

U.S. DEPARTMENT OF COMMERCE

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
(NOAA)

HYDROGRAPHIC SERVICES REVIEW PANEL

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PUBLIC MEETING

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THURSDAY
AUGUST 29, 2019

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The Hydrographic Services Review Panel
met at the Hotel Monteleone, 214 Royal Street,
New Orleans, Louisiana, at 8:30 a.m., Ed Saade,
Chair, presiding.

HSRP MEMBERS PRESENT

EDWARD J. SAADE, HSRP Chair
JULIE THOMAS, HSRP Vice Chair
CAPTAIN ANUJ CHOPRA
SEAN M. DUFFY, SR.
KIM HALL
DEANNE HARGRAVE
EDWARD J. KELLY
CAPTAIN ANN KINNER
DR. DAVID MAUNE
CAPTAIN ANNE MCINTYRE
CAPTAIN (ret. USCG) ED PAGE
GARY THOMPSON

NON-VOTING HSRP MEMBERS

JULIANA BLACKWELL, Director, National
Geodetic Survey, NOS

RICH EDWING, Director, Center for
Operational Oceanographic Products and
Services, NOS

NOAA LEADERSHIP PRESENT:

NICOLE LEBOEUF, Acting Assistant Secretary, NOS

CAPTAIN ELIZABETH KRETOVIC, Acting Director,
Office of Coast Survey, NOS; Alternate
HSRP DFO

NOAA STAFF PRESENT:

GLENN BOLEDOVICH, Policy Director, NOS PCAD

CAPTAIN RICK BRENNAN, Chief, Hydrographic Surveys
Division, OCS, NOS

VIRGINIA DENTLER, Center for Operational
Oceanographic Products and Services

LYNNE MERSFELDER-LEWIS, HSRP Coordinator

GALEN SCOTT, Program Analyst, Geosciences
Research Division, NGS

ALSO PRESENT:

**RENEE COLLINI, Program Coordinator, Northern
Gulf of Mexico Sentinel Site Cooperative,
Mississippi-Alabama Sea Grant, Mississippi
State University**

**WINDELL CUROLE, General Manager, South LaFourche
Levee District**

**BRIAN LEZINA, Division Chief, Planning and
Research, Louisiana Coastal Protection and
Restoration Authority**

**DR. RICK LUETTICH, Alumni Distinguished Professor
and Director, Institute of Marine Sciences
and Center for Natural Hazards Resilience,
University of North Carolina at Chapel Hill**

**CLIFFORD MUNGIER, CP, CMS, FASPRS, Senior
Instructor, Department of Civil and
Environmental Engineering, Louisiana State
University; Chief of Geodesy, Louisiana
Spatial Reference Center, Center for
GeoInformatics**

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

8:32 a.m.

CHAIR SAADE: Okay, we'll start the meeting. Thanks, everyone. Thanks again for the local participation and the audience. As always, please make sure you sign in and to drop off your badges when you leave.

Welcome back to the HSRP Meeting, Day 3. We had a great first day and a second day of speakers and discussion. I look forward to the speakers today. We'll do a quick recap of yesterday from the members. Please note the topics, FE.

As we won't have time to do audience introductions, during the breaks, at each break I'd like to ask you to introduce yourselves to someone that you don't know. So with that, Captain Kretovic, could you take the lead?

CAPT KRETOVIC: Thanks, Ed. Welcome back to Day 3, everybody. Today we start off with Mr. Galen Scott from NGS, discussing the National Spatial Reference System, NSRS,

1 Addressing Subsidence Through Time-Dependent
2 Positioning and Intraframe Velocity Modules. We
3 have great panel addressing NOAA's existing and
4 potential subsidence and sea level rise services
5 for hydrographic services. Also just a reminder,
6 if you have not already signed up to make a
7 comment or signed into the meeting, the sign-in
8 sheets for both are coming around.

9 Again, there are three emergency exits
10 on that wall, and in the event of emergency we
11 will muster out in front of the hotel on the
12 street if we have to evacuate. The bathrooms are
13 also outside of these doors right across the
14 hall.

15 CHAIR SAADE: Julie Thomas and Captain
16 Kretovic, will you please lead us off with your
17 comments from yesterday? We'll do a recap around
18 the room as we did yesterday from the members,
19 and what resonated with you. This is largely to
20 capture the recommendations and take advantage of
21 everybody having an evening to think about it.
22 So please go ahead.

1 CAPT KRETOVIC: Sure. I was really
2 impressed with the partnership in unmanned
3 systems for hydrographic surveying. Everyone
4 gave a great presentation and there was a lot of
5 really robust discussion.

6 VICE CHAIR THOMAS: There we go. One
7 comment is that these unmanned systems, since we
8 do so much surveying offshore, bathymetric and
9 then topographic lidar right along the beach, and
10 jet skis using push dollies with GPS sonar on
11 them, I'm always looking for these unmanned
12 systems or some way to serve through the -- to
13 survey through the surf zone.

14 So it was interesting because the
15 technology still hasn't come up with a way to
16 actually bring -- I mean we do do it by jet skis.
17 But that surf zone for us in Southern California
18 is so dynamic. It really drives the shoreline
19 erosion and our bars offshore. So it was
20 interesting. I mean I loved the effects of using
21 the drones because that of course saves us
22 getting an airplane to do some of the areas that

1 we're doing, and we've already started using
2 drones also.

3 But I'm always looking for that magic
4 way to survey through the surf zone. Okay,
5 thanks.

6 MEMBER THOMPSON: And just to follow
7 up on that, the -- Tom's vehicles, I think, just
8 exciting to see what we can -- the future holds
9 with that. But also yesterday, there was
10 discussion about some of the limitations because
11 of current rules and regulations.

12 So hopefully we can work with other
13 federal agencies to allow the full extent of use
14 of that technology safely in the environment.

15 MEMBER KINNER: I'll just echo what
16 Gary just said. I think by the time that the
17 IMO, or not -- well yeah, the IMO and other
18 organizations get organized around these unmanned
19 vessels. First of all, the technology seems to
20 be growing, and I see things happening with the
21 actual machines that I wouldn't have imagined.

22 There's so many different kinds of

1 unmanned vessels now out there, and it gives us
2 so many opportunities, except for the fact that
3 we've got all these COLREGS to deal with. I'm
4 hoping that they don't get too far ahead of the
5 legal stuff before we get, I don't know, to the
6 point where we've eliminated their usefulness. I
7 don't even know how you approach the IMO on all
8 this stuff.

9 MEMBER HALL: Just to that point, the
10 IMO is struggling with that, especially with the
11 COLREGS. So I know that that's something that
12 they're addressing. So I've been on the
13 committee for -- the Panel for four years, and
14 I'm always amazed that every time we have a
15 meeting there is some new advance, and it's --

16 And I knew so little when I first
17 started apparently, and I'm still probably only
18 about a teaspoon's depth of the ocean of any kind
19 of knowledge on what NOAA and the actual
20 technology side. But yesterday, I mean seeing
21 what those drones can do and the pictures that
22 they deliver and getting that information was

1 really amazing.

2 So the guy from Texas A&M, that was a
3 really great presentation and some neat products
4 from what they've been able to do.

5 MEMBER KELLY: Good morning, Ed Kelly,
6 New York/New Jersey. I had a couple of kind of
7 impressive things to me. One was the potential
8 for the autonomous operation, and it brought to
9 mind be careful what you ask for, you just might
10 get it. That is going to give us an opportunity,
11 at a very reduced and efficient cost, to generate
12 enormous amounts of data.

13 The question now becomes what are we
14 going to do with that data, how is it formatted,
15 and how can we maximize the use of all the
16 different public and private enterprises that are
17 going to be generating all this data? How can we
18 best, in a safe, secure, et cetera way, pull that
19 data together to create the necessary products
20 that we have to have to move forward?

21 That tied me into you know again, I'm
22 all about economics. That's my business. I'm in

1 the commercial maritime business. We're here to
2 make money, you know. So that being the case, as
3 the vessels and the scale of the operations
4 increasingly get bigger, most regrettably, most
5 of the channels and the land bases don't change.
6 We have to find more, better ways to operate
7 within those zones.

8 And that data, leading toward the
9 concept of precision navigation really means that
10 we need to be able to find the best and the
11 safest way to operate in constrained spaces, to
12 maximize economic impact. I think, you know,
13 there's a lot to be done there with what data do
14 we get and how do we get that data formulated,
15 sifted down to the most relevant portions of the
16 data that can be used by end users?

17 Not scientists, not researchers, but
18 actual practical operators, so that they can
19 actually operate these vessels, these different
20 channels, all these different things that lead to
21 our blue economy. I think that was kind of what
22 was hitting me. We're going to generate all this

1 data; how do we best use it for the best purpose?

2 MEMBER DUFFY: So good morning.

3 You've made it through three days of New Orleans,
4 and that means you're the strongest of the
5 strong, right? So teamwork. I guess there's a
6 lot of, and before this meeting there's been a
7 lot of discussion this year on the historic water
8 levels that we've faced, and it raises a lot of
9 challenges.

10 When I hear Julie speak of surveying
11 on jet skis, I mean the channel is so different
12 here and it really stresses the survey
13 capability. I will say that a lot of times, it's
14 easy to say that, you know, we know multibeam is
15 the way to go, but how to apply it here is a real
16 challenge.

17 I know that because I've spoken to the
18 team members who really know that a whole lot
19 better than I do. As we get down to brass tacks
20 on it, the good thing is there is teamwork going
21 on with NOAA and the Corps and the private
22 industry, working on solutions that will

1 hopefully move forward in the future as we go
2 forward to help with surveying Southwest Pass.

3 But in an area where you have 30 miles
4 of river that need to be dredged in high water,
5 and there's a 24-hour change where you can see
6 over five feet of sediment in 24 hours. So the
7 survey that you started with doesn't look that
8 way when it's delivered is a real challenge.
9 That's one of the problems. It's not as simple
10 as it might sound.

11 Yeah, I'm happy to be here talking to
12 the people who will shape that future, and look
13 forward to the new technologies. But that panel
14 really was helpful, and I will be reaching out to
15 some of those folks and hopefully we can help
16 move that forward to bring back a real solution.
17 Thank you.

18 MEMBER McINTYRE: What I took away
19 from that panel was the importance of having
20 academic partnerships, and it's just really
21 important. There's a lot of technology,
22 everything's changing and it's really good to see

1 kind of the government, industry, the people that
2 are doing the work and the universities alongside
3 with everything.

4 MEMBER MAUNE: I enjoyed the
5 technology panel also, and it's pretty much been
6 said. I agree with everybody. I've been so
7 impressed by the differences of New Orleans with
8 other ports we've been to. The first HSRP I went
9 to was in Long Beach/Los Angeles, and their
10 problems were just 100 percent different from the
11 problems here.

12 When we drove through the port
13 yesterday to see those miles of containers
14 sitting out there, and you wonder might some of
15 those containers have been there for years? The
16 guy assured me, they're there for seven days,
17 maybe some of them 14 days but that's the max.

18 So they have to have an extremely
19 efficient port to pull that off, and I found that
20 very impressive.

21 MEMBER CHOPRA: Good morning. I
22 thought yesterday was very informative. I think

1 it showed us the capabilities for the autonomous
2 vehicles especially adapted to hydrography. On
3 capacity, I think we're building on it as more
4 research goes. I really appreciate NOAA's
5 leadership in that space and its support.

6 Echoing other comments that, you know,
7 the academic partnership and educational support,
8 taking that to the next level so that it becomes
9 the mainstay for hydrography for us. Thank you.

10 MEMBER PAGE: Hi. Ed Page from Marine
11 Exchange of Alaska. I'm very impressed with NOAA
12 being so progressive and leaning forward with
13 respect to taking advantage of the emerging
14 technologies, the force multiplier to get the
15 increasingly daunting workload they have ahead of
16 them, make some progress in it.

17 So my historical thought of NOAA is
18 going along these ships and slowly surveying the
19 bottom, and now they're just stepping on an
20 accelerator pedal going up to max speed. I know
21 there's a lot of concerns about IMO and the Coast
22 Guard approving these operations or unmanned

1 vessels, if you will. I started my maritime
2 career about 51 years ago now, when I first
3 entered the Coast Guard and spent 30 years with
4 the Coast Guard. But my whole life had been
5 avoiding flotsam and jetsam, not jetsam
6 obviously, flotsam all over the water.

7 So there's fish nets, there's logs,
8 there's coastal aids to navigation sometimes when
9 you get off station you have to avoid. There's
10 vessels, unmarked vessels. There's all kinds of
11 flotsam out there, and if we have sensors that
12 actually have lights on them and AIS transmitters
13 on them, they're much more visible than all the
14 other things you have to avoid.

15 So you still have to look out the
16 window and keep your radar on, et cetera. So I'm
17 not -- I don't think that's a very daunting
18 challenge to get these vessels that don't have,
19 you know, not staffed with people to be
20 operating. In fact, they're out there right now
21 as well know. We saw a lot of things and
22 Sairdrones, what have you. They're playing

1 around out on the ocean.

2 So I think that's not going to be a
3 heavy lift at all. I think that technology could
4 help us. In fact right now, a lot of the fish
5 nets, which I get caught in my scoop periodically
6 because they're not marked very well, a lot of
7 the fish nets are having AIS transponders on them
8 so you can find them. That's an issue the Coast
9 Guard's wrestling with right now.

10 So you don't just -- the only way you
11 find a fish net is when your engine slows down,
12 you're wrapped up in a net. Now you know where
13 the nets are with the buoys. That's very
14 prevalent throughout the world. If you look on
15 AIS screen, you see these things all over the
16 world now, fish net buoys.

17 So again, technology's there. It will
18 solve that problem also as far as these vessels
19 not being, having persons on them. Thank you.

20 MEMBER RASSELLO: Hi, good morning.
21 Sal Rassello, Carnival Cruise Line Miami. The
22 past years, I have seen we are keeping talking

1 about technology and data collecting. In my
2 small world, in my small work environment, I have
3 used a lot of data you're producing.

4 What I've seen that nowadays when I do
5 my planning, I can navigate over two, three feet
6 of water with a large vessel, and that is doable
7 due to the fact that I have the data and I know
8 how to find the data.

9 Therefore, I think we should continue
10 doing surveys. We see how the environment
11 changes due to, you know, hurricane and flooding
12 and inundations. I think that's the right way to
13 do it. I see the future that we will be manned
14 vessel from shore. That's not very far, so but
15 that is based again on how much and how much data
16 the operator can use, and how precise is the
17 data.

18 So the safety margins are very limited
19 nowadays, as I see two-three feet of water is
20 very challenging situation, and channels are not
21 very wide now. The ships are getting bigger, and
22 that's my main challenge during my small work

1 environment. That's all I have to say. Thank
2 you very much.

3 MR. EDWING: Morning, Rich Edwing
4 with CO-OPS. So I really enjoyed the autonomous
5 vehicles panel yesterday. My program doesn't
6 have a lot of application for that technology.
7 We like our observing systems to stay put right
8 where they established them, but that's just --

9 CHAIR SAADE: They're already
10 autonomous.

11 MR. EDWING: Yeah, right.

12 (Laughter.)

13 MR. EDWING: But clearly that
14 technology is the future, as was said several
15 times. And I will point out right now there are
16 gliders, underwater gliders that were launched by
17 IOOS, by the Navy and perhaps other entities out
18 there doing temperature profiles and other
19 observations, to help people understand what's
20 going to be happening with Dorian.

21 And that's, you know that's, can't
22 have a more important application than that I

1 think. So anyways, I really don't have much more
2 to add than other people have said about the
3 partnerships and the future for the -- for that
4 panel, so thank you.

5 MEMBER HARGRAVE: Good morning.
6 Deanne Hargrave with Shell. So yesterday
7 technology, that's my area of passion and it was
8 a great, great panel. I loved to hear what
9 NOAA's doing, also what academia is doing and I'm
10 most familiar with what industry is doing.

11 When I -- the first, the first sonar
12 I was working with, I was looking at paper
13 records. So you know, 20 years ago it was paper
14 records. Ten years ago it was the big analog to
15 digital change. Now we're looking at unmanned
16 vehicles and we're looking at a plethora of
17 options, what they can do.

18 It's like it's a technology explosion,
19 and I think that I'm completely impressed that
20 NOAA is using already a lot of these
21 technologies, because that takes a lot of
22 investment and these things are changing so fast.

1 It's like, you know, it's like buying your
2 iPhone. You don't want to buy Version Number 1,
3 because you know that in six months it's going to
4 change and that there's a huge learning curve.

5 So I did appreciate the comment that
6 I heard yesterday about don't -- buy one. Learn
7 how to do the whole process, figure out all the
8 problems, the details of how to actually manage
9 that, and then make a bigger investment. I think
10 that was really valuable.

11 MS. BLACKWELL: Good morning, Juliana
12 Blackwell of NGS. I had two takeaways from
13 yesterday, again following on what others have
14 said about the unmanned systems. For me, it was
15 the importance of working together within NOAA,
16 within our offices and other offices within NOAA
17 that are all important in making sure that we are
18 doing unmanned systems safely, securely and
19 efficiently, and continuing to work with the
20 emerging technologies because things are going to
21 continue to change.

22 But it's taking, you know, it is a

1 team effort to make sure that we are doing this
2 well and coordinating with each other internally,
3 as well as with our partners who are doing
4 exciting things from their respective
5 organizations. So hearing from the partners
6 yesterday on that I think was also very engaging.

7 The second takeaway I had was related
8 to the tour that we had of the City of New
9 Orleans, and for me I look at things more so from
10 the land side, as you all have heard me say over
11 and over again. But you know, while we're
12 talking about commerce on the water, the fact is
13 we're building the shoreside infrastructure to
14 support that. In this challenging area and we'll
15 hear more about today with subsidence and sea
16 level rise panel that's coming up here shortly,
17 is I heard we're going to build another container
18 facility.

19 I'm thinking where, first of all, and
20 how high? So those are the kinds of things that
21 were going through my mind is okay, I can see the
22 need for it, but I'm really interested in trying

1 to understand who all's working on making sure
2 that when that does get built it's sustainable
3 and it connects to the other areas where the
4 cargo is going to have to be transported to.

5 So I think that was really eye-
6 opening, to be able to visualize that yesterday
7 and appreciate the tour and all the interactions
8 that we had last evening. Thank you.

9 CHAIR SAADE: Okay, thanks, everyone.
10 I just want to say those are great points. It's
11 really energizing and great to see everyone's
12 thinking about all this and getting stimulated by
13 it all. The comment about how remarkable all the
14 ports are, how different the ports are. You
15 know, it all leads to the adaptability of NOAA,
16 because NOAA's the common element certainly for
17 us.

18 But NOAA's the common element in being
19 able to do it right in Long Beach and do it right
20 here and do it right in Juneau, and that's a lot
21 of credit to the whole NOAA organization I think,
22 and Sal's comments about trusting the data? I

1 mean that's what it's really all about. His
2 captains trust the data.

3 I can tell you as a contractor, NOAA's
4 really, really demanding on the accuracy,
5 improving the accuracy of it and it pays off, you
6 know. The reason that Sal's captains trust the
7 data wherever they go, certainly in the United
8 States in the areas that NOAA has control of is
9 because of these rigorous requirements.

10 And then the other aspect of it is
11 visualization, and that goes back to the whole
12 discussion in my mind relative to what you said,
13 Ed, in terms of the tremendous amount of data,
14 and the end users being -- it doesn't have to be
15 an engineer or a hydrographer or a geophysicist
16 or whatever. It can be -- anybody can look at
17 that data and understand where the dangers are,
18 what's good, what needs to be done.

19 Those are really important points, and
20 again it's all because of the demands everybody
21 puts on themselves. The other thing was talking
22 about the private industry/academia/government

1 partnerships. I agree. That's the key to all
2 this.

3 It was really nice to see the
4 diversity of that panel yesterday, all these
5 different organizations with different
6 backgrounds sharing ideas, really pushing this
7 technology forward, and then having the insight
8 of Thomas Chance.

9 Let's face it, it was great, which
10 allows me to say multibeam, multibeam, multibeam.
11 So he said it best, but that was the best part of
12 it. I think I had one another point. Anyway,
13 that's enough talking I guess for now. But
14 again, it's really nice to see that we can
15 stimulate these ideas, and I'm hoping that the
16 public and the other folks that were listening in
17 get energized by all this as well.

18 Okay. So we are a little bit early.
19 Just one second. Okay, Julie.

20 VICE CHAIR THOMAS: Maybe I'll take a
21 minute just to -- I want to wrap up just a couple
22 of things. Our prioritization list I feel is in

1 really good shape. Rich, we kind of died on the
2 last bullet in the prioritization and it really
3 has to do with the Ocean Forecast System, and I
4 wrote a description which I pulled from the Web.
5 But I don't really know the status of that, and
6 then one more comment on there, would it be
7 appropriate.

8 I guess this is really Rich and
9 Juliana. No, it's Rich and OCS, I think, because
10 you're the ones that are actually rolling it out
11 to the NWS offices. Who's -- I'm a little
12 confused about OFS. It's done in CO-OPS, right?
13 Could you just give us a brief survey of that
14 one?

15 MR. EDWING: Sure. So CO-OPS is I'll
16 say the operators of the operational forecast
17 system models, hydrodynamic models, which are
18 forecasting most of the same observations that we
19 provide in real-time, you know, water levels,
20 currents, air temperature, water temperature,
21 things of -- salinity, things of that nature.

22 VICE CHAIR THOMAS: Right.

1 MR. EDWING: They're developed in a
2 number of places. Coast Survey Development Lab
3 develops most of our models but not all. For
4 example, the Great Lakes Environmental Research
5 Laboratory develops the models that we operate up
6 in the Great Lakes. There's also an IOOS role
7 through the COMT, which is a modeling testbed.
8 You're aware of that, I think, Julie.

9 But the models themselves actually
10 operate at the high performance computers in
11 College Park at the National Centers for
12 Environmental Prediction. We have a partnership,
13 if you will, with the Weather Service where, as
14 the different developers develop their models and
15 make the transitions to the high performance
16 computers that are, you know, take advantage of
17 the computing power and the robust, you know,
18 availability, operational infrastructure.

19 It's there to ensure the data's always
20 there, and then that output comes to CO-OPS, you
21 know, to then put out the products, if you will.

22 VICE CHAIR THOMAS: Okay. So are they

1 never -- how does that interface with the local
2 NWS offices?

3 MR. EDWING: Well, they are users of
4 the models. They look at the output.

5 (Simultaneous speaking.)

6 VICE CHAIR THOMAS: Right, okay.

7 MR. EDWING: So but there's not really
8 a direct I'll say link to them --

9 VICE CHAIR THOMAS: There's not a
10 direct, okay.

11 MR. EDWING: -- as part of our
12 process, you know.

13 VICE CHAIR THOMAS: So I guess the
14 question is how do we want to handle this on the
15 priority matrix? Is this something that we
16 should have on there that folks are interested in
17 and --

18 MEMBER HALL: It was something that
19 somebody was interested at some point.

20 VICE CHAIR THOMAS: Right, right.

21 MEMBER HALL: So I don't recall exactly
22 who it was. So if nobody in here, and we haven't

1 figured out if Lindsay Gee wants it, then I'm not
2 sure it needs to -- it was something that like it
3 popped up when we did the very first priority
4 matrix, that somebody put it into the Survey
5 Monkey survey that they did, and I don't know who
6 it was.

7 VICE CHAIR THOMAS: It actually could
8 have been me, because I remember that Shep
9 brought it up at the Miami meeting and I said oh,
10 I want to hear more about that or learn more
11 about it, and it probably made it into the
12 matrix. So --

13 MR. EDWING: So a suggestion might be
14 we could put on a webinar and kind of do an
15 overview of the whole modeling program for -- you
16 know for everyone, and then you can kind of take
17 that in and see what you'd like, you know, where
18 you'd like to go next. You know, we're still
19 building it out around the country. We don't
20 have model coverage everywhere. We actually just
21 formalized our --

22 We've had kind of a five-year plan, an

1 informal five year plan for a number of years.
2 But we just kind of made it formal, being signed
3 by the different directors, and it's kind of
4 almost a public-facing document which we can
5 share that as well, you know, kind of where we're
6 going next with the modeling program.

7 VICE CHAIR THOMAS: So Dave, maybe on
8 one of our Planning and Engagement calls, we
9 could plan to have a webinar talking about the
10 modeling and OFS. Would that be appropriate?
11 And then we could kind of table it until San
12 Francisco if we want -- what we want to do in San
13 Francisco, if we want to have a 20-minute
14 briefing, half an hour update on it or what we
15 want to do with it there.

16 MR. EDWING: Yeah, and certainly I
17 know one thing that you guys could help us with.
18 It's a new capability and well, like I said, some
19 places we don't have any capability and we're
20 kind of building it out in others. We do
21 everything we can to make people aware and
22 educate them, but I think there's a lot of places

1 where people aren't even aware that the model's
2 there --

3 VICE CHAIR THOMAS: Right. So the
4 outreach --

5 MR. EDWING: I think the outreach and
6 engagement, and kind of just how to make people
7 aware that it's there and start building that
8 confidence in the forecast data, the way that
9 people have, you know, confidence in the real-
10 time data and other things we do right now would
11 be helpful.

12 VICE CHAIR THOMAS: Okay. So why
13 don't I leave it on our priority list. Well I'll
14 put -- under Status, I'll put webinar to be
15 planned for future P&E call, and we can arrange
16 that. Then I'll put San Francisco down as a
17 possible place to dig into it a little bit
18 deeper, because it might be more mature by that
19 time?

20 MR. EDWING: Yeah, and that's a good
21 place because we do have a model there.

22 VICE CHAIR THOMAS: Right.

1 MR. EDWING: And I think that's one
2 that's kind of coming up for a refresh, a
3 modernization. But yeah, that'd be a good place.

4 VICE CHAIR THOMAS: Okay. So I think
5 that finishes -- so I'll go ahead and make those
6 notes to the priority matrix, and then try to
7 mail that out within the next couple of hours, or
8 maybe I'll do it over lunchtime.

9 Then if you on the panel could just
10 look at the matrix and see if there's anything
11 that I didn't capture correctly or stands out,
12 because that way we can kind of sign off on it to
13 include it with the letter to the Administrator,
14 okay. That was one thing to wrap up that.

15 I have been feeling -- I updated the
16 letter to the Administrator. Yeah, yeah?

17 MEMBER KELLY: So just, I think, to
18 call it a list of priorities, we have to actually
19 prioritize it. I think it might be a list of
20 topics of interest or, you know, to say it's a
21 prioritization list means it should be numbered
22 1-2-3-4, not just all of this stuff.

1 VICE CHAIR THOMAS: Do you know what's
2 funny? I took the numbering out last night. I
3 took that whole column out.

4 MEMBER KELLY: So I think we just have
5 to be careful what we call it, and/or it's a
6 valid discussion to prioritize, maybe knock down
7 to the top one or two anyway, the one or two and
8 the others to be of continued interest. But we
9 have a fairly ambitious agenda for something
10 that's not really prioritized, and internally we
11 as a Panel should have some feeling as to what
12 the one or two most important of these several
13 items are.

14 So I think we still need to change the
15 title and/or have a continued discussion as far
16 as, you know, what is our priority.

17 VICE CHAIR THOMAS: All right. We can
18 go either way. I'm happy to change the title.
19 Right now as you know, it's divided -- there's
20 two topics on there for Hawaii. There will be
21 two for San Francisco. There's a few ongoing.

22 There's a few issue papers and then

1 the archive that we set up on Ken's suggestion,
2 which was good. So what -- do you have a feeling
3 on that? Should we change the title or do you
4 want to number them?

5 CHAIR SAADE: Before I forget what was
6 on my mind, relative to the ASV we've agreed
7 we're going to look at it again in San Francisco,
8 because of the local capabilities, right?

9 VICE CHAIR THOMAS: Oh, with Saildrone
10 and ASV.

11 CHAIR SAADE: Right. So one of the
12 things I'd like to add to that list was -- I
13 wanted to mention relative to Sean's needs is
14 challenging whoever's developing ASVs to get near
15 real-time data collection processing and to the
16 end user, because it's obvious that it's really
17 critical and it's a trend that's going on in the
18 offshore industry anyway.

19 I think we need to challenge the ASV
20 developers on that, because there's such a need
21 in places like the Mississippi River.

22 MEMBER DUFFY: Thank you for that, Ed.

1 Mr. Chairman, I couldn't have said it any better,
2 and on the title, I'll hit you with a little of
3 my humor, but remember words are important.

4 MEMBER MAUNE: Could it be the HSRP
5 Issues Matrix rather than Priorities Matrix?

6 VICE CHAIR THOMAS: Issue Matrix?

7 MEMBER MAUNE: Issues Matrix.

8 VICE CHAIR THOMAS: Okay, I will do
9 that, and I will add that one in for San
10 Francisco.

11 MEMBER KELLY: Yeah, Ed Kelly again.
12 I hate to be a pest, but you know prioritization
13 is something that we do need to look at, and I
14 think we need a combination of prioritization
15 based on where we're going to be that are
16 relevant, localized specific issues. Like I hope
17 we get Google in here, you know, in San Francisco
18 to come visit us and talk about not necessarily
19 shipping but the Internet of Things and AI and
20 challenging issues. So that's very germane to
21 the location, but there are other issues here
22 that we ought to prioritize based on just because

1 it needs to be done.

2 So you know, I'm all about
3 prioritization, trying to get stuff done not just
4 talked about, and I don't want to create a list
5 of things that we talk about but something that
6 we can actually try to channel the Panel's
7 interest and energy into a little bit to get some
8 stuff done. But I know it's challenging. We all
9 have real jobs and what-not but --

10 VICE CHAIR THOMAS: No, I think we
11 actually --

12 MEMBER KELLY: We have a list. Let's
13 use it. Let's make the list work.

14 VICE CHAIR THOMAS: We do. We based
15 the panels on our New Orleans list, and I think
16 we got them all. So I think that we are -- look.
17 I mean I certainly look at Hawaii-San Francisco.
18 When we're developing the agendas, we certainly
19 look at those. But of course you're welcome to
20 any feedback or additional. You can be on the
21 planning committee, Ed. Better watch out.

22 MEMBER KELLY: Volunteers get what

1 they deserve.

2 VICE CHAIR THOMAS: I know, okay. All
3 right. Well let me try to update that issues
4 list a little bit over the lunch and then we'll
5 send it back out so you can take a quick look at
6 it or a longer look at it. You'll have a few
7 days. But we do want to try to get it out with
8 the Administrator, so I wanted to get it cleared
9 up. Okay.

10 Thanks Rich on that, and I guess what
11 I'll do also is send my updated letter to the
12 Administrator, to Lynne and Virginia, and they
13 can email it out to everyone, and if at the end
14 of the day we have some time, I'd like to go
15 through the bullets on that. I've been putting
16 them right into the format of the letter to make
17 sure that we capture everything that people feel
18 is important. That's all I have to say on that.

19 As far as the issue papers, the sea
20 level one, Audra and Mike are actually updating
21 -- there were a couple of things that we wanted
22 to get in there. Okay great, and Audra, maybe

1 you could send it to Virginia and Lynne. Okay.

2 So that one was -- that one should go
3 out to the Panel, to the subcommittee on sea
4 level. I mean you can send it to everybody.
5 It's easier to just send it to everybody. But
6 really it's those that were in that -- because
7 we're going to meet again. When do we meet
8 again, right after lunch in our -- to discuss the
9 issue papers?

10 Right. Working group at one o'clock.
11 So right after lunch, we'll get back into our
12 working groups and thanks Audra and Mike for
13 doing that. And then we'll get back into our
14 working groups and see where we get with these.
15 Everybody good with that? Any questions? Okay.
16 That's all I have, Ed.

17 CHAIR SAADE: Okay, yeah. Anyone have
18 any additional comments or topics they want to
19 bring up? Go ahead, Ann.

20 MEMBER KINNER: This is something in
21 my notes yesterday and particularly listening to
22 the panel and noting how many people are in this

1 whole new world of unmanned, whether you call
2 them autonomous or whatever, and what I wrote
3 down was, distribution of effort across academic
4 and commercial programs: does anybody coordinate?
5 Is there any kind of you might call a central
6 clearinghouse to know Company A is doing this,
7 Company B is doing exactly the same thing, a
8 little different coastline and allowing for the
9 competitive issues? Is there some position that
10 NOAA could take to become kind of a central
11 coordination/distribution point for some of the
12 basic research on some of these resources?

13 CHAIR SAADE: I can -- the few of us
14 can probably answer that in different ways. I
15 can use -- personally I can use University of New
16 Hampshire's, the folks we deal with there that do
17 exactly that. A lot of that is because people
18 are more than willing to let them know what we're
19 working on, whether you're a private company or
20 you're another research outfit.

21 So that one kind of happens naturally.
22 Dave, you probably have a lot of experience on

1 people in various research developments.

2 MEMBER MAUNE: You know, I think we
3 need to allow the competitive marketplace to --
4 each guy's back there trying to develop a better
5 mousetrap than his competitor, and they don't
6 like to tell the other people what they're
7 working on. I know that happened with lidar,
8 that we had three or four major lidar developers
9 and they were all doing things, keeping it
10 secret.

11 I published a book one time in 2007
12 that said that you can only have one lidar pulse
13 in the air at a time, and the day that book was
14 being introduced, OP/TECH introduced multiple
15 pulse in the air or maybe it was a different one.
16 But these guys hide what they're doing to gain a
17 competitive advantage over the others, and it
18 does bring out the best of our industry by not
19 having a central control.

20 They deliberately try not to share
21 what they're working on, for fear that their
22 competitors might gain an advantage from knowing

1 what the other guy's working on.

2 CHAIR SAADE: I mean that's a good
3 point. That's exactly what we did on recent
4 developments as well. But you have to do it to
5 protect yourself and protect the IPs.

6 MEMBER KELLY: If the IOOS groups and
7 the regional associations have helped in academia
8 in particular, to let's say ameliorate that
9 issue. It still hasn't gone completely away, but
10 by working through IOOS, where money and funding
11 is directed through the regional association
12 instead of the direct competition for grants for
13 institutions, I've seen over the past years a
14 better cooperation among the academic groups.

15 I think that's also become a little
16 bit of a clearinghouse because there's a little
17 less proprietary information that goes on there.
18 So I think that's helped, but it still hasn't
19 solved that issue. Everybody wants to know what
20 the neighbor is doing, and nobody wants your
21 neighbor to know what you're doing, and that's
22 you know, free enterprise. So I think there's

1 only so much we can do with that.

2 CHAIR SAADE: I was going to add
3 relative to Hawaii, I was thinking that maybe
4 Ann's interest in terms of the recreational
5 vessel representative. We haven't really done
6 much on that. Hawaii might be a great time to
7 have a little bit of focus on that. I'll throw
8 that in there.

9 MEMBER KINNER: Total agreement on
10 that, because one of the things that I find is
11 that the small boat fleet, which in my brain is
12 anything up to 300 feet frankly because even the
13 skippers on large yachts don't know of a lot of
14 the resources that are out there. But
15 particularly the smaller boats, oh what's the
16 magic cut off, the 65 foot, 20 meter break, which
17 is a lot of what I talked to all the time.

18 They have no clue about what we're
19 doing, about what's available to them. I spend a
20 lot of time introducing them, and one of the
21 things I've thought about is maybe some, don't
22 know if you want to call it a newsletter or what

1 to call it, but some way to get the word out to
2 that level. There's something like ten million
3 registered boats in the United States. God knows
4 what there are worldwide.

5 But that's a lot of potential users of
6 what we are talking about, that don't even know
7 it exists. It's an outreach thing. It's an
8 education and outreach thing and trying to figure
9 out a way to push that out. You know, BoatUS can
10 do some. I get Maritime Commons. I get little
11 dribbles here and there that apply to my fleet.

12 But I don't, I'm not aware of any
13 strong way to push this kind of information out.
14 I was talking to, I think I was talking to Rich
15 in March about the change to the tide tables, and
16 my commercial fleet doesn't even know that's
17 coming. How am I going to introduce them to the
18 idea that they have to download those tide tables
19 that the Coast Guard just tells them every year
20 they need to have on board? Does the Coast Guard
21 even know that the books aren't going to be
22 printed like they've been printed for however

1 many years?

2 There's this gap of information
3 between the big guys, which is a lot of what you
4 guys are, and the little guys, which is mostly
5 what I'm talking to.

6 MEMBER CHOPRA: Ed, can I make a
7 comment on that? So in Houston-Galveston, we've
8 seen this issue also, and the Lone Star Harbor
9 Safety Committee has been very active in that.
10 We've had NOAA reps on that committee. We also
11 have the president of the associations both the
12 fishing and the leisure craft on those
13 committees, and there's a very good outreach
14 program there.

15 So there is a mechanism which is
16 there. Maybe we can just redirect to focus the
17 existing Harbor Safety Committee mechanism for
18 that outreach, rather than do an independent.
19 Because that -- we've seen that to be very
20 successful and working, that the Harbor Safety
21 Committee mechanism works. Lone Star's a classic
22 example.

1 MEMBER PAGE: If I could just add to
2 that, I know through my time down in California,
3 I used the Latitude 38 magazine, the Latitude,
4 you know. I think there was the marine log down
5 in your area or whatever.

6 But the magazines or the papers that
7 the recreational boaters use, I used to post a
8 lot of articles on search and rescue cases and
9 lessons learned from marine casualties, real
10 short articles, what we can learn from someone
11 else's mistakes, but also any other changes as
12 far as regulations or new procedures or tide
13 tables, et cetera, new technologies.

14 I mean that's the form they use. When
15 I was Captain of the Port, I used that when I
16 wanted to talk to the recreational community.
17 Down in LA I used that form or in San Francisco
18 and Latitude 38 or down there in Marine Log, and
19 then but also had a different form for the
20 Professional Maritime and for Pacific Maritime
21 magazine, when you're talking with the commercial
22 industry.

1 So there's a whole suite of -- there's
2 not one solution. There's a whole, you know,
3 suite of options you have to use --

4 MEMBER KINNER: And I see all of them
5 and I try to contribute to the Sea Magazine,
6 Passagemaker, Cruising World, Cruising Outpost,
7 you name it, and each one has its own little
8 niche and that's part of the problem. The
9 Passagemaker people don't talk to the Latitude 38
10 people. They're not even on the same planet
11 frankly, and that's an issue.

12 There's -- what I'm trying to figure
13 out is if there's some way, I don't want to call
14 it a press release, but some way to push this
15 out. It kind of goes back to the discussion we
16 had at some point about AIS distributing safety
17 information and ten million little boats out
18 there and a lot of them don't have AIS.

19 So it's a nice idea, but it's not
20 going to fly in certain fleets. I don't know
21 whether -- because even BoatUS doesn't reach --
22 it doesn't even reach a significant number of the

1 people in that fleet, and whether it's Coast
2 Guard Auxiliary, Power Squadron, whatever. But
3 some way to reach out and begin to educate that
4 level of floaters to the fact that this
5 information is changing, that it's out there.
6 Most of it's free.

7 I hate to tell you how many different
8 weather sites I have on my phone and my computer,
9 and I'm adept and I'm still finding new places.
10 I'm tuned in to know where to look. A lot of
11 these people don't even know that there is
12 anything for them to go look for. I don't know
13 how you get beyond that. I don't know if it's a
14 PR thing or what it is.

15 But it's definitely an educational
16 push, and I wish I could figure out an easy way
17 to do it. We're dealing with the same thing
18 frankly in some of our Harbor Safety Committee
19 issues. How do you get the information out to
20 the people who need to know?

21 CHAIR SAADE: Rick. Do you need to
22 get a microphone?

1 CAPT BRENNAN: I think you're
2 absolutely correct, and I think as we know, the
3 pyramid of maritime users has a base of, you
4 know, recreational users. I think the precision
5 navigation project, even though I think we talk
6 about that it's focused on low under keel
7 clearance and commercial navigation, I think the
8 intent is, is that that is made available across
9 the board, and it's packaging everything that we
10 NOAA do in an easily consumable way.

11 I think that when we talk about those
12 users, I think the amazing thing is is 20 years
13 ago, you know, you would go out and I remember
14 going on a friend's boat and him pulling out a
15 1960's paper chart that he had stuffed under the
16 seat of his sailboat and complained about how
17 this particular wreck wasn't on the chart and,
18 you know.

19 So you're like well sure. Maybe you
20 should get a new chart, you know, because it's
21 2000 now. So but I think today when you go out,
22 I mean even a jet skier has their iPhone in front

1 of them with some sort of navigational app up,
2 and those apps in my mind are the way to that
3 community, right, because everybody has an iPhone
4 and we can debate the efficacy of it.

5 But that has been a huge advance for,
6 you know, having people navigate in a way and
7 getting them information in a way. I think that
8 is the grand hope for precision navigation as a
9 program, is that it democratizes the delivery of
10 that data and harmonizes it in a way that it can
11 be consumed by as many people as possible, and
12 particularly these app developers.

13 So a lot of the time that we're
14 spending in doing this development is really
15 about making sure that it is absolutely readily
16 consumable by a whole host of these developers.
17 So not just portable pilot unit manufacturers,
18 not just ECDIS producers but, you know, the
19 base, the most base level of people.

20 I think those app developers that all
21 these folks are using, and there's a whole
22 plethora of them, I think that's a unique place

1 where we have an opportunity to penetrate that
2 recreation market and the floaters as you put it.
3 So anyway, so I just had to say that. Thank you
4 for letting me --

5 MEMBER KINNER: And that makes perfect
6 sense, and it occurs to me that if we had an
7 opportunity at some point to bring in, for
8 instance, somebody from Sea Map, somebody from
9 Navionics, somebody from Nobletech, somebody from
10 Raymarine, somebody from whoever, that are
11 developing the hardware too, because these
12 plotter systems pull in a lot of the so-called
13 free information.

14 The users have them, I've got it on my
15 phone. That might be a way if we could bring
16 them into a situation like this and talk to them
17 about what do they need in order to be able to
18 push this kind of information out, because I
19 think everybody I talked to these days has some
20 sort of electronic chart system.

21 CAPT BRENNAN: No, absolutely, and I
22 think the HSRP that we had in Seattle, we did

1 have a couple of those vendors there. I know
2 Rose Point was there and the one refrain that
3 we've heard from them over and over again is
4 great, we love that idea. We need it everywhere.
5 We need it reliably and we need it delivered in a
6 way that we can consume.

7 So that again has been the thing that
8 has been informing the whole precision
9 navigation, you know, initiative that we have is
10 how do we get it? So that's the thing. We don't
11 have operational forecast systems everywhere.
12 We're working on that, but it's really about
13 trying to get the data that we do have
14 everywhere.

15 Just for example, I mean Rose Point
16 was paying to take, you know, the Weather Service
17 grid models, convert them into something that
18 they could transmit and deliver just so they
19 could share wind fields. So it was this, you
20 know, this guy who was on his motor trawler
21 created a software package that would do that
22 conversion just to show it.

1 So it was a matter of us going the 99
2 miles, but that one last mile, you know, that we
3 needed to deliver it so that that data was
4 consumable by the small guy, was not getting
5 done. So I think that's the thing that we're
6 trying to bridge that gap right now, is that one
7 last mile that you've got to go to make sure that
8 it's there.

9 So we've got it out in all sorts of
10 other ways, but anyways.

11 CHAIR SAADE: Thanks, Rick.

12 VICE CHAIR THOMAS: Okay, all right.
13 I have to just say for CDIP at Scripps, we get
14 250,000 hits a day from surfers and it's amazing
15 how many coastal planners, military, small
16 boaters are actually interested in the waves in
17 Southern California.

18 So we found -- our big thing has been
19 to get out the word to boaters that we have
20 buoys, because our buoys are not as big as the
21 NDBC three-meter discus buoys, where a meter
22 across and round and low to the water, but they

1 give this high resolution wave data.

2 And so you know, we've started on our
3 website actually posting things, but we have an
4 app and I was telling Ann this. I went to Silver
5 Gate Yacht Club two weeks ago. I loaded apps on
6 every one of their phones because a lot of them
7 were non-familiar, they weren't familiar with how
8 to get an app, how to save it to your home page,
9 right, or whatever.

10 And but I went around for like 40
11 people and I loaded these apps onto their phone.
12 So there is this whole thing, Ann, and I know in
13 San Diego. I mean I think we have a few ways in
14 San Diego to get out to the small boater and the
15 small user.

16 MEMBER KINNER: It's the rest of them.

17 VICE CHAIR THOMAS: It's the rest of
18 them, I know. But you're not going to get
19 everybody. But we do, you know, I've walked the
20 docks. I hand out flyers. I go to the fishing
21 associations, I go to the yacht clubs. We have
22 lists, and of course through the Marine Exchange

1 at Southern California, Kip has a list a mile
2 long of recreational boaters, because they're
3 part of the Harbor Safety Committee meeting
4 there.

5 So then that way we get all of the
6 Channel Islands boats, and I've sent things out.
7 He's very generous with that list, and so he's
8 actually emailed things out.

9 MEMBER KINNER: It's a big issue.

10 VICE CHAIR THOMAS: It is. It's a big
11 issue.

12 MEMBER KINNER: It's a very big ocean,
13 because I'm talking to people from all over the
14 world literally, and if there is some way to pull
15 in the software people. The other note I made
16 was techies versus mariners, because frankly some
17 of the people who develop the software have no
18 clue what the environment is like when you're out
19 on a boat that's moving in three dimensions at
20 once, and getting them to understand that you
21 need to be able to dim the screen at night, which
22 literally came up.

1 If we could get directly into, whether
2 it's Rose Point or Nobletech or whoever, and
3 bring them in. Because I've had this discussion
4 with the Nobletech people. The question of how
5 do you dim the screen came up. Why would you
6 want to dim the screen? Well most of us
7 understand that. The techie knew how to play the
8 game on his computer, but he didn't know the
9 circumstances under which we were going to use
10 his product.

11 I see an awful lot of that in the
12 technology world. So bringing them into the
13 picture in more than a, hey, this is here for you
14 way, but letting them understand what we are
15 looking for. When I turn the key and take my
16 boat out of the slip, I need to know that the
17 toys are going to work, and the toys are going to
18 give me the information I need, and that I can
19 make the screen do what I need it to do.

20 I'm afraid a lot of them don't, and I
21 don't know -- other than bringing them into the
22 forum, I don't know how else you make sure that

1 as they're developing new technologies, as
2 they're implementing new information, whether
3 it's G Captain or -- not G Captain, what's the
4 other one, ActiveCaptain, all these other things
5 that are out there.

6 It's nice but how do we use it and how
7 do -- they need to understand how we use it.
8 Other than having them sit down in a session like
9 I did one day and have somebody ask the question
10 how do you dim the screen, they're not going to
11 get those -- they're not going to understand what
12 our absolute needs are.

13 So I'd love to see them brought into
14 more direct contact with what is available.

15 CHAIR SAADE: Okay, thanks. We've got
16 just a couple of minutes before we move onto the
17 next segment of the program. Is there anything
18 else to talk about?

19 However, I do think -- I was just
20 sitting here thinking we might want to have a
21 recreational users session in Hawaii, because I
22 agree with Julie. The amount of interest and

1 focus that the surfing community has in
2 California really drives a lot of what goes on
3 for coastal applications.

4 VICE CHAIR THOMAS: We're getting
5 pushback from Lynne for Hawaii.

6 CHAIR SAADE: Lynne doesn't
7 understand. We're going to be there for two
8 weeks.

9 (Laughter.)

10 MEMBER DUFFY: That sounded like a
11 field trip you were speaking of, Mr. Chairman.

12 CHAIR SAADE: We're just brainstorming.

13 VICE CHAIR THOMAS: We're going to announce
14 the dates of the following meeting so everybody
15 has them in their pockets, including the two
16 weeks in Hawaii.

17 MS. MERSFELDER-LEWIS: Right. There's
18 going to be an extended HSRP meeting for a lot of
19 extra sessions. The dates that seems best for
20 everybody were the week of April 27th for Oahu,
21 and the week of September 21st for San Francisco.
22 So we'll reconfirm those and I'll put that all in

1 writing for you guys, but please save the date.

2 We have such a long list of topics for
3 Oahu. We will take everything under
4 consideration, but I'm telling you you have about
5 a third more than what you could possibly fit on
6 the agenda and have time for discussion.

7 So just FYI on that, and I hope we'll
8 have some time this afternoon to talk about that
9 or this morning or whenever that's going to be
10 this afternoon. We can talk about what we've
11 already -- the team that's met, some of the stuff
12 we've already talked about, the new ideas we have
13 here and for San Francisco too. We can just run
14 through those.

15 CHAIR SAADE: Okay, thanks, Lynne.
16 Can we go ahead and have Galen get set up?

17 MEMBER MAUNE: Lynne, has a venue
18 been established for Hawaii?

19 MS. MERSFELDER-LEWIS: We can't even
20 contract it until October.

21 MEMBER MAUNE: We can't even contract
22 until October. Okay. Lynne, being the

1 mathematician that I am, when you say we have
2 one-third more material than we can cover in
3 three days, that to me sounds like you need a
4 four-day HSRP.

5 CHAIR SAADE: Okay. We're all set for
6 the next segment with Galen Scott. He's program
7 analyst with Geosciences Research Division of NGS
8 and NOS. Take it way, Galen.

9 MR. SCOTT: Thank you.

10 CHAIR SAADE: Thank you.

11 MR. SCOTT: Good morning, everybody.
12 I'm Galen Scott. I'm currently the NGS acting
13 constituent resource manager, which means I'm
14 supposed to be talking to stakeholders and
15 bringing information back to NGS to help us make
16 decisions about how we move forward.

17 I also happen to be the co-chair of
18 the NOAA Sentinel Site Program, which is all
19 about taking NOAA products and services and
20 delivering them on the ground to people to help
21 make decisions about responding to sea level
22 rise. So I'm very pleased to be here to kind of

1 set the stage for the next upcoming panel that's
2 going to have a really interesting discussion.

3 So the topic that I'm talking about
4 here is the National Spatial Reference System
5 modernization, which is going to set the stage
6 for helping to deal with places that are moving.
7 So I've got a terrible subtitle here addressing
8 subsidence through time-dependent positioning and
9 intraframe velocity models. However, really what
10 that means is the Earth is moving, so where are
11 we now?

12 The National Spatial Reference System
13 is the system that has latitude, longitude,
14 elevation, gravity, shoreline and particularly
15 their changes over time. National Geodetic
16 Survey's mission is to define the National
17 Spatial Reference System and to maintain it and
18 to provide access to it. Currently, this
19 consists of two datums, the North American Datum
20 of 1983, NAD 83 and the North American Vertical
21 Datum of 1988 or NAVD 88.

22 This is the underpinning of all

1 geospatial data. It helps you align different
2 data layers and currently -- well, first of all,
3 I'm going to be speaking to the elevation portion
4 of the NSRS because that's really about which way
5 water flows, which is what we're all concerned
6 about. Currently that system, the NAVD 88 is
7 referenced through what we call passive controls,
8 or those little benchmarks in the ground that is
9 where surveyors start their work.

10 In the future, we are going to be
11 going to active control, meaning continuously
12 operating GPS stations. So when we move to the
13 new datums, tomorrow's National Spatial Reference
14 System is going to be active, and we're going to
15 have, as Juliana mentioned the other day, four
16 terrestrial reference frames that are based on
17 the tectonic plates.

18 So I'm not going to go through all of
19 those, but particularly what we're going to focus
20 on is the fact that we're going to be creating,
21 replacing NAVD 88 with the North American and
22 Pacific Geopotential Datum or NAPGD 2022. The

1 idea here is that we're going to be able to
2 account for how things move through time.

3 So just to kind of give you a sense of
4 how the National Spatial Reference System works,
5 it's the, as I said, the underpinning of all
6 geospatial data layers. So if we want to talk
7 about creating flood insurance rate maps, we
8 start with something like airborne or mobile
9 lidar data sets that's collected by one person at
10 one time. We then need to connect that to a
11 stream hydrograph that's collected probably in a
12 different place by different people maybe at a
13 different time.

14 Then we create the elevation
15 certificates, which you know, are used to show
16 where the particular places are. Put all of that
17 information together to create the FIRMS. So if
18 everything is consistently aligned, all those
19 different data sources are consistently aligned,
20 they'll work well together to show you where the
21 water's going to go over the land.

22 So the current NSRS, the North

1 American Geodetic -- North American Vertical
2 Datum of 1988, sorry for those folks in the back
3 that may not be able to see those tiny little
4 lines, but the lines on this map are the geodetic
5 leveling networks that were created by roving
6 bands of surveyors that literally walked across
7 the country, east to west, north to south,
8 bringing their families with them in tow and
9 doing these observations, leapfrogging one
10 observation after another all the way across the
11 country and back over decades and decades, right.
12 Seventy or 80 years of data that was collected by
13 these roving bands of surveyors were all matched
14 together, put together to create NAVD 88.

15 800,000 of those little benchmarks
16 connected by 2.2 million kilometers of geodetic
17 leveling, right. So that's what was used to
18 create NAVD 88. It was the best technology at
19 the time. Leveling is extremely precise, to the
20 submillimeter level, but errors build up over
21 time and over distances. And so now that's the
22 elevation portion.

1 Imagine there's a whole other set of
2 roving bands of surveyors that are building
3 towers and taking angles and distances to create
4 the horizontal component of the spatial reference
5 system. So that's NAVD 88, and we realized here
6 after Katrina that that wasn't really sufficient,
7 to provide the level of survey control that was
8 needed in a dynamic place, right?

9 Eighty years of leveling data put
10 together in a place that's moving considerably
11 year after year really didn't give us the kind of
12 consistent and accurate information that we
13 needed. So back in 2004 and for several years
14 after that, we started working with Louisiana to
15 create GPS surveys, to do GPS surveys that would
16 get us more accurate positions now. Where is the
17 land now, so that that could be referenced?

18 The problem is, is that that was -- we
19 did it several different times, but that left
20 some survey control marks in specific places, but
21 it was not necessarily that accessible to the
22 surveyors. They sometimes had to travel pretty

1 far to find the marks. We did these different
2 surveys over time, didn't always hit the same
3 marks.

4 So we had four different surveys, but
5 only 55 of those surveys were tied in to all four
6 surveys, to give us an idea of how things were
7 changing over time. So we started to do this
8 here because of the need of this dynamic place,
9 and that really kind of pushed the idea that we
10 needed to do this in general, because the Earth
11 is a dynamic place and things are moving.

12 So are we modernizing the National
13 Spatial Reference System? To better serve
14 communities in regions experiencing land motion
15 and uplift and subsidence, but also because we
16 want to be consistent with the main driver, GNSS
17 or Global Navigation Satellite Systems. That
18 includes GPS as well as GLONASS and the other
19 satellite systems, the positioning systems up
20 there that we can -- that we can use.

21 The big things here are access,
22 accuracy and consistency, right? Access, GPS is

1 much faster, cheaper and more reliable than --
2 and it's getting better over time. GPS reduces
3 our reliance on those -- on finding that passive
4 control to start your surveys. The accuracy
5 component here is that GPS is insensitive to that
6 buildup of air as you walk across the country,
7 and it's immune to benchmark stability issues,
8 right.

9 You know, if we're observing it now,
10 we're not relying on a mark that may have been
11 observed last -- decades ago, and then
12 consistency. This is eliminating some of the
13 systematic errors that are in our current datums.
14 We're aligning this to the international
15 terrestrial reference frames, to the global
16 frames and it integrated both the horizontal and
17 the elevation components of the National Spatial
18 Reference System.

19 So the NSRS modernization is going to
20 have a whole lot of benefits, and in particular
21 two centimeter heights pretty much anywhere. So
22 in today's NSRS, the way that we work now and the

1 way that we have for the past several decades is
2 that the height that we publish, that is the
3 authoritative height, is held fixed until it's
4 replaced by another set of observations.

5 So plotting those observations over
6 time would look like this, right. You take an
7 observation in 1990 and that's what we publish
8 until it gets observed again and so on. Imagine
9 in a place like this if you were using only -- we
10 only had one observation here, right, and it was
11 at 1990 height. But now we're in 2015, and we're
12 still using that 1990 height. That can be a real
13 problem. That's the danger of passive control,
14 survey control that's there and only -- and is
15 only good until the last time you observed it.

16 Moving forward, the modernized spatial
17 reference system, we're going to have estimates
18 of crustal motion from what we call the IFVM 2022
19 or the intra-frame velocity model of 2022. Not
20 only do we have these GPS observations over time,
21 we have error bars on them to give you a sense of
22 the accuracy of them.

1 We also have a model that will project
2 into the future, based on information that we
3 have and based on those observations where we're
4 going to be in the future. We're setting
5 specific what we call reference epochs. These
6 are epochs in time where all of these
7 observations can be moved to so that everything
8 is comparable within a specific timeframe.

9 So it provides that consistent time to
10 compare surveys that are done at different times,
11 right, and those are the red dots there. We can
12 use the observations that we have, we can use our
13 models, and then we can in 2020.0, this is where
14 all of these -- this information is going to be
15 referenced to.

16 As we move through time, if we don't
17 have new observations, then the error estimates
18 will grow larger. We'll stay we're pretty sure
19 it's here, but we're this confident instead of
20 that confident.

21 The intra-frame velocity model we're
22 developing now. We've got several different

1 ideas of how it can be done. Right now we're
2 taking our CORS, our Continuously Operating GPS
3 Reference Stations and we are gridding those
4 velocities and creating a velocity model that
5 way. But we're also considering adding
6 geophysical modeling to it and InSAR.

7 That's Intraferometric Synthetic
8 Aperture Radar that can get you very small
9 changes in elevations over time, putting that all
10 together to give you a model of not only, you
11 know, of how the crust is moving and where your
12 positions are going to be at those specific
13 reference epochs.

14 So we have a whole bunch of tools that
15 are going to be going along with this
16 modernization. We have web pages to get our
17 information out there in machine-readable
18 formats. Our online positioning users service is
19 one of the core products that we have that allows
20 you to process GPS data.

21 That's going to be -- created,
22 expanded to include a lot of different survey

1 observations that you can adjust together, and
2 then our transformation tools. You heard from
3 Stephen White the other day about VDatum. We
4 also have NCAT or the NGS Coordinate Conversion
5 and Transformation Tool. These are tools that
6 allow you to go back and forth between the old
7 datums and the new datums and to tidal datums
8 with new data.

9 So there's a lot of new tools that are
10 coming with this, and we have a big citizen
11 science crowdsource campaign to collect GPS data
12 on those survey control benchmarks. It's called
13 GPS on Benchmarks, so that we get the data that
14 we need to create these transformation tools.

15 So there's a lot of new products that
16 are going to be out there with the new reference
17 system, and we really hope to make that an easier
18 transition for folks, because there are a whole
19 lot of benefits to be derived by moving to it.

20 That's it. That's my contact
21 information, and I'm going to leave that up
22 because this is a deep topic and if you want to

1 learn more you can.

2 (Applause.)

3 CHAIR SAADE: Great stuff, Galen. So,
4 I get to start with the questions?

5 Great. So, the SAR measurement
6 accuracy. When you talk about fairly accurate,
7 how accurate is it? Plus or minus what?

8 MR. SCOTT: So, the accuracy of SAR,
9 the absolute accuracy can really depend in terms
10 of exactly where. But the power of SAR is
11 measuring changes over time, right? You get
12 repeat passes of the satellite and you can get
13 millimeter scale changes, even sub-millimeter
14 scale changes over time, depending on how much
15 data you have.

16 CHAIR SAADE: So, over time is a year?
17 Over time is a day?

18 MR. SCOTT: Over time is over years.
19 It really depends on the number of satellite
20 passes that you have. There's only a handful of
21 SAR satellites up there and there's kinds of
22 operate in different ways. So my understanding

1 is that there are monthly passes, that you can go
2 from month to month.

3 CHAIR SAADE: So the way we're going
4 to update going forward to '20 in the future,
5 you're not going to be sending out these teams
6 that walk the continent for a decade or two?
7 It's all going to be satellite updates.

8 MR. SCOTT: No sir. We don't have the
9 resources to do that anymore. Well, that's a
10 really good point here, and that is we are
11 creating the system here to be able to process
12 this data and to align it all together. But the
13 observations that are required to be submitted to
14 us need to come from partners, from states, from
15 other agencies.

16 You know, that's what OPUS is all
17 about. You know, people collect GPS data and
18 they submit it to us and use our tools to process
19 it, and then we can publish it. We don't have
20 these roving bands of surveyors anymore, so we
21 need to rely on the data that's being given to
22 us. And that's a really big issue. If folks are

1 not giving us new data, what we're publishing is
2 what we got last.

3 CHAIR SAADE: Is that working? Do you
4 need advocates for that?

5 MR. SCOTT: We definitely need
6 advocates for that. That's part of the change
7 here in the paradigm, is saying that we've got
8 the system, but we need people to actively be
9 participating, doing these observations, and
10 submitting them to us.

11 CHAIR SAADE: Thanks. Any other
12 questions?

13 MR. SCOTT: Juliana, if you want to
14 respond to that, too.

15 VICE CHAIR THOMAS: Oh, yeah, go
16 ahead.

17 MS. BLACKWELL: This is Juliana
18 Blackwell. If I can just add on to what Galen
19 said. You did a great job Galen, by the way, so
20 thank you very much for that.

21 So, we are working with the National
22 Society of Professional Surveyors. We meet with

1 them regularly. They are advocates for a lot of
2 the campaigns that we're doing, a lot of the
3 information, the tools, and using professional
4 surveyors to give us feedback. We also have 14
5 Regional Geodetic Advisors who are reaching out
6 to partners, current partners and new partners in
7 all the states, and so we are represented that
8 way, too. But we're certainly looking for other
9 ways to reach out to other communities to get
10 data, feedback, et cetera.

11 The other thing I want to mention
12 briefly is regarding the SAR technology. This is
13 a great thing that we're looking into doing.
14 We're partnering with USGS and NASA to be able to
15 utilize SAR technology to help us with those
16 relative changes over time.

17 One of the key things that we need to
18 do is be able to make the relative absolute by
19 connecting that to the National Spatial Reference
20 System through most likely our CORS network, and
21 particularly our Foundation CORS. So, in other
22 words, we can model and, you know, use that

1 technology in the future for relative changes and
2 it will help us with the motions between the
3 places in particular. But we need to be able to
4 bring that down to earth, so to speak, and make
5 sure that we are referencing that to geodetic --
6 highly accurate geodetic points, particular
7 Foundation CORS and other CORS locations. Thank
8 you.

9 MEMBER MAUNE: Ed, Dave Maune. That
10 differential InSAR process which you used on
11 Hampton Roads, Virginia to determine what its
12 subsidence rate. And something interesting was
13 it showed this one bridge, summer, fall, winter,
14 spring, to see how the bridge expanded in the
15 summer. You're talking millimeter level. But
16 this technology is good for things other than
17 just the millimeter level stuff.

18 We need to track subsidence in a lot
19 of places in the country. I personally have seen
20 many cases where lidar data sets did not fit
21 together by two feet because of subsidence in the
22 Florida panhandle and down near Palm Beach. Both

1 had subsidence rates in excess of two feet in
2 Florida.

3 We know there's major subsidence in
4 Louisiana and Houston, Texas -- your backyard,
5 really. And then out in California there's a
6 famous photograph of a place that's subsided. I
7 don't know if it's 30 feet. It's however high
8 that telephone pole was, but in 1926 it was at
9 the top of the telephone pole and now it's -- by
10 the 1970s it was at the bottom of the telephone
11 pole.

12 So, some of these are very huge
13 subsidence rates, and what they're doing is
14 absolutely vital for keeping track of how things
15 are changing.

16 CHAIR SAADE: Great. So, let's say
17 there's an earthquake in California -- two months
18 ago there was a 7.2 -- that you know things have
19 moved significantly. How quickly are you able to
20 go out and update that one, for instance?

21 MR. SCOTT: So, we can see that,
22 because we have active control, because we have

1 GPS station that are running 24/7 and feeding
2 that data back to our office, we can see that
3 pretty quickly. Now, getting that information
4 uploaded and into our tools and models takes a
5 little bit more time. But because we have active
6 control, we can really see things, how things are
7 moving, pretty quickly.

8 CHAIR SAADE: Okay. That was really
9 great. Thanks a lot and we're going to take a
10 break now. Thanks, Galen.

11 (Applause.)

12 (Whereupon, the above-entitled matter
13 went off the record at 9:47 a.m. and resumed at
14 10:03 a.m.)

15 CHAIR SAADE: Okay, everyone, we're
16 going to get started. We're going to turn this
17 session over to Julie and Audra Luscher. Sorry.

18 VICE CHAIR THOMAS: Thank you, Ed.
19 Good morning and welcome, everyone. I am Julie
20 Thomas. I'm co-chairing this session on sea
21 level and subsidence along with Audra Luscher
22 from NOAA CO-OPS.

1 As you know, these topics are key
2 issues in our coastal states and territories. We
3 are fortunate today to have a panel of subject
4 matter experts, and we're looking forward to
5 finding out what their unique perspectives are on
6 this important topic.

7 Audra and I are going to split, a
8 little bit, the introductions of the panelists,
9 and it's over to you, Audra, and we'll get going.

10 MS. LUSCHER: First of all, I just
11 want to thank the HSRP for allowing me to help
12 with this session. This is a topic that has been
13 a part of my career for 20 years, and it's been a
14 pleasure to work with Julie and others on
15 crafting some recommendations with the group and
16 the energy around this issue.

17 I also just want to acknowledge,
18 Larry, you know, he started this over a year ago,
19 and Julie was gracious enough to take it over and
20 continue the energy. But you know I thank Larry
21 for his effort and just really enjoyed the time I
22 had to spend with him on this issue.

1 So I'm going to turn to the
2 introductions now. This is our second session.
3 Just a little bit of a recap. You know, we
4 started this in D.C. We had a number of
5 panelists then and there was a lot of energy
6 about continuing it on in a local area around
7 Louisiana, and to dig in a little bit more around
8 the subsidence issue.

9 We have Nicole LeBoeuf, our Acting
10 Assistant Administrator. You know Nicole has
11 this issue in her foresight and has a lot of
12 energy and activity around that. I've been
13 serving on a detail and it's been a privilege to
14 help kind of think about this continually, both
15 in the span of HSRP as well as within NOS. So I
16 want to introduce her and thank her again for
17 joining us. And then I'll pass it back to you.

18 VICE CHAIR THOMAS: All right. I
19 think we're going to introduce as we present
20 them, as we do the speakers. Why don't we do it
21 that way? And we'll just jump right into
22 Nicole's presentation.

1 MS. LeBOEUF: All right, good morning,
2 everyone. As you may have heard on Tuesday, I've
3 got roots here in Louisiana and it puts Louisiana
4 top of mind for me at NOS when we talk about
5 these issues. And, quite frankly, I wonder what
6 the future holds for towns like Morgan City, Cut
7 Off, Galliano, Grand Isle.

8 If you know a little bit about
9 Louisiana's geography, you'll know that sort of
10 roughly the order of those towns is giving you
11 north to south, deeper into Cajun country, and
12 further at risk from both episodic events like
13 hurricanes and floods, but also chronic events
14 like sea level rise and subsidence.

15 And as we watched Dorian largely miss
16 Puerto Rico but set its sights on Florida, I am
17 reminded that none of our coastlines will be
18 immune to these events and we'll all need to
19 adapt. As a leader of NOAA's coastal programs
20 and services, I can say without a doubt, and
21 Audra just alluded to this, providing information
22 about coastal change so that others may adapt is

1 quickly becoming one of our top priorities.

2 More and more each day government,
3 industry, and the public are looking to NOS as
4 the authoritative, consistent, reliable source of
5 geographic positioning, water level data, and
6 much else. Fortunately, along with our Coastal
7 Zone Management Programs, NOS provides core
8 services, as you heard about today, from the
9 National Geodetic Survey and the Center for
10 Operational and Oceanographic Products and
11 Services. These are all essential to
12 understanding coastal change.

13 The programs that NOS has under the
14 purview of this Panel are increasingly playing an
15 important role in supporting coastal resilience.
16 But our long-term investment and commitment to
17 sustaining these observations allows us to do
18 things that we would not have been able to had we
19 just arrived on the scene.

20 So we are able to identify not just
21 sea rise or sea levels, but sea level rise
22 trends. And that provides inundation statistics

1 and assessments of the probability of extreme
2 water levels, and this is all really essential to
3 resilience.

4 Events like Hurricane Barry, right, a
5 relatively moderate storm, modest storm,
6 delivered over a seven-foot storm surge in some
7 locations here in Louisiana, costing between \$500
8 and \$900 million in damage. And that was just a
9 moderate storm.

10 And it doesn't even take a storm these
11 days to cause damage and destroy lives on the
12 coast. Today, what we call high tide flooding
13 can happen on a calm sunny day, and these
14 elevated water levels can disrupt coastal
15 communities and crucial infrastructure like
16 septic and storm water systems.

17 We are, at NOS, combining our
18 scientific, technical, and our resource
19 management expertise to deliver tools to coastal
20 communities to help mitigate the impacts of the
21 future that we're seeing, and also provide
22 advisory services. For example, we just released

1 our High Tide Bulletin and our 2018 State of High
2 Tide Flooding and 2019 Outlook report.

3 For many issues associated with
4 coastal change, Louisiana is ground zero. We've
5 heard a lot about that both directly and
6 indirectly this week. And it is true that
7 Louisianans have lived with the impacts that
8 water brings for some time. They are deeply
9 invested and expert in adapting to rising waters,
10 I think as only Louisianans along the Mississippi
11 can be.

12 But, despite this expertise, change
13 here in Louisiana is going to be hard. That
14 change is going to have to come from planners,
15 the shipping industry, conservationists, pilots,
16 government, and local communities all the way
17 down LA-1. They're going to have some really
18 tough choices to make.

19 I sincerely appreciate the HSRP's
20 willingness to shift its focus at least to cover
21 a panel in its second year on this, because these
22 impacts are going to be pervasive not just here

1 in Louisiana but throughout our coasts.

2 I'm confident, with the HSRP's help
3 and advice, we'll be able to bring value to our
4 coastal communities here in Louisiana and
5 elsewhere. And I look forward to hearing your
6 input, not only on what NOS is doing well, but on
7 what NOS can do to change its programs to improve
8 our services for you. Louisiana's future matters
9 and the rest of our coastal zones matter just as
10 well.

11 With that in mind, before I conclude
12 my introduction, I wanted to recognize that today
13 marks the 14th anniversary of the landfall of
14 Hurricane Katrina. This region continues to
15 recover from the loss of life and the devastation
16 from that historic storm. Ed Richards, senior
17 law professor at LSU photographed poignant images
18 of Katrina's aftermath. And as we recall the
19 events of that day and the days that followed, I
20 hope his photos will speak not only to the
21 memories in our minds, but those in our hearts.

22 In honor of those lost and those whose

1 lives were forever changed by Katrina, please
2 join me in 14 seconds of silence.

3 (Moment of silence.)

4 MS. LeBOEUF: Thank you. Thank you
5 again for the opportunity to introduce this
6 panel. I look forward to your presentations and
7 our partnerships with you all as we continue to
8 provide reliable and authoritative data and
9 services so that our collective future is not
10 just wetter but brighter as well. Thank you.

11 (Applause.)

12 VICE CHAIR THOMAS: Thanks, Nicole.
13 It's great to have your passion and your support
14 of this topic as we move forward.

15 Next I'd like to introduce Clifford
16 Mungier. Clifford is with Louisiana State
17 University and we're looking forward to hearing
18 about your focus on geodesy. Thank you.

19 MR. MUNGIER: Thank you, ma'am. Good
20 morning, everyone.

21 So, talking about some of the
22 observations that have been done in Louisiana

1 with precise leveling, in the middle '70s
2 Congress appropriated money for the
3 channelization of the Red River, primarily in the
4 state of Louisiana, to enhance commercial
5 shipping traffic, primarily for barge traffic for
6 transport of construction materials.

7 The Corps of Engineers gave money to
8 the National Geodetic Survey to do precise
9 leveling along the Red River down to what is the
10 instep of Louisiana, and then they split up one
11 leveling crew down the Mississippi River, the
12 other one the Atchafalaya River to Morgan City.
13 They looped around and then met up outside of New
14 Orleans, went through metropolitan New Orleans,
15 and closed in to Logtown, Mississippi, with a
16 spur down to near the birdsfoot delta in Venice,
17 Louisiana.

18 And after \$1.5 million of Corps of
19 Engineers money, they found that there was
20 significant subsidence that had occurred in south
21 Louisiana, realized primarily in New Orleans,
22 where they had done their observations.

1 About around that time, in '78, the
2 National Geodetic Survey changed the name from
3 Sea Level Datum in 1929 to the National Geodetic
4 Vertical Datum. For decades, my students have
5 had difficulty remembering that, so I tell them
6 just think "No Good Venereal Disease 29," and
7 it's been burned in their minds ever since.

8 (Laughter.)

9 MR. MUNGIER: Well, it worked didn't
10 it? You won't forget it either.

11 So, because there had been such a
12 significant change in the values for elevations
13 realized in New Orleans through that recent
14 leveling, NGS decided to try doing a paper
15 adjustment for the South Louisiana region.

16 Around the same time they had
17 catastrophic floods due to rain in metropolitan
18 New Orleans in '79 and '80, and FEMA contacted
19 the Justice Department and complained about the
20 amount of money that they were paying out in
21 insurance. So, the local parishes -- Orleans,
22 Jefferson, Plaquemines, and St. Bernard's --

1 along with every land surveyor and professional
2 engineer in metro New Orleans, were co-named in a
3 suit for \$96 million. That got everyone's
4 attention.

5 So, some of the parishes authorized
6 and paid for densification of leveling networks
7 in metropolitan New Orleans. In addition, the
8 New Orleans District Corps of Engineers was
9 concerned with the NGS free adjustment and the
10 chief of engineering back then, Fred Chatry,
11 decided that, to bring some order to everything,
12 Fred said, from here on, or for the time being,
13 subsidence is not authorized. And elevations
14 were frozen by fiat.

15 The purpose of that was to cut out
16 confusion with the construction in progress for
17 the levee system. And after the levee
18 construction was completed, then Fred Chatry then
19 sat back and said, all right, now we can
20 recognize subsidence, its effects. And
21 eventually, in the early 2000s, the New Orleans
22 District Corps of Engineers asked for permission

1 from the Office of the Chief of Engineers to then
2 update everything to NAVD 88, which they did.

3 In '86-'88, because of those lawsuits,
4 Jefferson Parish and St. Bernard's Parish
5 established new benchmark systems. And it was
6 350 benchmarks in Jefferson Parish, 100
7 benchmarks in St. Bernard, as well as additional
8 marks that were put in by NGS in Orleans Parish
9 and Plaquemines Parish.

10 This is the type of instrument that
11 the National Geodetic Survey used in metropolitan
12 New Orleans. This is along the riverfront along
13 Tchoupitoulas Avenue. And this is the type of
14 instrument that was used in the local parishes by
15 contracting registered land surveyors.

16 In addition to those first and second
17 order densification surveys for leveling, I was
18 at the University of New Orleans at the time and
19 I had students doing relative gravity surveys of
20 all the benchmarks in metropolitan New Orleans.
21 And we observed about 450 benchmarks that are
22 included in a relative gravity network.

1 Everything was bluebooked according to NGS
2 specifications. NGS accepted the data and
3 incorporated into the National Spatial Reference
4 System.

5 The North American Vertical Datum was
6 announced for 1988. They actually published data
7 available starting in 1990, except for South
8 Louisiana, because by then Louisiana, South
9 Louisiana, was recognized to be a crustal motion
10 area. Around the same time, with the U.S.
11 Department of Defense allowing some things to
12 become public, Dr. Faller at University of
13 Colorado invented the absolute gravity meter, and
14 one of these instruments was purchased by the
15 National Geodetic Survey.

16 The instrument is good to plus or
17 minus one microgal, which equates to about one
18 centimeter change in the distance from the
19 earth's surface to the center of mass. So it's
20 quite capable of making absolute gravity
21 measurements to detect subsidence.

22 So, the National Geodetic Survey came

1 through New Orleans at the University of New
2 Orleans in '89 and returned again in '91, and the
3 increase in absolute gravity showed that this one
4 spot at the University of New Orleans was getting
5 closer to the center of the earth by nine
6 millimeters a year, which raised a few eyebrows.

7 In '91 was the fall of the Soviet
8 Union, and with the fall of the Soviet Union some
9 of the Air Force generals in the Soviet Union
10 started turning the switches off at their missile
11 silos for the intercontinental ballistic
12 missiles. Because of that, then the need for a
13 classified, top secret geoid or a gravity model
14 of the earth was less critical than it had been.

15 National Geodetic Survey returned to
16 New Orleans in '91-'92 and did field observations
17 in support of the Orleans Parish GeoCadastre,
18 which was federal money funding for a GIS system
19 for Orleans Parish and Jefferson Parishes. And
20 they tied to a couple of benchmarks in the metro
21 area, J-92 at the Rigolets Bridge, what at the
22 time was thought to be one of the most stable

1 areas in the area, and unfortunately it's not, as
2 well as to Veterans Boulevard.

3 There was a '93 adjustment by NGS for
4 subsidence zone elevations in metropolitan New
5 Orleans, and that was the last visit of NGS to
6 South Louisiana for the century. Because the
7 prices of first order leveling at about \$1,500 a
8 mile for double-run first order leveling,
9 Congress was less than enthusiastic about funding
10 that. The GPS constellation continued to grow as
11 more satellites were put into orbit successfully.
12 And the security classification of the geoid,
13 which at one time was Top Secret code word, was
14 declassified.

15 The National Geodetic Survey returned
16 again in '93 as well as '94, and continued
17 observations of absolute gravity showed it to be
18 continuing to increase at the steady rate of nine
19 millimeters a year.

20 In '96, the Defense Mapping Agency
21 awarded a million dollar contract to Ohio State
22 University, for Professor Richard Rapp to

1 recompute the geoid using previously classified
2 data held by the U.S. Department of Defense.
3 What we were looking for: what was necessary to
4 replace differential leveling, first order
5 leveling at \$1,500 a mile. Because to get
6 current elevations in New Orleans, you start in
7 Pensacola. You walk to New Orleans, and you keep
8 on walking until you close out in Austin, Texas.
9 And that's a lot of kilometers at 1,500 bucks a
10 mile.

11 There was a different way of getting
12 elevations, and that was with GPS. The problem
13 with GPS is it give you heights. Heights aren't
14 elevations. And the difference between height
15 and elevation is on the diagram; the little H in
16 green gives you the height of a point on the
17 surface of the earth from GPS. It gives you the
18 distance down to the ellipsoid, a smooth
19 ellipsoid of revolution that is a mathematical
20 guesstimate of the average shape of the whole
21 earth.

22 But the shape of the earth in terms of

1 mean sea level is a mathematical model called the
2 geoid, G-E-O-I-D. And the geoid is represented
3 on the diagram by that wavy red line. That
4 approximates mean sea level. The surface of the
5 ocean as the mean of rise and fall of the tides,
6 as well as what it might represent inside the
7 continents.

8 And that distance from the green line
9 to the red line, this capital N, that's the
10 height of the geoid. That's what used to be
11 classified. That's what used to be used for --
12 well, and still is -- used for targeting purposes
13 of intercontinental ballistic missiles. That was
14 declassified.

15 So when we get a little H from GPS
16 observations and knowing what N is, courtesy of
17 the National Geodetic Survey, we subtract from
18 the other and we get capital H, which is
19 elevation. And that is where elevations are
20 coming from for the entire world, but most
21 accurately in the United States of America
22 courtesy of the National Geodetic Survey. And,

1 each year, the National Geodetic Survey
2 incorporates more and more gravity observations
3 through the air, through satellites, and through
4 ground observations to enhance the quality and
5 knowledge of the situation or the knowledge of
6 the geoid in the United States, as well as its
7 territories and possessions.

8 So when the world geoid was published
9 by the Department of Defense through Professor
10 Rapp, the National Geodetic Survey took it upon
11 themselves to take that world model and to warp
12 it, to forget about the rest of the world and fit
13 best to the United States. And that was
14 published as earth gravity model 96 -- or, I'm
15 sorry, GEOID96, just for the continental United
16 States. And that vastly increased the
17 reliability of obtaining a good idea of what
18 elevation was from GPS observations. And since
19 then, every year, the National Geodetic Survey
20 has been incorporating more gravity models into
21 the geoid for the U.S. and its territories and
22 possessions, and publishing them as different

1 geoids. Keeping up with science as it
2 progressed, the NGS has been right on the
3 forefront of the development of geoids.

4 Because of that and the price of
5 differential leveling over long lines, Congress
6 asked NGS for the best solution to continue
7 forward in the future. And in 1998, the National
8 Geodetic Survey came out with the National Height
9 Modernization Study. That was to use the geoid
10 and to use GPS to get reliable elevations in the
11 U.S. And Congress accepted that as the sanest,
12 most economical way of proceeding forward with
13 current technology.

14 In metro New Orleans, we're concerned
15 about subsidence and we're putting up -- LSU is
16 putting up Continuously Operating Reference
17 Stations throughout the state. Here's a couple
18 in metro New Orleans, out in the east, where one
19 of the antennas we have is mounted on about a
20 5,000-foot welded steel casing into the ground.
21 That one there. And we've named that Station
22 Mary. And there's a mark next to it that's just

1 mounted on the surface that has a strange name of
2 Moon.

3 And Moon and Mary are two first names
4 that are familiar to people in New Orleans. It's
5 Moon Landrieu, the past mayor of New Orleans; and
6 Mary Landrieu, who for many decades was a Senator
7 to the U.S. Congress.

8 What we do with these two is we watch
9 Moon go down with respect to Mary. So we're
10 seeing differential subsidence in action on a
11 day-to-day basis. Subsidence occurs throughout
12 Louisiana at different places, at different
13 rates, at different times. One place near the
14 coast, an area called LUMCON, this particular
15 benchmark where we've got a range pole sitting on
16 the center of the mark, that disk was inside of
17 that PVC pipe about ten years prior.

18 And through ten years of surface
19 subsidence, the ground has subsided away from the
20 benchmark. And this is a rather graphic
21 illustration of what subsidence can appear to be
22 throughout areas, particularly along the

1 Louisiana coast, when you can still find the
2 coast, that is.

3 So, the University of New Orleans has
4 established Continuously Operating Reference
5 Stations throughout the state. We have also
6 observed absolute gravity at all of these
7 stations. In 2006, we observed a second time.
8 And the summer before last, LSU purchased our own
9 absolute gravity meter. And we are continuing to
10 observe, as well as get assistance from the
11 National Geospatial Intelligence Agency. And by
12 NGA we have now observed 15 stations in 2019; by
13 the Louisiana Spatial Reference System, we've
14 observed 22. We have a remaining 17 to go. We
15 will continue to observe absolute gravity in
16 Texas, Mississippi, and Alabama, and results so
17 far, just with absolute gravity, show the amount
18 of subsidence we've seen at different locations
19 throughout Louisiana.

20 In addition, we will be observing
21 absolute gravity and deflection of the vertical,
22 which we just acquired an instrument for that

1 this summer, at all of these stations, including
2 at tide stations throughout the Gulf of Mexico.

3 This represents the Continuously
4 Operating Reference Station that we administer
5 with our software through the Louisiana Spatial
6 Reference System. And of those in Louisiana, LSU
7 supports 31 national COR sites in the state. In
8 addition to regional subsidence, we also have the
9 Baton Rouge Fault, which happens to be subsiding
10 at five millimeters a year, in addition to
11 regional subsidence.

12 This represents graphs of Continuously
13 Operating Reference Stations at LSU, down at
14 Venice High School Bootheville, Destrehan, Grand
15 Isle tide gage, Houma, LUMCON, Shreveport, Sicily
16 Island High School, Thibodaux. And that's what
17 the new digital zenith camera looks like that we
18 just bought for 100 grand in euros.

19 So our objectives are to continue all
20 of the absolute gravity observations, along with
21 deflection of the vertical. We're doing GIPSY
22 processing of all of our historical COR sites for

1 correlation with InSAR, because, courtesy of
2 funding from the National Geodetic Survey, the
3 Louisiana Spatial Reference Center has a
4 subcontract with the Jet Propulsion Laboratories
5 and NASA to do InSAR flights over South
6 Louisiana, and they are using our COR sites as
7 benchmarks for current elevations. And we will
8 continue to provide all of our data to the
9 National Geodetic Survey.

10 And, finally, Louisiana Revised
11 Statute, Chapter 50, Section 173.1 says, in
12 Louisiana, if you want current elevations, come
13 to LSU.

14 (Applause.)

15 VICE CHAIR THOMAS: Thank you very
16 much, Clifford. You've got a wealth of
17 information and I wish we had more time to spend
18 more time on it.

19 Next is Rich Luettich, and Rick is at
20 the University of North Carolina-Chapel Hill. He
21 has been a real asset to NOAA. He's advanced
22 community modeling. He's been chief on several

1 testbed projects, so we're looking forward to
2 listening to him.

3 DR. LUETTICH: Good, thank you. It's
4 a pleasure to be here. As I thought about what
5 to talk about here, the starting point was sort
6 of who am I and what perspective am I coming
7 from.

8 I am a coastal resident in coastal
9 North Carolina. I'm a part of the coastal
10 scientific community there, and I'm director of a
11 Department of Homeland Security-funded Coastal
12 Resilience Center of Excellence. I'm working
13 with the State of North Carolina on to --
14 actually, we now have permission to talk about
15 climate science and climate change in North
16 Carolina. We didn't for a while. But we're
17 working on a climate science report, and so I'm
18 helping with the sea level rise component of
19 that.

20 So, all of those could have me talk a
21 lot about NOAA products related to sea level
22 rise, the high tide flooding work that CO-OPS has

1 been doing, and particularly the future
2 projections with probabilities attached with
3 them. I think these are all incredibly valuable.
4 But that's not what I'm going to talk about
5 today.

6 Another hat that I could talk from,
7 and I'll come back to it at the end, is I had the
8 great pleasure -- this is a hat that I just
9 recently took off in June -- but being on the
10 board that was formed after Katrina to oversee
11 the levees here in New Orleans. It's sort of an
12 uber-board that had a fairly high level of
13 outside and technical expertise on it. And so
14 that's certainly -- and I served on that for
15 seven and a half years and rotated off in June.
16 And so I'll come back to that at the end, but
17 that's certainly shaped my perspective,
18 definitely, of the greater New Orleans area.

19 But specifically what I'm going to
20 talk to you about, from the hat that I'm going to
21 talk to you about, is just that of the coastal
22 modeling community at large. This is comprised

1 of the academic community. There's probably, at
2 least within the U.S., a couple of dozen
3 universities that have active coastal modeling
4 groups of one sort or another interested in
5 process-based understanding, interested in
6 actually developing better models and then
7 applying them in complex situations. And many of
8 my colleagues are very interested and work
9 closely with mission agencies to help transition
10 this capability into operational applications.

11 A critical part of the coastal
12 modeling community are indeed the mission
13 agencies: the Army Corps of Engineers, NOAA, the
14 USGS, FEMA, the Coast Guard, EPA. And those are
15 all at the federal level, but many state levels.
16 Here in Louisiana, Louisiana CPRA is a critical
17 organization in this space. And they're
18 interested in hazard assessment; for example, the
19 National Flood Insurance Program and also the
20 Coastal Act are both hazard assessments. You
21 need coastal modeling for that.

22 Mitigation and design. Certainly

1 navigation, and I know that's a lot of this
2 committee's charge. But CO-OPS runs the PORTS
3 models and others specifically to aid navigation.
4 And then more recently, ecosystem models to
5 predict HABS and dead zones, and the Gulf of
6 Mexico is a big concern in terms of that, to make
7 better management decisions in the heartland
8 particularly related to fertilizers and what not.

9 And then also during events. Barry
10 was a good one. I'll come back to that in a
11 minute. But Dorian we're all looking at.
12 There's decisions that are made during those
13 events that are based on people's interpretations
14 of models. And so advancing all of those is what
15 the coastal modeling community is working on for
16 the benefit and through the mission agencies.

17 And then private sectors and NGOs work
18 in this space as well extensively. And, again,
19 here in Louisiana the Water Institute of the Gulf
20 is a significant player in all of that.

21 All right. So that's kind of the
22 perspective I'd like to present in the remaining

1 minutes I have. My specific lens in that big
2 space tends to be hazards lens related to coastal
3 flooding. I've been one of the primary
4 developers of the ADCIRC coastal modeling system.
5 This is used by many mission agencies. It's used
6 through academia, it's used in the private
7 sector. NOAA uses it as the basis of their
8 VDatum calculations. They use it for the ESTOFS
9 system, the Extratropical Surge and Tide
10 Operational Forecast System. And then its
11 partner that's not widely talked about, the
12 hurricane version of that, the HSOFS system. And
13 then also for the new Coastal Act work, ADCIRC is
14 the heart of that.

15 It really starts out as a storm surge
16 coastal circulation model driven by tides, driven
17 by meteorology, winds. More recently, we've
18 added in wave properties, both through the SWAN
19 wave model but also NOAA's Wave Watch III model
20 has been linked to it through the Coastal Act
21 work. And now we're working hard to try to get
22 fresh water into it, all to be able to better

1 model hazards in the coastal zone.

2 So, those models start out with a
3 whole bunch of equations, and they get translated
4 into a bunch of computer code, tens and maybe
5 even hundreds of thousands of lines.

6 But at the end of the day, if you want to use
7 them, it's place-based. And so you come to
8 Louisiana and you say how in the world do I apply
9 these in Louisiana? And certainly this is one of
10 the most complicated areas I've ever dealt with
11 in modeling. And you've got water, you've got
12 land, and you've got stuff in between.

13 As, you know, Cliff has talked about,
14 others have talked about, it's changing in time.
15 So the real challenge here is, how do you model
16 this in that context? And, of course, the
17 outlying areas are an issue. They're subsiding
18 and people are faced with terrible decisions, and
19 we heard about that. But Greater New Orleans is
20 in particularly difficult shape because they're
21 below the Mississippi River in many places, and
22 they're below Lake Pontchartrain and Lake Borgne.

1 And so they're below everybody, and as a result
2 there's been quite a system constructed to try to
3 keep the water out.

4 How does one model all of that? Well,
5 you cut the world up into little pieces. And
6 through our ADCIRC system we cut it up into
7 little triangles. This just gives you a sense of
8 what it might look like, or what it looks like in
9 our modeling context here in this general area.
10 And on the right-hand side you can see perhaps
11 the bird's foot sticking out and Lake
12 Pontchartrain sort of circled. The higher
13 density the triangles are, then the higher
14 resolution the information is and the more it
15 looks black on this figure.

16 But the reason we do that is because,
17 at the vertex of every single one of those
18 triangles, we need to know what the bathymetry or
19 the topography is. So to apply these models and
20 to apply any model in the coastal zone, we have
21 to know what the ground elevation is relative to
22 datums of various sorts, water datums as well as

1 geodetic datums, throughout that entire region.

2 So, again, on the right is what our
3 representation of the ground was at this
4 particular point in time when we did this work.
5 Colors, warm colors being higher water or higher
6 land, and down into the blues, which are actually
7 below mean sea level.

8 When I first started working in New
9 Orleans with this model, it was actually the late
10 '90's, prior to Katrina. And I've got to tell
11 you, it was chaotic. We had multiple data sets
12 from a lot of different places. We were trying
13 to piece them together. None of the water data
14 sets and the land data sets were integrated. We
15 were doing all of that. Shorelines were a mile
16 or two away, and we were trying to estimate
17 things. We were actually trying to reconcile
18 datums and data sets just by trying get the
19 shoreline in the right place.

20 Of course, those were aerial
21 photographs that were dated, in many cases. I
22 can remember Lake Pontchartrain had at least a

1 one-, maybe a two-foot step that cut right
2 through the middle of it north to south, because
3 there were two different datums, and we just
4 heard a mention of that, in Galen's talk, in
5 Florida.

6 Same thing here in Lake Pontchartrain.
7 Different surveys done at different times
8 referenced to different datums, none of which
9 were well-recorded. And so it was quite an
10 adventure at the time. It's certainly got much
11 better, and NOAA has been the primary driver of
12 that and certainly our community is grateful for
13 that.

14 All right. Well, sort of with that
15 history, then, what is my priority list of key
16 things that NOAA can hopefully continue to
17 provide for our community? And I realize this is
18 all what Louisiana calls lagniappe in many cases.
19 It's the extra stuff that you get after you do
20 what you were designed or intended to do to start
21 with, which is navigation, I know, through NOS.

22 But, for us, it's really critical to

1 have up-to-date coastal bathymetry and topography
2 integrated -- integrated, integrated -- into a
3 seamless data set. It's much better today. It's
4 much better today than it was, but it's still not
5 very good in a lot of the sort of shallow near-
6 shore areas.

7 Those aren't necessarily high priority
8 navigational areas, but nevertheless they're
9 really critical in this coastal hazard issue,
10 because they're where water gets from the ocean
11 onto the land. They've got to go through those
12 areas. And so light-penetrating or water-
13 penetrating radar or lidar and things are useful
14 tools, but there's still a lot of work to be done
15 to make those things work well.

16 Having that data well-tied to datums
17 is absolutely essential, both tidal datums and,
18 again, geodetic datums. Every model out there
19 needs to know what the bathymetry and topography
20 are relative to mean sea level, relative to the
21 geoid, as Cliff's graph just pointed out.

22 Interestingly enough, and you can't

1 read it in this figure, but from the VDatum
2 website, there's in red this disclaimer that
3 basically says this VDatum product is doing well
4 except for in coastal Louisiana, from the
5 birdsfoot up through Lake Pontchartrain, in which
6 case it's probably off by at least 20 to 50
7 centimeters and we're working on it.

8 Keep working on it, because it's
9 critical. We also need a robust water level gage
10 network, and again NOAA has done very well with
11 that, particularly post-Katrina. Virtually all
12 of the water level gages were knocked out during
13 Katrina, and so the models were relied on to try
14 to recreate what happened in that storm.

15 Since then, it's gotten much, much
16 better, but we rely on that heavily to validate
17 our models. We are now doing real-time data
18 simulation of water levels to make our models
19 more accurate. We rely on that data to be able
20 to access it in near real-time so that we can do
21 that. So, that data is critical for operation of
22 these models in this space.

1 And, again, in my wish list, really
2 getting the coastal water level information well-
3 connected with the land and some of the inland
4 waters. As we try to piece together the
5 hydrologic component to this, it's critical that
6 we can connect that on the right datum, and Galen
7 said this as well, that we make that connection
8 well with the coast, and that we're all on the
9 same datum and we know which way water is
10 flowing. Essentially, it boils down to it.

11 Now, in New England it's easier; there
12 are steep slopes. In the Gulf and the South
13 Atlantic coast, it's really flat and so you've
14 got to be pretty accurate in order to get water
15 to flow in the right direction. That's all about
16 getting the datums right and the connections made
17 well between the inland and the coastal waters.

18 So, just to end up, we'll come back to
19 my hat with this flood protection authority.
20 Everything that's colored in various colors in
21 this map are inside of this protection system
22 that actually started decades ago, but sort of

1 brought to fruition post-Katrina. Everyone that
2 lives inside of this is depending on this, for a
3 variety of reasons, for life safety, but also
4 just simply for being able to buy insurance.
5 This is built to the one percent or 100-year
6 standard, and that's critical for getting
7 affordable insurance.

8 So, continuing to keep this well-
9 understood, how rapidly the protection system
10 itself is settling, but how rapidly the area
11 around the protection system is settling as it
12 relates to then the implications of that in
13 future storm surge or future impacts on that
14 system is absolutely essential. It's a forever
15 challenge now living here in New Orleans, living
16 with water here. And the system has to be
17 recertified periodically. So it has to be
18 remodeled. So it's absolutely essential for the
19 viability of the City of New Orleans and the
20 greater New Orleans area. Additional systems are
21 being built in the outlying areas, and that makes
22 sense, but this area requires that. And in order

1 to do that, we require what NOAA has taken on as
2 a huge mission, which is providing the bathymetry
3 and topography to support that modeling.

4 So, with that, I will say thank you
5 again for the opportunity to speak with you.

6 (Applause.)

7 MS. LUSCHER: Thank you, Rick. It's
8 always a pleasure to hear you. I've been working
9 with Rick on the community modeling
10 collaboration, and he's just creating such
11 foresight. So, again, thank you both for
12 traveling here and providing your expertise.

13 We're going to change directions a
14 little bit and talk about the viewpoints of
15 people who work on the ground, from people who
16 work with stakeholders making planning decisions,
17 and how we bring information through what's
18 called the Northern Gulf Sentinel Site
19 Cooperative.

20 So, this is one of the NOAA programs
21 that's done through extension with Sea Grant.
22 So, I'd like to welcome Renee Collini. She

1 really is kind of a boots on the ground person,
2 where she's helping people make sense of what her
3 information does to the coastal planning
4 community. Thanks.

5 MS. COLLINI: Thanks, Audra. I would
6 make a joke here about being Italian and talking
7 with my hands, and that's why I have to stand up
8 so I don't hit my fellow panelists. But it turns
9 out I'm in the spot where all the AC goes, and
10 I'm freezing. So I'm going to stand up for a
11 little while and get my blood moving.

12 So, thank you for the introduction.
13 Before today, who had heard of the Sentinel Site
14 Cooperative?

15 (Show of hands.)

16 MS. COLLINI: Nice. That was a lot of
17 hands. I'm very excited about that. For those
18 who have not heard of the Cooperative, we are a
19 partnership, so this spans from people on the
20 ground doing the research and the science all the
21 way through to people who are making decisions,
22 and really everybody in between, specifically on

1 how we can practically address sea level rise.

2 This is, as we heard, a NOAA-funded
3 product. But really what we want to do is take
4 all the pieces that we have, products, services
5 within NOAA and external to NOAA, and put them
6 together in a way that people can move forward
7 and make progress on what it is they're trying to
8 accomplish.

9 Which sounds really nice, but the
10 question boils down to, how do you actually do
11 that? So, the way our partnerships work together
12 is to identify and help provide access to new
13 science, or even old science if it's available;
14 and then, second, to help people use that
15 accurately and to the best of its ability; and
16 then, third, generally facilitate the
17 conversation around sea level rise.

18 So, this does not just mean having
19 dialogues in community halls and with residents,
20 but it also means developing a two-way flow of
21 information. So we're working on all sectors,
22 the science, the stewardship, the service towards

1 addressing these problems on the ground. So from
2 that place of facilitating the conversation is
3 where you're going to hear a lot from me today.

4 So I talked to three different groups
5 when I found out that I was coming here, because
6 I figured better to hear from them than from me.
7 So, the three general groups can be thought of as
8 extension and outreach professionals, people like
9 myself helping to make sense of the science for
10 people trying to use it; coastal decision-makers,
11 both natural resource managers and built
12 environment; and then researchers, which I'll
13 probably skip over pretty quickly because we just
14 heard a lot of great stuff from Rich.

15 So, starting with the extension
16 outreach professionals, the way people are using
17 the products and services, the big three I heard
18 about: aerial imagery, especially over time; sea
19 level rise projections, both the projections
20 themselves and the impacts; and then the
21 historical water level trends. The sea level
22 trends page was cited quite a lot.

1 Transitioning to talk about
2 operational purposes for decision-makers, which I
3 hadn't actually thought that much about. So, in
4 addition to the things the extension and outreach
5 professionals are putting in front of them, the
6 things you just saw, they also talked about how,
7 when they have to go out on boats or when they
8 have to do dive ops, they use the tides and
9 currents information.

10 But one I had not thought about,
11 Jackson County Utility Authority had said they
12 use these projections to know when to go out and
13 observe where there could potentially be sewer
14 overflows so that they can be ready to take
15 pictures, block off roads, because if they can't
16 document this problem, they can't ever get
17 resources to fix the problem. So I thought that
18 was a really interesting way to use these
19 products and services.

20 Thinking about researchers, some of
21 the information's the same. Instead of using the
22 trends and those already-analyzed data, they get

1 into the actual tide gage data. They look at the
2 rates of sea level rise for siting as well as for
3 doing post-analysis. Also the datum information
4 and services is very helpful.

5 And then this sort of broad category
6 of what I call NGS services, some of the post-
7 data analysis that we heard about and several
8 other things, and also the on-the-ground people
9 with NGS, those advisors.

10 So I'm going to transition and spend
11 the rest of my time talking about some of the
12 needs. This is one quick page on data needs, but
13 I want to caveat that the rest of what I'm going
14 to talk about is how to get this information to
15 people efficiently and some of the requests
16 around that.

17 So, some of the specific data needs
18 were about sea level rise observing gaps. I
19 don't think this surprises anybody, for both
20 water level as well as CORS, which you've heard a
21 lot about already.

22 This one, contextualizing and

1 connecting data sets, I thought was really
2 interesting. I had two specific requests. One,
3 on those tide gage sites, when you go and look at
4 a tide gage, also having the subsidence rate
5 there somewhere as just an identified piece of
6 information.

7 And then another one, which came from
8 an extension agent, was asking for, when you have
9 aerial imagery over time, also have an indication
10 of where that water level is, where with sea
11 level rise we're at. I thought that was really
12 interesting. And then this last one, which we
13 actually just heard about again, was some of
14 these non-priority for navigation areas for
15 aerial imagery.

16 So, moving past the data needs, there
17 is the sentiment that kept coming up, and the
18 best way to capture it, I think, was this Finnish
19 proverb, which is that happiness is a place
20 between too little and too much. I think when it
21 comes to tools and resources, this is the best
22 way to describe that. A rusty screwdriver by

1 itself is not going to get it done for you, but
2 really how productive is a giant pile of tools as
3 well? So, happiness around tools and resources,
4 maybe somewhere in the middle there.

5 There was a study done by Dr. Tracie
6 Sempier. She did a survey of all Gulf Coast
7 stakeholders, asking them specifically about
8 resilience tools. So, when understanding what
9 tools and services are needed, these are the
10 responses. You can see here these percentages
11 break down to around a third of the people wanted
12 something that was explicitly no more tools or
13 something other than tools. They wanted
14 capacity, they wanted assistance, they wanted
15 awareness.

16 And then a third of the people who
17 answered have like a case-specific thing they
18 needed. It was hard to generalize, but almost
19 none of those were new tools or a specific tool.
20 So just keep in mind that new tools is not
21 necessarily the answer that people are looking
22 for.

1 When I came up with my title, which
2 is, "Tools: Renovate Before You Build and Other
3 Bad Analogies," I was hoping to make analogies
4 for all these points, but it got pretty tortured
5 pretty fast. So, only one analogy and then the
6 rest are just summary points. So, I'm going to
7 get into each of these more in-depth, but I
8 wanted to hit on some of these big points around
9 the existing resources.

10 The big one, again, renovate before
11 you build. Before you build a new tool, look at
12 how you can fix the one you have. Organization
13 of current resources, technical support on the
14 ground, and then leaning on existing outreach
15 extension services. And I'm going to get into
16 each of these after I have some water.

17 So, for renovate before you build,
18 every time you ask somebody to learn a new tool,
19 you are asking for a significant investment in
20 their time. You are promising it is worth it to
21 put in this effort to learn how to use this tool.
22 Whenever we ask people to tell us what tools they

1 use, of the hundreds available on the Gulf Coast,
2 five were listed. Five. So, people have the
3 things they like. They want to keep using it.
4 If you want them to add something new, you're
5 going to have to ask them to put in a lot of
6 effort. So keep that in mind, that as you add
7 new tools to people's toolboxes, you're starting
8 to wear on the trust.

9 And then also evaluate the current
10 tools that you have. Think about the impact
11 they're having. Are people using it, how as they
12 using it, how is it helping them? And then think
13 about how that could be improved from an end
14 user's perspective. So, these are sentiments I
15 heard in various capacities throughout the people
16 I talked to, and just generally we hear in the
17 Gulf Coast.

18 In terms of organization, it's pretty
19 straightforward. I pulled out some key sort of
20 example quotes. So, bringing the existing family
21 of tools together, regardless of who in NOAA put
22 it together, just a place to search NOAA

1 resources by problem or need. Another quote that
2 sort of highlights this is make it easier to find
3 or have simpler guidance on how to develop
4 relative sea level rise rates. And then another
5 one was clarity specifically on imagery data,
6 being able to search a location and no matter who
7 collected it when or why for NOAA, it would all
8 be there.

9 So, an example of how we did something
10 similar to help resources be more available, we
11 developed this tool for tools, if you will,
12 called Gulf TREE. And so we asked people across
13 the Gulf of Mexico what kind of climate issues
14 they were facing. We went and collected a
15 database of all the climate resilience tools in
16 the Gulf of Mexico and developed a resource where
17 someone can answer five questions and it will
18 take that 109 tools and narrow it down
19 significantly.

20 Then we provided quick hit
21 information, strengths, maybe drawbacks or
22 limitations in a summary to see if that tool best

1 met your need before you invest time in learning
2 it. This has been very successful, people really
3 like it. It's just an example of how you can
4 think about this organization process.

5 So, moving on to technical support.
6 Datum conversion, calculators, guidance came up
7 repeatedly. I know we have VDatum but this is
8 still an area people are struggling with, and I
9 noticed it particularly among the ecologists.
10 That seemed to be a group that is needing an
11 assistance.

12 And then on-the-ground people. So,
13 this is a quote from someone who works in
14 Florida, and I think it's a testament to how
15 valuable these NGS advisors are, and just that
16 people want more of it. One person can't be in
17 every room. There's just a limit to how many
18 field sites and phone calls and things you can
19 make. And so there was just a request to have
20 more people.

21 And so then using existing outreach
22 and extension services. First, I just want to

1 make sure that y'all understand, this is
2 something that came from people who benefit from
3 extension and outreach services, as well as the
4 people doing the extension and outreach. Got a
5 little bit of both here in these comments.

6 Defining extension and outreach
7 services so we're all on the same page. I'm just
8 going to use groups y'all are probably familiar
9 with. The Office for Coastal Management does a
10 phenomenal job of this. Sea Grant is well
11 established at this. There are also regional
12 partnerships: the Gulf of Mexico Alliance, the
13 Climate and Resilience Community of Practice, and
14 then this is what the Sentinel Site Cooperatives
15 does.

16 Galen Scott I think described it best
17 earlier this week when he said the Cooperative
18 sort of takes that fire hose of sea level rise
19 information that's coming from all across NOAA,
20 and then distills that down and pours it into
21 cups so people get just what they need, depending
22 on what they're asking about.

1 Specific things that these
2 partnerships can do, specifically around
3 delivery. There are sort of two ways to think
4 about this. One is this socializing the data and
5 information. It takes time to integrate
6 something into someone's toolbox. There was
7 research that was conducted through NCCOS that
8 people had asked for. They wanted to know what
9 storm surge was going to look like with sea level
10 rise. It takes somewhere between four and six
11 personal touch points with one person to get that
12 science integrated into their daily mental model
13 that they asked for, that they wanted. If this
14 is something they don't even know they need, it's
15 going to take even more time. And so people that
16 are already on the ground doing this are people
17 you can benefit from and work with.

18 Additionally, communicating the
19 science clearly. There's a whole other branch of
20 science about how to communicate science, and we
21 live there and work there and understand that.
22 And o relying on that helps y'all focus on what

1 you do well, and they can focus on what they do
2 well.

3 We can also help with that tool
4 development and evaluation that I talked about,
5 looking at the impacts, how are they being used,
6 how they can be enhanced, identifying gaps.
7 People talk to us. They tell us what they want,
8 they tell us what they don't have.

9 And then also thinking about which
10 tools would be ripe for expanding. Instead of
11 coming with a new tool when you have new science,
12 let's find existing resources people already know
13 how to use, have already invested the time in,
14 and see how we might add stuff to it.

15 So, to give you an example of how
16 these partnerships can work well, in 2017 the
17 Sweet et al. paper came out, the CO-OPS technical
18 report, which looked at both global and regional
19 sea level rise scenarios. This was wanted
20 information. It was locally relevant. It was
21 contextualized with those exceedance
22 probabilities. This was great.

1 But people whose job it is to
2 communicate science were struggling. This was
3 sort of inaccessible for them, which made it
4 even harder for some of the people on the ground.
5 So the Sentinel Site Cooperative worked with the
6 study authors, worked with Audra, worked with
7 OCM, who was already working on communicating
8 this, and came up with a standardized template
9 and a data analysis helper to pull all this
10 information in and help communicate it in a
11 standardized, easy way.

12 So, it's two pages. Let me tell you,
13 Billy's a trooper. We took 130 pages of
14 technical report and put it on two pages, which
15 I'm sure was painful for him but it worked out
16 really well. I don't expect you to look at and
17 read all this, but just see that we have local
18 curves for that area. We have the projections of
19 high tide flooding, and then we have exceedance
20 probabilities and tips and tools on the back.

21 This allows someone like myself to
22 walk into a room and have a conversation with

1 anyone. It structures the conversation. I'm not
2 supposed to hand this to a mayor and walk away.
3 This helps open the door to enhance that
4 conversation, to have it be informed, to have it
5 be based on the best available science. Because
6 of these two-pagers, we've seen these new curves
7 and the new rates integrated into restoration
8 projects, several planning efforts, and sea level
9 rise communication across North Carolina,
10 Florida, Georgia, all of the Gulf Coast, several
11 places on the west coast. And so it's just
12 helped get this information out there faster and
13 more efficiently, and I think it's a good example
14 of how we can keep doing that. Thanks, y'all.

15 (Applause.)

16 VICE CHAIR THOMAS: Thanks so much,
17 Renee. That was a great presentation and I can
18 tell you're really connected in the area.

19 All right. The next person we have is
20 Brian Lezina, and Brian is with the Louisiana
21 Coastal Protection and Restoration Authority. And
22 I understand that you're a key player in the

1 Louisiana restoration here, so we're looking
2 forward to your presentation.

3 MR. LEZINA: Yeah, I play the keys.

4 VICE CHAIR THOMAS: That's right. You
5 play the keys.

6 MR. LEZINA: Yeah, I feel the chief
7 dartboard sometimes on there. But good morning,
8 everybody. I appreciate the opportunity to be
9 here. I'm going to try and sit down just because
10 of the one hand as well, and hopefully everybody
11 can see. Also because, like a lot of us here in
12 South Louisiana, I'll climb on a soapbox and get
13 to storytelling a little too much if I can stand
14 and walk around the room.

15 As was mentioned, I'm Brian Lezina.
16 I work for the Louisiana Coastal Protection and
17 Restoration Authority. In that capacity, I'm
18 honored to serve as our Chief of Planning and
19 Research, which is generally the catch-all for
20 what we have in the organization on there.

21 A little of background. I do want to
22 say, awesome job, actually, on the structure of

1 the panel. I think we're going to see, and what
2 I hope to get with y'all, is start to stop on how
3 the data goes and how we collect that. Outreach
4 is a huge component of those things that we have,
5 especially when you get down to a state level
6 organization like ours in planning.

7 I'll give you a little sense of how
8 important these things are to Louisiana. You see
9 here, you can see where we are in the world. If
10 you walked out the door and saw where you are in
11 relation to those ships passing, you'd get a
12 sense of urgency on doing things. And, of
13 course, we've seen some before that. And then
14 hopefully transition -- and I'm going to leave,
15 hopefully, a good bit of time for Mr. Windell --
16 to show you what it really means to localities to
17 enact some of these things, especially hard
18 protection.

19 I do want to give a bit of background
20 from the organization. I think it's important to
21 see how Louisiana is sort of treating these
22 things. So it was mentioned today is the 14th

1 anniversary of Hurricane Katrina. We all
2 remember the devastation of that, those of us
3 that were here, and also Hurricane Rita that
4 passed in its wake some time later.

5 So, with all that devastation, and you
6 saw some of those images which we appreciate
7 seeing, it was recognized that the state had to
8 do better. We had to do better than piecemealing
9 how we did these things through the umpteen levee
10 boards that we had. Many state agencies that
11 were all responsible for the protection of its
12 citizens and then the restoration of the coast.

13 So we did just that. In 2007, this
14 organization was stood up. So, we are a very
15 young state entity on there. Really to become,
16 as you see on the first part there, the single
17 state entity with authority to articulate a clear
18 statement of priorities to achieve that
19 comprehensive coastal restoration and protection
20 on there.

21 We always try to add sustainability
22 when we can, because that's also a big driver. We

1 heard some of that yesterday and that's really
2 where we're trying to get with that. So we're a
3 little bit difference, like I mentioned, with
4 other agencies. We exactly were set up a little
5 bit to perform more as a private kind of sector
6 model on there.

7 So we have an executive director. We
8 have oversight from a board of directors that are
9 largely public officials and some others. So it
10 gives the ability to move a little faster, to
11 react differently to things, which is exactly
12 what we need when we're dealing with so many
13 stakeholders, so many entities, really that sense
14 of urgency on there, but all at the same time
15 trying to articulate that one real need that has
16 been spread across the state organizations on it.

17 How do we do that? Well, our mandate
18 is to develop, implement, and enforce a
19 comprehensive coastal and restoration master
20 plan. Just had a change in the legislature, so
21 we do that now every six years, and- if you see
22 and you can check it out, it's Louisiana's

1 Comprehensive Coastal Master Plan on there, for
2 sustainability. Let me add that part.

3 So we all realize it's our attempt to
4 try and move the state into a more sustainable
5 coastline to protect its citizens and to keep the
6 critical habitats we have. Not the same
7 coastline, I think we all recognize that, but a
8 more sustainable coastline.

9 So what the plan does is we take a
10 resource-constrained approach, resource being
11 monetary. It's actually a -- it's got a \$50
12 billion price tag on it over 50 years. Of
13 course, we don't have that in hand. We could use
14 100. That would be awesome, too. We've got
15 about a quarter of that maybe recognized right
16 now.

17 What we do is we go and take a robust
18 science-based approach on how to look at things
19 such as hard structure protection, those critical
20 elements, versus restoration and what we can do,
21 and really integrate those projects. So the
22 challenge, right? It's dealing with multiple

1 stakeholders as we see bigger challenges.

2 How do we do that over a 50 year
3 timeframe? We plan projects that we're going to
4 do tomorrow. We have to try and envision what
5 the world's going to look like in 50 years, not
6 only for what projects come down that way but
7 what the projects we're placing now, if they're
8 going to be viable projects in that timeframe.

9 That's a huge deal. We'll see some of
10 these projects now are approaching -- have
11 exceeded or may exceed a billion dollar projects
12 on there. That's not something that we can take
13 too lightly, right, with the situation we're in
14 to say that these projects won't be viable 50-
15 plus years on there.

16 So, speaking of the coastal program
17 and through the implementation of the master
18 plan, this kind of sets up some of the
19 challenging the state faces. We really tried to
20 do this through a broad approach on what the
21 goals are, and number one is flood protection on
22 there, which we'll hear a little more about

1 later. But really it starts and stops with that.
2 If we can't protect their citizens through
3 whatever means, well, really everything else is
4 just kind of there. I won't want to downplay.
5 Before I had the title administrator I was an
6 ecologist at one point in time. So I don't want
7 to downplay that, but obviously this is a
8 critical need.

9 Second is natural processes, and
10 that's restoration of those things that built
11 coastal Louisiana to begin with, those things
12 that can help offset sea level rise and
13 subsidence. I think I've already set up right
14 there maybe a little bit of competition between
15 those, and sort of the challenges the state
16 feels.

17 Of course, protection of our coastal
18 habitats, our cultural heritage. You'd see that
19 here in New Orleans and certainly all around the
20 coast. It's something that's vitally important.
21 I don't know of too many other places that across
22 the coast you see such a strong working coast

1 mentality on there. So that's also -- whether
2 it's you're clearly aware of the benefit to this
3 state and the nation, maritime transportation,
4 but that's also local sea food harvest. That's
5 recreation, all those things that are really big
6 components.

7 So when we get into topics of
8 subsidence and sea level rise, they mean a little
9 bit different thing to all of these groups. I'm
10 glad we can talk about it here. That makes it a
11 little easier since you see it. You saw
12 presentations of what subsidence looks like in
13 action on there. But at the same time, it's
14 critical for us to be able to put good numbers on
15 that, put good variability on that outreach of
16 that, which is dramatically important, to get
17 folks in a posture to be able to make decisions
18 about their future.

19 So, a little bit about some key
20 products in use. I can go on and on like most of
21 the folks here about what we use with such a
22 large program. We'll take it all, and then we'll

1 take a little bit more. But water level
2 information, critically important on there. We
3 heard about ADCIRC. We are a huge user of that
4 model for both long term prediction, but really
5 we're also charged with tidal inundation.

6 We used to call it nuisance flooding
7 a lot, but it's so common now it's mundane,
8 right. It's whatever. So we're back to high
9 tide flooding, too, on there, but as well as
10 tropical surges, all those things. So that water
11 level information is critically important.
12 Bathymetry, same. Topo-bathymetry, we heard that
13 and I'll show a little slide later kind of
14 highlighting the need on that.

15 But also salinity, temperature,
16 altimetry, all those things in an offshore zone
17 that we aren't necessarily charged with
18 management, but inform water levels here. What's
19 the loop current doing, what are we seeing with
20 eddies? How does that play into our models or
21 our sort of edge effect on those? Relative sea
22 level rise and atmosphere.

1 I also want to talk about sort of the
2 time scales on that. So, you see the map on your
3 lower level. It's kind of a spatial look at sea
4 level -- or, excuse me, subsidence rates, just
5 broadly generalized south of here. Of course, we
6 can see anything from, you know, six meters, six
7 millimeters a year -- six meters, oh my -- six
8 millimeters a year, you know, upwards of 12 and
9 greater in some of those spots.

10 So we rely on that real-time data to
11 make some of our decisions on when we put things
12 there, how do we do it, right? And our
13 engineers, our construction, what do we need to
14 do, compaction, all those things going into it,
15 into what makes that subsidence critically
16 important for the now. But we also have to take
17 that future look. The map on the right there is
18 an inundation flood risk map.

19 So this is where it's critically
20 important that we continue to refine our
21 estimates of sea level rise, and not only that
22 but the brackets around that, because folks are

1 making decisions about their future on data that
2 we're putting out there, be it a business need,
3 be it a personal choice.

4 We're already seeing communities in
5 Louisiana are dealing with that very choice some
6 time ago actually, and now it's become a critical
7 need. So our ability to outreach and put that in
8 action is huge.

9 And of course we're looking at
10 compounding, top right, is where all these things
11 come together on here. This is actually a little
12 visual image of one of the model runs from a
13 proposed project that's a reconnection of the
14 river to the estuary. And on the left what the
15 landscape looks like now; on the right what the
16 predicted landscape.

17 Those of you that are in the modeling
18 world know that everything on the left went into
19 that and probably some other science that I can't
20 speak of, but a critical need. But that's a ten
21 year look right there in the particular model
22 run. But I mentioned 50 years, and I think in

1 Louisiana what we're really grasping with is how
2 do we take that, get it to our citizens and
3 really plan on that. So we're moving in strides.

4 An example is the various relative sea
5 level rise sort of graphs that you see up at the
6 top on NOAA. The first circle on the left you
7 can see is 2020. That's usually where we start
8 our planning horizon. Not a big deal, right, in
9 that spread. It might be a couple of inches here
10 and there, which is not a small item but then --
11 get to 2070, the larger circle right there on the
12 right. That's that 50 year term we looked at.
13 That spreads in meters, right. It's feet, and
14 when you're in a microtidal sort of situation
15 like we are here, that's everything. Heck,
16 that's Baton Rouge you know on there is back
17 door. So that's really where we get into how do
18 we communicate that, how do we put that in the
19 planning, how do we give folks that range on
20 there.

21 You can see an example of one of the
22 restoration projects on the bottom there. This

1 is Bayou Dupont. We pumped sediment from the
2 Mississippi River. You can see on the left and
3 right it looks dramatically different. Standing
4 there it does not look dramatically different in
5 certain years. So what it really means is it's
6 important for what we build to target elevation,
7 how we design capacities.

8 If we put something on the ground now
9 like a sediment diversion, can we still move that
10 same amount of water in the face of sea level
11 rise 50 years from now? And have to make
12 critical choices on do we have the money in hand?
13 Do we feel that we can even build to those? So
14 that decision-making comes in. You see where the
15 nexus of all this kind of uncertainty and
16 hopefully prediction comes in.

17 Timing and locations of projects is
18 huge, and really whether or not we put hard or
19 soft infrastructure in some of these things. We
20 try to rely on those integrated projects. We try
21 to rely for those coastal habitats. But sooner
22 or later you might have to see a wall there. You

1 might have to see a floodgate or non-structural
2 measures. We do a lot in these parishes, raise a
3 home, flood proof, those sorts of things.

4 Did want to touch just a little bit on
5 future efforts and where I hope to see, and we
6 have some things. First is kind of taking a next
7 step on some of this and it's cooperatives like
8 the EESLR program. So ecological effects. We
9 have our work cut out for us on sea level rise,
10 how we view subsidence, all those things. But
11 really it's the next level, what does that mean?

12 So we're already seeing in Louisiana
13 and some places some of our coastal marsh types
14 can keep up with what we see for subsidence,
15 current sea level rise. Might be just increases
16 in growing season, organic kind of accretion,
17 those things on there. That's vitally huge for
18 us to know in how we plan with Louisiana with
19 sediment resources that are finite, money
20 resources that are finite, right, time that's
21 finite, all of those things.

22 So it really does make a huge

1 difference on those sorts of things when we take
2 it to that next step, and you mentioned some of
3 the modeling. A lot of this goes into that,
4 whether it's not just morphology but all those
5 other things we look at. So increases to real-
6 time monitoring. I know we're going to harp on
7 that, and I won't need to necessarily harp on
8 that anymore. But we all have missions here that
9 are what it's going to look like tomorrow and
10 what it's going to look like 50 to 100 years from
11 now, and that real-time monitoring helps us tie
12 all of these things together.

13 Increases to sampling frequency. So
14 real-time is good, but we have a lot of other
15 programs out there. Topo-bathy has been
16 mentioned a lot.

17 And just some examples on there. So
18 I think the before slide I buried behind. But on
19 the left is one of our reference sites. The
20 state of Louisiana maintains about 400 of these
21 sites across, looking at various variables.
22 Several years before this, this site was a really

1 degraded marsh with none of those willow trees.
2 So you can imagine that that means in the world
3 of lidar, right, what that means in the world of
4 subsidence, all those things.

5 Just driving that home on the right is
6 some actual NOAA chart images. On the left is
7 1965 and 2013 on the right. So this is a federal
8 nav channel, the Empire Waterway south of here in
9 Plaquemines Parish. Just the change on that map
10 alone, and I can tell you if Tim Osborn was here,
11 he would tell you -- would agree that a lot of
12 these place names now are historical. They are
13 relegated to historical, and that was in my life
14 time.

15 So I've seen this in my lifetime on
16 here with my eyes. So that just highlights the
17 need for update. Most of these changes are
18 occurring as we see it, right now. So that
19 highlights the need.

20 Coordination across data platforms.
21 Obviously huge when we're all in different
22 datums. We all have a lot of different things

1 going on, really that central focus. Where I
2 think that comes in and we appreciate the efforts
3 so far is the NOS led teams to interrogate sea
4 level rise data.

5 That's not just what we all are
6 collecting each agency, but some of us collect,
7 right, soil samples, core samples. We look at a
8 lot, what's the difference between shallow
9 subsidence and what's going on at the bottom in
10 deep subsidence, and all those things make a
11 difference on what we plan. I think getting all
12 that together in one spot can only help when we
13 look at future planning here and the decisions
14 that Louisiana and the nation has to make as far
15 as this.

16 Before I lase everybody with the wrong
17 button, I thank y'all for your time and
18 opportunity to be with y'all today.

19 (Applause.)

20 VICE CHAIR THOMAS: Thank you very
21 much, Brian. I appreciate the highlighting of
22 the NOAA products there too and what's really

1 critical for you and important for your efforts.
2 Windell, Windell.

3 MR. CUROLE: Bonjour, comment ca va?

4 VICE CHAIR THOMAS: Mais voila!

5 Wendell and I discovered -- well, he speaks
6 French very well. I speak a little old French,
7 but still we had a good conversation. So Windell
8 Curole is with the South LaFourche Levee
9 District, and we're really looking forward to his
10 presentation. I understand he has several Cajun
11 jokes too. I don't know if we'll get to those,
12 but we're looking forward to hearing about the
13 impacts in your district. Thank you.

14 MR. CUROLE: I guess with the gravity
15 of the situation, we don't get to talk about
16 Pierre de Marie (phonetic) now. It may be after.
17 But bottom line, I was actually a Sea Grant
18 fisheries agent at the beginning of my career,
19 and then became manager of the Levee District.
20 I've been doing that for 39 years.

21 GPS elevation by far is the greatest
22 technological improvement in our work and

1 survival in South Louisiana. All the work he
2 just described is all better and more doable
3 because of GPS elevations. Our system that was
4 built that I've been working on for all these
5 years, I guess around 2000, I called the Corps
6 and said look, just eyeballing it, you're telling
7 me the levees are at this elevation. I see the
8 water here. I don't see the differential that
9 we're supposed to have, and then earlier Mr.
10 Chatry has mentioned, and in fact I wrote a
11 letter to the Corps because we're the local
12 sponsors of that Corps project. I said the
13 levees don't look right. They don't look like
14 they're high enough, and he says "Well, after the
15 project is finished, we'll reassess."

16 I'm thinking the project might take
17 ten years, 15 years to finish. That's 15
18 hurricane seasons. We can't do that. So we
19 started looking. I get my engineers to start
20 looking at it, and sure enough, and this started
21 happening right when GPS was coming in, all
22 right. We had basically an 18 inches low. The

1 levee system was built, the entire levee some 18
2 inches low, and that's critical. Every inch
3 matters when you're living in a subsiding delta.

4 That's where we live. We live in a
5 subsiding delta. I'll get into the geology a
6 little bit about it. But if you live in a
7 subsiding delta, where GPS lets us do what we
8 need to do, elevation is a salvation to
9 inundation. It's that direct, that easy.

10 The other thing is in a subsiding
11 delta, without flood protection nothing else
12 matters. The best roads, the best libraries
13 don't do well under four to five feet of water.
14 That is the bottom line, and that's the challenge
15 that we have. Everything we're doing today is 20
16 years late.

17 My father was born in 1930, I was born
18 in '51, and in that timeframe I thought we had
19 lost a lot of land. My dad saw a lot of land
20 loss, and I was sort of realizing in my lifetime,
21 we were losing as much as 70 square miles a year
22 in coastal Louisiana. Since 1930 we've lost the

1 size of Delaware, you know.

2 You know when I saw President Clinton
3 talk about \$8 billion going to the Everglades,
4 I'm saying that's good. But he didn't talk about
5 South Louisiana, which is basically the Midwest's
6 way to get to the rest of the world. It's where
7 we have this energy. It's where we have these
8 fisheries. If the Midwest is the nation's bread
9 basket, South Louisiana is its seafood platter.
10 It truly is.

11 The thing is, a farmer in Iowa if he
12 never visits Florida, would get very little
13 benefit from the manipulation of the Everglades.
14 That same farmer in Iowa never visits Louisiana.
15 He's still dependent, the price of his fuel, his
16 fertilizer, his ability to get his goods to
17 market are all based on South Louisiana
18 functioning and it's sinking, and that is the
19 challenge, to keep those functions for us and
20 also for the rest of the country.

21 The other thing is, you know, I didn't
22 learn about the geology of South Louisiana until

1 I was in college on the aquatic biology club and
2 they have a geologist come and speak to us. When
3 he explained that when you look at the
4 Mississippi Valley from western New York to
5 Montana all the way into Canada, that the
6 drainage of that Basin is what built all of this
7 land.

8 In other words, we live in the United
9 States, but we live in the real United States
10 right here, because every bit of soil comes from
11 somewhere up there brought here by water, and
12 that's the next big difference. It was brought
13 here by water, so our highland is actually near
14 the water way, because when a delta builds it
15 drops a load quickest when it starts going over
16 the natural levee.

17 That's very different. The rest of
18 the country has -- your land tapers. That's
19 where your waterways are. Different animal here.
20 I've been involved with the National Association
21 of Flood Plain Managers, and they say you want to
22 flood; you build near the waterway. I said you

1 got to be crazy. The high land's near the water,
2 and then I realized we are very different.

3 In all those things, and again because
4 we live, you know, there are only seven great
5 deltas in the world and this is one of them. So
6 when there's a national law, a lot of times they
7 don't apply very well here because of that
8 difference. I have a term. I call it "generally
9 correct but specifically wrong." But we do that
10 a lot in the Gulf of Mexico.

11 Okay. I'm going to show you some of
12 the reality on the ground. Again, you see the
13 delta sitting there, Lake -- everything south of
14 Lake Pontchartrain was basically built by the
15 Mississippi River. God gave us the Mississippi
16 River, the Mississippi River gave us South
17 Louisiana, and you see how it's built all the way
18 to the continental -- there's a continental
19 shelf. To the end of the shelf, now 70 percent
20 of that sediment goes over the end.

21 All of South Louisiana was built with
22 that sediment spreading out and flooding. When

1 we started really good flood protection in the
2 1930s building the Mississippi River levees we
3 solved that. We starved that land from the way
4 it was built. Now gravity's been pulling all the
5 time, but you would have a flood every once in a
6 while. The sediment would replenish and get
7 four, two, three, four feet higher. When the
8 flood would go down, the land would be higher.
9 Of course it's a different situation when you
10 have hurricanes come.

11 But this is the process that built it,
12 and it's not a surprise that we're having
13 problems, because we've deprived -- we basically
14 have deprived the supply that actually built the
15 land itself. So we're trying to fix some of
16 that, and this is the loss since 1930. This is
17 not only the land going down or losing the land;
18 that allows the Gulf to get closer to us.

19 My estimation that the Gulf, because
20 of salinity lines, is 30 miles closer than it was
21 50 years ago. That means hurricanes, that means
22 tidal differences, that means tidal prisms are

1 that much more powerful, and that's the crux of
2 our problem. Again, if you look -- if you look,
3 if you see New Orleans, Lake Pontchartrain in New
4 Orleans, my system is 30 miles south of New
5 Orleans, yeah. And you can see we've lost so
6 much land you can see from space now that there's
7 that -- it's sort of -- if you look almost
8 straight down from New Orleans, you'll see a very
9 distinct line, and that's the levee system.
10 We're the only levee system that has not flooded
11 for any of the storms since 2000.

12 If you look at that little gray area,
13 you know, people in the north, south, east and
14 west zones have flooded. Combination of good
15 luck and good work, because with Katrina pushing
16 a 28 foot storm surge that hit Pass Christian,
17 that hits anywhere from Brownsville, Texas to
18 Maine, you're wiped out.

19 Superstorm Sandy, eight feet, right.
20 Most of it's six feet flooding. 28 feet, it hit
21 past Pascagoula, I mean Pass Christian.

22 This is Hurricane Barry. This is a

1 little tidal, a tropical storm that hit two years
2 ago, but this -- the same scene, I'm on the end
3 of my levee system. The picture on your left is
4 inside the system. It looks like an everyday
5 thing. I'm standing on the levee and looking
6 down on LA-1 headed toward Port Fourchon, which
7 supports all of the -- about 90 percent of deep
8 offshore oil. And leased our only 20 -- about
9 another 20 miles leased the only inhabited island
10 in Louisiana is 20 miles south of where that, and
11 the road was completely covered.

12 Barry did the same thing. Storms that
13 hit Texas and Florida this happens. So it goes
14 underwater a lot. With the levee system inside,
15 that road there is lower than the road on the
16 outside where the flooding is taking place, that
17 the flood -- that basically makes it all work.

18 I mentioned that port, Port Fourchon.
19 The average 1995 till today, the average income
20 to the federal government from the leases and
21 royalties that come from what that port supports
22 is \$6 billion a year. Yet we've never had money

1 to use it.

2 We had to sue the federal government,
3 and our governor, on our request, has to sue for
4 the lease sale to get a share, and we finally
5 started getting a share of that money, 37 percent
6 of all the new leases coming in, where other
7 states that have that type of operation in their
8 boundaries get anywhere from 50 to 90 percent of
9 that money.

10 That wall was supposed to be at 12-1/2
11 feet. After we checked it out, it was only 11
12 feet, but it worked. I'm showing you something
13 you don't see in the news, successful flood
14 protection. You see we play a game, that when
15 you win, nobody knows the score. When you lose,
16 people can't stop talking about it, you know.
17 All my friends get all the press, and I'm happy
18 about that.

19 This is Leeville, and this is -- this
20 happens every little storm. Now Leeville's still
21 a good place to fish, to do business, but the
22 road goes under very often. This is where my

1 grandparents actually moved from the coast of
2 Leeville because it was a high land, and then
3 after a hurricane in 1915 they moved further up
4 the coast.

5 That's just 12 miles from the coast.
6 That levee system I had to build, they went there
7 because it was high, but because of subsidence.
8 People like, the press likes to talk about sea
9 level rise, but in Leeville, for example, let's
10 see if I can get -- yeah. Here's a cemetery.
11 The land appears to be about a plus four foot
12 elevation, and that was about 1935-1940. They're
13 putting in a pipeline here, have to put a
14 bulkhead, and this is about 1995.

15 This is at low tide we had to take
16 these pictures, and that is subsidence. In the
17 last 100 years in Leeville, probably if you look
18 at the cake, if the cake is subsidence and sea
19 level rise is the icing. Now those parameters
20 might change but South Louisiana's problem is
21 subsidence is a key factor.

22 People keep talking about sea level

1 rise, and that is a factor. But the controlling
2 factor is subsidence, and again you see this and
3 let's see. And again, Roy Dokka, we were looking
4 for accuracy. Roy Dokka comes in and sets up the
5 Corps' project and I'm thinking it's like heaven,
6 man. It's like you know, we can't tell what's
7 -- how high the water's going to come in. We
8 can't tell that.

9 But we need to know at least what we
10 have to protect it and what we're building to,
11 and because of the GPS system we have confidence.
12 It saves us time; it saves us money. When I used
13 to get a centerline survey of the system, we have
14 a 48 mile ring levee system, it would take two
15 months, three months, cost \$100,000 and be
16 inaccurate, you know, by a foot, foot and a half.

17 GPS shows up. They can make the round
18 basically in a couple of days. I get the data
19 out, pay \$8,000, and I'm accurate to the size of
20 a golf ball. We can do some real work when you
21 have that type of accuracy. Now I just want to
22 -- again, that program is invaluable for what we

1 do in South Louisiana.

2 I just want to show some of the other
3 things that, you know. I'll show Roy, one of
4 Roy's work. He went down to LA-1 and showed the
5 subsidence. It's 20 years, a one foot drop in
6 elevation. This is not stopping, guys. This is
7 something we have to deal with, and that's why
8 everything we do we look at it that way.

9 But, like I say, elevation is a
10 salvation to inundation. That's the trick. And
11 again, these are all of the issues that we have
12 to deal with. That's Leeville on a good day. It
13 don't look too good, you know. Again, thank
14 y'all.

15 (Applause.)

16 VICE CHAIR THOMAS: Well thank you,
17 Windell, and I think this quote of every inch
18 matters when living in a subsiding levee or
19 district, it's like that really does drive it
20 home. And I think that also highlights why NOAA
21 is so important with their datums and their
22 products and their aerial surveys and every other

1 thing that they're doing.

2 So we'd like to open it up to Panel
3 questions. Dave.

4 MEMBER MAUNE: Hi, I'm Dave Maune.
5 I'm going to ask each of you to answer a question
6 for me, and hopefully give me your business card
7 that you write "yes" on. But you don't know what
8 the question is yet, so let me give you a little
9 background.

10 NOAA and the U.S. Geological Survey
11 are constantly trying to determine what their
12 products are worth, what's the value to their
13 clients, and NOAA right now has a 3D Nation
14 elevation requirements and benefits study going
15 on, along with USGS, in which they're asking
16 various federal agencies and states what they
17 need in terms of inland topography, inland
18 bathymetry, near-shore bathymetry and offshore
19 bathymetry.

20 What quality level data do you need?
21 How often does it need to be updated? What do
22 you use it for, and what is its value if you get

1 what you ask for? That's the background on this
2 study. They then carved those requirements up
3 into business uses. There are 30 business uses,
4 one of which is sea level rise and subsidence.
5 I've been evaluating the results of that study,
6 and on sea level rise and subsidence, the only
7 states that said this was an issue to them was
8 Florida, Maryland, Delaware, Massachusetts, and
9 New Hampshire.

10 We knew we did not talk to the right
11 people for this study, because when I hear people
12 like you who know what ADCIRC is and the value of
13 topographic and bathymetric lidar, I think we
14 haven't talked to the right people. So I'm
15 asking each of you would you be willing to answer
16 some questions on a questionnaire, and tell us
17 what the value of these data sources are to you
18 for sea level rise and subsidence.

19 I'm hoping that you can answer my
20 question here, but give me your business card
21 with a yes written on it. That's my challenge to
22 you. Anybody care to comment?

1 MR. LEZINA: No problem. It's yes for
2 Louisiana. Yeah. I think yes, and also it's
3 -- we can do that. I think what we see and what
4 we -- a lot of us don't have time to go into each
5 little detail about all our presentations on
6 there, but one thing we try to do -- so not only
7 the value it is to prediction and what those
8 things give us in real-time, but we put economic
9 value on what happens if we don't do these things
10 or what expected annual damages are. It's
11 something-B on there for each year. So yeah
12 certainly, certainly.

13 MR. CUROLE: Yeah. Again, I would say
14 I was involved in a lot of the legislation after
15 Katrina, and centerline surveys are the key to
16 know where you're at. Because of the cost of the
17 old way of doing it, we talked about doing it
18 once every three years. But once GPS came in, I
19 pushed that every levee district should have a
20 center line survey every year. It's cost
21 effective.

22 And that's the other thing about, you

1 know, some of the speakers were talking about it
2 earlier. The issue is, you know, we would have
3 this -- our benchmarks measured every 20 years
4 when you have the type of loss we have. With GPS
5 it's constant, constant, and the improvements
6 we're having. Before our guys would have a point
7 you'd have to go to and calibrate. Now with the
8 new technology, they get an email and they get it
9 done. I mean this is unbelievable how good it
10 is. So that's maybe like a yes.

11 MS. COLLINI: I'll just add to that
12 that if you want, I can also share it with other
13 partners that I know are using those data.

14 MEMBER MAUNE: Great. If you can
15 pass this information on to other people who can
16 answer it, you also may see that there's other
17 business uses there that could be critical as
18 well.

19 MS. COLLINI: Yeah. I'll absolutely
20 do that.

21 MEMBER MAUNE: Please pass it around
22 and keep in mind we're looking -- if you can find

1 a way to quantify the dollar benefits in the
2 future.

3 MS. COLLINI: You might consider also
4 sending it. There's five Sentinel Site
5 Cooperatives. So it's all people with
6 partnerships around sea level rise all over the
7 U.S. So I would send it to those coordinators as
8 well.

9 MEMBER MAUNE: Thank you.

10 VICE CHAIR THOMAS: Great. Thank you
11 for the feedback there. Anyone else? Clifford?

12 DR. LUETTICH: I'm happy to as well,
13 and I think we have to realize New Orleans is
14 sort of leading the charge, but we have a lot of
15 other coastal cities, none of which seemed like
16 they showed up on your list, all of which are
17 facing this now and a fairly predictable future.
18 And so there seems to be an awful lot of
19 information out there that you could take
20 advantage of, yeah.

21 VICE CHAIR THOMAS: Great. Other
22 questions? Sean?

1 MEMBER DUFFY: So I'm going to be nice
2 and tactful and not ask a question, but this
3 panel was great. I really appreciate a lot of the
4 feedback, and I have mentioned many times that I
5 have a problem understanding the implications and
6 impacts of our datums. It's nice to see that
7 leaders in this effort locally have some of the
8 same problems, and are right to say that if we
9 ever do a tour bus in this area, I would like to
10 have Windell on as our tour guide.

11 I've had the pleasure and I've had
12 some side-splitting pains afterwards. But I
13 remember one of the first time I met Windell and,
14 you know, if you go to the CPRA board meetings
15 and hearings, I represent navigation. So all the
16 efforts and projects, and many of them especially
17 on the river will have an impact to navigation.
18 You know, there are other people that have
19 different interests, and the one thing that I
20 remember when I first spoke to Windell was he
21 said because of my Cajun heritage, this is a
22 working coast.

1 And so we see things very similarly
2 for different reasons, but the working coast part
3 for me is represented in the navigation industry.
4 So the best economics we have on the total value
5 of the river system, and I think it's still kind
6 of understated, is about \$735 billion a year. So
7 one thing that Windell said I have at times tried
8 to show him, we've increased the beneficial use
9 of dredge material a great deal, and I will say
10 that the CPRA helped us in that they found the
11 projects we were doing complementary to or
12 consistent with the state master plan.

13 By the end of the year, I believe we
14 will have restored 10,000 acres below Venice
15 which, if you remember, some of you were here
16 when Captain Miller made a presentation. There
17 were two looked like beach areas along Southwest
18 Pass. Those are the base of two lighthouses. I
19 have to look at the 1871 and 1834. And those
20 beaches were where that was restored.

21 But it also shows that, you know, it
22 is a changing landscape, and by increasing the

1 beneficial use of dredge material, I think this
2 year we will be at least 55 percent of the
3 material beneficial use. So as we do that, and
4 the one thing that I always say is we can do a
5 lot of restoration with dredge material if we
6 dredge -- if we beneficially use it close to
7 where we're dredging it.

8 That's one of the big challenges, is
9 it becomes very costly when you start moving it a
10 long way away. But I want to -- I'm going to
11 probably say something about Hurricane Katrina at
12 the end, but these efforts and things going on
13 here, and I know Brian is in the hot seat a lot,
14 I'm in the hot seat a lot. We're all trying to
15 work together and figure out.

16 But what may benefit a restoration
17 effort may hurt navigation and may hurt, you
18 know, another stakeholder group. There's a lot
19 of impact to fisheries that are being discussed,
20 and the other thing that I have to add is that
21 we, as we see increased precipitation, these
22 problems are going to continue to be exasperated.

1 We are at a time in our history where
2 I know enough that I'm concerned, really
3 concerned. You know, look at Bonnet Carre, all
4 the operations of what we see is we're going to
5 have more water to deal with.

6 So I'd like us to continue to meet
7 behind closed doors with leaders and talk about
8 the path forward because I understand the
9 complexity of just hearing from a navigation guy,
10 and then having to go in the next room and talk
11 to somebody who may, you know, see things a
12 little differently.

13 So there's a lot to the state master
14 plan. It's very -- it's very hard to argue
15 against beneficial use of dredge material, but
16 that's not to say some people won't do it. But
17 there are a lot of real-time positives, where you
18 can see land built in minutes or marsh restored
19 in minutes.

20 So I don't have a question. I won't
21 do that to any of you, but I appreciate your
22 panel and your knowledge and its comforting for

1 me to know that it's not easy, and I think you
2 all added to my understanding of that. Thank
3 you.

4 VICE CHAIR THOMAS: Thank you, Sean,
5 for those comments. Rich, did you have a
6 question?

7 MR. EDWING: This question is for
8 Rick. Actually, it's a comment then a question,
9 and the comment's about your bullet about needing
10 a robust water level network, you know, for the
11 models.

12 So the comment part is you're right.
13 When Katrina and Rita hit, it destroyed all of
14 the stations in its path with the exception of
15 two stations, which were the only two hardened
16 stations that were in existence at that time.
17 That was Dauphin Island and Grand Isle.

18 Since then, all of the stations that
19 have been reestablished have been hardened to
20 some level. With all the hurricanes since, not
21 just here in the Gulf but also in Florida and
22 other areas, the tide stations have been, you

1 know, really surviving much better.

2 But the question is do you feel like
3 you have enough water level information to
4 accurately drive, you know, assimilate it and
5 drive your models? More data is always kind of
6 characterized as being good. But are you able to
7 actually kind of say if I had three more tide
8 stations, you know, located here, here, and here,
9 that would significantly improve the performance
10 of that model?

11 DR. LUETTICH: So I agree with you 100
12 percent. The gages are, have been hardened
13 since, particularly since Katrina because of the
14 lessons learned. And so we are very grateful for
15 that, and you see them surviving these events.
16 You see almost all of them survived Michael, a
17 Category 5 landfall. And so that's, you know,
18 quite impressive.

19 In terms of where else would we need
20 gages, I don't have an answer for you. I can't
21 give you lat-longs. Our biggest challenge now I
22 think is really making this connection with the

1 land, with the hydrology. So it really is trying
2 to model that, those processes, those processes
3 that are becoming more and more important as
4 we're seeing higher and higher precipitation,
5 land falling events.

6 And so there's an aspect of this that
7 may not be where along the coastline we need more
8 gages, but it may be how those gages, how we
9 penetrate inland with those gages to make that
10 connection, and so that we can do a better job in
11 that arena. So my sense is is that that's where,
12 that's where we could have bang for our buck if
13 you will, in terms of additional stations.

14 But it's certainly possible to look at
15 specific areas with, use the models for that
16 purpose. But I can't -- I don't have any pet
17 places at the moment.

18 MR. EDWING: Thank you.

19 VICE CHAIR THOMAS: Thanks, Rick. We
20 have a couple more minutes. Anyone else have a
21 question? Yes. Go ahead.

22 Oh, hold your question for just a

1 minute because we're actually going to take
2 questions from the Panel, and then we're going to
3 go into the Public Comment. So if you want to
4 just take a seat right there, we'll get to you in
5 just a minute. Audra, did you have a comment you
6 wanted to make?

7 (Off mic comment.)

8 VICE CHAIR THOMAS: We could.
9 Audra and I were talking. We both have a couple
10 of comment questions. You know, I'll just make
11 one comment. It's such an eye-opener to be here
12 for me coming from San Diego, you know. We have
13 outreach people, Sea Grant people in San Diego.
14 We do a lot of, through the IOOS region that I'm
15 connected with in Southern California.

16 A lot of outreach and public
17 engagement on climate change, sea level.
18 Subsidence is there. We know our benchmarks are
19 sinking, but we don't have the obvious. We
20 haven't been through the hurricanes that you
21 have. It's a different public, and even though
22 they believe in climate change, when we talk

1 about sea level that's still a little bit too out
2 there for them. They don't see the immediate
3 impact.

4 And so I'd just like to hear, you
5 know, I mean I'm assuming that here the public
6 believes in sea level. They see these changes.
7 They -- what type of response do you get from the
8 public?

9 MR. CUROLE: They know, they know
10 there's less land. I mean again, it's not
11 something unique someone will tell you. This, we
12 knew -- what we didn't know was the whys, okay,
13 that's what really came out; with the 60s we had
14 better research. We know the whys of it. But
15 the other issue's that understanding, I believe
16 we talk a little bit too much about the warming
17 climate and not enough about subsidence.

18 It's important to be -- have the truth
19 when you deal with stuff. The big issue is
20 subsidence, which we can't do a heck of a lot
21 with. Well, you need to know that, and then
22 continuing measuring the sea level rise that

1 takes place and how it adjusts now and into the
2 future is critical.

3 But yeah, people -- in fact I'll tell
4 you this. We have a working coast. We have a
5 real excuse to have everybody living on the
6 coast. We're losing population on the coast.
7 Even with the jobs, even with the fisheries and
8 the shipbuilding, when the oil's doing well.
9 People work from all over the country, you know,
10 7 and 7, 14 and 7, 14 and 14 and go back to their
11 home.

12 And even in Louisiana, our populations
13 have dropped in the Lower Bayous and have gone
14 north, not because the jobs are not there because
15 the jobs are still there, but living there.
16 Leeville used to have 100 families. Now there's
17 six people living there, okay. Still, you can do
18 great fishing. You can do work, the boats are
19 still there, but you can't do an everyday dry
20 existence. So that fact is just there.

21 But it leaves an opening. Because of
22 the storms there are teaching moments, and you're

1 always going to teach when you have those things
2 there.

3 MS. COLLINI: So --

4 MALE PARTICIPANT: Oh, go ahead.

5 MS. COLLINI: Something I just want to
6 bring up that this, I think, raises for me is
7 that between what you have said and then what you
8 said is that it's so place-specific. So here,
9 subsidence is a dominating problem. But when you
10 move over just a little bit to where I work in
11 Mississippi, Alabama and then northwest Florida,
12 sea level rise is sort of the dominating factor.

13 There, they're -- it's different that
14 people see it, but they've been living there,
15 these are rural communities, their whole lives.
16 So there's not a lot of concern because the idea
17 of acceleration is the thing that we're working
18 on. So all of these tools help us have a data-
19 based way to have the conversation.

20 But here, I think that it's just
21 important that it is about the place and the
22 people that you're working with.

1 And then I wanted to take a second too
2 to highlight the difference between outreach and
3 extension. So outreach is, you know, when you're
4 talking to coastal residents, but coastal
5 residents aren't necessarily users of data. They
6 are beneficiaries of data, and then when you talk
7 about extension, you're talking about helping
8 people integrate into decision-making, the
9 science.

10 So even then, you have differences in
11 terms of what people's needs are and the kind of
12 information that they need, and how they need it
13 packaged to better meet their needs. Because in
14 some places, they're a lot more advanced when it
15 comes to subsidence and elevation problems than
16 they even are over two states.

17 VICE CHAIR THOMAS: Brian?

18 MR. LEZINA: Just to echo that there's
19 no correlation that I'm sitting between the two
20 here on here. But looking in even Louisiana, I
21 think you see a mix on there. You see folks like
22 Windell says those of us that grew up in coastal

1 communities. In fact in a bayou just east of
2 here where my family was, we're on pilings,
3 right? Everybody's elevated on there; it's how
4 you live.

5 You kind of got used to the fact that
6 over decades, if you went out the front porch
7 steps you might have fallen a little further than
8 you did in the back porch steps, because the
9 house wasn't settling on there but the steps were
10 actually settling on some of this stuff. That
11 was -- that was -- you get it.

12 But at sea level rise, folks kind of
13 acknowledge it, but they don't acknowledge maybe
14 the acceleration of sea level rise everywhere on
15 there, because some folks haven't seen subsidence
16 the same. They don't put the two kind of
17 separating. So that's something that's hugely
18 important, and that's why, you know, Windell
19 showed that big red map. This is my first
20 presentation in a long time I haven't shown the
21 big red map.

22 So that's awesome, and folks look at

1 it and say oh, it's shock, it's awe. You want to
2 do these things just to drive home sort of your
3 message and your point. That's where we get into
4 that run-in about, you know, look a little
5 longer, look out to 50 years and while we're
6 trying to put some bounds, put some real world
7 information for folks after this.

8 Because we do see it. They might
9 acknowledge it, but not to the extent that we're
10 all kind of talking about.

11 VICE CHAIR THOMAS: Great. Thank you,
12 and oh, Rick, go ahead.

13 DR. LUETTICH: Yeah. Just a couple of
14 quick things. I also think that there's just
15 been some very smart messaging done. You know,
16 I'm not from Louisiana, but I certainly knew that
17 Louisiana was losing a football field of land a
18 day. So somebody has figured out some messaging,
19 and similarly, the notion -- in North Carolina we
20 have pushed back against the notion of sea level
21 rise and in fact attempted to legislate against
22 it.

1 And but the idea of the messaging of
2 sunny day, nuisance high tide flooding I think
3 has been critical to try to say this is what sea
4 level rise, which is long and you may not think
5 it's happening, is going to affect whether you
6 can build there. But you're seeing it, and so
7 it's -- and the first person I ever saw talk
8 about that was Larry Atkinson in talks.

9 In fact, I asked him if I could borrow
10 a slide of his probably ten years ago. He was
11 showing, he was showing that information. So I
12 think that messaging is really critical. I can
13 also say from the perspective of Flood Protection
14 Authority here, I think the authority feels like
15 it struggles with messaging and keeping people
16 well informed and that they appreciate just what
17 the protection system around greater New Orleans
18 does and doesn't do on their behalf. So again, I
19 think it's a constant battle that needs to be
20 worked on.

21 VICE CHAIR THOMAS: Okay, thank you.
22 You know, we are running out of time. I want to

1 just -- I know Liz has a comment and Nicole, I
2 know we've talked about this messaging in San
3 Diego. Do you have any closing comments here?
4 Not putting you on the spot or anything.

5 MS. LeBOEUF: No, not at all. I think
6 that the points made about location-specific
7 information is critical. One of the issues that
8 we're sort of grappling with in terms of products
9 and tools and visualization is what is our role
10 versus the roles of folks on the ground who might
11 know some things different or might know the
12 messaging different or better, more tailored than
13 us.

14 And so you know, a comment that I'll
15 just make is, and we met with the Foundation for
16 Louisiana and their partners yesterday morning,
17 and it was a really powerful session here in
18 front of the communities throughout Southern
19 Louisiana about how they're -- the different
20 parishes, how they're dealing with messaging to
21 their own communities about these threats.

22 One of the issues that I raised for

1 them that we're talking about internally that
2 resonated with them as well is that communication
3 handoff, and how important getting the handoff
4 right is.

5 So, you know, I'm doing this and I'm
6 saying this, and I need, you know, maybe you to
7 do this and say it differently, you know, and be
8 very clear about how we're -- what we're doing
9 and how we're messaging that, so that that
10 handoff is quick and seamless and we're not
11 giving different messages or different confusing
12 tools and that kind of thing.

13 And that takes a lot of work. That
14 takes a lot of work because there's so many
15 actors and there's so many people that are doing
16 what they think is right. But I think those
17 handoffs are critical, and just saying let's just
18 hand it off. You take that part, I'll take this
19 part, and just that's got to be okay.

20 VICE CHAIR THOMAS: Okay. So I know
21 that Windell's dying to say something. You have
22 30 seconds.

1 MR. CUROLE: But in -- what I've
2 learned as a Sea Grant agent, as I teach -- is
3 that make sure what you message matches what
4 people are seeing on the ground. Observation is
5 what the science is based on, and when we put a
6 message that doesn't match what the people see,
7 you lose everything. We don't do a good job. We
8 worry more about the people farther away that
9 don't see it every day.

10 Once we talk the same language and see
11 what the locals see, then you can get your
12 message across when you get that gap of some
13 trust, and then you can build education on top of
14 that.

15 VICE CHAIR THOMAS: Good point. Okay,
16 Liz, closing remark.

17 CAPT KRETOVIC: No, it's a question
18 for the panel. Thank you. Thank you to all of
19 you on the panel. It was very thought-provoking,
20 and all of your passion comes through loud and
21 clear. Rick, this is a question for you, sort of
22 around the requirements that you may have for the

1 near-shore mapping.

2 In terms of the resolution needs that
3 you may have for bathymetry, do you have any idea
4 of the resolution needs that you may have?

5 DR. LUETTICH: Vertical or horizontal?
6 Both?

7 CAPT KRETOVIC: Both, and also across
8 what depth range, zero to 30 meters relative to
9 mean sea level?

10 DR. LUETTICH: Well, so the areas that
11 are probably the most poorly represented in
12 existing bathymetry today are inside sounds and
13 estuaries. So an awful lot of those are -- now
14 sometimes the dredge channels are at least -- we
15 know what the authorized dredging depth is, even
16 if we don't know exactly what the current depth
17 is.

18 But a lot of the depths around those
19 areas are completely, you know, completely absent
20 or very, very old. So I don't know that I have a
21 -- it's not as simple as the deep ocean coming up
22 onto a continental shelf and once you get inside

1 the 20 meter or something, all of a sudden the
2 data isn't there.

3 It's more geospatially in those types
4 of water bodies that the data is by and large
5 missing. Now that being said, as I think was
6 mentioned earlier this morning and this is
7 probably even more of a west coast problem but
8 it's also an east coast problem with our shifting
9 barrier islands and all of that, is that as you
10 get into the surf zone and the real near shore,
11 things are changing very dramatically.

12 So keeping up with that is a
13 challenge, and that's really important as you
14 start to try to understand what the run-up of the
15 water is that is associated with the waves that
16 come in shore. That's very sensitive to the
17 beach face slope. And so there's a number of
18 different areas that by virtue of lack of
19 sampling or rapid change, that we have real
20 challenges with bathymetry.

21 And then the other areas are just
22 simply this area at large that's subsiding so

1 quickly and things are just flat out changing.
2 So those are kind of the priority areas for
3 bathymetry. I don't know if that answered your
4 question.

5 CAPT KRETOVIC: I believe it does.

6 DR. LUETTICH: Yeah.

7 CAPT KRETOVIC: Thank you very much.

8 DR. LUETTICH: Sure.

9 VICE CHAIR THOMAS: Thanks, Liz. So
10 I know we're getting into -- you know, I just
11 really would like to thank first the panel here.
12 It was a really nice diverse opinions and impacts
13 and whatever down here. It's just an amazing
14 location. So thank you all very much.

15 (Applause.)

16 VICE CHAIR THOMAS: Ed, do you want to
17 take the public comment?

18 CHAIR SAADE: Okay. It's time for
19 Public Comment online and here in the room. So,
20 Qassim, if you want to go first? Please identify
21 yourself.

22 DR. ABDULLAH: Yeah, thank you.

1 Qassim Abdullah with Woolpert. I was going to
2 ask the panel but it can be a general comment
3 too. On the -- we notice the last couple of days
4 there is a lot of issues associated with the
5 vertical datum of data and historical data,
6 because this is always confusing topic,
7 intimidating topic.

8 A lot of people don't understand it,
9 and it's causing -- on the practical level it's
10 causing a problem. Now we see from Galen's
11 presentation what the NGS is doing. The 2022 is
12 coming, the NAPGD 2022, you know, which is if
13 you're not familiar with it already, is a true
14 gravitational model to model the elevation.

15 You know, this is the most accurate
16 thing we ever achieve in the -- the professor
17 give us great introduction to it where we are.
18 So now we're going to model elevation to one
19 centimeter to two centimeter accuracy. The nice
20 thing about the gravitational model, it is almost
21 sea level, you know. So my invitation or my
22 question is can we use, as we move into the 2022,

1 can we just migrate, leave all the low mean
2 water. Low mean water is a problematic now. The
3 harmonic cycle of 11 years with the sea level
4 rise, and with the global warming.

5 I don't think it will be as reliable
6 as a gravity modeling, you know. So can't we
7 just leave all these behind and we use one
8 unified national, where you're going to be
9 geodetic and going to be tidal water. The
10 reference to very accurate geodesy model, you
11 know. So and the nice thing is like again that's
12 very important is reference to the sea level.
13 It's almost sea level, you know.

14 So when we talk about navigation,
15 people can relate to it, you know. So that's
16 really my question. I think we should -- we
17 should push it toward, push not just NOAA, the
18 Corps for the interior navigation. Stay away
19 from these confusing, you know, datum, different
20 datum, and stick to where we nationally move the
21 nation to that, a new system and stick to the
22 2022. That's really my comment and a question.

1 Thank you.

2 CHAIR SAADE: First of all thanks,
3 good stuff. I don't know if Juliana here or
4 anybody wants to respond.

5 MS. BLACKWELL: This is Juliana
6 Blackwell. I'll just, maybe just say a few words
7 along the lines. It is our hope that utilizing
8 GNSS, taking the ellipsoid heights, applying the
9 North American Pacific Geopotential Datum of 2022
10 will solve a lot of these problems. We have a
11 long way to go to, one, get to that point, which
12 is only just a few years away so we're working
13 hard to make that happen.

14 But really about taking data, getting
15 new data, updated data no matter where you are in
16 your dynamic environment, and making sure that we
17 have new information and apply the datums
18 properly. I think there's -- I think what Qassim
19 has commented on is certainly the vision that we
20 have, and is really the fruition of the National
21 Height Modernization Program that Cliff alluded
22 to in the study that was done in the late 1990s,

1 that sort of -- that kicked off the use of GPS to
2 get not only ellipsoid heights, but to get the
3 elevations and have that be relative to sea level
4 through the geopotential datum that we're
5 developing.

6 So we're all -- we're moving in that
7 direction. I know that it's confusing, but
8 there's going to be a lot of historical local
9 datums, whether they're geodetic, river, tidal.
10 There's going to be a lot of work to be done to
11 get that translated and understood. But
12 hopefully the idea is that the future will be a
13 lot more simple in trying to connect both water
14 and land using one common national geopotential
15 datum.

16 So we're working that way, and
17 continue to invite you to help us with case
18 studies, to make it relevant to your areas of
19 expertise and your geographic areas. So we can
20 prove this and show -- and get the locals talking
21 about how important it is and the benefits of it.
22 So thank you.

1 CHAIR SAADE: Thanks, Juliana. Any
2 other questions from the room?

3 MS. COLLINI: I have a public comment
4 whenever it's appropriate. You can go first.

5 MR. DAVIS: I don't know if my -- oh,
6 I'm good. So I guess this question is kind of
7 related both to the panel and to NOAA at large.
8 As a surveyor here in South Louisiana for six
9 years, I've worked for both the Corps of
10 Engineers, seen it on the government side, and
11 now on the private industry side.

12 You talk about datums. It's always --
13 I think that NOAA does a really good with the
14 water level datums. We have such a good -- --
15 such a good job that NGS does on the terrestrial
16 side. I think what we're lacking is where those
17 two meet, which is on a coastal area. I'm sorry.

18 Also, my name is Thomas Davis. I've
19 lived in New Orleans for the last six years,
20 originally from Texas. I worked for the Corps of
21 Engineers for the last five years and just
22 recently switched over to a private engineering

1 firm building marine terminals on the Mississippi
2 River.

3 So I think that seeing it, seeing our
4 perspective of being here in the nitty-gritty and
5 trying to work with these in an ever-changing
6 environment. I think that the biggest lack
7 that's communicating is when land and water meet.
8 So specifically like anything that talks about
9 coastal, right. So when we go from the water to
10 the land, especially on the Mississippi River.

11 I think that NOAA does a good job in
12 the tidal world and in the land world, but I
13 think where they're missing is the two. So I
14 think that -- so if anybody looks on CO-OPS, all
15 the gages in South Louisiana are pretty much
16 missing NAVD 88 ties, which is for a variety of
17 reasons. So I was wondering, my question to NOAA
18 and to the Panel is I think that creates so many
19 problems for us on the surveying side.

20 Everybody's, since it's not published,
21 number one VDatum's out almost 50 centimeters
22 here, right? So people that are using VDatum

1 aren't talking to the same people that are using
2 gages, because they don't publish an NAVD 88. So
3 everybody goes and publishes their own NAVD 88 on
4 the gage.

5 So I was wondering is NOAA working
6 towards publishing those NAVD 88s, maybe with
7 some kind of unknown inaccuracy on them? And
8 then just moving forward, is also VDatum going to
9 get more accurate, because I think that's what
10 everybody wants to use. It's the easy answer,
11 right? You plug it in, you get an answer out.
12 So I think that just those two questions.

13 So I guess my answer is two part.
14 Number one, is NOAA going to publish better
15 guidance on gages? So that's to NOAA, and then
16 my question to the panel is how are you guys
17 using -- are you guys using VDatum or are you
18 guys using CO-OPS gages?

19 CHAIR SAADE: Juliana, you want to go
20 first?

21 MS. BLACKWELL: This is Juliana
22 Blackwell. As I said before, I mean we're

1 working on providing an updated geopotential
2 datum with -- there are not good NAVD 88 heights.
3 We've talked about the lack of new observations,
4 the fact that many of the marks are no longer
5 above water or, yeah, they're below the water
6 surface now.

7 It's impossible to recreate and update
8 all of the NAVD 88 benchmarks that were available
9 in the past. Therefore, you can't really have an
10 update to VDatum. We need new observations. We
11 need a new geopotential datum to replace NAVD 88.
12 It's not -- certainly in this area, it's not a
13 model for success to try to continue to rely on
14 passive marks to determine the datum.

15 But the importance of having repeat
16 GNSS observations on marks that are available is
17 critical for us to be able to update and provide
18 velocity models, inter-frame velocity models for
19 the area in which you all are working and making
20 those connections to water level stations. And
21 so having GNSS and increasing the number of
22 observations, feeding that data to NGS and then

1 enabling us to provide updates and keep those
2 marks and the coordinates and the elevations and
3 the heights fresh is really important to have,
4 have crowdsource information that meets our
5 criteria for geodetic control, so that we can
6 continue to keep that fresh and put it into our
7 conversion models and provide that to Stephen
8 White so that he can build that into things.

9 But it's not going to happen quickly.
10 So there is no -- there is no quick fix to this.
11 This is something that we've been working on and
12 we'll continue to work on, and unfortunately this
13 is one of the areas where it's just really tough
14 to do. But we welcome your support and we'll
15 continue to work with you and work through our
16 regional advisors to figure out how we can do
17 that better.

18 We'll also continue to work with our
19 geospatial modeling partners, with the University
20 of Southern Mississippi, Texas A&M-Corpus
21 Christi, Louisiana State University; we've got
22 Alabama involved as well as Florida.

1 There's a partnership effort there to
2 figure out how we can get coordination in getting
3 additional observations to help make this better
4 sooner rather than later. But bear with us,
5 we're working on it. Thank you.

6 Rich, do you have anything you want to
7 say?

8 MR. EDWING: I'm really just
9 reinforcing what you're saying. I mean it is our
10 practice to publish NAVD 88 on our benchmark
11 sheets when we have good connections between that
12 datum and our water level stations. But that's
13 just not been possible down in Southern Louisiana
14 because for the reasons Juliana just stated.

15 But the solution is, and that our
16 offices are working together in bringing cGNSS
17 and the water level stations together. But it's
18 going to take new datums to really allow that
19 problem to be addressed.

20 MR. DASLER: Jon Dasler, David Evans
21 and Associates. So I understand the problem with
22 the passive marks and hopefully as we move

1 forward in datums, I mean passive marks and
2 keeping updates on passive marks is going to be a
3 never-ending battle that ultimately probably
4 needs to be abandoned, right?

5 In the interim, just having tidal
6 datums and things relevant to ellipsoid heights
7 would be a great benefit, right? I mean those
8 things should be -- you know, it's not as much as
9 a moving target, it's a little more fixed.

10 Having that update would certainly help. I
11 totally get the comment relative to the marks and
12 the challenge in the professional surveying
13 community in bringing that together. But having
14 ellipsoid heights published would be of great
15 benefit.

16 Just I guess one more comment, I
17 guess, on the datum thing. I'm not sure if I
18 understood, Dr. Abdullah, your comment. But
19 there is a tremendous need for gradient datums
20 and tidal datums. I mean you need to know where
21 things are wet from aquatic vegetation and
22 permitting, and then navigation.

1 I mean the whole point of mean low
2 level water for navigation is if a mariner
3 doesn't have tide predictions, they have
4 conservative depths, right? So again, that
5 critical tie of those two datums is really vital
6 for the surveying community, and getting --
7 meeting the different needs of the users. But
8 again, I think using ellipsoid heights as that
9 could be a good short-term solution. Thank you.

10 CHAIR SAADE: Thanks, Jon. I think
11 there was one last comment from the panel, and
12 then we've got to break for lunch.

13 Oh we have one more? We'll do one
14 more public comment, sorry.

15 I'm sorry. We're going to finish up
16 with the public comment over here.

17 MS. FRENCH: Thank you for giving me
18 the chance to say this. Yesterday, you guys had
19 asked about -- my name is Wendi French, Wendi
20 Couvillion French. My name's Wendi. I'm a GIS
21 consultant here in Louisiana, and I've been doing
22 GIS for 30 years, since 1990.

1 So I wanted to just kind of comment on
2 your conversation yesterday about the priorities
3 of what issues should be at your following
4 meetings about internet of things and AI and
5 emergency response. I started my career doing
6 Superfund litigation cases with the New York
7 Harbor cleanup and the Richmond Shipyard cleanup
8 in California, and we spent a good five years
9 with Barataria-Terrebone National Estuary Program
10 here, and ended up doing emergency response for
11 the state for the hurricanes here and the BP oil
12 spill.

13 To say that, in 1990 when we were
14 doing GIS, there was not that much desktop
15 mapping capability at all. NOAA has come along
16 with several programs that has fostered the
17 actual development of base map data. NOAA Coast
18 Now, the nowCoast, was instrumental in both
19 Hurricane Gustav in (microphone interference)
20 Louisiana.

21 As for an economic value of what your
22 data was. The parishes that we've used Coast, we

1 used the nowCoast for the (microphone
2 interference).

3 Sorry about that. We received our
4 payment reimbursements quickly and rapidly using
5 those base maps. The fastest way to make a
6 municipality go underwater fiscally is to not pay
7 those reimbursables, and for us to be able to
8 track exactly what happened and when.

9 And as we were moving supplies around,
10 we were completely documented up and received our
11 payments fast enough to keep our parishes out of
12 bankruptcy. So I wanted to transition to that to
13 say that water is -- every piece of the water
14 column plays in our economic cycle. Whether
15 removing the dredge from the bottom or we're
16 paying attention to the salinity rates for the
17 fish population, or we're tracking it to see if
18 we have invasive species coming in on the ports.

19 Insurance is a place where these data
20 sets help us mitigate risk, and there's no way to
21 exponentially figure out the impact that these
22 new systems are giving us the ability to move

1 money around and solve critical problems that in
2 the past have been just beyond our reach.

3 In Louisiana, we've had not enough
4 money to do the things that we need to do. But
5 with a collaborative working environment, we've
6 always been able to play a chess game, where
7 we've been able to say you do this and I'll do
8 this and we'll just patch it up and get a better
9 accuracy later, but we need something.

10 It's really appropriate that NOAA is
11 inside the Department of Commerce, because I
12 think you guys have a huge role of policy and
13 governance and authenticating data sets. The
14 ports are the gateways to the global economy, and
15 anything that you decide here for the tenants and
16 the pilots, they're going to get used to those
17 tools here in America.

18 But they don't stay here. They're
19 traveling all over. So you guys have a unique
20 opportunity to set the right structure up, about
21 how to bring in new data sets and let the private
22 sector lead that way with authenticated actual

1 data that decision-makers, insurance risk
2 monitors, stockbrokers, supply chain, block chain
3 can follow up on.

4 Without your support, those things
5 won't happen and other places in the globe won't
6 get that experience that we're getting here. So
7 I don't want to scare you, but I want to
8 encourage you.

9 CHAIR SAADE: Thanks a lot. Okay, we
10 have one more comment, and then we'll have to
11 break.

12 MS. COLLINI: I'll be quick. I'm
13 between y'all and lunch. I essentially just
14 wanted to say, and I didn't put this in my talk
15 because I didn't know exactly how it refers
16 specifically to CO-OPS, Coast Survey and NGS.
17 But we've spent a lot of time talking about all-
18 hazard, about sea level rise and sort of a little
19 bit with subsidence. But a big need, especially
20 across Mississippi, Alabama, and northwest
21 Florida is understanding how sea levels coming up
22 are going to reduce the capacity of our storm

1 water systems, who are all gravity-fed with the
2 exceptions of some communities here in Louisiana.

3 And we're really suffering from
4 increased precipitation-driven flooding that is a
5 result of our storm water systems not functioning
6 as well. We don't have research really on that
7 to help quantify what that might be, and I think
8 the role of these organizations is to provide
9 supporting data that will enable that research to
10 move forward.

11 But I just wanted to get it on the
12 record that across the states, this is a very
13 real problem, moving from univariate hazards to
14 multivariate hazards and considering them
15 together and how they're going to interact with
16 each other. Thanks, y'all.

17 CHAIR SAADE: Thanks, Renee. Okay.
18 Thanks, everyone. It's great to have good
19 feedback. I really appreciate the public's
20 participation as well. We're going to break
21 until 1:30? Until one o'clock. See y'all back
22 then. Thanks.

1 (Whereupon, the above-entitled matter
2 went off the record at 12:14 p.m. and resumed at
3 1:09 p.m.)

4 CHAIR SAADE: So we're going to do the
5 general wrap-up right now, specifically for the
6 bullet items and things we want to put into the
7 letter. So Julie's going to go ahead and lead
8 that, and we'll get your feedback now.

9 VICE CHAIR THOMAS: So I have been
10 making a note of items that came up, and I want
11 to say that I did look at this last night after
12 my couple of glasses of wine at Sean's. I
13 realized that there's still some topics that we
14 have mentioned in previous letters, and they're
15 still important. So I'd like to read -- I'm going
16 to just focus on the recommendations, and I have
17 still six of them or something.

18 So if you don't mind, I'll just go
19 through and tell you the topics here, and then
20 you can comment on them, keep, take out and then
21 we're going to ask for any additions that people
22 might have. The first one is this continuous

1 investment in establishing and maintaining the
2 CORS network, and I thought with that -- so we've
3 heard a lot about how important this is, and I
4 thought what we might do is just add another
5 sentence there and talk about how particularly
6 critical in the Mississippi River region and
7 these accuracies are important.

8 I thought Juliana, Sean, a few of
9 these people can help me word it correctly, okay?
10 Is that -- that's a keeper, right?

11 MEMBER PAGE: It is, yes.

12 VICE CHAIR THOMAS: Okay. Number two,
13 this is the navigational restricted visibility
14 portion. So this is the fog sensors that came up
15 again. I wanted to work with Rich on the exact
16 wording here, but I'm assuming that that's still
17 a keeper. Is it? Yes, okay.

18 Number three, all right. This is
19 supporting emergency response and sea level rise
20 studies. We might do sea level rise/subsidence
21 studies based on the discussions. But we did
22 have a section last time regarding that, and what

1 about that one? Okay, okay.

2 I'm going to put it in right now. Sea
3 level rise/subsidence, okay. That one's done.
4 You're going to see this letter, and you can
5 wordsmith it and help me with the wording. But I
6 just want to get the ideas. Okay. Now this one
7 -- last time we had this thing about the Coast
8 Guard and AIS.

9 Based on the discussion and what we
10 learned, I was thinking about deleting that as a
11 recommendation and up in the letter portion, like
12 we said, thanking and how we appreciate the
13 progress that's been made on that topic. Is that
14 okay with folks?

15 MEMBER PAGE: I think so. I don't
16 think it's succeeding, I think it's making
17 progress on --

18 VICE CHAIR THOMAS: Right. So I put
19 it -- okay. I should read you what I actually
20 put in. I put a sentence in.

21 MEMBER CHOPRA: Julie, can I make a
22 suggestion? So because NOAA is also leading CMTS

1 at this time, in your letter which you're
2 sending, maybe you can split it in two parts.
3 One would be which is purely related to NOAA, and
4 one which is related to as a leadership point
5 within CMTS, because Corps of Engineers is
6 involved or Coast Guard is involved. That's
7 where the split would happen.

8 So I don't know how you think it's
9 better to word it in your letter, where certain
10 items are applicable to CMTS, and certain are
11 applicable directly to NOAA. Does that make
12 sense?

13 VICE CHAIR THOMAS: Let me just say
14 one more comment here. I do congratulate Rear
15 Admiral Gallaudet on his appointment as chair of
16 the CMTS. "We were pleased to hear from the
17 Admiral that his goals of assessing the state of
18 marine transportation, advancing technology
19 behind it, and continuing the effort of product
20 integration. These goals align well with the
21 priorities of HSRP."

22 And then I say that we're pleased --

1 further down, "We're pleased to learn of the
2 progress regarding the Coast Guard's effort
3 towards AIS." I mean I was going to just put a
4 statement in there. Okay. So like I said, I was
5 going to take this out as a bullet of
6 recommendations, and just acknowledge it up
7 front. Okay.

8 The next one is to do with PORTS, the
9 continual advancement of PORTS. I think this is
10 actually a large section. I think we can cut it
11 down some and make it more succinct. Rich isn't
12 here, but we have heard quite a bit how PORTS is
13 still useful, so we'll keep it in there, okay.

14 The next one is support the efforts to
15 expand 3D Nation, Ed and Juliana and all, from
16 the shoreline into the deep ocean, and so keep
17 that as a bullet, as a recommendation?

18 MEMBER MAUNE: 3D Nation from the
19 land area to the ocean. It's not just on the
20 shoreline now, it also includes land.

21 CHAIR SAADE: And the mountaintops.

22 VICE CHAIR THOMAS: Mountaintops --

1 MEMBER MAUNE: From the tops of the
2 mountain to the depths of the ocean.

3 (Off mic comments.)

4 VICE CHAIR THOMAS: All right. So
5 we'll keep that one. Is this -- is this still
6 applicable, the -- last time we said one example
7 of the critical application of this effort was
8 Gallaudet's reference to the White House
9 increasing interest in the Southwest Pacific as
10 an area of key strategic importance for the
11 country, and NOAA will be working to fulfill
12 their hydrographic mission in --

13 CHAIR SAADE: Definitely. He was in
14 --

15 VICE CHAIR THOMAS: Leave it in there?
16 Okay.

17 CHAIR SAADE: Yeah, and two reasons.
18 The Admiral mentioned it, and it's a nice lead-in
19 to Hawaii.

20 VICE CHAIR THOMAS: Okay.

21 (Off mic comment.)

22 VICE CHAIR THOMAS: Right.

1 (Off mic comment.)

2 MEMBER MAUNE: -- in the oceans. I'm
3 sorry.

4 VICE CHAIR THOMAS: Do we want to put
5 that level of detail, or do you think just
6 mentioning their work would be okay, or do you
7 actually want to mention the minerals?

8 MEMBER MAUNE: Well, if you can put
9 it in a sentence, that the Pacific Islands are
10 important for a number of reasons, including the
11 search for critical minerals.

12 MALE PARTICIPANT: Rare earth
13 minerals.

14 MEMBER MAUNE: And rare earth
15 elements.

16 MALE PARTICIPANT: Yeah, rare earth
17 elements.

18 VICE CHAIR THOMAS: Do you want to
19 send me -- send me a sentence, okay?

20 CHAIR SAADE: Yeah, and let's not
21 forget, we're going to be able to edit all this.
22 So this is kind of brainstorming right now.

1 VICE CHAIR THOMAS: Yeah, but the more
2 I can get written sentences right now, the better
3 because I have a short time line.

4 CHAIR SAADE: So I would suggest the
5 more sentences you put in, the better, so that we
6 can edit everything down, okay?

7 VICE CHAIR THOMAS: Oh, I see what
8 you're saying, okay.

9 CHAIR SAADE: Okay. I don't think we
10 should leave anything out if anybody has a point
11 of interest.

12 VICE CHAIR THOMAS: Got it, got it.
13 We're putting it in.

14 CHAIR SAADE: So the other thing along
15 those lines relative to Gallaudet is I don't know
16 how many times he mentioned this White House
17 summit in November.

18 VICE CHAIR THOMAS: Okay. So I've got
19 -- that's coming.

20 CHAIR SAADE: Okay.

21 VICE CHAIR THOMAS: That's coming.
22 Let me just do my, the last bullet that I have

1 for recommendations, and, Sean, you were going to
2 send me a sentence on this. But I do -- I was
3 thinking that we could mention something about
4 the multibeam surveys and about maybe in the
5 Mississippi River delta like expanding or
6 whatever. What do you think?

7 MEMBER DUFFY: I'll send you a
8 sentence, and I'm happy to --

9 VICE CHAIR THOMAS: You did send it to
10 me?

11 MEMBER DUFFY: Yes, ma'am.

12 VICE CHAIR THOMAS: Whoa. That's
13 because I'm behind on my emails.

14 MEMBER DUFFY: I didn't want to call
15 you out.

16 VICE CHAIR THOMAS: Thank you. I
17 appreciate it. I will get it -- I will look at
18 my emails some time in the next day. Okay,
19 that's great. So we have whatever Sean sent me a
20 bullet here on the multibeam. And to your point,
21 Ed, I put after all of this, I said "Rear Admiral
22 Gallaudet mentioned the proposed White House

1 Ocean Science and Technology Summit. As you
2 know, the HSRP has many members who are subject
3 matter experts in mapping and hydrography.
4 Please let us know if we can help out in
5 preparation or presentations for this meeting."
6 So I mentioned it.

7 CHAIR SAADE: Okay, that's good.

8 VICE CHAIR THOMAS: Next. What are --
9 that's okay. That's about as many ideas as I
10 have in here.

11 CHAIR SAADE: Okay, so I've got a few.

12 VICE CHAIR THOMAS: Okay.

13 CHAIR SAADE: And I can say -- you
14 don't need to write these down necessarily.

15 VICE CHAIR THOMAS: I'm not going to
16 write them. I'm going to check my --

17 CHAIR SAADE: So we've got to mention
18 the 14th anniversary of Katrina landfall. I'm
19 not sure how to word it, Juliana, but the GPS
20 benchmarking volunteerism advocacy. If you can
21 give us a sentence or two, we need to put that
22 in.

1 VICE CHAIR THOMAS: We could put that
2 actually in the Corps -- or the Corps section of
3 the recommendations.

4 (Off mic comment.)

5 CHAIR SAADE: Advocate. I was going
6 to write a sentence advocating for multibeam
7 Echosounder using the words that were from the
8 panel members.

9 VICE CHAIR THOMAS: Okay. So that
10 will go in with Sean.

11 CHAIR SAADE: So the two of us can
12 bounce that back and forth. I really like the
13 quote "we want to get the most draft." I don't
14 know how to put that in there. You got the White
15 House Summit. How does relative to critical
16 minerals and deep ocean mining and Seabed 2030,
17 how does the NOS/OCS play into all that? I'm not
18 sure how to word that question either.

19 VICE CHAIR THOMAS: Yeah. Can we put
20 that in with --

21 CHAIR SAADE: Or maybe we could
22 recommend how NOS/OCS should play in all that.

1 Maybe that's better.

2 VICE CHAIR THOMAS: The 3D Nation.
3 Well remember there is a 3D Nation bullet here
4 for recommendations.

5 CHAIR SAADE: Yeah. We could weave
6 all that together. That's good, that's good,
7 yeah.

8 (Simultaneous speaking.)

9 VICE CHAIR THOMAS: --if we could put
10 it in there. Okay. I think what I'll do is
11 email this out to you, or Virginia's very good at
12 emailing it out to the group. Right now, even
13 though it's very much in draft form, just so that
14 you can see some of the writing that was in here
15 before. And then you can like work in the 3D
16 stuff and everything, okay?

17 CHAIR SAADE: Yeah, yeah, good.

18 VICE CHAIR THOMAS: Any other
19 comments?

20 MEMBER HARGRAVE: I have one quick
21 one. We've talked about the Mississippi River,
22 but we haven't talked about Port Fourchon, and I

1 think it's important to at least capture that and
2 I don't know if the letter is the right place to
3 do it. But the entire energy industry in the
4 Gulf of Mexico goes through Port Fourchon, and
5 the same problems that Sean's talked about these
6 last three days apply there as well.

7 And unfortunately I'm not expert in
8 framing exactly what the issues are there. The
9 director of the port is here and could possibly
10 help us with that. But if that can be worked in,
11 I think that would be good.

12 VICE CHAIR THOMAS: Sure. We can wrap
13 that into the language for the Mississippi River
14 delta. Did that not --

15 MEMBER DUFFY: That might be a good
16 place to do that, and not to cut that out in any
17 way but related to coastal land loss, those
18 impacts, and because the port systems are
19 different. But I don't mean to -- I'm fine with
20 the thought. I just think how we include it,
21 we'll have to look at it. But happy to take
22 input and complete that goal.

1 MEMBER HARGRAVE: The comment that I
2 heard was related to not being -- having to close
3 the port and not being able to open it until the
4 authorities allowed it to be open, even though
5 the port has the means internally to do the same
6 work and open the port sooner. I think that was
7 kind of the concern.

8 So in a way it relates to multibeam
9 and being able to turn data around quickly in a
10 usable way.

11 MEMBER DUFFY: And that's true, and
12 the other side of it is, at least to some degree,
13 the reopening is really impacted by the road, the
14 accessibility by roads. If Katrina taught us one
15 thing, it's we could move on the water quicker
16 than we could on the roads.

17 VICE CHAIR THOMAS: Okay, Virginia?
18 Yeah.

19 MEMBER PAGE: I was just curious about
20 Port Fourchon. But other areas, was it the case
21 that the other areas were surveyed and there were
22 no obstructions in the bottom? Did they do that

1 for Port Fourchon? The Coast Guard shut it down
2 because of some reasons or I was just kind of
3 curious. What really was the reason behind Port
4 Fourchon not opening I guess?

5 MEMBER DUFFY: So I mean one of the
6 problems of answering that is we have to shut
7 down multiple times every year for different
8 impacts. So if it's specific to Katrina, I
9 couldn't answer that and I'm happy to -- like I
10 think we can fine tune that and include it. I
11 want to be clear, I didn't want to cut it out. I
12 just wanted shape it into what we were talking
13 about.

14 But right, because I mean that --
15 you've seen one port, you've seen one port
16 reopen, too, is really --

17 (Simultaneous speaking.)

18 MEMBER PAGE: Gotcha, okay. I was
19 also going to add, and I don't know how you --
20 maybe I didn't pay close enough attention to what
21 you said as far as the letter, but if so I
22 apologize, but I was kind of thinking at the same

1 time. But maybe reinforcing this -- apparently
2 the term that they like to throw around, and I
3 think we can embrace it in this blue economy
4 concept, that you know, our visit to New Orleans,
5 you know, was a great example of the blue
6 economy, the impacts of the blue economy and what
7 a vital role that NOAA plays in ensuring the blue
8 economy is sustainable. So something along those
9 lines, because I think blue economy --

10 VICE CHAIR THOMAS: So that's the
11 opening statement.

12 (Simultaneous speaking.)

13 MEMBER PAGE: Something like that. I
14 don't know if it's an opening but I think it's a
15 good thing to open, because I think we went to
16 New Orleans, you know. I think most of the
17 impact is like wow, this really impacts the
18 country. This is the blue economy. If you want
19 to define blue economy, I think I could do it
20 better here than talk about Alaska quite
21 honestly. I might start off with an argument
22 talking about New Orleans and how impactful it is

1 to the whole, you know, central of the United
2 States, and then how vital, what a big role NOAA
3 plays and the National Ocean Service plays in
4 facilitating this blue economy and keeping it up
5 and running.

6 So I think that's kind of a powerful
7 story, why we were here, you know. It kind of
8 reinforces why we move around the country,
9 because my eyes are opened much bigger now that
10 I've seen other ports, and then we can contribute
11 more understanding what your roles are. So I
12 think to capture that, the why we showed up in
13 New Orleans versus in D.C., in the office in
14 Silver Spring, you know, is because of things
15 like this.

16 So anyway, I would kind of urge some
17 kind of -- and if you want, I could help give a
18 first draft of the language of that, while I have
19 it rambling through my mind.

20 VICE CHAIR THOMAS: You're about --
21 except for my Internet is not working right now.
22 My wireless is not connecting. I tried to send

1 this letter to --

2 (Off the record comments)

3 VICE CHAIR THOMAS: Ed, I was just
4 going to say, when you get this letter, if you
5 could just -- you'll see the blue economy
6 mentioned right up front, and if you could go
7 ahead and just edit that sentence right there,
8 that would be great.

9 MEMBER PAGE: Okay. All right, done.

10 (Pause.)

11 VICE CHAIR THOMAS: Ed, all right. So
12 hold on. So Lynne, I don't think you were in the
13 room. The Emergency Management Group doesn't
14 need to meet. So we're trying to do everything
15 other than issue papers first, I think is the
16 idea.

17 So Lynne suggests that we run through
18 the meetings for Hawaii and San Francisco real
19 quickly as far as what we have so far, and I have
20 been on one planning meeting for Hawaii. Most of
21 you know Joyce Miller who -- Joyce used to be
22 chair on the HSRP for eight years. So it's

1 really great, because she is in Honolulu and she
2 is helping out with the planning of the meeting.

3 And I know quite a few people because
4 we've done so much work at the University of
5 Hawaii at Honolulu, and I've been working already
6 to set up a panel on sea level over there. It
7 includes people from the Army Corps, people from
8 the National Weather Service, Chip Fletcher,
9 who's known on Hawaii as one of the key -- in the
10 Pacific Islands as the key sea level person, and
11 John Marra from -- what is he, who is he with?
12 He's with NOAA. He's a NOAA employee in
13 Honolulu. Anyway, there's quite a list of people
14 that have a lot of expertise in that region.

15 So I've kind of been connecting with
16 that and seeing who we can have and set up over
17 there. Do you want to talk about it some more
18 Lynne?

19 MS. MERSFELDER-LEWIS: Okay. Sorry,
20 technical difficulties. I like these different
21 push to talk mics. We've got the dates. Again,
22 I'll run -- it's April 27th, the week of April

1 27th, likely our same pattern which is fly on a
2 Monday, meet Tuesday-Wednesday-Thursday, depart
3 on Friday or depart on Thursday night. We are
4 going to be in Oahu, likely in Waikiki. Once a
5 long time ago NOAA had me go to Hawaii all the
6 time to run special events and meetings and
7 workshops.

8 So I've got a bunch of contacts and a
9 lot of people stay in the same jobs there, so
10 they're all the same contacts. So we'll find
11 some, a great place to meet. I want to just
12 mention the meeting team and partners first. You
13 might have heard, it's Ed Carlson. He's a
14 geodetic advisor for NGS. It's Crescent
15 Moegling. She's our NAF manager for the Pacific.
16 She's out of Seattle. It's Laura Rear McLaughlin
17 from CO-OPS, and it's Galen Scott and NGS as
18 well, and then it's Julie Thomas and Joyce
19 Miller, who's our past chair, who had offered
20 before she even left, she knew the meeting would
21 be in Oahu in a year after she had left. And
22 then there are regional team coordinators out

1 there. There's a bunch of Weather Service folks
2 out there, so we'll involve some of those folks.

3 Rick Brennan generously offered to
4 also help us, and Liz Kretovic also was a captain
5 of one of the NOAA ships out there. She has a
6 lot of experience in Hawaii. So we have a lot of
7 -- there's a lot of stuff going on in Hawaii and
8 in the Pacific. So we'll also consider the rest
9 of the Pacific.

10 NOAA has a big presence -- a small
11 presence compared to the rest of Ford Island.
12 But we have a presence there. We have a presence
13 there. We have a new, relatively new Estuarine
14 Research Reserve. We have their partners at
15 University of Hawaii and NOAA that do research on
16 Coconut Island. There's all kinds of cool stuff
17 going on.

18 There's also a really awesome
19 container terminal that MATSON runs, and that's
20 another possibility of something we might do.
21 Some of the past ideas, not incorporating the
22 stuff we talked about today because I haven't

1 updated those notes, but we did talk about doing
2 a big ocean mapping piece, hydrodynamic modeling
3 from OCS and model validation and training the
4 models and maybe an IOOS, or we may move that to
5 San Fran.

6 VICE CHAIR THOMAS: We're going to
7 move the hydrodynamic one --

8 MS. MERSFELDER-LEWIS: To San Fran,
9 right, okay.

10 VICE CHAIR THOMAS: --to San
11 Francisco.

12 MS. MERSFELDER-LEWIS: Okay, so San
13 Fran. And then a sea level rise
14 session/resilience, probably co-chaired by Julie
15 and then she's going to decide who's the other
16 co-chair with her. There's a lot of stuff going
17 on in datums in Hawaii and maybe even the new
18 tidal datum updates and new geodetic datums
19 coming soon.

20 So I want to look at Juliana, and I
21 know Juliana mentioned there's a lot going on in
22 the Pacific, and so you might want to -- would

1 you follow-up after we go through this. So you
2 guys these are the notes from the, excuse me, the
3 couple of meetings we've actually had.

4 One of the NOAA ships is out there and
5 also launches are out there right now doing work,
6 and I might have Rick Brennan comment on that, as
7 well. Joyce has already been in contact with the
8 University of Hawaii. They have a marine center
9 and both her husband works at the marine center
10 on the ship research projects, and as well as our
11 old Rear Admiral Anita Lopez.

12 So she also went to the Hawaii Ocean
13 Safety Team meeting to talk about them, to talk
14 with them about ideas for their topics and to let
15 them know we're going to be coming. Brian
16 Schatz, who used to be Lieutenant Governor at the
17 time, spoke to the HSRP when we were last there,
18 and he is now the senator. And so either he or
19 staff might be available.

20 We are not going to be there during
21 Congressional break, so it's unlikely we'll get
22 him but you never know. She did say the last

1 meeting, the pressing issue was sea level rise,
2 and it's a nice continuation of the topics you
3 guys have been talking about since Miami.

4 So Joyce also wants you to consider
5 there's a cultural ship that is called the
6 Hokule'a and it's a native Hawaiian made ship
7 that tried to recreate a Pacific navigation
8 itinerary, and she would love to somehow have
9 that. It's a very large canoe, somehow have that
10 integrated into the meeting if it was possible.

11 And then there's -- it's not always in
12 Hawaii, right. It moves around, but right. So
13 that's another kind of cool, interesting thing.
14 You guys, there's a lot of traditional things in
15 Hawaii in terms of fish ponds and early
16 sustainability management of coasts and
17 fisheries. So if, you know, if there's the right
18 mix, we could try to also mix those.

19 Also Joyce has offered us to do member
20 hospitality at her house, which is super nice of
21 her. So we'll try to take advantage of that, as
22 well.

1 VICE CHAIR THOMAS: Only fruit and
2 yoga.

3 MS. MERSFELDER-LEWIS: Right, only
4 fruit and yoga right, okay, and a little bit of
5 poi. I know that there's work from NGS going on
6 in American Samoa and Hawaii and airborne gravity
7 surveys, and -- excuse me, and quite a few other
8 things. I'm going to actually call on Juliana
9 and then Rick. If you -- we would really love to
10 hear what ideas you have.

11 MS. BLACKWELL: Thanks, Lynne. We can
12 cover all of those things as far as giving a
13 status update on where we have and where we plan
14 to finish up our modernization efforts with the
15 airborne gravity collection. I do think it would
16 be really helpful to have our advisor, Ed
17 Carlson, who's been mostly the point person in
18 interacting with the other territories, do an
19 update about the work that he has been
20 championing out there in form of doing workshops
21 and talking with other island nations, and just
22 give an overview of some of the other activities

1 and how it will fit in with the rest of the
2 agenda as we look at the entire -- perhaps look
3 at the entire Pacific in support of some of these
4 national security issues.

5 So I would like to pencil Ed in as
6 somebody who would not only be there present and
7 help plan this, but also give a Pacific Islander
8 update as far as the geodetic work being done. I
9 think we could also tie that in to some of the
10 needs that we're still trying to fill as far as
11 the Pacific Plate, because primarily we're
12 talking about the North American Plate when we're
13 here, and I think there's some other challenges
14 with the data that we need to be able to be
15 successful for our modernization efforts.

16 Obviously, coastal mapping, you know,
17 is needed everywhere. So there's another element
18 of that. We can basically tie in everything that
19 we're doing with the Pacific Islands. So I don't
20 know what else you're looking for right now, but
21 I think we certainly can fill in a number of
22 details as we work through the planning for this.

1 MS. MERSFELDER-LEWIS: Thanks Juliana,
2 that's perfect.

3 CAPT BRENNAN: So there's a couple of
4 things going on. We -- I think since the last
5 meeting, we had the Hi'ialakai had been taken
6 offline and we've redirected Rainier to the
7 Pacific Islands. So Rainier's there now working
8 northwestern Hawaiian Islands, doing mostly reef
9 assessment and monitoring work.

10 But she did discharge her launches and
11 the launches have been surveying on the north
12 side of Maui and on the south side of Molokai,
13 and doing hydrographic surveys in those areas in
14 the different ports there. So certainly there
15 would be an update here. But I think in the
16 bigger scheme of the Pacific, I know there were
17 -- there have been interests in NOAA taking a
18 larger charting role in the Pacific Islands and
19 how we would fit into that.

20 When you look at the Seabed 2030 arena
21 and you look at the volume of data that is in the
22 Pacific Islands that needs to be mapped, that is

1 a significant issue there. So talking about the
2 pertinence of mapping to the larger Pacific
3 community, I think, you know, could be resonant.

4 I think the other hot topic that has
5 been bubbling up in our arena is critical marine
6 minerals, and when you look at the permissivity
7 maps that USGS has of those minerals, a lot of
8 them exist within our EEZ, within our current
9 EEZ.

10 That's not even the extended
11 continental shelf understanding of that in the
12 Pacific Islands, because those particularly
13 manganese nodules only exist in the deep water.
14 Then there's also areas of hydrate crusts out
15 there as well, and so -- and from a national
16 asset, the biggest issue is a lot of those areas,
17 at least in the public domain, I'm looking at my
18 Shell and Fugro friends, you know, that
19 information does not exist.

20 And so there are major mapping gaps
21 that need to be acquired there, just so USGS and
22 BOEM can make assessments on the lease blocks

1 for those, and so that was -- that was the
2 outfall of a recent meeting that NOAA and BOEM
3 and USGS all participated in, to talk about
4 critical marine minerals, and that consistently
5 revolved around the Pacific.

6 So I think that also is one that would
7 be timely and interesting. As far as the
8 Hokule'a goes, sanctuaries has had Nainoa
9 Thompson, who is the -- I think he's the current
10 president of the Polynesian Voyaging Society. If
11 there's any way that you can get him on the
12 agenda to talk, spellbinding and really
13 interesting discussion about voyaging and how
14 that, you know, the history of them in the
15 Pacific Islanders, and how they've resurrected
16 voyaging just from a general interest level.

17 I'm not sure exactly of its pertinence
18 to the board, but you know, it may be that a
19 dinner or a lunch or something. If we could get
20 him in, I mean it's really, really interesting
21 from the perspective of the Pacific Islands and
22 that cultural heritage that they carry there.

1 MS. MERSFELDER-LEWIS: Traditional
2 knowledge of navigation.

3 CAPT BRENNAN: Yeah absolutely,
4 because there's no -- you know, they do this
5 thousands of miles without the first stitch of
6 electronics, and it's all based on birds and
7 clouds and stars and wave directions and sticks,
8 you know, it's sticks and shells are their maps,
9 which are really amazing, you know, to look at
10 their voyaging maps that they make.

11 So I think from that level, it would
12 be a really interesting talk to have him come in
13 just as a general perspective goes. So those
14 would be my ideas for that.

15 MS. MERSFELDER-LEWIS: That's
16 excellent and I really appreciate it. Rich, if
17 there's things you'd like to highlight. Laura
18 has given us a list, but if there's stuff you
19 want to mention.

20 MR. EDWING: Okay. Hopefully what I
21 mention matches what Laura's provided. So I
22 can't say we have a tremendous amount going on in

1 the Pacific. We certainly have an NWLON network
2 out there. There are about I think six or seven
3 stations on the main Hawaiian Islands, and then
4 stations in some of the other territories like
5 American Samoa, the Marshall Islands, Guam, Wake,
6 Midway.

7 I would say for that part of our
8 network, it certainly helps with safe navigation.
9 But they don't really have the navigation
10 challenges in the ports and harbors that we see
11 more typically around CONUS. Really the value, I
12 think the greater value of the network out there
13 is for tsunami warnings. Those are kind of early
14 warning stations for tsunamis, as well as sea
15 level rise.

16 The Islands are particularly valuable
17 because they are out there in the middle of the
18 ocean, and there's not many data points for
19 global sea level rise. So those type of uses of
20 the network I think kind of outweigh the marine
21 transportation aspects that are usually driving
22 most of the rest of the network.

1 CHAIR SAADE: So one thing about
2 Hawaii, it's probably the only place we'll go
3 where the coastline is growing, and that may be
4 something of interest to talk about. And there
5 is a lot of deep ocean mining. There's even
6 renewable activity. It may be something we want
7 to look into from an industry presentation point
8 of view.

9 MEMBER CHOPRA: I wanted to suggest
10 something for Marshall Islands. We know they
11 have some islands which are now sinking. They're
12 getting underwater, and we know they have been
13 very active in IMO and United Nations. Maybe
14 it's worth inviting them for a presentation, to
15 see how we can support them or what's their
16 current scenario or awareness.

17 VICE CHAIR THOMAS: So I'll just
18 mention that actually I was in Marshall Islands
19 because we put a wave buoy down there, and we
20 actually had dinner with the Ambassador at that
21 time. It was a woman. PacIOOS, who we're kind
22 of wrapping in, I mentioned her. Melissa Iwamoto

1 is the director of PacIOOS, and she's fantastic.
2 They are so connected to the Marshall Islands,
3 and they have people from the Marshall Islands on
4 their board.

5 I already talked to Melissa about it
6 because I don't know how much funding. When you
7 start talking about bringing in people from the
8 Islands, it can get expensive really quickly.
9 What would be really good is if Melissa could
10 plan her PacIOOS board meeting during the same
11 week or something that we're meeting, because
12 then she'll get people from American Samoa, Guam
13 who use that.

14 I know the tide gage on Guam, because
15 I've worked with them about it down there too.
16 There's a lot of interest on all of the topics
17 that we've talked about. So ideally we can get
18 some of these people up to Honolulu or Oahu
19 anyway, and I think that's one thing that I
20 wanted. That's why I'm glad that the date is
21 narrowed, is firmed here now, because now we can
22 really make some plans.

1 But you're right about the Marshall
2 Islands. Eight feet elevation, and that's the
3 dump piled up.

4 MEMBER CHOPRA: Right. So their
5 shipping minister led the EPA, the MEDC at the
6 General Assembly, and then even the last COP
7 meeting to focus the attention on climate change
8 and greenhouse gas emissions, and what they were
9 having and the issues they were having. So
10 there's been some changes. It's actually made
11 some changes on the maritime side of where we go.

12 So maybe it's worth getting that
13 update directly from them. That will be more
14 awareness for all of us.

15 VICE CHAIR THOMAS: Is there anybody
16 else on the Panel that has ideas about Hawaii,
17 other than fruit and yoga?

18 CAPT BRENNAN: Julie, one more comment
19 on that. There is a national security angle out
20 there as well that may be worth discussing.

21 (Simultaneous speaking.)

22 VICE CHAIR THOMAS: Is that the one?

1 CAPT BRENNAN: No. Well, I mean just
2 the general area. And so I think, you know, I
3 think just -- I think that there's a large
4 security issue there I think in general, and I
5 think projecting even soft power, particularly
6 with regard to the services that the -- that our
7 offices provide to those U.S. territories, is
8 very important.

9 VICE CHAIR THOMAS: Okay.

10 CAPT BRENNAN: And so there's a large
11 DoD presence right there in Honolulu that would
12 not be difficult to get them to come down the
13 hill and talk to us, and that may be another
14 angle if you decided to go that way --

15 VICE CHAIR THOMAS: You're talking the
16 Navy there, not the Army Corps?

17 CAPT BRENNAN: Specifically the Navy,
18 yeah. But there's, I think all services are
19 represented there at that campus.

20 VICE CHAIR THOMAS: Okay, yeah. No,
21 I know the Army Corps is very involved on the
22 islands but --

1 CAPT BRENNAN: Yeah, no. Specifically
2 the Navy is who I'm thinking of, and we have
3 contacts there that we could --

4 MS. MERSFELDER-LEWIS: That would be
5 great to talk to them, because the other -- I
6 know that other parts of NOAA are doing things as
7 well. We mentioned the Estuarine Research
8 Reserves have a new reserve that's with the
9 state, but the OCM, the Office of Coastal
10 Management also has a blue economy report, and
11 you know, there's other -- so there's other.
12 Yeah, there's a ton of stuff exactly. So right.
13 So like exactly.

14 So I think like I said, we have at
15 least a third more if not more than that of -- as
16 we brainstorm and then need to cull down some of
17 that stuff. Like so that team of people will try
18 to work on that, and make sure everybody's happy
19 enough as we can.

20 MEMBER CHOPRA: Regarding blue
21 economy, the biggest refinery there is Par
22 Pacific. They're also the main oil supplies for

1 the full islands, all the Hawaiian Islands. We
2 can get them to -- we can invite them to come and
3 make a presentation, to tell us what and how
4 they're doing.

5 So they're the sole oil providers in
6 the islands at this time, Par Pacific. I know
7 them well. I can put them in touch with you.

8 VICE CHAIR THOMAS: Yes, Gary.

9 MEMBER THOMPSON: So I met with some
10 surveyors from Guam a couple of weeks back, and
11 they had some questions about elevations. So Ed
12 may have someone from Guam that may want to take
13 part, to talk about the 2022 datum.

14 MS. MERSFELDER-LEWIS: So you guys, we
15 will put out a really early announcement that
16 we're having a meeting in Hawaii and a few of the
17 potential topic areas, so that you could share it
18 with, if you have contacts, especially folks
19 coming from far away would have to budget far in
20 advance and/or kind of another meeting nearby
21 that they should be attending or make their
22 meeting around our meeting or whatever.

1 So that would work if we could get
2 that to happen. All right, that's awesome.

3 VICE CHAIR THOMAS: Do we want to
4 touch base about San Francisco or not?

5 MEMBER HARGRAVE: Could I add one more
6 for Hawaii before we move on, if that's okay?

7 VICE CHAIR THOMAS: Yeah.

8 MEMBER HARGRAVE: So there is a --
9 there's a company in Hawaii called Oceanic
10 Imaging Consultants, and the originator of that
11 company is Dr. Tom Reed. He was a professor at U
12 of H, and he developed or his company has worked
13 with, partnered with the Navy and NOAA and a
14 number of other groups for many years, probably
15 40 years, developing acoustic technologies in
16 both the hardware and the software realms.

17 I think somebody like that would be a
18 good tie-in to this issue of bringing data
19 quickly from acquisition to usable information.
20 I think that's -- that would be something that he
21 could speak to, and I can provide you that
22 contact.

1 MR. EDWING: Julie?

2 VICE CHAIR THOMAS: Yeah.

3 MR. EDWING: So I should have
4 mentioned, you know, the Tsunami Warning Center
5 is located there in Honolulu, and if there's a
6 coastal hazards panel or something of that type,
7 you know, it would be good to invite the head of
8 that center.

9 VICE CHAIR THOMAS: I'm sorry, I
10 missed.

11 MR. EDWING: The Weather Service
12 Tsunami Warning Center is right there in
13 Honolulu.

14 VICE CHAIR THOMAS: Right, yeah. No
15 I --

16 MR. EDWING: Okay, and Laura's
17 probably already flagged that.

18 VICE CHAIR THOMAS: Actually, that's
19 an interesting tour that they have. San
20 Francisco? Do we want to?

21 MS. MERSFELDER-LEWIS: Yeah.

22 VICE CHAIR THOMAS: Okay. So we're

1 going to jump over to San Francisco, and so now
2 that's been decided to be on September 21st, I
3 believe, and we're just starting to put together
4 ideas and agenda for there. That's a really rich
5 place too, along with Hawaii. Different
6 challenges, but a lot of wealth of information.
7 A lot of NOAA partners in the area there.

8 I work really closely with NWS there,
9 with the Army Corps, of course OCM. There's a
10 lot of different NOAA partners. And so I think
11 that we will not have a shortage. If anybody has
12 particular things that they want to talk about
13 for San Francisco, you can always send us ideas.
14 We'll probably have another sea level panel
15 there.

16 Patrick Barnard at USGS in Santa Cruz
17 is one of the leading people on the west coast
18 for sea level. Leslie Ewing and the Coastal
19 Commission. They wrote the plans for all of the
20 cities for sea level, for all of the California
21 planning.

22 MR. EDWING: So they had a lot of

1 problems like what Superstorm Sandy brought to
2 bear on lower Manhattan. So with Silicon Valley
3 on the south end of the Bay, there's a tremendous
4 amount of focus on how are we going to protect
5 the South end of the bay from sea level rise.
6 There's lots of contracts out there at the state,
7 local and multiple federal agencies. I mean we
8 need to dig into that, but there's going to be
9 plenty of really good darn topics and papers and
10 things.

11 VICE CHAIR THOMAS: Let alone the
12 whole airport is a whole other thing there in San
13 Francisco.

14 MR. EDWING: Yeah.

15 VICE CHAIR THOMAS: So yeah Ed, I know
16 you have lots of contacts there too. But you
17 know, I just wanted to throw it out there if
18 anybody has any particular things that they want
19 to talk about. Yeah.

20 MEMBER KELLY: We're kind of going
21 into the heart of the, you know, tech area and
22 future thinkers and what not. Would it be

1 worthwhile for us to have one of those
2 organizations, like a Google or something come to
3 talk to us about thinking outside the box,
4 potentiality for what they're doing for
5 artificial intelligence, internet of things,
6 things that might be applicable to what we do?

7 VICE CHAIR THOMAS: We can certainly
8 put that down. You know, Google had a whole
9 Ocean section, and they actually came to Scripps.
10 We talked a lot with them and then they kind of
11 pulled it back. But that's different than what
12 you're talking about. You're talking an actual
13 AI and a different point of view with them. So
14 we can certainly make a note of that.

15 We also talked about Saildrone, maybe,
16 and ASV. I mean we have a lot of things that we
17 could visit. Saildrone has an open invitation.
18 ASV has an open invitation to go, so working with
19 those companies I think it would be fun.

20 Okay, and ESRI's right there. Well,
21 yeah. They have a headquarter there. That's not
22 their headquarters but yeah. So let us know if

1 you have specific ideas.

2 MS. MERSFELDER-LEWIS: I do have a
3 list of brainstorm, some really early
4 brainstorming ideas, so if there' somebody else
5 who would like to sit on that organizing session,
6 let us know. I can't get it to open. Google
7 Docs anybody? Sorry.

8 CAPT BRENNAN: A number of our USGS
9 partners that we've been working with,
10 particularly out of the Santa Cruz office are not
11 that far, and that would be easy for them to
12 participate. We've had a very fruitful
13 collaboration with them on the EXPRESS project on
14 the west coast doing a lot of the mapping work.
15 A lot of that has been done in collaboration with
16 a number of the researchers there. Danny
17 Brothers, Amy Gartman, Guy Gelfenbaum, et cetera
18 there.

19 And so, you know, they -- if we don't
20 do something regarding critical minerals or
21 geohazards in Hawaii, they could certainly bring
22 that in because from the ocean mapping standpoint

1 they certainly -- that's their --

2 VICE CHAIR THOMAS: They excel. I've
3 seen, I've actually been to their shop and seen
4 their bottom classification, right. Sam Johnson
5 was the person involved with it initially. It's
6 incredible. Off of Point Conception, where
7 they're thinking of putting a wind farm offshore.
8 The detail, the amount of detail. I mean you
9 could see a pinhead on the bottom. It was just
10 like overwhelming.

11 So it's too bad they're not closer.
12 They have a nice display. Santa Cruz is a little
13 bit far to take the whole panel. But I agree.
14 We'll try to get, both from the mapping and then
15 from the sea level perspective, they have good
16 people.

17 MS. MERSFELDER-LEWIS: Also just a
18 reminder. We think that will be September, the
19 week of September 21st, same pattern. Travel on
20 Monday, return on Thursday night or Friday, meet
21 Tuesday-Wednesday-Thursday.

22 CHAIR SAADE: Julie, that's an

1 interesting comment because nothing says we have
2 to be in San Francisco proper. You could do it
3 in the South Bay, and then you're close to the
4 universities and you're close to USGS.

5 VICE CHAIR THOMAS: We could do it in
6 South Bay, and I've actually been thinking.
7 There's a really nice hotel in Pacifica. I don't
8 know if you know where Pacifica is. It's right
9 on the ocean. I've been to a million conferences
10 there, and they have -- I mean it's actually not
11 a really nice hotel, but it's an okay hotel and
12 it's right --

13 What makes it good is you look out the
14 window and the Pacific Ocean is right there. So
15 it's -- and it's a great, it's set up for
16 conferences. So that's another thing. Tiburon
17 also has good conference space.

18 MEMBER KELLY: In San Francisco, they
19 just sleep on the street.

20 VICE CHAIR THOMAS: Only in certain
21 sections. I was just there. It's not -- it
22 depends what section you're in.

1 MS. MERSFELDER-LEWIS: That is one
2 place I would be happy to take recommendations of
3 where you would prefer to be located, because
4 it's very hard to find housing for groups in San
5 Fran so -- and I don't want to just -- I mean if
6 you want to go to the broader San Fran and you
7 want to be in South Bay or Pacifica or Tiburon or
8 something to get, you know, to consider that.

9 MEMBER PAGE: I mean I think what
10 you're suggesting here that you may be, that
11 Santa Cruz might be an option, or further south.
12 It's only like -- I think it's like an hour and a
13 half drive maybe. I'm not even sure. An hour
14 maybe?

15 VICE CHAIR THOMAS: Yeah, it's a
16 couple of hours out there.

17 MS. MERSFELDER-LEWIS: It's about two
18 and a half hours to get down to Santa Cruz, and
19 it's not convenient to any airports, and that
20 would be the same thing with Pacifica. But you
21 could look at Oakland if San Francisco's pricey.
22 There's a convention center in Oakland at Jack

1 London Square. It's right across from where the
2 Sairdrone building is and --

3 VICE CHAIR THOMAS: And the advantage
4 of being there is that then it's more central in
5 San Francisco. Then we have the San Francisco
6 Bar Pilots, which are fun and they have a great
7 facility to visit. There's like a lot of the
8 Army Corps facility at Sausalito with the Bay
9 Model is very good. The Army Corps guys that
10 were in the Dillard of Sausalito, they would give
11 us a tour.

12 I know they put our buoy in every
13 other week because it gets hit, and they would --
14 they have a great boat vessel there to go out on.
15 So it's -- the Dillard is the name of the vessel.
16 It's the Army Corps Sausalito Bay model.

17 So we -- there's, you know, all these
18 different pockets have pluses and minuses. In a
19 way, San Francisco has an awful lot to offer
20 also.

21 I was just -- there is the Westin
22 Marriott right, and Union Square. I was just

1 there and that is a great place for meetings.

2 MEMBER HALL: They tend to be booked
3 up already for September, which is a gorgeous
4 time to be in San Francisco.

5 VICE CHAIR THOMAS: Oh, I see what
6 you're saying. It's the timing.

7 MEMBER McINTYRE: Yeah. I think if
8 you look at the Jack London Square in Oakland,
9 the Port of Oakland, their offices are there. And
10 the Marine Exchange is quite close to there.
11 It's pretty central and convenient.

12 MEMBER KINNER: Let me just chime in
13 too. It's sometimes a lot easier to fly into
14 Oakland than to fly into San Francisco by a long
15 shot, and Sausalito means you fly in some place
16 and then you have a very long drive to get there.

17 MS. MERSFELDER-LEWIS: Okay. So I'm
18 going to check that out first and we'll work from
19 there, and I think we can -- but we would -- so
20 we'll worry about logistics when we get closer to
21 the time. If we're really stuck, we'll take you
22 to Santa Cruz or wherever. If we really get

1 stuck, we'll let you know. I mean, the times
2 we've been stuck we've changed the pattern.

3 So like we could do a meeting on
4 Monday-Tuesday-Wednesdays sometimes or Wednesday-
5 Thursday Friday, and they don't always love
6 Tuesday-Wednesday-Thursday because we take all
7 their good time. So okay. Thank you guys for
8 the details. I think we can go ahead to the next
9 topic.

10 VICE CHAIR THOMAS: Anything you want
11 to say about future locations of meetings? No,
12 okay. Ed, do you have -- the only -- I mean I
13 still would like to go into a breakout group for
14 the sea level. Ed Page, Arctic breakout group.
15 Do you want to do a little more?

16 MEMBER PAGE: Well, we took a round
17 turn on it and made some edits. I don't know how
18 important it is to get it out right now as
19 opposed to allow others to look at the other
20 draft and just let it percolate for a while. So
21 unless there's a real urgency to get this out
22 now, I think we're ready to just share with the

1 group and absolutely put it to bed today.

2 Oh, I did notice that we're slowing
3 down, because in February 2018 we put out nine
4 position papers. So if people are talking about
5 we're putting out too many with three --

6 MEMBER MAUNE: No, that wasn't all at
7 one time.

8 MEMBER PAGE: Well, it was --
9 (Simultaneous speaking.)

10 MS. MERSFELDER-LEWIS: Those were the
11 updates of some of the old ones.

12 MEMBER PAGE: I gotcha. I was like
13 whoa, we're slowing down here.

14 MEMBER MAUNE: We did have a goal of
15 two per HSRP meeting.

16 MEMBER PAGE: Okay, all right. In any
17 case --

18 VICE CHAIR THOMAS: How close is your
19 Arctic? I mean, I actually feel that since we
20 had the chance to do a lot of revisions, that our
21 sea level one has come a long ways, and I'd like
22 just another 20 minutes, half an hour with the

1 people that are on it to kind of wrap it up --

2 MEMBER PAGE: That's fine.

3 VICE CHAIR THOMAS: -- and see if we
4 can come to closure. If you guys meet again, are
5 you in a place that you would be there, or are
6 you --

7 MEMBER PAGE: No, we redrafted it and
8 --

9 MEMBER McINTYRE: Yeah. I mean we've
10 made some edits.

11 MEMBER PAGE: We made some edits. So
12 I guess the question is how would we get it
13 disseminated right now in this order and get
14 closure on it? I mean --

15 VICE CHAIR THOMAS: Okay. So you
16 don't need to meet again to do -- I'm just trying
17 to get a feel.

18 MEMBER McINTYRE: Yeah. I mean I
19 think we've done our edits.

20 VICE CHAIR THOMAS: Your edits, okay.

21 MEMBER PAGE: We got consensus.

22 VICE CHAIR THOMAS: So then it should

1 go back out to the group.

2 MEMBER McINTYRE: Exactly, and then
3 maybe firmed up at the next meeting?

4 VICE CHAIR THOMAS: No. Firmed up
5 within the next five days.

6 MEMBER McINTYRE: Got it, okay. Well,
7 then we need to have a breakout group.

8 MEMBER PAGE: If we want to put it out
9 now, people can look at it. I mean --

10 (Simultaneous speaking.)

11 MS. MERSFELDER-LEWIS: The process is
12 that the working group meets on it. You guys
13 send it to everybody, everybody has concurrence,
14 and then if you have small edits, copy edits,
15 corrections, that's fine.

16 VICE CHAIR THOMAS: I mean we have two
17 hours to work on this.

18 MEMBER PAGE: Well, I don't mind if we
19 -- we can print it out right now.

20 MEMBER KINNER: Ed, can I suggest too
21 that you push it out first as a PDF so that it
22 cleans up the edits? It's a little tricky to

1 read right now.

2 MEMBER PAGE: Yeah. Well, I'll just
3 make sure it accepts all my changes.

4 VICE CHAIR THOMAS: Yeah.

5 (Simultaneous speaking.)

6 MEMBER KINNER: I haven't been able to
7 make that work on my system, no.

8 (Simultaneous speaking.)

9 MEMBER KINNER: With that, if you can
10 do that, then I can read it.

11 MEMBER PAGE: You have a printer handy
12 there?

13 MS. DENTLER: We'd have to go up to
14 the copy center, but we can print it.

15 MEMBER PAGE: Well, but I mean I could
16 send it electronically to everybody too.

17 MEMBER KINNER: That would be the
18 easiest.

19 (Simultaneous speaking.)

20 MEMBER PAGE: I'll do it that way.

21 VICE CHAIR THOMAS: Okay. Let's take
22 just a minute -- Lynne would like five more

1 minutes to discuss some logistics.

2 MS. MERSFELDER-LEWIS: So the only
3 other thing we didn't take about is next meeting
4 location for 2021 through let's say 2026. But
5 we're not going to go through all of those.
6 We're just going to say that in 2021, we had
7 proposed Puerto Rico and at one point there
8 wasn't a lot going on. But now that we've had a
9 lot of response and a lot of other stuff going
10 on, and I know NGS had a lot of stuff and I think
11 CO-OPS had some things. So there's plenty enough
12 to go to Puerto Rico and talk about, but not
13 during hurricane season.

14 So that would be a spring meeting or
15 before hurricane season, and then 2021, the other
16 -- some ideas that were floated, again this is
17 like probably a year ago, were to consider a
18 meeting like Norfolk-Hampton Roads or Savannah,
19 Georgia. I think Norfolk-Hampton Roads was
20 really with Larry Atkinson in mind, and we miss
21 him dearly and wish he was around. I think
22 Savannah -- we went to Charleston about six years

1 ago.

2 VICE CHAIR THOMAS: Savannah would be
3 fine.

4 MS. MERSEFELDER-LEWIS: Savannah might
5 be a good one. I know we're doing -- there's a
6 lot of port stuff going on there, big, big --

7 MEMBER KELLY: Precision navigation.

8 MS. MERSEFELDER-LEWIS: Precision nav,
9 okay.

10 (Simultaneous speaking.)

11 MS. MERSEFELDER-LEWIS: So would you
12 guys weigh in on Savannah?

13 VICE CHAIR THOMAS: I would say Puerto
14 Rico and then Savannah.

15 (Simultaneous speaking.)

16 MS. MERSEFELDER-LEWIS: Puerto Rico is
17 a pretty --

18 (Simultaneous speaking.)

19 CAPT KRETOVIC: I just want to say,
20 Savannah is going through a major expansion that
21 will be completed at the end of '21. It may be
22 better from a precision nav perspective to hold

1 off until '22, so that way we can have something
2 to really talk about there, because we should be
3 working there in '22. We might have preliminary
4 data that we can share with them. Just a
5 thought.

6 MEMBER MAUNE: When is the last time
7 we went to New York?

8 MS. MERSFELDER-LEWIS: 2014, so I
9 think we might not be the right time to go back
10 there.

11 CHAIR SAADE: I think we needed to go
12 to New York and I think we need to have a focus
13 on offshore wind farm at some point.

14 MEMBER MAUNE: I thought it might be
15 good to go there while Ed is still on our board.

16 MS. MERSFELDER-LEWIS: Three more
17 years Ed, yeah.

18 MEMBER CHOPRA: Do we want to look
19 some place within the continental United States
20 up in the river system, northern Mississippi, you
21 know, somewhere there because we discussed this.
22 We saw some amazing data yesterday and day

1 before. But we haven't -- I don't think we've
2 ever met, let's say I don't know, Chicago or
3 south of Chicago some place. Cleveland, yeah.
4 Somewhere on the rivers.

5 MS. MERSFELDER-LEWIS: We met in
6 Cleveland in the last couple of years. So like
7 there's a list in your materials that says where
8 we've met recently. So you could just peek at
9 that and you can see that we met in Cleveland in
10 '16. So Chicago is on the list for like as maybe
11 2022 or you know, it could get swapped out for --
12 Chicago could get swapped out for Savannah, and
13 Savannah, that would actually work really well.
14 So maybe Chicago for 2021 and Savannah for 2022,
15 and also D.C. for 2022, I think. So we didn't --
16 go ahead.

17 CAPT KRETOVIC: I would just say that
18 the amount of people, the stakeholders that
19 didn't come to D.C. gives me a little pause about
20 going back there so quickly. You know, maybe if
21 you want to be Mid-Atlantic, what about
22 Baltimore, you know, or something else? Just I

1 feel like we swung and we missed with D.C.

2 We really didn't have a lot of folks
3 show up to that meeting, and I think we really
4 want to get input from the local stakeholders.
5 So I would suggest something like Baltimore or
6 Delaware, you know, Philly. I don't know when
7 the last time we went to Philly.

8 MS. MERSFELDER-LEWIS: We are talking
9 about Mid-Atlantic for like 2024 maybe, so maybe
10 we move that to 2022. So like that would be like
11 Philly, Delaware. That could even be New
12 York/New Jersey, I mean that's the right mix.
13 But anyways that was your partial update. I
14 think we're -- I think it sounds like Puerto Rico
15 and then Chicago, or it's Chicago, Detroit/Ann
16 Arbor, but I think Chicago.

17 MEMBER DUFFY: So I just want to chime
18 in on the Mississippi River system and Chicago.
19 Illinois is our largest trading partner between
20 Louisiana. But there are other -- like Chicago
21 of course isn't on the river, and maybe being
22 strategic if we want to capture the river, we

1 should look at some way that is on the river.

2 St. Louis comes to mind, kind of the
3 gateway to the Midwest. There's, you know, a lot
4 of connection to barge traffic, locks and dams.
5 A lot of people that -- no offense to Chicago.
6 It's like we're just kind of getting away from
7 the river that we are trying to focus on.

8 CAPT KRETOVIC: I think it's important
9 though Sean to remember where NOAA's jurisdiction
10 is on the river, and I am not sure if we were in
11 a place like the Quad Cities, if because that's
12 the Corps' area there, they are responsible.
13 They're the authoritative source. So Chicago may
14 be the better option because that is an area
15 where we have jurisdiction.

16 MEMBER DUFFY: Okay.

17 CAPT KRETOVIC: Just as a -- I mean I
18 agree with you 100 percent, but I also think
19 like, you know, we really don't have the
20 jurisdiction on that part of the waterway.

21 MEMBER DUFFY: Okay, good point.

22 MS. MERSFELDER-LEWIS: I think we're

1 a wrap talking about our locations and we'll get
2 back to you like with confirmations for 2022 and
3 on.

4 VICE CHAIR THOMAS: Yeah, I think we
5 do breakouts. I don't know what -- Kim, if you
6 want to take this time to work on the Emergency
7 Management paper or? Okay.

8 MEMBER HALL: I appreciate the offer.

9 VICE CHAIR THOMAS: So for -- let's
10 just -- we'll go back to the original places that
11 we were. I'm just finishing up one thing here,
12 but let's go back to the rom then over here for
13 the two groups. I don't know what the Emergency
14 Management group's going to do.

15 (Whereupon, the above-entitled matter
16 went off the record at 2:13 p.m. and resumed at
17 3:00 p.m.)

18 CHAIR SAADE: Okay, everyone. We're
19 going to get back into this for the next 55
20 minutes or so, maybe 50 minutes or less. But
21 it's Julie's got it all under control. So here
22 we --

1 VICE CHAIR THOMAS: I have nothing
2 under control, but I think we're really happy
3 because I understand that the Arctic paper is
4 being mailed around, and the sea level paper is
5 being mailed around. So I really want to thank
6 that working group for sea level, the NOAA folks
7 having their participation and having local
8 participation, and the other Panel members that
9 were there. It was great, really good
10 discussions.

11 So I believe that both of these papers
12 are pretty darn close to being finalized. Please
13 read them if you can on your planes going home or
14 take some time right now, because we have a
15 little bit of time before we break, and the more
16 you can give me feedback. Like I said, within a
17 week I'd like to get the letter out to the
18 Administrator. So --

19 (Off mic comments.)

20 VICE CHAIR THOMAS: Their schedule.

21 MS. MERSFELDER-LEWIS: Your schedule.

22 VICE CHAIR THOMAS: My schedule. No,

1 they all know I'm leaving Tuesday, and I'm
2 disappearing for a month. So that's why I really
3 want to try to get this out over the weekend. So
4 if you can read both the Arctic and the sea level
5 and give back feedback even while we're sitting
6 here. If you don't have to -- if you have time
7 before your four o'clock bus, that would be
8 great. So that's the issue papers.

9 The matrix, the one thing I'm doing
10 that you didn't see was I'm adding in under the
11 issue -- I'm sorry, the Issue Matrix is what I
12 meant now. I'm adding in under the issue paper
13 section on the Alaska coastal mapping, which is
14 what Dave Maune talked about, and that will be
15 pending and tabled until the Hawaii meeting to
16 discuss, but I'm going to put that line in there
17 for the issue papers.

18 So that's the one addition that will
19 be in there. I will send that final copy out to
20 you probably sometime this evening, and then the
21 last thing is the letter to Neil Jacobs, and so I
22 believe that Virginia -- thank you Virginia for

1 all of your help, too. I believe that she's
2 sending that out. That's a really, really rough
3 draft. The reason why I mailed it out to you is
4 because several of you had comments to include,
5 and I just wanted you to see --

6 That's a little bit of a mismatch now
7 between what was in there before and what new
8 comments are. I've just plugging them in. But
9 that if you can just two sentences. You don't
10 even have to edit the letter. Just put it in the
11 email to me to include this, and I'll make sure
12 it gets it in there. I just need your wording.

13 MEMBER MAUNE: Julie, on the issue
14 papers you sound as though you want us to send in
15 input next week or something.

16 VICE CHAIR THOMAS: No.

17 MEMBER MAUNE: I thought we were
18 going to try to vote on it today.

19 VICE CHAIR THOMAS: We are going to
20 vote on both of those today. Okay. We're going
21 to vote today. If there's still -- what I was
22 going to say was can we vote to approve these,

1 knowing that there might be a typo, a minor --
2 right, minor editing, and really I said a week
3 but this is like -- just read it and send it back
4 to me. Send me your approval or send me your
5 edits if you have typos, if we had typos or
6 something.

7 So I think we do need to take a public
8 vote on the issue papers. The Arctic paper
9 first. Do we approve that there will be an
10 Arctic paper included with our letter to Neil
11 Jacobs? That's the question.

12 (Chorus of ayes.)

13 VICE CHAIR THOMAS: Is there anyone
14 that is opposed?

15 (No response.)

16 VICE CHAIR THOMAS: Okay.

17 CHAIR SAADE: Passes.

18 CAPT KRETOVIC: It's unanimous.

19 CHAIR SAADE: It's unanimous.

20 VICE CHAIR THOMAS: May we have a vote
21 on the sea level paper, sea level rise and
22 subsidence paper I should say, that we include

1 this letter with the -- this issue paper with the
2 letter to Neil Jacobs.

3 (Chorus of ayes.)

4 VICE CHAIR THOMAS: Anybody opposed?

5 (No response.)

6 CHAIR SAADE: Passes.

7 VICE CHAIR THOMAS: Okay. Thank you,
8 Ed. We got that on record. Okay. Is there
9 anything else we need to vote on Lynne? No, all
10 right.

11 MS. MERSFELDER-LEWIS: Are you voting
12 anybody off the island or onto the island?

13 VICE CHAIR THOMAS: What do you want?
14 We'll take care of it. Okay.

15 MEMBER THOMPSON: And we're working
16 on the emergency services. We're focusing it
17 more on, completely on AI. So we're going to go
18 in and reformat it and we'll get out so that
19 people can review that.

20 VICE CHAIR THOMAS: And thank you very
21 much for that working group too, and Gary can --
22 whenever that is ready, you can send it to

1 Virginia and Lynne, and then they can send it out
2 to the group. We will definitely -- that will be
3 our number one task, issue paper to tackle in
4 Honolulu, okay.

5 I wanted to mention one more thing.
6 Lucy, do you want to stand up and come on up to
7 the microphone, and why don't you tell them about
8 your webinar series, because what I'm thinking is
9 this might be two things. She offered to do a
10 webinar that we could join in on the Planning and
11 Engagement call, and then she's also asking for
12 additional ideas. So why don't you explain a
13 little bit? Introduce yourself.

14 MS. HICK: Yeah hi. So I'm Lucy Hick
15 and I'm the chief of Customer Affairs for NOAA's
16 Office of Coast Survey. We recently started a
17 new webinar series within Coast Survey called the
18 NOAA Navcast. The original or the inaugural
19 webinar was in the spring or no, back in June I
20 think, and it was on S-100 and surface currents.
21 We were aiming to do it quarterly, although we
22 don't have a set schedule necessarily.

1 We have a list of potential topics
2 that we're kind of picking off of, and our next
3 NOAA Navcast will be I think at the end of
4 September and it's going to be on nowCoast. So
5 John Kelly is going to -- or one of his minions,
6 will talk to us about nowCoast. However, we were
7 talking about the need maybe for a webinar on
8 OFS's. You guys were mentioning that.

9 VICE CHAIR THOMAS: Ocean Forecast
10 System.

11 MS. HICK: Oh thank you, and I was
12 thinking that perhaps maybe that would be a good
13 topic for the next NOAA Navcast. If we were to
14 do it, it wouldn't be limited to just the HSRP;
15 it would be open to the public and we do
16 publicize them. But we could look at trying to
17 coincide it with the --

18 VICE CHAIR THOMAS: Planning and
19 Engagement call.

20 MS. HICK: The Planning and Engagement
21 call, so that it could serve dual purposes. So
22 that was the first thing. If you would like to

1 do that, we will definitely look and see if
2 that's possible, and we could work with CO-OPS,
3 as well. CO-OPS was happy to work with us
4 because obviously we have dual roles in that or
5 complementary roles.

6 The other thing is of course if you,
7 if the Panel has ideas for things that you think
8 would be a good thing for us to publicize to the
9 community. We're looking at it as like, sort of
10 replacing in a way or supplementing what we used
11 to do was an Industry Day at different events,
12 and we're trying to get a wider distribution or
13 wider participation from different industry
14 partners on different topics that we're working
15 on or different projects.

16 So I am more than happy to hear from
17 the Panel on ideas for subjects that you think
18 would be applicable or appropriate to do during
19 one of our NOAA Navcasts. After we do the
20 Navcast, we post it on our website. So we post
21 both the video -- or not video, but the audio of
22 the Navcast, the PowerPoint deck and also a

1 transcript of it. So any materials are
2 available, and we'll continue doing that. So
3 thank you for the opportunity.

4 VICE CHAIR THOMAS: Thanks Lucy. So
5 we'll plan to coordinate and get word out to the
6 Panel as far as when, particularly the Ocean
7 Forecast System. I thought it might be a great
8 opportunity since we're going to be discussing
9 that one in San Francisco, and it might be a
10 great opportunity to at least get a heads up on
11 what it's about.

12 All right. One more -- okay. So who
13 amongst you -- we had a lot of comments to
14 include with the letter to Neil Jacobs. Have
15 people had a chance to email me that comment that
16 they want included?

17 No. Can we take the next ten -- we've
18 got until four o'clock. Can people please go
19 email it to me? I mean unless it's short, yeah.
20 That's what I was wondering. Could we take the
21 next ten minutes and just let people that want to
22 include a comment, as we talked about, if you can

1 just send it to me.

2 Not comment on the whole letter, Ed.
3 Just there was some very specific things to be
4 included or a quote to be included, and I just
5 was not writing those down. I was hoping people
6 could email them to me.

7 CHAIR SAADE: So how about we do it
8 this way? If you don't send your comments in
9 before you leave, they don't get to be in it,
10 okay?

11 MS. MERSFELDER-LEWIS: So this is
12 Lynne. We've had an issue with people following
13 up after the meetings, and so it's really delayed
14 the letter or just made it not nearly as useful.
15 So if you guys would take a few minutes to give
16 her your one or two comments. It's like, you
17 know, a sentence, two sentences. That's what
18 she's looking for so she could include those.

19 MEMBER DUFFY: So the one item that I
20 sent over, I didn't see that. I saw it in a
21 different way. I didn't know if that was an edit
22 or if I was supposed to still put mine in. I'm

1 happy to do either. Go ahead, okay.

2 VICE CHAIR THOMAS: So that you did see
3 what was mentioned the last time, because some of
4 them were redundant and I said it's already in
5 there. So that's all. Yours is okay.

6 MEMBER DUFFY: My homework is turned
7 in. Thank you.

8 (Pause.)

9 CHAIR SAADE: Thanks Julie. So if
10 there's any more general comments of anybody,
11 kind of the wrap-up of the wrap-up? I'm always a
12 big fan of it's okay to end meetings early, if
13 you've got everything done. So if there's
14 anything else anybody's got that they want to
15 bring up, now's the time. The clock's ticking.

16 Oh yeah. Oh, I'm sorry. My list
17 first. Wait, wait.

18 Thanks, Rich. So I got a couple of
19 things. First of all, I'd like to recognize the
20 fact that the audiovisual folks in the venue was
21 really nice. This worked out great.

22 (Applause.)

1 CHAIR SAADE: And then Lynne and her
2 team did a really good job. That worked out
3 extremely well, and thank you.

4 (Applause.)

5 MS. MERSFELDER-LEWIS: Just a super
6 thanks to Amanda Phelps, Christine Burns, David
7 Ermisch and forever Virginia Dentler, who did
8 everything I couldn't do when I was stuck in bed
9 with a sore neck.

10 (Applause.)

11 CHAIR SAADE: Thank you. Of course a
12 huge thank you once again and recognition of Sean
13 and Michelle for everything from last night, and
14 everything for setting this up, the panels. You
15 all did a super job on the panels, and it's
16 really easy to see that you put a lot of effort
17 into it. Last night, the number of comments that
18 I received in terms of everybody just -- it was a
19 great example of team work. It was a really
20 great example of the camaraderie and the
21 interaction of everybody here within HSRP, and
22 you're home and the way it was all set up really

1 brought all that out. So thanks a lot.

2 (Applause.)

3 MS. MERSFELDER-LEWIS: I have a short
4 list. My short list is I think it worked
5 amazingly well to have a HSRP member/co-chair
6 session with a NOAA subject matter expert, and I
7 just really liked how that worked, both in D.C.
8 and here.

9 MEMBER DUFFY: So I've like worked on
10 my team approach here, and I'd like to leave you
11 with one of those things, and it's real simple
12 and it's that when you're a team, you win and
13 lose as a team. So all the success in the things
14 that we do we all did together. We all have a
15 role in. Something that I do have to say is that
16 Hurricane Katrina was a very hard time for me.

17 I took over. I was the assistant to
18 the president of the Steamship of Louisiana, and
19 the Friday before Hurricane Katrina I was
20 promoted to the president of the Steamship
21 Association of Louisiana. I had a whole lot of
22 happiness and then a whole lot of "holy crap,

1 life will never be the same," including sending
2 my young son away. He had never been away from
3 his dad in his life when he was -- see, he would
4 have been about seven years old at the time.

5 There's a song that is very important
6 to people in New Orleans by U2, the Saints are
7 Coming, and there's a line in it that just says
8 "I cried to my daddy on the telephone." To this
9 day, it chokes me up a lot because my son was
10 crying to come home and I couldn't bring him home
11 because I think it just simply wasn't safe.

12 But the other thing that I want to add
13 is that as you leave New Orleans today, remember
14 to focus on the people you care about, and know
15 that life can change very quickly at times. So
16 part of that team work means looking out for each
17 other. So please travel safe as you go home. I
18 look forward to catching up with you next time,
19 and that the successes of HSRP and NOAA and our
20 government agencies are part of team work, and we
21 win and lose as a team. Thank you.

22 (Applause.)

1 CHAIR SAADE: Thanks a lot, Sean.
2 I've got one other question. When will all the
3 presentations be posted? They're already posted,
4 great, and we all have the link right? The
5 regular link.

6 MS. MERSFELDER-LEWIS: There's an HSRP
7 meetings page that has every meeting and almost
8 every presentation, except sometimes the very
9 last minute change doesn't always get posted.
10 But like when we get the third version from
11 somebody, but the second version might still be
12 up there.

13 CHAIR SAADE: Okay, thanks. Go ahead.

14 MEMBER HALL: As the sole departing
15 member of the Panel, I just I wanted to leave
16 with two things, well three. I've really enjoyed
17 my time and I've really enjoyed seeing the
18 progression of this Panel. Not that it was
19 horrible when I first got here, but it's really
20 kind of a nice, a well-oiled machine and that's
21 thanks to everybody including Lynne for putting
22 up with it and doing it.

1 But really all of us should kind of
2 take a piece of that, because we're part of, like
3 Sean said, the team. One thing I do want to say
4 that might sound more critical than I mean it to
5 is I really want to encourage participation
6 through kind of rotating leadership of the
7 working groups, because I think poor Julie's
8 turning into Joyce, which was kind of doing all
9 of the things and I don't think that's fair.

10 I'm sure Julie enjoys some of it, but
11 I think that there is a responsibility when you
12 get on these Panels to try to, and I know you're
13 trying to, some of the new folks are still trying
14 to learn what this Panel actually is. I think
15 it's really important to just keep the energy up,
16 and I think we can really get and have in the
17 past gotten into just we just do what we do.

18 I think it's really important for
19 things like the Planning and Engagement Working
20 Group, which is so important to the meetings,
21 that you shift and you rotate some of the
22 leadership there. That's not critical of any one

1 person. It's simply because I think you can
2 bring new energy and some new ideas and really
3 help, you know, the priority matrix or the issues
4 or whatever.

5 I think there's a lot of good ideas
6 here, and that's a really great place to take on
7 a leadership role for the committee. So I'd
8 encourage that as you guy want to do that where
9 it makes sense.

10 The second is I'm just going to pat
11 myself on the back for the legacy of the bottom
12 line up front. So thank you for -- I mean that
13 was Day 1. I had just joined the Panel, I had
14 just been sworn in Galveston, Texas, and I said
15 put this bottom line up front.

16 So for four years, you all adapted it,
17 made me usually write them. So somebody else is
18 going to have to take on that role. I did see in
19 the subsidence/sea level rise paper that there is
20 a bottom line up front and I didn't write it. So
21 my job here is done, and if I could drop the mic,
22 I would. So thank you for that. Thanks.

1 CHAIR SAADE: Thanks a lot Kim, and
2 thanks again for all the input, the
3 participation, the writing, everything. It's
4 been really beneficial to the Panel obviously.
5 So we -- yeah. Anybody, anybody? We've done a
6 couple of round robins, but I'm not going to
7 force anybody to speak. So if you're all done.

8 MS. MERSFELDER-LEWIS: I would second
9 Kim's suggestion about rotating leadership. Like
10 we've -- that's a regular thing that has happened
11 in the past and continues to happen. So where
12 you feel like you want to take something on or do
13 something or lose something, you guys can discuss
14 that amongst yourselves, and you can also mention
15 it to me and I'll mention it to whoever.

16 But it's a great -- it's great to have
17 folks who have energy and want to do something.
18 I really appreciate it. Like Ann McIntyre saying
19 she would take on the comments to the OCS
20 Strategic Plan and, you know, other folks saying
21 they would take on -- Gary has very generously
22 offered to do a couple of issue papers and that

1 kind of stuff. Really, yeah.

2 MEMBER PAGE: I'd just like to add I
3 really appreciate Julie stepping up to the plate
4 and taking such a strong leadership role. I'm
5 pretty sure -- I'm sure Ed appreciates that too,
6 since he's juggling a lot of stuff. So you make
7 a great tag team, so I applaud all your energy
8 and tenacity and pushing us, controlling us to be
9 productive. So kudos to you and thank you for
10 doing all that. I appreciate it, as do the rest
11 of us I'm sure.

12 CHAIR SAADE: In the spirit of all
13 this, Julie and I were talking earlier, that you
14 know, I'm reupping for several years, but I don't
15 think it's right for me to be the chairman for
16 multiple years. I think it's really important
17 that we rotate this position. I think it's
18 really important that we bring up other people to
19 be the deputy chairmen or the co-chair.

20 So I think keep that in mind. It's
21 incredibly satisfying, I have to tell you that.
22 It's incredibly educational and again, this

1 meeting topped the last one, which topped the
2 last one before that in terms of things that I
3 learned. So we don't know exactly what days
4 we're all going to start to do the rotate.

5 I'm not leaving the Panel, but I don't
6 think it's right to be the chairman year after
7 year, you know, for many, many years. So that's
8 coming, and we can get into that in the next
9 meeting or two.

10 (Pause.)

11 CHAIR SAADE: All right. Meeting
12 adjourned. Thank you all.

13 (Applause.)

14 (Whereupon, the above-entitled matter
15 went off the record at 3:23 p.m.)

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C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Hydrographic Services Review Panel

Before: NOAA

Date: 08-29-19

Place: New Orleans, LA

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