then before we turn it over to Sean to kick off the round robin for this morning, I'd like to turn it over to Amber to give us a quick -- a few quick administrative reminders.

MS. BUTLER: Thank you, Rear Admiral. This is our privacy statement for the meeting today. This meeting is recorded today. You can refrain from using the question box if you do not want your likeness recorded or you can close out of the meeting.

For our meeting logistics, we have an agenda attached as a resource for you. You can use the questions box in the menu on the right side of your screen to submit any public comments or questions.

You can contact myself or Virginia Dentler for any troubleshooting. You can also

contact us at hydroservices.panel@noaa.gov for any public comments now or later.

We will be addressing all comments and questions during our public comment period later in the agenda today. And here is some alternate connection info if you would like to join by phone.

And now I'm going to turn it back to Mr. Sean Duffy. Thank you very much.

CHAIR DUFFY: So good morning, everyone. Welcome to Day 2 of HSRP. Yesterday was a very interesting day. Lots of moving pieces; appreciate everybody's attendance.

I am serving as the Chair of the HSRP and then based in New Orleans, Mississippi River Navigation, Big River Coalition. We're going to start off this morning with a round robin to hear from our members, notes from yesterday, thoughts that stayed with you and we're going to do it alphabetically.

I see a new show, Mary Paige, are you -- there are two As there, Mary Paige, I think

you're up first.

MEMBER ABBOTT: I had to put my glasses on Sean just so that I would look similar to you.

CHAIR DUFFY: That's not a good goal. Like that should not be a goal at all.

MEMBER ABBOTT: I got to cut my bangs. Anyways, from the rainy East Coast of the Gulf of Mexico -- my today, that is. Yesterday was gorgeous.

First, the sessions were fabulous yesterday. And I want to thank everyone, and kudos to all the moderators and the presenters. It was as I'm learning these meetings can be a tad overwhelming as to the amount of information that's being presented.

Yet, what I heard most yesterday was a focus on safe and efficient as well as create best practices. And that seemed to ride across the presenters as well as our Directors.

And then a couple of concerns that I had is that information we may have may be

underutilized, so underutilization of data, websites, everything that we're doing, may unintentionally be underutilized.

Or I'm also concerned that some of our non-NOAA sources -- Jeff Ferguson brought about, made a comment about we must make sure we validate non-NOAA sources.

So that's a concern as to whatever is the dynamics that are put in place to do that as well as the continuity, a concern of continuity. Another was that PPUs that the pilots are using.

It seemed that one coast had one system or one port was using a system that suited that pilot association and then I believe I heard another one using yet a different.

I don't know if there's rationale for having continuity between things, but that was just something that caught my eye. And that's it for me at this moment.

CHAIR DUFFY: Thank you, Mary Paige. Next we'll go to Qassim. I don't see him on the screen. No, there you are.

MEMBER ABDULLAH: Thank you, Sean. Good morning, --

CHAIR DUFFY: Good morning.

MEMBER ABDULLAH: -- everyone. I think it was a great day. I agree with Mary Paige definitely as was fabulous day. All the Panel well organized, nice mix of a speaker.

And really the nice thing, the one I noted about, the timeline the importance of NOAA services and data to the industry, to this community of mariners.

But also a timeline to the importance or I will say as climate, the more people rely on NOAA data, you got to expect -- more expectation for high resolution data, higher accuracy and more frequency. That's what I noticed definitely.

I mean, we -- that is a highlight on the precision navigation with all these great presentations, how much a foot of draft could save us in 30 - 50,000 barrel of oil, for example.

So the precision navigation, that is a pressure on us to really to support that. And the only way to support it is to have high resolution, more availability of the data with more frequency, so that's a great opportunity for NOAA. Thank you all. That's all I have sharing.

CHAIR DUFFY: Thank you, Qassim. Next up Anuj Chopra. Anuj, I saw you earlier. There you are.

MEMBER CHOPRA: Hi, good morning, everyone. This is Anuj Chopra. My apologies. I couldn't attend yesterday. I did catch up on the proceedings, but things got ahead of me so I'm looking forward to today.

I would like to reiterate what Dr. Qassim said. That precision navigation is very critical for our competitiveness for the ports. So for economic security, for operational security, and second that we utilize every data source there, like other commercial ports, and make our ports more competitive as to what they already have.

Whatever information they have, what they have, that's value. Second point to what Mary Paige added about pilot PPUs, maybe there's opportunity for the National Pilot's Association or other organizations to review that to standardize as a bare minimum.

Maybe that's for another time to delve into it, but that's good point raised by Mary Paige on that. Looking forward to today and thank you, again.

CHAIR DUFFY: Thank you, Anuj. I am looking -- I see Captain Cruz would be next. I'm not sure if he's there. And not seeing, I'll just, I'll go down the list. Nicole Elko, are you here?

MEMBER ELKO: Yes, good morning.

CHAIR DUFFY: Hey, good morning, Nicole.

MEMBER ELKO: All right, I would love to amplify all of the thanks and applause for yesterday. It was marvelous. Great job making a virtual meeting happen so quickly. That was

amazing.

Truly the Panels were really interesting and informative. And, you know, when I saw the agenda, I seen like a lot of the ports focus and I wasn't, you know, not as surprised. Of course, we would do that here.

I wondered what the coastal community connection might be and it's very obvious. I think very relatable. The challenges that the ports are having, their data needs, you know, it's very relatable to coastal communities which is the, you know, my lens, my kind of perspective.

But I bring to this as I mentioned yesterday in my question related to, you know, reusing sediment for resilience, lots of other challenges are bubbling with this surface that I think are, you know, not just port specific. Right?

They are, they are things that NOAA can help with, and by helping the ports, they're going to be helping the neighboring and adjacent

communities.

So some of the specific things that I was hearing yesterday and I was glad to hear because I came to the meeting wanting to talk about them was, you know, as Qassim just mentioned, the height of spatial resolution in the data.

We all know that taper local water level is something that I'm passionate about and that our communities are asking for even louder than they were six months ago to help with their sunny day flooding, their challenges with planning for sea level rise.

The second one is communities have some data conversion anxiety so I was glad to hear Mary Anne's update yesterday as well as updates on the NSRS.

You know, that's all coming together and I look forward to helping communicate all that you all are doing to the coastal communities as they move through that process.

And then the third one that is of

concern to communities right now is the implementation of this unprecedented amount of coastal resilience funding with BIL and IRA.

You know, getting the funding though automated and then sort of what is involved in implementation. All the permitting that NOAA is going to be overseeing to get it through, funding the foundational data collection that you need to support those projects.

And expanding the workforce. Right? Having enough people at NOAA and everywhere else to do all of this work. And that goes along with training the next generation, which is one of our other goals.

And I heard all of that stuff yesterday. So, Admiral Evans, thank you for your excellent presentation, the collaboration across NOAA, not just within NOS, is impressive.

I loved that Weather Service is kind of included in almost everything you all are doing. And the stakeholder engagement, you had so many pictures of humans on your slides. I was

just cheering you on.

QR codes, it is really cool. So great to see all of that happening and, yes, the training the next generation really warms my heart. Finally, I had some questions yesterday regarding the data conversion or the datum conversion.

And just wanted to thank Marian and CO-OPS, you know, the way that you all are looking forward, thinking about incorporating AI into the next conversion and already starting to get ahead of that is a very good contract so thank you for the time.

CHAIR DUFFY: Thank you, Nicole. Excellent insight. So good morning Deanne Hargrave. You're up next.

MEMBER HARGRAVE: Hi. Good morning, everyone. Nice to see you. Echo amazing presentations yesterday, the content, the expertise. The sharing of information is, you know, it's symbolic of the great work that this, that this group does.

So no surprises there. Interesting, Qassim, that you went before me because I think you are in my head and read my notes. I had resolution, accuracy and frequency and so you've already prefaced that.

And I'll then move it into data standards for a globalization of these data sets to really leverage, you know, the full capability. The more standardization we have, the easier that becomes.

And that the models are there, you know, the models are only as good as the information and as we build more real time and more complex models, they need more data to be -- not only to build the model, but to keep it updated.

And to keep, and you know, once you've -- I think you've all experienced, you know, you -- maybe with your iPhone, you get a new phone and all of a sudden it's fantastic and all these new things.

But then they stop maintaining the

tools that you've gotten used to using on a daily basis. And so that maintenance of the things that we build is equally as important as building on them first place, so.

Yes, also I was tickled by Larry's presentation looking into the, you know, how do we best utilize these tools. Tools, of course, are very interesting and we love to just say, oh, here's a new thing, let's go use it.

So it's really interesting to see how effective they can be and when are the optimum times to leverage tools like that, uncrewed tools, that's all. So, thanks for that. Looking forward to another great session today. Thank you.

CHAIR DUFFY: Thank you, Deanne. I know that Tuba has an excused absence so I will move to Eric Peace. And Eric, I did catch your comment about beignets yesterday.

Just made a move forward, I'm sure the interpreters brushed up on their beignets. With that, good morning, good to see you, Eric.

MEMBER PEACE: Good morning. So as we get ready to start our season here on the Great Lakes which is going to be earlier this year than ever before, I start to think about the operational aspects.

The couple of things I heard yesterday, they kind of stemmed through a lot of it. So you talk about, you know, and one of our members mentioned the economic impact in making sure that our ports are resilient and can function. Their issue is safety.

Navigation safety is critical, so here on the lakes, we have some places that we just discovered that haven't been surveyed since 1948. And that shoal has encroached now onto our traffic separation scheme which is going to cause a hazard to navigation.

So things like that are critical to make sure that we continue to have that vital precision data to be able to operate our vessels safely.

And again, we're talking thousand foot

vessels here on the Great Lakes as well so heavy, big ships. In addition to that, the other big piece which I'm sure everybody knows I foot stomp this all the time, the NOAA PORTS system is crucial.

That PORTS system is absolutely safety of navigation. And again, I'll say it one more time. I believe it should be funded completely within NOAA. I don't think it should be a cost share agreement.

Just like I don't pay for my stop sign, we all pay for it. It's a safety in navigation issue, but the presentations were fabulous.

I really enjoyed the fact that I get exposure to the West Coast as well. So thank you.

CHAIR DUFFY: Thank you, Eric. And Julie Thomas is up next. I haven't seen her on the screen. Julie, are you with us? Okay well - -

MEMBER THOMAS: Hey, I'm here.

CHAIR DUFFY: Okay. All right. Sorry, Julie.

MEMBER THOMAS: Thank you, Sean. Yes, while I try to make these virtual meetings, really interactive is difficult. One thing that -- I did drive down from Long Beach last night to San Diego so I'm home now.

And I thought, you know, particularly for the four new Members that we have, I was feeling kind of bad for you because when we're in person, we're really much nicer.

And we're much more interactive and not -- I don't really mean nicer, but there's a lot of discussions, you would be welcomed very warmly, et cetera. So it's very difficult in this virtual environment.

But I do appreciate the four new Members sitting through this meeting because it is difficult in your first meetings. I have to say that I really always enjoy the Directors' reports.

And you've heard me say this many

times. I like to have them right up front of this meeting because I feel that the work that goes on within these three divisions is so incredible.

Trying to ingest everything that the three, Brad and Marian and Ben, went through yesterday in their very quick allotted time slot was quite challenging I thought.

It's almost I need to go back and really check out some of those programs that you mentioned. And I always learn so much and then I actually think they kind of set the stage for the meeting because really what we are here to discuss, and advise, is to support these three divisions.

And so the more we know about their work, I feel it's really crucial and pivotal to this group. There were a bunch of certain particular comments that I wanted to follow up on.

This modernization of the NSRS, I definitely have already been talking with Dana,

Brad, we're going to -- Captain Jacobsen asked if I would arrange a meeting.

And Kim, you, Kim Holtz would be involved with this too, but Captain Jacobsen would like to learn a little bit more about this modernization and particularly how it's going to affect this under keel clearance project, et cetera.

And so I will be following up with Dana on that and Kim and Captain Jacobsen and I don't know, Admiral, if you want to be included in that conversation.

But it is kind of important as we're bringing in these deep draft ships, you know, if there's going to be an impact there with this change. The other thing was Admiral Evans' comment about STOFS.

I do want to follow up on that. Jim Haussener's presentation was really interesting. He managed to cram a lot of facts and figures and points into that talk.

And, you know, one thing he said was,

NOAA, please do something to protect our wetlands and our underserved communities. And I was sitting, you know, I am like at home I started thinking about that and I thought, what?

What can NOAA do to protect some of these very vulnerable places? We have a lot in California and, you know, we have water level measurements. There's inundation models now.

But I thought that was really interesting to try to quantify a little bit about, you know, what are the components of NOAA that's really going to support these areas?

Okay, I've got two more comments. I could go on and on, but really Qassim, I'm a little bit sorry we didn't have more discussion time. Karsten from Rotterdam is -- I had dinner with him the night before.

And he's such a wealth of information about projects that are going on that really do overlap with this digital twin concept in AI. I mean, one thing that was interesting and we were talking about AI in this context, the more data,

like the motion sensor now that they're developing to put on the ship.

Right now there's a very cumbersome motion sensor that they have. And the pilots really, you know, if the weather is rough or anything, they can't really deal with setting up the sensor.

And they have, as of today, they have 150 measurements, the vessels with the motion sensor on, but now they're developing this three-inch cube that they'll be able to take on and like a black box, set on the deck.

They're trying to, the manufacturer is trying to get it so they don't even have to take it out of the box. It will just have this little antenna, pick up the motion sensor.

They'll put one on the stern, one on the bow and, you know, he really would like thousands of measurements because to really, as you heard, the -- it's not only the length and the width and the depth, it's the how it's loaded and what type of product they're carrying.

There's so many variables in this motion sensor. So thinking about deep draft and under keel clearance, the discussions to me could just go on and on.

And I was sorry that, you know, we didn't have more time to really get into that. And Nicole, this comment about sediment transport is so crucial.

In L.A. there isn't, as was mentioned yesterday, a lot of sediment transport. But during large storms, those edges can fall off. There's deep canyons there, and we do see it.

And as you heard, one foot of change, they now have reduced the draft of the channel from 76 to 75 and they suspect that there will be more reduction edges as we go on after the large storms.

So there is -- was just a multitude of things that go on. I'll stop there. Thank you.

CHAIR DUFFY: Thank you, Julie. Some really excellent points and again, I'd like to thank you for your leadership as our past

chairman.

MEMBER THOMAS: Thank you.

CHAIR DUFFY: Big shoes to fill. I won't say bigger jersey, because I would need a fat boy size and you would need a small lady size. So with that, and as we do this, we'll get a little better.

I've noticed, of course, that Nathan is online and I can see the names. I had to wake up and think about that. Our Vice Chairman Nathan Wardwell. Good morning, sir.

VICE CHAIR WARDWELL: Good morning. All right, well let's see, I don't know if it's better going first or going last. And those are always my options, you know?

I mean going in the middle might be a nice choice at some point, but I -- yes, so, I took a number of -- a ton of notes from the meeting yesterday.

And, you know, I'll echo what a lot of people have said, but just a ton of kudos to the NOAA team for pulling this meeting off. With

being Vice Chair, I'm starting to see all the effort behind the scenes that it takes to pull off this meeting and there is a lot that goes into it.

And let alone switching -- pivoting so fast from in-person to virtual so definitely appreciate all that effort. One of the main takeaways or something that I heard quite a bit was about just the increased vessel size.

And how that's bringing challenges for ports and waterways and crowding the oceans and spatial awareness. Right? And so, you know, just kind of for me that further highlighted comments that other Panel Members just brought up, but the importance of increased measurements and improved positioning. Right?

Like these waterways aren't getting bigger so we need to provide more information to be able to navigate them safely. I mentioned, or I heard about the value of PORTS, the Physical Oceanographic Real Time System, a number of times, and that's no surprise.

It's a very valuable system especially with the Panels that we're hearing yesterday. I did hear specifically call outs to wave data and wind data for those ports from a few Panelists.

I really enjoyed Larry's presentation, and I was digesting it and trying to figure out the right way to explain my thoughts, and Deanne hit it right on the head for me and it was how to best utilize tools. Right?

And so I think about that all the time in just the water level world. There's a lot of different types of sensors to use, but not one works in every situation.

And so I look forward to hearing more about that and learning. I was really excited about the OceanMaps release that will be coming out in March for better access to operational forecast models that Marian brought up.

And then Julie's comments about Jacobsen's interest in getting an update on the NSRS modernization, I think that's awesome. I mean, that is really great.

If that's something that comes out of this meeting then that is great. I hear, you know, just kind of my general sense is there's a lot -- groups understand that this modernization is happening.

But I don't think many people understand what it's going to do to their operations and how it will affect the operations. And so getting a better grasp of that is going to be a big task.

And then just one last comment. I'm -- I think I'm really surprised, Qassim, that I didn't hear digital twin come up yesterday so well maybe it will come up today. And that's it for me.

CHAIR DUFFY: Thank you, Nathan. Again, excellent comments and as I adapt a little better, I do see that Tuba was online. I think I messed up and think she's going to miss tomorrow.

Tuba, I apologize. Are you there? I did not mean to skip you. And --

MEMBER OZKAN-HALLER: There we go.

Can you hear me now?

CHAIR DUFFY: Yes. Yes, and I apologize again. I'm at out of adaption here.

MEMBER OZKAN-HALLER: No, Sean, you didn't skip me. I was, unfortunately, only able to join a little bit late. So I came online just as Julie was talking about her impressions.

Yes, but so thank you and again, apologies that I was late this morning. So yesterday, as usual, packed meeting, but one thing that I reflected on after the meeting, you all remember I did miss the fall meeting which means the last time I really engaged, you know, with all of this work was a year ago when we met in Puerto Rico.

I was impressed when I was hearing all of the updates from the NOAA folks just how much work gets done in a year. I actually was really impressed by just all of the progress along all of the dimensions that we talked about at our last meeting.

So that's just phenomenal to see so,

you know, congrats to all of you all who are doing this important work. And then, as far as the other sessions are concerned, I really, really enjoyed the session on the PORTS.

I really enjoyed seeing just how all of the bits and pieces fit together in order to, you know, enables safer passage and safer navigation. This is exactly how it should work.

And, you know, I asked the questions about funding because I feel the local context matters, but again, NOAA's willingness to prioritize a particular area because this engaged work is going on there and maybe we can replicate that kind of collaboration coordination for some of these other important ports too.

And then finally, again, I was just really happy and I feel fortunate that I would hear about the progress that Marian and Ben and Brad reported on. And again, I too, really enjoyed Larry's presentation.

Even though it was all the way at the end, you know, it was definitely one worth

waiting for. So great first day. Look forward to another day and a half here. Thank you.

CHAIR DUFFY: Great. Thank you very much and I'll let you know your late, tardiness is excused. So I really want to welcome the new Members. If it doesn't show, I was an athlete coach for a long time.

I really do believe in a team concept and it's great to have some new Members here. I'm going to ask -- it's not in my notes, but I would ask that you give us a -- add a little about your background, and where you are, what your expertise is and we will go in order as you see on this screen. And it's hard for me to introduce you because I really don't think I've ever met -- I've seen some of your names before.

But I'm happy to be educated and we'll start off with Sloan Freeman. Good morning. Welcome.

MEMBER FREEMAN: Good morning. It's a pleasure to be here. And it's an honor to serve on the HSRP. I guess a little background

on myself, I co-founded a hydrographic survey company in the Mid-Atlantic region about 20 years ago.

We've been a contractor for the Corps of Engineers and for NOAA and updating nautical charts as well as some state port authorities over this decade.

And so it's in my primary impression from yesterday's meeting is certainly how critical the data that we've collected over decades is to the -- to the safety and to the commerce sector as a whole.

And my primary impression, honestly, I can't help but see it through the lens of how much work goes into collecting high resolution data.

Especially when it's needed repetitively in areas of concern and across the wider physical ocean where data might be, you know, 60, 70 years old is how much workforce is going to be required in order to keep that type of data updated and serving the public interest.

Whether that data is collected on traditional vessel platforms or through autonomous vehicles, there's a tremendous amount of expertise that comes into acquiring good data and processing good data and then delivering good data so that it can be used in the public sphere. And that will be challenging in a flat budget environment to say the least.

So I look forward to serving on the Panel and helping however I can. And I really look forward to the continued discussion today and tomorrow. Thank you.

CHAIR DUFFY: Thank you. And welcome aboard. Next we'll move on, Kimberly Holtz. I guess you're at home where we were going to be, but all of you --

MEMBER HOLTZ: Yes.

CHAIR DUFFY: All right, well welcome, again and look forward to learning more about each and every one of you.

MEMBER HOLTZ: So yes, so I'm the Director of Surveys for the Port of Long Beach,

but most of my career -- probably I have 30 years of land surveying experience.

And most of it has been geodetic surveying, coordinate systems, datum changes. I also am a licensed geologist and work as a petroleum geologist for the city for four years. So I kind of switch back and forth.

But I remember when we switched from data or NAD 27 to NAD 83 which was the datum shift. So we're getting ready to do that again and I remember, you know, when it was actually put out, the new coordinate system, new elevations, and when agencies switched to it.

It was about a ten-year period because, you know, smaller agencies didn't switch to it so I'll be curious to see as the new national spatial reference system rolls out, you know, how quickly like do ports switch to it?

You know, there's obviously lots of other agencies that are port related. And I was really interested too when they were talking about like the new tidal datum coming out.

Which I assume the tidal datum coming out is going to be tied to the vertical datum of 88 which we're currently on, but I'm, you know, I'm assuming that as soon as the new system comes out, they'll have like dual -- we'll be able to update our tidal datum to the I think they're calling it 24, NSR 24.

So I'm just curious to see how that's going to work out and then how actually, how long does it actually take before ports start using this system.

Because historically, I mean, there's only been -- this will be the third datum shift in the history of the United States. So it's a big deal.

I mean, I was, that's how I got involved in geodetic surveying was when the data shift happened in, you know, '88, but most of the agencies didn't switch to like 1995. So I'm real curious about that.

In the last five years, I've gotten very involved with the bathymetry survey at the

port because I oversee our hydrographic crew and then we've been working closely with NOAA to get all of -- to be doing our surveys in the same manner that NOAA does theirs.

And probably half the port has been zoned as Category Zone of Confidence A1. The other is we're just waiting for it to where we expected the whole port will be all Category Zone of Confidence A1 which is a big deal.

And we plan on updating the port bathymetry surveys every two years, so we will never have data older than two years old anywhere in any of the channels in the Port of Long Beach.

And that's because we get the largest ships in the world. And we have very -- you know, our main channel is very tight. I mean we're getting ready to do a big deep draft project where we're going to lower the -- I think we're going to 80 feet depth.

But it's still a very narrow channel. We are going to try widening it at points, widening it as to some of the turning basins.

It's a tight fit. I mean, Jacobsen Pilots is very aware of what a tight fit it is and we work with them.

Pretty much if they have a concern for any specific berth, like we'll bring in -- we probably have brought in a largest ships. And, you know, the first port to get with this large ship.

We'll go out and do a hydrographic survey right like the day or two before they come in just to, you know, double checking, ensure that we can take that large ship.

So the last five years I've learned a lot about bathymetry surveying. And I'm really excited to be on this Committee. The talks yesterday were just amazing. A lot of information.

CHAIR DUFFY: Thank you for that update and good to get to know a little bit more about you and with -- very much appreciate. I can't help it when people say what I call the D word, datum.

I have to like make sure I'm paying attention. It's over my level. I've been told by many that the Mississippi River is the most complicated place in the world for datums.

And maybe that's why it's above my head, but it's good to have smart friends on that list to call to ask and with that, I'm going to move on to Captain Carolyn Kurtz, Tampa Bay Pilots.

Good morning and I think it's well, it's actually afternoon in Tampa so assuming you're home. Good morning and welcome aboard.

MEMBER KURTZ: Hi, there. Hi, everyone. So first of all I just want to well going close to the end there's not a whole lot to add. Yesterday was amazing and I have lots of notes.

I have a whole page of acronyms so if anyone needs those, I'd be happy to share. A little bit about me, I am a life-long mariner. I graduated from Merchant Marine Academy in 1986 and was deep sea for nine years.

And then I became a Tampa Bay Pilot, so the last 28 years as a Tampa Bay Pilot. During that time, I chaired the Pilot Commission for many, many years.

And also, chaired NAVSAC which is a Coast Guard FACA, so Navigation Safety Advisory Committee, and I still do that. And I'm also a pilot instructor.

So I coach pilots in man model and ship handling and other deck officers that go through the school and simulator instruction and all that.

It's all about ship handling and piloting. So those are just some of the things I'm doing now even though I'm not working as a pilot, climbing up ships in the middle of the night anymore, which is really nice.

But it was a fantastic profession. I would like to address something that Mary Paige brought up about the lack of standardizations in PPUs. And there are a few reasons for that.

Every pilotage area is different, and

pilots are very protective and proprietary about their pilotage areas and fight tooth and nail to avoid standardization in training, in policies, in the economic structure of their associations.

And of course, in the equipment that they carry aboard ships. So there are even groups that still are not using PPUs because they don't feel it's appropriate.

Although the standard of care in the piloting profession is to carry a PPU. One of the most important parts of the PPU is to carry an independent GPS so that you're not getting that through the AIS plug.

And I don't want to go too far into the weeds. I could probably talk all day about all of that stuff. But pilot groups feel that they have chosen the best equipment for their port, for their use.

One of the other really important factors that determine the selection of this equipment is cost. Even though it's something that is -- has become very important and critical

in making some of these decisions with huge ships and with very little under keel clearance, some ports are fully funded for this equipment through their tariff.

And through grants and things and then other ports are paying for this stuff out of their own pocket. So, you know, there's a spectrum of equipment that's available and that's another thing.

There are only about 1,200 pilots in the United States and so vendors are competing with this kind of fixed market for who is going to use them. So it seems to trend.

A lot of people are using SEAiq, which is what they're using in Long Beach. And actually, that's what we were using in Tampa. It's great software, highly customizable and easily integrated with other things.

But anyway, it's kind of a long answer, but that's the reason why this stuff is not standardized. There is no standardization of the equipment and the quality of the data that

goes into what you're seeing on your screen.

So that's the underlying reason. I also just wanted to touch on this, you know, the precision navigation thing is amazing and it's so impressive.

All of that I think has to be taken with a grain of salt that, you know, pilots were not supposed to really be subject to economic pressure. It's really all about safety.

And so increasing the draft of the ship that can come in even if you have in dredged, you know, that's your smaller tolerances, your chipping away at your safety margins.

So that the precise navigation information is critical if those are the decisions that you're trying to make. And we went through that in Tampa.

We increased the draft by a foot even though nothing else had changed physically in the channel. So it really was about the pressure to bring in larger vessels and to accommodate a

customer.

And so, but you end up running slower in the channel because if you go too fast then you squat and then you have just done away with the extra water and -- anyway, I'm not going to go too far into that.

But I would just remind people that it is the pilot's job to make an informed and supported no decision. That's a very important reason to have this, all of this data.

It's not just the go decision, but the no is the hardest thing that we have to do is to say no to a customer because of particular conditions. And with that, I will say thank you and I look forward to the next day and a half.

CHAIR DUFFY: Well good to have you on the team. Some excellent comments. I had very similar thoughts being closely associated with the pilots on the Mississippi River.

And our last of the four new ladies to join the team, Rebecca Quintal. Can you give us a little update about yourself and comments

please. The floor is yours. Good morning.

MEMBER QUINTAL: Good morning, afternoon, yes. We've switched. Well I'm happy to be on the Panel. Yesterday was very informative and well managed. We stayed on track for a lot of content.

My background, I am a degree in geology and oceanography. And a long history of ocean floor mapping. A large majority of that had to do with the safety of navigation surveys, but other types of surveys as well.

Both for domestic and international safety of navigation. So I -- that's where my background lies and where I think I can contribute the most to this.

I want to echo Tuba's comments on the -- just how informative the conversations were on the Port of Long Beach and Los Angeles yesterday. I really enjoyed those.

I had not seen the Port in action so I hope to get back there, maybe at a future meeting we'll be able to attend. There was a lot

covered already.

A couple of topics of interest that I am interested in pulling the thread on is, you know, I'm not surprised at all that the pilots are utilizing the S-102 standard to add a level of granularity to their EMCs displays.

And I know that the format is not finalized and there's limited coverage that we have available now, but I'm interested in understanding what other community groups are taking advantage of that ability to customize.

And hope that we're getting the word out on that ability. And then another area that I'm interested in learning more on, the talk on the wave heights and that of the magnitude of the wave heights has been increasing.

And I'm interested in how well our predictive models are performing at predicting those extreme events because particularly in a place of like Long Beach that can be very impactful.

And a lot of thoughts have been

covered so I'm happy to be part and I'm looking forward to the next two days.

CHAIR DUFFY: Well it's good to have you on board. We have given out some new jerseys and with that, we'll move over to our Government, non-voting members. I'm not sure if Nicole is available. I didn't see her on the list.

MS. BUTLER: We're going to go to the Directors.

CHAIR DUFFY: Okay. Okay, I'm --

MS. BUTLER: Thank you.

CHAIR DUFFY: I must be -- okay, must have the -- I'm sorry, must have the wrong list. Got something crossed.

MS. CHAPPELL: I think Andy is up next.

CHAIR DUFFY: I'm sorry. Well, good morning, Andy. Or afternoon, Andy. Sorry.

CAPT ARMSTRONG: Yes, good afternoon, all. So, you know, folks spoke about going last. We're really last here in this list so there's not much left to say.

I do just want to add how impressed I was with the Panels yesterday and how they're -- folks are working together and using NOAA's data. I think it's important for us and NOAA to pay attention as to how folks use our data so that was very informative.

But I think the main thing I would like to say is how impressed I am with the HSRP Panel Members who have been so closely paying attention and absorbing material from this meeting.

I just think the comments that we've just heard are impressive and I'm really pleased to be a part of a Panel that pays so much attention and takes so much care in what they're doing. Thanks.

CHAIR DUFFY: Thank you, Andy. So I see Dr. Marian Westley in front of me. If you are ready to go, good morning, or good afternoon. I guess I'm going to catch myself sooner or later.

It's all the different -- with

everybody across different places in the country.

DR. WESTLEY: Great. Can everyone hear me okay?

Great. So thank you again. I just find these meetings extremely energizing. It's always terrific fun to brag about the great things your people do, but it's even more, it's more exciting that you're really listening.

And you're giving that real feedback and kind of real input. So I just really appreciate the time here. Very sorry we're not in L.A./Long Beach. I've been very interested in getting, seeing that port up close.

As you know, we have a great PORTS partnership in L.A./Long Beach with three partners. Very exciting to see how you're using all the PORTS data that we have and the interest and possibly additional data would be great.

So just again, exciting to be here. It's a real shot in the arm to kind of keep doing the great work that we're doing, and so thank you all much.

CHAIR DUFFY: Thank you. Moving on to Brad Kearse as the next Director.

MR. KEARSE: Yes, great to be here. I'm not usually involved in these. Juliana is, but it's really -- it was really enlightening to listen to just the feedback that you were giving.

And, you know, where we go as an organization in helping us out as the parts of this nav, obs, and positioning. I always love it when I hear about the National Spatial Reference System. We've got a lot of work to do.

You know, to make sure that the word is getting out there, where it might impact folks so I hope that conversation continues. You know, we've got some folks on the Panel that do really understand that.

And we need you as advocates to keep quizzing us and get the right folks connected up. Julie, I'm glad to hear that Dana is going to get connected with the Port.

I know he's very active in the state of California and those things are really nice to

hear, and where we have our other advisors that are out there across the country to get them engaged with everything from the ports to all pieces of transportation and how they connect.

So great to hear the discussion, really appreciate your feedback. I took copious notes from each one of you all as you were giving the feedback. I look forward to, you know, catching up in person.

You know, those sidebars and all those are so important, but really appreciate everybody that pulled this together in the virtual environment. Thanks.

CHAIR DUFFY: Thank you. I really appreciate the comments about pulling this together and I don't have everybody's title in front of me so I'm doing the best I can and we'll wing through.

I appreciate you putting up with not maybe a proper introduction. But I can go to Larry Mayer and just say it's Larry Mayer. Good morning or good afternoon, Larry.

DR. MAYER: Thank you, Sean. It's wonderful to be last again. It's not my place I guess. So as Andy said, you come at the end and notice everything that's been said already.

I do have to reiterate the compliments that have been given by others to the great sessions yesterday. They really were great Panels.

And to the staff because this switch suddenly to a virtual meeting is a non-trivial thing and I think they pulled that off amazingly. I think what I can do is take a step back and offer a very long-term view.

I think with the exception of Andy, I've probably been at more HSRP meetings over the years than anybody else attending here. I think that's true.

And I have to say that, well, the quality of the Panel, but the sophistication of the Panelists this time was tremendous. And what I heard from them, and it's actually -- I think I've seen an evolution over the years is really

sincere praise for what NOAA has to offer.

Sometimes we'd hear at panels kind of lip service and things like that and a lot of whining and a lot of complaints, but I think there was no question -- I've seen this again in the last few years -- there's real convergence of coming away from a meeting like yesterday and feeling that NOAA really, really is providing a tremendous service to this amazing part of our economy. I mean, the numbers and the size of these ships are just tremendous.

And I really came away feeling very good about that. I think you're really on the mark here in terms of providing what they need, particularly with the precision navigation. And it's wonderful to see both NOAA models and NOAA data streams being used in models that really are providing very, very helpful real-time information. I think that's great.

Now, as always, people want more and they want better. That's natural and we heard some of that, but what I didn't hear which I've

heard over the years and I remember the days of Sal, the Carnival, you know, Chief Captain.

You know, there was a lot of what he wanted was different. And, you know, NOAA just wasn't doing things right. But I think, you know, I think we really are seeing a real convergent here.

And I, it just made me feel real good so it was nice to hear all that. I'll stop there.

CHAIR DUFFY: Very good. I really appreciate your comments too and I will say that it's very good for navigation to be able to reach out to you and Andy.

Some of the work at UNH is being embraced and desired by pilots on the Mississippi River as we talk about advancing things like air gaps.

So with that, again, thank you everybody. Directors, hopefully I didn't blow anything too bad. It's easier for me to introduce Rear Admiral Ben Evans to see if he had

any comments he would like to make.

RDML EVANS: Thank you, Sean. And just before I begin, I want to note for everybody that Rachael Dempsey, our Deputy Assistant Administrator for nav, obs and positioning is on the line.

Our understanding is that she may be in a position where she can't speak up. So Rachael if you're listening and you would like to say anything, feel free to just speak away and I'll pause my comments.

But our understanding is that, excuse me, that she's not currently in a place where she can easily speak. So just, you know, I want to acknowledge this as really I am going last year.

So everything I'm going to say does sound a bit, has already been tread, but I want to add to the comments of everyone and frankly it's very gratifying to hear, you know, the comments about the products and services that the, that our offices are providing that are making a difference.

I think for me of the discussion of the local requirements yesterday in the Southern California region and in particular the under keel clearance project, that that's something that's been in the works.

We've been working that problem for seven, six, seven, maybe eight years now dating back to when I was in at the Pacific Hydrographic Branch in Seattle when this really first kicked off in the mid-2010s.

So it's really great to see that coming to fruition in the S-102 format and being utilized. But of course, now the challenge is how do we, how do we, how do we export that?

How do we, how do we expand that effort to other ports, other waterways where that same value could be realized? Yes, I think it was Nathan that noted that, you know, the ships are getting bigger and the waterways aren't.

And that's very true. And we're spending as a country we're spending billions on physical infrastructure to support our marine

transportation system, to support our ports and that is absolutely justified spending.

The challenge we have is, you know, commensurate, proportionate, but commensurate level of investment in the geospatial infrastructure because in many respects, that is, you know, I think of that as virtually dredging in some respects.

It allows us to make smarter risk assessments to utilize all the water that's there at a fraction of the cost of building out the physical infrastructure further so. It's very gratifying, again, to hear that the public private partnership the Port of Long Beach is showing so much value.

To a couple of the comments made by some of the other Panelists, I just want to note, Julie, to your comment about the datum changes and Captain Jacobsen's interest, I think OCS would absolutely like to be a part of that conversation as well.

I think NGS and CO-OPS probably have

a more central role, but as that comes together, please keep Jeff in the loop and I'll also note, you know, the comments on Larry's presentation which I also thoroughly enjoyed and learned a lot from.

And we'll just note that as we think this, you know, Larry hit the nail on the head there. You know, where we are right now with the, with utilizing uncrewed systems.

And trying to figure out, well okay, where does this make the most sense? Yes, this is very cool technology, and it, where can we insert that and where can we plan to insert that in the future as the technology improves even further, where could we slot that in now in a way that makes sense?

Where can we be ready to slot it in in the future? And so as you hear us talking about our utilization of uncrewed systems and as we plan for further utilization of uncrewed systems with the new Class B ships, you hear a lot about that building in that flexibility now to utilize

those systems now, where it makes sense to do so and ensuring we have the ability to do so in the future.

And then the last comment I'll make is that, again, I think this was Julie's comment about the, about the Director's presentations. I'll simply note that this is largely your meeting to the Panelists.

And so if you feel that you would like to see additional time for those Director updates, I as having given one of those and feeling like I was racing through my presentation, if that's something the Panel would like to hear more of, that's certainly a conversation we can have about adjusting the agenda to ensure that there's more space.

Again, we don't want certainly the Directors don't want to suck all the air out of the room. It's not all about us. We really want you to have time to hear from the local Panels and the Panels of experts that we're putting together to meet your interests.

But the agenda can be, can be adjusted. We're not stuck with that, that format. So I think I'll stop there, pass it back to Sean for any final comments as we wrap up this session.

And then I just have a, I just have some administrative reminders before we move on to the next session.

CHAIR DUFFY: Thank you, Admiral. And I'm going to be very quick and figure out as Chair have a place at some point to talk. There were a lot of comments that are relevant.

I think I could lead in intro into the next Panel. Mississippi River changes, challenges, relative sea level rise, saltwater encroachment, subsidence, beneficial use of dredge material, active crevasses.

We're at a very challenging place here. It's part of the reason I enjoy this so much is I can look at real world situations, what's impacting navigation on the river and hit a group of experts that can provide some insight,

help come up with some ideas.

And with that, I'll again, probably have some longer-winded comments at some point, but we'll try to keep this on time and let the preparation for the next Panel go.

I know, Admiral, you have some comments and that our Vice Chair Nathan Wardwell is going to moderate the next Panel. I'll be close in case there's anything I can help with, but I'll turn that over to Nathan when you're ready, sir.

RMDL EVANS: Hey, Sean. Yes, thank you. And I'll just, I'll be very quick here because I think we've covered some of this. But again, I want to make a note about public comments.

We do have a public comment period here at the end of the session. Thank you, again, to the participants who have provided comments in advance, to the stakeholder staff and others joining the webinar.

I encourage your public comments and

input. If you have a comment, please type it in the webinar under the questions box. It will be read into the public record and/or put on the screen as time permits.

All comments from meeting that are on topic will be included in the official meeting minutes. When comments are received in advance, it will be shared and highlighted at the meeting as well as become part of the public record.

I welcome and encourage comments from any group directly or individuals during the public comment period. And then, again, a reminder about privacy and a disclaimer.

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You can decline by abstaining from speaking or dropping off the webinar. And so with that, Sean, with your permission, I think I'll just go straight to Nathan who will be leading our next session, Adaptive and Resilient Ports: Managing climate change impacts to port infrastructure and operations. You've got the floor, Nathan. Thank you.

VICE CHAIR WARDWELL: All right. Thank you, Rear Admiral Ben Evans. Yes, so I have the honor of moderating this next session so as Ben mentioned, it's the Adaptive and Resilient Ports: Managing climate change impacts to port infrastructure.

Let's see here. So Assistant Administrator Nicole LeBoeuf will be providing an introduction. Hello, Nicole. Thank you for joining us. I am, let me pull up the -- and then we have, we're going to have two presentations after the introduction.

We'll have Justin Luedy, Senior Environmental Specialist with the Port of Long

Beach and then Rosemarie Fusco, Marine Affairs Department with University of Rhode Island. Is that correct, Rosemarie?

MS. FUSCO: (No audible response)

VICE CHAIR WARDWELL: Great. And I apologize if I got your names incorrectly. I have not met either of you and have not confirmed the proper pronunciation.

But then after those presentations, there will be a discussion, we'll have about 30 minutes or so for a discussion. And I look forward to it, this, the only thing I'll add is, you know, ports are not necessarily my expertise.

And ports in Alaska are substantially different I think than some of the major ports in Long Beach. We do deal with sea ice and do deal with large tides.

There was actually an article in the local paper here recently about potentially in the next decade the Artic being ice free for periods of time throughout the year.

So that would be a significant change

and would affect shipping so I look forward to this conversation. Nicole, the floor is yours.

MS. LEBOEUF: Yes, thank you so much, Nathan. Can everyone hear me? Good. Oh, awesome. Thank you. I'm absolutely thrilled to be here to talk with HSRP about this work that we're doing.

It's emerging, it's collaborative, it's kind of unchartered waters for us. So and I just want to say, I was on for the last few minutes and heard the last comments about the previous session and regarding infrastructure investments and Admiral Evans' comments about geospatial infrastructure needed for those investments.

And I couldn't have teed this session up any better. So with that, I wanted to note that and I mentioned this to you all yesterday, I'm going to be wearing two hats today.

One as the Head of the National Ocean Service and the other as the Chair of the U.S. Committee on the Marine Transportation Systems

Coordinating Board or as we like to just say, the CMTS.

And I am really here a little bit with both hats. But I'm here on behalf of NOAA asking you all for your expert input and consideration of how we might work together to accelerate port resilience.

So and first, I'll be a little cheeky and say I have to give the HSRP credit for what is now a very keen interest of mine in this topic. It's all your fault that you taught me how much to love and respect our ports.

And I've been following that ever since I started coming to these meetings. So specifically, I want to say that this work centers around what we want to do at NOAA which is to make sure our ports are fully applying the authoritative guidance.

And NOAA's trusted environmental data when they plan their infrastructure investments. This includes planning for sea level rise, but also extreme weather events and other coastal

hazards that are changing over time.

From you all, I hope, to and our Panelists, I hope to learn more about whether you believe that ports have sufficient authoritative data and guidance for detecting coastal change over time.

And the technical capacity to make sure that their infrastructure plans will last for decades to come. All right, next slide. As the HSRP is well aware, NOS has many products and services designed to promote safe and efficient maritime transportation, nautical charts, a precision marine navigation and, of course, our human capital expertise in NOS's regional navigation managers who work with pilots, mariners, port authorities and recreational borders on a daily basis.

In addition, NOS leads our coastal planning and management in this country including working with coastal communities and industries to create resilience and to promote adaptation to climate change.

NOS also as you know, measures our elevation and subsidence and oversees much of our nation's coastal and ocean observations measuring tides, currents, and sea level rise.

Now, of course, none of this touches on what else NOAA does like at the National Weather Service, but right now we focus on NOS. And I also want to note that we have skin in the game when it comes to coastal adaptation.

And our preparations for climate change because most of NOS's people and facilities are located in the coastal zone. Planning for a resilient future for NOS is so important that it cuts across all of our programs and our recently released NOS strategic plan.

It just means that much to us. Next slide please. So a little bit more. If you're not familiar with the CMTS Coordinating Board, it is the Federal body for agencies whose missions support U.S. sports and maritime operations.

At the CMTS table agencies like NOAA, via the Department of Commerce talk about their

MTS concerns or work to solve complex issues together and combine our expertise for the benefit of the U.S. MTS.

As the current Chair, I have included as one of my top priorities, addressing port resilience in this year's work plan. Next slide please. And I know you know this, but I want to say it out loud. Ports are important.

Ports provide $1.5 trillion annually to the U.S. economy and support over 13 million jobs. Our coastal and ocean-related economies contribute disproportionately to our nation's GDP with over 90 percent of our goods and products being reliant upon our ports and related maritime industries.

And as I like to say when anyone will let me get up on a podium, most Americans cannot go a single day without eating, wearing or using something that's come through our ports.

Ports fundamentally support our way of life and as such, they are two big to fail. These efforts are being undertaken in an effort

to make sure that they do not. Next slide please. So I grew up coastal.

Coastal change in the coastal zone is not new. What is new is the pace of change and what we know about it, including the degree to which coastal hazards are impacting our ability to plan for the future.

Coastal change is impacting more people in the industries than ever before because more than ever, humans are living along the coast, 40 percent of the U.S. population live in coastal counties and that number continues to grow.

We know that the rates of change in the ocean and along our coast are occurring faster than anywhere else on the planet. And that those rates of change are accelerating.

Many ports are located in low-lying coastal areas which makes up especially vulnerable to innovation and coastal change therefore threatens our national security, U.S. competitiveness and our U.S. supply chain whether

we're talking about bananas, speakers, speakers or sneakers, medical supplies, or fuel.

At the same time, ports themselves are facing rapid change within their own industry of placing pressure on them to transform their daily operations and infrastructure while simultaneously planning for climate change.

Next slide please. Planning for the future is essential, but extreme weather and climate change are here now impacting the United States and ports around the world.

Globally, a total of $81 billion in trade and $122 billion in economic activity is estimated to be at risk annually due to climate-related impacts.

Oxford University published a study last year estimating that the annual cost of physical damage and resulting trade losses for more than a thousand ports around the world.

They found, not surprisingly, that large ports in high-income nations faced the largest financial losses including the Port of

Houston which faces the potential loss of $169 million from natural hazards each year.

It's the highest in the world. These economic impacts, of course, would extend well beyond the Port of Houston and into the surrounding economies and communities creating supply change destructions and shortages of all manner of things. Next slide please.

So how do we keep track of what's going on with climate change? Well we have a good starting point. As you know, NOAA and NOS in particular, is a trusted source of environmental information particularly for short-term operational port and shipping activities.

NOS's Office of Coast Survey and our Center for Operational Oceanographic Products and Services deliver products like Precision Marine Navigation and our new monthly high-tide flooding outlook among many others. Next slide please.

In addition to data and services as support daily, weekly and monthly, port operations' authoritative NOAA climate data also

exits. What do I mean by climate data? Next slide please.

Climate data is simply data that tells us about environmental conditions at longer intervals such as years or decades. NOAA collects observations and disseminates watches and warnings and forecasts, of course, at multiple time scales, seven day forecasts, monthly, seasonal outlooks.

NOAA uses these data to inform our predictions at climate timescales like those depicted here and by the way, down in the right-hand bottom corner there's an explicit call app in this scientific paper about climate change for port resilience and port infrastructure planning.

I do apologize for the graininess of the image. I found this yesterday and decided to pop it in and didn't have a chance to reach out to the authors who are NOAA scientists also.

Anyway, NOAA uses our ocean and coastal observations that you're well familiar with. But other foundational data as well like

our measurements of elevation and subsidence from the National Geodetic Survey to feed our predictive models to understand the what, where, how and who of climate impacts.

Tell me more you say. National Geodetic Survey, for example, the NGS data is used to measure the elevation changes over time and we can add that to our projections for ocean heat to better provide predictions for sea level rise at specific locations.

Knowing this, we can build a more holistic picture of what ports could face and therefore should be planning their infrastructure for.

What we're doing in our work and what we're asking today is if we think that ports, we being the HSRP as well, if we all think that ports are using these climate data and predictions or whether there's something we can do differently to support port planning needs.

Next slide please. Of course, port planning, planning for port infrastructure is

inherently complex requiring authoritative data and approaches to ensure reliable adaptation and resilience.

In recent years, guidance documents for report planning resilience have been developed. Last year, the Cyber Security and Infrastructure Security agency or CISA and the U.S. Army Corps of Engineers released the Marine Transportation Resilience Assessment Guide.

And an infrastructure resilience plan and framework. NOAA and the Gulf of Mexico alliance also developed a similar document called the Port Resilience Index, a port management self-assessment document just a few years before that.

These are just a couple of examples of guidance that was made with industry and Federal agency input including those agencies on the scenes, yes.

So some ports are already using these resources, but many are not. And for those that are not, we'd like to understand more about why.

Next slide please.

So resilience experts at Federal agencies and in academic institutions are working with ports to directly, directly to understand how best to design and plan Coastal Resilient Port Infrastructure.

NOS works with communities including ports to support local decision making. We have visualization tools online such as in the digital coast which is a website that has a deep collection of data visualization, training and resilience decision support tools.

Also, NOAA Sea Grant affiliated institutions are becoming experts in port resilience like the Universities of Rhode Island and Wisconsin that are featured here and others as well.

There's also a Department of Defense-led working group that has built a database including with help from NOAA to assess and project sea level and coastal risk, coastal risks, sorry, for installations, DoD

installations and facilities for a while.

But of course, some of you know that major ports are sometimes located right next door to some of these DoD installations. So we have all of this authoritative expertise.

It should be in forming port resilience planning. And on top of that at the present time, we have a lot of Federal funding going in to support climate resilient infrastructure including with ports.

The American Association of Port Authorities has done this great summary of all the funding that's out there and they estimate that over $6.5 billion is intended exclusively for ports in the Infrastructure Investments and Job Act with another $27 billion that ports are eligible to apply for.

One example includes the MARAD port infrastructure development program, but also under the Inflation Reduction Act there is the EPA's clean ports program creating financial incentives for ports to make resilient

infrastructure plans. This is free money.

Right? But we're trying to figure out if there's barriers to ports applying for those funds and when they do apply for those funds, are they using authoritative data and guidance at the Corps? Next slide please.

Of course, all of that sounds very Washington, D.C. focused. Outside of D.C. in the real world, ports are going about their business and they have busy daily operations.

And all kinds of expertise in how to plan for their futures. So knowing this, we have engaged directly with the AAPA to gauge their level of interest and concern on this issue. Not surprisingly, AAPA gets it.

I was invited to give a keynote remarks at a recent POWERS summit which is a new initiative the AAPA has launched to build a resilient port planning for the future.

And I will be participating in their upcoming legislative summit in D.C. in just a couple of weeks. I believe that NOAA working

with the CMTS, AAPA, Sea Grant Institutions, the HSRP and others can really help to narrow any uncertainty that ports may have when it comes to planning for climate change.

But that does include identifying any barriers and closing any gaps that ports may have for use of authoritative information and guidance. Next slide.

So the good news is there are folks who want to enhance U.S. Ports' Authoritative Information. NOAA seems yes, University of Rhode Island and like I said, others at AAPA are trying to build a cross sectorial collaborative approach with Federal, Non-Federal academic private sector and other actors to really try and keep the ports ahead of the climate curve.

Next slide please. One of our first actions is being led by the CMTS. The CMTS is in the process of developing a Request for Information that they hope will publish in the Federal Register this spring.

In the RFI we will be seeking

information from port planners, as well as others who play a role in planning for port resilience such as engineering and contracting firms that are hired by ports to assist them as well as academic institutions that are working in the space and becoming experts on port resilience planning.

Some of the questions that we plan to include in the RFI are here for your consideration. With this information, we're really hoping to get a better understanding, like I said of any barriers to using authoritative guidance documents and data like NOAA's climate predictions.

Though the CMTS is the lead for the RFI, of course, NOAA has a big role to play and that's why I wanted to seek input from HSRP and why I'm really looking forward to hearing from our invited guests.

I would like to thank Rosemarie Fusco, a graduate student at URI as well as Justin Luedy, Senior Environmental Specialist at the

Port of Long Beach who are here to share with us their experiences in planning for climate resilient ports.

Welcome Rosemarie and Justin to the HSRP. It's really wonderful to meet you. I'm thrilled to have you here. With that, I'm going to turn the mic back over to Nathan. Thank you so much for your attention.

VICE CHAIR WARDWELL: Thank you for that great introduction, Nicole. I did notice that on your slide for about climate data and infrastructure planning where you had the red circle.

It really looked like it mentioned planning for Artic Commercial shipping in there so very timely with the article that I read this morning about continued loss of sea ice in the Artic.

So really looking forward to the rest of the session. I believe Mr. Justin Luedy, you are up with the first presentation and the floor is yours.

MR. LUEDY: All right, good morning. Thank you, Nathan, and thank you, Administrator LeBoeuf, that was a really great introduction on ports and really good information for the, for all the attendees today on really the scale and the importance of sea ports here.

And especially on the West Coast so that's a great introduction to my own presentation. I'll be talking again this is Justin Luedy of the Senior Environmental Specialist for the port.

I'm an ecologist, but I also really focus on adaptation planning. The infrastructure side of adaptation planning for the Port of Long Beach.

We'll talk a little bit about the difference between adaptation and some of our mitigation efforts. But in terms of scale, just some basic highlights for the group is the Port of Long Beach is the third busiest container sea port in the U.S. just after Port of L.A. and then New York-New Jersey.

We are a major gateway for U.S.-Asia trade. And quite an economic engine for the region and the nation as a whole. So you can see why the topic of resiliency is important for us.

Oh, and we move about I think over $200 billion in cargo each year. So that's a bit of context for our troupe out here at the port. So next slide please.

So why is resiliency important? So as you can imagine, there is quite a potential for impact here on our port complex and I say port complex, that's the Long Beach and Los Angeles ports together as our San Pedro Bay ports.

And so we are already seeing impacts from climate change here. Our primary concerns at this point are sea level rise and storm surges.

That's where we've already seen impacts and that's where we're really looking into the future, but actually on the next slide I'll talk a little bit about the greater frequency and magnitude of storms.

I've got a couple of case studies to share and what we've already experienced here. Go back please. So and we're also seeing certainly a greater number of hot weather days here in the harbor which is stressing our electrical systems.

So resiliency really is become a key topic of concern when it comes to decision making. That's really for our port and our executive team, or Board of Harbor Commissioners, you know, we work under a Board of five Commissioners as well as our tenants and stakeholders.

Long Beach is a landlord port so we have married tenants that, you know, are doing all sorts of industrial activities here in the harbor.

And how do we, you know, the question is really how do we prioritize resources especially in the face of a rapidly changing climate.

This is an on-going discussion we have

here internally as Harbor Department Staff, but also with our tenants and other folks in the region.

So this, it really drives this investment in maritime infrastructure. We have a really robust large capital improvement program so we have, you know, everything from small to large development and redevelopment projects all within that improvement project program.

Notably, our Pier Wind, some folks here especially in California, probably are familiar with the, our newest push to produce a -- rather build a facility for the staging and development of offshore wind turbines for placement offshore and central California as well as our expansion of rail.

Rail is a big topic out here in the port right now, expanding rail for better efficiency of cargo. Energy resilience also has become a really hot topic really within the last five or six years.

We've had more of a push for energy

resilience programs and really coming up with strategies to address our energy concerns. And that's both within our harbor district but also within the larger city context.

We are working on a variety of power resistance resilience programs to support our terminals and then lots of projects, large and small, under way for critical port facilities.

So those are things like fire stations, fire boat stations, our very robust security systems as well as our command center. So we're looking at, you know, how to generate renewable energy, store that energy.

And then really figure out the best way to convey power to ports of our own facilities as well as everything that we lease and operate.

So that is really a big push within our, especially here in our environmental team as energy resilience as it pertains to climate change. Next slide please.

Okay, so as mentioned, we're seeing

that greater frequency in magnitude of storms here in Southern California. A couple of case studies that have really highlighted the need for resiliency planning and going beyond status quo and really becoming leaders in this, in this field are two past hurricanes.

So back in August of 2014 we experienced Hurricane Marie. This was a storm over 300 miles off the coast of Southern California, but the surge from that storm -- we're a south facing beach and port city by the way and so that puts us at a certain position geographically that, you know, can be troublesome for storm surge.

And so Hurricane Marie came just at that right angle and caused significant damage at our Navy Mole and Pier F shorelines. Over $7 million there.

Significant damage to our break water, the break water system here protected Ports of L.A. and Long Beach is a total of nine miles long in three different sections.

So two gates in the center, four access. And so we saw three large holes and over 80 breaches of the break water during that event. Well over $21 million of repairs.

That number has probably become much larger after all the work that was done up there. And then almost two weeks of access restricted to rail operations, fueling centers, and some of our other critical facilities and tenants so that was a huge wakeup call for us and our Board.

And then most recently, last August 2023, we saw Hurricane Hilary. So Hurricane Hilary made landfall as a tropical storm which was certainly great news for our region.

We got lucky on this one and minimal impact to the port and the city, but you know, this was absolutely a wake-up call as well or it certainly highlighted the need for a greater more centralized response when these sorts of storm events come our way and probably are more frequently in the future.

And so this, and so we produce an

incident management team. This really was a, you know, pulling representatives from various departments, rather divisions within our harbor department which is our port to coordinate on all of the potential concerns and issues that could come from a storm like this.

We checked our pump stations, we installed temporary pumps. Our maintenance team was, are the on-the-ground folks who did all of our equipment checks, made sure everything was up and operating.

And then a really robust notification system to our tenants about storm water concerns. And so the, you know, the tropical storm Hilary was a great way for us to prepare in advance and make sure that we had something really centralized and strong for future storms.

Next slide please. So all of this, you know, talk of resilience and planning began quite a while ago and it was sort of framed in the context of how will the port, large international sea port like Long Beach evolve and

adapt over time?

And so it really started with this, the production of a climate adaptation and coastal resiliency plan or CRP. And this really is our guiding document. It's a living document.

It's grown over time with various updates, but it really centralizes our approach to adaptation planning and ensure resilience and business continuity in the face of climate change.

And so this is a really robust process that took over three years starting with a really over-arching inventory of our port assets. It is everything that we lease, own, operate.

Even our private facilities were included in that. Then on to risk and vulnerability assessments of those assets and then the development of, excuse me, of adaptation strategies.

And those ranged from, you know, the governance side of things so, you know, port plans and policies considering climate impacts,

all the way to infrastructure enhancements.

So certainly a wide suite of adaptation strategies came of that. The first strategy really looked at incorporating considerable rise in extreme heats and storm search considerations into some really large port documents for our strategic plan, our design at electrical guidelines, all sorts of risk assessments that we do and actually what's now underway.

Under developed is a stormwater infrastructure master plan so Step 1 was really making sure that we're accounting, updating our plans and policies, accounting for climate considerations in what was existing as well as what was coming.

Also, we are charged with by the California Coastal Commission on issuing harbor development permits. And within the very specific geographic boundaries of our harbor district.

And so we enhanced our harbor

development permit application and that's used by both port staff for port projects as well as our tenant projects.

So they all use the same application form. We really wanted to capture, sort of cast the net wide at the beginning of the process to ensure that development and redevelopment projects we're considering climate vulnerability, sea level rise impacts and extreme heat.

And so with this, HDP application, our applicants use coastal vulnerability zone maps that allows them to locate their project on a map that shows both temporary and permanent inundation potential.

And then really guides them through a process by which they can say, you know, is my project vulnerable? What sort of options might I have for adaptation? And we get them thinking about that and, of course, we work with them on that as we issue permits.

So and then once we went through all that process then we have, we provided a both our

port engineers as well as our tenants with a large suite of sealable rise inundation maps to help them with their own planning and design.

The early maps were based on an old model so back in December 2022 we updated our inundation maps based on the best available science and the latest guidance and here in the State of California.

And those are now, without our, you know, within a GIS system They can, you know, they're very usable, very user friendly. Those maps look at 20/30, 20/50, 20/80, 2100 and 2120 at three different risk aversion scenarios.

And then we have two suites of maps produced. One for the mean higher high water and then one based on more extreme case of the 100-year storm tide.

So these maps have really proved super helpful especially to our own internal staff here at the port as our design team, you know, really assesses primarily larger scale, longer lifespan port projects looking outward.

And so we typically focus port assets of the 20/80 horizon at this point. And that's somewhat standard here at least in my experience here on the west coast as the other sea ports are looking out that far too with the, what we consider like life span or the design life of a port asset.

And that's very different than the cities that surround us. They adapt and evolve differently. Obviously a very different set of stressors and assets and so port infrastructure, you know, it really requires that roughly 50-year life span looking outwards of the 20/80 up to approximately 4.3 feet of rise for the Los Angeles region.

And then for folks on the line here who are working in California and doing climate considerations here in the state, you probably are aware of the newest draft guidance from the Ocean Protection Council released back in late January proposed for finalization in probably early June.

And the port is really looking at, you know, what is that new guidance saying? How does that compare back to the 2018 guidance and what might that change for short and long-range planning? Next slide please.

So this just gives an idea as one of the provide one snapshot of what our maps look like and so right now what you're looking at in the darker grey area is our harbor district.

The is the geographic scope of our port and what you're seeing here is inundation, the blue shades represent inundation in feet and then the shades of yellow to orange-brown represent the over topping potential.

So where we're seeing access points within the harbor for potential inundation and then the areas that are sort of the hatch marks in purple represent large scale proposed or either recently completed or proposed port development from year 2018 onward.

And so you can see some of the, some of the potential impacts on new port projects.

You'll also notice that when you look outward into our harbor district parts of Pier G, Pier J and T, those are the newer developments and so those areas are relatively safe at this point.

At least not the 20/80 horizon. But what we see here in the older parts of the port, North Harbor parts of Pier A, S and B, that's where we see the concern.

These are older areas of the harbor. These are also areas that subsided resulting from oil extraction over many decades and so these are areas of priority.

Certainly of vulnerability and where we'll prioritize assets. Next slide please. Okay, this is actually my last slide. I don't want to spend a lot of time here.

I just wanted to show that the, that this is the mitigation side so while I work on the adaptation side, the, you know, the port has to really take a two-pronged approach to climate.

So we have the adaptation side, how will we evolve? We understand that this, the

issue is upon us and our infrastructure needs to be resilient.

But we also have a really incredible air quality team here working on mitigation strategies. Most of that falls within our Clean Air Action Plan so these are, you know, greenhouse gas reductions, a transition to zero emissions, cargo handling equipment and trucks.

We have a new robust ZEERO Policy which is, you know, all things zero emissions, greenhouse gas reduction strategies. These are, this is a huge point of the, a huge part of the decarbonization efforts here in the harbor.

So I didn't want to leave that out simply because it is really part of our climate strategy overall. And then lastly, we contribute to the City of Long Beach's climate action plan.

So we are one adaptation plan as part of a much larger approach here in the City of Long Beach for reducing local impacts and addressing climate change together with other City Departments. And that wraps up my slides.

Thank you.

VICE CHAIR WARDWELL: Thank you for that great presentation, Justin. We're just about right on time. Rosemarie, you've got the floor so go right ahead.

MS. FUSCO: Can you hear me clearly?

VICE CHAIR WARDWELL: Yes, I can hear you great. Thank you.

MS. FUSCO: Okay, great. Thanks. So thank you to Nicole and to Justin. That was very motivating. This presentation should fit well into the examination of how Federal tools fit into the port resilience on the ground.

And in this case, my presentation will be talking about how we're using academia as a conduit for that implementation. So my name is Rosemarie Fusco.

I am a professional urban planner and a fourth year PhD student in the Department of Marine affairs at the University of Rhode Island. I'm going to talk about incorporating CISA's Infrastructure Resilience Planning Framework into

a port master plan process in the Port of Providence, Rhode Island.

And the Infrastructure Resilience Planning Framework is the IRPF, something that you saw briefly in Nicole's slides so. It's out of the Department of Homeland Security and I'll talk a little bit more about that. Next slide please.

So I just want to go over the project team for this because it is a public-private partnership and then you have academia thrown in there as well.

So this is kind of a great look at how a team would be made to implement port resilience in a wider scope. This project that I am talking about is funded by the Department of Homeland Security as I said through the CISA, the Cyber Security Infrastructure Resilience Agency.

So you or I brings a significant portion of funding to the table in this scenario. However, the rest of the master plan, of course, is funded through bonds attained by the port

operator Waterson Terminal Services.

And through a partnership with the City of Providence because the land is primarily leased from the City of Providence. So in this project, the Waterson Terminal Services, WTS, will be hiring a private consultant as part of the project to run the master planning process.

But they will be collaborating and running the process alongside you or I who will contribute a few components. I'm going to talk about that more, but I just want to say that there are these very significant pieces to the puzzle here.

And so while port resilience is a major component of what we do in my Department and you or I in the MACRL, it's the Marine Affairs Coastal Resilience Lab where port resilience is a key component of our work.

Most of our projects have been funded by the U.S. Army Corps of Engineer, the Department of Homeland Security, National Science Foundation, DOT, Rhode Island Sea Grant.

This is kind of a new component so I just wanted to make sure that landscape is put out there. Next slide please. So the infrastructure resilience planning framework was released by CISA in November of 2022, the end of November.

The IRPF is a Federal framing framework for port planning processes that is mostly traditional, but has some very significant resources and components that support port resilience in a very tangible way.

So CISA collaborated with the Department of Homeland Security Center of Excellence for testing and implementing this Federal planning tool.

They started with a case study in Kentucky in 2019 and they released a request to find other possible case studies after that. And the Marine Affairs Department reviewed the planning landscape that we are a part of.

And because of our robust ties to the port and to maritime resilience in the State of

Rhode Island, we were able to find out that the ProvPort was looking to do their master plan.

The first, by the way, the first master plan for the Port of Providence in history and we were able to bring them onboard as a project champion and allow us to implement this IRPF process through their core master plan right from the bat.

So URI was able to collaborate them with the ProvPort, with the city, on releasing their RFP to hire a consultant and that is still underway. They're in the final stages now of releasing a notifications to the contestants and choosing a consultant next week, I believe.

And we should just say the ProvPort case study is one of three case studies for the IRPF in progress right now, along with Norfolk and Galveston. But I believe Providence was the only one that is specifically in a designated port area. The other planning case studies are in a wider community, more wider coastal community. Providence is, of course, port-

specific.

So here is just a quick look at the study area. The purple parcels are the parcels leased for ProvPort. The orange parcels and the area within the dotted line are going to be the study areas.

So, one of the initial benefits off the bat of incorporating a Federal planning process into this master plan is that it expands the study area and brings the components of risk assessment and components of vulnerability assessments to a wider area than if it was just contained to private port parcels.

And I should mention that ProvPort has been a petroleum port historically and is undergoing a major transformation right now to support the offshore wind industry which is, of course, very influential in the State of Rhode Island right now.

So ProvPort itself, the operator of ProvPort has a need to expand and to incorporate some new types of supportive mechanisms for that

market. Next slide please.

So the overall goal of the IRPF portion of the project are these specific five things. So they, the IRPF, means to incorporate these following tasks into this case study. Right?

But the thing about it is that it is expanding what would traditionally be the core master planning process for ProvPort and adding some new components to that planning process.

So, the inclusion of the Federal framework is actually growing the master planning process beyond what it would traditionally be. And what our role is, you or I's role is, is essentially to see how that planning process is working, how it's being incorporated into this live action master plan for the core of problems in Providence.

And then report back to CISA on what is working, what's not working, what resources are being used, what is valuable, what is maybe not so valuable, what the gaps are and other

things that pop up as we walk through the planning process step by step.

And I'm going to go through some of the IRPF process for you now. But first, I want to talk about the goals of ProvPort's master plan, right, for the Port of Providence because those are very important.

And the application of the IRFP process, its goals overlap with these goals somewhat. But it's important to note that the master plan should already be evaluating the land and land use.

And the other components that are already present in this space that it would ideally target properties for expansion or areas for improvement, ways to grow the market that the port needs.

And it would also have some sort of stakeholder engagement component that would identify ways to benefit the community, things like job creation.

But also other potentially more

environmentally related issues like environmental justice issues or just aesthetic things, and also public access to the water is a really important one for this project.

And one thing that I should add which is very important, the last two presenters talked about, is that a big goal of the master plan just inherently for ProvPort and the City of Providence is to identify, but to create material so that they can be supported to apply for new and large Federal funding opportunities.

And that is something that has already been discussed in the master plan and that's one of the very useful things that will come out of this master plan. So that's a big one.

So, the goals of the IRPF and the ProvPort overlap. There's some major components that underpin resilience and their shared goals. These are some of them.

The stakeholder engagement process will be enhanced and grown because of the inclusion of the Federal framework into this

report master plan. Are you behind me on -- oh, I'm sorry, can you go forward one slide.

Thank you. I jumped ahead, so this is a slide that explains the overlap of the goals between this as a project and the ProvPort's master plan.

So the major components that overlap include things like stakeholder engagement, how risk affects the businesses within the port, and how key infrastructure interdependencies influence the master plan and vulnerability for the port, and then the addition of risk assessment to the master plan.

And this is a big piece of the value of implementing a Federal planning process into the port master plan, is the addition of risk assessment at the level that you or I can provide.

And also a more detailed examination of business-to-business risk and interdependencies within the space. So, next slide please.

So, I want to get into the nuts and bolts a little bit about the IRPF and how we're going to implement that, and just leave you with that.

So the IRPF outlines five key steps as their sections to incorporate into the planning process as existing planning processes. In this case, a live one that enhance resilience by addressing like critical infrastructure dependencies.

And to support these five steps, it provides tools, guidances, things that are very basic like a meeting facilitation guide to things that are more advanced like mechanisms to fund resilience and solutions.

So, within these five steps, we are taking some and implementing them through your eye and then some are going to be done through the consultant and the ProvPorts portion of the master plan.

And you or I is contributing the identification of critical infrastructure and of

highly detailed risk assessment beyond what would traditionally be done in the master plan.

And the consultant's role in this, so the private sector's role in this, is to help develop actions and the implementation and evaluation that comes later in the planning process.

But we are going to work together on the laying of the foundation, which is like identifying project champions and designing the stakeholder engagement strategy.

Those are going to be things that are very collaborative. Next slide please. And here's a little more of the nuts and bolts so you can see this is a, what is going to be a very basic outline of the master plan components.

The orange items, community engagement and infrastructure and dependencies, are things that are being added because of the IRPF's role in this port master plan.

And the blue items are things that you or I will take the lead on because of their

inclusion in the process and grow beyond what would traditionally be in the port master plan because of funding limitations and just other capacity limitations.

So, the community engagement plan is very, is going to be something that's significantly influenced by the IRPF. We already know because the stakeholder engagement strategy due to other Federal resources like the Metropolitan Transportation Guide is, are going to have big roles to play and are already influencing the way ProvPort thinks about their stakeholder engagement plan.

So, next slide please. And so, just a little bit about the value of including academia in this type of case study. You or I will be using two major platforms that are developed through the University.

And used at the state level to further -- to grow the risk assessment component of this master plan. So RI-CHAMP is the Rhode Island Coastal Hazards Analysis Modeling and Prediction

platform.

And that is a deterministic platform that uses storm scenarios with a very high resolution mesh, coastal mesh, so that you can have very specific idea of what impacts from natural hazards there will be at a very specific point.

And that coupled with data that we collect when we visit the site and talk to business owners, we get very detailed information about like where a doorway is, the things that are very important on the ground.

Where a generator is, and that information coupled with the scenario, the scenario storm modeling from the deterministic models gives businesses, organizations or at the state level, very specific ideas of what they can expect in a given scenario and how to prepare for that.

So this RI-CHAMP is used by the emergency management organizations in the State of Rhode Island. And the other component that

URI uses is called STORMTOOLS. And that's a probabilistic model so 10, 20, 30 year probabilistic model that's used in long-term planning.

And that, this platform is used by the state of Rhode Island when examining land use changes and other permitting aspects. So, the combination of those two things really gives you an idea of the type of risk and vulnerability in different areas and different parcels and change over time.

And one thing that we learned from doing this already is that sensitive information and security is really important to some of the core components that we deal with, particularly small businesses.

So, we are -- in this project with the IRPF, we are going to provide individualized risk assessments to the businesses that participate with us, and that will contain sensitive and confidential data that they do not agree to have us share with anybody.

But they will get that information so that they can increase the resilience in their capacity. But the public access information and information that we are allowed to share will be the component that goes into the publicly available master plan.

And that is part of a larger picture that will, that goes into the two models that we'll also be providing to the master plan. And next slide please.

So, and then a little bit about the stakeholder engagement because it's so important, right. So, the port master plan would normally have a baseline engagement that would be dictated by the City.

And I think it's, yes, so for core community meetings and awards and a public engagement of -- a public hearing rather -- at the end of it.

But because the IRPF process is being involved and because URI is going to help design the stakeholder engagement strategy, there will

be more expansive involvement.

And the involvement will start earlier on. So, there's going to be a stakeholder mapping exercise, and because of URI's robust ties to community groups that are already in the area, the people's port authority and other active groups, they will be brought in earlier in the process.

So, it's kind of like a, think of like a double bond, it's more of like a connective tissue that is able to be added to this process and just strengthen the process from the start to the end.

And so, with that said, the stakeholder engagement has not started yet. The consultant is about to be selected and we're really excited to get started on this. So, next slide.

I'll show you where we are. We're just in the second phase of the project where we start our risk assessment and we design our stakeholder engagement.

And the data collection should take place over the late spring and into the summer with the report out at the end of the year. So, hopefully we'll be back in front of you with more findings from this research.

And a really good look at how to live action a Federal planning process into a local master plan and report. And this is a small examination of it.

But I think we'll have some really important information to report back to CISA, so we're very excited. So, if you want some more information about this project, you can contact our principle investigator, Dr. Austin Becker, and the Chair of the Department of Marine Affairs here, myself, or one of our Coastal resilient specialists.

And so hopefully we'll be back with you at the end of this year. So, thanks for having me.

VICE CHAIR WARDWELL: Thank you very much for that, Rosemarie. That's a significant

effort that you're undertaking. Let's see, so now we have 20 minute -- less than 20 minutes or so for discussion.

I don't know if the Panel Members can turn their cameras on or if that's going to slow things down for the interpreters. But --

MS. CHAPPELL: Nathan, I think if the Panel Members who want to make a comment just turn their cameras on so we know.

VICE CHAIR WARDWELL: Okay, sorry for the confusion. I was just thinking about the speakers, not necessarily the HSRP Panel Members, but I guess as you have a, if you have a question, just turn your camera on.

And I would also offer the opportunity to Nicole also if she has questions or input while we're, people are gathering their thoughts from the great presentations we just had.

MS. LEBOEUF: Yes, Nathan, I'll buy a little time. I just want to thank our invited guests. Those were really amazing and impressive conversations.

And I would love to think that our ports around the country are all as well off and as far advanced as moving out as much as Long Beach and Rhode Island.

And maybe they are, but if they're not, I think we're also standing by to help understand some of that and how we can spread those best practices through port-to-port sharing and other means.

Anyway, just so excited to have this conversation teed up and would love to hear more from the HSRP about what they see as some needs there.

And just for our invited guests, a quick, I guess, sort of point of clarification. The Hydrographic Services Review Panel advises the NOAA Administrator on a range of issues associated with, you know, this and other things in the marine transportation and navigation sectors.

So this, anything we hear from them that we can take to heart and then build right

back into a partnership is with you also. Anyway, that's all I've got.

VICE CHAIR WARDWELL: Great, thanks, Nicole.

MS. LEBOEUF: Yes. Hopefully that bought some time.

VICE CHAIR WARDWELL: You broke the ice for us to now -- I love this --

MS. LEBOEUF: That's right.

VICE CHAIR WARDWELL: There's a new Panel Member that looks like she has a question, so Rebecca, why don't you go ahead? And I think you're on mute, Rebecca. I can't hear you.

MEMBER QUINTAL: Thanks. Rosemarie, enjoyed your talk. I'm a fellow Rhode Islander, so it's very pertinent for me. I'm interested in the RI-CHAMPS.

I think that was the right tool that you're using for predictive -- for coastal hazards for the port. And you mentioned, you know, having in the data base, you know, where doors are, where generators are, et cetera.

I'm wondering if it also includes dwellings that are below ground floor. I'm thinking about Hurricane Sandy and, you know, just walls of water coming into people's apartments and, you know, how dangerous that was.

Is that kind of information included in the model?

MS. FUSCO: That's a, can you hear me okay? Yes, okay. The answer is a little bit -- there are a couple of things, parameters here, so our data is only collected in areas that are designated under our projects.

So, and that doesn't often include residential. So, in short, we don't often -- like I have not collected any data on underground dwellings so far.

However, the data collection model, and the process that we use, and the platform collects all information about the facility that would make it vulnerable or have inundation points or have a component that would result in cascading consequences for the property and for

the area.

So if we collect data on a building that has an underground residence, we will collect information on that. And, specifically, on what points to the exact location, what points would be vulnerable for that specific place.

So, for example, if it flooded on one side of the building and not on the other, we would know if an inundation point had been affected by the water.

And which points were vulnerable. So, that's the essence of it. So, not many residential points so far, but we're always growing the data base.

MEMBER QUINTAL: Thank you.

MS. FUSCO: Thank you.

VICE CHAIR WARDWELL: Julie, go ahead.

MEMBER THOMAS: Yes. Oh, Qassim too. I don't have to go first, but do you include the storm drains, Rosemarie?

MS. FUSCO: Yes. Yes, Yes.

MEMBER THOMSAS: Yes. So that does a

lot to also, I think, predict some of the underground or the flooding that might happen. Yes, thank you all for your comments.

It was really interesting. Nicole, I kind of laughed because I thought oh, my gosh, I knew she is really going to like hearing here that Houston has the highest, what was it, natural disasters or something.

I thought, well that's very appropriate for this Panel to know. Justin, I also note, well I'm from San Diego, but it was interesting, your climate guidance from state agencies.

I kind of have followed CoSMoS, Cal-Adapt, OPC, Scripps actually has some inundation work, and I find -- and this goes a little bit to what you both spoke about, Rosemarie too, with the stakeholder engagement.

One of the things that I get push back a little bit is when I attend a stakeholder meeting or even I'll say my local City Council sometimes they have asked me to come.

And it's like, you know, we had -- I mean climate change is so unpredictable, but it's just unpredictability, like how do we deal with it? Which model do we follow? Which publication do we follow? Which IPPC graph do we follow?

And I'm just wondering if you found that in dealing, and I find it's very hard to talk with stakeholders because they have, many of them are already very educated on a lot of facets and have already said, yes, we have a problem here.

And almost many different agencies, people have gone to them and said what can we do to help out, but then when it comes right down to it, you know, there could be either a dearth of information or you have these models that sometimes don't agree.

So, I'm just throwing that out there. Maybe both of you could comment on that, Justin and Rosemary, like how you're dealing with that.

MR. LUEDY: Sure. I can comment. This is Justin. And pardon me, I don't have

camera access through the GoToWebinar program so only voice for me today.

MEMBER THOMAS: No worries.

MR. LUEDY: But that's a great question. And you know, we talked a lot about, by the way I should have mentioned in my presentation that we use the AECOM for the production of our adaptation plan and our inundation mapping.

And they're a fantastic team in the Bay area and so they certainly deserve that credit. And for us, the OPC model, you know, here in California we're such a different animal in so many ways in the state.

And when it comes to, you know, coastal resiliency planning, OPC, the Ocean Protection Council guidance really is the best for sea port planning.

We, first, we are privy to the California Coastal Commission and the California State Lands Commission. And so those two agencies really do sanction this, the OPC models.

And so, it made the most sense for us to use that model for inundation mapping of our harbor district simply because we knew we'd have the congruency there with, you know, with the state agencies.

They are, they approve our coastal development permits and they have quite a purview over sea ports here. And so that was, you know, to me it was sort of a no-brainer in a sense that we would use the OPC model.

But we have looked into the past at CoSMoS. The City of Long Beach used the CoSMoS model for its inundation mapping as part of their climate action plan.

And so we're always certainly aware of the other models in place, but OPC really was the more appropriate choice for our port.

MEMBER THOMAS: Okay, great. And Rosemarie, what has your interaction been with the stakeholders? Have you had enough interaction already to have any feedback like, you know, what you --

MS. FUSCO: Yes.

MEMBER THOMAS: -- can tell us?

MS. FUSCO: Yes, so there is, so the Waters and Terminal Services of the Port of Providence and URI both have active and robust connections to the neighboring communities.

And then communities around Rhode Island as well in regard to like port planning and the interaction of the port with its neighbors and the impact of the environmental outcomes of the port on the neighbors.

And I feel like this is a good moment because you get to hear from Justin in a very kind of large port community and then from me where port of Providence port community is very small compared to California.

And for us, the neighboring communities for ProvPort are low income or multi-lingual and they are organized and already have a lot of information and have a vision for what they would like to see from the port over the next 10 to 20 years.

So we have a really good starting point. But one of the things that is problematic is that the information that everybody uses is different as we say.

So one of the things that helps us is we use these different types of modeling platforms to show the audience, the end users that there are varying degrees of information.

But, even though there's uncertainty, what is certain is that things are going to change, right? And so what is certain that there is going to be a level of impact even if we don't know what level of impact that is yet.

There is going to be impact. And so, just saying that for everybody is like this unifying force and it kind of just, it adds a sense of cohesion like we're all working towards the same goal.

And so we've seen that over past interactions. We'll see how this port master plan works out. I think there's more at stake now and we're, the conversation is changing a

little bit because the port is undergoing transformation and engaging with emerging markets.

So we'll see how the conversation hashes out now, but we have found that despite the level of uncertainty and the myriad sources that can be used to contribute to this conversation.

Just saying that we, you know, that there is the need for adaptation or the need for resilience as a starting point. I hope that answers your question.

MEMBER THOMAS: Sure, thank you. Thanks, Nathan.

VICE CHAIR WARDWELL: Yes, thanks, Julie. Qassim, yes. Why don't you go ahead.

MEMBER ABDULLAH: Yes, thank you. Thank you both. Thank you, Nicole. Great information, Justin and Rosemarie. I have a comment and a question.

And please don't feel obligated if you don't know the answer because probably you're not

involved on the concept of digital twin element I want to bring.

Because looking at the two ports and for two sea ports the digital twin will come as a big help in case of climate change emergency planning, that sort of plan, and digital twin I'm talking about like both have physical digital, no digital replica for the physical environment of the boat.

Everything there, navigation tunnel, building, the utilities and that will help a lot. In cases like this it will help in assessing the risk and getting mitigation strategy for it.

So I'm wondering, especially for Rosemarie, with the master plan for Rhode Island, are they thinking of building digital twin? And, Justin, is the same way.

Do you know if there are -- I'm pretty sure there isn't, didn't exist, but are they going that way? Are they thinking that way to build the digital twin for their ports? Thank you. Qassim out.

MS. FUSCO: I'll answer for me. I actually don't know. I haven't heard any, that has not been brought to the table when I've been there. I have not heard of that, of them doing that. It's a great, great question. Maybe I'll bring it up.

MEMBER ABDULLAH: Thank you.

MS. FUSCO: Thank you.

MR. LUEDY: I agree here. This is Justin. I'm not aware of that either, but a great question.

VICE CHAIR WARDWELL: All right, thank you, Qassim. I'm glad you got your digital twin in there. I'm waiting for it patiently.

MEMBER ABDULLAH: Yes.

VICE CHAIR WARDWELL: Mary Paige, why don't you go ahead? And we have, we might have a little bit of extra time here. And so if there are questions, go ahead and try to get them in. All right, Mary Paige?

MEMBER ABBOTT: Great, thank you. I enjoyed listening to both of the presentations,

especially because they, both East and the West Coast being represented.

And my area of, my focus is that of the recreational boater. And when I listen to the presentation speaking about ports, I don't want anyone to forget about the public and private marinas that are used by the, by the boaters in the area.

And a lot of time, the access is the exact same physical water base. It's just gone non-commercial. It's a recreational standpoint. The economic impact of a recreational boater in the United States is about a $230 billion annual impact.

We've got 12 billion, excuse me, 12 million registered recreational boats in the U.S., and in Rhode Island for instance, it's a $1.7 billion economic impact with over 7,000 jobs that are impacted as well as 381 direct businesses.

So as a stakeholder in Rhode Island, and then the numbers in California are a tad

larger by additional zeros, but regardless, the point is, hopefully the stakeholders are including this in a huge, huge group to the data collection as well as the impact on that.

So I just wanted to make that statement and hear an affirmative from both of you that you are including us.

MS. FUSCO: That's a great, great point for the ProvPort master plan. There, so far, is no plan to include those stakeholders in an active way outside of community meetings.

So I'm glad you brought that up because I am going to bring it up to our next team meeting. I think, are you in Rhode Island, this is a hot topic in Rhode Island because Rhode Island's economy so greatly depends on our recreational boaters and also our fisheries.

So the impact of the increase in port traffic through the Narragansett Bay has a significant potential impact for the State of Rhode Island.

So it's a part of the master plan in

process, but I think that, I'm glad you said this, because I think it needs to be brought up more specifically next time we talk about it particularly once the consultant is selected.

MEMBER ABBOTT: Perfect. Perfect, thank you.

MS. FUSCO: Thank you.

MR. LUEDY: And for us here in Long Beach, the Port of Long Beach actually highly discourages recreational boating. It's something that our Harbor Patrol and others really just, we just really try to, I wouldn't say it's strictly forbidden because it certainly happens, but we really try to avoid that.

We only have one it's like a sportfishing organization. They're actually located outside of our harbor district, but they do use the port for transiting and navigation.

Obviously, that's what generally occurs further out off the coast outside of our break waters. But we don't, we didn't account for recreational boating in our adaptation plan

simply because it's not what we don't see it as a stakeholder.

Now Port of Los Angeles is a different story. Port of L.A., our neighbor here in the port complex absolutely has commercial fishing and boating and so they certainly had to account for that.

But here in Long Beach, there's just not something that we do. The City of Long Beach in its own climate action plan does account for that.

Obviously, we're a large coastal City here in California and so that's been taken into account. But in the harbor district, specifically our plan does not address it.

MEMBER ABBOTT: Interesting. Interesting, I appreciate that information and thank you for sharing it.

MR. LUEDY: Sure. Although we do have one fishing pier that we consider to be public. We, it's specifically designed, we put fishing platforms but the angler can, we did want to make

sure because there is sustenance fishing here in our region.

And so we did want to account for that, but again, that's just the fishing community.

MEMBER ABBOTT: I have a question and then please don't consider me flip on this, but so I'm a boater. I was a sailor and stink potter.

But the point is, you know, I might need big signs out in front of your port or in the channel saying recreational boaters not wanted.

So it just, that concerns me from the standpoint that not everybody has the choice especially if there's a dangerous situation occurring, being occurred, but I'll have to take a look at my ENCs and my other data available to me as a recreational boater as to what's keeping me out of that, out of that harbor. But thank you very much.

MR. LUEDY: Yes.

MEMBER ABBOTT: For sharing that.

MR. LUEDY: Sure. And in short, the response to that in short is just really based on the industrial nature of our port. We are a huge marine terminals. Right?

With lots of private and public facilities and intense shipping traffic and so it's just not the appropriate environment in terms of recreational boating. So that --

MEMBER ABBOTT: Got you.

MR. LUEDY: -- would be the reason you probably would get from others on our staff, yes.

MEMBER ABBOTT: Okay, thank you.

MR. LUEDY: Sure.

VICE CHAIR WARDWELL: All right, great. Thank you for that. So we have two more minutes I believe and I see Nicole and Julie up here and I have a question too.

I don't know if I can fit it in there, but Nicole, why don't you go ahead and we'll see how much time we have left.

MEMBER ELKO: Okay, I'll try to be

quick. I was having glitching weird issues with my software when you all were presenting so my question is, you may have said this already and if so, I apologize.

I understand that you did a lot of modeling, inundation modeling, but then are you looking ahead to a certain time, 2050 -- some year in the future?

And are you adding an amount of inundation on top in planning toward that time? And I ask because NOAA has a fantastic report published with the interagency Panel that a lot of our coastal communities are using, you know, with the one foot by 2050 guidance.

MS. FUSCO: Yes, so Justin, do you mind if I? I'll go quickly.

MR. LUEDY: Sure.

MS. FUSCO: So far in this master plan, the planning horizon is not set yet. It's likely to be 75 years. And with that planning horizon, then we will zero in on what exact scenarios we're going to use in our deterministic

modeling.

And then the probabilistic modeling, how that hashes out and which curves we're going to use, but we will do inundation on top of sea level rise. Absolutely, so that's absolutely a part of all of the models we'll use.

But so for us, we just don't know yet what it's going to be because the planning horizon isn't secured. As we move through the next three months, then they'll know in the plan. Thank you for asking that.

MR. LUEDY: And that's ultimately the same for us here in Long Beach. So we were over the last few years and in our work, were in this large phase of largely development projects and most of them have been designated a 50-year lifespan.

And so for that reason, when it comes to the early stages of program management, engineering, the design and development of engineering drawings and plans right now, we really look to the 2080 horizon per the Ocean

Protection Council Guidance.

And that really helps us to understand sort of based on the life span, average life span of a port infrastructure and redevelopment project. We'd be looking as a 2080 and then, you know, obviously that will shift and change over time as we move forward on projects.

But that's really where we look right now unless it's a critical facility, something that the Coastal Commission has been, has designated as critical which typically is water and transportation assets.

Then we might look beyond to 2100, but that's pretty uncommon for us at this point.

VICE CHAIR WARDWELL: All right, thanks for that question, Nicole. All right, since I'm the moderator, I'm going to try to fit in my last question here, Sean.

I see you hop in there, but I figure I should get an opportunity. So there's a lot of data sources out there and a lot of places where these data can be accessed.

And being provided by NOAA, you know, as this Panel, you know, our role is to advise the administrator on what other needs are out there.

And I don't know, I just want to ask the question and provide you the opportunity if there are any gaps in the information you need for doing your assessment?

And, yes, if you have identified any gaps in data or products, to do your assessment and there's a way that NOAA can help with that.

MS. FUSCO: I'm sorry to say that's the hot topic and that's the goal of the project that I presented to you really is so we hope to identify some of what those significant and impactful gaps are in the resilience world of port planning.

And see if the Federal planning process of the IRPF contributes some solutions to those gaps or if there are some barriers to implementing the IRPF, for example.

And what those barriers are so I think

I don't have a specific answer for that because that is a question that we're working on and I think probably one of the most impactful for port resilience right now.

MR. LUEDY: And in the interest of time for me, I'll really point to heat. I would say, you know, we've got a lot of great, excuse me, great guidance on sea level rise.

But extreme heat I think would be something interesting to see, you know, more reliable information in modeling that could help us plan for -- especially with our energy resilience efforts and initiatives here.

VICE CHAIR WARDWELL: Okay. Great. You've heard that. All right, I'll hand it back over to you, Sean. I believe you're on mute.

CHAIR DUFFY: Good, yes, right. So one of the things we really didn't get to touch on yesterday I'm going to hit real quick is this is both Nathan's first time moderating and first HSRP as Vice Chair and my first role as Chair, so there's a lot of moving pieces.

I'm going to try to keep it all on time and be quick. I wanted to thank Ms. LeBoeuf, Nicole, excellent idea of Panel. As a Louisiana, Mississippi River person a port resilience is one thing.

I also have a concern related to waterway resilience. The most resilient port here may not survive some of the changes we see, but with that, excellent Panel, thank you, Nathan.

You did a great job. I'm going to turn it over to Admiral Evans. I think we have a public comment period, but I will silence myself, sir. The floor is yours.

RDML EVANS: Thank you, Sean. And I just want to, before our Panelists jump off, I want to thank them for their input and their time as a really outstanding discussion and I'm glad we were able to extend it at that.

But at this point, we are at another public comment period. This is a request for public comments and attendees are encouraged to

enter their comments in the question box.

Please target your comments to the HSRP Members and NOAA, focus on what NOAA can improve for the navigation observations of positioning products, data and services.

This is not a request or an opportunity to ask the presenters questions. So I'm going to turn this over to Ashley Chappell to read and summarize the comments we're received.

We will show the comments on the screen and they will be collated into a document shared with the HSRP Members and NOAA. After the meeting, the comments will be posed at the HSRP website included in the public record.

So, Ashley, can you please show us and summarize the comments.

MS. CHAPPELL: Sure. They should be on the screen. Hopefully you can see these. Thanks, Amanda, for posting them. So actually, Captain, Carolyn Kurtz generated a lot of comments after I think it was Mary Paige's question about standardization of PPUs.

So Frank Rabena from Virginia Pilots just notes that you can't always generalize expertise across local areas so it's a good clarification.

Jon Dasler also has a comment noting that the Coast Guard doesn't -- purposely does not regulate PPU software in order to drive flexibility and noting that regulation can impede and slow progress with customized displays and the like.

So, you know, noting how unique each port area is. Guy Noll also building off of Captain Kurtz's comments actually poses a question to the HSRP so you all might just take a look at this.

To pre-qualify ports for their survey data incentivizing port communities toward ownership of the port approaches of their information assets and encouraging funding for maintaining under keel clearance and air gas.

So this is information infrastructure, not just physical infrastructure. Lindsay Gee

also comments on PPUs and he makes a leap in this comment from, you know, acquisition of surveying data to certifying a port who compiles their own ENC or updates, ENC data, you know, within their area.

So that is a big jump from our external source data process now, but something to think about. I'm going to skip ahead. Bob Moshiri, Johnson Outdoors appreciated the comments from Mary Paige in support of recreational boaters.

And reiterates his comment from yesterday about more emphasis on surveying near shore areas and the Great Lakes. I did see, I'm going to jump to it.

This will be a little more ragged because this came in after we had updated our sheet. But Lindsay sent, submitted another comment about the Alaska Coastal Mapping Strategy and the imbalance of services delivered to underserved communities.

Has there been any discussion or

progress on establishing a similar strategy for the remote Pacific that has the largest unmapped area in the EEZ?

So this brings us back around to our bathymetric gap analysis and ties in underserved communities as well. So we will get that comment posted into this document during the break.

And if we, Admiral, what do you think, do we have time to open the phone, open the line rather?

RDML EVANS: I think we should. We got a couple of minutes here and so I assume it's technically feasible that if there are any attendees who would like to make a verbal comment, again, addressing NOAA or the HSRP Panel Members, we can, we can open the line at this point for them to do so. But I believe there's a hand raise --

MS. CHAPPELL: Excellent.

RDML EVANS: -- raise function for the --

MS. CHAPPELL: Exactly.

RDML EVANS: -- attendees that they can use to signify their interest in speaking.

MS. CHAPPELL: Exactly. There is a hand raise function and then we can turn your microphone on. And you could also keep that in mind for tomorrow's public comment too.

If you're not prepared today, but want to say something tomorrow. All right, I'm scrolling through and I don't see any raised hands.

RDML EVANS: Me either.

MS. CHAPPELL: So why don't we wrap up this public comment period and look forward to tomorrow's. All right?

RDML EVANS: Yes. I think that makes sense. Thank you to everyone who submitted public comments. There's a lot of really good questions embedded in there which we'd be happy to dig into further. And some outstanding ideas.

At this point, I believe we have a break coming up so I'll turn it back to Sean briefly for any closing comments before the break

and to take us out.

CHAIR DUFFY: Thank you, sir. So we do have a 15-minute break. I like to hit some quotes every now and then. I'm going to read one of my favorites from Steve Jobs.

It kind of goes with my approach to the Panel Members. To build a strong team, you must see someone else's strength as a compliment to your weakness and not a threat to your position of authority.

I thought that was very fitting. Counting on a lot of you to help explain the hard stuff to me. But with that, look forward to reconvening in 15 minutes and we officially have a time out.

(Whereupon, the above-entitled matter went off the record at 11:00 a.m. and resumed at 11:18 a.m.)

CHAIR DUFFY: All right, well welcome back from break, everybody. I see Nathan was noted on here, but I'll just go to turn it over to capable hands of Eric and Mary Paige on the

working group discussion on issue papers. The floor is yours.

MEMBER ABBOTT: Well, good afternoon and first what Eric and I have just to quickly review, we have decided to split the responsibilities here.

And he will be championing the issue paper focus and I will be helping maintain the matrix and such. And as such, we are not going to take a look at the matrix at this moment.

We were going to go straight into the issue papers as those which have been presented to the group and Eric, you may have the floor.

MEMBER PEACE: So good afternoon. We've got to the point where we have the geodesy issue paper was complete and posted. So that one is finished, the geodesy crisis.

The second one that is currently awaiting approval is the digital twin. So in your, in your documents, you'll see that the results were in paper which has been drafted and has been put in there.

It's got the top part like six, seven down on the actual Google drive. Has anybody had a chance to look at it? I guess a better way to phrase it is, anybody not had a chance to review the final draft of the digital twin paper?

It's dated the 25th of February of this year.

MEMBER THOMAS: I think that I'm good with, this is Julie, Eric. And I think that my changes or edits were included in that so that's fine with me.

CHAIR DUFFY: This is Sean. I'll just say I second that. I saw we made a bunch of changes, been edited a bunch, but I'm fine with the version as discussed.

MEMBER PEACE: Like I said before, is anybody not ready to vote on the digital twin paper as to whether to move forward with it? All right, great.

I guess then we take the vote at this point. It sounds like it's been seconded, first and seconded by Julie and Sean and all those in

favor, say aye.

(Chorus of aye.)

MEMBER PEACE: Any opposed? Thank you. Great so the digital twin paper will go forward from here. And with that said, I won't belabor the point.

I know Qassim has been definitely looking forward to this day with the digital twin. But --

MEMBER QASSIM: I am now.

MEMBER PEACE: Moving on, is there any other additional digital twin papers or excuse me, not digital twin, any additional papers we want to put forward or propose working on?

I know Deanne had talked a little bit about the sand waves. I don't know if that's still in her consideration if anybody else wants to get on that or if there's any other topics that we want to bring up for an issue paper.

MEMBER QASSIM: Eric, I have suggestion. We are probably going to or we are planning to discuss it next, the technology

folks, as you ask I can just bring it up as a placeholder.

We are thinking about the importance of interoperable land and sea which is connecting all our coastal bathy data, the BlueTopo to the 3DEP, the NWLON, the USGS.

It is very important for all the things we are talking about coastal resilience, modeling, we really need that connection. So I'm seriously thinking about drafting after I talk to the few individual, Admiral Evans at length for me.

I didn't have a chance, I was focusing on the digital twin. But after this meeting, I will start brainstorming with NOAA staff on it and see what we can do. That's all I can say now.

MEMBER PEACE: Okay. And Deanne, are you still with us?

MEMBER HARGRAVE: Yes. I'm here.

MEMBER PEACE: Any further thoughts on the sand waves?

MEMBER HARGRAVE: Well, they're still out there and they're still moving around. And I think about them a lot. But I may be unique in that.

Although, you know, I did hear, you hear about it, tangentially in a lot of the other conversations, coastal resilience, the presentations we've had in the last day and a half. I think it's still relevant.

I'm not quite sure if it's quite ready for a paper just yet. I really like the idea that Qassim just floated about the transition between offshore and onshore.

And I think that it's a little bit related to building the mobile seabed as well. Like that's a, that could be a component of that issue paper or the transition issue paper could kind of have some bits that come out of it.

And one of those more focused areas could be the sea bed mobility or, you know, other things of interest. Yes, that's just kind of where my head's at, at this moment.

I don't know if others of you have had a chance to think about that as well or have other thoughts the seabed mobility.

MEMBER PEACE: Well I do and the reason I say that in particular to the Great Lakes here we're typically a shallow essentially. I mean, yes, we do have beds, but we've seen, I hate to say this because again, I look like a crazy man out in front of an icebreaker.

But the lack of ice out here on the Great Lakes and the increased intensity of storms has driven more sediment along the shoreline in that open water and moved it into the harbors as opposed to tributaries dumping sediment in. We're actually getting more movement on the bottom which is shoving sediment into the harbor entrances. And it's also moving into our track lines out in open water where those essentially a sand waves are pushing up because of the heavy winds and stuff that we've been getting in the storms.

And then couple that with staged in

Lake Erie, which is a big, basically a big bathtub. It's sucking sediment back and forth between Buffalo and Toledo and pushing it into those harbors as well.

And so I think it's an interesting topic. I think it's something that we could predict or maybe look at those a little bit closer. Maybe it's something we look at in the future, but I think it's something important.

MEMBER HARGRAVE: Yes, I think, I think it ties to the really the conversation we've been having here about I mean to be able to predict sand waves, you need to have data.

You need to have the bathymetry data, the exact kind of data that NOAA produces fantastic, right? But not just at one point in time. Right? Not the data from 1948.

You need to have sequential data that you can use to analyze that fourth dimension time. And so I think it links to kind of a broader topic of you can build a, you can build a model at any point in time and it's a great model

for that point in time, but things change.

And so, the model is only as good as it was when the inputs were valid. And so the more and more that we build tools that are great tools and we're using those and we become dependent on those, the more important it is that we're able to add new data.

And continue to keep the tool or the model relevant, otherwise, it loses its effect. And the key bit there where I think, you know, maybe we can help explain the importance of that sequential data or repeat surveys, is where it comes into the budget in thinking about okay, if you, if you want to build a tool, you have to plan for not only building the tool, but for maintaining it for the lifetime of the usability of that tool. Right?

So I don't know, my brain just went on a little bit there at the end. Sorry for that.

RDML EVANS: Julie, did you have something?

MEMBER THOMAS: I do. I was thinking

about the seabed mobility during these talks today, Deanne, and that issue paper. And I'm wondering if it doesn't fit more with the, and Nicole Elko should definitely chime in here.

But there's been talk of sediment movement, the channel of Long Beach, some of the coastal resilience talks and what Eric just commented on the Great Lakes.

I'm wondering if we don't want to make it a little bit broader than just, you know, wind farm seabed mobility, but talk about the influences or the challenge of sediment movement, seabed movement, seabed mobility, sediment management, whatever.

And we could wrap it -- you know, I think that there's people on this Panel that have expertise in a certain area that they could contribute a paragraph as another example or something like that.

And so we kind of tie it into a larger picture of sediment management and how do we monitor, how do we observe that, how do we

monitor it, the effects, whatever?

That was my thought. Great issue paper. Nicole, do you have a comment on that?

MEMBER ELKO: I do, thanks, Julie. That's okay, I'm expecting Julie's remarks that I was thinking the same thing like, you know, I think in my mind the goal of this paper should be to motivate the cause of the themes coming. Right? We need more data in the near shore, and this is one very, very compelling reason why. And then we can link it back to the NOAA mission as like resilience navigation of others.

Yes, it's just, you know, when it comes to sediment for me, this is like my world and Tuba's world and, you know, trying to narrow it down is a big challenge. We struggle with that and --

MEMBER THOMAS: But I think we should take advantage of your expertise, both of you and Tuba and some of these challenges that other people on the Panel are seeing, and, you know, I could see an issue paper coming together that was

kind of this larger picture and whether or not we do the topo hydro, I hadn't really thought of merging that as an issue paper, because to me that might be such a big challenge. I don't know enough about the actual status of that or what efforts have been done and so I guess that would leave it up to I don't know, Evans and Qassim to see if it would be merged in.

But, you know, all of these topics I think are good is what I'm saying.

CHAIR DUFFY: I'd just like to jump in real quick and say when we were talking about offshore, I didn't have much to say, but sediment transport on Mississippi River is a huge issue, not a great deal of information.

I will throw out that I mentioned I think at the last meeting I had co-authored a paper with some scientists from Tulane Coastal Studies.

We are, they invited me back for a second goal and that is related to sediment transport on the Mississippi River. I would just

say, I'd like to see it, of course, I'm not the scientist on this, but I would be happy to share that information that came from other scientists just to help improve, but I'll even say we call sand waves sediment kind of moving on the bottom of the river. Probably not the most accurate scientific term, but it's what a lot of the CORS and Pilots Navigation Members talk about where those speeds sometimes of change in draft or change in water depth of over five feet in a 24-hour period. So very relevant, like to see this happen and contribute. Thank you.

MEMBER PEACE: Admiral Evans, do you have something?

RDML EVANS: Thanks, Eric. I certainly, you know, I'm always sensitive to my role here and these discussions and don't intend to tell the Panel it's business.

I would just offer that we could, if the Panel is interested, work to put together a discussion at a future meeting or a future working group meeting focused on seabed mobility,

where it matters, where it doesn't, the various tools and techniques utilized or available to tracking it.

Because not in all cases do you need to perform a full re-survey. They're remote sensing techniques and others that can be utilized to help with recognizance to identify these areas with where the seabed is moving.

And I would offer that could be a first step to get us all a little bit smarter on the topic before going ahead to an issue paper. That said, if the Panel feels that they know what they need to know on this, and they want to move ahead, it's not my place to stand in the way of that. I certainly wouldn't want to, but I would just offer that through the meeting process we might be able to pull this together a little tighter.

MEMBER ABDULLAH: So, Eric, if I can add to this, maybe it's a good idea to plan on a Panel on the topic in the next meeting would be good. I think that's what Admiral Evans probably

alluding to. I think it would be a good to educate ourself more about it.

MEMBER OZKAN-HALLER: I agree. I really like that idea. If I can jump in, may I? I think this topic also dovetails really well with what we heard yesterday about Long Beach hardware.

And we talked about how they, you know, generally enjoy a bathymetry that varies relatively little compared to some of these other places like the Mississippi River or yesterday too I mentioned the mouth of the Columbia River.

Not the Columbia River, right? Four million cubic yards of sediment dredged every year. That's like, that fills up multiple Empire State Buildings with sand every year.

I mean, that's all sand that fills in and we don't actually know if that happens during the first storm or the last storm or, you know, equal amounts over the course of time so there's a lot there.

And Admiral Evans, I also liked your

comment about there are, you know, technologies. There are ways of observing the bottom changing once we have a baseline.

And so it would be really good to have a session where we can talk about some of those innovative new ideas and yes, and family certainly ties in, ties in with, you know, offshore wind development and things like that too.

I wonder though, like how much does NOAA view sediment as its, you know, as its main worry or issue? Is there, am I reading, is there an issue there at all?

Like is that something that NOAA's like oh, no, that's somebody else's purview and not ours? Thank you, Ben, for coming online for that one.

RDML EVANS: Sure and I'll try to address that. And I would, you know, ask any of the other NOAA experts or office directors who may have an opinion here to offer it and I think that, I think the answer to that is it depends.

Certainly from the Hydrographic Services Review Panel perspective, from a purely navigation perspective and from a, you know, where is the seabed?

You know, we care about that because that's our job. Right? We, you know, our job is to ensure, you know, that fundamentally safety of service navigation within U.S. waters more generally provide accurate seabed model water levels geodesy that support a wide range of navigation and non-navigation uses.

And certainly seabed mobility sand waves, sediment transport is part of that because it affects the answer. Now as a practical matter, but do we regard, you know, the science of tracking those, of tracking sand waves for instance?

That is less squarely in our wheel house. That's probably more say a USGS emission, understanding the physics of how and why sand waves move.

There may be other pieces of NOAA that

have a strong interest in that potentially in the fishery service or the other components of the agency.

But I think it's, you know, we again, you having an interest in responsibility for understanding the shape and character of the seabed, this does fit.

I think for us, you know, thinking about limited resources, part of that would be all right, well where does it matter most? And I'm drawn back to and I think Deanne and I shared this example with you when you brought this up at the last meeting. Right?

These huge sand waves, Long Island Sound that I remember surveying as a junior officer on the Rude more than 20 years ago. And yes, they had moved significantly.

And then kind of wondering to myself, well does this really matter? Right? You have a control in depth is the same here and yes, that sand wave moved maybe a quarter of a mile, the peak of that sand wave.

But the controlling depth is still the same so how much does it, is this a dangered navigation? Is this not a dangered navigation? Clearly, it needed to be portrayed on the chart, but was it a crisis, you know, that somebody was going to hit this thing that was 30 feet below the sea floor or before below the surface?

I think those are the sorts of questions that we wrestle with a little bit in terms of whether we dedicate resources to tracking these on a regular basis.

Now, but again, if we understood the requirements better, for instance, in offshore wind, that might influence our decision making and, you know, to Tuba's point, maybe there are remote sensing or the recognizance techniques we could use to identify where things are moving so that we can, we can react appropriately.

MEMBER PEACE: To put into exact context of the Admiral's statement, so for the first time ever, we've actually had encroachment of a shoal in the open lake.

So typically open lake is obviously not maintained by the Army Corps, there's no dredging out there. But now we have one of our traffic separation scheme routes which is our recommended route sitting on top of a shoal that moved on us over the last year and a half or so.

So that would be someplace where probably NOAA would have an interest because I've got nowhere else to go. I've got to go to NOAA for that one because the Corps won't do anything with it.

But as we plan and as the Coast Guard like if you look at Nathan, if even they start, the Coast Guard starts laying out these paths, the traffic separation or I forget what they call it now, port access, between different areas, those are going to be planned routes.

And so if we know that there's something moving in that area that could impact navigation, you wouldn't put that planned route on that location. Well, good discussion. I guess we'll open it up. Is there any other

issues, working group I know we want to save some time here for Nathan to talk about the Artic, anything else anyone wants to discuss? Julie, I see a finger.

MEMBER THOMAS: Can I just say one thing? I would really, I just put it in the chat too. I would propose taking advantage of our working group meetings to take Ben up on his offer here to see if we could get a little bit more educated about what NOAA is doing in this sediment realm.

And to kind of get a head start particularly if we're going to do an issue paper. Rather than just wait for a Panel at the next meeting, I think we, this could be a good discussion over the next six months is what I'm saying.

MEMBER PEACE: I agree.

MEMBER HARGRAVE: That sounds like a nice approach, Julie. Definitely, you know, helpful to understand what is already being done.

MEMBER THOMAS: Worth talking, yes.

MEMBER HARGRAVE: Yes, and also to give us a little bit more time to frame the potential issues. Right? And then line those up with where it does align with NOAA's or the analysist's core mission.

I think that makes a lot of sense. Maybe and that is a bit of a two-way conversation of understanding what NOAA is already doing, but also having some you know, some of Eric, you know, your example having a few industry experts or whoever come in and talk about how this is relevant to what they're doing.

And I think we, like you said, Julie, we have a lot of that expertise here on the Panel to have some of those conversations.

MEMBER PEACE: I just have a really quick question, Admiral. When we have hurricane response after a hurricane moves through an area, is NOAA doing -- are they looking at anything for movement on the shifting bottom?

RDML EVANS: Absolutely. So I think and I don't want to speak out of turn, it really

depends on the nature of the impacted area. So you know, often the, well let's take Port of Virginia, for example.

The approaches of the Chesapeake. Depending on what the Coast Guard identifies as the impacted area or the portion, the draft restrictions they may have implemented, the portion of channel, if any, that they have, you know, shut down.

That would be our first priority to survey to give them confident to re-open. As part of that, we're looking for any change in the character of the seabed or things on the seabed.

Whether that's, you know, seabed mobility, you know, shifting sand or, you know, debris that may have washed into a guts channel or into a navigation channel.

It's really any or all of the above so we're not exclusively looking, for instance, for a lost container and ignoring shoaling or shifting sand.

It's looking for change detection of

any sort in the assigned area.

MEMBER PEACE: That definitely sounds like a climate resiliency issue to me, but okay.

RDML EVANS: So as I muddle through this, anything else with the issue papers anybody would like to bring out?

MEMBER HOLTZ: This is Kim. I had a question because obviously being new, you know, like topics for issue papers, but I was, we're talking about precise navigation, you know, like I was surprised of Port of L.A. hadn't switched to that, you know, completely in their port where the Port of Long Beach has.

And I'm wondering, you know, we've been so successful because we're doing our own surveys, submitting them to NOAA for CATZOC rating.

Would that be an appropriate issue, paper to talk about how one port is successful and how other ports could start providing their surveys to NOAA for a higher rating for precise navigational purposes?

I would say it would probably be the larger ports, you know, commerce ports. But I wasn't sure so it was more question.

MEMBER PEACE: Anyone?

RDML EVANS: I'll just say, you know, I don't want to speak for the Panel, but I would say that from a NOAA perspective, having that story told would be very powerful for us.

And I think we could also incorporate into that discussion of our external source data pipeline. And improvements that we, you know, I think depending on how we wanted to approach this, we could talk about the Panel could address the external source data pipeline in general.

Or in -- or specific to particular large ports that may be conducting their own survey work. I think there's, it's in some respects, there's a good story to tell there.

And so for us that's always good to have to be able to point to, but I think there's also some technical work and some connecting that we could get at through a paper like that as

well.

RDML EVANS: Julie, you're -- Julie, you're on --

MEMBER THOMAS: Muted. Can I talk for just a -- I just have a question about these S products. Does someone have to, because it came up this morning about I think it was Captain Kurtz that mentioned about the, you know, she was talking about the different PPUs.

And I've seen many of the varieties that are out there, but does it have to, do the PPUs have to be of a certain quality, power, it's not a highly -- to run the S products, you don't need anything special as far as the operation of PPU goes?

RDML EVANS: So maybe I'll tackle that and I would offer, you know, Caroline or others who are more knowledgeable. So there, you know, as has been noted, there's no regulatory, there's no regulations on PPUs.

Different pilots associations are free to use whatever they would like and call it a

PPU. Some of them have things on tablets, some of them have laptops. It really runs the gamut.

There is definitely a probably a performance limit of the hardware and the software below which you are not going to be able to realistically utilize.

And that's S-102 or a file or suite of S-102 files and cut contours, customized contours from that data as that product is intended to support.

I don't know if we've explored that limit. But I suspect that there is a floor below which you're just not going to get the kind of performance you need.

MEMBER THOMAS: I guess I was just wondering how many PPUs out there and obviously this is kind of jumping ahead, but you know, if we were going to do a paper on how great this product, these products are, I guess we would like to have some ideas too that were -- we want to make sure we get the full gamut of the pilots. Right?

And what their, if there are restrictions. And I don't know enough about this so I see Captain Kurtz and Qassim both have something here to contribute. Much more than me.

MEMBER PEACE: I'll call Caroline first. I think that just dovetails nicely and go ahead Caroline.

MEMBER KURTZ: Yes, so right. So there are no standards for this. And I can only speak from my own personal use of the devices over the years.

And we've had several different evolutions of the equipment. The SEAiq software seems to be very accommodating. Many of us were downloading the Army Corps soundings because we work on dredge channels with center lines.

So that's like a primary piece of information that we're using as cross track error from the center line. And so, you know, we just were able to go right to the Army Corps website and get those files and load them up on SEAiq.

So I imagine that would be similar for

using the S-100, 102, you know, whatever those products are. And the vendor, SEAiq, they'll make any kind of software adjustments, you know, they're very accommodating to customize the product for the user.

So you know, typically, if pilots need the equipment, they're going to get the best equipment they can get so that it's useful.

Because the idea is that, you know, you're doing this in fog or in rain or, you know, whatever the, your enhanced, circumstances are where you need more help than maybe just looking out the window.

Anyway, so that's just a little bit of how that works, but it's been my experience every time we've gotten a different system, we're able to customize it for the port.

So you know, you certainly do a survey of pilot associations, you know, as simple as sending out a questionnaire to every group. There's a, you know, like a master list and, you know, what equipment do you use.

And are you able to, you know, expand what you're doing with what you have? So.

MEMBER PEACE: Next we go to Qassim and then Kim and then Sean looks like he's ready. Go ahead Qassim.

MEMBER ABDULLAH: I'm sorry, I was muted. Thank you, Eric. That's great discussion and can you just give me a thought about maybe it's time we do kind of technology showcase.

Where we write a few of these PPU manufacturers because I just got informed Garmin, they have two events. I'm not sure how good this is, but where I can work with Caroline or anybody and we can put kind of Panel for these manufacturers to adjust that.

Because as it's hit directly to our precision navigation efforts, you know, so we would know how they, their software committee are open for data or the Corps of Engineers data or something like that.

What's capability? What's accuracy? I think it would be a really great time at the

next meeting. We can organize manufacturer showcase if that's okay with you guys.

MEMBER PEACE: Thanks, Qassim. I don't think there's any objection. Kim, did you have a comment?

MEMBER HOLTZ: Yes, I was just going to say so in Long Beach, you know, Jeff Ferguson from NOAA, Jon Dasler from DEA, the port surveyors and Jacobsen Pilots, we all kind of worked because we were kind of the test for Precise Navigation files.

So once we got it set up, it seems like it's pretty seamless or seamless for them when they want to update files. The one comment we just got back from Jacobsen Pilot is, you know, because we're doing our surveys and we go out every year and do half the port, they want that data the next day.

Well, you know, we have to submit it to NOAA to be, you know, to get into the system. So we're trying to work out that mechanism with them now because, you know, as we've given them

more precise data and every pilot you know, in the port of homage is using it, they don't want to wait six months to get an updated S-102 file.

So, you know, that is an issue that could come up, you know, as you give them better data, they want it quicker and quicker. So I just wanted to make that comment.

CHAIR DUFFY: So I wanted to chime in and first I think the Admiral made an good audible suggestion there instead of an issue paper to look at a Panel.

Qassim I will say not to be disagreeable, but I think like a technology showcase is a little out of our bounds. There are technology showcases that exist.

I can recommend them where a lot of the pilot PPU manufacturers attend. One of the more famous ones is NAVTEQ, but there are others. And I'll say that for, you know, and make a statement.

I think close to a third of the pilots in the country reside along the Mississippi

River. And we don't have like even going back to CATSAG, we can't do that on the river because we rely on single-beam data because the bottom changes so much.

There's a 30-mile stretch from Venice to the sea buoy that you can see five to seven foot changes in a 24-hour period. By the time the multi-beam survey would be ready, it would be irrelevant.

So kind of, I think part of our efforts should be to know more about what's out there not try to look at standardizing the pilot units, but here one of the big lacking things is the amount of surveys and sensors.

There's probably about a 150 miles or more of the Mississippi River that are not surveyed or routinely surveyed. And, you know, although Jon Dasler was mentioned, David Evans and Associates did a hydrographic survey as a Polish Ship Channel.

I think it was completed in 2019, but it's five years old. It was a great effort and

update, but actual real time data is missing and I would just be careful about that.

And although I think it's good to, you know, talk in some of the groups and discussions here, we'll familiarize ourself with what is out there, what's available and I think trying to standardize PPU that's trying to like tell Microsoft and Apple how to do their programming. And I think that's beyond our effort.

MEMBER PEACE: I'm getting the virtual hook here. We have five, four minutes now. So with that, I'll turn it back over to Sean and we'll have another session that's similar to this next time tomorrow.

So we can expand on some other issues then. Sean, you want to close us out?

CHAIR DUFFY: Sure. I will exactly, I didn't want to cut anybody off and, of course, went back on mute for about a second there. So a lot of great discussion.

I want to try to keep us on time and give the Admiral a chance to comment as well.

Again, you know, this team is amazing. There's a lot of experts in varied fields and trying to keep us pointed in the right direction is, you know, a challenge, but it's great to hear all the talks.

Eric and Mary Paige, I'll thank you. I've worked on a bunch of issue papers since being here and the wordsmithing going back and forth and multiple versions, that digital twin paper gave you a lot of experience to see that.

With that, I'm going to turn it over to the Admiral for any final thoughts before we close out for the day.

RDML EVANS: Yes, thank you, Sean. And thank you, Eric and Mary Paige for marshaling that last conversation. I was getting all excited and into it and then realized that we only had five minutes left.

So Eric, thank you for bringing that to a close. Although I think as you said, there's a lot more to unpack there. I'll just note that we have your starting at 8:30 a.m.

Eastern, 11:30 a.m. Pacific tomorrow morning.

First up will be another hour as we had this morning for round robin and reflection on today. So be ready for that. But I realize it feels like we're kind of drawing a hard line here at the end of what's been a very productive day.

Although we'll have some time to think on it and reflect tomorrow morning when we reconvene. So with that, I think that's everything I wanted to share. Thanks again to the Panelists.

And to our attendees, any of whom are still on with us. Sean, if there's nothing further, I think we can adjourn for the evening, the afternoon.

MEMBER CHAPPELL: Can I interrupt just for a quick second. This is Ashley.

RDML EVANS: Yes, sure Ashley.

MEMBER CHAPPELL: Just to be clear, it's 8:30 a.m. Pacific time, 11:30 a.m. Eastern.

RDML EVANS: Okay, sorry if I --

MEMBER CHAPPELL: No worries, no, worries. Just got flipped around.

CHAIR DUFFY: That's part of the problem between knowing whether it's morning or afternoon.

MEMBER CHAPPELL: I know.

CHAIR DUFFY: Kind of in the middle here. So -- We appreciate all the efforts. A lot of great teamwork here. I'm happy with the progress and process and everybody's contributions.

Welcome the new Members, remember some of the old Members and I'd be remiss if I haven't mentioned Lynne Mersfelder-Lewis. Ashley, you've done a great job. The team's been great.

A lot of support. There is a lot going on that nobody else will know, but well done. Thank you. I'm ready to close this meeting out and see you tomorrow.

Qassim, I think are you here to say good bye? Or you have a --

MEMBER ABDULLAH: Yes, no, I just say

good evening to you. You are doing a great job.

CHAIR DUFFY: I just want to make sure. Don't ever want to stop any brilliant minds, so thank you, team. Let your jerseys get washed tonight and freshen them up for tomorrow. Look forward to seeing you in the morning.

(Whereupon, the above-entitled matter went off the record at 12:00 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: DOC NOAA

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was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate complete record of the proceedings.

Neal R Gross

Court Reporter