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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TUESDAY

AUGUST 28, 2018

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The Hydrographic Services Review Panel met at the Elizabeth Peratrovich Conference Hall, 320 W. Willoughby Avenue, Juneau, Alaska, at 9:00 a.m., Joyce Miller, Chair, presiding.

HSRP MEMBERS PRESENT

JOYCE E. MILLER, HSRP Chair

EDWARD J. SAADE, HSRP Vice Chair

DR. LARRY ATKINSON

SEAN M. DUFFY, SR.

LINDSAY GEE

KIM HALL

EDWARD J. KELLY

CAROL LOCKHART

DR. DAVID MAUNE

CAPTAIN ANNE MCINTYRE

CAPTAIN (ret. USCG) ED PAGE

SUSAN SHINGLEDECKER

JULIE THOMAS

GARY THOMPSON

NON-VOTING HSRP MEMBERS

CAPT ANDY ARMSTRONG (ret. NOAA Corps), Co-

Director, NOAA/University of New Hampshire

Joint Hydrographic Center

JULIANA BLACKWELL, Director, National Geodetic

Survey, NOS

RICH EDWING, Director, Center for

Operational Oceanographic Products and

Services, NOS

DR. LARRY MAYER, Co-Director, NOAA/University of

New Hampshire Joint Hydrographic Center

IOOS ADVISORY COMMITTEE MEMBERS PRESENT

VICE ADMIRAL CONRAD C. LAUTENBACHER, Ph.D.,

Chair

TOM GULBRANSEN, Vice Chair

THOMAS B. CURTIN

JENNIFER HAGEN

VAL KLUMP

JUSTIN MANLEY

CHRIS OSTRANDER

LaVERNE RAGSTER

DOUG VANDEMARK

STAFF PRESENT

REAR ADMIRAL TIM GALLAUDET, Ph.D. (ret.

USN), Assistant Secretary of Commerce

for Oceans and Atmosphere, and Acting

Undersecretary of Commerce for Oceans

and Atmosphere, NOAA

REAR ADMIRAL SHEP SMITH, HSRP Designated

Federal Official; Director, Office of

Coast Survey

GLENN BOLEDOVICH, Policy Director, Policy and

Constituent Affairs Division, National

Ocean Service

CAPTAIN RICK BRENNAN, Office of Coast Survey

ASHLEY CHAPPELL, Office of Coast Survey

VIRGINIA DENTLER, Center for Operational

Oceanographic Products and Services

COLBY HARMON, Office of Coast Survey

DR. NICOLE KINSMAN, National Geodetic Survey

CAPT ELIZABETH KRETOVIC, Office of Coast

Survey

LAURA REAR McLAUGHLIN, Center for Operational

Oceanographic Products and Services

LYNNE MERSFELDER-LEWIS, HSRP Coordinator

NEERAJ SARAF, Office of Coast Survey

ALSO PRESENT

LIEUTENANT GOVERNOR BYRON MALLOTT, State

of Alaska

RDML MATTHEW T. BELL, Commander, 17th Coast

Guard District, U.S. Coast Guard

CAPT HANS ANTONSEN, Southeast Pilots

Association (SEPA)

LT BART BUESSELER, Alaska Navigation

Manager, OCS/NOS/NOAA

HEIDI HANSEN, Deputy Commissioner,

Department of Natural Resources,

Alaska

FRANCES LEACH, Director, United Fishermen of

Alaska (UFA)

MOLLY McCAMMON, Executive Director, Alaska

Ocean Observing System (AOOS)

DON MOORE, Decision Support Specialist, National

Weather Service Alaska Region

JACQUELYN R. OVERBECK, Coastal Hazards

Geologist, State of Alaska, Department

of Natural Resources, Division of

Geological and Geophysical Surveys

MARK L. SMITH, CEO Vitus Energy, LLC

ANGIE THROWER, Captain, Allen Marine Tours

CAPT CARL UCHYTIL (USCG, ret.), President

and Juneau Port Director, Alaska

Association of Harbormasters and Port

Administrators (AAPHA)

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

9:04 a.m.

CHAIR MILLER: Would everyone please take their seats? Admiral?

RDML SMITH: Thank you, Joyce. Welcome to the joint session of the HSRP and the IOOS Advisory Committee.

First, before we get started, I'd like to acknowledge that this meeting is being held on the traditional lands of the Haida and Tlingit people and pay my respect to elders, both past and present. The Haida and Tlingit people have always lived on these sacred and wondrous lands and waters of Southeast Alaska as the original occupants and guardians.

Madam Chairwoman.

CHAIR MILLER: Good morning. I'm Joyce Miller, Chair of the NOAA Hydrographic Services Review Panel. It's great to be in Juneau, Alaska, where the blue economy is right out the window.

One item, Nicole LeBoeuf is going to join us later. She is the NOS Acting Assistant Administrator, and she's been delayed by weather but she will be joining us later.

We're thrilled to have a joint session with the IOOS AC, and we will have three opportunities for public comment over the next three days. If you want to sign up, if the public wants to sign up either here in the room or on the webinar, you can submit one in writing and you can do that to either Lynne Mersfelder-Lewis or Virginia Dentler.

I'd also like to remind our panel members today, sometimes we don't follow it very closely, but please always, when you're speaking, for the record, please announce or say your name and whether you're HSRP or IOOS.

Admiral.

RDML SMITH: Good morning, HSRP and IOOS Advisory Committee members. I am the HSRP DFO and Director of the Office of Coast Survey at NOS. I see a really great joint session this morning, coming up this morning, and a real focus on Alaska and the Arctic. The next two days will allow ample time for formal and informal opportunities to discuss topics of neutral interest for both groups and to focus on their own priorities, as well.

A few housekeeping details. The exits are the way we came in and the restrooms are out in the lobby. The NOS and NOAA staff, there are quite a few here, and subject matter experts are at your beck and call this week. You'll see some familiar faces. I do want to just call out the Alaska-based NOAA folks here. Nic Kinsman. Nic, are you here? There's Nic who is the Geodetic Advisory for Alaska. Amy Holman. Amy, are you here? Amy is around somewhere. Most of you probably know her. And Lieutenant Bart Buesseler, the tall guy in uniform there, is the Navigation Manager for Alaska.

Captain Rick Brennan, Jim Crocker, and Liz Kretovic are here from Coast Survey. Colby Harmon from MCD, Laura Rear McLaughlin from CO-OPS, Neeraj Saraf from Coast Survey Development Lab, Jim Rice and Glenn from NOS Policy. And you'll have help from Lynne Mersfelder-Lewis and Virginia Dentler, who are seated behind me.

From IOOS, you have Marnie Brown, Sabra Comet, Kate Culpepper, and Dave Easter on site.

I want to acknowledge the Chair of the IOOS Advisory Committee and former NOAA administrator, Vice Admiral Conrad Lautenbacher, and the DFO, Jessica Snowden. Welcome. And the Director of IOOS, Carl Gouldman, and the eleven IOOS Advisory Committee members. There are bios circulated in advance.

So Nicole LeBoeuf will be joining us later this morning after some weather delays, and she's serving as the Assistant Administrator for the NOS. Dr. Callender, who many of you know, is moving to the Washington Sea Grant.

So in Nicole's absence, Glenn Boledovich has agreed to make a few remarks on behalf of NOS.

Glenn.

MR. BOLEDOVICH: Okay. Good morning, everyone, and welcome. I'm in the cold spot right here. You can see. I have her remarks in front of me, but they're all written in the first person. And since I'm not her, I will not try to struggle my way through those.

So I'm just going to welcome everyone here. This is the first joint meeting, joint session of the Intermediate Ocean Observing System Advisory Committee and the Hydrographic Services Review Panel and long overdue. I've been a supporter of that for many years, and I'm glad to see it happen. There's a lot in common with these programs and the increased communication between not only the programs but their advisory committees I think is an important thing to keep ongoing and to foster going into the future. So I'm very pleased to see that. I'd like to see us maybe do it once again sometime, perhaps in Washington, D.C., where we might be able to make an impact on some national federal decision-makers about the work we're doing together to move things forward.

But it's great to be back here in Alaska. I lived here, actually, for 14 years, ten years in the Aleutian Islands in Unalaska, Dutch Harbor, where I started as a canary rat when I was, like, 20 years old and became a longshoreman and worked on foreign vessels quite a bit in the Bering Sea during the whole transfer of the EEZ to American fishing. I worked at several opportunities there.

I had a wonderful time there. A couple of hernia surgeries later, I thought maybe I'd go back to school, so I moved to Anchorage and got my undergraduate degree at the University of Alaska Anchorage. So it's a thrill and an honor to be back up here. It certainly is where I fostered my interests and commitment to ocean and coastal issues, so it's a pleasure for me to be back up here.

As Admiral Smith noted, our administrator of the Ocean Services recently departed from the head of NOS. He's taking over the Washington State Sea Grant program, so he's on his way traveling across the country right now, I believe. And Nicole LeBoeuf, my boss, the acting head of the Ocean Service, has been in Juneau in the area all weekend and she's a short floatplane away and can't get here. She's been stuck there since yesterday. She was supposed to be here last evening, actually, so she's desperately trying to get back here and join us.

So with that, I think I'll leave it at that. I'm looking forward to an amazing meeting, and I think, Nicole, are you on the phone?

MS. LeBOEUF: I'm on the phone. I don't know if you guys can hear me.

MR. BOLEDOVICH: We can hear you loud and clear. Please, go ahead.

MS. LeBOEUF: Well, Glenn, you did a great job. You've spent a lot more time in Alaska than I have. Good morning, everyone. I am, as Glenn said, a floatplane away from you guys. I'm in Tenakee Springs. Not a bad place to be stranded, but we are stuck in here, as well.

I just wanted to say good morning and I'm sorry I can't be there. I'm looking forward to meeting those of you that I don't know already and seeing some familiar faces. Some of you have, you know, I've met some of you already. Those of you who don't know me, I'm the Deputy Assistant Administrator for the National Ocean Service and will soon be assuming the role of Acting Assistant Administrator for the Ocean Service. As you guys probably have heard, Russell Callender has moved out west to be the director of the Washington Sea Grant program. I know he sends his best to all of you and will be looking forward to getting visitors as soon as he's set up there.

I'm truly looking forward to the joint session and whatever I can participate in. Hopefully, the weather will clear tomorrow and I'll be with you. And I'll just give my best to you all once I get there. I really know how important this meeting is and I thank you all.

RDML SMITH: Thank you, Nicole. We look forward to your arrival, safe arrival, and have a safe trip. We'll see you hopefully later today.

MS. LeBOEUF: Yes, and I'll be on the phone today as much as I can.

RDML SMITH: Great. Thank you. So I would also like to acknowledge a few other individuals who have made time and traveled far to get to this meeting. Is Garrett Boyle, the legislative director for Senator Murkowski, here? Welcome. Thank you. Also from Senator Murkowski's office, Ann Robertson? Great. From the Juneau office of Senator Sullivan and Murkowski, Connie McKenzie? Hi, Connie. Ephraim Froehlich from Governor Walker's office? Is Ephraim here? I think we'll see some of Ephraim later on this week. Janan Evans-Wilent from the Commerce Ocean Subcommittee, welcome.

Have I missed any congressional or state representatives? All right.

Before we go any further, I really need to call out Ed Page. Where did Ed go? Ed is the director of the Alaska Marine Exchange and has served as sort of our local host for logistics and for some of the side events we have. So thank you, Ed, for your insights into Alaska over stories at breakfast this morning and for hosting all three of these meetings.

I also want to thank Anna Branch on your staff. Thanks, Anna, for all the help getting this set up.

For those of you outside of Juneau, there is, the Tourism Bureau would like us to help them with their data collection, as we like others to help us with our data collection. And there are some sort of questionnaires that they've asked us to fill out, so you'll see those around.

Okay. Back to you, Madam Chairwoman.

CHAIR MILLER: Thank you. I'd like to also thank Ed and Anna for all the hard work. This has been quite -- herding cats, I think, is probably the best description. Now I'd like to have the panel members, anyone around the main table, introduce yourselves and, very briefly, the organization you represent and where you're from.

So I'll start. I'm Joyce Miller. I'm retired from University of Hawaii. And Ed?

VICE CHAIR SAADE: Good morning. I'm Ed Saade. I'm the president of Fugro USA. It's really nice to be back in Alaska. I started my career in 1975 working in the Bering Sea and around the Pribilof Islands, and that experience got me going my entire career. So I owe a lot to Alaska, and I'm really glad to be here.

MR. EDWING: Good morning. I'm Richard Edwing, the Director of the Center for Operational Oceanographic Products and Services, or Tides and Currents is a simpler name, out of Silver Springs, Maryland. I'm very pleased to be here in Juneau. I've been to many other parts of Alaska but never quite made it to the panhandle, so it's good to be here.

MS. BLACKWELL: Good morning. I'm Juliana Blackwell. I'm the Director of NOAA's National Geodetic Survey, or NGS, and I'm happy to be here. I've seen to Alaska a few times, but this is my first experience in Juneau so looking forward to getting to know more about the place. Thank you.

RDML BELL: Hi, good morning. Matt Bell. I'm the District Commander here for the 17th Coast Guard District right here in Juneau, responsible for all Coast Guard actions in and around the state of Alaska, Bering Sea, Gulf of Alaska, Western Pacific, and that new ocean opening up, the Arctic.

MR. GULBRANSEN: Good morning. Thanks for having us. Tom Gulbransen from Battelle, one of the data scientists in our environmental group, co-chair of the IOOS Federal Advisory Committee, and haven't been up here since '89 and '91, so I'm glad to be back under better circumstances.

MS. HAGEN: Good morning. Can you hear me? Am I coming through? Okay. Jennifer Hagen. I'm with the Quileute Tribe located in the Coast of Washington, IOOS Committee member. And the last time I was in Alaska was in a capacity working for NOAA on damage assessment of the Exxon Valdez.

MS. KLUMP: Val Klump. I'm the Dean of the School of Freshwater Sciences, University of Wisconsin Milwaukee. We sit on 20 percent of the world's surface freshwater, second largest coastline in the United States. My first trip to Alaska and I'm really glad to be here.

MR. McDONALD: I'm Tony McDonald. I'm the Director of the Urban Coast Institute at Monmouth University, and we're located in Bruce Springsteen country at the beautiful New Jersey Shore.

MR. MANLEY: My name is Justin Manley. I run an independent consultancy called Just Innovation focused on maritime robotics, ocean tech, innovation and disruption. And I am from the Boston area.

MR. OSTRANDER: Good morning. My name is Chris Ostrander, formerly the Director of the Pacific Islands Ocean Observing System and recently moved to University of Utah as Assistance Vice President for Research.

MS. RAGSTER: Good morning. My name is LaVerne Ragster. I'm a retired professor of marine biology and President Emerita at the University of the Virgin Islands. I'm a member of the CariCOOS Stakeholder Council, and this is my third or fourth trip to Alaska, second time to Juneau, and every time I think this place is so much like the Caribbean.

MR. VANDEMARK: I don't know what to say to that. I'm Doug Vandemark. I'm a professor at the University of New Hampshire.

MEMBER GEE: Lindsay Gee. I'm the Mapping and Science Coordinator at the Ocean Exploration Trust, the operators of the Exploration Vessel Nautilus.

MEMBER HALL: Hi. I'm a little disadvantaged here at the corner of the table. My name is Kim Hall. I'm the principal and founder of a small consultants firm called Brizo Maritime Consulting where I concentrate on maritime security and nautical operations.

And just to take one moment, I did get Ed Page a couple of gifts, including the movie "Rookie of the Year," since this is his first year on the Committee and he got to put this meeting together. And then a little sign that says "You don't have to be crazy to work here. We'll train you." So welcome aboard, Ed, and thanks for putting this meeting together.

MEMBER SHINGLEDECKER: I'm Susan Shingledecker. I am Vice President of Chesapeake Conservancy, a regional non-profit based in Annapolis, Maryland. And before that, I spent 12 years with BoatUS, the Boat Owners' Association of the United States.

MR. THOMPSON. Good morning. My name is Gary Thompson. I'm with the North Carolina Emergency Management. I'm the Director of the North Carolina Geodetic Survey.

MEMBER LOCKHART: Good morning. I'm Carol Lockhart, owner and hydrographer with Geomatics Data Solutions based in Portland, Oregon.

MEMBER ATKINSON: Good morning. I'm Larry Atkinson from Old Dominion University in Norfolk, Virginia.

MEMBER MCINTYRE: Good morning. Anne McIntyre. I'm a pilot on the Columbia River and a heavy user of NOAA products and spent the formative years of my career hauling oil between Valdez, Nikiski, and Anchorage.

MEMBER KELLY: Good morning. Ed Kelly. I'm the Executive Director of the Maritime Association of the Port of New York and New Jersey. We are a marine exchange, as well as a trade association and advocate for commercial deep sea marine operations.

MEMBER DUFFY: Good morning. I'm Sean Duffy, Executive Director of the Big River Coalition, a maritime trade association based in New Orleans on the Mighty Mississippi River.

MEMBER MAUNE: Good morning. I'm Dave Maune from Dewberry Engineers in Fairfax, Virginia. This is my 15th trip to Alaska because I am managing the IfSAR mapping statewide for Alaska. I also managed the GPS survey of the elevation of Denali several years ago, 20,310 feet. And I also managed the expedition the following year to take ground-penetrating radar up to the top of the mountain to determine the depth of the ice and snow, 6.1 meters.

MEMBER THOMAS: Juliana Thomas. I am a program manager in PI for a program, a waves program, called CDIP and also an advisor for the Southern California Coastal Observing System, that's SCCOOS, one of the regional associations for IOOS, and I used to be director for nine years of SCCOOS. So it's really exciting to have a joint meeting.

MEMBER PAGE: I'm Ed Page, the Executive Director of Marine Exchange of Alaska. My part-time job is saving damsels in distress, as I did yesterday. I had the good fortune, the United States Coast Guard sent me here in 1973, after sailing on the East Coast and Boston. I was forced to bring a ship around and start sailing Alaska patrols and fell in love with Alaska. After thirty years with the Coast Guard. I retired 17 years ago and started this Marine Exchange of Alaska because I love this area so much. So thank you for coming and visiting our neighborhood.

CAPT ARMSTRONG: Good morning. I'm Andy Armstrong. I'm the NOAA Co-Director of the NOAA University of New Hampshire/Joint Hydrographic Center in Durham, New Hampshire.

DR. MAYER: Hello. I'm Larry Mayer. I am the UNH Co-Director of the Joint Hydrographic Center and Director of the Center for Coastal and Ocean Mapping at the University of New Hampshire. And it's actually a real pleasure for me to be this far south at this time of year in Alaska. For the last 15 years, I've either been on the Healy or the Oden somewhere way, way, way up there. So it's nice to see summer in Alaska.

MS. SNOWDEN: I think I've already been introduced. Jessica Snowden, Designated Federal Official for the IOOS Advisory Committee and very happy to be here.

MR. GOULDMAN: Carl Gouldman, Director for the IOOS program, which is organizationally placed in the National Ocean Service within NOAA, but we're supposed to represent all the federal agencies who have interests in coastal ocean observing in the U.S. head of tide to EEZ and really glad to be here today in Alaska for my third time, first time to Juneau. And I'm really happy we have the two committees meeting together.

VADM LAUTENBACHER: Conrad Lautenbacher. Retired Naval officer and a Pacific sailor, I might add, so it's always a pleasure to be in this part of the world. I represent GeoOptics, which is a satellite company, a small satellite company. Hopefully, we're going to do things to observe the oceans. And as a former head of NOAA, I am really delighted to see so many people in one place thinking about the oceans. So thank you all for coming. This is the largest group I've seen together. Oceans, as you know, people are very fragmented. That's the way it works. But today we have a huge number of people here all working on the same cause. Thank you.

RDML SMITH: Thank you all for introductions. I'd like to bounce the microphone right back to Admiral Lautenbacher to offer some remarks.

VADM LAUTENBACHER: By golly, that was my speech, so I guess you heard it already. No, it's indeed a great honor and a pleasure to be here, as this being sort of a new experience to have the number of people here and the groups together that do different things but all part of a big picture to help provide the kind of conservation and usage of our oceans that will give us the future for our children and whatever happens beyond when we are here. So thank you all for coming and doing this.

Representing the Integrated Ocean Observing System group, let me put you in the situation here. That's a -- well, this has been going for four or five years, six years, something like that. And the rules are set up so that everybody changes position. It's not staggered. So what we have here is the last meeting of the current group of people who are on this panel, so, out of the number of people that are on the panel now, ten of them will be replaced and there will be four people that are still onboard. So it's really kind of a turnover. It's our graduation, so to speak, for a number of people that are sitting at the tables around this room. And I know, having worked with them for the last four years or so, they're a fabulous bunch of people and they've done a wonderful job working on the Integrated Ocean Observing System.

I would like to also say that these people are not going to go back and forget about the ocean when they leave here, I can assure you that. They all are dedicated to what goes on and they're going to be great supporters, and hopefully the more people that cycle through these advisory committees the more audience and cheerleaders we develop in the public and the private sectors to help build an understanding of what we need to do to save our oceans and to make them even more valuable in the future.

I've enjoyed every moment of this, myself as being part of it. And I've appreciated all the support we've had from the folks that are coming along.

I think that we have a great deal to do today with the joint meeting in terms of looking at the issues that cross everyone's, you know, venues at this point and looking at putting it together. It is, after all, you've heard, many of you have heard my mantra before, the Earth is a system of systems. You're dealing with system of systems. You have to put the pieces together. You can't do the ocean without the atmosphere. You can't do the atmosphere without the ocean. You can't forget the physical and the chemical and the biological. They all work together. Sometimes the biological part is the hardest part to deal with because the changes happen most quickly in that region than they do with changing the salinity and the amount of carbon dioxide in the air.

So there's a great deal of joint work to be done, and that's another reason why I'm glad to see so many people here with different aspects of understanding of our environment and working on the same cause. So I look forward to a very profitable and enlightening discussion and hopefully reports that come out from this that will influence where we go in the future. Thank you.

RDML SMITH: Thank you, Admiral. Carl Gouldman, do you have some remarks to share?

MR. GOULDMAN: I do. Thank you, Shep. I have a few things to say. I've got one announcement to make that I'll give a little bit of lead-in. But first off, thank you for all of the people that made the efforts to put this whole meeting together to bring the two committees together, the team of folks that have been doing this have been going through a lot of motions to get everyone here, and I'm happy for everyone to have traveled this far to be together. And I really appreciate through the years the advice that we get from the Advisory Committee for IOOS, but the HSRP is a key advisory group to NOAA, as well, and HSRP services are part of IOOS and a fundamental component. And we don't have a lot of overlap, and I've never been able to be a part of an HSRP meeting together.

When I say not a lot of overlap, we have a lot of overlap in mission interest and expertise areas. We don't have enough resources to have actual duplication going on, and we have a lot of specialty capabilities that we try to bring together under both committees. And I'm really happy to have folks together for those reasons.

Within IOOS, the network of eleven IOOS regions is non-federal and it's mandated to bring non-federal data into common standards into this federal system. And the announcement I have to make, I've got to read this to make sure I get my history correct here, but in 2009 when the IOOS Act was signed into law it contained a provision to verify that all U.S. IOOS regional associations were gathering and managing data in compliance with NOAA standards, essentially to get NOAA's blessing on non-federal ocean observations. The IOOS construct fundamentally relies upon a federated data structure that brings regional and local expertise together into a national system while meeting the highest-priority regional needs.

Certification would mean that these non-federal pillars of IOOS were gathering and managing data in ways that meet NOAA standards and it would extend liability coverage to the use of RA data. IOOS is ultimately a network of partnerships, and certification strengthens the partnerships between the interagency and regional components of IOOS by showing national confidence in non-federal networks and by demonstrating the commitment of the regional associations by meeting and documenting compliance with national standards.

So we certified the first regional association PAC IOOS in 2015. And today, after a lot of hard work by a lot of people, I'm so happy to tell you that NOAA has certified our eleventh and final regional association, CENCOOS. That's Central and Northern California, and it's a remarkable achievement to have all eleven of the eleven regions certified. And I hope you'll join me in congratulating them on this important milestone. Thank you.

And so, for me, it's fun to see Chris Ostrander who's now at Utah across the room and he kicked off the first region getting certified and to have Julie here as part of the HSRP and she worked on the SCCOOS work getting done. And we've got folks in the audience, Molly McCammon from Alaska and Ru Morrison from the Northeast, and it's great to see this network coming together and it's a real evolution from the beginning of IOOS to a place where we're really getting things done together and working together in this federal/non-federal partnership. Thank you.

RDML SMITH: Thank you, Carl. And congratulations on the certification program. I think that's a really exciting step forward for not only the IOOS program but for sort of observations and services in general and really leading the world in a new approach. So congratulations.

We're now to the point of recognizing our guest who we've left sitting up there all by himself as we've done introductions. I do want to introduce the D-17 Commander, Rear Admiral Matt Bell, who just arrived here in D-17, although he's a veteran of Alaska. I first met Admiral Bell when we were jointly sponsoring the Coast Guard and NOAA Corps officer training class at the Coast Guard Academy. So we spent a few times there.

He's a really inspirational leader for the Coast Guard and for young officers, and I want to thank him here in this context for your leadership for the coming generation of NOAA Corps officers, as well. So Admiral Bell has some thoughts to offer on the Coast Guard's perspective on operations in Alaska. Admiral Bell.

RDML BELL: Great. Thanks, Shep. So just a quick introduction. So everybody is talking about their Alaska history, so I don't think I'd go back as far as Ed Page so mid-80s. I don't want to give a specific date because that makes me really old. Thanks, Ed. But back and forth to Alaska since the mid-80s doing Bering Sea fishery, search and rescue, Gulf of Alaska, IUU/HSDN enforcement on the Western Pacific, and been probably 18 or 19 different ALPATs, our Alaska patrols for cutters out of Hawaii, Alameda, and then two ship's CO jobs in Kodiak. So my wife and I call Kodiak home, so it's nice for us to be back in the state. Been doing about 33 and a half years of service in the Coast Guard.

By education, I'm a chemist. So groundwater, trace metal analysis, graphite instrumentation from Flagstaff and Northern Arizona University. But I'm a sailor, as best as you can be at. Sailed everywhere except the Indian Ocean, I think, on a Coast Guard cutter. So East Coast, West Coast, but most of my big ship time is here, have been spent in Alaska. And for Nancy and I, we're happy to be back in Alaska. So, you know, we talked about everybody here talking about oceans, but the fact that you're in Alaska and a lot of you are going to talk about Alaska, I'm good.

So we're excited to be here. There are three orders from me, so anybody you meet it's three orders from me. I'm never leaving Alaska. They're going to have to either promote me or kick me out.

So for those of you who are interested, so Cutter Healy is in Alaska waters. Today they're in Dutch Harbor. Today, I think they're going to get underway, if not today tomorrow, heading to Seward. Then they'll pick up the next round of scientists for phase two and then head back up to the Arctic.

So good morning, distinguished panel members, good friends, and critical partners. Welcome back to Alaska for those of you visiting. And for many of those who are first time, welcome to sunny Juneau. Liquid sunshine, that's what we call it here. That's my attempt at humor, and Nancy says work on that.

So a disclaimer up-front. So Dave Seris works in my District 17 DPW shop, so the Waterways Management folks, so he's the expert behind most of these thoughts and comments. So if there's any really difficult questions, Dave, you can come up here and sit with me so I'm not all by myself.

So much has changed in Alaska since I think you were here last in 2012. Outer continental shelf drilling in the Arctic has come and gone and obviously may come back again. The 1,070-passenger cruise ship, Crystal Serenity, has transited the Canadian Northwest Passage twice, 2016 and 2017.

A widened Panama Canal has brought newer, larger cruise ships to Alaska and the West Coast. This summer, we saw our first of these ships, the Norwegian Bliss, which is actually tied up right out here today, with a crew of nearly 2,000 and a capacity for more than 4,000 guests.

Nome will see five cruise ships this summer. Twelve are scheduled for next summer and even more are coming to the state in the coming years.

Terrestrial-based GPS is on its way out, and nationwide AIS is coming online, has the capability to change the way the government delivers navigation services to the mariners. Alaska, of course, is the exception that proves the rule. Here we partnered with Alaska Marine Exchange -- thank you, Ed -- and their network of terrestrial-based AIS sites. You'll learn all about that this week, I believe.

I'd like to start by pointing out the partnership between the Coast Guard and NOAA as one of the most important ones that our far-reaching service has. In the few short months I've been here, I've already had the pleasure of meeting with Deputy Undersecretary Friedman, as well as Deputy General Counsels Jeff Dillen and Kristen Gustafson. This is a testament to the importance that we both place on this vital relationship.

I'd also like to point out the great work that Admiral Shep Smith does in taking care of us here in Alaska. One of the most impressive things he does is manages NOAA's Office of Coast Surveys Officer Corps to ensure that there's always someone in the ranks who has a deep understanding of Alaska's unique maritime environment and economy.

Those individuals, maybe here in Alaska, or working at Sand Point or in Silver Springs. But they are always available and ready to work with our staff here in Juneau when we see emerging trends that require a response.

Next slide, please. I'm a simple sailor, so the best way I can think to give you the Coast Guard's perspective on matters is to give you a sail story or two. The 98-foot Fishing Vessel Destination disappeared on February 11th in 2017, with her crew of six missing. The ensuing search found no survivors. This is the kind of case that isn't supposed to happen anymore in the rationalized fishing industry where the pressure to be on the grounds regardless of the weather is no longer there.

The Coast Guard's Marine Board's inquiry of this sinking is not yet complete, so I cannot share its findings, but I can tell you a bit about the investigation. Our first clue came in the form of AIS transmissions from the Marine Exchange in Alaska's terrestrial AIS sites. It gave us some indicators of what was happening in the moments prior to the vessel sinking. The fact that this was a terrestrial AIS site is very important. It means that the Destination's AIS data is refreshing every couple of seconds, vice every hour or even longer if we had to wait on our satellite AIS data. It also meant we had a place to look for the vessel.

Our casualty investigators reached out to NOAA for support. And after an unsuccessful search by the Oscar Dyson, the Coast Survey Ship Fairweather located not only the vessel but also some of the nearby crab pots. This allowed further investigation by our medium icebreaker the Healy and a Coast Guard dive team that used ROVs to obtain imagery of the vessel and even recover some of those pots. As it turns out, some of these pots were heavier than people thought and brought into question some of the entering assumptions that are a foundation of stability calculations for this fleet.

Since then, we've been able to focus our efforts on prevention and actually sent teams out to the field to weigh individual crab pots and ensure that the stability letters were correct. Without those capabilities the NOAA Coast Guard Survey brings to the table, we never would have found this vessel and none of this would have been possible.

Next slide, please. You probably remember reading about this grounding from July 2nd in 2015. Fennica was part of Shell's exploratory drilling fleet. The ship played a key role in Shell's operation, as this is the vessel that would have been used to place the capping stack in the event of a loss of well control. It had to sail back to Seattle for repairs as the clock was ticking on an already short drilling season. Fennica was getting underway from Dutch Harbor via Hog Island Channel and grounded on an unchartered shoal. We figured this out pretty quickly since the survey ship Fairweather was already in Dutch Harbor on a mid-patrol break and was able to investigate immediately.

Now, I can tell you, as an Alaska sailor, Dutch Harbor, home away from home for most of us, thought that an unchartered shoal could go unnoticed for such a long period of time with this much traffic was a bit disconcerting. While not a direct cause, the rate at which things are changing in Alaska and the Arctic sets the stage for this kind of casualty. New activity on the outer continental shelf after decades of dormancy brought new types of vessels to Alaska, larger vessels and some with deeper drafts than have historically been used in our waterways. The addition of Shell's 29 vessels put the Dutch Harbor close to or over its capacity. So you can see ships anchoring in new locations are taking different routes to avoid congestion.

Hog Island Channel, where this grounding occurred, is frequently used, just not by vessels that draw up 26 feet. Ironically, this new use of Hog Island Channel was being driven by activity occurring more than a 1,000 miles away. I ask you to keep this in mind as you provide input to NOAA on how best to prepare for potential changes in the Arctic and the rest of Alaska.

Next slide, please. Here's my final sea story for the day, at least formally in this presentation. Champion Ebony is a 599-foot tank vessel that grounded on an unchartered shoal on June 24th in 2016 near Nunivak Island. At the time of the grounding, it was carrying 14 million gallons of petroleum product. Within a few hours, the vessel refloated and no oil was spilled. There was a lot of things that went right in that case that gave us the positive outcomes. The master of the vessel was operating with caution, traveling at only four knots, and on a rising tide. Winds were calm, and seas were only three feet. That is not always the case up here. Let me say that again: that's not always the case up here in Alaska.

Ironically, the area where this grounding occurred was due to be surveyed later this summer. There's a lot of work to be done in the state, but investing in Alaska does pay off. This was another instance where the rapid pace of change in Alaska set the stage for what could have been a catastrophic marine casualty.

When you last came to visit in 2012, this kind of ship wasn't even found here. There's always been some offshore lightering activity that supports distant water fishing fleets operating in the Russian waters, but the use of tank vessels as part of a fuel distribution logistics chain in Western Alaska didn't happen on any large scale prior to 2012.

This slide shows a year-to-year comparison of tank vessel activity in Alaska from 2014 to 2015. Note the dramatic expansion in 2015 when Shell's fleet shows up for exploratory drilling. Also note the change in just one year in terms of the new location these vessels are going to.

Next slide, please. In Alaska, partnerships are important, and I would much rather spend time preventing those casualties than respond to them.

The final thing I'd like to share with you is the tremendous amount of support that was provided by NOAA as the Coast Guard moved out with our Port Access Route Study for the Bering Strait. Nearly a decade in the making, ship-routing measures in the form of two-way routes in areas to be avoided have been approved at the IMO and will go into effect this coming December. It goes without saying that if the U.S. government is going to tell ships where they ought to go in the Arctic, we need to make sure that the water is deep enough.

Coast Survey ships made multiple transits of our proposed 700-mile long, four-mile wide shipping routes to ensure they were indeed free of dangers to navigation. Coast Survey staff in Silver Springs devoted countless hours to expedite the processing of this data so we could keep the project on track.

This summer, the Fairweather is taking a look at the final leg of the system which was proposed at the last minute by the Russian Federation as part of a joint proposal of the IMO. I look forward to continuing this kind of partnership as we expand these efforts in the Chukchi and Beaufort Seas.

Next slide. I think that's all I have. So I'd be more than happy to entertain any questions or suggestions or recommendations that you have, and I'll be here for much of the morning and also be returning on Thursday and Dave will be here for the rest of the week, so we can always entertain.

So with that, Shep, I'll turn it back over to you. Thanks.

RDML SMITH: Thank you, Admiral. I think we do, we are running a little early, so if we have any questions or thoughts for Admiral Bell while we have him, we can entertain those.

RDML BELL: I can't believe we're early. Ed, a sea story or two? I mean, come on. There I was, a dark and stormy night, right? So just a little bit about my background. It's a really scary thought. So I started here in the mid-80s, and so I was on the Coast Guard Cutter Rush about 36 hours after the Exxon Valdez grounded there, so I spent 90-plus days in Prince William Sound post-accident. I was onboard the Alex Haley when the Selendang Ayu ran out of power, so I was involved in that search and rescue effort after our helicopter crashed. I can provide you some, I'll call it just horrifying stories about what it means to leave your rescue swimmer on a ship that breaks in half in 40-foot seas and 90 knot winds.

I was down in the PAC Area staff when the Kulluk came untethered and drifted ashore here just a few years back. And so it seems I kind of follow around with those. At least I don't go back as far back as 1964. And I say that because there's two things that concern me most about the District Commander here in Alaska is what happens when the next big thing, whether that's a quake or seismic or a tsunami or volcanic action occurs in Alaska. How are we going to respond? And that's the partnership that NOAA and I would have, talking about how do you reopen any one of those channels or access points to the state.

And then, of course, many of our passengers, you know, we're expecting a million-plus next year as they're coming in and out of Alaska, if one of those ships catches on fire or grounds, those are going to be bad days for not only the state of Alaska but for the people involved but for the responders, as well. And those are things I kind of worry about the most and you try to get out there and be preventive as much as you can, and that, again, requires how much visibility do you have not only in the environment but what's on the bottom.

Yes, sir?

MR. GULBRANSEN: Sir, thank you very much for the information. In the Integrated Ocean Observing Systems world and in the ecological data observations world, we find ourselves having to spend a fair amount of time on workforce development and getting more people aware of and empowered to take on. How is that in the world of response and preventiveness in your area? Do you feel that you have adequate feed through the university systems and through the developmental programs, or is it something that we could both learn from together on how to increase the next generation of leaders?

RDML BELL: So that's a great question. My first initial response to you, it's really hard. Just from my perspective, at least from a Coast Guard perspective on where we are at in relationship to the big organization headquarters in D.C., that's a long, long, long way, and they're four time zones part. And so when you start looking at the tyranny of distance, the actual number of people that live in Alaska is, you know, three-quarters of a million people here, not as many as in the city of New York. So that level of attention becomes hard, yet anything that occurs in Alaska is going to be big. I mean, that's just the nature of the business. You can look at the accidents that have happened, look at the interactions.

But I would say that the partnerships that we have out there are pretty intense. So we have a great working relationship with the universities in Alaska, Church Kee, part of that ADAC, Arctic Demand Awareness Center, the DHS Center of Excellence there at the University of Anchorage. We've got a good working relationship. We talk on a regular time. I'm actually scheduled to go up to the University of Fairbanks here in a couple of weeks.

Improving that dialogue, discussion, is required. We have numerous exercises throughout the year that not only have the responders, the state folks, the village, tribal connections are attending that, but a lot of the education networks are already plugged in to that trying to help inform not only the decisions that we're making but to form that way ahead as it progresses.

Is it enough? Are there enough people planning? I'd say certainly not. I mean, it kind of gets back into the, you know, the more maritime domain awareness that you have, the better off that you'll be. But I don't think we'll ever have as much information as we want, especially when you look at the complexities of the systems that are there now, whether that's ocean systems or atmospheric conditions that exist today, but they're changing so rapidly in the future, how well we're going to be able to predict those is going to be very, very difficult, especially the further north you work the less observations that we've had in the past.

MEMBER MAUNE: So my name is Dave Maune, over here straight across from you. With all the traffic in the Arctic in the years ahead, I'd like to hear your opinion of the need for a Port of Refuge when ship runs into trouble up there.

RDML BELL: Yes. So a Port of Refuge is always, I mean, from a sailor's perspective, I'm a square-rigger sailor, did that for years. So when you ask for a Port of Refuge, most of those sailors will want to know where those are at. If you go north of the Aleutian chain, there isn't one, you know. Nome has probably, you know, some type of protected access, but it's very limited, especially for deep draft and any of the longer vessels. Outside of that, there is no Port of Refuge. The best you're going to be able to be hope for is find, you know, a lee side of one of the islands out there and be able to go there. But that in itself isn't going to provide very much refuge, especially if you're going to have to make repairs.

I go back to my time on Alex Haley when we dealt with the Selendang Ayu. I mean, they're at sea, you know, going to make a repair and weren't able to affect the repair before the big storm came up and literally washed them up on the rocks. And the intensity of that storm prevented them from even arresting the ship's movement at anchor.

So when you start talking about approaches to that lee shore, there isn't one that exists in Alaska. Should there be one? I'd say yes. What's the investment and the level of support that's going to have to do that? That's going to be, that's going to be the interesting challenging question, at least not only for the state but industry, as well, on where would you put that and what would be the best avenue to make that happen sometime in the short term.

MEMBER MAUNE: Thank you.

RDML BELL: Ed?

MEMBER KELLY: I'm Ed Kelly, Maritime Association from Port of New York and New Jersey. In light of the increasing geopolitical importance of the whole Arctic region, is Coast Guard adequately supplied with the proper fleet to manage their responsibilities for operation up there? I have a particular concern with ice-breaking vessels.

RDML BELL: No.

MEMBER KELLY: Thank you. I thought so.

RDML BELL: So absolutely right. That's a spot-on observation. So our Commandant, Admiral Karl Schultz, has now gone on record saying his strategy is 6-3-1. So he's looking for a program of record of six polar icebreakers, call them polar security cutters. It kind of gets you focused back on a national security type effort for that particular fleet. The three means he wants at least three of those to be heavy, and he needs one now. You know, we're on a shoestring, call it that. So Polar Star is one of one, a heavy icebreaker that can do that mission going south to McMurdo, and Cutter Healy, our medium endurance -- or our medium-capability icebreaker is the only one we have doing work in the Arctic right now. Both of those are needing recap, and he's gone on record saying we're doing that. There's some great support right now on getting those authorized and working through the appropriations. He's still got some work to do for that.

Sir?

MR. MANLEY: Sir, Justin Manley from the IOOS side. You used the term maritime domain awareness, right? And that's sort of what IOOS is all about. Fleets and icebreakers is a great transition. You mentioned, for example, terrestrial AIS. You told us a lot about the demand for services. Any sort of highlight stories of how some of the innovative approaches, whether it's high-frequency radar or better models, can you give us any examples or insight as to how sort of new tools and approaches are helping you do your job in this large domain that you're overseeing?

RDML BELL: So great question. So new tools. I mean, the terrestrial AIS that we've had, we've got a great information exchange. I mean, we use the Alaska Marine Exchange information to help us feed our information system. You know, ironically, and Ed could give you the real specific details, Southeast Alaska, South Central Aleutian chain, I'm doing pretty good on information that's available from those terrestrial positions. But when I start working north of Dillingham up the western coast of Alaska to the North Shore, I don't want to say I've got nothing but it's really far and few between so very limited access there.

They're still trying to continue to improve their footprint and that's an outreach that they're doing. We'll take advantage of those connections.

From a Coast Guard perspective, when we start doing operations out of Kotzebue, so we put two helicopters up there seasonally to deal with mostly the subsistence hunting, commercial fishing in and around the small villages there, our ability to communicate with them is limited so there aren't a lot of VHF, you know, towers, if you will. We established one up at Utqiagvik in summertime but, beyond that, we've got no capabilities there.

We're looking at putting up a couple of CubeSats here later in November. We're going to try to test a couple of different mechanisms, systems, to be able to communicate with folks on the water and in the air.

That's new and challenging if we can put up a whole bunch of those. But as soon as you start adding up the price tag up for each of those and looking at the rocket shoots, to put something in polar orbit is very, very expensive for a Coast Guard budget. It would be great to say, "hey, we've put up a lot," but, from a reality standpoint, that's likely not going to happen. Partnering with other folks and trying to take advantage of those systems will be the key moving forward.

RDML SMITH: Thank you, Admiral Bell. It's been a great discussion. I do want to acknowledge that Admiral Gallaudet, NOAA's Acting Administrator, has just arrived.

And so, welcome, Admiral Gallaudet. We've been talking about you already quite a bit this morning, Blue Economy and that sort of thing. And Admiral Gallaudet will be offering remarks to the HSRP tomorrow morning. So, welcome.

RDML GALLAUDET: Yes. Thank you.

RDML SMITH: The Lieutenant Governor is our next speaker, and he will be arriving soon. I do not think he's here, right? And we do have another acknowledgment from Senator Murkowski and Senator Sullivan that we can cue up by video while we're waiting.

(Video played.)

RDML SMITH: Thank you, Senator Murkowski and to Senator Murkowski's staff, for getting us a really great supportive video for us.

I do want to welcome Lieutenant Governor Byron Mallott. And Heidi Hansen. Is Heidi here, as well? And to welcome you to our joint panel this morning. The HSRP and IOOS advisory committees are thrilled you could join us.

The goal of the meeting this week and the reason we're here in Juneau is to ensure that the recommendations of these two federal advisory committees reflect the concerns of all Alaskans. Having elected officials, representatives, and state officials here is a tremendous opportunity to help us realize that goal. So, thank you.

So, without further delay, I'm pleased to introduce Lieutenant Byron Mallott and Deputy Commissioner Heidi Hansen. As an Alaskan native and clan leader, Lieutenant Governor Mallott has a long history of leadership that began as a young mayor of Yakutat and has continued with his service to every Alaska governor since it became a state in 1959. In addition to overseeing elections and advising on fisheries, he's the lead on issues such as transboundary waters and climate change, and these topics are key issues for NOAA, as well.

We're also very pleased to have Deputy Commissioner Hansen here. NOS has an incredibly strong relationship with the Department of Natural Resources that touches on all the topics we're discussing here this week.

So, without any further ado, I'd like to turn the floor over to Lieutenant Governor Byron Mallott.

(Applause.)

LT. GOV. MALLOTT: Thank you very much for being in Alaska. As I understand it, it's been a while since this review panel has met formally in our state, and for that meeting now we thank you.

This must be a tough crowd. Typically, even with a video, the Senator gets applause in Alaska. I was like, whoa, what am I walking into here? Certainly, Senator Murkowski and our delegation are in constant touch with the Department and with NOAA. The work that you do in all of your various agencies and institutions are hugely important to our state.

I want to reflect just for a moment. I went to boarding school in Sitka at a time when Alaska's villages did not have high schools. And a lot of us literally grew up in boarding schools. And I remember as a senior two friends of mine from Sitka, Alaska native young men -- I can't recall the names of the vessels. I think there were two that they were old wooden vessels, beautiful. At the time, I called them ships. They were big vessels relative to those that typically served our state, other than the visitors who came through, Navy and Coast Guard. And Coast Guard, of course, was here all of the time, and its work is incredibly important to our state and to our nation.

But there were two small ships, wooden. And these two young Alaska native kids, we called ourselves kids then, said we're going to work on those boats, on those ships. And they were so excited. They were hydrographic vessels. They were surveyors. They were constantly moving around our state charting our waters. And this was at a time when not a lot of Alaska natives worked for government. And for some reason, that image just sticks in my mind. It was a sign of hope. It was a sign of opportunity and service. That was so important, and it made an impression upon me.

And I recall those same vessels coming into my small village of Yakutat as they steadily went about their work charting our waters. And by their very presence, in addition to the Coast Guard being a beacon of service and meeting need, that was so important to our communities' futures and the future of our state and, of course, the future of our nation.

And they were there also when emergency needs were present assisting vessels, assisting communities. I remember a NOAA vessel in Icy Bay north of Yakutat. I think some of you know where Yakutat is. It's a pretty remote place in the Gulf of Alaska and a port of refuge, as is the small bay, Icy Bay. And there was a NOAA research vessel anchored.

And I was 18 years old and the skipper of a small cannery tender and we went into Icy Bay to anchor because a storm was coming. And that night, a tugboat out front was in danger of sinking, and the weather was horrific and that NOAA vessel pulled its anchor and headed out to assist that tug. And the Coast Guard flew up from Annette, at the time it was the only major Coast Guard base in Alaska, and dropped a pump right on their deck, and the NOAA vessel escorted that tug to safe waters.

I mention those things because what NOAA and its services and responsibilities do in our state is, in addition to all that you do to meet your responsibilities, as Senator Murkowski briefly outlined and much more, and all of those things in which the State of Alaska are in contact with you about, and will continue to emphasize and accelerate because of the importance of an Arctic becoming more and more ice-free, and ultimately completely ice-free at least as far as navigation is concerned.

In addition to all of those things, everything we do as government affects people's lives, affects people's attitudes, affects people's spirit, affects a sense of community, a sense of being connected, a sense that by the services you render and the obligations you meet on behalf of a federal government and agencies whose funding and responsibilities and infrastructure and obligations are clear and designed to meet the needs of our country and the places that you bring those services and meet those obligations.

Particularly, in Alaska, in my judgment, you affect people's lives in intimate ways, both by what you've done in the past, by what you do now, and what you will do in the future to make the seas, our river systems, our ports, our coasts safe and navigable. And with the security and knowledge that allows not just commerce to flourish but that allows everyday people to go about their lives with a sense that there are those who are here and we see on the horizon or we see in our ports or we hear in the news that are helping our lives to be better.

And with all that you do and with all the demands that are made upon you and those who give advice and counsel to leadership, I found, in all of my life, that what is most important is that we palpably feel and acknowledge and understand the consequences, the impacts, that what we do, of what we do, inform and ultimately make people's lives better.

You deal with science. You deal with research. You deal with service. You deal with meeting safety. You deal with looking over the horizons to meet obligations that are hugely important. But at the end of the day, you serve people. And I, for one, who grew up in a place where that service was critical to our lives, thank you so much for meeting your responsibilities and your obligations.

Welcome to Alaska. I wish you, as the Governor does, a very successful meeting and godspeed and safety and success in all that you do. Thank you.

(Applause.)

RDML SMITH: Thank you, Lieutenant Governor Byron Mallott. I'm very sorry that I butchered your first name. My dyslexia got the best of me.

LT. GOV. MALLOTT: I love my name. It's great for dealing with telemarketers. I can tell the truth whenever they pronounce my name in ways that I don't.

(Laughter.)

RDML SMITH: I also wanted to thank you for a really poignant picture, particularly of the work that my office does with hydrography. I'd like to have a plaque that says "steadily went about their work" because I think that that really sort of captures the sort of long-term commitment that hydrography takes where we're not afraid to plan decades or centuries for our work. So I want to thank you for your remarks.

Joyce, did you have anything? And I think that Heidi has arrived, as well. I introduced you in your absence. I apologize. Do I understand that you have some remarks to share, as well?

MS. HANSEN: I do have a few remarks, although I must say I couldn't be more honored to be here, and I feel a little awkward following the Lieutenant Governor. His words are always so poignant and meaningful. I hope that my perhaps slightly more programmatic words will not be sort of lost in the essence of all of the things that he just shared.

So, my name's Heidi Hansen. I'm Deputy Commission for the Department of Natural Resources. I cover agriculture, mining land and water, forestry, parks --

LT. GOV. MALLOTT: She does such a wonderful job. Thank you, Heidi.

MS. HANSEN: Oh, thank you. Anyway, there's a lot of things I cover in my portfolio and a lot of them cover the areas that you all are working very hard on. And I probably won't speak as much to the substance of some of those things as more to, as I said, the programmatic things.

I would like to say that I spent about ten years serving as a lawyer for the federal government, both with the Corps of Engineers and at the Army, and so I hope that nothing that I say here is taken in any other way but with the utmost respect and love for what you all do and what your role is. And it's most earnestly said with a hope of increased cooperation and increased collaboration so that you understand a little bit more some of our challenges and where we're coming from and how we can hopefully work better together.

So I spoke with some NOAA folks a few months ago, and I was rather intimidated because, to be honest, I'm not scientifically-minded and I haven't spent a lot of time working with NOAA. And so I wasn't exactly sure what would be helpful to share with them. But I ended up sharing what I can see in my vantage point, and I hope that doing the same thing here will be helpful to you and you can extrapolate where there's a nexus in the areas that you work.

So, what am I familiar with? I'm familiar with, as I said, the mining land and water portfolios, forestry, parks, agriculture, permitting, project management, and budget for the state, for the Department of Natural Resources. I'm familiar with the vast and plentiful resources of our state and untapped and untold resources that we work very hard every day to try to realize to benefit Alaskans.

I'm familiar with high costs of energy that make living in our state astronomically expensive for some and prohibitive for some natural resource extraction and production. I'm familiar with mines that, at the beginning of their operations, we believe have 12 years of operational life, and at 25 years they could not be going stronger because we found another vein that we haven't tapped.

I'm familiar with 105 million acres of land that the state manages. 105 million acres. We have the largest state park in the country. We have vast resources and innumerable elements to those lands that we try to leverage every day. I'm familiar with the natural resource benefits that Alaskans enjoy, such as subsistence and hunting resources, minerals, timber, renewable energy resources.

And I'm very familiar with a greater need that we have to understand our landscapes better, to understand potential hazards, to understand even more so our mineral potential and our general topography.

I'm familiar with our agricultural industry. No one thinks of Alaska and agriculture, but one day you will. And if any of you have weddings planned in August sometime, we have fabulous peonies we'd like to send you.

I'm very familiar with our challenged access to use and work our land, limited entrance and exit points. All of the work that you all do with ports is very important to us, and we would like to collaborate more with you so that we can greater benefit from an increased blue economy in that regard.

You'll often hear that Alaska is special and deserves unique treatment. It's not some quippy tagline that we're trying to demand federal attention undeservedly. We are so grateful that you are here so that you can experience some of this yourself personally, but I think everything that the Lieutenant Governor said sort of imparts upon you how special we are and how unique we are and how challenged we are to access, and how challenged we are and the needs that we have with regard to our navigational resources and being able to transport ourselves and our goods and be able to live and support ourselves in a very general manner.

We're a very small state, yet an enormous state. We have big needs and modest quantities of resources, but we have big thinkers, creative minds, and people dedicated and committed to the betterment of Alaska.

So, as you work with Alaskans and as you work on issues that affect Alaska, I would ask you to sort of keep two words in mind when you do that: agility and receptivity. Our state public servants know their state better than anyone else. I would ask that you engage with them earnestly and trust the information that they provide you. You can trust, but verify; that's fine. But I would ask that you trust and work with them and listen to the information that they provide and incorporate the information and learn from your engagement with the state.

You know, there have been instances of inaction because something doesn't fit a mold or a square peg doesn't fit into a round hole. That inaction really hurts Alaskans. It really hurts our country in larger ways, but it's part of why I ask for such creativity when we're working together.

Our public servants are more intimately familiar with and invested in Alaska. We have a lot of federal rights that are specific to Alaska, and Alaskans are very interested in understanding those and supporting the rights of Alaskans and the rights of our access and use of our land, and we need your help in being able to realize that.

There are a lot of federal regulations that, by necessity, blanket our country, but sometimes are short on practicality when you're trying to implement them in a place like Alaska. And so one thing that I would ask is that you make your regulations as flexible as you can -- without being unreasonable, obviously -- and give the folks on the ground that you have working for you the authority to analyze thoughtfully and make decisions that work and are pragmatic for Alaska.

Touching again very briefly on Alaskans, they're very earnest and hardworking people. Our public servants are the most earnest folks that I've ever worked with. And when they're working with you, if they ask for X it's because they need X. They're not hedging their bets. They're not expecting you to come back with X-minus-ten. We need X, and we'll explain and we'll share with you why and we'll work with you. And just know that we're not trying to ask for anything more than what we need. It's a big state, and we just need some flexibility and we need to be able to work with you.

So right now, in particular, we have an amazing opportunity to increase our cooperative federalism. And I would really ask that each and every one of you think hard about how we can contribute to that effort and how you might be able to increase engagement with state and local folks to enhance that opportunity.

We've seen this administration work cooperatively with Alaska to propel some really major policy developments forward, and it's very exciting. It's exciting for the country, it's exciting for the state, it's exciting for the individuals that live nearby those opportunities. And we can do more of that, so much more of that.

You know, Alaska has a very steep history of cooperative federalism because of the nature of when we came about and how we came about and the place in our country when Alaska came online as a state. The state will welcome any opportunity that we have to cooperatively engage with the federal government.

And as I've said before, the state public servants stand ready to roll up their sleeves and work with you and get creative. If we help each other, we'll all be better off. Let's build our trust. Let's expand our existing working relationships. Let's leverage our respective dollars that seem to be increasingly diminishing across the board.

One example of this kind of effort, but there are many opportunities out there, is the Alaska Geospatial Council. It's a venue where we share data and leverage resources and collaborate on mapping efforts that benefit many federal agencies, the state, native corporations, individuals. I see great potential for more opportunities like the Geospatial Council, areas in which we all need to require and collect more data. We all need to have weather predictions for things, everything from subsistence hunting to erosion control. Increased blue economy, as I stated before, hazards monitoring and assessment.

There are limitless ways that we can work together, and I very much look forward to that opportunity.

And one last principle I'd like to leave you with is that it's really easy to say no. It's harder and more purposeful to say yes. We need you to say yes often, and I'm not asking for a yes where it skirts legal or ethical principles. I'm not asking for a yes where it defies sound principles of science. But I'm asking for yeses where it serves principles of pragmatism, when it demands creative thinking and perhaps standards that apply differently in Alaska but that nevertheless produce constructive results. Yes where it benefits Alaskans, yes where it benefits the state, where it benefits the country, and where it benefits our international efforts.

So thank you so much for letting me speak for a few moments here. I really appreciate the opportunity and I look forward to meeting anyone that I have the opportunity to do so during the breaks. Thanks. (Applause.)

CHAIR MILLER: Thank you, Heidi, and thank you for the state of Alaska showing up in such force here. This is probably the biggest meeting I've seen in eight years, so it's great.

Admiral, do you have any comments on these --

RDML SMITH: I do. I mean to catch Heidi before she leaves the room, because I was really inspired by a few of your key adjectives. You talked about creativity, flexibility, pragmatism, getting to yes. And I think that really resonated with me, with a lot of the approaches that we're taking to meeting some of the challenges in Alaska that simply can't be solved the way that we have solved them in other parts of the U.S.

So, thank you. I think that was a really key insight. So, thank you.

And I think we have one more. We've been jumping around a little bit on our agenda this morning, but we have one more video to play before the break.

(Video played.)

(Applause.)

CHAIR MILLER: Yes, we did clap for that one. Okay. It's now time for a break. It is 10:28. I ask you all to be back in your seats by 10:45.

(Whereupon, the above-entitled matter went off the record at 10:29 a.m. and resumed at 10:51 a.m.)

CHAIR MILLER: Please take your seats. Welcome back to the second morning session of the HSRP/IOOS meeting. Admiral Lautenbacher wanted to say a few words regarding the Lieutenant Governor's talk.

VADM LAUTENBACHER: Thank you very much. Is this one? It is? Okay. It's hard to tell.

I keyed on making this comment because of the fact that no one clapped after Senator Murkowski gave her speech, okay? And I want to make sure that everybody in this room, because this is a very -- as I mentioned before, I've never seen this many people together in Alaska talking about these things together, and it's important because Alaska is an important state. And we have had, inside of NOAA, a special relationship with Alaska for as long as it's been around. I'm sure you understand that.

Senator Stevens. And I can remember standing with Senator Stevens at an opening of something down here, I can't remember what it was, and introducing then-candidate Murkowski to become the senator. And it was a groundbreaking thing, and Senator Stevens always supported us very well, and I think the people in NOAA understand what difficulties there are and what importance there is to the state of Alaska and the types of economic activities and natural resources and all of the things that make it a very important part of the United States.

And it's a hard area for NOAA to work in because it's got a lot of space and a lot of issues with the atmosphere and the ocean, but it's always been a strong relationship and I wanted to make sure that I expressed that to the Governor, to the Lieutenant Governor, and to everybody in this room that has supported that relationship for the time that I have been around as a Pacific sailor and also the commander of the 3rd Fleet and responsible for these waters up here for defense.

Alaska is very important and Alaska has always supported us. In fact, I just talked to Senator Sullivan, I don't know, three months ago about fishing issues. So we're still working hard, even for people like me that don't have any control over anything anymore.

But I can tell you that it's a special deal. And I'm sure I speak for a lot of the NOAA, if not for all of the NOAA people, that realize what that is and thank you, thank the state people for the hospitality we have today and for the relationships that's gone on. And so, yes, we should have clapped for Senator Murkowski. That's my view. Thank you very much.

(Applause.)

CHAIR MILLER: Thank you, Admiral. I'll now turn the meeting over to Rich Edwing and Julie Thomas to introduce our joint IOOS/HSRP panel for this morning.

MR. EDWING: So, good morning, everyone. Again, I'm Rich Edwing. I'm the Director of the Ocean Service Center for Operational Oceanographic Products and Services, or, again, Tides and Currents is the easier way to say that. I'm here to introduce and share the panel -- you can't hear me? It's lit up. Closer? All right. Better? Okay, all right.

But before I do that, I'd first like to introduce Julie Thomas, who is well-positioned to be our moderator today, as she said earlier. She's an HSRP panel member, as well as spent many years as the Southern California Ocean Observing System director, and manages the Coastal Data Information Program and other things, as well. And I think we're going to hold off on introducing the other panelists until I turn it over to Julie and move into that part of the session.

So it's certainly exciting and honor for me to be chairing the first joint HSRP/IOOS session, if you will. And I think the topic, water level partnerships, was a very appropriate topic that was selected for us, because water level is a very, I'll say common, if you will, observation. Or water level information is really needed pretty much any coast you're on.

And that's because it's got many, many different societal benefits. It helps support maritime commerce, storm surge and tsunami warnings, habitat restoration, you know, sea level trends for long-term coastal planning, and so forth. So, there's a lot of interest in it, and, you know, people always want more information.

And also, here in Alaska, as we know, particularly in the Arctic, it's a data sparse state. You know, water levels isn't the only environmental parameter that I'm sure that is needed up here, but, again, certainly, I think it's one of the more essential observations, and the products are some of the more central products that may be needed.

And like other areas, you know, people get together and partner to make things happen. You know, people get together to put together limited resources to maximize the information that can be acquired and used and to help make good decisions.

So I'm going to start off today by talking a little bit at the national level, talking about the national water level program operated by NOAA. It's got a long history of providing timely, accurate, and reliable data. It's a trusted source for Tides and Currents information. And then I'm going to turn it over to the panel, and they're really going to talk to you about, you know, why they need water level information, how they use it, and how we're all working together to try to get, you know, more of that information available to people up here in Alaska.

So, the National Water Level Observation Network is the observing system behind the program, right? We have 210 long-term stations. We don't call them permanent because Mother Nature and the coast don't like the word permanent. We do the best we can. And all these stations, of course, continuously monitor water level and water temperature, and most of them also have meteorological instrumentation associated with them, as well.

A number of these have data series going back over a hundred years in length, and really most of them have data series that are at least a climactic value of over 30 years, which is when we started generating sea level trends from those.

And I should also mention that the NWLON was one of the 15 U.S. government-operated Earth observing systems that were highlighted by a White House report done in 2014, the Office of Science and Technology Policy program. That's considered a high-benefit, high-impact observing system, along with satellites and radars and things of that nature.

And, of course, the observing system, it's hardware, right? And hardware is interesting, but the real value is in the information that comes out of it. And the most foundational purpose of the NWLON is to provide the water level reference system for the nation, tidal datums along the coast, and IGLD, International Great Lakes Datum, up in the Lakes. About a quarter of the network is up in the Lakes. Because you have to have a reference system to know where you're starting from to be able to communicate, describe, use water level information.

And, of course, hand-in-hand with that goes the sea level trends, because every so often we have to update the datums to account for changes in sea level rise along the coast and other variabilities up in the Great Lakes. And a subset of the NWLON, about 25 stations, are the U.S. contribution to GLOSS, which is an international organization that ensures that tide gauge networks around the world are operated at certain standards so that we're looking at apples-to-apples data comparisons for understanding global sea level rise.

And so that's the NWLON, but I should mention that there's also about another 100 long-term partnership stations around the coast that we partner with other organizations for. About half of those are operated through the PORTS, our Physical Oceanographic Realtime System program. About another 25 or so are operated through the Texas Coastal Ocean Observing Network down in Texas. Panel members who were at that meeting may remember some discussion of that. And the rest are through other smaller partnerships. So there's about another 100 stations out there long term.

In any given year, we're putting in 25 to 50 short-term tide gauge deployments for hydrographic surveys, VDatum projects, habitat restoration projects, a whole variety of those applications I talked about earlier, and all that information comes in.

So let's talk about the NWLON in Alaska. In Alaska, we have about -- well, we have 27 stations, ten of which are in the Arctic as defined really north of the Aleutian chain. This graphic was taken from a gaps analysis report that we did back in 2008 where we tried to define how many water level stations we needed based upon the vertical control that they can provide.

And so the little green areas with the red dots in the middle, those were existing NWLON stations. And that's the span of vertical control, that green area, that they can provide. And those darker purple areas are gaps in the system.

So I should mention 27 and 10 are going to go down by one because we had a station at Port Moller, the pier was destroyed by a fire last year, and we're going to be unable to reestablish that station. So those numbers go down by one.

Around the nation, we have 111 coastal NWLON gaps. But you can see most of those are up here in Alaska with 32 being in Alaska, 21 in the Arctic. And so there's, roughly, you know, a quarter to a third of our gaps are here in Alaska, and that's just by the numbers. We did actually look at kind of the square miles that these areas cover. When we look at the square miles of the gaps, over 85 percent of our gaps are in the Arctic.

So I mentioned earlier we do short-term deployments. And certainly we do those up here in Alaska, as well, for a number of, again, different applications. There's 242 historic locations where we don't have gauges operating, but, because of the data we've collected, we can put out tidal datums, predictions. And we have the data available, typically, one to three months in length. Some of them have gone longer.

And I had this little table put together on the right-hand side, and you can see, really, not much, if any, activity prior to 1980, and, really, just in the last two decades we've had the bulk of these deployments occurring. A lot of that has been through the increased surveying being done by Coast Survey and, you know, other reasons, as well. And I know people are going to add up that column and it's going to add up to more than 242, and that's because some of these gauges have straddled decades. So there's the answer to that.

But the other thing I wanted to point out is you can significantly reduce the uncertainty of a tidal datum by comparing that short-term data series with a long-term data series from an NWLON station, because you can get rid of, or certainly reduce, a lot of the seasonal and annual variations that that short-term series may have in it. Again, that's another way that the NWLON's used to help elevate the accuracy of these shorter-term stations.

Next, I thought I'd talk a little bit about the challenges of actually acquiring information in the Arctic. As I said, we're only up here in now nine locations. A lot of that is just because of the remoteness of the area. A big factor is just a lack of just physical infrastructure. We like vertical surfaces, like piers and bulkheads and things to attach our equipment to. There's not a lot of that in the Arctic. And, of course, the other big factor is the ice. You know, that grinding ice which tends to just take away anything you try to put in the water.

Along other coasts, and even really in lower Alaska, we don't have too much of a problem. But our standard method of putting in a station is to have two sensors, two water-level sensors. One is just for pure redundancy. We try to get continuous data series. But we also use different technology sensors because every technology has pros and cons and we try to use the pros of the second technology to offset the cons of the first technology.

So, in most places, we're transitioning away from acoustic sensors to radar or microwave water level sensors as our primary water level sensor. And then we use a fairly inexpensive pressure sensor as our back-up sensor. However, that doesn't work up in the Arctic because of the acoustic and the microwave either won't survive or they can't measure through the ice, so we use something called a dual-digibub, which is actually two pressure sensors. And we can put those orifices down and armor them in behind steel plating, typically on a bulkhead, so that they'll survive the ice and operate year-round.

And we use two, not just for redundancy. You know, pressure measurements you have to adjust for salinity, so we put those orifices in and measure them precisely the difference between those, and we can compare that measurement to what we're actually measuring and adjust for salinity.

So this is how we do most of the measurements up in the Arctic, most of the stations there, and even a few down below the Arctic in Anchorage and Nikiski, particularly, because they have significant ice issues.

I'll just point out one other station in the Arctic, Prudhoe Bay, where, thanks to the oil industry building and bringing over a billion dollar desalinization plant, sinking it in place, building a long gravel causeway out to it. The desalinization plan has big bays that are always open to the water, and we're able to put our microwave sensor in there and measure inside the bay and have our pressure sensor outside the bay to get our measurements there.

But there's really very few locations in the Arctic where you have this sort of infrastructure that we're not already operating at. So that's really one of the biggest challenges for us for getting long-term measurements.

So a number of years ago, really a decade ago, it looked like there was going to be a big push for NOAA to do a lot more work of a lot of different types up in the Arctic, again because of the retreating sea ice and the opening up of the area to different types of economic uses. So that kind of scares us, because you can give us a lot of money but we really didn't have the ability to put a lot of tide stations up in the Arctic.

So we started developing another approach, which is this offshore capability. And we started off with just that bottom part, which is just a sled, if you will. And it's got some pressure sensors on there and conductivity sensors and it had some acoustics modems at the time. And I think it was around 2007-2008 timeframe we deployed that and we got 18 months of data off a barrel, so it was a pretty successful test. We were pretty happy with that.

But as we continued to refine it, people were also saying, "well, we really want that realtime data, as well." So we started developing a method of attaching a buoy to that, bringing the data up that way, adding cement sensors and doing some other things. And we've been continuing to develop this, and we've gotten it to Technology Readiness Level 6, but we had to put a pause on it and put it on a shelf because I think, as we all know, a lot of that big push and resources we thought were going to materialize to do a lot of this work never really happened.

So we kind of put this on the shelf for right now because until we can actually operate it, it doesn't make much sense for us to take it the whole way to the end of the line, but we can certainly pick this up if needed.

So my last two slides is really just talking about the partnerships that we have up here in Alaska. And this first slide is about we have partnerships where we're getting data to our standards and generating our standard products and services. And, again, you know, obviously, we work closely with Coast Survey and NGS for doing tide gauging for hydrographic surveying. It's not necessarily my office doing it. You know, for their surveys, it's their contractors doing that. They're getting us the data.

For VDatum surveys and for other types of projects up here, we're doing a lot of shorter-term stations. The Office of Coastal Management is funding three stations being established up here in Homer, Gambell, and I'm not even going to try Kwigillinok. I'm sure I mangled that. There we go. Thank you. To help provide datums for local coastal communities. And that's being done through one of the contractors that we use.

We work at the Weather Service. The Weather Service funded the establishment of a long-term station at Unalakleet, which is an Arctic station and has a bulkhead that we can put in that dual-digibub sensor. And they funded the establishment of that in the first few years of operation and maintenance, and now we've taken that over as an NWLON station.

We work all over with the Corps. The Corps does a lot of work, and they're doing some projects up here. And whenever they do a project, you know, they're doing it to our standards and we get that data. They're doing something up in Barrow right now.

And Park Service we have a nice program with where, again, around the country they're establishing long-term tide stations because they want sea level trends because they're concerned about vulnerabilities of some of the natural resources they have stewardship responsibilities for. And they're doing one up here in Chiswick Island which is on the western side of Cook Inlet, I believe. And the illustration is showing Unalakleet.

So those are the partnerships that we're directly involved with for data to our standards. But now what you're going to hear about -- and I'm not going to get too much into this, otherwise I'll be doing their presentation for them -- is our three panelists here will be talking to you, you know, why they need water level data, how they're using it, how they're partnering together and with us to get more water level information.

You know, not everybody needs water level information to NWLON's standards, and so they don't need to do things to NWLON's standards because, you know, typically that costs more money than they need to spend. So we're all working together to look at those things and still partner -- we still, you know, AOOS has been a big, probably one of our most robust RA partners in terms of partnering on water levels and looking for new ways to do things and so forth.

So, at this point, I'm almost going to turn it over to Julie, but, before I do that, I also want to mention you can also pencil NGS in here as a partner, because one of the challenging parts of water level measurements is, besides collecting continuous water level information, you have to do these periodic geodetic, you know, observations to ensure your sensor isn't moving, to connect your sensor to your benchmarks, to connect your station to the National Spatial Reference System, other reference systems. And that can be a challenging process.

And I'm going to say I think Nic Kinsman is here in the audience, and I actually haven't had a chance to meet her directly but I know she's been a stellar partner up here in the area for this group of partners. And she's been a stellar partner for CO-OPS, as well, because she's been helping us with some other GPS modernization efforts we have underway, which actually I talked at the last panel about.

So I'm going to conclude here and turn it over to Julie. We are holding questions until the end. So, thank you.

MS. THOMAS: Thank you, Rich. It's great to hear about the partnerships and the overview of the water level stations in Alaska.

So I'd really like to thank this panel here this morning. We have this excellent panel that has been put together, and we're just so thrilled to have them. Each one of them is an expert in their own right for what they're working on.

Our talks will be about 15 minutes. At ten minutes, you will receive a timer. Ed's going to do that. So you'll get the ten-minute signal. We're going to try to hold the talks to 15 minutes because we're going to save all the questions and discussions until afterwards. So we're hoping that that will keep our meeting flowing this morning.

First of all, I'd like to introduce Don Moore. He's going to be our first presenter, and we have a big thanks to Don. He's filling in for Carven Scott at the National Weather Service. Carven could not make it at the last minute, so Don flew in this morning from Anchorage. He is the Director of Operations for the NWS in Alaska. Don, thank you very much.

MR. MOORE: Thanks you. Good morning. It is an honor to speak, especially first. I would have preferred to follow everybody else. Actually, I'm pretty comfortable up here because I am sitting next to what I would consider two very good friends of the National Weather Service, both Jackie and Molly. We work very well together. I first met Molly in 2009 when I came up here. I came up as the marine program manager, and so this is an area that, right when I got to Alaska, was something that was near and dear to my heart.

And I think the partnership and the closeness that we have is quite good. I think if somebody were to tie our legs together and make us walk across the street, we could probably do it and it wouldn't be uncomfortable. And that's kind of the way I look at how we work together.

So, go ahead and go to the next slide. Oh, I got it. All right. I'm in charge. Okay.

So this is a map that we like to show for all the people that have seen the United States with Alaska and Hawaii in the lower left-hand corner with both those two states about the same size. Obviously, Alaska is a big state, which we all I think here in this audience know. But the challenge here is if you look, if you really look closely at the coastline of Alaska, it's not straight. It's not like the West Coast or the East Coast. I mean, yes, there's curves on both coasts, but not like the west coast of Alaska.

And that presents a really difficult forecast challenge, because when you have a coastal threat, or any kind of inundation threat, it's not going to be equal everywhere. There's going to be drastic changes over very short distances, which make it very difficult to forecast. Now, on top of that, we're resource challenged, which makes it even more complicated.

So I'm going to tell a fictitious story about Carven, since he's not here. And the point of this story is going to be to try to get an idea of what it's like to actually forecast in the state of Alaska with the resources that we have.

So, Carven, as he describes himself, is born Texan, Alaska by choice. So, Carven was in Texas visiting his family. The radio station was having a contest of who was going to get to go see the Dallas Cowboys play at Lambeau Field in Green Bay, Wisconsin. He won. They told him on Thursday morning, show up to the radio station in Midland, Texas, and it's an all-expense paid trip to Green Bay to watch them play.

So Carven shows up Thursday morning at the radio station in Midland, Texas. And if you were to look on that map, it is, you know, on the western part of the Alaska peninsula. And they tell him he has to drive, not fly, drive to Green Bay. So Carven is a little shocked, but, "Okay, I can do it."

They also tell him you've got to pick up some other contestant winners along the way. If you look at the map, we're going to follow the coastline. We'll go to Oklahoma City, and we're going to go to Goodland, Kansas. Then we'll go to Sidney or the panhandle of Nebraska there where St. Lawrence Island is. And then we'll drive over to Omaha, we'll pick up somebody in the Badlands, a park ranger, and then we'll go to Sioux City and then we'll go to Minot, and then you go to Green Bay.

And Carven, he's got this great deer-in-the-headlights look. If you've ever seen him, he just does this. So that's what he does. And he goes, "But I drive a Prius. So there's no way. That's a lot of people to fit in a Prius. I don't think I can do this. How do I do this?"

Well, he was allowed to take two friends with him, so he brought Jackie and he brought Molly. He looks at Jackie and goes, "What kind of vehicle do you drive?" and Jackie drives a two-door pickup truck. And he looks at Molly and goes, "What do you drive?" and she goes, "Well, I got a fifth wheel." So they put their heads together and decide that Jackie is going to drive her truck and we're going to pull a fifth wheel and we're going to get there.

And they drive along the way, take turns driving, and they're able to get there in time to see the game on Sunday.

That's really how it's like to work as a forecaster here, is you have this thing that you're trying to do, you don't have the resources to do it, but you really, really want to do it and you want to do it well. And so you partner with different people and you try to get it done, and I think that's kind of the story that we have with Molly and Jackie and the work they do, and many people in this room.

So I'm trying to get my order of when I want to talk about something. But let me go back to this slide, and I'll keep talking on this one. Hopefully, I'll get done in the right amount of time.

So I'm going to tell a personal story. 2011 we had what I think was deemed the Snowicane. I think that was the term they used. There was this big monster storm that came up in the Bering Sea and it went straight through the Bering Strait. Unheard of. It doesn't do that. It ended up being, I think, the pressure on the level of a Cat 2 hurricane. This was unheard of, because usually when you have a coastal threat it's for a small portion of the coastline, because, again, the winds are very important, where the water is going to go is relative to how the storm is coming in. And so normally you don't have widespread concerns. It's for a portion of, say, Norton Sound or Kotzebue Sound or something to that effect. But this one was up and down the whole west coast, and it was extremely complicated because the coastline, again, it's not straight.

I was in the state emergency operations center for that event, and they took a phone call from Gullivan. Gullivan was in dire straits. They were concerned about having to shut their power off because the water was going to get up to where their power supply was, and they didn't want it to get inundated while it was on. So they were trying to struggle with do I shut the power off to the community, which means that there is going to be no heat; and, of course, ahead of major storms like this, it actually starts off as a blizzard. You get a blizzard first, and then you get the coastal inundation threat.

So do I shut the power off with the cold air, you know, in and around when a blizzard was occurring and have the people evacuate to another location, which means they're going to have to go out in the elements and evacuate? So, a big deal.

And I took the call. It wasn't an easy answer because we don't have a lot of observations. We don't have, especially back then, the modeling for what the water is going to do. The resolution is not very good. It is not capturing all of those little nooks and crannies of the coastline.

So, fortunately, I had some model guidance that included some tidal information. Now, Gullivan, if you were to look on tidesandcurrents.noaa.gov, Gullivan is not on that map. But the modeling data, it had some of that information in there. So it was showing when things were peaking and whatnot.

Well, when I was on the phone with them, they told me, you know, we don't have any observations. So I'm like where is it at, how far do you think, how much do you have to go? And he tells me about how far he's away, and I looked at the data and I took the best guess I could. And I said, you know what, I think you're at the worst of it right now, I think you'll be fine.

And I was lucky and, fortunately, they were and the water level hovered for that little while longer and then an hour later they said it started receding, and I was like, whew, good.

So, you know, we didn't have the Tides and Currents, but we had it embedded in some of the model data. And the model data was just good enough because we were able to reach out to the community, find out what was actually going on there, get their observation, kind of do our bias correcting of what we were doing. I don't remember what the specific water level was, but, at that point, it didn't matter. I just wanted to know, what was the trend? Do I say it's okay or do I say, you know what, it's going to get worse?

So that was really valuable. So I'll go to the next slide. So this is tying on to what was shown before. The black are the areas where we don't have any tidal datums, and then the white area is where we do. If you look, there's a lot of black in areas where we have a really big concern about coastal threats, and that's something that we need to work on. And as it was said earlier, for us, we don't need super specific information. What we need is realtime information, no latency in the delivery of that information so that we can see that in realtime.

And so we don't need a super high-tech, super expensive gauge somewhere. We just need something to get us the data in a short manner. And these are the kinds of impacts that we're trying to predict. You know, is there going to be coastal flooding? What kind of erosion is going to take place? The freshwater supply. Newtok, in 2013, had water that inundated their freshwater supply, and what they ended up doing through the winter was using that ice that was on top of their water supply through the winter and melted it. The problem was it was full of bacteria, and they ended up getting some health concerns where they had to get assistance later on in the year.

So these challenges are significant. And, you know, the resources to deal with them are not that great. So, again, partnerships is what's all-important for us.

VICE CHAIR SAADE: Ten minutes.

MR. MOORE: Thank you. So this is, you know, kind of one of the things that we would look at as a forecaster. You see the model and the prediction of it. You have the observation that's shown on it. So this is Unalakleet, one of the new observation sites that we've installed.

And the models aren't always right. In fact, they're usually wrong. It's just a matter of how wrong are they going to be? So you have to use the observation to bias-correct it, to look at the observation and go, "that's what's going on, but this is what the model is saying." All right, they're off. Why are they off? Maybe figure that out. Maybe it's because of the orientation of the coastline, and you can mentally figure that out and go, "I know why it's off, it's because of this," and you can adjust for that. Or maybe sometimes you don't because you don't have enough observations to do that.

But we'll put the observations on, tie it with the forecast, and then there's an uncertainty there. And then we try to communicate that to, you know, the villages. And the problem is, if you say 13 feet, what does that mean? What does that mean to the community? Because as a forecaster, that's really what we're looking at. We're going, well, I see the model, it's showing 13 feet. I guess we'll tell them it's 13 feet.

And then our role isn't just to forecast, we're supposed to help people make decisions. So we've got to figure out how do I make that 13 feet relatable to what they care about? That's where Jackie came in. She did this for us, which is fantastic. How many locations do we have? So we're expanding this. This information, this is the one for Unalakleet in 2017. This is actually what the Fairbanks forecast office had put out, and they provided it to the state, they provided it to the community. So, they could look at this map and go that's what 13 feet looks like, now I need to know where do I evacuate. Or, if I'm in Gullivan, do I need to worry about the power supply?

So this is really, really valuable information taking what is a specific number in a model in an observation and then relating it back to the community. It's more things like this that we should be doing in the state, and doing it for more locations that are being impacted.

I think this is the last slide, so I'll probably finish quick. This is Unalakleet. This is Carven Scott showing us how to use scissors correctly where he had the ribbon-cutting at Unalakleet. On the right is what we're calling iGage. This was developed, I believe, completely within the River Forecast Center, where it's a very inexpensive gauge that we can install that will allow us to monitor the water levels.

Again, it's extremely inexpensive and it's just a matter of getting these things installed and finding the partnerships to help us maintain them.

And so I'm going to emphasize that, that, for us -- I'll just conclude on this -- for us, it's not so much high-resolution information or how accurate it is. Yes, accuracy is important. But it's just, for now, let's just get the data and use it.

One of my folks or people that took off after me when I left as a marine program manager was Amy Fish. She tells a really interesting story or comparison. So you're in, just pick any big city in the United States, and there's some strawberries in the store and they're going rotten. What do they do? They're going to chuck them, throw them away.

Now, imagine you're in a village in Alaska and you see those same strawberries. What are you going to do with them? They're going to make jam. And that's what we need to be doing with our observations. You know, we don't have to have super-high quality stuff, we just need stuff. And I'll just end at that. Thank you.

(Applause.)

MEMBER THOMAS: Thanks so much, Don. Really appreciate it. Good talk and a nice introduction here to the panel.

All right. So the next person will be Jaci Overbeck, and Jaci is a geologist for the State of Alaska. And I'm sure you all know that you have the bios for all of the panel in your packet. So there's some really interesting background.

And, Jaci, go ahead.

MS. OVERBECK: Thank you. Yes, that's a perfect lead-in for what I'm going to talk about today, and I will say that our next partnership meeting might have to take place in a fifth wheel and ‑-

(Laughter.)

MS. OVERBECK: ‑- go somewhere cool in Alaska. I'm all right with that.

So today I'm talking about our coordinated efforts within the state to establish an interagency coastal water level observation network for Alaska. I work with the State of Alaska in our Department of Natural Resources and manage a coastal hazards program. So you got to hear a lot of what we do in partnership with the National Weather Service, but I'm going to talk specifically today about our water level partnerships. And they go down all the way to the tribal level and working with individual tribe and city governments, as you can see in this photo where I traveled out to Kwigillingok and worked with Louis and Mick to install a staff on a power pole that they can use to take photos of flooding events and have a measured elevation of how those events are impacting them.

So just a little bit of background on our coastal hazards program. This map shows all the coastal communities and tidally-influenced riverine communities throughout Alaska. So you can see we have quite a few. And we have here listed from some of the government reporting which communities are subject to flooding, erosion, or a combination of the two. So our office is doing work throughout the state to map, monitor, and model both coastal flooding and erosion.

Because we are primarily focused on storm-impacted areas, we do focus on Western and Northern Alaska, and I would say there's probably about 60 communities within that region that my office is working to provide coverage for. And my office is about to be me at the end of the month, so just to give you an idea of the scale and the lack of resources in order to do that.

And on here we have a few of those observations. So just from the last storm season that's the tide staff that we had installed at Kwigillingok getting flooded. And then just this summer in Kotzebue we were there opportunistically during a small-scale storm event that did cause some flooding and loss of access to one particular road.

So our office is set up pretty well to establish some of these partnerships around the state. And so we've done that in primary conjunction with the Alaska Ocean Observing Systems and in establishing the Alaska Water Level Watch, which is currently a web site that provides any information that we can about water levels in the coastal environment of Alaska. We provide access to different tools that might mirror some of NOAA's tools, but are specific to Alaska's needs on that web site.

And our partnerships are very broad. This is just some of the logos for participants in a recent water level meeting that I'm going to talk about more, but the Alaska Water Level Watch is a collaborative group working to improve the quality, coverage, and accessibility to water level observations in Alaska's coastal zone. And you can see it takes an army of people in order to do that for Alaska's great state.

We do have a variety of state and federal partnerships as well as research institutions, private industry, as well as non-profits, engineering firms that are looking to get access to the data.

So as a collaborative group there were two meetings held. There have been two meetings thus far, one in 2015, which was the first meeting, and really established what the gaps were for our state. And so Rich mentioned this earlier, but here's another map of the gaps and NWLON coverage for Alaska. We have our starred locations as our NOAA NWLON, our backbone for any other water level observations that are taken in the state.

For comparison I put up what I thought were the NWLON stations on the Texas and Louisiana coasts, but I think I grabbed the wrong shapefile because I looked at your map earlier and it didn't seem to have the same coverage. So just compare the gaps I guess between those two locations so you can see just a comparison to scale of what those gaps look like. There are some blue marks in there for real-time water level stations where data is provided in real time, but those are not NWLON stations at this time.

And then in 2018, so just last May, we had a follow-up meeting to our meeting in 2015 where we discussed the technological advancements that have taken place really due to research efforts spearheaded by the Alaska Ocean Observing Systems. And many of those technologies are going from research stage to operation stage, so that's really exciting.

And in better understanding what technologies we can use into the future, we're developing a strategy to move forward and a build-out plan to identify which locations are most important to have water levels collected at and what types of technologies might fit that.

So these are some of the developments since the 2015 meeting. The NOAA NWLON gauge at Unalakleet was a huge success in getting that established. I was just in Unalakleet on Sunday, and we installed a wave run-up monitoring camera. So not only are we gaining access to the real-time data of an NWLON station for our stakeholders' use, but we're also able to expand on some of the research capacity within the region, which is pretty fantastic. And that was in conjunction with the U.S. Geological Survey.

As Don mentioned, the Alaska Pacific River Forecast Center put a lot of research into some of the ultrasonic sensors and even radar gauges that are autonomously operated in rural parts of Alaska. Those require some sort of infrastructure in order to put them on since they are downward looking. So we're really working to get all of the bridges in Western Alaska covered with these really low-cost sensors and keeping them operated. So I head to Kotzebue and Deering next week in order to install two more sensors.

And then some of the greatest research, or really some really fantastic results came from GNSS/GPS reflectometry. And so there are these GPS sensors that are established to observe plate boundaries and vertical land motion, but there is kind of a secondary response of that GPS hitting the water surface where those stations are located near the water.

And so from finding that information there's been a lot of effort to establish these stations just for water level sensing. And so a sensor was established in Seward and compared to the NWLON gauge at Seward with really good results. And then just recently AOOS deployed a sensor at St. Michael, Alaska. So that's what I'm talking about on research to operations. That gauge is now in rural Alaska and operating at that site.

Then there's also been some development of rapid response, so since our gaps are so large, we still need to have some coverage in areas where there is no infrastructure to have monitoring. And so UAF developed a tripod in order to put a pressure sensor on top of that. And you can just place it on the beach anywhere. It's above normal water levels, but during storm events expected to monitor storm water levels.

And then JOA Surveys developed a mount for a pressure transducer to be put on tidal benchmark locations. And so we've been testing out some of those capabilities.

So within the next year we're anticipating to improve water level sensing capabilities. Again we have the NOAA NWLON stations as those black stars. And then in light blue we have current operational equipment. In the next year much of the new observations we're hoping to establish a method for extracting the water level data from those plate boundary observation sites, those GNSS sensors that are primarily monitoring vertical land motion. And then I'll be traveling at the end of the season in order to establish some other sensors. And that St. Michael sensor is there as well.

So this is our idealized sensor location map as a group. And what I've done here is I've broken up different locations by either the partner that we anticipate being able to work with or a particular sensor technology that might be most beneficial.

So at the top of our list we have Alaska ports and harbors. And you may not know but nearly 40 percent of Alaska's ports and harbors do not have water level sensing capabilities. So there's likely the infrastructure to put on a low-cost sensor, but that needs to be done still.

The National Tsunami Warning Center has their own methods for monitoring water levels, and their primary focus is of course in tsunami-affected regions, but they're going to continue to develop those.

There are some primary locations where our coastal storm and tide modelers have identified as being important for improving their models, so at the top of Bristol Bay where there's a huge tide range and is impacted by flow of water through the Aleutians, as well as in the back of Norton Sound where tide nodes can move around St. Lawrence Island from season to season.

And then there is one location were barge navigation has been established as a primary reason for improving water levels. I think that that could be expanded on with more input from that community. And then the National Park Service has their own capabilities for establishing water level sensing sites. And so we want to be able to include their data in any efforts ‑- or in any culmination of these data sets.

There's also some locations where there might be opportunistic infrastructure. So like it was mentioned, the Unalakleet tide gauge worked very well for this Arctic environment because there was a sheet pile wall. There are a few other locations in Alaska that have sheet pile walls like that that we could establish maybe an NWLON or some other type of system at.

I've identified ‑-

VICE CHAR SAADE: Ten minutes.

MS. OVERBECK: ‑- the north slope communities since they are so sparse across the north slope as being potential locations as well.

And then for areas where there's very minimal infrastructure or there might be quite a bit of navigation in the bay systems, buoy systems are an option for water level monitoring.

And then at our second meeting it was also identified by all of our partners that tidal datums were incredibly important for any work being done in Alaska. And like Don mentioned, we're providing these maps to the National Weather Service to inform individual communities about how high storms might get. And the main barrier to being able to do that at this point is tidal datums. So that's why we're working with NOAA's Office for Coastal Management to establish at least three additional locations over the next year where they'll be establishing short-term water level sensors for tidal datums.

And then basically this map shows the communities that do not have tidal datums and prioritized by their potential impact to storm surge flooding or for other reasons.

So in summary, we have ‑- we anticipate ‑- we already have quite a few different data sets coming in in different formats, and we anticipate that improving into the future, so we really need a consistent format for people to be reporting in and one location to access that data, something like a NOAA CO-OPS-type environment that can be trusted and the data are tested to a certain standard. Although that standard will not meet NOAA NWLON, it will meet some of the requirements that many of our stakeholders use for all those reasons listed there.

And Alaska's data needs are incredibly vast, as we'll probably continue to talk about throughout this meeting, so we understand that we're not going to get NWLONs all along our coast. And that's ‑- it's just not feasible to do that, but we do need to use these new technologies and collaborative efforts to get some sort of water level monitoring system in place.

And then I would also say that these data needs are emerging. Just last winter there was ‑- it was ice-free in the Bering Strait, and the community, the small community on an island in the Bering Strait was impacted by storm waves and flooding that disrupted some of their infrastructure, and it really sparked a conversation throughout the state to say we know this is going to continue to happen. This is going to be a bigger issue into the future. Who's doing work, who's monitoring this, and who's documenting these changes? So we need to get ahead of the game as far as sea ice concentration is concerned and establish these sites.

So thank you for allowing me to speak here today, and I look forward to answering any questions after our final presentation.

(Applause.)

MEMBER THOMAS: Thank you very much, Jaci, for a really interesting presentation there.

Our last speaker is Molly McCammon. Been a good friend for several years through IOOS. And Molly is the Executive Director of AOOS and will talk to us a little bit about AOOS's role within the water level arena.

MS. McCAMMON: Thanks, Julie. While my slides are coming up I'm going to digress for two comments. One, you may have heard some stories this morning about rescues and damsels in distress or whatever.

(Laughter.)

MS. McCAMMON: I just want to tell you, you should not believe everything Ed Page says, first off, because Ed is kind of a chechako in Alaska. He's only been here like 30 years. I've been here 45.

(Laughter.)

MS. McCAMMON: And when I first came to Alaska I homesteaded in the Brooks Range for 10 years and guided hikers and boaters, and Ed has been trying to catch up with me ever since.

(Laughter.)

MS. McCAMMON: But I think our story though, what it really highlighted from my perspective is the importance of communication, and that was something that really the Coast Guard commander did not really speak to this morning, that we do not have very good communications systems up here and in the Arctic, and it is critical that we do devote a lot more resources to improving those communications.

Here we were 25 miles from Juneau. This is, I mean, lots of boats and traffic out here and we ‑- our cell coverage was like really bad. And this is some place that's close. You talk to Willie Goodwin and you go up and you're a walrus hunter or a seal hunter, doing whaling or something, their communication is really almost nil. So communication is one of those kind of overarching needs and assets that really ties in a lot of the pieces that we're all working towards.

The second thing that Commander Bell mentioned was just the lack of assets in the Arctic. And I want to tell you that with the support of our congressional delegation, the support actually of Congress, the support of the IOOS program, a lot of it due to Josie Quintrell and the IOOS Program Office, we will be getting HF radars in the Bering Strait in the next year. Over $900,000 was appropriated for that.

Last month with a partnership with the Port of Nome, the Marine Exchange, Julie's CDIP program with the Army Corps of Engineers, we deployed a wave and current buoy right outside the Port of Nome. With our partnership with the Marine Exchange we'll be deploying weather stations and AIS stations, two new ones, on St. Lawrence Island in Gambell and Savoonga, and looking for another site there.

So we are starting to get assets in the Arctic. It's slow, but we do a lot with little bits of money. So I just wanted to digress and mention those two things.

So I am going to speak to you about how do we grow an Alaskan water level network and just the data management access innovation partnerships?

So this is the slide that Jaci had, and it's kind of our future, where we would like to be. And in a way we do ourselves a disservice in Alaska because we put the entire state on one slide. And it looks like ‑- you look at all those dots and you think what are they complaining about? They've got a lot of stuff there, and they're going to have a lot. This is no big deal. We're not talking tens of kilometers between these dots. We're talking hundreds of kilometers. So it is very sparsely sampled. There are huge gaps in all of these observations. We have very few observations.

And so when we try to do models and forecasting, our models and forecasts are often, as Don said, often ‑- they're always wrong. It's just how wrong are they and how can we correct with that? And so we really are trying to figure out something that's realistic given that we know we have a small population. We have 750,000 people in our state. We know this. But what's realistic? What's affordable? What's technologically feasible? And trying to work together to pull this all together.

So why is AOOS involved? Why are our people looking at AOOS as a partner? A lot of it is because from day one when our program was started in 2003, my board established our data center as our flagship program and has devoted a lot of resources to our data center. We are now one of the IOOS regionally-certified data assembly centers.

We have the largest collection of ocean and coastal data in the entire state. We have 20 people working on this. We have more capacity than almost any other data center around. So it was logical that they would come to AOOS to help build this partnership, this water level partnership. So we're building on an existing system with support from the IOOS program and all of the capabilities that we have with this.

So what do we have? We have a map. We have ‑- it's all GIS-integrated mapping services. We have a data catalog that has a search function. It has metadata, the ability to download data. We produce individual customized data views so you can assimilate and compare different data streams. And we have huge amounts of data available. So we have this capacity.

So as Jaci mentioned, our challenge is to make elevation and water level observations where conventional methods don't work. So we have this kind of gamut of various types of observations. And how do we pull those pieces together and make that a network and actually produce products and services to our customers and stakeholders who need these kinds of things?

So it goes from simple things like the color index maps for flood communication that both Don and Jaci mentioned. So these are very simple, but they also highlight that we're not just talking about water levels. It's all part of a package. We also need the maps and charting. We need tidal datums. We need the ability to tie together our terrestrial maps with our bathymetry and tie that so we have an accurate coastline. In most places in Alaska Google Maps does a better job of showing where the coastline of Alaska is than our current NOAA charts. I mean, this is kind of sad. Very sad.

So we're trying to pull together something as simple as that to something a bit more complicated and complex, the land-based GPS reflectometry sites, which with support from the Weather Service and from Department of Natural Resources and from the IOOS program we're piloting a couple of systems here.

One of them, the ASTRA system, it was ‑- it's used for space weather, and so we're actually using that now to get real-time water level observations. The other one is used for seismic monitoring for plate tectonics. We're using that for monitoring water levels. So these are systems that are cheaper. They're easier to maintain than NWLONs. They aren't as robust because they don't have the redundancy that NWLONs have, but they do provide very high quality real-time data. So we're looking at how can we test these in remote locations and actually incorporate the data into products and services that CO-OPS, that the Weather Service, and that others can use for products.

So as Rich said, NOAA CO-OPS, they're the gold standard, but their focus really is on data products that meet their standards. Their mission is to maintain the authoritative version of water level observations, and they really are looking at accurate and reliable. They're looking at what Tampa Bay needs to put those big container ships under the bridge there at high tide. We don't need that level up here. We don't have bridges and big container ships going under them. So that's why we've been focusing on kind of the non-NWLON, the non-gold-standard-type observations.

So we've been developing this partnership with CO-OPS for looking at what we call Tier 2 and Tier 3 data and how can we at the AOOS, at the regional ‑- Alaska regional level pilot this effort of pulling these various data pieces together and developing products that not only CO-OPS but the Weather Service and others can use? And so we're looking at things that go from historical ‑- the historical short-term data sets that are not in real time to things that the Army Corps deployed years ago when they were putting in ports or a harbor or a revetment somewhere and pulling these different pieces ‑- the iGages that Jaci was mentioning or GPS sites, and pulling those pieces together, standardizing them and incorporating them into something that is visually useful for a lot of different purposes.

And so we think this is kind of a win/win for all of us. So for CO-OPS it expands our relationship between IOOS and CO-OPS. It enhances the IOOS contributions to the blue economy by densifying the water level observations beyond the NWLON backbone. It pilots the regional implementation of this tiered data policy vision that CO-OPS was very visionary in developing, but they haven't been able to implement it yet. So we're really piloting that. And it encourages the use and development of lots of new and different products and services that puts things in the hands of users.

From our perspective it makes publicly accessible all this data that's now on a lot of different sites and different formats, doesn't have sufficient metadata, and trying to pull those pieces together. It increases consistency in format and delivery of these records. It enhances that discoverability so they can go to that one site and find things. And it also allows a lot of different tools so you can calculate unofficial tidal datums for use as you're going forward.

So working with Jaci and the Weather Service and others we've developed these templates. We have the web site up and running. We have a template data portal. We're trying to say, okay, does this make sense? Is this useful for our stakeholders? How do people want to see data portrayed? We have ‑- using our basic cyber infrastructure, which is a huge cyber infrastructure that's actually housed in Portland, Oregon, and we have our own cloud services, we use the AOOS interactive map. So you can add additional layers to it. And that becomes the basis of our water level watch map.

We are developing sample water level watch station pages. So we're trying to mirror the CO-OPS pages and services, but with this Tier 2 and Tier 3 data sets. So we have the station pages which will have interactive graphs, statistics, anomaly plots. Each station will have its own page. It will show the metadata and the parameters over time, the history of that data set.

We'll have data views so you can do some comparisons between different sites or between a nearby NWLON and a less-robust alternative-type site, or maybe a historical station and something that's real time operating now. Then you can do some comparisons and analysis from these. All of this stuff can be done on the fly using our basic infrastructure.

We'll also have data inventory pages so you can see what's the history of this data and are there gaps in it? How far back does it go to? And we can have that all presented visually for whoever is looking at it. It will also show what data has QARTOD quality, QA/QC over the sensor's life-span. So you really get a snapshot of that data station.

It will also have a data inventory page. So this is an example of it. It shows water level inventories and qualities for all the stations from one source. This uses CO-OPS, but for Tier B and ‑- Tier 2 and 3 we would use ‑- it would be very similar to this.

VICE CHAR SAADE: Ten minutes.

MS. McCAMMON: In addition we'll have a couple of different tools available for online products that you can use to fill gaps in tidal data computations and transformations. And this is the Alaska Tidal Datum Portal that the state has developed. We have one that JOA Surveys has developed. So it gives people an additional way to access the data and develop on-the-fly products for themselves.

So what do we have so far in this partnership? We have the AOOS cyber infrastructure, we have lots of data, lots of historical data in a lot of different sites. We have the mechanisms to serve up that data using ERDDAP, THREDDS, OPeNDAP, all these different web services. We have QARTOD for quality control including gap tests. And we always ‑- already have the Time Strata fields in our system that we need to use.

But here's what we need to ‑- future actions to make this happen. We need to pilot implementation of both the observations and the data portal in implementing ‑- integrating those into it and actually implementing the system. We need to serve up the data, especially historical data, which means going back and retrieving it, making sure we have the metadata, making sure it's quality-controlled, and then making sure it's standardized. This is something we can use for building out our water level system, for planning and for prioritization.

We need to explore options for something that we call PORTS-lite systems. So this would probably be something using a lot of the ASTRA and UNAVCO GPS-type systems. How can we put those and fill in some of those gaps between our existing NWLONs right now? This can serve as a model for other IOOS regions. Pacific islands is a perfect example of that, but even if ‑- on the northeast there are still gaps in water level observations there, trying to pull those things together.

So again, growing a partnership. And I think this is one of the things that the IOOS regions and AOOS really focus on is that kind of facilitation partnership building aspect of our mission. We do a lot of that. So people do come to us to help be a hub and create that kind of partnership. And we have great support for doing that around the state and then with our national partners.

And again I want to emphasize that we need to couple this with our mapping initiative. And you'll hear a little bit more about that with the Alaska Mapping Executive Committee that's meeting tomorrow and some of the focus on mapping.

So water levels is a piece. Mapping is definitely another major piece. So I want to put a shout-out to that.

And with that I'd be happy to take any questions with the rest of the panel. Thank you.

MEMBER THOMAS: Thank you so much, Molly.

(Applause.)

MEMBER THOMAS: And I have to say I can confirm, if you want an adventure in Alaska, Molly and Ed are the two to talk to.

(Laughter.)

MEMBER THOMAS: I didn't want to write to Shep and say I was stranded today, so ‑- it was an adventure.

So with that, gosh, I just really appreciate all the comments and it's great to see the talk about the partnerships, because with my time in IOOS and through this panel I know how important that is.

We do ‑- Joyce, we're going to take questions now? We have 15 minutes.

CHAIR MILLER: Yes, we have about 15 minutes for questions. I wanted to ask the assembled admirals over here if they had any questions to start off.

RDML GALLAUDET: Yes, actually I have no questions. I kind of know some of this stuff. But I do have some comments.

And I want to say, Rich, you know I'm a big fan of CO-OPS. Your work is so important to the blue economy, and your team is just doing fantastic things. And I love visiting your people in the field. So keep up the great work. And I'll just leave it at that.

Also, Dan, great presentation. It was great to meet you and your team yesterday, and you are a terrific speaker. I took some notes. I like your style.

But everyone in the room should know that the forecasters and the weather and the river forecasters at the WFOs in Alaska are just doing a lot with a little. Talk about making jam. I saw it firsthand yesterday. And 130 or so rivers that they're tracking every day, and there's multiple inputs, and there's sparse data, and they are making it happen and saving lives every year. So I just want you to be ‑- please thank them whenever you see them for their service. Thanks.

CHAIR MILLER: Admiral Smith?

RDML SMITH: Well, I didn't expect to be called on, but ‑-

(Laughter.)

RDML SMITH: ‑- I did want to ‑- appreciate all the speakers. I took a whole lot of notes, and I particularly like the gap analysis and really trying to go ‑- because observations are a key to the knowledge, but they're not necessarily the knowledge itself. And so as we extend that into modeling, looking at it systematically to look at where the gaps are I think is really important, so I really appreciate the analysis done there.

There were a couple of things that I was waiting to hear, and particularly because I, wearing my navigation hat, heard a little bit of that from Jaci, a little bit less from others, as navigation users of water levels. We heard a lot about that from talking to stakeholders in Western Alaska a few weeks ago, and I'd be happy to ‑- Bart would be happy to share the specifics on the tidal concerns for the navigation folks in the ‑- particularly community resupply.

So and the flexibility and creativity exemplified in all of the different creative approaches I think is really exciting, so thank you.

CHAIR MILLER: I had a question. Molly, you mentioned communications, and I see some potentially great web sites and so forth. How much ability is there in Alaska ‑- I mean, how well are communities connected and so forth in order to use computer web sites and things like that?

MS. McCAMMON: Not well. That is a big issue because our web site is pretty bandwidth-heavy, and it does limit users going to it for ‑- to access the entire web site. And that's why we've been focusing on these data views, which takes just information from a few sensors or a few data streams and trying to develop those, because those require a lot less bandwidth.

But almost every community now ‑- cell phones. I mean, they are cell phone users. Facebook. Facebook is big. The Weather Service I think is really ‑- has been really great about providing information through Facebook. I mean, that's their primary access point.

But it's getting better. Cell phones weren't used maybe 5 to 10 years ago. So things are ‑- some things are better, some things worse as there's more ‑- for example, just where I was this past weekend five years ago they had great cell phone coverage there, but now because there's so much data use of cell services for downloading movies, music, whatever, the footprint of the cell tower is like half of what it used to be. So their coverage has been really reduced. So it's all these different things, but that is an issue.

CHAIR MILLER: Thank you.

Other questions?

MS. OVERBECK: Can I first make a comment ‑-

CHAIR MILLER: Sure.

MS. OVERBECK: ‑- to Admiral Smith in response to navigation? And I just want to say I travel to these rural communities quite a bit, and I think that one of the first things people say is barge navigation, gaining access to resources. Being in Quinhagak in early June they've had sedimentation of their river, and so the barge can only make it at the highest tide, and even then they have to make a tight turn. So they were worried about getting fuel for the rest of the summer and even into the winter just from that one barge coming in.

So that is a huge issue, and I think it's something that might be under-represented on that map, and I would love to get more input from the barge navigation community to update our map. Thank you.

MEMBER SHINGLEDECKER: Susan Shingledecker, HSRP. Speaking of partnerships I heard, Rich and Jacqueline, you both mentioned partnerships with the National Park Service, which I'm thrilled to hear about. We partner a lot with the Park Service in the Chesapeake.

Another huge partner of ours is the Department of Defense, and it's particularly top of my mind. I was ‑- two weeks ago I spent a week with many of the different branches at a conference called Sustaining Military Readiness, looking at threats to installations from encroachment and sea level rise.

So I was wondering if anyone on the panel could speak to how is the Department of Defense playing a role and helping to fill out these infrastructure gaps that you see, particularly in areas where they have installations here or nationally?

MS. McCAMMON: Well, I can respond maybe a little bit. We don't have sites, military sites that are at risk right now from sea level rise, not like Norfolk and different places like that, but the military is very much looking at the opening of the Arctic and challenges and issues there. For example, they are very interested in our placement of high-frequency radars in the Bering Strait. They're very ‑- looking at partnering with us on that.

So I think there will be a lot more in the future than there is now. But it's kind of ‑- it's a different kind of perspective that they're coming to from that.

CHAIR MILLER: Dave Maune?

MEMBER MAUNE: Hi, I have a question for Molly. You mentioned that Google Earth had better shorelines than what NOAA was providing. I am wondering if you have tried using the new IfSAR data that has shoreline on it to identify shoreline issues that you might have.

MS. McCAMMON: I am going to turn that to my IfSAR specialist right here to my left.

MS. OVERBECK: Yes, so there's even better data than IfSAR available for much of Western Alaska using recent technologies such as photogrammetrically-derived elevation models, and it's a matter of getting those data sets processed and sent through another tiered data system to apply them to the CUSP.

So I think we're getting there, but there's no one I know right now that's going ‑- that's actually processing that data yet.

MS. McCAMMON: I should say the priority of the state in the last 5 years, 5 to 10 years, has really been mapping the terrestrial portion of our state and really getting that up to a high enough standard, and a lot of that is developed to our mineral and oil and gas resources and along the pipeline corridor and different places. And I think the majority of that is completed now, and we are really hoping that the focus can be on the coast so that we can knit together the land and the ocean better.

CHAIR MILLER: Dave? Or Ed. Sorry.

MEMBER KELLY: Ed Kelly, HSRP. Molly, I'll start with you and then sort of phase over toward Rich.

(Laughter.)

MEMBER KELLY: There's a lot ‑- yes, I know. I only get one question.

There's a lot of data I'm hearing that's available from a lot of different sources, and in some cases the quality might not be as good. We'd like to do whatever we can with whatever we can get. We've had this type of discussion in a lot of different regions that we've been in, even going out as far as crowd sourcing and just how good does the data have to be in order to be useful?

So really two questions I've had is how good is your data overall and the format that you're using here in AOOS? Would that also be useful for the rest of the regional associations to try to standardize some of that so that it could be a more universal approach throughout the various regional associations boiling up to IOOS?

And then kind of shifting to Rich, at what point would you be able to actually accept or use that data to integrate it into NOAA data, maybe even into the PORTS? Because I'm looking from the point of commercial maritime interests who don't want to have to hit 87 different little web sites; and a lot of them have disclaimers because they're educational or whatever that say if you use this data, you will die, your children will die.

This data is never accurate because there's disclaimers. But everything is useful. So how do we get past some of that? How can we standardize among the regional associations to know what's out there and get it in a standardized usage?

And then, Rich, how can you accept that somehow so that ‑- and make an integrated system overall that people can use? I know it's a lot to ask, but we're kind of starting out Alaska saying we don't have much and we want to us anything we can get, even somewhat less-sophisticated equipment. And on the other end we've got the PORTS system that's out there that's QA/QC, absolutely reliable, that's got electronic ‑- there's apps you can put on your phone. So how do we move from that to that? And is that possible to do? Because as a user, if you're on a ship, you don't have time to go looking all over the place and you go different ports. You might not know what's available, how to start looking for it even.

MS. McCAMMON: No, I agree with you totally on that. And I think all of us around the country are facing very similar issues with similar kinds of data. So I think there is this ‑- definitely this possibility of one region doing a particular kind of data and really getting that together and then having that replicated elsewhere. So we don't have to reinvent the wheel in every region. So I think that's an important thing.

A lot of the data that we have, the historical data is actually with the Army Corps of Engineers, because the Army Corps does a lot of these kinds of projects to put in a port or a harbor or a revetment or some kind of actual facility there. The Army Corps requires that there be match, and a lot of that money then gets put up forward by either a private sector or a municipality or a tribal government or something, but there's no requirement that that data then be made public. And so that's ‑- then you're trying to go back to history and then where is that data and who has it and who has control over it and how can you actually get access to it.

So in my overly simplistic world of what would be really ideal is every time they do a project like that there be a requirement that that data be made available publicly on some certified data center in some quality controlled fashion with proper metadata.

We're finding this now with the oil and gas industry. We are housing a lot of their data that they collected over time because, for example, Shell in the Chukchi Sea, we're housing a lot of their data now. If they come back in 10 years, they know they can come to us and we are housing and archiving and curating their data. If they left it in the hands of their contractors or even their own employees, it ends up in somebody's basement in Houston that then gets flooded and moved and then the person retires and ‑-

(Laughter.)

VICE CHAR SAADE: Hey, some of their contractors are responsible.

(Laughter.)

MS. McCAMMON: So I mean, that's ‑- but I can let others respond to that, too.

MR. EDWING: So one of the things we did to help with this issue was a number of years ago is we developed this tiered data policy, as you call it, because everybody knew that you were out there collecting data, but ‑- and everybody's doing it to different levels, but nobody ever really tried to kind of quantify that. So the first step was to try to somehow put these things into bins you could work with. And that's what we did. And I think that's been relatively well-received or helpful. I'll put it that way.

And with each one of these bins we tried to associate applications. Storm surge and tsunami warning information doesn't need to be to NWLON standards. If a tsunami is headed at you, you're not worried about whether it's a millimeter or two off, right? And so we put that out there.

Now in terms of bringing in data, right now we really just bring in the Tier A data for our purposes. My vision or my dream is, because I always hate seeing anybody collecting data, that data kind of only kind of just being used by themselves or not being able to be used for other people ‑- would be that we'd have kind of local to national or federal, or national, however you want to say that, connectivity and exchange of that data. And I think that's where the IOOS RAs can really play a huge role, because they can kind of ‑- they can bring in that data at all different levels and kind of make it available. And when I need data to put into my Coastal Inundation Dashboard, maybe I can reach down and grab it from them and use it for that purpose.

So I think that's kind of been the emerging relationship here, and it's really progressed most here in Alaska where they've had to deal with such ‑- a lack of data that's I think maybe forced the issue here more than in other places.

And we've also been a bit flexible with our port standards. I'll let you know, for example, when we brought in some partner stations, not so much from an accuracy point, but sometimes ‑- one of our requirements is we always have to have a spare on hand in case something goes down. Sometimes the partner can't have a spare. And we've said to the users, well, are you okay with this sensor maybe being down more than maybe these ‑- and they said ‑- if they say okay, we say that's fine. We'll put it on there. Just expect it's not going to be as reliable as maybe everything else, but the accuracy we don't shy ‑- or retreat from.

CHAIR MILLER: We've got time for one more ‑- or two more questions. Be aware that during lunch we're going to continue the conversation to some extent.

And the other thing I'd like to let the public know, there will be opportunity for public comment this afternoon I think about 3:30. So we always put a public comment period in.

Juliana?

MS. BLACKWELL: Thank you, Joyce.

Juliana Blackwell with the National Geodetic Survey. Just mainly a comment and some follow-up with some of the items that have been brought up by the panel members.

First of all, I want to just say I appreciate the fact that you're mentioning the importance of tying the water level stations and the data from those stations to the terrestrial reference frame and encapsulating that under the National Spatial Reference System.

The two points I want to make related to that, and I think it's come up in some conversation, and I'll be briefing more on the updates of that tomorrow during the NGS update, the importance of having an accurate statewide or nationwide reference frame for the vertical as well as the horizontal is something that we at NGS are working towards in our modernization efforts. So appreciate just everything that's being done here in the state to help us get to that point.

We've done a lot with airborne gravity collection. We've actually completed the mainland part of Alaska and will be able to produce some experimental models soon that will help with getting the water level station information as well as all data referenced to something that is 21st Century, because we haven't been able to do that for you in a while, and how that relates to determining the shoreline and the work that's being done that was mentioned with CUSP, having accurate shoreline information and using the best available data that we can.

And I just wanted to say a shout-out to the state for working with us and providing the data and providing the resources to get that data to the point where we can apply that to our shoreline map through NOAA so that others can make use of that. And that continually updated shoreline product is something that we're seeing is a great value to the State of Alaska as well as all the states so that they can have a better ‑- a more ‑- even if it's not perfect, it's certainly the best available that meets minimum requirements so that that shoreline can be used by people, and whoever else wants to use it. But we are trying to make something that is a better product and appreciate all the work that's being done here through federal and state partners to make that grow. So thank you.

CHAIR MILLER: Lindsay?

MEMBER GEE: Yes, Lindsay Gee, HSRP. Just following really a bit from Ed's comment, and I guess as I was watching Molly's presentation, seeing you modeling the ‑- trying to model the NWLON stations and those sort of things. And hearing Rich's vision I guess is I would comment and say, yes, I would hope that in that moving forward there would be that place that we could all just go to the one stop and see those various tiers of data.

And I guess that ‑- my comment was technology is kind of moving to allow that kind of easily and that ‑- hope that that is a role that you take as being able to do that, to be able to then incorporate all the ‑- and I think we're seeing it with all of the data now. We keep talking about that, but with the bathymetry as an example, I think we're seeing NOAA now use that non-contracted survey data that is at a level that's acceptable for whatever the purpose.

And I think being able to define that uncertainty and be able to incorporate that is really important these days because people have access. And the driver is going be I think the site like IOOS and others, having that available is going to drive you to make sure the federal organizations can get at it as well. That would be my comment on that.

And a question I guess for Molly is you mentioned about archiving all the industry data. In various places, whether oil and gas and others, there's requirements so that gets archived. The contract data for BOEM or something has a ‑- that the data gets archived. There's no ‑- for water level data? Is there any similar kind of requirements on that and is there ‑- and if your archive is your industry is there any funding that comes to you from industry for that?

MS. McCAMMON: Well, I know that the Army Corps has a lot of that data on individual engineers' computers, and they have been making some effort in the past to try to standardize and get metadata and make that more available. So, but I don't believe there's a requirement, but I wouldn't swear to that.

CHAIR MILLER: Other questions? Okay. Tony?

MR. McDONALD: I'm a little bit of the lawyer policy person who snuck into this science group, and I just ‑- great presentation, and the collaboration is clear and really powerful.

I guess I'd kind of ask a question. A lot of the language is the same and ‑- kind of how do you back-engineer out of this emergency management storm readiness real time into the flood management and resilience and adaptation world? I think it might overlap a little bit with the mapping discussion that Molly was alluding to. But a little bit more about how ‑- as we think about improving this data from the perspective of weather, readiness, and response.

How do you engage the communities around ‑- again, you mentioned 31 communities at risk for flooding now. You know, how many in the future? What are future trends? What are the risks? In the planning and management side we talk a little bit more about more at-risk assets and vulnerability of communities. And so just a little more on how that relates to how you work with communities and maybe some of the community science things that Don was alluding to might be a really great strategy as we work out all the high-tech science over here in these groups, but really engaging those communities might be extremely important to actually getting them to appreciate the value of these products.

So anyway, just a little thought about how this overlaps. NOAA has other products like Digital Coast that are a little bit more focused on the management and planning community.

MS. McCAMMON: Well, I would say we all respond a lot to those needs, and in fact in the last year we have all participated in climate change adaptation workshops in a lot of the hub communities in Western Alaska. There have been a lot of stakeholder meetings and outreach on all of those. And so we have incorporated that. And a lot of the work that they need, the information is not necessarily in real time for planning and long term. So that's again in that spectrum of data sources that can respond to those needs.

But I've been to workshops in Nome, Kotzebue, Bethel with all of these folks from Weather Service and state talking to various groups. And I think Jaci said something about she thought the barge companies were a little under-represented in our maps, but we have ‑- at both workshops that we've had we have had barge companies, we've had tribal communities, we've had representatives of state and federal land management agencies, and what a lot of those dots on the map represent are when we get multiple hits for priority areas. These priority areas do reflect to a large degree ‑- it's not perfect, but to a large degree the top priorities of all these various user groups.

MS. OVERBECK: Yes, I mean, engaging tribe and tribal governments, city governments is a huge part of what I do. And basically I don't do any sort of project in rural Alaska without getting some sort of invitation. The invitations are definitely outweighing our capacity to respond to them. But we work with individuals at those levels. We have a community-based monitoring program. That's what the tide staff or the flooding staff was showing was a part of that community-based monitoring program where we're giving people, local people the capacity to make observations. They send data to my office, and then we provide it back to them in a community-specific web page, low-bandwidth, but, yes, very similar.

Do you want to add anything?

MR. MOORE: Yes, I don't think I have a whole lot to add. I will share one of the challenges that we do face, and when we forecast a weather condition or how high the water is going to get, we often relate it to a previous event because that's relatable to them. So we say, hey, it looks like it's going to be comparable to this or it's going to be a little bit less than that one.

And for us though the challenge is sometimes there's actually something that happened in the community where they maybe took some protective action to prevent a road from being eroded. Or maybe there was a previous storm that made it more vulnerable. And that's the hard part for us is to know when is this community really going to be under threat? And so that's a really hard thing to do because there are so many different communities, and the communication between everybody is not necessarily the greatest. And so we don't always know what's going on. And that's a definite challenge for us.

CHAIR MILLER: Okay. Thank you very much. Very interesting panel. Lot of interesting information.

RDML SMITH: Can we clap for them?

CHAIR MILLER: Yes.

(Applause.)

CHAIR MILLER: We're now going ‑- we have a working lunch for the HSRP members and NOAA staff in the room where we had breakfast and ‑- and IOOS, I'm sorry, and we will reconvene at 1:30 here in this room.

(Whereupon, the above-entitled matter went off the record at 12:25 p.m. and resumed at 1:30 p.m.)

CHAIR MILLER: Welcome back to the afternoon session of the HSRP. Our IOOS team has gone off for their separate meeting.

This afternoon, we have panel on stakeholder perspectives for Alaska. Our co-moderators will be Lieutenant Bart Buesseler?

LT BUESSELER: Buesseler.

CHAIR MILLER: Okay, and Dr. Nicole Kinsman.

DR. KINSMAN: So, we're going to be using the roving in our session -- we've got the roving mic running today.

So, yes, Lieutenant Bart Buesseler and myself as the Geodetic Advisor for Alaska and the Alaska Navigation Manager, we have two of some of the best jobs in all of NOAA.

And so, for the next two hours here, you're going to get a little taste of what it's like to be us.

We get to work at that interface where NOAA products and services really get out into one of the most dynamic coastal and maritime environments in America.

And we get to see when those things don't work so well and we get to see when they work really well and we get to hear all about how people are using all the products and services that we create.

So, we have really some fantastic stakeholders here today for you to hear from. One of the best parts of our job is getting to work with these people every single day and getting to hear from them. And getting to work closely with them and build relationships. So, we hope you get a taste of that over the next two hours here.

LT BUESSELER: So, the layout that we're going to do is we're just going to go down the line, have a series of hopefully quick ten minute presentations hearing a little bit from each stakeholder that we have about what products they're using and what products they'd like to see developed further to help them grow and develop in their operations.

We're going to try to hold the questions until the end. If there's a burning question after a presentation, we might have time for one or two, but otherwise, we'll try and keep as much time as we can until the end of the session then we can have a big group discussion with the entire panel and our stakeholders.

And I think that we are going to have a lot of great topics to talk about so we're going to try to keep as much time in there as possible.

So, with that said, we're going to start it off with Ms. Frances Leach. She's the Director of United Fishermen of Alaska.

MS. LEACH: I'm not going to be roaming so I'm going to stand right here.

Thank you, my name is Frances Leach. I'm the Executive Director of United Fishermen of Alaska.

I have commercial fished on and off for over 40 years with -- alongside of my father.

United Fishermen of Alaska is the largest stakeholder group of commercial fishermen in Alaska with over 35 member organizations, as well as thousands of business and individual memberships, mostly composed of commercial fishermen.

In Alaska, commercial fishing is a very big business, as you might've guessed. With over 6.1 billion pounds of harvested seafood, Alaska produces over 61 percent of the U.S.'s harvest, which is more than the total of the U.S. estimate of annual seafood consumption.

The commercial fishing industry employs over 60,000 people in the State of Alaska, which is the largest single employer in the state.

We have over 9,000 commercial fishing vessels in over 9,125 commercial fishing permit holders.

The title first wholesale value is $4.2 billion with $3.27 billion of seafood exported in value.

As previously mentioned, we have over 9,000 commercial fishing vessels in Alaska. The first time I visited the Marine Exchange and Ed Page pulled me into the head command room, I guess that's what you might call it, he pulled up this image on the screen and I was absolutely flabbergasted.

I mean, I grew up in these waters and I, you know, you see the occasional fishing boat as you're going by because it's such a vast place.

But when you pull it up on the screen, it is absolutely amazing. And it doesn't even -- this image doesn't even come close to depicting the amount of vessels that are on the water in Alaska right now.

But it does give you a really good idea that we are an exception when it comes to vessels in the water at any given time.

So how do commercial fishermen use NOAA navigational services? We rely heavily on them for accurate real-time weather, forecasts, accurate charts and tidal and current information.

Safety is first. Fishermen are constantly making risk assessment decisions based on weather.

They can find other places to fish at the weather is going to be bad. They may not be the most desirable places to fish but it's better than getting stuck in a storm.

What would fishermen like? They would like to see more real-time weather sensors and relaying a forecast and observations be as smartphones and AIS which will enhance efficiency and safety in fisheries.

The recent expansion of weather sensors by AOOS and the Marine Exchange has been a great asset and is heavily used by fishermen.

They also want relevant weather observations in a real-time manner without having to listen to a bunch of nonrelevant information, which is a great segue into my next slide.

The man on the left is my father, Leonard Leach. He's 75 years young. Today he is out fishing off of Lincoln Rock in Clarence Straits, which anyone will tell you in southeast Alaska can be one of the most gnarliest and most unpredictable weather systems in southeast Alaska.

The boat he is pictured on is the F/V Clancy, a 35 aluminum bowpicker that he is using to gillnet for salmon.

The boat on the right is the F/V Towego, a 55 foot steel halibut longliner and salmon tenderer. And this is the boat that I mainly grew up on commercial fishing.

Ed Page suggested that I should tell you a great sea story about my father. He's been fishing for 55 years, so he has a lot of them.

In 1987 is 48-foot wood boat that he built by hand, took a rogue wave in Clarence Straits. It was plug-loaded with 30,000 pounds of halibut, filled the stern, rolled and sank.

My dad, heroically, and single-handedly saved the entire crew, but the boat was lost.

When I asked my dad if I could share this story, he said, "No, tell them my gripes about the marine weather."

And then, as he had me on the phone, he turned on the VHF and forced me to listen to the entire marine forecast for his area, which lasted about 15 minutes. But, there was probably only about 30 seconds worth of valuable information.

Here's what my dad wanted me to tell you, first and foremost, he said he wanted you to know that the folks who are tuning into the marine forecast are professional mariners. They are not folks sitting on their couches in town wanting to know if Saturday is a good day for a barbecue.

Professional mariners want to know how to decipher a weather forecast and they want specific information to help them make the most informed decisions that could be a matter of life or death.

He said that in the synopsis not enough information is given. When referring to the low, he was to know which direction is coming from, how fast it's moving, and most importantly, what is the size of it?

Right now, none of that information is given. He would like to know if it's a 990, a 980 or a 960 and if he needs to seek a harbor or if he's okay where he is.

He wants to know the direction it's coming from and how fast it's coming.

This is the information that is going to make it or break it for them. It's like knowing there's going to be a party but not knowing when it is, where it is, or what you need to wear.

And if you just know that there's a low coming, it's just not helping you. So he would like a lot more information on the low.

He also said there is a lot of fluff in the report that is not very useful to mariners.

For example, all mariners know that the reports come out at 4:00 a.m. and 4:00 p.m. Unless there is an update, they don't need to be told that at the beginning of every synopsis.

He said they also don't know if it -- they don't need to know if it's raining or what the temperature is in the town. He said the only time that might be helpful is if they are docked and wanting to paint their boat.

But knowing the precipitation in town is useless information for those that are on the water.

Lastly, he wanted to thank you. The observation sites and buoys like Lincoln Rock are extremely important and helpful. He is also extremely appreciative of the three to four day out forecast.

He recognizes that things can change on the drop of the dime, but if he's planning a halibut trip out in the Gulf, he wants to know what his window is.

If it's gale knot winds that are forecasted, he knows he's not going to go out because he's going to get stuck and is going to put his crew at risk.

So there you have it, probably way more information than you want to know from my 75-year-old father, but with 55 years of experience, I think he knows what he's talking about.

And that wraps up my presentation. Thank you. If you have any further questions please do not hesitate to contact me.

(Applause.)

LT BUESSELER: Any burning questions as we get queued up for the next speaker?

Okay, seeing none, our next speaker is Captain Carl Uchytil, did I got that close -- close enough -- and he will be speaking on behalf of the Alaska Association of Harbormasters and Port Authorities -- Port Administrators.

CAPT UCHYTIL: Good afternoon.

A little more introduction, I'm also the Port Director here in Juneau and I'm going to be presenting on two different presentations, Alaska Association of Harbormasters and Port Administrators is the first presentation and -- okay, the Alaska Association of Harbormasters and Port Administrators.

We represent 43 municipal harbors in Alaska. We're a 501(c)(3) organization primarily -- I'm sorry, we're a 501(c)(6) organization.

Primarily, we serve and promote ports and harbors throughout the state. And we do that through a variety of different ways.

We advocate for legislative changes. We advocate for grant money, grant opportunities to recapitalize the small boat harbors throughout the state.

For people outside Alaska, the Department of Transportation built and maintained nearly all harbors until about 2002 when they decided that they were unable to maintain the facilities.

And so, whenever they could transfer harbor responsibilities to municipalities, they did so.

And so, there's 125 various harbors in the state, 100 of them are in municipal control.

Some of the key legislation that were working on right now is abandoned and derelict vessels throughout the state and working towards having a more robust opportunity to deal with the vessels that are littering much of the inland waterways.

We have some as you drive down Egan Drive you'll see a derelict across the channel there. And that's on state land right now, but those are issues that are near and dear to the Association's heart.

So, just showing the vastness of our membership of the 42 members who go all the way from Metlakatla up to Nome. Obviously, you guys have heard in your presentations already today, you know, Alaska being one-fifth the size of the lower 48, 33,000 miles of coastline and only 4 percent of the U.S. maritime Arctic being mapped to international modern standards.

So, just to show big state, lots of opportunity for surveying and mapping.

This shows -- I sent out an email to my membership and trying to distill down what my user base uses. And, of course, bathymetric charts, tide data, wind buoy data, and weather forecasting are key.

It's also -- the data's also necessary for determining storm surge and tsunami warnings and weather forecasting. So, a little more on tsunami towards the end here.

If I could, can I link on -- I wanted to share something that we're very proud of.

Yes, so one thing that the Port of Juneau partnered with Marine Exchange of Alaska to install real-time current sensors.

And can you blow that up at all? Just south of the CT Dock.

We went out to contract with Ed Page, and so this is highly used by the pilots and the cruise ships and the commercial fishing vessels that come in and discharge their product at the Taku smokeries.

But it's a real-time at 20 feet and it'll give a -- click down some more -- click, just click on one of the arrows and that'll give us -- that's a real-time direction and set and drift at that time off the cruise ship dock.

And so, we were the first port to work with Alaska Marine Exchange to get this in. And it's been highly valuable and Ed can talk more about it at a later time.

But the other ports in the state are following suit. So, we're very proud of our record to try to improve safety and efficiency throughout our port.

So, as far as what we need, what my membership would like to see, you know, because of the expansive shoreline and remoteness and because of the dearth of critically underutilized instrumentation, we would like to see a lot more instruments, more buoys.

We're also -- the Association is just now becoming aware of the AOOS Water Level Watch. And we think there's great opportunity to leverage that with our membership.

We believe that this -- the Water Level Watch will update and correct outdated tide tables.

And we're also specifically -- we believe that we need more tidal data corrections. Homer, for example, weighed in and said that their correction station hasn't been updated since 1979.

And Anchorage, on another topic, Anchorage was recommending that if we could come up with some real-time navigational chart correction for their area which is shoals extensively in upper Cook Inlet and the Port of Anchorage, that would be their ask.

And from an engineer, one thing that they would like to see relative sea level change data that include both sea level change and uplift when designing a new port.

So in Southeast, and south-central, we have a lot of isostatic rebound and just getting the data that is updated to design for new harbors would be a great benefit to my membership.

And finally, I just wanted to kind of share a story that looking for opportunities with NOAA to help the tsunami issues that we see in the state.

And when I say issues, harbormasters throughout the state, right or wrong, are considered first responders. They're considered to be the expert with anything water related, and we're not.

And an example in January, there was a 7.9 earthquake off Kodiak. And the Nixle warning system that went out throughout south-central through Anchorage, through Seward and Homer and Cordova and also in the Southeast as well, saying tsunami alert, go to higher ground.

And, it went out and there really wasn't any, I'll say, coordinated efforts to manage that information.

So, when you have such a wide breadth of information going out, there was a lot of uncertainty. And when there's uncertainty, poor information fills that vacuum.

So, an example in Homer, Homer, harbormaster started texting with the harbormaster in Kodiak. And basically saying, what are you seeing? We've got the alert.

The harbormaster in Kodiak followed directions, went up to higher ground and was watching the tidal surge.

And so, between Homer and Seward, as well, coordinating with Lonnie White, the harbormaster, that is how they got the best information about what was going on.

And, right or wrong, it's an inexact process. And so, I don't know if through the Water Level Watch that improvements could be made that harbormasters could have greater access to information that would provide a greater certainty with regards to tsunami warnings.

So, with that, that is my AAPHA presentation.

(Applause.)

LT BUESSELER: So, Carl was kind enough to volunteer to actually give two presentations. We had Mr. Greg Kinney signed up to give the presentation -- the next presentation here, but, unfortunately, he was unable to make it.

So Carl is also part of the American Society of Civil Engineers and was able to step up and fill in.

So, we've got him to go back to back, he's that good.

CAPT UCHYTIL: So, the American Society of Civil Engineers is a 501(c)(3) organization. We advocate for the civil engineering profession through licensing and education.

We advocate for all engineering professions. And we serve the public good.

The American Society of Civil Engineers Alaska Section has 800 members and five branches. Worldwide, we're over 150,000.

And so, last year when we knew that NOAA reached out to the organization asking our membership what resources would be beneficial to our engineers.

We did send out an email and we got some feedback. And granted, I'm going to go through the points that we received. I realize that all of the information is NOAA NOS, but it's still, I think it's good information to know and pass on.

So, if I was to summarize what the American Society of Civil Engineers, coastal engineers and marine engineers need as far as records or data, they really -- we really need to document the peak water levels for storm surge modeling and validation of flood mapping.

We need to establish tidal datums, standardized vertical references and especially this applies to FEMA maps.

Would like to quantify long-term relative sea level trends arising from climate change and variables associated with isostatic rebound.

We like to analyze the temporal trends and coastal storm frequency, magnitude and durations.

And, and we like to correct the bathymetric and shoreline survey measurements.

So, I'm going to go through, I know it's not the format that was requested. But this is -- these are just kind of responses that we got back from our membership and if it resonates with you, fine. If there's another colleague within NOAA Weather Service, please feel free to share it.

So, storm surge studies, especially Western Alaska where were having a lot more degradation and erosion, more air temperature monitoring stations, again, in the remote areas as they pertain to permafrost and climate information.

Ground temperature profile data throughout Alaska would be desirable. And more wind and precipitation data in rural Alaska.

Unalaska, specifically, is collecting their own data. They're working with the Department of Natural Resources and U.S. Geologic Service to get that information.

Wave buoy seems to be a topic even with AAPHA that would like to see more inshore to provide the data that they need, that there coastal engineers need.

You know, the bathymetric survey information is well known. Establishing the sea level changes are important, especially data further up and above the mean higher water is very important for a lot of coastal engineers when we're designing small boat harbors.

And any information that NOAA can provide on the potential for alternative wind and energy potentials in Alaska.

The engineers also would like to see the data in CAD DWG format would be very helpful.

There is some concerns from a lot of our engineering companies and going to get permits. And it seems like that's a growing challenge in Alaska, coastal permits. And I can vouch for that as well. We're spending tens of thousands of more dollars on our permitting issues.

And just a lot more detailed rain, snow depth data would be helpful and tidal data updates.

So, I don't think this is a NOAA issue, but meandering rivers and vegetative cover throughout the state and more investment in weather stations.

So those are kind of unvarnished bullets that we received from our membership.

LT BUESSELER: Thank you very much.

(Applause.)

LT BUESSELER: So, next up we have Captain Hans Antonsen with the Southeast Pilots Association, SEPA.

CAPT ANTONSEN: Thank you very much.

First of all I'd like to say thank you for inviting me to participate. Obviously, weather, tides and currents, wind are thing that are just the foundation of what pilots do, charts and everything.

My name is Hans Antonsen, I'm a third generation Alaskan, born and raised on the waterfront in Ketchikan. I think I learned how to operate skiff and an outboard before I could ride a bicycle. And, it was just as frequent to see a kid from Ketchikan going around on a skiff as it was a skateboard or a bike.

We have quite a few pilots in our organization. We have a majority of pilots in the state. Of the 75 pilots, approximately in the state right now, we have about 50.

We have a little bit of attrition problems so we have 17 trainees right now that are up and running and riding these ships.

As you know, the three regions of Alaska for piloting, Region 1 is Southeast from the border with British Columbia up to and including Yakutat Bay, 141 degrees west latitude. And, our primary industry is cruise ships now.

Cruise ships provide about 99 percent of our volume, it used to be about 75 percent. But since 1998 and the closure of the mills, we're a cruise-centric region.

The other two regions, of course, Aleutians, fish, and Southwest, oil and containers.

Cruise ships have been on the rise steadily since I started. This is my 31st season piloting as a ship's pilot after my career on tugboats. I worked with Frances's brother, I believe, and know her family well, their reputation.

And the ships have been getting bigger and bigger all the time, as you see. I spent last night cruising up from Ketchikan, mostly in the fog, but otherwise, looking at the stern of the Bliss or, as I call it, the Bling because it's really bright.

I don't have the guts to ask a fishing boat to turn its sodiums off when I'm on a cruise ship. I just like expecting the guy to say "you first"

Our usage of the tools for NOAA, basically, charts are the foundation of what we do. Other than looking out the window, second to looking out the window, charts are the foundation for what we do.

That's why we start with state pilots just memorizing charts and drawing them from memory, sounding points, rocks, buoys, light sectors.

All the data on the coast pilot and the light list, the light list had a lot of columns and information. We only had reproduce nine of those or 52 Aids to Navigation. That was a one day's chart.

Accurate tide and current data is huge with these bigger ships. The bigger the ships get, the more important it is for us to have accurate tide and data -- tide and current data, especially the currents.

These big ships have lower tolerances with tide and current and wind. The ships are not getting only bigger, but we're getting more of them.

We used to have medium-sized ships, now we seem to be trending toward very large cruise ships, the ultra-large ships and then smaller excursion boats. And we all have to share the same waterways.

Weather, weather is huge. I mean, we use weather long-range planning, short-time decision making. But, if we're going to be able to continue to bring these big ships to Alaska, bringing one million passengers a year or more to Alaska, a lot of those are probably U.S. voters that can help get some funds directed to NOAA and the Coast Guard for dredging for projects or weather sensors. We hope so.

But these people all want to get up and close to Alaska. They don't want to cruise by, they want to come in and see what we have to offer. They want to see glaciers. They want to whales. They want to see everything.

They want to land on the top of the glacier. They want to climb on that iceberg. They want to shake hands with the bear. They want to experience Alaska.

So, these are the tools that we use the most.

The tools we don't use is the Coast Pilot because most of us have that memorized anyway. And we use the real-time information.

We want to be able to, at a glance, say what's happening now? How do we make a decision now? How does the present dynamic changing conditions, where we are, where we're at, affect our decision making?

Big ships bring big risk and risk needs to be mitigated. One of the things that we can -- the tools that we can use to mitigate the risk of these ships coming is have accurate data to make good decisions.

So, our requests, we'll keep it short because we had a list about three pages long. So, we pared it down because I'm doing the presenting into three.

We really encourage the expanded use and expanded placement of real-time current sensors and wind sensors. That's huge for us.

And I would say that wind is probably the biggest priority right now.

With these big ships, pilots are going on board, we're riding these ships, we're collecting and collating data. We're running these ship models through simulators.

We're putting in several different scenarios of wind and current to try to see ahead of time how much wind can the Bliss, that's parked out in the AJ Dock right now, how much wind can it take going up the east channel of Ketchikan Tongass Narrow? The answer is about 25 knots.

At 25 knots of wind, the Norwegian Bliss, without going into Aziman Mode, has about a 10.5 angle swept path.

That gives me about 25 meters on each side of the ship from one buoy to the next to get through.

On a good day with the Bliss, if I could get within 25 meters of the track line where my pivot point is, they think I was a super pilot. I'm just an average pilot.

So, the wind is the most important tool.

Current meters are also important. Our request is just to continue to work on accuracy of meters, especially in places like North Indian Pass where, for some reason, the recalculation has changed what we are expected to experience in North India Pass from 7 knots which it has been ever since I was young to less than that, 3, 4, 5, 6 knots and less.

That's not as important safety-wise because that's a planning tool. But of more importance, is what we see in collaboration with the Marine Exchange, is the current sensors in the harbors being able to come into Juneau Harbor, make real-time decisions about trust and verify.

This is what we expect to see. If we are seeing that, this is how to maneuver the ship. If we're not seeing that actual observing what the predications are, then we'll do something different.

We need the information format that is easy for us to assimilate and make safety decisions on. Situation evaluation, risk analysis, and make decisions.

You see here, there's just not a lot of information on those chevrons, those arrows. But it tells us the speed and it tells us at a glance what we can expect. Which way is this ship going to set? I love that.

Easily accessible, we can't get that information on the ship's ECDIS. There's a sign outside the ship that -- the door of the bridge that says, cruise -- excuse me -- it says, cell phone use is prohibited on the bridge.

Well, I use this on the bridge because I dial up the Marine Exchange website and I look on the Marine Exchange website real-time weather and I can see what the current's doing and I can see what the wind's doing at three different points in Juneau Harbor.

And, as I'm looking at my pilot unit, my navigational unit that's plugged into the ship's AIS port, I've got my phone in my hand that gives me other data that can be used in making decisions and I can't get that on the ship's AIS.

We need to be able to have this information in a way that we can actually use it.

Also, ease of access to simple tools. The watermark there you see is just a simple surface map. Now, it looks a little bit different from the surface map that's available on the NOAA website which has got blue and green and red and all kinds of colors and chevrons and arrows and everything. That's great, give me that. That's a shortcut on my phone.

I punch that, I'm good to go. I see that at a glance, I can see what I can expect if I'm going to cross the gulf in a ship carrying 5,000, 6,000 people before we start out.

So, ease of access of simple tools, don't get lost in the feldercarb of all the data that is available. Like Ms. Leach said, we don't need to listen to four minutes, we don't need to listen to four minutes to get 30 seconds of information.

Another tool we don't use, we don't listen to the weather forecast anymore. We can't. It's useless to us, we have to move on. So, we get our information for weather in different ways.

Surveys of retreating glaciers, Tracy Arm/Endicott Arm and then in Glacier Bay, Margerie Glacier. In Endicott Arm, Dawes Glacier has retreated eight-tenths of a mile behind the survey point.

It used to stay off the glacier two and a half cables, 2.5 nautical miles so you wouldn't get a shooter come up and interfere with the ship.

Now, we have to worry about grounding. So, very few cruise ships, especially ships like the Bliss with so many people want to go beyond "there be dragons" where there's no surveys beyond that. And, they would be irresponsible to proceed past a point where there are reliable surveys.

We talk a lot to the Allen Marine people who are a great resource up in Glacier Bay and Endicott Arm and in Tracy Arm, I mean, sharing conditions of ice.

But we would encourage to get some boat sheets and get some new surveys in front of some of the glaciers that have retreated so far.

Margerie Glacier in Glacier Bay, some real big pinnacles out there that used to be safe water now are revealed to be sandbars and rocks.

So, that's basically the list of what we'd like to see.

Perspective is everything on a cruise ship. Speed is everything when you're going through ice.

A lot of these ships that we're using have limits and most of those limits of being able to go through Tracy Arm/Endicott Arm are based on wind.

So, as I said, with the Bliss, pilots took the lead in modeling the Bliss in Southeast Alaska, Tracy Arm Bar, Ketchikan. We took and remodeled that ship. We spent 5,000 man hours last winter, the pilots did, unpaid, uncompensated for.

We set up simulations in Navtech and down at PMI. We're doing the same thing this winter. I'm on the committee for very large cruise ship committee.

We're modeling these ships, we're seeing what they can do and we're using the tools that you provide to us to plan and try to come up with port parameters that we think are safe for these ships to come in.

The duties of a pilot are simple, we have one job, safe navigation of ships under our direction and control.

And the purpose of that is also in statute, it's protection of life, property and the marine environment. That's all about the State of Alaska. That's not about Carnival Cruise Lines. That's not about NCL, RCI, that's about the people of the State of Alaska, protecting their lives, their property, their marine environment.

So, we rely on your tools heavily and we probably use your tools more than we use any other resource that we have, cookbooks, everything else, other than the Bible, I use the NOAA resources more than anything else.

And I would really encourage you to continue the partnership with Marine Exchange, help us make these real-time current sensors, wind sensors available to all mariners in a form that we can use.

And we just applaud what you're doing. We've had a long partnership with you. We thank you from the pilots. They wanted me to thank you for the responsiveness that NOAA has really had to pilots, seeking out what's important to us and then responding as best they could.

So, let us know, we'll give a call to the White House and see if we can't trump up some more money for you.

So, anyway, that's all I have and I'll be available for a few hours here. I have to sail the Golden Princess out. But, you have my email there and you can get my contact information in other ways from Ed Page if you need.

And I'll be happy to answer any questions throughout the afternoon.

Thank you.

(Applause.)

LT BUESSELER: Thank you very much. Our next speaker is with Allen Marine Tours and it is supposed to be Angela, right? It was Brian Vreeland, that's what your schedule says, but he got called away so, Angela has stepped up at the last minute to give the presentation. So, thank you.

CAPT THROWER: Hi there. Thank you so much for having me today.

My name is Angie Thrower. I apparently don't know how to use slides.

But, I'm the Staff Captain at Allen Marine Tours. I don't want to take up too much time waiting for those slides -- fantastic. Oh, that would be the old slide show.

That's all right.

So, I'm Angie Thrower. I'm the Staff Captain at Allen Marine Tours in Juneau.

Just a little bit about myself, I'm a local born and raised Juneauite. I am a Captain and I'm a tour professional of the past 12 years.

Now, Allen Marine Tours, we are a local family-owned company. For those of you unfamiliar with us, we started off 50 years ago over in Sitka, Alaska, with just a single vessel and a shipyard.

We started servicing the cruise ships that came to port.

Now, you can say we've been a little bit busy since then in the last 50 years.

We currently operate three main divisions. We have our tours division operating out of Sitka, Juneau, and Ketchikan.

We have our Alaska Dream Cruises division which is what our take on Alaskan cruising is. We have five overnight ships as well.

We also operate Allen Marine Industries which is where our shipyard where we design vessels for Alaska by Alaskans specifically built in Alaska.

So, you could say we're pretty homegrown. We're quite expansive. We hold contracts -- our day touring holds contracts with almost every major cruise line that comes to port here in Southeast Alaska.

As Hans did say, we're just over a million cruise guests to port this year and then the next three years, we're projected to be over a million and a half.

So, we do hold contracts with almost every single one of those very, very large ships, increasingly large ships here.

Now, we do operate about 300 nautical miles. Our tour range is about 300 nautical miles. We have 450 seasonal employees and 150 year-round employees. So, we're very invested in this state economy.

We're invested in keeping our labor local, keeping our contracts local, keeping our vendors as local as possible, as well.

Now, we do also offer something particularly unique about us, particularly with our relationship with the cruise lines. We provide remote access to public lands, to national wilderness areas, to congressional National Monuments, areas like Tracy Arm, Glacier Bay, Misty Fjords.

We provide an ease of access for these remote areas and public owned lands.

Now, we are also the largest operator of U.S. Coast Guard certified tour vessels in the southeast region of Alaska.

Our fleet currently consists of 35 passenger vessels and we're looking to expand into 40 in 2019. So, we are a rapidly growing and ever expanding company.

In fact, I do believe that a lot of you are going to have the opportunity to come out with us in the next couple of days. I think you have a cruise booked with us, so we're very excited to see you.

There we go.

So, how our captains use all of these -- all of the NOAA tools. Primarily, what we use, we use the daily marine operations -- or daily marine, sorry, weather observations.

These weather observations, they are used by every captain in the fleet every single day. All of our remote teams, so all of our offsite teams, people working out in the Taku Inlet area, people working out over on Cole Island and all of our management team as well.

We use this information to make weather-based safety decisions. We want our passengers to be comfortable and we want them to be safe.

And one of the things that were really proud of as a company is that we homegrow our own captains. The vast majority of the year-round staff -- year-round captains that we have, we raised and trains ourselves.

And one of the most -- one of my favorite maritime adages that we teach our captains, a superior captain uses superior judgment so they do not have to demonstrate superior skill.

Now, part of that is using all information available. That information, that's our day-to-day -- the day-to-day weather observations. That's the weekly Marine forecasting that decides whether or not we're going to relocate a vessel Juneau to Sitka in February.

Anybody who's familiar with Lynn Canal, when it's blowing 80 and there are 16 footers out there, you stay home, that's what the prudent mariner does.

It also -- the marine forecast, using any history, any facts that we can get on that, we use that for decision-making and tour expansion. Where do we want to go next?

That's one of my favorite things about working for Allen Marine. Even though were just one tour company, we're creative. We like to push the boundaries. We like to share Alaska with the world.

So, a lot of that -- a lot of the decision-making for where were going to go next is based on all of the maritime forecasting, the history of weather in certain areas, about whether something is possible and whether something is smart to do.

So we also use your nautical charts, which we really appreciate. They are actively used at all times by all captains in all ports.

We use AIS. We have our NobleTek up. We make sure that we are appropriately zoomed into the right area.

Now, we do have a graphic of the South Sawyer Glacier, this little chartlet right there off to the left.

As Hans was saying about the Dawes area, these charts are a little outmoded. When our tour vessels are in the Coast Guard recommended quarter-mile away from the face of South Sawyer Glacier, we're inside of South Sawyer Glacier.

And so, it would be great to see a little bit up updating to those charts.

Now, those nautical charts also determine site safety, site-specific safety protocols. So, all of our emergency planning, all of our bailout points, if something were to go wrong, where can we beach the vessel? Where is it safe to go? Where is the closest area to safely offload the up to 150 guests that we have on each one of our boats at a time?

Now, it also -- those nautical charts also aid in decision making for tour expansion. And also aid for decision making when a tour might not be as prudent anymore.

One of the very first tours that Allen Marine Tours operated in the Juneau area was at Taku. I don't know if anybody was around for that.

So, Taku Glacier is a very unique area. That glacier, it's an advancing glacier. It's in a constant state of motion. It's dumping a whole lot of silt into that area. It makes it very shallow to operate.

Thirty -- or 20 years ago, we were able to take our catamarans all the way up Taku River and get a great up close look.

In the 1930s, cruise ships were going to the face of Taku Glacier to check it out.

A couple -- about 15 years ago, the glacier had such an incredible surge, it moved so substantially, it kind of snow plowed up all of that glacial till, all the sand, all the mud, it snow plowed it up and we were no longer able to do our tours up there.

Now, we kind of kept our eye on Taku, and a few years ago, we started doing a hovercraft tour up the Taku because that was the prudent vessel to use.

So, we need to know what an area is like before we're looking at expanding into that area. It kind of informs what type of vessels we should be building.

We are Alaskans building vessels for Alaska and we need to know what that terrain is like and we need to know what the weather is like to inform that decision making.

Requests for navigation services, as everybody on this panel has said previously, we would like to see more real-time information.

When we are moving vessels from one area to another, it's important to know, you know, when Icy Strait, Lynn Canal and Chatham, when we have a vessel approaching that area in the middle of February, we'd like to know exactly what the weather is doing.

We want to make sure that we're using our prudent judgment or, great example, we subcontract transportation for some of the mining in the area. So, Green's Creek and Kensington, we do transportation subcontracts for them during the winter.

If I'm waking up at 2:00 in the morning, and for those of you familiar with Alaska, it's a little dark at 2:00 in the morning when we have blinding snow, so flood lights don't even help you.

But when I'm waking up at 2:00 in the morning to go do a transportation run between Slate Cove and Echo Cove, the first thing I'm going to do is get on my phone and check what Eldred Rock is saying.

So, if the Eldred Rock observation is saying it's blowing 80, I'm making a couple phone calls and going back to bed.

Again, we want to use as much information as possible. If the forecast had been less than that and the forecast wasn't accurate, that means we're finding these huge seas, we're finding these huge winds when we're out in it.

We're not able to make the prudent call to not leave port at all. So, it's important to have that real accurate in-time information.

Now, one of the most important things about charting in this area, Alaska is in a state of change. For those of you not familiar with the geology of the state, for those of you not familiar with the glaciology and the natural history, Alaska is very new. We're very young in terms of natural history.

I've heard, I believe Carl mentioned, isostatic rebound. So, the State of Alaska, we're growing a little bit. We're rising, all of that -- all that granite is still relaxing and expanding which causes certain narrow channels like this is Echo Cove, it's an area that we navigate through that run out to Kensington Mine, taking miners back and forth between the remote work site and Echo Cove.

So, isostatic rebound is one factor here. Additionally, the shifting sand bars, the glaciers that have formed Alaska are still in the process of forming Alaska.

Massive amounts of glacial silt flow through this area and choke up narrow waterways just like this.

So, this is the chart as it exists into Echo Cove. Now, it's a very narrow waterway. Our vessels are very large, but we have a nice shallow draft.

Unfortunately, this chart is not -- it's not accurate to the area. More accurately, when you see our track lines, we go right over the land.

So, it's really fantastic, it would be great to get the opportunity to have just have the surveying take another look as some of these areas.

Because, not only are they transportation securities, they're great points of interest for guests traveling to Alaska. These are fantastic marketable exclusive areas that people want to come see on public lands.

Now, the more accurate we can get with the real-time weather information, with the charting, being responsive to the state of change here in Alaska, the more accurate we can get.

That will increase our safety. That increases our reliability. And, overall, it's not just us as a company, it increases consumer confidence in the State of Alaska, not just day boats, not just tourism, but it increases consumer confidence in the State of Alaska.

Guests from all over the world travel here to experience this beautiful place. And, it's our obligation as mariners, as a company and as Alaskans to make sure everyone gets home safe.

So, we use those tools, all of the maritime forecasting, all of the real-time observations and all of that charting to make sure that everyone, both crew and guests, get home safe.

Now, in terms of tourism futures, I had mentioned before, Allen Marine is a very expansive company. We like what's next. We want to see what's new, we are interested in what the people are interested in.

So, we're always looking for that next thing to do. We're really excited about that. And the more accurate information we get, the more we're able to custom build our vessels to a certain site, the more we're able to go explore.

As I mentioned before, the more reliable information we can have, the more we have a better idea of not what is only possible, but what is safe.

So --

VICE CHAIR SAADE: Ten minutes.

CAPT. THROWER: Thank you so very much. That was perfect timing.

So, thank you so very much for having me today. I'll be sticking around for the next few hours if you have any questions about Allen Marine Tours or touring on the waters of Southeast Alaska, I would be happy to answer those questions.

Thank you so much.

(Applause.)

LT BUESSELER: Thank you. And last, but certainly not least, we have Mr. Mark Smith who's the CEO of Vitus Energy. Western Alaska Perspective.

MR. SMITH: Appreciate the fine audience here. It's rare to get on a soap box and have such a powerful audience. Usually, I yell at individuals or small groups. So, having you all together here is just fantastic.

My position in navigation is actually -- it's the end of a long chain. So, I have great uncles on both sides of my family.

One of them was in the Klondike Gold Rush. I have a picture of him crossing Lake Leberge on his way to Dawson.

My other great uncle, Frank, was in the Nome Gold Rush before the turn of the last turn of the century.

And when you're in Nome and you think about the infrastructure and the extraction of all that gold there, everything that got to the Nome gold fields came in on ships and was lightered ashore in lighterage vessels.

And so, that's kind of a -- it's a military term, not many people know it. But, essentially, what we do in all of Western Alaska is really lighterage.

We have large ships that bring in fuel and freight. And, none of those ships generally reach a majority of the population. The number of docks that you have in Western Alaska, and if you count Dutch Harbor, that's one.

You have some docks in Naknek and Dillingham mainly to serve the fishing industry. You have a small dock at Bethel, but you're restricted to 11 feet up the Kuskokwim River. And then, you have a Nome Dock and then you have a Kotzebue Dock.

Kotzebue is restricted to about eight feet to cross the bar in Kotzebue.

So, what we have in western Alaska is really a lighterage situation. And that is a choke point that every good or service that can't be stuffed in an aircraft needs to go across.

So, my point is, is that Alaska is much the same frontier state that it was a 100, a 150 year ago.

We don't have a highway infrastructure. And so, we have this little choke point that all the things, all the vessels really provide that very valuable and critical service is getting goods and services to that population in western Alaska through the act of lighterage.

So, I started with my great uncles. I'll skip a lot of the other relatives that influenced me. I did grow up like a lot of these other folks on the water. You started out set-netting on the beach with your mother and your other siblings that were young.

At 13, we had what was called the Bristol Bay bar mitzvah. When you're 13, you leave your mother and your siblings, younger siblings, and you go fish with your father on a boat.

It wasn't quite as sexist as it sounds, because all of my sisters did the same thing. And I have a current sister in Bristol Bay. She's one of Icicles' top fishermen for the area.

So, at 18, is the day you leave your father because you're eligible for the State of Alaska commercial fishing loans. And so, all of the family, when they turned 18 were immediately told by my father to go get their own boat and permit. And he took the next kid.

So, I was one of those kids that grew up in this area of commercial fishing where that really funded my college, my high school, and everything else. And our family not only did commercial fishing, but my grandfather also worked for the fishing business and he said, wow, there's all these wooden barges that are just used for, you know, 40 days out of the year. We have all of this infrastructure going into western Alaska. Why don't I use these wooden barges and we'll deliver freight and fuel to all the outlying villages for the U.S. government, for the U.S. military, for Bureau of Indian Affairs as infrastructure really began growing in the state.

So, that's the self-introduction.

The current company is really kind of an evolution of the company that my grandfather formed called Smith Lighterage Company in 1932. Vitus is a kind of a natural extension of that.

I included this picture because it really kind of demonstrates the craziness that you can find in Alaska. That's the Coast Guard Cutter Healy. And we're doing a winter fuel delivery to Nome.

And, growing up in western Alaska, I thought I knew ice. And so when we took this rather unusual project, I thought I was well-prepared. But the truth is I was woefully under-prepared.

The Healy is not really an ice breaker, it's an ice-capable research ship. And the Russian tanker that we chartered to come into Nome had a 29-year-old captain. And what I learned from him was an amazing amount of items, because he had spent his life actually working in the Bering Straits up in the north in the ice. And he had a lot of practical knowledge. I'd just love to sit down and interview him for a few days and write a short book on what it means to really navigate in the ice and the currents and the pressure and the expansion and the nature of ice navigation.

So, you can see the Renda off in the far right. I took actually two pictures. I took this same picture of the Renda with the Healy being the small boat to demonstrate that they're sort of two perspectives about what's most important.

So, the Russian presentations always had the Renda large and the U.S. presentations always had the Coast Guard cutter as the major part.

So, Vitus tries to be a dynamic company in looking how we most efficiently bridge this lighterage gap that truly is a choke point. And it's very expensive, because you take a commodity and you put it in a little tiny barge. Our smallest barge is only 55,000 gallons if you max it out to 5.6 feet. But we have some places where we go where we can only take two and a half feet.

So, you still have to have a fully compliant, fully inspected, fully licensed crew to deliver that, and your cost per gallon just skyrockets as you go in to some of these places. So, we have a lot of areas out there where Vitus is trying to save pennies and dimes on an already very expensive commodity.

It's sometimes embarrassing to talk about economies of scale, because we really don't have any in western Alaska. So, when I approach NOAA, I'm not going to spend a lot of time on that. And I'm always going to take the other side of the argument about anything that has to do with cost effectiveness, because cost effectiveness really isn't an issue out here.

To serve these people, we have to have the tools that we'd have whether it's 5,000 people or 5.5 million. We're still taking oil barges, we're dragging oil barges across these areas, and safe navigation for the preservation of the state, for the people, for all the stakeholders involved, nobody wants to have a problem. And the way we do that is to maximize the tools that we have when we do these transits.

So, I was a little bit snarky; instead of use of NOAA's navigation services and data, I said lack of NOAA navigation services and data.

And for 90 percent of the time, we use charts the way everybody else. Vital, tides charts are extremely helpful. But, again, we're coming to this choke point and this choke point is the transition zone between the ocean that's very static and a shoreline that's very dynamic, and then again, into the river systems where you get things that are fairly static. Ninety-five percent of all inland navigation that Vitus does I'm going to say has not changed over my lifetime. But the transit zone has subtle changes in almost every location and almost every year.

So, this is the ask slide. And, the ask slide is, there is a lot of information that's available out there. And when we do a typical voyage plan, we like to have senior captains, because senior captains have experience and they have judgment. They have knowledge of local conditions. But captains are actually a bit of a challenge because they come and they go, and so you really can't rely on an individual with a 100 percent certainty.

So we try to create institutional knowledge which, again, would be great if NOAA could help us fill that in, because what we mainly use are track lines. And those track lines, as has been mentioned earlier with the subtle changes, those are of dubious value as time goes on.

So, again, to avoid these dangerous parts around the edges, we need to use everything that we can. And, on my next slide, it talks some about the Bridge Resource Management.

But one of the things that, as I've spoken to the NOAA folks over the years, is, you know, the idea that every chart is a gold standard and nothing should be on the chart that's not verifiable.

And I think that the mission of NOAA in a lot of places where you have static information that that is absolutely critical and weather reports where you need, you know, super good data, that's true.

But this is, actually, in western Alaska where we work, perfect truly, truly is the enemy of good. And it's not even good; fair would be acceptable. And where fair isn't possible, anything is better than nothing.

And so that's what we're doing, we're filling in these nothing places with other data that's coming to us from a variety of sources.

VICE CHAIR SAADE: Ten minutes.

MR. SMITH: And just one more thing about using any other source: these are areas really that don't have cell service, typically. And so you have sat service. And we have satellite broadband, but it's very expensive. And just for an idea, each of our tugboats that support between four and six crew members, we usually pay about $3,000 per month of operation just for broadband service. And that is with very limited browser use.

So, we don't have access to a lot of the internet sites. And, as mentioned before, a lot of them, they're very broadband -- they're heavy, they're data heavy. And so, using a lot of sources is difficult.

MR. SMITH: You've seen there's a variety of folks -- this is what Vitus uses to take a look at what we have.

This is a place called Kongiganak and it's in the Kuskokwim Bay. And Kong has a variety of approaches. And this just gives you an idea of what we work with.

So, the NOAA charts, just white, and it has a little indication there of green, and then we have a Google Earth where you can look at the photography and get a little finer point on what that entrance is.

And then we have track lines. These track lines, again, can be internal or external. And then we have a lidar map, but the lidar typically doesn't show the information that you'd get at low tide.

So, that is what a typical voyage plan is and kind of the data source and the things that we go and look at before we make a transit and the things we try to provide our captains.

So, thank you very much. A picture of one of our village locations. So, again, just to reinforce the facts that going to a dock is an extremely rare luxury. This is about 98 percent of our deliveries.

Thank you.

(Applause.)

LT BUESSELER: I'd like to thank all of our panel for staying nice within the time limits. We have plenty of time for discussion now. So, I'll hand it back over.

CHAIR MILLER: Actually, Bart, do you want to sort of coordinate the discussion for your panel?

LT BUESSELER: Happy to coordinate it. At this point, sort of open, we have the entire panel of experts. So, if you have any questions, comments, now is a great time to --

RDML SMITH: I'll start off. Thank you for all the really great, you know, specific examples of needs. And, you know, for every one of the examples you showed, there's probably ten more that are like it. And so, you know, Bart's job is to find those other ten. To not only take note of the one, but to find the other ten.

One thing I did note is that when I go to speak to your congressmen about our program, they always start off by beating us up about the fact that only 4.1 percent has been mapped to modern standards. But none of you mentioned percentage as being important. You've mentioned specific examples of very small areas that wouldn't budge us off 4.1 percent, but that are examples.

So, I think I just want to observe that the value and the percentage are not always in alignment there. So, if it's a glacier face, that's a small project that has really high value. If it's the last mile, that has really high value, but it has no appreciable area. If we want to push the performance measure, we're going to survey off where it's deep and easy.

So, I think I just wanted to note that in public, because I think it's really important to note. So, we are committed to surveying everything, but we really need to -- not everything has the high value.

So, I'll let others have it.

CHAIR MILLER: I wanted to ask the folks that actually drive around in these waters a lot, do you have ideas of how you could help? Crowdsourcing was up there a couple times. You're the ones that go into these areas and know them. Have you thought of, or do you do any surveying on your own? I mean, obviously, you have echo sounders. Any of you, Angie or Carl or, I'm sorry --

CAPT THROWER: Well, at Allen Marine Tours, we don't do any surveying of our own. It's definitely a lot of shared knowledge on the water-based community out there. We have a lot of historical data, I suppose, and a lot of guesstimates, but we don't have any way to do the level of surveying, especially in areas like Glacial Arms, like at the face of Tracy Arm, it's very challenging. There's so much glacial silt in the water, we don't quite have the equipment to get an accurate impression of what that bottom looks like.

There's so much glacial till, and that glacial silt is a very fine sand. It stays suspended in the water, it makes it very difficult to get accurate depth readings. So, as much as we would like to, we can only get depth readings to a point.

It would be very nice to have the more accurate picture of that. But in certain areas where there are shifting sandbars, of course, other vessels that we do know transit through that area, we'll share information with, pre-season, of course.

But there's no -- I guess there's no broader public access to that. So recreational users of that area might not necessarily be aware that the sandbar has shifted, and they might not be as aware of the maritime, you know, the maritime community at large that would eager to share that information with them.

MR. SMITH: I'll speak to crowdsourcing. Crowdsourcing, I think it has a lot of great potential to it. There's a company called Olex out of Norway that has taken some North Atlantic data and really aggregated it well. It's also used by the crab and other trawl industries in the Bering Sea to get the very best picture of the fishing grounds that they can.

So, what we need, I believe, is sort of a baby version of that for commercial vessel tracking in and out.

Ed Page and the Marine Exchange, and now that AIS is mandated I think beginning of last year for just every commercial vessel, you have a really good indication of what I'll call the rabbit trails.

And we understand, and I think we don't need a gold standard chart. And that's very difficult and it's really a waste of resources to chart much of Alaska where we don't operate.

So, I think that what we have now with crowdsourced data and being able to look at those paths and say, okay, let's just say for a 100 yards on either side of that rabbit trail is a great place to start your survey, and just, you know, do that 100th of a percent and it would make our lives a 100 percent better.

DR. MAYER: I want to follow up on the crowdsourcing question. And I agree with you totally. An example like Olex I think has done wonders in the North Atlantic. But there, there is a crowd; and here, the crowd is very small.

And I wonder if there's a middle ground. And I'm curious about, in each of your constituencies, how you would react to the idea of carrying an authorized and authoritative black box that has gone through some sort of certification process and would be relatively inexpensive but then could provide to NOAA or others data that is one step above the dirty crowd, but now something that has some level of authoritativeness to it. I'm just curious what your reaction would be to that.

MR. SMITH: I'll start out, but, Bart, I was just wondering if you were going to moderate the questions here?

LT BUESSELER: If you guys are jumping in, that's fine. If people are too quiet, I'll start calling on you.

MR. SMITH: Okay. Yeah, I've always been an advocate for our industry and the industry players.

There are some interesting attitudes out there where a few companies and a few captains have actually said that their special advantage is navigation and they weren't anxious to share because they didn't want everybody to know their secret paths.

But I would say that that attitude is less and less with each year goes by and as these captains move into administrative positions and now they have to go out and hire their replacement, they're finding out how difficult it is to bring these people up and give them the information to safely navigate.

So, as far as my company goes, we'd be delighted to contribute to any better information.

MS. LEACH: I don't think too many fishermen would be overly excited. Most of them really don't like people knowing exactly where they're going or where they are at any given time. So, I mean, we have a hard enough time with observers on our boats. So I think it would definitely be a concern.

MR. SMITH: I'll jump in there, and I think that that, again, reflects a lot of the old school ideas. But the truth is now, with AIS, none of that's secret anymore. So, it's really more attitude than reality unless, you know, you turn off your AIS.

MS. LEACH: I would just jump in and say, the majority of the commercial fishing vessels out there do not have AIS because they're under the footage required to have it.

MR. SMITH: I guess I'm thinking Bering Sea where the fishing vessels are typically larger.

LT BUESSELER: Any other comments?

CAPT THROWER: From a passenger vessel standpoint, I think that any potential partnership that we could have with NOAA would be really exciting. One, to be able to, you know, aid navigation in the southeast region of Alaska. But what a great thing to share with the guests that we take out with us, that NOAA participation, that partnership would be a fantastic thing to share with more people. So I'd definitely be interested in hearing more about that if that's possible.

LT BUESSELER: I believe we had a question from Colby.

MR. HARMON: So, I'm Colby Harmon. I'm cartographer from the Coast Survey, and I'm just wondering, all the examples that you've showed seem to be paper charts or raster digital versions of paper charts.

And my question is, do you ever use electronic navigational charts, ENCs? And, if not, what would it take you to make that transition?

MS. LEACH: Yes, we definitely use a lot of different systems that are not just paper charts any longer.

CAPT ANTONSEN: Yeah, we use every form of electronic navigation chart that exists, every layer, every aspect of a layerable vector chart. We have some issues with the vector charts and the quilting of them, that information, especially in areas where you go from a small-scale chart to a large-scale chart. We're still dealing with the same data that goes to build a raster chart on a vector chart. So there's some issues with quilting and things with that.

There's also some issues with what's visible on a full presentation of a vector chart. That has to do sometimes with the software provider. But there's sometimes nothing better than alternating back and forth and getting a quick look, overview at a raster chart that'll show shallows in a format that you're expecting. Whereas, it can get lost in the blue, you know, of the limits that an operator puts on depths for, what's a safety contour? What's the shallow contour? What's that?

So, there is some issues right now with meshing vector charts in a display.

So, we use everything and I think most -- all the tugboaters I know, most all mariners, even the ones that are out there fishing using their cell phone, the charter boat guys using their cell phone to go find the hot spots and drift jig for halibut off Point Alava and Ketchikan, they're using electronic charts.

CAPT THROWER: Allen Marine, as well, we utilize the electronic charts. We were actually one of the first companies, passenger vessel-wise, to implement AIS throughout its entire fleet. So, we certainly like to be on the forefront of what's possible for our passengers.

CAPT ANTONSEN: That's a good plug.

(Laughter.)

MR. SMITH: Just a quick answer is that looking at bad information with a better magnifying glass isn't helpful.

(Laughter.)

MEMBER MAUNE: I'm Dave Maune. NOAA is currently in the process of conducting a 3D Nation Elevation Requirements and Benefits Study. And that gives many people the opportunity to identify what their requirements are for near-shore bathymetry, far-shore bathymetry and, more specifically, to state what their benefits would be if they actually received what they said they needed. And it's that dollar benefit part that's the hardest.

My question to you was, were any of you part of the 3D Nation questionnaire process that has recently been completed?

None of you? Okay, thank you.

CAPT ANTONSEN: Did we just sign up for that survey mailing list?

(Laughter.)

MEMBER MAUNE: Well, I guess we'll think about that.

I should say, if you did take it, would you be able to document dollar benefits as a result of getting better bathymetry? Or would you be part of those that say, unable to estimate that?

CAPT UCHYTIL: I think, you know, given the opportunity for the coastal engineers and the marine engineers to have greater access to data, they'd be willing to pay for it and have that discussion.

So, I think we don't know what's available. But if there's a product that can be pushed out and shared with the engineers in Alaska, certainly, most companies are willing to pay for good data when they need it.

MEMBER MAUNE: Yeah, we're not even asking you to pay for it. We're asking you to say what would the dollar benefits be to you if you receive what you -- what would your annual benefits be in dollar terms if you receive the data that you -- the bathymetry data you say you need?

If you're able to estimate the dollar benefits without even having to pay for it, that's about all we would ask for at this time.

MEMBER PAGE: I'll comment on that for a second. L.A. and Long Beach have been talking about the draft with a tanker and how much they can save. It's an easy one to quantify.

In the meantime, we're trying to quantify accidents you prevent. It's very hard to quantify accidents you prevent. And that's what I think one of the problems with some of the issues here as far as getting the numbers.

I was also going to say that, in Alaska, I think we -- if you look at the lower 48, you push your VHF radio call for help, the Coast Guard is going to hear you. In Alaska, it's like 90, 85 percent of the area, they're not going to hear you.

So, I mean, the reality, Alaska does not have the resources like you have in the lower 48. And so we're kind of used to kind of cobbling things together. We don't wait for the gold standard, some have mentioned. We need some capability.

I remember a couple years ago, Admiral Thomas from the Coast Guard said, well, you need something like a maritime Waze. I had no idea what Waze was because I've never been in traffic, for years anyway. But I get Waze is an app that you can see what other cars are doing. You're basically crowdsourcing information.

But, to some extent, we're doing that. We're crowdsourcing information internally. We also realize that we're not going to go from four percent to 100 percent charting of Alaska waters. You have to kind of triage and prioritize and, you know, look at it.

And I know NOAA's doing that. Their decisions are based on now real-time or recent information on vessel transits, and say, well, we'll start with these areas.

And the Coast Guard and NOAA's worked together on prioritizing the areas based on the most maritime activity. And so, that's good. They've been responsive to that. And, even when I was in the Coast Guard, we had some incidents in Tracy Arm where the charts didn't reflect reality. They were right on it and they went and surveyed it and got new charts.

They did it recently up in Kotzebue area, whatever. So I think they have been very responsive. It's just a huge area. It's Mission: Impossible everywhere. So, we've going to have to give them information to prioritize.

I know Mark Smith has done that and NOAA did, you know, do that near Nunivak Island. And, unfortunately, they didn't complete the work before this tanker ran aground, but it wasn't a big incident. So, all that stuff's underway.

Just to clarify on the AIS requirements, because sometimes it's -- it's changed over the years, and so there's some confusion on who's required and not required to have it, and what have you.

All commercial vessels over 65 feet have to have AIS, fishing, whatever. There are other vessels, like tow boats over 26 feet more than 600 horsepower, that have to have AIS. So, the different layered requirements to what -- high-speed passenger vessel or not, what have you.

But we're finding that a lot of vessels, even fishing vessels, they may not want to have them all the time, a fishing vessel less than 65 feet, but there are out there at night on anchor, or if they've got their nets out and they see cruise ships off in the distance, they like to have AIS so the cruise ships can see who they are and they can contact on the radio and what have you. I know fishing vessels are also putting AIS buoys on their nets so they can find their nets and others don't get fouled in that.

So, AIS is just evolving. It's still evolving. The requirements just last year changed as far as the carriage requirements. The technology is getting better. The Coast Guard has conducted some studies, evaluations, what they call a cooperative research development agreement for what they refer to Arctic Next Generation Navigational Safety Information.

And this will be a benefit to NOAA and the maritime industry as far as disseminating more and more information over AIS.

So, this is a new tool for disseminating information, kind of like Frances said that, instead of telling you -- I listened to the broadcast last week, I was trying to get some good information when I was down by Canada and I finally realized all I was hearing was radio talk about what the high in 1925 for Ketchikan was 85. Like, what? Do I really care about that? And the rainfall over the years and all kinds of stuff, but I didn't care. All I wanted to know was what the wind strength was near me so I knew where our transit was going to be going back up and which route we would take.

And I looked at Canada and I said, oh, Canada has an AIS transmitting beacon and it showed me exactly what the weather was 10 miles away, which is a better indication than I had anywhere else. The Canadians had AIS dissemination data.

So, you know, delivering of good data so mariners can make sound decisions is very helpful, and that's how that tool is being applied right now. And it's still evolving, but I think it's -- we do have some unique challenges up here. It's a huge region and, as we mentioned, from Allen Marine, that how -- and I didn't realize it, the mayor at one point said, I'm the largest city in the United States and I'm getting bigger.

And, I said, how are you getting bigger? I said isostatic rebound, which I didn't know what that meant. Because the glacier retreats, the land comes up and that's why each year we talk about the Mendenhall Bar as being shallower and shallower because the glacier retreats and the land increases. So we get more property as a result. And I live on the water, so I guess that's a good thing. I'm not really sure.

But it's a dynamic area, as I think many people are trying to point out. I found myself on a chart looking and saying, there's no water here, I'm sitting on top of a glacier, but I'm really floating on water. So, that's another discussion.

Allen Marine's going there. Pilots are going there with their ships. You know, recharting in these dynamic areas that are, you know, basically become increasing waterways, is it helpful for us?

And so, at the end of the day, I think that we do have some information challenges and we have a huge environment, as we try to keep on pointing out with these slides. And we have this new challenge to the Arctic that we want to make sure we get it right.

So, it's kind of interesting suite of challenges we have for NOAA, but I think they can all be done. And we appreciate what you've done to date.

But that's kind of some of my -- because I asked a lot of people to show up, I appreciate you doing that and taking your time. Because people are on the waterfront. You know, Carl doesn't say anything about his past, but basically he's a Coast Guard captain that commanded a Coast Guard icebreaker and sailed many, many years. And he's got a lot of time on the waterfront himself.

And so, these are people that have actually been operating vessels for years and have a lot of hands-on knowledge and I really appreciate all of them coming here and talking to us, giving their perspective.

So, I'll shut up now.

(Laughter.)

DR. MAYER: I want to come back to a comment that Mark made, and I was intrigued by it and actually totally agree that something is better than nothing in terms of getting a little bit of information.

But as I put my academic hat on, I also feel obligated that if I have many different somethings and I know some of those somethings are really, really good and others, I don't know, but it's better than nothing, I feel obligated to try to transmit that information, too, to transmit information about the uncertainty associated with that sounding or that measurement.

And, again, in your communities, would you want that kind of uncertainty transmitted with the data? Would you use that? How would you use that? How would you want it presented?

It seems to me a difficult -- it's something we've struggled with for a long time. But I'm very curious to hear your response to that.

CAPT ANTONSEN: If you don't mind. Well, from the standpoint of large ships and a lot of people and a lot of fuel, bad data is worse than no data.

If you're proceeding on a ship and navigation with no data or uncertainty, then you're going to proceed cautiously. But if you have a false sense of reliance on poor data or poor information that's wrong, that can lead you into a decision or different procedure that's maybe not quite as safe. It doesn't prepare you to respond or react as you would if you didn't have the certainty.

So, uncertain data, when it's a critical piece of data -- and I think that's kind of assumed. I think that's really understood by everybody up here, when I say bad data is better than no data. Yes, it is, for planning and, yes, it is, for starting points, and, yes, it is, for those things.

But when it gets down to critical, like the 10 fathom shoal off of Haenke Island off of Hubbard Glacier, you're going to have either a high level of certainty that that data is good or it's useless to you, you're not going to test it out.

I mean, everybody else that's talking about surveying, so far, I have not been able to get any cruise ships on board with, hey, let's go surveying, you know, with -- let's go, let's see what's out there. You know, they just really frown on that.

(Laughter.)

CAPT ANTONSEN: And I tell them, there's lots of water, Captain, it's just spread thin.

(Laughter.)

MR. SMITH: I'll respond, just sort of in the defensive. Not necessarily bad data, but incomplete data.

We're required to have skiffs aboard our tugs and barges so that in the case we do have a spill that we're able to tow boom and do other oil spill response activities.

But what we really do with those skiffs is we do soundings. And every single tug and barge marriage has a skiff on it and it has the most simplest of, you know, simplex depth sounder on it. And we're literally trying to find, you know, water that ranges from, you know, two to eight feet.

And so, every boat has its little, you know, hydrographic station on it that stays with it. And, of course, the narrower we can restrict that operation, the more cost effective it is.

So, we would prefer, right, to have a lot of incomplete information to create our picture, because that's really what we're doing is we're making a composite. And we don't have the choice of not going there. These are essential services. We take fuel oil to these communities, and, whether we have good or bad information, we're going to get there and we want to get there with the best information we can.

And I mentioned in one of these presentations that some of the best information that we could possibly get is very old school. Let's take a photograph at low tide, take a stereoscopic photograph at low tide, and give me some basic ideas where things are.

And, again, that's not typical NOAA hydrographic work, that's really out of the box. But this isn't about having a gold standard chart, this is about giving, you know, us some information on a very narrow and short approach to a river.

CAPT UCHYTIL: The two organizations I'm representing, the Alaska Association of Harbormasters and Port Administrators and ASCE are both infrastructure-focused organizations.

And Alaska's a young state and we were built on resource extraction, fisheries, mining, and we're still growing and we still have the opportunity to build ports and infrastructure throughout the state. And it's important that our engineers have the best information available.

You know, a foot from isostatic rebound or six inches makes a difference when you're designing a harbor, a launch ramp. Throughout the state, ASCE needs better than just okay data to really be successful and build facilities that are deserving of the communities we serve.

CHAIR MILLER: Given the quick changes that happen in some of these areas, how long would a chart be good for?

Let's say, NOAA goes in there today, in some of these areas, it seems to me it may be weeks, I don't know, months. You know, what's the change rate in many of these areas?

CAPT UCHYTIL: I can speaks for Juneau, and isostatic rebound is somewhere about, you know, a foot a decade.

CHAIR MILLER: Is that glacial shoaling and things like that? The silting and --

CAPT THROWER: The silting would depend more on the area, how much outflow there is in a particular area.

Like an area, say an area like Gastineau Channel where you have run-off from the Taku, you have runoff from the Mendenhall, all shallowing up in a very, very shallow area, very high current area. That's going to be changing in a lot more of a rapid fashion.

Or a place like Echo Cove realistically is going to change a little bit more quickly than other areas, like say the Tracy Arm Bar. So, the Tracy Arm Bar heading into the Fords Terror Wilderness allowing access to the south and north Sawyer Glaciers, that's going to be a little bit more stationary. You do have high, high glacial outflow but you have a lot deeper water in that area as well.

So, an area like that, it's going to be good for decades. But when you're talking about glacial recession, like the Dawes Glacier, the South Sawyer Glacier, it really depends on the stability of the ice field.

But what we have seen in the last several years is South Sawyer Glacier galloping back. And it did that in 2007 as well. And so, realistically, about a decade. Hans, would you agree, in that area?

CAPT ANTONSEN: Yeah, I think so. I think it's right. I think they do vary but I think local knowledge can really give you an idea of what the longevity and usefulness is.

And then the frequency of getting surveys, like you say, you're looking for a priority, or we call it profiling. Where are people going? Let's help them get there safer. Where are they going regularly? How many people are going out? Are a million people or half a million people going there every summer now? That's an area that probably bears stronger scrutiny. An area that's uncertain bears more scrutiny than an area that's static, like currents in Gastineau Channel and Juneau Harbor. Why are there so many sensors and current sensors? Because it's unpredictable.

Ketchikan Harbor? We don't have any current sensors, it's predictable.

So, reasonable allocation of resources, frequency and survey period, I think can be dictated by the local areas.

You know, up north, you can see all the rivers and things, boy, that changes so fast, but -- so, I think it's dynamic but they each are unique and those questions can be answered as far as is it worthwhile and what frequency to allocate resources.

MR. SMITH: And I'd like to follow up just quickly. I sometimes feel like that the dynamic nature of a lot of these entrances are somewhat used as an excuse not to do anything.

And that's what I would like to avoid, is that I think it's really a challenge for us as industry, and really a challenge to NOAA, is to rethink, you know, how we provide navigation to mariners.

And I really do think that, you know, if you had a way to compare this crowdsourced AIS information with what the chart says, it really kind of brings an ability to look at very small areas and things that could be done to provide updates.

Because a historical excuse is, "oh, that's going to change anyway, so let's not do anything," because we can't redo a massive chart rebuild, right, every year.

And that's, of course, true to the gold standard. But I don't care about 99 percent of the information on that chart. I need just the entrance information, and that really can be hit with high specificity through the use of AIS data.

MEMBER LOCKHART: So, this is a little bit of a follow-up to Larry's authoritative box, and also the fact that we tend to focus on vessels as a solution to a lot of the problems we discuss on this panel. And I'm thinking mainly about Mark's problem and the fact that you mentioned that sometimes the best solution is taking a photo at low tide.

There are ways now to using structure from motion and a really cheap drone with a camera to get elevations pretty quickly just by running some images through some software. That may be a better way to get quickly that changing low water area.

Obviously, you're not going to get underneath the water, but where the tide change is significant enough that you can do something as low water with just a small drone. It would be an interesting solution to have a drone rather than a skiff doing some of that work for you.

And I'm wondering if NOAA's though about using drones in Alaska as well to do just that. The data's not going to be as accurate as your typical NOAA product, but for change detection in some of these smaller channels it might be kind of a useful solution.

RDML SMITH: So, I'll take that, since you sort of asked NOAA. And I will say that Terrasond, working on behalf of NOAA, has done a lot of innovative work with drones for mapping intertidal areas.

Now, it's been in the context of sort of more traditional shoreline verification rather than this community resupply landing spot application.

But certainly the technology and the application are very well matched. And, you know, the beauty is you don't need to get a whole boat there. You can show up with an expert or there's probably already an expert there that could do some of this.

And the real magic is in the processing afterward. So, we're not really in the public comment period, but I would invite you to talk to Tom Newman at the break, too, about his experience with that.

MEMBER GEE: Yeah, Lindsay Gee. I just have just a comment regarding we talked about the follow-up from Carol, but also the non-authoritative data, it would seem that when you say, you know, all of you, I think, expressed that you'd like the best available in some sense.

But it would seem the current charts aren't the kind of vehicle you need. I mean, if they're going to be, you know, there's going to be lag time in that and they don't get updated enough, you know, and all of those issues.

So, is there another way that that good enough data could get distributed, apart from just internally having track lines you save and all of those sort of things? Whether that be shared or it's not shared, you know, is there a way to share it maybe? So those that want to share it can make it public and those that don't can still have access.

You know, but maybe the chart is not the vehicle for transmission of that below the kind of gold standard data. And I wonder if you had any comments on that, both from the panel and also NOAA?

Just to follow on what I mean, I guess, is that we know there's so much to do, we know there's so much charting, and it's kind of priority to get that information out.

So, with GIS technology or whatever it is, there's kind of technology that allows you to get that -- you mentioned Google Earth and other things. But there's technology that certainly allows you to show that. And even with the pilot units and the non-ECDIS kind of charting systems, you know, you can add layers and those sort of things.

So, it's trying to get it out quick without having to wait for then the chart, so you can all have access to it in this region because it's obviously a bigger issue here than in other areas around the country.

MR. SMITH: I'll jump in and just say that, yeah, creating a new chart for every change, under the typical, the historical paradigm, is absolutely impossible.

So, it's going to require some new vehicle to get this information out. And, for us, with our very shallow draft, you know, it's an alluvial plain out in western Alaska, and in some places we have, you know, varying from four feet of tidal differentiation to 27 feet.

Again, I've had, you know, folks from NOAA say we really don't care about anything that's above three meters below mean low water.

And for Vitus, for my company, we absolutely don't care about anything there. I mean, everything that we care about is in that transition zone which is above what NOAA cares about.

And then you have USGS that cares about the coastline. So, literally, we have this disenfranchised section of the earth, right, that is our most critical part for our navigation and to provide our service.

So, that's, you know, my ask of you folks, is what can we do different? Because this is not a chart update issue, it's much more complicated. But the great news is that, in our modern age, we do have a tremendous amount of data and it really just is finding that department or, you know, the subdivision of government who will take the responsibility for that transition zone.

And so, you know, I naturally think, at a NOAA meeting, I'm going to say that that organization is NOAA and I would love them to grab on to that and take it.

RDML SMITH: Well, I'll jump in on that.

So, the four meters thing, that was to keep our hydrographers from trying to count every rock in Alaska in areas where nobody cared. Right? And so that was simply to try to keep them moving so that we could get something done. It's not a blanket rule, and I'm sorry that you got that impression.

But, that said, you know, you've also identified that our tools are not the -- our big, industrial-type tools are not well-geared to that area. Now, you know, bathymetric lidar is. To some extent satellite-derived bathymetry could be.

And so we've got some tools, but I wanted to get back to Lindsay's question and really to say I've not given up on the chart as being able to be nimble. Right?

Just four years ago, we had additions of charts and we held information back in order to get it on the next edition, and we wouldn't publish it.

What's today? Tuesday? Thursday, you know, we'll have 150 charts coming out with new information on it. Some of that information is just weeks old. And so there's nothing, you know, in our GIS-based system that we're in today, there is nothing that keeps us from doing that.

Now, we want to make sure that we don't put it on, take it off and, you know, be willy-nilly about it and keep our quality up. But there's nothing structural about the chart that makes it not that nimble.

Now, there may be parts of our organization that are not that nimble yet, but we're getting there, we're getting there on that.

So, I guess I just wanted to push back on that notion a little bit. And we do envision, you know, the chart being the right way to carry information, you know, that may be quite fresh.

CAPT ANTONSEN: So, about three years ago at a meeting in Seattle, I was sitting at a table with -- or sitting in a chair with James, then-Commander James Hauck, who lives here and works in Juneau.

And we heard a similar discussion and we were talking with all the brains of people who gather the data and do the surveys and the scanner, get the information. And in the same room were the software developers who provide NobleTek, CIQ, all these different things.

And there was a disconnect there from the people who had the data and the people who are trying to be able to make it usable in a graphic, usable way to the public. And there was a disconnect.

So, James and I looked at each other and said, why don't we get these guys together for lunch, invite them to lunch?

So, we invited them to lunch and then we stepped out of the room. They didn't need to talk to us, we were like the end users or whatever. But what they needed to do was talk together.

If it's not the chart, thinking outside the box of what's the medium of getting the information to the user and in a format that, when it's shared, it can be used by many software providers.

And then those software providers have the economic -- you know, will people use it, do people want it? Yeah, people want it a lot, and that will drive their end of the economics of actually making it happen.

But those two entities need to talk so that what can be given is given in the method and in a manner and format that can be used and can be then disseminated out to the public.

MEMBER GEE: Can I just comment again on that? And I acknowledge what you're saying, and I think we've seen a great, you know, move forward in that.

But I would also say, Hans, I think it's maybe time you got back in the room with them, because you have other requirements that -- and I think the chart provides that baseline. And I would see that it is those manufacturers that want to give you the capability now to be able to add what you need.

So, whether it's Mark, you know, being able to put his tracks into that so he can -- if the manufacturers are providing you with that base level knowledge that's from as good as NOAA can give them, then I think the next step is to be able for you to add that. Or an organization to add that, whether it's, you know, Mark and his coastal region or it's Frances with fishing, so they don't have to share, or you may want to share it.

So, I think that kind of capability of delivery to others in that kind of GIS and electronic environment is something that technology allows and that we just haven't -- and it's interesting because I think you all kind of want it but you're all doing it for different purposes kind of thing. It's all to make money, obviously, you've got to do it.

You know, you're sharing it for your cruise industry or Mark has deliveries to make and Frances wants to go fishing. But it's kind of like, okay, how can we --

the technology is there to allow you to do it and I think it does need the kind of users to get back in the room with NOAA and the manufacturers to try and refine those requirements.

Because I think we're all said back, yeah, well, just leave it to them and make sure NOAA gets the data and then we can move on and everything can be sweet. But we kind of know on the line that you can't get it quick enough, and I think that's the -- or it's in areas where NOAA really isn't going to do it, you know, in the coastal -- in the dead man's land in between kind of thing.

CAPT UCHYTIL: I just would like to follow up real quick. And something I mentioned, I spoke with the port director from the Port of Anchorage, now called the Port of Alaska.

Eighty-five percent of all goods that enter the state come through Anchorage. And they believe they have a strong desire to have real-time shoaling information, bathymetric information updates.

And, I'm not sure if that's something that is in the realm of possibility but that was an issue that they would really like to stress.

And that the importance of that port both economically and militarily, I think, would merit additional resources to provide that service if it's possible.

MEMBER MAUNE: Carl, I think it was you had a slide in which you said you needed something in Auto CAD DWG format, can you be specific on what product it is and what's the wrong format that you're getting it in now?

CAPT UCHYTIL: It would be for coastal engineering, small boat harbor development and recapitalization.

So, I don't know what the format that we're getting, I assume it's just JPEG or some other non-CAD available format.

MEMBER MAUNE: Okay, thank you.

MEMBER KELLY: Ed Kelly. We've heard very similar stories in almost every geographic region that we visited with certain unique local applications as to what people want.

In light of that, I would kind of once again kick back to IOOS that perhaps NOAA could give IOOS direction that IOOS overall could promulgate some type of a program or requirement that would be in accordance with NOAA strategy and goals in this area that could be passed to the Regional Associations so that they could have these types of meetings locally and find ways to bubble this back up to us that we can really put our arms around it.

Because this is a recurring theme every place we go and we really need to find a better way to respond to it than just every time we're at one of these, we go yes, yes, yes, we understand and there's limits to what we can do.

There are all limits to what we can do. There are limits to what we should be doing but there can be some local solutions that might be worked out.

And if we're going to encourage that, we should do it under a defined format or outline at least from NOAA, passed down to IOOS and delegate that down the chain and with the mandate that it come back up the food chain and maybe we find things that we can do.

So, just a suggestion.

CHAIR MILLER: Ed, one thing that we talked with the IOOS leadership at lunch is we're hoping that we will come out with a recommendation about what we heard, particularly this morning, that is, sort of a joint HSRP-IOOS recommendation.

So, we'll discuss that a bit later.

Okay, are there any further questions?

MEMBER PAGE: Just for the panel, they probably not know what IOOS is or whatever, it's Integrated Ocean Observing System.

You're familiar with AOOS which is Alaska Ocean Observing System, so there's a whole bunch of these things around the country.

So, IOOS is Integrated, it's just something that we use in our alphabet soup discussion here and other people are going, what are they talking about?

So, that's what we're talking about is this Integrated Ocean Observing System that allows for some regional solutions Southern California, Pacific Northwest, Gulf, or whatever on the East Coast.

And that's what we've taken advantage of in Alaska is we've AOOS, Alaska Ocean Observing System subset is kind of focused on Alaska issues.

So, I think it's a kind of innovative way for NOAA that gives them a little more latitude in different regions. They kind of move independently still under the same kind of objective of NOAA, but be a little more agile than trying to get a national fix everywhere.

They have some regional fixes that are more tailored to your needs.

So, that's why I think when other parts of the country probably are not talking about we need to chart waters where icebergs or excuse me, glaciers were before. We're the only ones that really have this glacier issue.

So, AOOS can talk about that but anywhere else in the country, they don't, it's unique to Alaska.

So, anyway, that's what IOOS is, you know.

(Off-microphone comment.)

MEMBER PAGE: Yes, I agree with what it's saying, I just want to say why those subsets and what IOOS is and why there's subsets and there's also commonality and they're meeting right now in the next room and they're sharing, you know, ideas around the country saying that would work with me also.

The one that probably doesn't work is the glacier one, but that's okay.

CAPT ARMSTRONG: Thank you.

I'd like to ask Ms. Leach about depth information. I suspect your father pretty much knows how deep it is where he's fishing.

But in speaking for the fishing community in general if you could, how -- you talked mostly about weather and that's certainly the most compelling and pressing thing you probably deal with.

How would you like to see depth information? How do you see it now or is that not much of an issue for your constituents and your members?

MS. LEACH: Depth is a very important issue when it comes to navigation as well as setting gear, depending on what type of fishing you're doing. You are fishing in a certain amount of depth.

And so, right now, fishermen rely on charts that have the depth listed on them. They're relying on their own fathometers on their boats as well as, you know, the computer programs that they may or may not have.

But, that is very important. Just a quick story.

A few years ago, we were going through and area that we had been through several times south of Ketchikan, Garnet Point.

And we were charging out of the harbor full speak ahead and we hit a rock in the middle of the channel. And that rock was not on the chart and, you know, we thankfully everything was okay. We kind of just bounced right off it.

But, it was a super -- it was a low tide and a minus tide. And, you know, once my dad started talking to some of the other old timers, they were like, oh yes, that rock's there, it's just not on the chart.

So, it's -- you know, and then that becomes one of those things where you tell everybody you know, be careful, there's a rock in the middle of the channel right there.

So, yes, depth is very important and it's used quite regularly.

CAPT ARMSTRONG: And just to follow up. Would you like to see depth in much higher resolution than available on the charts? Would you like a product that showed depth at, you know, really tiny detail?

MS. LEACH: Absolutely. I think it would be really beneficial. You know, what tends to happen is, if you're going to go set your gear in a certain amount of fathoms, you go to that area and then you rely on your fathometer to actually tell you what it is.

Because it doesn't usually pinpoint the exact location where you are on a chart telling you how deep it is so you're going to rely on your fathometer.

But, if there was something actually that listed the accurate depth, that would be very helpful.

CHAIR MILLER: Okay, thank you, panel, for a great discussion and great presentations.

(Applause)

CHAIR MILLER: It's now 3:30. We're going to take a break and right after the break at 3:45, we will have a chance for public comment both from the audience here and on the webinar.

(Whereupon, the above-entitled matter went off the record at 3:28 p.m. and resumed at 3:48 p.m.)

DR. KINSMAN: Here again, I believe. We wanted to open up some questions to the general audience while we still have our panelists up here for a few minutes before we get into the full formal public comment period.

But we started that, we have -- I have Ashley Chappell here and she's just going to say a couple words about some of the other events going on this week to make sure that everyone here at HSRP is aware of some of the other neat federal coordination activities that are underway here in Juneau.

MS. CHAPPELL: Hi, everybody. So, on your agendas and hopefully as you heard today, we have the Alaska Mapping Executive Committee meeting here --

(Off-microphone comment.)

MS. CHAPPELL: Oh, okay. We can do this wrap-up at the end, during the wrap-up.

DR. KINSMAN: Okay, so I guess we're going to do public comment with questions first stakeholders here then.

CHAIR MILLER: Actually, let me officially announce because it's a federal thing.

We are now open for public comment either from the floor or from the stakeholders here present or from letters that have been sent or from the webinar.

Are there any comments or any comments here in the room that people would like to make?

Do we have a microphone?

MS. MERSFELDER-LEWIS: First we're going to do questions for the panelists and then we're going -- we have Rada is on the list and we have another person on the list, we have two people.

CHAIR MILLER: Okay, so, questions for the panelists first, I guess.

Jon Dasler?

MR. DASLER: Yes, John Dasler, David Evans and Associates, former HSRP member for seven years, one of the charter members.

But, I guess a question to Captain, I think you made a comment on that the cruise lines weren't willing to pay for some of the surveys.

So, I know Seaborne has been looking at some areas in Alaska where they're trying to ships in and have inquired about surveys.

And, I guess a shout out to Admiral Smith and NOAA that they were able to go back and look at surveys, one of them was, I think, is Aialik, the sill that were the glacial sill there and they added some soundings to the chart.

And then, the other one was at Doran Point I think in Harriman Fjord that they were -- MCD was able to go back and pull some additional soundings.

But, I guess one of the questions to the panel, too, and I -- maybe this got brought up, so, it's not just the freshness of the data, but also the scale, right?

So, I think that was the issue on both of those charts. By the time it went to a raster chart and even the ENCs at that scale, you just didn't have the sounding density that was needed to make those passages across the sill.

So, I guess one of the questions to the panel is the scale of the charts, and think that was like the sounding density basically, if that would be more beneficial getting into some of those areas?

And, I don't know if you're familiar with the Seaborne efforts in some of those areas. I know they were working with the pilots on that.

CAPT ANTONSEN: Yes, and I don't think I was speaking for the -- I wasn't speaking for cruise lines as a whole that what they would be interested in paying for or not paying for.

But the rank and file, the big ships, if they don't have data or surveys, they'll just stay safer and they just won't go as close.

But there's a very distinct -- I think what we're seeing is even a more distinct breakup now, instead of ships of varying sizes from small through medium to large, is very, very large probably in scale lots of people and the excursion ones that goes -- bridges the gap between Seaboard, Sea Line and the Allen Marine boats to Seaborne, Legend, Star Legend, you know, those ones that are, you know, bridge the gap between those and the Quests, Nat Geo Quest and all.

Those are -- I would completely leave it to them because they have a very specialized interest in getting in close and then wanting to have accurate charts for those areas.

They have to abide by the big rules of the big ships, but they want to go on excursion and that's what they go for.

But as to the question of scale, scale is hugely important. I mean, just look at a local place like Endicott Arm, I mean, Endicott Arm, it's just this -- there's no resolution there to go up there.

And you've got a 50, you know, you've got a 50 fathom sounding and then you've got 300 all around it, and you've got just kind of an approximation of the contour line there, that's, again, one of those unproven areas that there's no detail there.

It's not going to stop ships from going but more detail in heavy traffic areas is going to give more safety because you're going to have a more precise understanding of what the depths are, what the contours are, where the rocks are.

So, when ice with bigger ships, it's amazing how much room in the fjord the Bliss or the Emerald Princess takes up.

I've never been up to the North Sawyer Glacier with the Emerald Princess before and apparently it fits because we managed to get around.

But that scale is a huge -- would be a huge help.

CAPT THROWER: Absolutely. Coming from -- so, Allen Marine Tours, one of the -- one of our kind of specialty tours that we do, we operate with a lot of the cruise lines in those areas, specifically talking about the fjords -- Tracy Arm and Fords Terror Wilderness Area.

I also represent us at WBMP which is Wilderness Best Management Practices and TBNP which is Tourism Best Management Practices as well.

Now, WBMP is specifically focused as a committee on looking at areas like the Tracy Arm and Ford Terror Wilderness -- well, not wilderness areas specifically.

It's a collaboration -- it's a committee of people who operate in those areas.

Now, we've tried various things of seeing -- keeping Endicott Arm a little more exclusionary to the smaller vessels and having the cruise lines predominantly agree to go to Tracy Arm when possible, when permitted.

But the real fact of the matter, what we're seeing, when Allen Marine Tours started doing those specialty tours, the Endicott tours, the Tracy tours 15 years ago, we were one of the only companies do it.

Now, every single -- all of those small cruise lines, all the major cruise lines, all of the day boats, all the recreational users, there is high traffic in Tracy Arm.

So, the more detailed we can be about certain areas, if we can get better resolution on that scope, what certain areas are like, it's going to help improve the safety margins as you're moving through the Arm.

And there's certainly areas in Tracy Arm when you're going through the S-turns where there's a giant mudflats area.

Now, in a fjord that is over a 1,000 feet deep, you wouldn't assume that out of nowhere there's a mudflat area. But it exists.

And, knowing how close you can get to that safely before you're running aground, especially in a passing situation with recreational users or those less familiar with the area, that's really important to know where your safety margins are at all times.

So, excellent question.

MR. DASLER: Yes, and I guess just a shout out on the nautical charting plan, right, and rework of the scale. So, that kind of input is really important to get to NOAA.

So, as they're re-looking at scale of charts and what that's going to look like for the nation, that kind of feedback is pretty critical.

And then, just one comment, I think Ed commented if only there was a Waze for the maritime community.

But, there was a great presentation at the Galveston HSRP for Active Captain which I think that it was the same guy who started Waze. Right?

But, that -- yes, it's on par anyway with Waze. But, I was curious if anybody uses Active Captain and, you know, it's a way of reporting just like Waze is in the maritime community where you -- and I know NOAA looks at that data and assesses, you know, where there are charting needs based on what's happening with Active Captain, if people are familiar with that and using it?

MEMBER SHINGLEDECKER: I would just -- Active Captain, it was when we saw in Galveston a really interesting resource like that, they changed ownership.

And the crowdsource nature of the platform has changed substantially. So, there is a gap right now in that area as far as that crowdsourced platform.

CAPT THROWER: I think if I could make a comment here.

There's been a lot of discussion about crowdsourcing of information from commercial professionals in the industry.

And I think that establishing almost a Wikipedia like platform for navigation, I think that has such great merit.

But I guess the question would be, who's going to host that platform? If there is any type of decision made that uses that data and that decision ultimately results in a negative outcome, where does that liability fall?

I think that's maybe where some commercial operators would hesitate to actively and openly participate in something like that not knowing what the liability limitations are.

You know, being part of the maritime industry, we all want to help. Every mariner out there is there for the other mariners.

It's definitely a particular -- it's a particularly great community to be a part of, especially in Alaska. The cold water boating community has a very, very different mentality. You share, you help, you communicate, you guide. We're more than happy to share ice reports.

Part of WBMP in the Tracy Arm area, we're always sharing ice reports with everybody. We're letting everyone know what those conditions are like, ultimately affecting what decisions are made by different cruise lines to go into which particular arm.

And we're always happy to share that information. But that's more just word of mouth, it's not public access that could be relied on by a less experienced user potentially to a negative outcome.

So, I think there's -- it might be a little hesitancy, and I can only speak for, you know, I can only speak for myself, not the tour industry as a whole, but I think I could see a lot of commercial operators being a little more hesitant to participate in that platform if they don't know where their liability extends.

CHAIR MILLER: Any other questions from the audience to the panel?

I believe there's a --

MS. KHADJINOVA: I have a quick question or a comment.

I think there's a lot of good will in the room. I think that there needs to be some sort of a manageable action on the part of people that do hydrography for a living on the part of people who QA/QC hydrography for a living and people who can contribute.

And maybe there's a way to meet offline and so forth and come up with pros and cons of what we can do with today's resources, with today's equipment, but with a whole bunch of energy and then provide a recommendation for the next HSRP meeting so that that can be reviewed and it could be a live conversation that's not going to die here when you guys leave.

CHAIR MILLER: Could you please identify yourself?

MS. KHADJINOVA: Oh yes, Rada Khadjinova and I'm Fugro Alaska manager and we do hydrographic charting for NOAA. So, definitely much energy here, too.

I will just step over to the microphone and do the public comment. Fantastic.

Thank you HSRP for choosing Juneau as meeting location. I think the last panel was the most lively discussion just from the quality of the question and answers and discussion points. So, thank you for that.

My name is Rada Khadjinova and, compared to some of you in the room, I could be called Alaska chechako. I only have 25 years in Alaska under my belt.

I came as an exchange student and fell in love with the state ever since and never left.

I work, as I mentioned, for Fugro, Alaska office. I'm the General Manager. And, Fugro is a global provider of geointelligence and asset integrity solutions for infrastructure projects, large construction and energy and a long participant in activities in Alaska.

Prior to my work at Fugro, I held management positions with state government, academia and other private sector firms.

I've been and remain and active volunteer for professional nonprofit organizations and serve on various boards.

Most recently, I was appointed to the Board of the Alaska Resource Development Council which represents interests of Alaska major resource industries, oil and gas, mining, timber, fishing and tourism.

These industries make a great use of geospatial data and so my interest in HSRP.

It's no secret that Alaska charting backlog remains formidable, deserving your continued vigilance.

However, this tough challenge has a responsible owner.

Today, I want to address a need that's yet to be adopted by a responsible owner. And as we heard just during this panel, this is called the dead man's zone, the transition zone.

But we call it Alaska's coast. Alaska's coasts deserve attention. In addition to having the longest coastline in the U.S. and boasting the largest fishery in the nation, Alaska is the only state with access to Arctic waters.

In the coming years, we see numerous opportunities and challenges that we've heard about today and I'm not going to go over that.

But the future of Alaska's coastal zone is of national consequence, impacting national security, maritime transportation, economic development and energy policy.

Growing Alaska's blue economy while managing effects of climate change and sea level rise and sometimes drop, will require charted access to coastal mapping data which merges shallow water, shoreline and coastal elevation data sets.

These data serve users from across the government spectrum, including tribal, state and federal agencies enabling economic development, coastal resource management and a fish and governance of numerous coastal issues.

And while a comprehensive coastal mapping program does not yet exist in Alaska, stakeholder engagement to form on is well underway.

This February, more than a 100 government and private sector participants took part in the Alaska Coastal Mapping Summit.

As an output of the summit, and thank you, NOAA for spearheading that, as an output of the summit a strategic plan to build Alaska's Coastal Mapping Program is anticipated for release later this year.

It is also encouraging to see NOAA as a newly minted participant or co-chair of the AMEC Committee, and interagency working group designed to maximize collaboration and efficiency with which elevation data is acquired and shared.

We're beginning to see the same spirit of collaboration for statewide coastal mapping data sets that we saw a decade ago when we started on topographic mapping of Alaska.

As we know from the topographic mapping program, the path forward requires a shared commitment among all stakeholders to systematically collect authoritative data sets that can be shared across user groups.

For the private sector, our commitment is expressed in how we approach each project, often integrating multiple technologies and platforms to balance cost, quality, and safety expectations.

This commitment is evident in many activities including technical innovations and new generations of sensors, advanced processes that enable multi-stream data collections, novel approaches that accelerate the collection pace during short Alaska fuel season, in-kind data contributions, and quality assessment of crowdsource data, just to name a few.

It is important to know that data needs should remain central to developing the data specifications.

It takes time and effort to prioritize plans, enable that integration and to develop optimal data spec acceptable to multiple users.

The private sector is a great resource for developing efficient scopes of work and should have a seat at the table to provide their professional input.

It should also be noted that, in Alaska, environmental permitting has been the longest lead activity for infrastructure or resource development projects, taking anywhere from 6 to 25 years or more with no certainty in the outcome.

And while we see and applaud administrative improvements in some agencies, there is plenty of more to be done.

One of the best things the government can do to reduce environmental permitting uncertainty is to acquire authoritative baseline data.

In this case, we're talking about upfront collection of land and marine elevation data.

This data depicting natural infrastructure give regulatory agencies information not only to make good management decisions, but even equally important to withstand legal scrutiny once decisions are made.

Every project in Alaska gets sued once it's authorized by an agency.

Thereby reducing costs and schedule impacts for all parties.

In addition, this data is relevant to missions of many federal agencies and can be a benefit research and private sector projects from pre-feasibility to decommissioning.

The needs for coastal mapping program are clear and very eloquently expressed here today.

Here is what I would like to ask HSRP and others who can positively influence coastal mapping program implementation.

One: deliver systematic and transparent updates on progress towards goals and objectives stated in the Alaska Coastal Mapping Summit Report and continue the Alaska Coastal Mapping Summit on an annual basis.

Two: support and improve effectiveness of an existing framework by which multiple agencies can contribute funds and specify their coastal mapping priorities.

Three: consider meaningful contributions or inputs that State of Alaska can champion to kick start the planning phase of the program, recognizing its current economic situation. After all, prioritizing data needs and developing acceptable data spec is arguably the longest lead, but also is the lowest cost activity.

And, my favorite and the last one: incentivize industry to come up with ideas for authoritative data collections through unconventional methods.

This can be accomplished through competition of ideas with contract award or some other notable motivation for the best solution.

And you don't have to go far, we already have ideas and I would love to talk to you about that.

Thank you.

What, no applause for me?

(Laughter.)

(Applause.)

CHAIR MILLER: Ed, this public comment is in HSRP's packet -- in the packet that the panel members have.

We have a comment from John Warrenchuk.

MR. WARRENCHUK: Okay, thank you. Hi, my name is John Warrenchuk and I am a senior scientist and a campaign manager for Oceana which is an environmental group. We are an international group dedicated to protecting the world's oceans.

I live here in Juneau. I've worked here for 15 years. My knowledge of your working group panel is a little provincial but I do understand that one of the outcomes is that you make recommendations to the NOAA Administrator who was in the room here earlier.

So, a couple of the -- and I did look over some of your past recommendations.

One thing, though, I do notice is maybe not addressed as often in your recommendations is data collection on currents.

And my job, you know, I'm mostly concerned about everything that's living between the top of the ocean and the bottom, including the things that are growing on the bottom.

And, one thing that is lacking a lot of ocean data sets in the meeting I go to is scientists trying to develop these models to predict changes and impacts is currents.

And so, in as much as you can make recommendations to the Administrator on the type of investment you need to do to collect the data on currents.

And, you know, seasonal changes in currents I think would be very helpful.

You know, and temperature as well. You know, we're seeing in Alaska just a whole litany of impacts from changing temperatures and climate change.

You know, just yesterday, the Governor had, you know, fishery disaster declaration for Chignik which is a region in the Gulf of Alaska which usually catches over a million salmon. And this year, they caught a 128 salmon.

So, these kind of changes, not only are they, you know, they're expensive, but they are, you know, they are ending ways of life.

And in as much as this kind of data that we collect now, maybe it doesn't pay off right away in solving these problems.

And investment in, you know, our future generations and how they can develop models, develop ways to mitigate impacts, ways to address some of these changes where these investments are going to pay off.

So, with that, I'll close. I know it's the end of the day here and thank you for the opportunity to comment.

(Applause.)

CHAIR MILLER: We have a comment from Guy Noll from the webinar. Admiral Smith is going to read it.

RDML SMITH: So, Guy, I will introduce Guy. Guy Noll is a software manager at Esri and former NOAA hydrographer.

From Guy, the question is: "Regarding the DWG issue, there is a new alliance between AutoDesk and Esri for GIS plus BIM, specifically for infrastructure and design."

These are all formats of CAD type formats, just for --

"As most of this is urban focused, Alaska stakeholders will need to participate in highlighting the value.

"For more information, here's a story map about BIM and GIS" and he includes a link to that.

And, I don't know whether we want -- somehow we should just publicize the link. I don't know whether we need to explore it together right now.

But, thank you, Guy, for your comment.

Are there any on the -- for the engineering format folks? Are there any nodding appreciatively around the room about Guy's comment.

All right, thanks, Guy, sorry you're not here.

MS. MERSFELDER-LEWIS: So, there were other public comments that are in the public materials, both on the website and in your packages, two letters and one report.

LT BUESSELER: So, I'm not going to read them, but I will say that when we reached out to some of the other marine operators in the state, Kenai Fjords Tours out of Seward wrote a very nice letter that should be in your packets along with the Seward Chamber of Commerce, sort of highlighting the same things that -- many of the same themes we heard with Allen Marine Tours of the significance of some of these small boat operators that they're going near short and especially sort of Seward as you get down towards the Kenai Fjords region, those charts are 1-to-80s and they're navigating very close to shore.

So, additional resolution on those charts would be a huge benefit to their operation as the common thread out of Kenai's letter.

Although it's a fantastic letter and my description isn't doing it justice and the Chamber of Commerce, just wanting to reinforce that message of how these -- tourism is driving a lot of their economy there.

So, the significance of that operation supporting that has big benefits beyond just that small tour boat operation. Well, they're not that small but it helps everyone.

They mentioned the resurrection of the Aialik Bays and that's sort of continuing down to Kenai Fjord region and that's where the 1-to-80,000 and tightening up into the -- what the operators mentioned, that there were a few miscontinuities in the shoreline that they would like to see resolved.

And, in the course of making a new chart, we would be re-evaluating that data.

MS. MERSFELDER-LEWIS: Okay. Guys, you wanted -- you have more -- many more details about those, it's a long, much longer letter.

And one of those 30 or 40 pages. They're in the -- they'll both be considered part -- those will all be considered part of the public record and you guys have them to review and the Chairs and some leadership had them way earlier to review.

So, if you want to make comments on those, I know, Ed, you had made a comment to me that this is very serious and important -- and how important the HSRP meeting is because you have people who really take that quite seriously and send you letters.

CHAIR MILLER: Okay, I believe that's the end of public comment unless anyone else in the room?

John?

MR. DASLER: I just want to actually give another shout out to NOAA on behalf of Scott Frost. I don't know how many people are -- know him, but he's a resident of Juneau, actually down in Gastineau Channel, but we started working with Scott several years ago and started bringing him on on NOAA contracts.

And, he's built several vessels, started Zephyr Marine and, you know, one is a woman-owned small business and works for a lot of the contractors.

But Scott's daughter, they were -- I mean, they're a fishing family and in southeast Alaska.

But his daughter, Courtney, a few years ago, they were trying to get their halibut quota and she bowed somebody's wooden boat out in Sitka and they were about 20 miles, her and her girlfriend and the plank sprung on the boat and they were able to get a call out and be able to get their immersion suits on.

And, the Rainer happened to be transiting at the time and the Rainer put in a launch and rescued Courtney and her friend.

So, there's a lot of I guess along the lines of what the Lieutenant Governor is saying. There are a lot of added benefits of NOAA's work here.

I mean, also beyond just the charting effort, the IOCM effort and the different uses, but also just being there in those kinds of situations.

And, Scott definitely wants to pass along his thanks for saving his daughter.

(Applause.)

CHAIR MILLER: It's 4:20. We were scheduled to start the planning and engagement group discussion.

But, we also have time for it tomorrow morning. Dave and Julie?

Let's spend 10 minutes on it right now and we need to leave here at 4:30 I believe.

MEMBER THOMAS: All right, okay.

I think that right now is the time that's allotted to really talk about the CO-OPS strategic plan and the draft comments. Those are in everyone's binders.

And, Joyce and Lynne, so my understanding is that we should be submitting these draft comments by the end of the meeting, is that correct? Approved and voted on by the Panel?

And so, all I want to really do is say today is, if you get a chance, please read through the comments because on the last day of the meeting, we will vote and approve these as a Panel and then submit them to CO-OPS.

And, I should go through them all? Yes, I mean, I'm not going to read -- I don't think I really need to read through these all right now.

There are recommendations for examples, more specifics. There's, you know, a recommendation for org charts within CO-OPS.

There's make some of the goals clearer.

They're pretty well spelled out on that sheet.

And, of course, these are drafts. If anyone has any additional comments, we can definitely add them. I just was typing them up here as I received them.

And you should all the CO-OP strategic plan, too.

And so, yes, I think in general it was considered a really good document it just needed a few more specifics and maybe some NOAA org chart to let them -- people were interested as far as what -- where CO-OPS sat within NOS and NOAA.

But, Joyce, I think that's all really that I need to say today on it because we will spend five minutes at the end more.

Lynne's saying more.

Okay, whatever we can do today on this? All right.

So, I don't know, have people read these or can we go ahead -- are there additional comments or is there something that we can vote on today to get out of the way and approved?

Yes, Susan?

MEMBER SHINGLEDECKER: I'm just going to weigh in on our last attempt to provide substantial comments on the National Charting Plan.

When we tried to do it at the end of the day of a meeting we found we didn't get quite the meaningful comments and people later said, oh, I wish I could have contributed more.

And so, we ended up doing a side exercise. I might recommend that maybe we try and everybody re-read it again this evening or something. But, I just don't know that right now is the best time --

MEMBER THOMAS: Is the time to delve into it?

MEMBER SHINGLEDECKER: -- get the vast input we really need for something of this magnitude.

MEMBER THOMAS: That's what I was getting the feeling, too. So, I think we can probably table this for right now.

CHAIR MILLER: I think that's a good suggestion. If everybody could, I know we have dinner plans, but of everybody just, if you don't review it thoroughly and didn't provide comments, you might want to re-read and review.

I think we had a request for what specific comments did we -- or sort of details did we want and I don't think we've ever gone anywhere with that.

MEMBER THOMAS: Right, with the examples?

So, for those that -- I mean, I think you all know that we did have one telephone call this and Rich Edwing was on the line.

So, we did have a chance to run by these comments by Rich and he very nicely went through each one of these comments that we had already provided.

We pulled out his answers. I didn't include them but I do have a document that has Rich's answers.

But, because when we actually submit these, it will not include Rich's answers.

And just one more thing, we can handle the examples and the two places Rich said it would be really helpful to have specifics as far as where we would like more details and more examples.

And, we don't have any specifics yet on that.

Sean?

CHAIR MILLER: Okay. Yes, I think that's fine.

Anything else?

MEMBER THOMAS: Did you want to say something, Sean? No.

CHAIR MILLER: Okay. So, with that, I think we'll adjourn for the day. And, we will reconvene tomorrow morning at 9:00.

(Whereupon, the above-entitled matter went off the record at 4:25 p.m.)