U.S. DEPARTMENT OF COMMERCE

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 NATIONAL OCEANIC AND ATMOSPHERIC

 ADMINISTRATION (NOAA)

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 HYDROGRAPHIC SERVICES REVIEW PANEL

 MEETING

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 WEDNESDAY

 MAY 23, 2012

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 The Panel met in the Aleutian Conference Room in the Hilton Anchorage, 500 West Third Avenue, Anchorage, Alaska, at 8:30 a.m., Matt Wellslager, HSRP Chair, presiding.

PANEL MEMBERS PRESENT:

MATT WELLSLAGER, Chair

SCOTT PERKINS, Vice Chair

RADM KEN BARBOR

LAWSON BRIGHAM, Ph.D.

JEFFREY CAROTHERS

CAPT. DEBORAH DEMPSEY

MICHELE DIONNE, Ph.D.

RADM EVELYN FIELDS

WILLIAM HANSON

DAVID JAY, Ph.D.

GARY JEFFRESS, Ph.D.

FRANK KUDRNA, Ph.D.

JOYCE MILLER

NON-VOTING MEMBERS PRESENT:

JULIANA BLACKWELL, NOAA/NGS Director

RICHARD EDWING, NOAA/CO-OPS Director

LARRY MAYER, Center for Coastal and Ocean

 Mapping, University of New Hampshire

STAKEHOLDER PANEL 1: ALASKA REGIONAL NEEDS FOR NOAA'S NAVIGATION SERVICES, PRODUCTS & INFORMATION:

STEVE BOARDMAN, Chief, Civil Works Project

 Management, U.S. Army Corps of

 Engineers, Alaska District

CAPT. EDWARD PAGE, Marine Exchange of Alaska

WALT TAGUE, Crowley Tug & Towing

MARK SMITH, Vitus Marine

CAPT. DANA JENSEN, Alaska Marine Highway

 System

STAKEHOLDER PANEL 2: ALASKA MULTI-MISSION APPLICATIONS OF NOAA'S GEOSPATIAL, TIDES & CURRENTS & HYDROGRAPHIC SERVICES:

MICHAEL O'HARE, Alaska Division of Homeland

 Security and Emergency Management

COMMANDER JAMES HOUCK, Chief, Waterways

 Management Division, U.S. Coast Guard,

 District 17

AIMEE FISH, National Weather Service

TOM HEINRICHS, Director of GIS Network of

 Alaska at University of Alaska Fairbanks

 and Executive Committee for Statewide

 Digital Mapping Initiative

MOLLY McCAMMON, Alaska Ocean Observing System

WILLIAM HAZELTON, Geomatics, University of

 Alaska Anchorage

NOAA STAFF PRESENT:

CAPT. JOHN E. LOWELL, JR., Designated Federal

 Official

HOLLY BAMFORD, Ph.D., NOAA/NOS Assistant

 Administrator

LTJG MATT FORNEY, NOAA/OCS, Navigation Manager

 of Alaska

CAPT. GERD GLANG, NOAA/NOS

KATHRYN D. SULLIVAN, Ph.D., Assistant

 Secretary of Commerce for Environmental

 Observation & Prediction, Deputy

 Administrator and Acting Chief

 Scientist, NOAA

KATHY WATSON, HSRP Program Coordinator

ALSO PRESENT:

CAROLE ANDERSON, ADS-B Technologies

LARRY BISCHOFF, Holland American Line

RON BRITTON, Alaska Peninsula National

 Wildlife Refuge

BRET CHRISTENSEN, U.S. Fish & Wildlife Service

BILL CREGER, David Evans & Associates

JOEL CUSICK, National Park Service

JON DASLER, David Evans & Associates

ANNE DOLLARD, U.S. Army Corps of Engineers

SHANNON EARL, Fugro Consultants

KAS EBRAHIM, Fugro Consultants

PENNELOPE GOFORTH, SeaCat Explorations

STUART GREYDANUS, Port of Anchorage

CLIFTON HEBERT, Witt Associates

COLLEEN KEANE, Pacific Environment

TOM LAKOSH, Public Interest Advocate for Oil

 Spill Prevention and Mitigation and

 Renewable Energy

CAROL LOCKHART, Woolpert, Inc.

STEVE MILES, David Evans & Associates

BOB PAWLOWSKI, Office of State Senator Kevin

 Meyer and University of Alaska Anchorage

 (retired)

JIM PERKINS

JOEL REYNOLDS, Western Alaska Landscape

 Conservation Cooperative

CAPT. MICHAEL TERMINEL, Edison Chouest

SCHAWNA THOMA, Office of Senator Mark Begich

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 8:33 a.m.

 CHAIR WELLSLAGER: Good morning, everyone. Welcome to Day 2. A couple of bookkeeping things that we need to discuss before we get started. Will all public attendees please sign in on the sheets in the back of the room? We have sign-in sheets and we like to have these done so we can keep a running tabulation of those who come to these meetings so we can see who's actually attending.

 We're going to have some breakout sessions, stakeholder breakout sessions with HSRP members tomorrow. And there are sign-up sheets for those in the back as well. And this is going to be something that I think would be beneficial for all those attendees other than the HSRP members to attend as well if you're interested.

 This is an idea that's new to us and it was presented to me during a call with the HSRP program coordinator, Kathy Watson. We were trying to come up with a new paradigm, and the paradigm was, you know, let's put the rubber on the road and find out what the users actually want from the Anchorage area and then indirectly the nation.

 So after she and I talked about this awhile I presented the idea to the Trioffice directors during a conference call about the format of the meeting and we've agreed to do this.

 And the sessions are going to be individual in meeting rooms downstairs and there will be signs up for each of the locations. They will be staffed with HSRP members. The Trioffice directors will be in their own separate room -- not their own separate room, but the room that they're going to be most associated with in the breakout sessions which will be the Alaska Baseline Data Collection & Requirements for NOAA's Nav Data, Arctic Emerging Priorities, Alaska Geospatial Framework, and Tides & Currents. So we're pretty much covering the gamut right there.

 And these are going to be things that we discuss for about 2 hours, come up with recommendations, and then after lunch present the recommendations to the HSRP panel and with those make recommendations to the NOAA administration.

 All right. Getting back to today, things that we've got on schedule. We will first have Dr. Bamford address the panel on some more navigation services in the emerging Arctic. After Dr. Bamford's remarks we'll get into the meat and potatoes of what we're here to do today, and that's hear from some stakeholder presentations.

 We have two set up. The stakeholder panels are at the front of the room and each will speak for about 20 minutes. We would like to hold the questions until after the presentations unless you just have a burning thing that you've got to get out, and we can take maybe one or two. But we want to get the panel discussions completed, then have the questions and keep a flow going through the whole thing.

 Following a break in the afternoon we'll have a panel discussion about what we heard today, throw some ideas out, bicker a little bit which is always healthy discussion anyhow. You know, this is what I like, this is what I didn't like, this is what we need to have, that type of thing. Come up for some recommendations for NOAA and then address the agenda for Thursday. After that we'll have a public comment period and we will adjourn.

 The HSRP panel will have a standing invitation to Dr. Brigham's house tonight for karaoke and lasagna.

 (Laughter.)

 CHAIR WELLSLAGER: But he was gracious enough to invite us out to his house for a light meal and discussion. So we thank you very much for that.

 Okay. Any questions? Captain Lowell, do you have anything you'd like to say?

 CAPT. LOWELL: I think you covered everything.

 CHAIR WELLSLAGER: Okay, very good. Well, our first speaker today, Dr. Bamford, is an organic chemist, a PhD in that. So that's actually quite impressive. Having a degree in biology, chemistry just killed me. I never could get through all that.

 She brings a significant leadership and management expertise that was first honed as an undergraduate studying business management. So we've got the best of both worlds right here.

 As a director of NOAA's marine debris program in the Office of Response and Restoration Dr. Bamford brought national recognition to issues related to marine debris and to the program, accomplishments that were recognized with a NOAA Administrator's Award in 2008.

 Through her work as Marine Debris director and division chief Dr. Bamford has served on a number of scientific and advisory committees. She's presented at a number of national and international meetings, academic institutions as well as addressed through national media outlets which include CNN, NewsHour with Jim Lehrer, Good Morning America, my favorite the Rolling Stone, People and the Wall Street Journal. Please help me welcome Dr. Bamford.

 (Applause.)

 DR. BAMFORD: So thank you, Matt, very much. I'm very happy to be here today and be again with the HSRP. I'm so sorry I missed last night. I came down with a cold and so that's why my voice is a little bit raspy today. So I brought some drink up here with me just so I don't lose my voice.

 I had a very good time on Monday. I got up here on Sunday and then Monday Dr. Sullivan, myself and others had an opportunity to tour around Homer and other places, and keeping up with an ex-astronaut is very tiresome. So I caught myself a little cold.

 Anyway, all kidding aside I do want to thank Dr. Sullivan for her leadership in the navigation/observation portfolio for NOAA and being at the HSRP here with us today. I also want to recognize Lieutenant Governor Treadwell, his presentation yesterday as well as Representative Joule. So we thank them very much for attending the HSRP.

 I'd also like to acknowledge Kathy and others who put the agenda together, and particularly the Port of Alaska yesterday in going down there and actually meeting with some of the captains. Frank and I were talking about that yesterday, how important it is for the panel members to really get out and talk to the community and talk to people who utilize the tools that we provide.

 It's good to do that in a forum here but actually getting out, speaking in the margins, actually talking to the captains in their comfort zone and hearing really what they like and what they don't like. Hearing from the captain of the Horizon Kodiak really of how he relies so heavily on the realtime tides and currents that we provide, the National Weather Service information really allowing him to get in and out safely.

 But then also hearing from him things that don't always work. He's very concerned about the change of bathymetry, the vintage charts in the area and just getting in and out of ports safely. So it was really good to have an opportunity to talk with him and hearing from him what's important to him in terms of tools for navigation but also what he hopes to see comes out in the future.

 I mean just hearing yesterday, I think they said within 4 days if we can't get goods into this port foods and goods can be off the shelf. I mean, I live in Washington, D.C. If there's a dusting within hours there's no more bread and milk to be found anywhere. So I am just so happy nobody from D.C. lives in Alaska, you guys would be in big trouble.

 But as I said, I'm very pleased to be back with the panel and I do want to recognize the diversity of this panel. It's so unique versus other FAC panels. And it's not necessarily the technological expertise or the leadership capabilities that you bring to this panel, but it's really the makeup of the panel.

 You're not just people who actually collect the data side by side with NOAA, but you also utilize the information for research and for doing your job. I mean, Deborah Dempsey needs these products to, you know, do her job safely. So I think that brings a really unique aspect to the recommendations that you can provide to the Under Secretary of NOAA. So we thank you.

 I'm also excited to hear that the working groups are established since Norfolk. And you guys are moving forward on some key areas to really drill down and focus on areas such as the Arctic as well as legislative issues.

 As you know, NOAA will be facing a lot of challenges in the coming budget. In 2012 we saw some challenges and `13. And so I'm not going to be here to talk about budget, I don't want to make this a depressing presentation, but I do know we'll be coming into some challenges.

 And that leads us to think very strategically and innovative in how we produce our products and how we work with our partners. As Dr. Sullivan mentioned yesterday, we're in the job of positioning America and our coastal economies for the future, and we have to do that with our partners and we have to think outside the box within our fiscal constraints to meet that vision and to meet that mission.

 Therefore, NOAA is really looking to this panel to provide us recommendations, and not necessarily 2012, 2013, but 2025. Start to think beyond the next 2 to 3 years, but what is it going to look like in 2035. I mean, right now we're already seeing a lot of challenges with sea ice melt and what that brings to the coastal economy and the ecosystem. But what's it going to look like in 2035 is what really concerns me and we have to be prepared to provide those tools by forward thinking of what we need today to be prepared for tomorrow.

 As the Lieutenant Governor said yesterday this region poses profound challenges and benefits to our nation's economy in the coming years due to ice receding. But this also produces a number of unexpected and expected challenges in terms of change in ecosystem, change in coastal erosion, sea level, tides and currents, all of which is really going to affect the navigation in and out of these ports safely.

 NOAA envisions an Arctic area that's using the best available information to make the most educated decisions. And as Dr. Sullivan mentioned yesterday we do have a NOAA Arctic Vision Strategy that outlines a number of different areas that we need to focus on. So what I was going to do this morning was talk about a couple of those that are focused more on the navigation, what are those gaps, and then what are some of the things that our offices are doing in partner to fill some of those gaps.

 So the first one is vintage hydrographic charting data. I have in my notes here that NOAA's charting data in certain areas of Alaska are vintage which is pre-1970. I'd rather say pre-1900 in some areas, pre-1800. You know, I think there's areas we just haven't looked at in a very, very long time or haven't been looked at at all, and this is a problem. We're going to have to really figure out how to fill that gap.

 For example, Kodiak, Alaska which has 1,800 vintage charts up there. And this area has seen a tremendous amount of growth in terms of commercial and ecosystem and recreational fishing along that coastline. And they've seen some changes in their bathymetry, which is concerning. So these are areas we need to look at in terms of updating our charts.

 John, you can correct me if I'm wrong, but I think Coast Survey identified 38,000 square nautical miles in the U.S. Arctic as priority. I think it's going to take about 25 years to actually survey all that area. So we have a lot to do in a very short time frame and how do we do that.

 As we heard yesterday NOAA is looking to really partner with folks up in the region and others to kind of fill this gap. And we heard from John yesterday that in the summer of 2010 and `11 the Ship Fairweather worked around the clock to provide Kotzebue Sound updated charts. And these charts were not only updated with bathymetry data but they had tide data, shoreline data from satellite imagery.

 And this area is very interesting because as you get into the sound, vessels had to anchor about 14 miles offshore in the sound because they were too large to actually safely navigate into the coastal area. So they actually had to bring other vessels out there to get those goods. So with this new nautical chart we're going to have better decisions to be made to safely navigate in that area.

 And this is the uniqueness of Alaska, that we really need to keep in mind as we provide recommendations for the Arctic. This is so different and unique that we have to be forward-thinking in how we come up with recommendations to safely provide nautical charts for safe navigation.

 Second, I'd like to talk about the collaborative sharing of oceanographic data and products. There's really a need for improved oceanographic, meteorological and accurate elevations for the area of the Arctic and for Alaska. As we heard about ERMA yesterday, it's a great tool but it's only as good as the products it's used to run that tool. And if we don't have the data to input into ERMA it's not as effective as it could be.

 Observations are sparse in Alaska as I learned on Monday in our touring around that there's not a lot out there. We had an opportunity to hear from our partners, and for instance, AOOS. We talked with them a little bit and we heard about the wave buoy that was deployed in Cook Inlet. And I want to mention it's one and stress that it's one of its kind, but it has provided a tremendous amount of information for boaters, mariners to safely navigate through Cook Inlet.

 Another example I'd like to talk about is the successful testing that CO-OPS is doing up in Barrow, Alaska. As we saw yesterday the tide gauge. They're also working with their partners up there, an Alaska-based contractor to leverage their experience and their understanding in putting out a tide gauge that's working now under the ice. And it's been operating now for 2 years, is that right, Rich?

 MR. EDWING: It's out now, but it was successful almost 2 years under the ice.

 DR. BAMFORD: And 2 years under the ice. And it's now gathering year-round information that we didn't have in that area before. CO-OPS and Coast Survey are also partnering with the Alaska Energy Authority to conduct a tidal current survey for this year and build a hydrographic dynamic model for Cook Inlet to assess the potential for renewable energy coming to this region.

 And I think yesterday there was some discussion on how we need to partner more, particularly with industry, and I think we're moving in that direction.

 And then NGS has also been collecting gravity data, part of our GRAV-D project to improve elevations. And I think the increase is from a meter down to 2 centimeters. That's a dramatic change and it's so critical in this area. We're going to see shoreline changes on an annual scale, and being able to provide that information is so beneficial and critical to producing the best nautical charts we can.

 So these efforts are just some of the efforts that NOAA is conducting. And this is really, truly a partnership. We can't do it alone. And that's something that we've seen and we've heard on Monday in our tour of talking with our partners of how important it is to bring all capabilities to bear to produce the best available science, to make the most educated decisions.

 These were just some of the issues I wanted to bring here. I know there's a lot more out there I did not mention. But I just, in terms of starting off today as you go into your breakout sessions, I just wanted to bring up some high-level things that we are doing up in the Arctic to start to fill some of those gaps. But clearly there is a lot that needs to be done. And we truly look forward to hearing what the panel has to say and the recommendations that come out of the panel in the next couple of years to guide us in how we operate and how we work in the Arctic. As we move and position the U.S. for the future. Thank you.

 (Applause.)

 CHAIR WELLSLAGER: Thank you, Dr. Bamford. Are there any questions in the audience that they would like to ask? Well, thank you. Oh, I'm sorry. Jeff, yes.

 MEMBER CAROTHERS: This is Jeff Carothers. Yes, Dr. Bamford, just -- I know NGS is flying GRAV-D in the lower 48. Is it currently going on here now, or is it planned for up here?

 MS. BLACKWELL: Juliana Blackwell, the director of National Geodetic Survey. Jeff, we have completed over half of the area of Alaska as far as the GRAV-D collection goes. At this point in time there is another small project that is planned to try to get done in FY `12. We're doing a lot of partnerships with other federal entities to try to get platforms and things necessary to be able to fly the airborne gravity.

 We also plan on doing a little bit of work down on the eastern side of Alaska along the coast in FY `13, realizing there's still some of the west coast and the Aleutians that's going to be a little further out before that data is collected. But I do have a printed map just to show what's been covered so I'd be happy to show that to you and others during the break.

 DR. BAMFORD: Thank you, Juliana.

 CHAIR WELLSLAGER: Lawson?

 MEMBER BRIGHAM: Maybe at the next meeting we could have a brief on how the Arctic strategy that you have in NOAA, how you're doing with it in implementation or what your success rate is for funding. It might be nice to hear maybe at our next meeting.

 DR. BAMFORD: That's a great idea and we can do that. We can do that. Great. Thank you, Matt.

 CHAIR WELLSLAGER: One note. As we do go through the panel discussions and questions and answers, if you have a discussion or if you have a question please speak into the microphone, give us your name and that'll make life much easier for the court reporter.

 All right. Well, we're fortunate today to have as our first stakeholder panel session a group addressing the Alaska regional needs for NOAA's nav services, products and information.

 The first speaker, Steve Boardman, is the chief, Engineer Division of the U.S. Army Corps of Engineers, the Alaska district. He'll be followed by Captain Edward Page, the Marine Exchange of Alaska, Walt Tague -- Tague, I'm sorry -- with Crowley Tug & Towing, Mark Smith with Vitus Marine and Captain Dana Jensen with the Alaska Marine Highway System. So, thank you very much for offering to be here with us, and Mr. Boardman, if you're ready to start, please.

 MR. BOARDMAN: Thank you so much for having me, giving me an opportunity to make a presentation. I have a number of slides here. I promise you I will not dwell on these slides. I'll rip right through them. Hopefully they'll be published and you can read them at your leisure. But there's a piece of information obviously I want to share on each one of those.

 A little small correction. I'm not the chief of the engineering division. I'm actually chief of project management, civil works project management.

 Just a little quick background. I have almost 40 years with the Corps of Engineers, 33 of them here. I've been in regulatory, operations, navigation and since 1989 I've been building navigation projects and erosion control projects, flood control projects throughout the state. So I'm going to focus my attentions on the items that are with the navigation and let's see if I can get this to work.

 A little quick history. I'm sure most of you are aware the Corps of Engineers in the state of Alaska, we've been doing projects since 1912. So far now we have built 49 harbors, 15 channels with a number of projects under construction right now. I say that because that just puts pressure then on NOAA and others to generate navigation surveys and whatever to approach those navigation projects as they come online.

 This morning it hit me that as I'm in the shower that whoa, I forgot all about erosion control which is a major event that's occurring for us as well. And we have multiple projects going on right now at Shishmaref, Kivalina, Unalakleet, relocation, assisting relocation of the community at Newtok.

 And we published a report not too many days ago where we identified 26 communities both coastal and riverine that have a severe and urgent need to deal with erosion and another 69 that have a moderate need. I say that because we do not have the engineering data, coastal data or riverine data for that matter to be able to calculate waves and what the currents and the basic conditions that we're protecting against. So we need the assistance of all the agencies here to generate that information.

 Just real quick, over the last few years we've built projects in Alaska, Douglas down by Juneau, False Pass, St. Paul, Chignik, just expanded Seward Harbor. Right now under construction, brand new harbor at Akutan, finishing up work at Douglas there in Juneau, and in Alaska.

 Projects that we have in plans and specs right now: Haines, a second harbor at Haines, a second harbor at Valdez, and a new project to expand Port Lions.

 Some of the other marine activities that are going on. I mentioned that we, and you folks are probably more aware of it than I, the lack of engineering data. So we've had some success with getting some green light and some money out of Washington, D.C. to do our Western Alaska Hindcast, getting some data on what are the winds, the waves, making a model that's predictive of what will happen along the west coast under certain conditions. As the ice and the weather changes of course that model is going to have to be dealt with.

 We also have the Western Alaska Storm-Induced Water Level Prediction Model. Working with AOOS and others I'm trying to figure out what's going on in the various sites that are out there.

 We were asked four basic questions. What are the uses and applications the Corps of Engineers has for NOAA data? Obviously we're in the business of navigation and erosion control. So, we are building things, we're operating them, we're maintaining them. We need data to be able to do that. We're planning new projects. We need data to do that. This state -- you folks are well aware of it -- is data-poor. So we either have to generate it as part of our planning process or going to our other agencies to figure out if that data might exist, whether it be wind, waves, hydrographic conditions, topographic conditions.

 So some of the things we need as I already indicated, tidal data. Hydrographic surveys. Tidal data, the first figure talked about Kodiak Island. Kodiak as well as Southeast is having an experience of glacial rebound. Kodiak Island in particular, for years we would go down and survey our small boat harbors and say the depth of water is in great shape.

 The problem with glacial rebound is the datum that you're measuring from is going up at the same rate your bottom contours are. So while we say it's 8 feet deep of water or 10 feet deep of water, because it's rebounded 2 to 3 feet it's actually 5 feet of water.

 So as part of the ARRA process we were able to get some money and we did a complete redoing of the datum on the Kodiak Island archipelago and we're working right now in southeast Alaska to try to do the datum. So when we do our surveys we'll have current and find out what the true depth of water is.

 Some of the data gaps or issues. I think that's a coordination issue. As we generate information, make sure we integrate it in with the greater body. Likewise as other people generate, is it stored, is it able to be retrieved by all of us.

 So there's an element of redundancy which is good and there's a certain aspect that is bad. As we are kind of plowing over the same area. Maybe we need to work together so as we're working that takes some of the pressure away from another agency. As we're setting tide gauges or setting other data.

 Lack of wave and wind, I indicated we've already generated some of that information and they're publishing it as part of various reports. But as we work together we need to make sure that all of that is collected and we understand who's doing what, where and why. Lack of tidal datum and hydrographics, those are obvious and I think you folks have discussed that already.

 Recommendations for improvement. Increased user groups such as the Alaska Interagency Hydrographic Survey Working Group to be able to share data. Standardization of data so that we can compare and match and folks look at that and be able to interpret it the same way.

 I'm not an expert here and I don't know if my expert is here, but collaboration on S57 products. You folks probably understand that more than I do, but mainly the Corps still uses PDF files rather than a universal system and we need to work on that.

 I'm not going to go very hard on this, but I just want to alert you because this is where we're going to be needing data tremendously in the next few years. Back in 2003 we started Alaska Regional Ports. Alaska Regional Ports Study was to look at the entire needs along the Alaska coast which you folks are well aware is greater than the entire lower 48 coastline. So we're trying to find out what is the federal needs for improvement in navigation.

 We also as part of that identify the harbors are part of a system rather than individual projects. So we're trying to work on a whole series of connections on whether it's 500-mile increments, 1,000-mile increments. So we've kind of broken the state into five areas as we're trying to go through this analysis, and trying to do a systemwide identification of the needs that are out there.

 So we've had two statewide port conferences, one in 2008, one in 2010. The one in 2008, overwhelming majority of the people needed greater collaboration between agencies. And of course the fact that there's no engineering data. We need to collect engineering data.

 The next report. Well, we then got into a cost-sharing agreement. We looked at trends analysis, hub analysis, the tabulation of needs, policy recommendations and where can you find building materials.

 The second one in November `10 identified a list of navigational needs which is what this document is. I don't know how many pages it is anymore, 19 pages of zero font it looks like.

 (Laughter.)

 MR. BOARDMAN: Identifying anywhere from needing a port or harbor, a deadman, piling, anything that will support navigation. The one big challenge obviously is do we even know what exists there. What is the beach line? What is the approaches to it? This is not necessarily Corps of Engineers-centric, this is everybody. You know, who's going to build these facilities as they become necessary? This was the entire state of Alaska and it's a monumental task to say the least.

 We also started to develop criteria that if -- what are the needs and what are the ports. What's the depth that we need or information we need? What's the moorage capacity? What are the infrastructure that would be necessary if we were to build marine improvements out there? Who are the users?

 And the congressional delegation and the Governor decided let's put a more focused, and that's the Arctic deep draft ports. It originally was Arctic deep water. We defined Arctic deep water meaning we already know what the depth of water is. In the case of -- and it's deep already. So we're going to Arctic deep draft, meaning we'll have to create that water by whatever means, assuming we know what the existing conditions are.

 And so we had a planning charrette. I'm just going to kind of fly through some of these slides. We had of course the State Government, the Federal Government that were there. These are some of the products. This is Ed Page's document. You'll see him next trying to define what are the Federal needs that are out there, mainly oil and gas and exploration.

 You can see on the right the current state of hydrographic surveying. This was published by NOAA as they made their presentations.

 State interests. Governor Parnell's main interest is the exportation of mineral wealth, whether it's oil, gas or otherwise. We need ports to move that out and where to put those ports.

 Arctic geographic. Where is the Arctic? The obvious is above the Arctic Circle but that is not the case. The legal definition takes you all the way down to the Pribilofs. Well, we felt that was too big of an apple. So the group at the time defined Mekoryuk Island which is here -- the Aleutians are down here -- as that's the starting point and we'll work our way to the coast.

 Define a vessel. Who's using this? What size vessels are using this? That kind of goes into the other one of what was deep. Who was envisioning deep? We define it as -35 feet. The state's now asking us to look for places along the coast for 45 and 55 feet deep so they can compete with the conditions and the folks who are moving product around the world. Who are the other ones? Obviously NOAA is doing hydrographic surveying. Maybe they need a place to berth every once in awhile for changing crews, taking out provisions, whatever is necessary. Life and safety, Coast Guard. I saw a Coast Guard uniform here. Their mission dealing with the opening of spill response. Shell is hoping to drill. Others are hoping to drill up there. What happens if there's a spill? There is very little information or, well, information and infrastructure out there to support all that.

 Where can you put a port? As I say we're talking about 35, 45 feet. Those who are doing hydrographic surveys know there's not many of those places out there. And generating it, digging it, we don't even know what the contours are or what volumes we're talking about.

 Here's just some of the port sites we're considering. I'm not going to go through all of them, but there's at least 14. I think Representative Joule talked about the Northern Waters Task Force yesterday. The vast majority of these were identified as part of that process. We're tagging onto that. We are now going through all of these.

 We're using multi-criteria decision analysis software, running what-ifs, trying to figure out. But one of the biggest things that's still missing is what is the depth of water coming to those sites from the approaches as well at the site. And so someone, either we're going to have to generate it as part of the study, we're going to ask our friends from NOAA to generate it, we're going to ask our friends from whomever else to try to identify the information.

 And again, this will be published hopefully as part of the record. If you want to see what's going on in these regional ports, the data is being posted on our website. And I'll defer questions till the end.

 CHAIR WELLSLAGER: Actually, we've got about 10 minutes. If there's some questions that would like to be asked right now we can go ahead and do that. Larry.

 MR. MAYER: It seems clear that during this Alaska Regional Ports process you had input from NOAA. But is there a formal process for more regular consultation and collaboration?

 MR. BOARDMAN: We are working right now. Again, the first rounds of these multi-decision criteria. Our next step, and I think it starts even next week is going to the stakeholders. And so we'll be going to the oil industry, the NOAA, the other agencies and presenting what we have. Now, yes, more and more stakeholder meetings are envisioned before the end of this calendar year.

 MR. MAYER: You look at NOAA as a stakeholder. NOAA is also a partner that has many of the same needs as you.

 MR. BOARDMAN: Yes, I understand that. I understand that. And yes, I mean right now our partner from a financial perspective is state of Alaska. The stakeholders we're going to engage are partners in the fact that yes, the data is necessary for all. And that would be the process that will be going on this summer is pulling more of that out.

 NOAA was a participant in all of these statewide and planning charrette, gathering information from it as well as Coast Guard, Navy and other users. So, it's the start of many years still to come. Because as we identify a handful of projects for consideration then the real work of identifying the needs for that port will come to pass. This is right now just to try to take this group of 14, 16, 20, whatever it is down to a more manageable number of sites.

 CHAIR WELLSLAGER: Joyce?

 MEMBER MILLER: Yes, Joyce Miller. Yesterday we went out to the ships and heard the concerns of the captain. And we asked Matt yesterday what was going on. But since it's Army Corps that's in charge of what's going on at the Port of Anchorage right now in terms of active projects can you tell us a bit about what's happening with Anchorage?

 MR. BOARDMAN: Well, let me try to touch on that because Stuart's over there and I'm not going to take away the Port of Anchorage's responsibilities of the expansion of the existing harbor.

 Port of Anchorage of course is a major project for us. I've been involved with the port since at least 1981. The Corps has been dredging at the Port of Anchorage when it was an Army dock back in the fifties.

 The Corps has multiple missions as it relates to the Port of Anchorage. Legislation back in 2006 I believe it was gave us more authority. And it all kind of dovetails into the physical structure of the Port of Anchorage is the Port of Anchorage is to deal with. And that includes the expansion project that's going on right now. Now, that's actually a mixture of MARAD and the port and the muni. That whole relationship, I'll let Stuart and the port answer that in greater depth or not.

 The Corps has the responsibility of dredging at the existing port. It's the only one that I'm aware of within the system where we dredge up to the face of the dock. And that started, again, when it was part of the U.S. Army. So we dredged up to the face of the dock. Everywhere else, the berthing area, dredging is part of the port.

 So the relationship is a much closer one because if a user feels that the depth of water at the port is not at a sufficient depth they're going to knock on our door as much as they knock on Stuart's door because it's our responsibility to do the dredging.

 Now, legislation we received in 2006 gave us other directions. One is what we quaintly call transitional dredging. As the port expands we are to dredge in front of the new phases down to -35 feet which is the authorized depth of the harbor so that that phase can be usable to any carrier that would come.

 So we've done that on the north end. The existing structure that's there we've dredged up to the face of that. Since it's not being used yet by a carrier we have it in a -- I'm not sure what term I want to use, but it's in the maintenance mode but it's not in the continuous maintenance mode as we would at the existing structure where we dredge constantly during the summer.

 We dredge it twice a year, start of the season, end of the season so that it does not fill in substantially and then consolidate because the fine-grained material, if you let it consolidate it turns hard like stone till you have to stir it up. So we've dredged in front.

 We had an authority -- well, we have an authority that allows us to do the construction dredging to assist in the development of the project except the terminology used in the law was "we may" and Washington, D.C. said we're not going to. The transitional dredging, the word was "we shall." We couldn't get out of that. So that's a poor way of putting it, but.

 We also have an authority obviously to maintain the existing -- is to take the existing navigational channel leading into the port or upper Cook Inlet in the Knik Arm. We have one that's 1,000 meters by 100 meters wide and approximately, I'll convert it to English, -38 feet channel out there between Fire Island and the Port of Anchorage. This law says take that channel and expand it against the two range lines, the entire length of the range lines, as it goes.

 One of those range lines as it travels north towards the two ports bisects a shoal that's been growing since 1999. The Corps is a bureaucratic organization. The process is go expand the channel the full length of these two range lines, deepen it to -45 feet.

 The Corps' answer is we'll do that after we do what we call a decision document to justify the engineering and the economics -- or not the economics, the environmental. We'll have to do economics too but there's no rationale, it doesn't have to be a positive B/C ratio, benefit to cost ratio. But we haven't done that study yet, that decision document because that has to be cost-shared with some partner and no one yet is willing to do that.

 So, all of the users are complaining about siltation outside our channel. They're complaining about the shoal. We recognize that. And we're working as best we can with the port and Port MacKenzie to provide a workaround the shoal by surveying it in conjunction with NOAA periodically and then we do spot areas to see what's the depth of water so that it can be navigated around. While we ultimately lead towards a solution, a permanent solution of creating a navigational channel that'll either be right through the shoal or around the shoal or however it's going to be as we determine those conditions.

 So our relationship with the port is close. It's a -- I'm not sure if I want to use the word "symbiotic" but the actual physical construction is the port's. We are doing a study for them on behalf of MARAD and the muni to determine the conditions or what happened in the construction, what happened in the design, geotech that led to where they are right now where they're kind of caught with an unusable structure or a partially usable structure. And then we'll provide that data as soon as it's completed and that's hopefully very soon. It's actually overdue. So they make some decisions on where they're going to go. And whether the Corps has a role in the future is yet to be determined. Long answer. I'm a politician, I'm sorry.

 CHAIR WELLSLAGER: Well, that's actually very good. Thank you. I'd like to hold any other questions until afterwards so we can move onto the next presenter. Captain Page, if you could please.

 CAPT. PAGE: I'm Ed Page from Marine Exchange of Alaska as it says up on the board there. I first came up to Alaska here in 1973. After sailing on the ocean station patrols off the North Atlantic I said this is really lousy, Alaska has got to be better. Obviously I was wrong on that one so I brought a ship around from Boston to Seattle and onto Alaska. And obviously I didn't graduate very high in my class. Alaska was even worse as far as harshness, whatever.

 But I've been back and forth to Alaska over various assignments in my 30 years with Coast Guard and became very enamored, fascinated and enamored with Alaska to the point where I retired here about 11 years ago and started the Marine Exchange of Alaska.

 During my Coast Guard career I did work several years with the Exxon Valdez oil spill as chief of environmental protection during that period. And then I think to put me in the penalty box the Commandant of the Coast Guard sent me to Los Angeles/Long Beach to be the captain of the port and group commander down there. He realized I was having too much fun in Alaska kayaking and hiking and what have you.

 But when I went down there very early on I was wowed by all the traffic and activity. I said gee, this is amazing. So where's the Vessel Traffic Service? Of course there wasn't one. The Coast Guard didn't have a Vessel Traffic Service back in 1993. And I realized that information was critical as far as enhancing maritime safety and what have you.

 So -- and the same issues existed then as they do now, probably now it's even worse and that's just the fiscally constrained environment. The Coast Guard certainly did not have money to build the Vessel Traffic Service to man the traffic in L.A./Long Beach even though it's one of the biggest ports in the world. And we basically found the workaround.

 And we basically sat down with the state of California. The Marine Exchange was a non-profit organization that has existed since 1900. The Marine Exchange is essentially exchange maritime information. I'll get into that here in a minute. And then the Coast Guard. And together we put together a Vessel Traffic Service through a partnership and a shared commitment, shared interest and obligation towards maritime safety and found solutions we all contributed towards.

 So, in my discussion in the next couple of minutes I'm going to talk about the Marine Exchange, how it works with the Coast Guard and NOAA and others, and some of the lessons learned over the last couple of years as far as in a fiscally challenging environment how do you prioritize and get certain things done. You know, how do you leverage resources with other agencies? How do you work with partnerships. As Dr. Bamford mentioned earlier about partnerships. And then information. How do we get the information we need to make informed decisions, smart decisions and be more efficient. So that's basically what I'm going to talk about in the next couple of minutes.

 The Marine Exchange is a non-profit maritime organization established to provide information and communication services to aid safe, secure, efficient and environmentally sound maritime operations. That's basically the Coast Guard statement too. The Coast Guard has the same mission, I just took that and walked out the door and continued on in that vein. And they go back to the nineteen hundreds, basically exchange maritime information.

 They're honest brokers of maritime information. Originally they used telescopes and scanned the horizons before the information crossed the bays if you will to the shipping industry to facilitate trade. And of course today we've moved forward into radars and whatever.

 In looking at starting the Marine Exchange for Alaska I realized that the only way we could pull off getting that type of information was tapping into the new emerging technologies that were coming online. Because -- and we also needed that information.

 Alaska is a state that's more maritime in nature. Some of my colleagues here that have worked in support of Marine Exchange over the years who will be talking after me who operate vessels can attest to the fact that it's a very challenging environment, a huge environment, ecologically sensitive environment and one of the most diverse maritime regions in the world for that matter. Any kind of ship you can think of, oil exploration, reduction, LNG ships, oil on tankers, ferries, cruise ships, tugs and barges, I'm missing some, but container ships and trampers all are operating -- fishing vessels of course are operating in this very challenging environment.

 One of the tools that we've been using and relying very heavily on the last couple of years basically is the cornerstone if you will of the Marine Exchange operations is the Automatic Identification System or it's referred to as AIS. And this is something that has been in the books an deliberated for several years for our international maritime organization, but it wasn't really until 9/11 and the interest of maritime security that kind of pushed it as one more reason why we should have this capability.

 And so IMO adopted the treaty for requiring larger commercial vessels to have Automatic Identification System which is much akin to or like transponders on aircraft. Basically ships are, every couple of seconds they're broadcasting out over VHF frequencies their course, speed, destination, dimensions, even their rudder angle in some cases, next port of call, destination ETA. A tremendous amount of information. Even draft for that matter.

 So this information is being pumped out all the time by these vessels sailing through Alaska waters. And unfortunately because of fiscal constraints the Coast Guard hasn't been able to build the system to receive this information, process it and disseminate it up in Alaska because the challenges of the tyranny of distance and the remoteness, what have you.

 So they -- if you find enough crazy folks like I've found walking the streets. We have about 16 people that are pretty adventurous and willing to go ahead and build the system. And so that's what we've been doing is we're building a Vessel Traffic Service.

 We use AIS and satellite tracking and the users -- the system goes from Puget Sound all through Alaska out to Adak, up to Beaufort Sea, over to Kaktovik for that matter and south to the Dixon entrance. And the users are tanker companies and Marine Highway System, cruise industry, container lines, passenger vessel operators, ports and harbors, oil spill response organizations, fishing companies, pilot associations as well as government agencies, NOAA, the state of Alaska, all of -- the Department of Environmental Conservation, Fish and Game, Commerce, you name it, they're all using this system and tapping into it.

 And certainly, you know, part of this is to kind of minimize -- a lot of it in my mind anyway is to help save lives, help save property, help protect the environment, help increase efficiency. And in a state where we've had a fair amount of incidents. I'm sure we've all heard about the Selendang Ayu and certainly the Exxon Valdez no doubt. So why do we track vessels? It provides a safety net. If someone's in distress we can find a vessel nearby and it's basically information to provide to the Coast Guard Operations Center. They can see all this information, they can make good decisions.

 Risk assessments, environmental protection, to validate compliance, emergency response, improve efficiency and maritime security. I'd like to think back. If you look at the Exxon Valdez incident or the Rena or the Costa Concordia, in each of those cases if somebody was watching, if they knew that somebody was watching their movements at all times kind of like you knew the police is out on the highway with a speed gun that would influence your behavior.

 Most likely it would -- Hazelwood would have stayed on the bridge where he was supposed to be, he would have stayed within the channel like he was supposed to be, but he was actually beyond the Coast Guard's range of the radar at the time. So he went below, he went out of the channel and the rest is history.

 The Costa Concordia, I'm sure he thought nobody was looking at him so he took that very bold move with very bad consequences obviously. And the Rena, what happened off New Zealand recently. Again, a vessel that went off course for quite some time. Nobody was watching, no alarms went off and the rest is history.

 Of course the other important thing about tracking is tracking your daughter when she goes down the Yukon River on a canoe. That's one of the more important things. And my operation centers used to give me daily updates of where my daughter was so there's other ancillary benefits to this thing.

 (Laughter.)

 MR. BOARDMAN: There's a personal side to this. It's not all business, some personal aspects to this thing.

 And this is our operations center. We run a 24-hour operations center where all this data is coming into, satellite and AIS information. And when I look at Alaska and what we learned beforehand, this is one I always like to talk about: 99.9 percent success in Alaska it caused public outrage because that's the success rate of getting tankers in and out of Prince William Sound before the Exxon Valdez. So that's not good enough. It's a very high-stakes, very zero tolerance game in Alaska. You really have to get it right, because if you don't get it right there's big consequences to pay.

 So as I mentioned, you know, the Marine Exchange and what we're doing here is a shared commitment by the maritime industry, government, what have you.

 And how we track vessels, we're using a variety of systems: Vessel Monitoring Systems which are required to be carried on fishing vessels; Global Marine Distress Safety and Signal System, we tap into that and track vessels with that. We use ship security alert systems to track vessels and alarms go off in our office for that matter when there's an incident. Long-range identification tracking is another system that the Coast Guard uses. And then -- which is IMO-adopted. Every 6 hours a vessel will provide a position report. Then Automatic Identification System which is another piece of equipment that's required by both international treaty and the Coast Guard regulations.

 And so to that end we've built in Alaska 90 AIS sites and we're still building. I still have people out today as we speak in helicopters and float planes around Alaska scoping out and building and upgrading and repairing sites. As you can see, all the way out to the Aleutians, southeast and up to the Arctic.

 And then we also continually evaluate the coverage of where we actually are picking on ships. This is where we picked up ships in a period of 30 days so we know where the gaps are and where the coverage is and where we need to put new equipment in, what have you.

 And we can also monitor our operations center. If they see the light goes out, a red light goes on, alarm goes off and then we start doing troubleshooting to get them back to operational.

 A lot of the discussion here has been about the Arctic. Well, we are prioritizing just like NOAA and the Hydrographic Service is doing. You can't do it all, you can't put everywhere, so initially we prioritized saying where are the biggest concerns, biggest consequences and that's where the tankers went, where the cruise ship went and where the ferries went. Those were our first three areas that we installed our AIS sites. And then when the Arctic became a pretty hot issue we started installing AIS sites up in the Arctic.

 And then we realized most of our trade, a lot of our trade goes into the wilderness and serving small communities throughout the interior if you will, and some of our -- so we started populating the entrances to the rivers, Vessel Traffic Service. So we're constantly looking at the trends and prioritizing. We don't have complete coverage. We're constantly looking at what's the best return on investment since we can't do it all at once.

 And how do we do this? Well basically, you know, the maritime industry has stepped forward to say we'll help get you there. We're not using a Lockheed Martin or General Dynamics solution where big expensive towers. We're really going to lighthouse associations saying can we come out and install an AIS site at your pilot station, the harbor office or tug offices, travel offices, fish hatcheries, science centers, you name it, and oil spill response organizations. All those have actually come to the plate to say we'll help you build this system. My staff calls it the Friends of Ed. I've got friends all over the place. If you're on the waterfront I'll befriend you and try to find a way I can put a tower on your property.

 (Laughter.)

 CAPT. PAGE: And this is an example of one of our sites. This is our little 30-foot landing craft that we put 3,000 miles on last year running around. And we'll put a couple tons of concrete bags and batteries and solar panels and wind generators, what have you, and then we'll build a site such as this that's looking down at Dixon entrance and watching vessels in the Canadian and the U.S. border and sends the information back to our operations center which goes into the Coast Guard system.

 Here's another system we've built at Cape St. Elias, another island lighthouse that's a lighthouse association that we built. This is another example of one we built and we actually took a sailboat and sailed down the coast with a crew and built the station. And this is basically where we put the antenna and power satellite. Now we're looking at tankers that's 224 miles offshore. We're tracking ships coming down the coast.

 And this is what I do. I catch the fish and I run around with my head cut off like delivering sonar buoys to the guys.

 (Laughter.)

 CAPT. PAGE: People say what do you do when this all happens? I say well, I catch fish and whatever.

 And also, our system allows us to see Russia from my backyard which I think is the expression that Sarah Palin used. And she said when I'm with Ed and his iPad I can see Russia I think is what she really said. They cut her off. Katie Couric didn't let her finish the sentence I think.

 So, we've also of course used it for search and rescue and emergency response. The Selendang Ayu is the classic example where we've used a system to track the vessel even as it's unfolding then later on an oil spill response tracking the vessels to ensure they're optimally located position and maximizing the return.

 Other incidents happen. This is a vessel that lost power that were identified. Something was an anomaly, it didn't make sense. It was going backwards a couple knots. Talked to the Coast Guard and sure enough she called and said they had some problems. A tug was dispatched but fortunately she got herself underway because she's far enough offshore that she had time to actually repair the problem.

 But we could track the whole thing, the rescue tug coming out to assist it and the vessel in distress and locate tugs. Pick on the screen where's the closest tug, where can we find it, where is it right now and what have you. So it's a tool that can be used in emergency response.

 I'd also use to identify what went wrong -- if there is a casualty what went wrong. In this particular case, a cruise ship ran aground and hit this rock and then continued on, and then called the Coast Guard and said I hit a submerged object. Well, it was a latter date action on that thing. Environmental protection, remind the cruise ships of where they're going.

 The nexus to the Hydrographic Service which Captain Lowell knows and Matt knows is that -- and I think that my analogy would be like a university where they put a couple of sidewalks down and then they watch where the students really walk and then that's where they go ahead and put another sidewalk. So when they cut across or what have you. And so what this does is give you an idea of where ships are really going. So we're going to prioritize, maybe you want to see where the ships are going.

 And this has to do with monitoring environmental compliance. This is also -- alarms go off. If a vessel's in the wrong area or going too fast alarms go off in the operation center, outside traffic lanes, whatever. So we can -- these things are ways that you can monitor compliance with the various safety measures in place, areas to be avoided, what have you. And we can demonstrate compliance when it's happening. If it's not then we can take other measures or the Coast Guard can take other measures to help improve compliance.

 But here's a traffic analysis that NOAA has had a lot of interest in the past as well as the Corps of Engineers where we can play back this data we come up with and see the density of traffic. We can say which vessels are actually going -- color-coded by which vessels are going where. This is Cook Inlet. This is the detail. We can play with Excel spreadsheets. Do you want to just see tankers? Do you want to see -- what kind of vessel do you want to see, basically, and what information, the destination or the type of ship or the size of the ship, whatever. It can sort it in different ways.

 The Bering Strait, this is a slide that shows up periodically in several presentations. A lot of people are interested in this new traffic that really didn't exist a couple of years ago. And where are the vessels going. And where -- if we're going to survey charts and I've got calls from the Fairweather XO saying hey Ed, can I get some information from you. We're up here in the Bering Strait. I'll send some pictures of me kayaking off Diomede Islands, just rub it in a little bit. And but anyway, and I begrudgingly give him information even though he kind of made me wish I was there.

 But I also might add that NOAA was bumping up the numbers a little bit. I don't think deliberately obviously, but we're looking at transits. We took a line and said what are the transit, where are they going, where's the density of transits and we came up with 568 transits of which a couple hundred were the Fairweather alone in their little boats. They were going back and forth surveying.

 (Laughter.)

 CAPT. PAGE: So we kind of rule them out and said sorry, it's 338. So nice job there, Captain, but we caught you on that one.

 We're also seeing ships that we never even knew existed or transit through our waters. And this is an example of a tanker. And we have a couple of examples of tankers coming that sail from San Francisco and then going to Tuktoyaktuk, a Canadian town east of Prudhoe Bay and what have you, and delivering oil. And so where are they going and who are these vessels again? And this is information we didn't have a couple of years ago quite honestly. Technology has changed the information we have to make good decisions on. So it's good and it's bad because your work changes. We have more information, you have something to do then. But in any case having the information is best because you can focus your efforts on it.

 And this is an example of vessels transiting up and down the North Slope and seeing where they're going and kind of seeing what the nature of the trade is. And this is off of Barrow. This is the traffic off of Barrow and they color-code the type of ships and what have you and where they're going. And then the density. Where are most of them going? Where are they -- how close to shore are they?

 So these are all analytical tools that we have that we've used to working with the Coast Guard and NOAA and the state of Alaska and other environmental agencies, what have you, to kind of get better information, to be more efficient and focus in your efforts.

 This is not a drunken sailor, by the way, this is a guy simply working his way through ice. So this is the other interesting things you see is that people are navigating through the area.

 One of the things that we're moving into migrating now is that once we have our AIS stations we're starting to hang on weather sensors and even testing digital sector calling for search and rescue capabilities that receive those signals which aren't, again, that equipment isn't available up in the Arctic and many other places in Alaska.

 And we're also doing some field tests and we're going to have the ability to, once we get Coast Guard approval, to push out data, weather data, safety data, even tidal data, realtime tidal data over AIS frequencies so they can just digitally see that on our AIS receiver and not have to listen to a long broadcast or what have you, or dig for it. So we're working on that to again further increase the benefit of some of these tools. And this is the Dixon entrance. It's another area that's emerging. I don't think it's been discussed at all here, but there's been a lot of concern by some parties, certainly the Coast Guard is looking at this very hard because this entrance is starting to heat up. This is the southern border of Alaska. Because Prince Rupert, a Canadian port, is starting to bring in oil into there in container ships and what have you. So, basically there was no shipping at all out of Prince Rupert a couple of years ago except fishing vessels. Now we're seeing large container ships and support vessels and then soon possibly tankers and right, going through basically our waters or shared waters right next to Alaska.

 So these are some of the things that we're using, tools that we're using to get information. I look at this in a macro perspective. You look at the bottom, we're using a variety of tools to bring in information. Global Marine Distress Signaling System, Ship Security Alert Systems, AIS, Vessel Monitoring System for fishing vessels. And we like to refer to this as Alaska Maritime Safety Net which has many other benefits of course.

 And then we can disseminate that data on a need-to-know basis to local authorities, NOAA, DoD, whatever, with no restriction to essentially the government if you will as far as access to data and some restrictions to the others in the community.

 Obviously some people could use this to, you know, target vessels if you will or cause some harm so we are sensitive to that. And basically if you're a stakeholder, you're operating vessels and you're on our team and you have access to it.

 But everyone pays. The only way we keep the lights on because we're a non-profit, and I have 16 mouths to feed and I've got 90 AIS sites and I've got -- my internet bill alone is about $150,000 a year, because I've got internet with everybody out there, is that everyone who accesses the system has to pay into the system to contribute to the success.

 So in summary, I see shared objectives of the Coast Guard, NOAA, state and local communities, the marine industry, all. They have good information, good charting information. The safe maritime operations and one of the tools is this vessel tracking data that can help you focus where you need to go. The assessment here is -- can identify. There's certainly a risk assessment component as far as which vessels do we need -- cause the greatest harm and how do we want to make sure those are done well, safely. And lastly, the efficiency of maritime operations is important.

 And seeing that many of you I'm hearing are from the D.C. area and are proud of, if you will, the traffic jams that you have and like to say yours is worse than New York or L.A. or what have you. I want you to know that even in Juneau where I reside that we also have heavy traffic in the morning. This is what we refer to as heavy traffic in Juneau. So with whales harassing people as I'm going to work after camping on the island for the night. So, you're not the only ones with heavy traffic. We have our own heavy traffic.

 (Laughter.)

 CAPT. PAGE: That's my story, I'm sticking to it. Thank you.

 (Applause.)

 CHAIR WELLSLAGER: Thank you, that was interesting. Would you rather be there in Long Beach kayaking?

 CAPT. PAGE: Where I'd rather be?

 CHAIR WELLSLAGER: Yes. Keep in mind where you're speaking.

 CAPT. PAGE: (Speaking off-microphone.)

 CHAIR WELLSLAGER: Understood. Thank you. The next speaker is Walt Tague with Crowley Tug & Towing.

 MR. TAGUE: Good morning, everybody. I appreciate the opportunity to speak to you guys. I pulled a presentation that I've used in the past here to educate captains of the port as they've rotated through Alaska here.

 I've been working in western Alaska specifically with the petroleum industry or petroleum distribution for the last 6 years, and prior to that I was in the escort response system over in Valdez. Crowley has been operating in Alaska for close to 6 years now and they've been involved in the transportation of goods and supplies to the western Alaska villages as well as sea lifts for the Arctic Slope production and even the Red Dog Mine type of exploration there.

 I put this slide show together originally as I said to educate captains of the port on kind of what we do up here so they're not quite as alarmed when we call them in the middle of the night and say we have a vessel aground.

 In the past requirements for reporting serious marine incidences included groundings, both intentional and unintentional. And as you'll see in these slides due to the lack of charting and basic knowledge of the coastline it is almost impossible not to run a vessel aground in some of these locations.

 So, this is a good example of what we do. This is an old Aputco barge that Crowley ran in the Arctic. This is what the beach can turn into in Barrow. And this is an example of a typical Alaskan port facility. So that is Barrow's port.

 Lack of tide datum. There are just some villages that exist out here that don't get the recognition that the current economic projects in the Arctic or mining projects in Bristol Bay or the Kuskokwim River get. But all these villages rely on safe, reliable and efficient transportation.

 One of the common complaints of the people in communities in western Alaska is the high price of transportation. And the reason is most of them require up to three transfers of product to get to the final destination. You might have to put it on a ship, then transfer it to a barge, and then transfer it to another barge that has the capability to get into the vessel.

 This picture here is of Newtok which is currently in the process of moving. But this is the navigation channel into Newtok. It is, like many villages, subject to wind and tide. You don't go into Newtok obviously on a low tide. And if the wind's blowing the wrong way, and it often does for several days, you may be in this type of a situation for awhile. So, it adds days and cost to the end user who is the village.

 Channels and crossings change from year to year. There are many villages that are located on rivers and river deltas that have some obviously unique challenges. These channels literally can change from week to week, year to year, and even storm to storm. This is the channel at Hooper Bay where again the water comes in with the tide and can be wind-assisted or abated by the wind. And you typically bump the whole way in here. It's not a wide channel and it's often restricted by the locals' fishing skiffs. And it takes some special equipment to get in and out of.

 Like I said that the port facilities in most of these villages are non-existent. We have been working with the Corps of Engineers to try and help and improve some of these sites, at least to give, as I said, deadmen a place to tie off to. You can see on some of the river locations there's at least some trees you can tie off to, but this is river delta tundra and there's just nothing here but the mud to lay in, so.

 MEMBER DIONNE: So you just wait for the tide to lift your boat up?

 MR. TAGUE: Yes, basically.

 MEMBER DIONNE: These are all just naturally formed channels. There's no --

 MR. TAGUE: Naturally formed, yes. And actually what's kind of unique is these villages used to be somewhat nomadic. They were fishing villages or fishing locations. Some are fish camps. And somewhere in the past somebody decided to put up a building and there sprung a community that needed fuel and goods and services.

 So, in a lot of these places they were originally located on a cut bank. The cut bank cut into the river, into the village and the village has moved since. Or if you're on the opposite side of the cut bank the water went away from you, you know, and it got harder and harder, and further and further to move the products and keep the vessels further offshore.

 This is Diomede and I put this in here. This, looking at the second picture here. There just isn't a port facility and there's really nothing to do but float offshore and run a hose in and hope the swell is not too bad to knock you out of there. And to also show that you really can't see Russia from Diomede. It's usually foggy.

 (Laughter.)

 MR. TAGUE: And here's an example of, again, a village that's located -- this is Gambell where you can't get close enough even with our shallow draft tug and barges. And you have to run a hose offshore to shore, and then approximately 800 feet up to the marine header which is safely tucked away from ice and the hazards that exist in the wintertime. Alaska has a short, intense season that's subject to freeze-up. On the Kuskokwim for example we have about a 150-day season. On the Kobuk River and then the Kotzebue area we typically run about 125 days. And those regions take, you know, up to 3 million gallons of fuel to some of the outlying villages. And if you can only take it 100,000 gallons at a time it's quite a few trips. So every trip is vital and every day is vital. And it typically happens every year, a village will not get their fuel because there's not enough water or the planning in getting the fuel to the village was too late for the weather to set in.

 So this is a transit in Cook Inlet. This can typically happen overnight. You can go from a 40 degree day to wake up and have yourself completely surrounded by ice. And it is, again, not necessarily a hydrographic function but the reasons a lot of these, we end up working late into the season is because we get stuck in places. There's not enough information on the whole Alaska coast to be able to deliver efficiently.

 There are some villages again that one of the Coast Guard requirements is to report whenever you block a channel. And in some cases the channel's only a boat-width wide or a barge-length wide. And to coin a fishing phrase, this would be getting corked off. You may -- we all try and time ourselves to be at a village at the highest point of the water.

 For example, White Mountain, there's about two tides in the summer where you can get a barge into White Mountain and you don't want to be second in line because the guy who goes in front of you is going to most likely knock around the channel and upset it a little bit. But the other issue is that he's going to be in there for the whole tide cycle and you're going to miss out.

 An example of a dock out in Bristol Bay where the dock is above the low water line. And it requires multiple transits in and out in order to get a full barge load off. And the other unique aspect of these is the mud is all slope. So even if you have a barge that's built where it can stay on, you know, and actually ground out safely there's always the potential that the barge can slide down the channel which can get kind of scary for the guys on the barge.

 And then finally there's some unique locations that require tidal plan transits. Togiak Bay is a good example and Goodnews Bay are examples where it may take you more than one tide to get across the tidal flat. And each time the water goes out your vessel lays aground in the mud.

 None of these, by the way, are emergencies. This is just a typical day in western Alaska.

 I took an Alaskan Native cultural awareness training last summer that our company sponsored. And during the presentation, Warren Anderson taught it here at the Alaskan Heritage Center. He talked about hunting and the cultural importance of hunting in western Alaska and just the process of planning these out. And I thought it would be applicable to how we use all our hydrographic and weather data.

 Basically on almost an hourly basis we're checking weather, satellite information, and we're always appreciative of the new chart information that Matt slides us when they become available to plan our logistics and to try and achieve the biggest economies of scale for each load that we can. And so we use your navigational suite basically on the NOAA site bouncing from Weather to NIMA sites, et cetera, to gather information.

 This is an example. Right now Bristol Bay has actually, this ice band has kind of moved off a little bit. But we have deliveries currently in Nelson Lagoon, Port Moller and Port Heiden. And each of these were affected by the ice that came down, packed in onshore and each of these locations required their fuel for -- in Nelson Lagoon it was for hunting. That's their economy. They needed their fuel by May 10th and we were able to get there May 21st. Port Heiden has a large project going on. I believe they're cleaning up contaminated dirt there. And they were projected to start their projects April 25th and were iced out until just yesterday. So it can have a huge impact on the planning obviously when companies are investing large amounts of money into the projects out there.

 Commonly used tools. Again for the hydrographic guys this is -- the Coast Pilot contains a lot of information on these ports, but what we do know is a lot of it is passed from boat to boat. Information is passed boat to boat and not necessarily through a documented means like a Coast Pilot. And to give Matt credit he showed up at a captains meeting and sat through all of my spiel to my vessel crews, but to interview our captains and talk to them about relaying information and advising them on what tools he has in his websites.

 This is Port Clarence and this was actually pretty timely for us. We bring tankers into Port Clarence, typically as Crowley, and lighter them. This information -- and most of the charts in western Alaska, the majority of them are no larger than 1 to 50,000 on a scale. So by no means pilotage charts. And even in this case bringing -- having an Alaska Marine pilot onboard to doesn't do you a whole lot of good. We bring them out, we board them on the ship and he asks us where should I go, you know. So those types of things.

 We do know where to go, I'm not trying to scare you, but we use this type of information to pinpoint deep draft anchorages where we can conduct our operations safely.

 And obviously the guys on the vessels, you know, right now the realtime stuff they get is weather faxes and NAVTEX forecasts. And you know, unless you're a trained meteorologist a lot of this stuff isn't, you know, it's not real useful to you. And you know, I have to admit there are probably a lot of mariners sailing out west that have no idea what these things mean except that that's a big storm and a really big storm.

 (Laughter.)

 MR. TAGUE: And I'm going to anchor, you know.

 But some of the things that we've been made aware of are your LiDAR hydrographic surveys. In the Kuskokwim River that sounds very promising. Each year -- and by the way the pilots for the Kuskokwim River no longer exist. The last one, Ron Sumstad, retired last year.

 And there isn't an official pilot for the Kuskokwim River, yet Bethel is probably the largest hub in western Alaska and relies on basic passing of knowledge back and forth between tugs and barges that have gone through and what the latest makeup of the channel is. The Kuskokwim River also is fickle in that which way the wind blows and how much the rain the river has gotten all make a difference in what you can bring in over the river crossings there.

 And you know, we've heard promising tales of realtime data being, you know, water datum that our mariners could be made aware of. And it would be just as useful and probably more useful than weather charts and NAVTEXs.

 I think that's the end of my presentation there. So I thank you very much and I'll look forward to questions.

 (Applause.)

 CHAIR WELLSLAGER: Thanks, Walt. Due to time constraints I think we'll actually honor some questions afterwards. It sounds like it's creative engineering with the tug driving in your neck of the woods. I'm surprised some haven't been stuck in the silt and weren't able to lift off when the tides came in and have to suffer through some of that.

 Our next speaker is Mark Smith with Vitus Marine.

 MR. SMITH: The name is after Vitus Bering.

 CHAIR WELLSLAGER: Okay.

 MR. SMITH: That's anglicized. He was Danish and the proper pronunciation is Vitus.

 CHAIR WELLSLAGER: Vitus.

 MR. SMITH: However, because we are here in America we call it Vitus Marine. I appreciate the invitation to be here. I'm sure that this audience is by far the most August one I have ever addressed so I thank you. You're a milestone in my life.

 (Laughter.)

 MR. SMITH: My previous experience was in the little village of Aleknagik, Alaska where I grew up and lived. I was able to deliver the eighth grade commencement address.

 (Laughter.)

 MR. SMITH: Lucky for me the principal found one that was already written and so I just had to read it a few times and then try to read it steadily during the event.

 Up here on the screen is a picture of one of our two vessels that we're going to be transiting western Alaska waters with. So our zone of operation is infrequently in the Aleutians, but mainly in the other areas of western Alaska.

 More brief history on myself. I'm a third generation tug and barge person of a company that was based in Bristol Bay. I was a commercial fishing captain at age 19 in 1980 and since then I have only missed the Bristol Bay salmon season four times since my mother took me setnetting in 1963. So I have a very long history with the NOAA Chart I think 16322, Bristol -- Nushagak Bay and its approaches.

 So that's where I spent my commercial fishing activity and then outside of that 30 days of critical salmon fishing I was able to wile away the hours with tug and barge work. So the typical tug and barge season for us started in May and ended in October.

 I have to say that I'm in love with Google Earth. It's a fantastic tool that I have just used probably more than any other application other than Microsoft Outlook.

 So, I got a few shots here just to give you the operating environment and I guess that's my presentation is similar to Walt's. We just happen to be the same couple of western Alaska guys here next to each other. But a little different perspective, but basically reinforcing the same thing, where we operate.

 So, large picture, coming into, closer into Bristol Bay as I get closer and closer to my home town. Same issues that were also mentioned. Tidal influence is rarely by the book. So you have a few datums that have been set up historically for the better part of a century, and then everything is sort of leveraged off these particular points. But not a lot of technical expertise was really laid into these. This is very old technology that exists out there. So it's basically local knowledge of the captains and the organizations there so that you can try to go in and enter a location and figure out what the actual tidal correction is.

 So actually this morning -- I'll try to use the laser here. We're up in Goodnews Bay here actually this morning waiting to get out. And so I was up talking to the captain just after I got into work and asked him what the, you know, when he was planning on leaving. And he was saying well, I'm just kind of adjusting what the tide book says to what actually I'm observing here in Goodnews Bay and I hope to be off by about 1:30 this afternoon. So that's the data that we deal with.

 So you've certainly seen the unimproved beach landings that Walt showed you. And one of the other issues about this operating environment is the Coast Guard is -- doesn't have a great presence here. Dutch Harbor has a lot of folks working out of there. Coast Guard has a great presence there. After my experience this fall I found the Coast Guard to be a useful partner when you're trying to get things done. So one of the things that we're looking forward to is having a larger Coast Guard presence here in the future.

 Getting in a little closer to the Nushagak Bay chart area which again I'm delighted to know that NOAA is doing some of the basic work this summer to update this chart that hasn't seen any major revisions since I believe the fifties.

 And you can start to see from this Google Earth picture just the areas here into the river entrances have a lot of gray shading around it. So these are two rivers that we transit very regularly. This is the Kvichak River and this is the Naknek River. This is the Nushagak River, this is the Wood River, this is the Snake River, this is the Weary River, this is the Igushik River. And these are all little rivers that we deliver the basic goods and services to. And so we have marine traffic there that has the 6-month operating season to take care of.

 Zooming in a little closer to the Igushik River and Weary River, highlighting this area. The Manokotak is the village we serve there, about 450 folk. And even though as the crow flies it's only about 22 miles to the village there's actually 55 miles of river that you go through.

 And when you get to Manokotak you have from bank to bank about 235 feet across. And so when you go in with a 180-foot barge and you have a tug strapped onto the back of it you really have to literally sometimes, you know, pull your tug off, get on the hip or on the bow of the tug and push out backwards down the river to find a place where you can turn around so you can head out in a conventional manner. And this is, again, not a particularly unusual circumstance for us.

 I'm sure a lot of the nautical folks have heard the old maxim that it's not the ocean that's dangerous, it's the hard parts around the edges. And that's truly what we experience in Alaska. And I was able to vent just yesterday a little bit to Mr. Lowell that we really don't care where the Fairweather goes because wherever the Fairweather goes we don't have any concerns. It's really that area that's less than 12 feet of draft that we're truly concerned about because our operations happen in the zone of about 3 and a half feet to 8 feet.

 So for the small barges that serve Alaska's coastal villages we really operate in that zone. I don't think that any of the Crowley or Delta or Vitus equipment that typically serves the village has a load line that's over 9 feet.

 Just to give you a perspective here, a little dark on the screen but there's a little red square here around what we call -- well, the Fish and Game calls the Wood River Special Harvest District. So again, this is part of the chart, NOAA chart there for Nugashak and its entrances. Here's Dillingham. Here's the Wood River.

 Between the Wood River and the Nushagak River there is between 2 and 4 million salmon go up every year during the famous Bristol Bay salmon season. There's a 4-mile stretch of river here called the Wood River Special Harvest District. This year it's going to be used because more salmon need to get up the Nushagak. Wood River's had success. So they're going to put all of the fishermen in this little stretch of river here 4 miles long. You can see just some of the issues.

 You're going to have over 300 vessels, 225 and 150 feet of gillnet behind a typical vessel. And you have setnet skiffs that are also running around, you have tenders, you have supply vessels and you have other things servicing this very small area that has, again, virtually no data with it.

 Also up at the end Walt and I have both had experience in transiting the very rocky upper end of that river. We'd also love to have some of those hazards identified.

 The aids to navigation in western Alaska are virtually nonexistent. Back in my family history my grandfather, dads and uncles basically, the aids to navigation were to find particular transit across the river and to, in the wintertime when the snow was high, go knock the branches off spruce trees and nail white signs so that you could make a transit line between the slots. So that is still some of the best aids to navigation in the area are things that were put up 50 years ago.

 This is a photograph as I'm leaving Dillingham with the local aircraft after fishing. This just gives you a visual of that 4-mile area river where you will have up to, you know, 400 vessels occupying that with a majority of several hundred feet of gillnet hanging off behind them so it's a very exciting area. And of course having good navigation charts and good water depth data would be a great asset.

 I appreciate the invitation by Matt Forney to come here. He said that some folks would be interested. The trip to Nome this winter, very exciting on any number of levels. Unprecedented and truly I think a great positive story about what we can do in the maritime industry. And just to let you know, we enjoyed a wonderful amount of national attention with this story and that national attention just literally stopped cold when the Concordia went aground. So that actually happened while we were in Nome. So tragedy, you know, does trump a positive story every time. And this was just another evidence of that.

 So, to quickly run through. This is a pirated presentation from some of my staff that gave this earlier. But you know, basically when the final barge missed its regular delivery there was some real trouble. And there's just no conventional way of getting fuel through the ice in U.S. domestic waters.

 What we knew that a lot of folks didn't know was that the Renda had gone through a modification in 2010 that made it a double -- an official double-hulled vessel and it was also an ice class A1 Super so it was some of the highest ice class capability out there. And it was home-ported in Vladivostok.

 So again, a gentleman by the name of Mikhail Shestakov had worked for Aleut Enterprises and had had overseen about 30 trips into U.S. waters I believe with the Renda, so very familiar with the vessel and its owners.

 So by early December we had kind of polled the stakeholders to see if they thought this was possible. Nobody really put up a flag and said no, it can't be done. Everybody said well, you know, if the Coast Guard is on board we'll try it, and ADEC said well, if you can amend your plan we think we can do it. And so based with at least tepid support we chartered the tanker and started the drama.

 The biggest challenge in doing this was actually not the navigation as much as it was just putting the financing together and finding the right product. When you're taking gasoline to the Arctic you have to achieve a specification that's appropriate. We finally found that specification in Japan that would be appropriate for the northern latitudes.

 When we got there and the tanker was ready to do a transfer we had a huge unprecedented storm that actually sank I think a Russian fishing boat up there in the Far East. And basically the conditions weren't appropriate for lightering. Coast Guard was on hold. It basically said don't wait for weather in Japan, head for Dutch Harbor and let's see if we can get a Jones Act waiver and get gasoline on you in Dutch Harbor which is a whole `nother story that could take up 20 minutes.

 So here's a picture of the planned route basically from Vladivostok where the vessel was home-ported. We were looking at going to Ulsan and Yeosu. We were thinking about going up around and getting our gasoline here.

 It didn't work out so we actually came back, came over here close to Japan, had the big storm, so we went off and then this was our route. Instead of going straight to St. Lawrence Island as we had originally planned with our gasoline we actually diverted to Dutch Harbor, met up with the Healy and then virtually headed straight north towards Nome.

 I think the critical factor in the success of this mission was unquestionably the Coast Guard. The Russian owners thought the ship would be able to make it to Nome unassisted. In retrospect I don't think that had any chance of happening because it just happened to be that December we had unprecedented cold. And it seemed the north wind blew and we had sub-zero temperatures and the ice formed extremely quickly through the Christmas break. And by New Year's the ice footprint I think had about tripled.

 Just a brief, there was a lot of discussion about whether or not the trip was necessary. The answer is no, it wasn't necessary, but the alternative would be to fly in fuel. And when it all came down and looking at the economics it turned out that the Renda's resupply was probably about half the cost of flying the fuel in via aircraft.

 Biggest challenge. The biggest challenge by far I think for us was just putting in the prevention aspects and trying to get the stakeholders to a level of confidence that we could pull this effort off without incident. And there was a great number of people who dedicated about an hour every day with a 9:30 conference call that started around mid-December and actually went for about 45 days. And I'm sure there were some days where we had 100 people on that conference call. So it was just a tremendous level of effort to get all the stakeholders involved with the operation.

 Some of the physical challenges though when we actually got the Healy and the Renda together were the expectations of both on what, you know, what the Coast Guard thought appropriate escort procedures were and what the Russian captain thought appropriate escort procedures were. So that was probably the biggest challenge in actually getting the vessel physically to Nome.

 The Russian tanker wanted to be right on the tail of the Healy and you know, they would be perfectly happy 100 feet off the stern traveling at 8 knots. And the Healy did not want the Renda anywhere close to their stern. And basically they wanted one-tenth of a nautical mile for each knot of forward speed. And so that was basically the paradigm that they went forward.

 Unfortunately that left the Renda so far behind that the ice lead would come together and essentially just put the brakes on. And so it was constantly beset in the ice and required a lot of relief work. So that's one of the reasons why it took, you know, the better part of a week each direction going through 300 or so miles of ice on the way to Nome and about 400 miles on the way out.

 Coast Guard took some great imagery, had flyovers to do some ice reconnaissance and other support work so we're sharing some of this. This is from the bridge of the Renda. This is some of the ice when they were beset. When you get pressure in the ice and the wind and the currents came sideways it would basically just squeeze the boat and the ice would crawl up the side. And here's a little bit of video if I can get it to play. I'm not sure it's showing up. Kathy, do you have any advice? There we go. Yes, just click on it.

 Taken with a cell phone from the bridge. It's not terribly dramatic but they said the accompanying noise and vibration of the vessel as they're squeezed by the ice had a profoundly chilling effect on those folks that had never made that type of voyage before just felt they would be crushed.

 This is a typical block of ice off the Nome Harbor. It's probably about 42 inches of ice there. And this just shows some of what the Healy and Renda went through to make it ashore. Folks from ADEC were out surveying areas where we thought would be the most appropriate place for the Renda to come to rest after it reached Nome. So a lot of pre-arrival survey was done. And you can ask Commander Houck in the back about some of that. He was the one that went out and did some of the initial recon.

 Some of the tools that were used. NOAA played a very key role in the trip with providing all of the ice and current and other information they could and consolidated a lot of data for. And I think in an unprecedented move to my knowledge actually set up a special website that was just for the Renda. And so the NOAA folks did an awesome job of putting together all of this data in one place that had ice, weather current and other information on it. So there was always good access for those of us on the shore and for those in the vessels to have access.

 A little over a half mile of hose was utilized to get from the vessel to the header. In deciding where the vessel stopped the Coast Guard did not want the Renda to get any closer to the beach than the Healy could safely transit next to it because they wanted to be able to make relief cuts to get the Renda out once she had been done delivering. So there was a lot of work that was done looking at all the data that exists off the end of the Nome breakwater to ensure that where the Renda came to rest that the Healy would be able to do relief cuts on both sides of it to get out.

 Just a few more pictures there. Twin hoses were used to try to speed up the pumping time so we were able to pump in one case two products simultaneously and when the gasoline was delivered have two lines running diesel. A picture of the Healy frame there at Nome.

 So the arrival was on the 14th. It took several days to get set up, get everybody's comfort level. Actual pumping time was about 40 hours. And on the morning of the 21st after several -- after the previous day of basically relief cuts by the Healy, the Renda was unable to really get started. Overnight we had a 40-knot north wind blowing directly offshore from Nome and essentially we all woke up to daylight, or when the daylight came essentially that 5 miles of shorefast ice was drifting its way out and the Renda and the Healy were able to depart in an open lead.

 The southbound journey. Because of the -- basically every day of the operation up there was sub-zero temperatures and I think the lowest that I saw was -31. And we had winds that were gusting up to 40 miles an hour occasionally during the exercise. So essentially the deep freeze was put on super cold and it just blew ice down into the Bering Sea. So there was a significant amount more of ice going south than there was. And with the Renda being light it was even harder to get through the ice and on some days the only progress made was actually just the wind and the currents pushing the Healy and the Renda south.

 Just a few of the folks that we have to thank here. There's just a tremendous, again, a lot of folks put a lot of calories into making this work and of course we're very appreciative because everyone played quite a critical role.

 And just have -- with great appreciation to the Coast Guard Chief Scott who was put on the Renda for the transit south. He took a little bit of video here and I guess it's having a hard time loading up, but I thought I'd give you just 1 minute to time-lapse photography to show you what the actual process looked like.

 So, they have a little comfort behind them and the Healy allowed them to get a little closer than they might just to make some progress. This is the 25th so they're probably 100 or 150 miles south of Nome. So essentially the --

 (Laughter.)

 MR. SMITH: Okay. And the recipe for success here is repeat as necessary, and it got repeated a lot. So that is the story and I'd be delighted to answer questions later. Thank you.

 (Applause.)

 CHAIR WELLSLAGER: Thank you very much, that's very interesting. Okay, our next and final speaker is Captain Dana Jensen with the Alaska Marine Highway System.

 CAPT. JENSEN: Good morning. It's my honor to represent Alaska Marine Highways. I'll give you a little outline or brief of what we're about and then I have some recommendations that came from people in our fleet for some areas that could use a little improvement for the mariners in Alaska.

 Alaska Marine Highways has been in existence since 1963. As our name implies we are the highway where there isn't one. We get vehicles and people from road heads to various communities around coastal Alaska. We're a division of the Department of Transportation in the state of Alaska.

 We operate from Bellingham, Washington along the coast of British Columbia out along the coast of Alaska out as far west as the eastern Aleutians and Dutch Harbor. We operate out of 35 different ports from, again, from Bellingham. We also touch Prince Rupert, British Columbia and 33 ports in Alaska.

 We operate -- if you went from port to port to port by the shortest means possible our route would be 3,248 nautical miles. If you traveled all of our routes it would actually be tremendously more than that because many of our vessels and routes overlap. But a minimum to get from one end of our system to the other would be three thousand and almost 250 nautical miles.

 Of the 33 ports we service in Alaska 15 are manned and have AMHS terminal staff. Seventeen of the ports we frequent have no staff, no shoreside support at all. In the last year we've added two new ports to our system, both of them near Kodiak. We've added Ouzinkie which is about 15 miles northwest of the city of Kodiak on Spruce Island and we've added Old Harbor which is about 80 to 100 miles southwest of the city of Kodiak on Kodiak Island.

 We operate a fleet of 11 ferries. The original three in our fleet were the Matanuska, Malaspina and Taku. They operate in our southeast system connecting the cities and towns in southeast Alaska and the Alexander Archipelago to the mainland and road heads out.

 The Tustumena was built a year later in 1964 and she's serviced from the Kenai Peninsula out to Kodiak and seasonally goes out the Alaska Peninsula and the eastern Aleutian Islands. She's also serviced Prince William Sound.

 In the nineteen seventies we added three more ships to our fleet, the LeConte which operates out of Juneau and services the smaller communities surrounding the Juneau area in North Lynn Canal, the Columbia which is our flagship of the fleet. She's 418 feet long, primarily operates from Bellingham to Skagway servicing the southeast communities and getting them connected to the lower 48. And the Aurora which services Prince William Sound.

 In 1998 we added our -- added the Kennicott. She's our largest oceangoing and she connects the southeast and the southwest systems with her cross-Gulf transits from Juneau up to Prince William Sound and then continues out to Kodiak, Homer and Seldovia.

 In 2004 and 2005 we added the fast ferries, the Fairweather and the Chenega. They're each 235 feet long. The Fairweather operates also out of Juneau connecting primarily Juneau with Sikta and Petersburg with faster service than the rest of our fleet.

 And the Chenega works out of Prince William Sound home-ported in Cordova and provides the communities in Prince William Sound a means of getting to and from road heads. And the Lituya, the smallest of our fleet at 181 feet was built in 2004 and connects Ketchikan to Metlakatla. And that's the shortest one we have of about 15 models.

 Over the last 30 years we've moved on average about 350,000 people per year and in the neighborhood of 100,000 vehicles per year. When I say "vehicles" that's a loose term. That's anything from a small sedan to a large tractor-trailer, large motor homes and construction equipment.

 In southeast the banner years as far as moving people for us were in the early nineties. It's dropped off some in Southeast primarily although it's been growing in Southwest pretty steadily. In Southeast we bottomed out more or less on passenger counts around 2005 and have been increasing again since 2005 for vehicles. We've been pretty consistent and that also though has been growing since 2005. And 2011 was actually a banner year for us. We moved the most vehicles we had ever moved at 114,100 vehicles.

 When I first came to Alaska in 1974 and like Captain Page I was a member of the Coast Guard at the time sailing out of Kodiak, the equipment we used to navigate and the survey techniques were quite, quite old compared to what we have now.

 The state of the art equipment that I had to use all too often was the LORAN-A unit. I also had LORAN-C. The charts didn't even have the lines plotted on them up here so to get a fix laid on the chart would take 15 to 30 minutes and then it was of questionable accuracy but you had to go through a worksheet. Well, you had to go through five steps just to get a TD, a single TD and then you had to go do a worksheet with the TD, go through a bookcase full of tables to come up with a means of laying that TD or line of position on the chart.

 Many of the charts back then operated, in fact all the charts I remember around Kodiak had a warning on them, and I'm paraphrasing here but it basically said that soundings may vary by as much as 50 feet due to the `64 earthquake. Well, I was sailing around `74, `75 and `76 and virtually all the charts said that. So, the assumption is there wasn't any surveys between `64 and up to that time. Of course that's improved tremendously in current years.

 Overall AMHS is very happy with the support we get through Hydrographic Services and NOAA. We build our schedules based on the Tides & Currents. We don't start a schedule before we go thoroughly through those. We travel a lot of waterways we can't get through under certain tide conditions or current conditions.

 There's a number of waterways we do operate and things, like I said, are much better. We use both electronic charts and the paper charts and the navigation systems greatly exceed what they did back in the seventies.

 A couple of areas of concern I wanted to bring up to the panel and point out that we think could use some improvement. This is Tongass Narrows. This is Ketchikan. Our terminal is right here next to Alaska Ship and Drydock and just to the south of us is Boyer Barge. It's the largest tug and barge facility in town, and then the largest small boat harbor there is at Bar Harbor.

 The tide prediction stations and current stations in Tongass Narrows are north and south of this narrow section across from the airport. The velocities in the wider sections of the Narrows are substantially less than what we are actually encountering in the vicinity of our terminal and we believe that it would be of value to have a tidal station or current station in the Narrows where so much activity in town is going on and where virtually everything transiting north to south goes through. We would say we probably get up to 4 knots of current going through there at times, yet the predictions are rarely over 1 and a quarter knots.

 Another area that we think could have improved metering for current would be in the vicinity of Wrangell. The station that is noted for Wrangell is about a mile and a half west of the town. The currents experienced near town, near the port appear to be stronger than what's predicted in the published tables and all of our vessels that have experienced some very heavy set onto the pier landing in Wrangell.

 This is a shot of Port Lions/Port Wakefield. This is on Kodiak Island about 30 miles west of the town of Kodiak. We have service going in there with the Tustumena, nearly a 300-foot vessel, multiple times a week. As you can see the scale of the chart is less than ideal for navigating in and out of the harbor. Basically we moor on top of the buoy right there. So we would like to see an inset developed of Port Lions if possible, a larger scale inset available on Chart 16594.

 Another place we would like to see an improved inset would be False Pass. False Pass, the chart appears to be accurate, but again, it's at a scale when you're maneuvering into the dock that is less than ideal and believe that with the challenges of getting in and out of False Pass due to weather and current a more detailed chart would serve not only Marine Highways but the other mariners in the area.

 The Coast Pilot isn't quite up to date. There are some things that's happened in False Pass that haven't -- that appear on the chart but haven't been updated in the Coast Pilot.

 Another area that we think could use extensive update on survey and an inset or a better scale inset of the harbor is Akutan. In the harbor of Akutan, the cannery wharf and the city wharf have been there for decades but neither is plotted on the chart. In 2008 there was extensive coastline change when a lot of fill was pushed out into the water. And currently there's a large boat harbor being constructed in the west end. So I think this area would warrant survey and a better inset into the chart.

 The last area that I wanted to bring up of our concern was Olga and Neva Straits. These two waterways are in southeast Alaska north of Sitka. They're the waterways that traffic coming in and out of Sitka primarily use.

 The charts are adequate there but we've noticed a lot of beach erosion and slides in those two channels. And the coastline in those two areas has changed somewhat over the years and we think that the underwater has probably changed as well.

 Anyway, that's really all I had to bring to the meeting this morning. And I'll be available for questions. Thank you.

 (Applause.)

 CHAIR WELLSLAGER: Thank you very much. I'd like to thank all the panel members for some very interesting and thought-provoking presentations. My hat's off to the tug drivers. I can't imagine going through some of that stuff and the ferries as well.

 But we've got time for some questions. And Frank, I know you had one to start.

 MEMBER KUDRNA: I did. This is for Steve Boardman. We've been discussing in one of our working groups cost-sharing and Holly earlier described how far behind we are in revising the charts. The Corps has cost-sharing relationships with local sponsors that you talk about, these new projects and new ports and port expansion.

 I guess my question is would it make sense to have a three-party agreement instead of a two-party agreement between the Corps, NOAA and the local sponsors so that the necessary charting both for design and for operation of a constructed facility would be available?

 MR. BOARDMAN: The idea is intriguing. We haven't had those serious dialogues. Certainly when we're dealing with the development of a marine infrastructure we've been looking at the near shore and haven't necessarily focused our attentions.

 The cost-sharing is an interesting one because part of it in my mind right now is how does the whole project fit together and all the pieces, and whether that throws any of the cost-benefit out. And I don't think it should, but I think it's an intriguing idea that we have not yet had a serious conversation with NOAA and others of how to put together a package.

 Several harbors that the Marine Highway just described are the ones that the Corps has built recently. I look at those charts and, wait a minute, the Heritage Harbor down in Wrangell is not on the chart, Akutan's under construction, False Pass, and they're not there yet. And as we build those and open up the door to users how comfortable are they of coming in there if they don't know what the conditions are outside the harbor? So it's an intriguing question and I'll engage Matt and others in that for future actions.

 CHAIR WELLSLAGER: Okay. Dr. Jeffress?

 MEMBER JEFFRESS: This is a question for Steve too. Steve, at least on big projects that you've put up on your slides do you have your own tide gauges associated with these projects?

 MR. BOARDMAN: We do put tide gauges, but we work with NOAA as much as possible to see because we've got to validate them. So in certain cases, yes, we put our own out and it's trying to then tie them into adjacent data marks.

 MEMBER JEFFRESS: On that subject are they designed to NOAA specifications and are they then permanently located and part of the national water level system?

 MR. BOARDMAN: My answer would be is they are not permanently there and they are not tied into the system. They're usually tied for the purpose of the project. I'll have to defer to Matt on whether we've been leaving them there or working on it from a permanent aspect. But during the course of the project more often than not. Anne? This is Anne Dollard from our operations and navigation organization.

 MS. DOLLARD: As part of the ARRA money in the CEPD program and agreement with NOAA we've been updating all of our datums to NOAA's standards.

 MR. BOARDMAN: What she's referring to is the datums that we're using for existing harbors. Some of the questions you're asking as we develop a new harbor it may be a long ways away from existing datum. So it's creating new datum.

 MEMBER JEFFRESS: Okay, can I just finish this off? In Texas we have a really sophisticated tide gauge network which is funded by local government, the state of Texas and the Corps of Engineers in cooperation with NOAA. And it's an ideal system where all those entities pay a part of the cost but they all get the benefit of the entire network and it's all to NOAA's standards. I just put that forward as an ideal model to follow.

 MR. BOARDMAN: I appreciate the idea and I think that's something for us to discuss. It's interesting, as you get down in the area that I'm looking at, Arctic, these small communities, cost-sharing is quite a challenge. That's why the state of Alaska is engaging more often than not because small communities do not have the tax base to cost-share. It'll be something that'll have to be discussed on how they can financially participate.

 But you're absolutely right, they will benefit by it. And whether it's a sliding scale based on their ability to pay. I'd be intrigued and interested in knowing how they set it up for Texas. You're working mainly with Galveston District or? Okay. I might knock on their door and see because that would be an appropriate -- of course the other members of ADOT as well to see how they would work.

 CHAIR WELLSLAGER: Lawson?

 MEMBER BRIGHAM: A question for Captain Page. Could you comment about -- I think there's some notion that satellite coverage in all of this with AIS data and how your system which is land-based kind of relates to satellite information or the use of satellite information in this new AIS arena.

 CAPT. PAGE: The satellite information is great strategic information because it provides a very good overview of traffic all over the Pacific and what have you. But the granularity of the data and the frequency of the data is many times 8 hours gaps.

 And so when you really want to get into the detail of what the routes they took, we'll look at our screen in AIS. We'll see a vessel that's north of Unimak Pass. We'll look at the satellite imagery and it's south of Unimak Pass, 150 miles away. So that doesn't help you for search and rescue, doesn't help you for tactical type decisions but the information is good as far as looking strategically. What are the routes, the patterns of where vessels are going.

 So it's a valuable tool but -- and it's also, the other satellite information like vessel monitoring systems or LRIT also provide different ways of providing reports. And also again it's hours versus seconds. AIS really gives it every 6 seconds. There's an updated position report. A satellite will give it probably every couple of hours. So it is information used in the big picture but it doesn't give you the granularity, the detail you need for some decision-making. In other decision-making it's very valuable.

 CHAIR WELLSLAGER: Joyce?

 MEMBER MILLER: Yes, this is for Captain Page too. You said that everybody has to pay for your services. Can you just sort of briefly describe your relationship with NOAA? I mean because NOAA would be contributing data as well as being a consumer.

 CAPT. PAGE: Right. Basically the Coast Guard is one of our biggest customers and pays in the system. When they pay in the system they've also said please make -- the conditions are that we can share with other agencies. So, basically federal agencies. So they share that information with DoD and NOAA. The only caveat is they can't turn around and put that publicly available on the internet because then I'd lose all the shipping companies who'd say we don't need to support you anymore, or other agencies or State, whatever. I no longer have a revenue stream and then a couple of months later the thing shuts down again because you don't have the revenues to keep it operational.

 So the Coast Guard actually right now is contributing to the operation of 65 of the 90 sites. They decided to pay into supporting 65 sites of the 90 that we have right now.

 The state of Alaska has provided us grants the last several years. The government and the lieutenant governor have been very supportive and the legislature. Guys like Representative Joule and others have been supportive. So they've given us capital grants over the last several years to help build the system but we don't have operating funds.

 So we go to the Coast Guard and the maritime industry to get the operating funds and we go to the state to help build it out. And we've also had, you know, the fortune of having NGOs on occasion contribute some money to build a site. Like Oceana said can we build something in the Pribilof Islands. So they give us some money to build it and we turn around and find money to pay for the operating cost.

 So it's kind of a very hybrid, convoluted, complicated system but basically we're going to be able to amortize costs by sharing it with those people who are benefitting from the information. Normally it would be a case where the Coast Guard has the whole burden to pay for the whole system and everybody else would take off of that. But the Coast Guard hasn't had the funding to build an entire system.

 And normally the Coast Guard, when you look at a Vessel Traffic Service to AIS they have in Prince William Sound they only have enough money to really build and operate their own operations center, but they don't have information to share with other agencies or similarly the maritime industry, the operators, whatever.

 Our system on the other hand is designed to be disseminated to a whole bunch of entities, the Coast Guard included of course. So that's probably a long answer to a short question, you can see it's somewhat complicated, but NOAA certainly has access through the Coast Guard for a percentage of information, a good percentage. About 60 percent of our data is available to NOAA through the Coast Guard right now.

 MEMBER MILLER: Would there also be opportunities to put, you know, sort of weather sensors and that type of thing?

 CAPT. PAGE: Oh, absolutely. We're working with AOOS. I sit on the AOOS board and AOOS is looking for the broader base of people that benefit from data including the maritime operators, shipping operators. And so they provided some funding to test and develop this capability.

 So we can take this and add weather stations to our -- once we got a footprint, once we build the infrastructure and a power plant which is solar powers and wind generators and the back haul it's real easy to hang out other ornaments as I call them such as digital selective calling search and rescue capability or AIS -- weather sensors, excuse me, that could be disseminated over AIS frequencies.

 So we're already working down that path, working very closely with Weather Service and AOOS in leveraging this capability and getting a lot more return on investment aiding to maritime safety and environmental protection.

 MEMBER MILLER: Yes, I was particularly thinking about potentially current sensors if you've already got power because there's been a number of calls for that.

 CAPT. PAGE: We definitely would like to do that. I'm definitely taking notes when I heard Walt Tague talking about that. Even Mark Smith was talking about tidal heights and whatever. Our goal is to get more of those sensors co-located or at least if not co-located then close enough they can transmit the data to our site and we can turn around and put it into the whole system as well as broadcast it over AIS so it's digitally readable to the vessel.

 So we've been working with the software engineers who -- and this is what AIS was designed to do anyway, broadcast other information, safety information, weather information, what have you, and get away from having to listen to the radio and trying to interpret what was said. And the range of radio is much less, voice comm is a much shorter range than AIS which is digital.

 So we have better range, better clarity, easier to get the information you want right when you want it versus push the button and it shows up versus listening for the broadcast that may have the information you're looking for. So those are all things that we're working on to better disseminate information to the mariners and get more miles out of the gallon if you will or more return on investment. So if we can kind of commingle and partner and share infrastructure we can certainly cut down costs.

 We've done that in southeast Alaska with the Weather Service down there. And we're working further up. I met with the Weather Service up in this area and so that's definitely the path we're going down.

 CHAIR WELLSLAGER: Larry?

 MR. MAYER: I should preface my question by saying that I'm brand new to the panel and I apologize if this is a very naive question. And it's maybe more appropriately a question to my colleagues here as opposed to Captain Page but you certainly brought it up. What you described really sounds fantastic and it also sounds like a critical infrastructure that's essential to safety and navigation as traffic increases. And I guess I wonder why this isn't part of the mission of a government agency as opposed to having -- you're doing a tremendous job but it seems to me this is really bordering on critical issues of safety and navigation.

 And why isn't this part of the mission of a government agency rather than having you to have to depend on fees and the fact that you might want to go fishing many more times next year and the thing will fall apart.

 CAPT. PAGE: I can answer real quickly. I mean, I agree with you but the point is that this is a lesson I learned with my last -- my 30-plus years in the Coast Guard that many times Congress wasn't forthcoming with information. They just needed it and not wait. So we just do it basically. But good point, good question.

 It won't hurt my feelings if you take it over. I can find other things to do. I can go back to retirement.

 CHAIR WELLSLAGER: Just a second, Larry. Rich?

 MR. EDWING: So Rich Edwing, Director of CO-OPS. And Ed, I run the office that does do realtime water levels and other information up in Alaska.

 We've been collaborating with the Coast Guard to get our realtime information into an AIS format. That's all been done. There's been successful tests down in Tampa Bay and Columbia River of actually pushing that data out to vessels. There's been at least one manufacturer of the black boxes on the vessels that have changed their firmware to accept this data and integrate it with other data.

 The thing that's been lacking is the Coast Guard has not had the funding to put up the transmitters to get this information out. So certainly -- it seems like you've been able to get a couple of steps beyond that up here so maybe we can talk afterwards and we can get something going up here.

 CAPT. PAGE: Absolutely. And again, the state benefits and the maritime industry benefits and the Coast Guard all benefit then maybe to pool those. And I know the National Academy of Science did a study after the L.A./Long Beach Vessel Traffic Service came online in a partnership.

 And they said we should do more of this. We don't have unlimited funds. We need to partner and amortize and leverage better with other entities benefitting from this than put the burden on the Coast Guard or the Federal Government for that matter in that particular case. So it's something that's been studied and I think it's one way of getting things to move faster. And I definitely would like to take to you further on this one because we're chasing down the same path and we'll get it done faster.

 CHAIR WELLSLAGER: Bill, did you have something you wanted to say?

 MEMBER HANSON: Walt, Mark and Dana, you guys touched on a different part of the operation, the true highway in Alaska since a lack of overland highways so much is done by the waterways, and sometimes in some pretty interesting locations.

 As I watched the slides here I was kind of struck though as what is the national interest in those areas. And as you provide your products and services to the locals you're going to some pretty remote areas and you might be the only folks going in there.

 Is that a service you provide to yourselves or to your clients to provide your own surveys to make your operation more efficient, or is that just something that you think that maybe we should take another look at with NOAA or the Corps?

 I guess just, again, struggling with what's the national interest and what might just be better done on a local basis and paid for that way.

 MR. TAGUE: I guess I can say there are a finite number of customers in western Alaska and we're in the business of transporting goods and selling fuel there. So you are correct in not all of them are strategic but they do have needs. So we get by sharing information between operators or between vessels.

 And each year it's a little different. Obviously there are some things that would have a large impact on the economies of western Alaska. When I say a large impact it may be relatively small in comparison to Seattle but to have realtime water datum transmitted at the Kuskokwim mouth near Bethel could mean the difference between spending 3 days taking in a limited draft of 12 feet versus maybe knowing and if possible maybe even forecasting what the -- based on all of the elements, the tides, the wind, you know, the amount of runoff upriver. To be able to forecast what the water might be at a certain crossing, you know, could be the difference of three trips into Bethel for a barge versus five or six trips into Bethel for a barge.

 MEMBER DEMPSEY: Deborah Dempsey. Just kind of an observation and a comment, Walt and Ed, is if we address the training on the vessels, you know, why the need for so much response. And Walt, as far as reading the NAVTEX is it a NOAA issue to make it more user-friendly or make sure that your officer has the background in meteorology in reading that. We used to, you know, we used to have that onboard.

 MR. TAGUE: Certainly we as industry make the effort to hire trained individuals. But just from my experience we can hire a captain with 30 years of experience and put him to work in western Alaska and tell him to go into a village and (a) there's no chart for that village. The GPS is showing him being 5 miles inland versus what's on the chart. The charts aren't scaled to show accurate pilotage. And he's thinking of his livelihood and career versus, you know, getting in and delivering a product. You know, because he's at risk for making headlines if he, you know, rips open the side of his barge.

 So we do try and provide specific training and we do have a continual improvement process through our ISM certifications where we're always trying to identify what we need to improve on, whether it's software, navigational equipment or training. But you know, and we've appreciate Matt coming over and talking to our guys.

 But things just kind of appear on your websites and you know, until we know that they're there and know how to use them, you know, they're probably just there.

 We, you know, I've gone through the NIMA site there and found some of the things that you guys are working on and they're very interesting. You know, now we can pull up site-specific area forecasts just with the click of a button. But unless you know it's there, you know, you don't know it's there.

 So in the past it's always been a call to Rich Courtney in Kodiak and said, you know, trying to -- he'll do an area-specific forecast and tell guys whether or not they've got enough time to run from one port to another. And in some cases that can be the difference between 2 days of transit versus 3 weeks of transit in the fall.

 MEMBER DEMPSEY: For sure you know what you have to face in the seat of the pants of your operation, you know, how much can NOAA prevent that daily change that changes so quickly. How feasible is it for NOAA to take that on?

 MR. TAGUE: I guess if you guys keep supplying us tools we'll figure out how to use them and use them to our advantage.

 MEMBER DEMPSEY: Local knowledge, right?

 MR. TAGUE: It is, it's very much local knowledge. When we lose a captain either to him or, you know, to somebody else --

 (Laughter.)

 MR. TAGUE: It's a big loss. We have some very skilled, very knowledgeable mariners that operate in western Alaska that -- they're probably not suitable for working anywhere else. But they do know western Alaska, you know.

 (Laughter.)

 MR. SMITH: I'd like to say just for the record that our captain was kicked off a tug in Mexico by Walt Tague.

 (Laughter.)

 MR. SMITH: I'd like to back up just a bit too and squeeze a word in about sort of the very larger picture, ask about what is the national interest in doing things out here.

 Just a really, really broad overview is that we operate in literally the wild west. And so I mean, some of the same questions could have been asked about moving from, you know, east of the Rockies to the west of the Rockies.

 I mean, if you take a long enough picture at what we're doing and the resources and the development of Alaska, you know, this is America's last frontier. There's a tremendous amount of resources. Yes, there's a very small population but it is in the national interest to develop western Alaska and we have to have the tools to do that safely.

 So, I think that the economies of scale do not work today, but in order to have something more to contribute to the greater national good there's no question that we need more data acquisition and more data aggregation. And I think that's absolutely NOAA's role is to help get that data and then aggregate it so it's useful to us.

 CHAIR WELLSLAGER: David.

 MEMBER JAY: I was going to comment that since the 19th century NOAA has -- it wasn't NOAA then, but the Coast Survey's job has been viewed as strategic. And in those days of course national defense and competing with the British was, you know, it was strategic aspect of things or even the Russians and Spanish.

 But economic is strategic too and the economic development side of this, the -- we've always taken in this country the point of view that federal investment in navigation was an important aspect of national security. And you know, what national security is gets reinterpreted and of course Congress could make another decision that they don't want to do that anymore, but that's certainly -- we're back to the 19th century the way this has been viewed.

 CHAIR WELLSLAGER: Gary.

 MEMBER JEFFRESS: Walt mentioned just a little while ago that a GPS position might plot some 5 miles different from what's on the chart. One of the physics of GPS is that the satellites oscillate between north and south latitude of around about 60. Is that right, Juliana? Yes.

 And so in these high latitudes the positioning of the satellites is always in the southern sky which dilutes the precision of the GPS positioning depending on the time of day and the satellite constellation. So the further north you go theoretically the worse your position is because there's no satellite coverage in the northern sky.

 So I'm wondering if that is a concern particularly if you're going further up into the Arctic around Barrow, et cetera, if the actual GPS positions are not accurate enough for what you need.

 MR. TAGUE: Well, I guess like for us there aren't a lot of features that we have to navigate through in Barrow, in that area. But, and I like your -- I've made use of that as an excuse sometimes when I'm talk to the Coast Guard about one of our grounded vessels.

 (Laughter.)

 MR. TAGUE: I guess there are probably two things I would -- two examples that I've seen. We have an ECDIS system on some of our tugs operating and you know, we were up in the Red Dog Mine area. We were trying to pinpoint an anchorage for the ship to come into which -- just inside the 3 nautical mile curve that had enough water depth for the ship to maintain its underkeel clearance. And it was difficult to determine based on the charting because, you know, the coastal plain there literally showed up 3 miles out according to the GPS. So we had pilots onboard and they knew from the local geographic features where the area we were trying to anchor at was, but.

 Another example was we had a grounding in Kwinhagak coming into the river there. And the locals there put out buoys each year to mark the channel. And it was late in the season and they had pulled the buoys out. And we came in via GPS and with a pilot skiff out front. The pilot skiff was carrying a handheld and reporting the information back to the tug.

 And they thought they were in good water but they weren't. They went aground and when we reported it and it got charted for our incident it looked like we had come aground about a mile inshore and kind of way up on the beach which sparked the Coast Guard to send C-130 flights and everything else. And very quickly we had what had been a routine grounding in western Alaska became a $300,000 incident for a company trying to deliver 50,000 gallons of fuel. So those are expensive to both us and to the customers.

 CHAIR WELLSLAGER: Scott?

 VICE CHAIR PERKINS: Captain Jensen, Scott Perkins, vice chair of the committee. Looking at your right table it looks like it costs me about $500 to get my personal vehicle from Juneau up to Whittier. Yesterday we reported out on our working group committee's activity and we've been looking at user fees.

 So I guess I'm trying to get an understanding, you're a state-run agency with 11 vessels on the water charging the public a fee for service. That's a model that we've been looking at for where are there opportunities that we could leverage additional user fees that would help fund for the products and the services that each of you are describing are desperately needed in this region.

 So what would the market bear and is your agency profitable at this point? Are you heavily subsidized? I mean, if $500 is enough to make profit could $510 be enough to pay for some charting and some mapping and some additional hydrographic services in this region? Can you speak to that or help us understand the economic model that might work here?

 CAPT. JENSEN: Well, unfortunately we aren't profitable. Basically the state subsidizes us just about $2 for every dollar we take in in revenue. It's very expensive to run passenger ships these days and it costs a lot. So the revenues are set by the state legislature. They're set at a cost that is believed to be acceptable to the public and not put too much of a burden on them. But unfortunately we cost considerably more to operate today than we're able to take in in revenue.

 I'm not an expert on this subject. I did watch -- was catching the news a few months ago and they were talking about with the recent recession that public transportation had increased significantly but a lot of the municipalities and states were cutting back at the same time that those were increasing. And they noted that it generally costs about $2 of the state, city or whatever agency is supporting the mass transit puts in about $2 for every dollar that they take in in revenue. So in that regard I don't think we're dramatically out of step with other means of transportation. But we are heavily subsidized.

 CHAIR WELLSLAGER: Lawson?

 MEMBER BRIGHAM: I just wanted to get back to the issue that Larry brought up about whether there should be -- Ed's operation in the Marine Exchange should be public or private, or Coast Guard should run some massive command center with all the data.

 In our working group the Marine Exchange model here is exactly what we're talking about, new and innovative approach to a remote area where the Federal Government will probably never invest enough to have a system. And here Ed said he had, what, 13 people. A pretty lean organization.

 I'd be nervous to think of what kind of command structure and massive maritime domain awareness system it would be if the Federal government had such a beast here or sitting in Washington trying to cover here or wherever.

 So I think in this particular case it's a unique and a model for what we're talking about thinking out of the box for how to handle Alaska. And it's public safety, it's in the public good but it's run by commercial interests who have a vested interest in the safety. So I think it's actually, as you would agree, very positive that maybe government not run this thing.

 MR. MAYER: I would agree, actually. I just am concerned about the frailty of the funding basically, that when you have a system like that it is maybe even more fragile than some of the -- so I'd like to see a hybrid where there's some commitment on the part of the government because it's recognized that this is an essential service and then have this other model.

 CAPT. PAGE: If I can add on the discussion a little bit. And from my perspective from having been in the Coast Guard, now on the other side of it. Old retired doddering captains like myself no longer can jump on ships and helicopters, whatever, so maybe it's a good job to sit there and collect data or install these. Basically I tell the Coast Guard we'll do the easy work. When it's a good day we'll go out and install the stuff. You know, when it's a dark and stormy night you can get those young kids and put them in helicopters and boats or whatever and do the rescues if you will.

 But some things are inherently governmental and some aren't. Like for instance I see the number shift in the phone system. I don't think the Federal Government needs to do a phone system but they need the phone system. And the key thing is getting information in the hands of the Coast Guard so they can do -- act upon it. That's what I see is just really an efficient way of getting information to those who can act upon that. So we're not really making decisions, we're just helping them get the information to make their decisions.

 And if the Marine Exchange go back -- I was just visiting with all the other marine exchanges here last week in San Francisco. Some go back to 1850 so some of them are lasting longer than the agencies. But I do agree that some commitment as far as a recognition and commitment which is done to some extent.

 I know Senator Begich in hearings has spoken very highly of the Marine Exchange back in Congress, congressional hearings or whatever, so we're definitely on the radar screen with the congressional delegation. They see the merit and wisdom of taking this approach. But maybe some more institutionalization of this to recognize and further ensure the stability and long-term would probably have some merit and recognized as a sufficient way of getting the job done.

 CHAIR WELLSLAGER: David?

 MEMBER JAY: I was very impressed, Captain Page -- this is David Jay -- by your, you know, the possibilities of traffic analysis and safety analysis. But the frailty of the organization raises the question are these data being archived, you know, centrally, nationally, anywhere so that somebody can take a 10-year retrospective or a 50-year retrospective and look at how traffic has changed and impacts for safety and you know, that sort of thing?

 CAPT. PAGE: Yes. I mean, we're realizing now how important this information is becoming to a lot of folks. And so we have several server banks and we have -- in Juneau but we also have servers in the lower 48 and backups and what have you. So we're recognizing that more and more people are asking for data. It's very costly for us to have the software and the servers, whatever, for it but we recognize it's key information that can help for risk assessment. So we are -- and plus the information we're getting is going right to the Coast Guard.

 So I'm not exactly sure what the Coast Guard is doing with it, but they also have servers and they also have the ability to data-mine or data-record and retain it. So it's going to the Coast Guard back at Virginia somewhere so they also have computers that can pull this out and cull it out. So we have several redundancy ways of both ourselves but also the Coast Guard are basically getting this information and have it available.

 MEMBER JAY: My experience with government agencies is that unless they are told specifically that they have a data archiving function they won't. You know, in theory it's being archived, but oops, it gets lost. And you know, the Coast Guard has got lots, I mean, I'm sure -- you've been there. They have lots of things to do other than, you know, curate data. So I do wonder about the robustness of the data.

 CAPT. PAGE: I would say that probably, you know, recognizing that Coast Guard is really not funded to go ahead and keep on generating data reports. So many people come to us and say I know we can go to the Coast Guard but it's not high on their priority list to accommodate somebody else.

 So we find a lot of people come to us and say -- because we'll say well, you can go to the Coast Guard. You know, they're a federal agency, you can go to them and get the data. And they come back to me and say you know, we'd rather get it from you actually.

 MEMBER JAY: I'm a subscriber to my local Portland Marine Exchange so that we have our own AIS data feed and we pay for it, so.

 CAPT. PAGE: Good.

 CHAIR WELLSLAGER: Lawson, do you have something you want to say?

 MEMBER BRIGHAM: Just to add that, you know, Larry, back to the original thought. I mean, the Federal Government is all over the place in the lower 48 with VTS systems. There's a vast Marine Domain Awareness System. We know ships come up from Singapore probably when they leave Singapore and we follow them using the intelligence. I mean, the Coast Guard is hugely involved in all that. None of that has actually been applied here, only occasionally and on a maybe particular issue. And so there have been calls for VTSs in Bering Strait. There would have to be a lot of justification to build some command center and to have a federal system to orchestrate traffic and manage it all. Maybe in the future, but I just think that other -- the vast investments that have been made in the rest of the country but again not here. And so this fills this niche and this gap.

 CHAIR WELLSLAGER: Admiral Barbor.

 MEMBER BARBOR: Yes, Ken Barbor. Follow-up on one of Joyce's questions to Steve. In particular, when we're on the Kodiak Horizon the master was very sensitive to the annotated channel there and the maintenance of it. And just wondering, I think Matt has said that you have plans for some maintenance coming up. But right now the chart says `08 and nothing more. What is your routine maintenance of that?

 MR. BOARDMAN: Well, the challenge we have, and we've already talked about budgeting challenge, is we dredge five harbors annually. The last few years the budget has been so constrained and we were very fortunate this past year. Well, the previous year ARRA gave some money to do some planning and then this year Congress had undesignated blocks of money which we were able to get because we had done the previous.

 So in the case of Kodiak the two that we're working on is the upper channel for St. Herman's Harbor which was never finished when we built the harbor because it was a rock outcrop and then St. Paul Harbor which is the one right at Kodiak itself. And that's either through the earthquake or uplift. We're going to knock a couple, 3 feet off of the bottom of that.

 Those plans and specs are due out in a month or so I guess, go out for dredging contracts here this season.

 MEMBER BARBOR: Let me follow up on my question. Maintenance is probably the wrong word for me to use. Actually, more awareness. What sort of survey asset do you have available to adjust the chart in the interim of the maintenance of this channel? Because 30 feet of tide and you can -- there's plenty of water out there, it's just knowing when there isn't.

 MR. BOARDMAN: Well, we have a schedule and each harbor has his own schedule based on historical use and the frequency. This is the first time in quite some time I've done any maintenance in the area. Anne, do you know what frequency you do of surveying? Everything is done contract. We used to have our own crews.

 We get a budget, annual budget in the order of $600,000 to go survey both hydrographic, topographic and aerial photography that we maintain on all of the 50-plus harbors and channels. But Kodiak, you know what the frequency is?

 MS. DOLLARD: I'm sorry, I don't.

 COURT REPORTER: Please use the microphone.

 MS. DOLLARD: I'm still pretty new at the Corps but I don't know the exact frequency of Kodiak. But in general it's 3 to 5 and even sometimes 7 years depending on the importance of the area.

 MR. BOARDMAN: So the unfortunate thing is that any sudden changes, we're not positioned to react to it very much.

 MEMBER BARBOR: And I'm sorry for my misleading question. It was the -- the ship was the Kodiak Horizon. The channel was the Cook Inlet Channel.

 MR. BOARDMAN: Oh, we're at Cook Inlet Channel. Okay. All right. I apologize. Now, you want to talk Cook Inlet Channel.

 (Laughter.)

 MR. BOARDMAN: The problem is that the Corps of Engineers is project-funded and Cook Inlet Channel which is a project but it's only the 1,000 meter by 100 meter and that's the area -- and that one right now is -- we also receive funding to dredge that particular channel but not the approaches to that channel. And so I think that contract is being worked right now. You're doing the environmental work for it for later this year or next, the actual dredging?

 MS. DOLLARD: As far as the actual dredging goes I don't know much about that, but the survey is happening next month. So everything will probably go from there. We're talking about doing it more routinely but we don't have a schedule as of right now.

 MR. BOARDMAN: Yes. I think the effort that we've got this year is to do the environmental, the geotech and plans and specs so that hopefully we'll do the maintenance dredging next year.

 We're trying to, we've asked Congress and Senator Begich's staffer has left the area. Asked Congress to move money from one project to Cook Inlet and we'll have to wait until Congress acts on that.

 In fact, to be honest with you it's still up in Washington, D.C. in the Corps channels. It hasn't even gone to the committees yet. The committees are going to go on recess here in a few weeks and then come back and we'll see how they react.

 But it has not been in the President's budget so we are in the process of asking Congress to move it from actually Port of Anchorage to Cook Inlet along with some other projects.

 CHAIR WELLSLAGER: Okay, Lawson.

 MEMBER BRIGHAM: Just to extend this discussion, Steve. When the arguments are made, I mean aren't there security, national security implications here when you have combat ships, combat support ships, Military Sealift Command ships come, pick up brigades and all that. They're all 30-plus draft, 35.

 I mean, why aren't the arguments not made by maybe you, but maybe Senator Begich and others that this is not only a commercial interest but a national security interest particularly for this place?

 MR. BOARDMAN: Well, I certainly won't argue with you. The difficulty in this constrained budget, again, we've presented I don't know how many harbors needing maintenance. Okay, we'll give you the five you've been doing since 1960 and you have channels throughout there.

 The interesting thing is the Port of Anchorage of course is challenged as the vessels move to the port. You go across the way, I don't know if anybody here represents Port MacKenzie. They indicate they have no need. Their vessels have no difficulty getting to their port. And I'm confused but I'm not a navigator and I don't move big vessels around.

 So, the -- in going back to the legislation was to extend that channel which in essence is saying Corps, establish a federal channel that you will maintain for future for all users whether it's at the Port of Anchorage, Port MacKenzie or any other development that might occur in upper Cook Inlet.

 And you know, we kind of hang our sails and say well, okay, that's going to take a study of X amount of time and dollars. We have other needs for it. And Port of Anchorage who is the more logical player to be the cost-sharing sponsor -- someone brought up cost-sharing earlier -- had not yet been -- they've been engaged in the port itself, not necessarily the driveway to the port. Port MacKenzie has been not necessarily in agreement and the state of Alaska hasn't necessarily been in agreement to jump in and say let's study it, let's get it ready so that we can do maintenance for future.

 But you're right, you know, the marine lift and everything else, all those folks need to step into the game and say this is impacting us adversely. We've got to go in there. And I'm not sure we have that choir yet singing.

 CHAIR WELLSLAGER: Michele. Speaker.

 MEMBER DIONNE: Yes, Michele Dionne. Going back a few steps to Lawson's comment about, you know, a government-funded effort versus a private non-profit. I can certainly see how a private non-profit's mission might go beyond the bottom line so that they could, you know, direct themselves to help a village out in a time of need at a loss. But I think that's something that needs to be worked out if you want to try to develop a commercial supporter of the work that needs to be done. I can't see a corporation making any decisions that would lead to a short-term or a long-term loss.

 CHAIR WELLSLAGER: Okay, Joyce.

 MEMBER MILLER: Joyce Miller. This is a question I put to Ken yesterday. And you know, Army Corps has assets. NOAA has assets. NAVOCEANO has big assets. I've sailed for NAVOCEANO.

 And we -- Lawson's comment about, you know, isn't this a national defense issue. I mean, it seems to me that, you know, putting a petition in for a couple of months. I mean, they have big ships with two or three launches and so forth. If it were a national security issue it might be another route of possible funding is to, you know.

 Now, most of their ships are not in this area unfortunately but it's just another way to look at potential for cost-sharing or potential for more assets that could be, you know, the small ports I don't think -- would make any sense. But if Anchorage is such a big, you know, if it's a real problem then maybe it's a possibility.

 CHAIR WELLSLAGER: For something like that though would it not require a memorandum of understanding or agreement between different departments within United States Government? That's going to be trend-setting right there I think. That would be pretty good. Interesting.

 (Laughter.)

 MR. BOARDMAN: Let me follow on that if I might just to understand a little bit of the politics. When the Corps legislatively was tasked to modify the depth of water at the Port of Anchorage there was a section in there is if the Department of Defense needed deeper water that would be the rationale. Department of Defense didn't want to touch that for anything because the marine or the carriers that were coming in for the deployments and whatever, their attitude was if I've got 10 feet of water I have a ship that can go into 10 feet of water. If you give me 30 feet of water I've got a ship that can go in 30 feet. You give me 100 feet I've got a ship that can go in 100 feet.

 I'm not going to tell you I must have X amount of feet because -- and I'm paraphrasing it in my mind is if I put the requirement then I'm going to be hit with the bill of creating it. So, right now the Coast Guard, NOAA and Navy and whatever don't necessarily want to make commitments because they'll be stuck with paying things.

 CHAIR WELLSLAGER: Okay. I've seen two people in the public that would like to ask questions so I'm going to ask that that happen. And we've got two questions. We're almost out of time. So, please, if you could limit it to one question I'd appreciate that.

 MR. LAKOSH: Yes. My name is Tom Lakosh. And the question was raised what kind of sources of funding you might have to do some of the hydrographic surveys and current, tide work. And the Coast Guard, you know, by both public and private vessel operators here, the Coast Guard has access to the Oil Spill Liability Trust Fund to establish not only planning but actual equipment that for its sub-area plants. And the state has a similar fund, it's called a 470 fund. They're both oil spill prevention and response funding.

 So to the extent that you need that hydrographic information for sub-area plans that have to be constructed by both state and federal governments and where the Federal Government has the liability for responding to spills from vessels in innocent passage and state vessels, you know, state of Alaska, federal vessels that are not otherwise required to have spill contingency plans, that it would be quite appropriate for the Coast Guard to make app with the Oil Spill Liability Trust Fund as it was the specifically designated fund for these types of information and planning purposes.

 And the question is why haven't those applications been made as part of the sub-area planning for all of these areas that now have tank vessel operations in the middle of winter in 42 inches of ice. You know, clearly I asked yesterday whether the hydrographic information would be gathered and utilized for designing specific salvage, lightering and spill response vessels in those areas.

 And there seems to be with such a large liability of the Coast Guard at stake here that it would necessarily budget hydrographic surveys and request funding from the OSLTF. And certainly where the state has very specific requests for operation of its public vessels that it also seek funding from the 470 Fund for that purpose as well.

 So there are government responsibilities here. There are government assets that are specifically dedicated to oil spill planning which these hydrographic surveys are clearly a part of. And to the extent that dredging is a spill prevention measure it could definitely be included in that sub-area plan request as well.

 So, the other end of that is that the private organizations that are required to respond in these areas also need that information, and it's a matter of these OSROs, federally recognized Oil Spill Response Organizations, to charge their membership dues that can fully fund planning and response in these areas.

 And I might specifically give an example of additional hydrographic surveys that might be necessary. In Hinchinbrook entrance we had a tanker go out that hit 135-knot winds from a barrier jet when the buoy near Seal Rocks registered less than 15-foot seas and 45-knot winds allowing that tanker to transit under the entrance closure conditions. So we've got a real disparity.

 I've seen AIS printouts of a Crowley tug that was strung out across the entrance to the extent that it forced a tank vessel, a laden tank vessel to transit east of Seal Rocks instead of through the normal shipping channel.

 So, we've got a real problem created by barrier jets off of Hinchinbrook Point that we need to recognize and that Coast Guard needs to fund, Crowley needs to fund, the state ferry system needs to fund and the alternative planning criteria group that Ed is now sponsoring, it needs to fund these types of facilities to properly plan for and to deploy equipment in these areas. Thank you.

 CHAIR WELLSLAGER: Thank you. Mr. James? I'm not sure if there actually was a statement or if that was a question. It sounded to me like it was a statement so I don't know if there's any reply that we can really make to that at this time.

 MR. LAKOSH: Well, it's the question is will the Coast Guard, the Marine Exchange APC group, Crowley Maritime, Vitus Maritime and the state spend the money that they need to make the planning in these areas using 470 funds and OSRO funds along with the Coast Guard funds, the OSLTF funds that are specifically supposed to be expended on these measures.

 CHAIR WELLSLAGER: I'm sure they'll take things like that under consideration and do what they can for that. Mr. Chance. Or Jon, I'm sorry.

 MR. DASLER: Our experience with Marine Exchange, we use that a lot and we were doing some work down in the Straits of Juan de Fuca and the VTS system that the Coast Guard runs down there was only picking up class A AIS. So I think it's Lockheed Martin that was working on that was working on that system for them, but it was only picking up class A AIS and we had to go through Marine Exchange where you could see class B AIS data. So are your receivers picking up all of those?

 CAPT. PAGE: Yes, we are picking up A and B. I'm pretty sure the Coast Guard would be also. I don't know why they wouldn't at that time but who knows, maybe the equipment hadn't been modified at that time. But actually we bring in, without diluting what we do, but the Marine Exchange of Alaska actually brings in data from Maine all the way to the gulf coast, west coast, throughout the country. It all comes in here and then we re-disseminate to Lloyd's of London and other folks.

 So we see that information all around the country and we work with other Marine Exchanges as far as data analysis and playbacks, historical and reports just to kind of amortize costs and share the burden, what have you. And we basically started it, we built it in the lower 48 and we passed it over to the other Marine Exchanges and we still provide technical support on the whole system. So but we do see that stuff all the time, Bs and As and have the data to kind of play it back whenever.

 MR. DASLER: It was just surprising to us that a class B AIS.

 CHAIR WELLSLAGER: Talk into the mike, please.

 CAPT. PAGE: You know, I should just say within class B because -- I just realized you and I are probably the only -- well, a couple of others know it, but probably don't really know the difference. But basically a B-AIS is less robust, less power, 2 and a half watts versus 12 watts. It's every 30 seconds versus every couple or 6 seconds or 3 seconds depending what your course and speed and other parameters. It doesn't have rudder angle indicator.

 It's basically designed as a low-cost, somewhere in the neighborhood of actually $500 you can put an AIS-B on the vessel. And it's predominantly focused towards fishing vessels and recreational boats, whatever.

 But fishing boats are starting to realize that it's nice to have cruise ships or other large vessels that steam in through the darkness of night to see them and see that they're a fishing vessel and they can also see the name of the lights in the Horizon or the radar image and call the cruise ship and say by the way, I'm that fishing vessel 5 miles ahead of you. I have net 1,000 feet or whatever, several hundred feet out my port side, please give me a wide berth and what have you. So it's a lot of information exchanged that normally wouldn't be exchanged. We drive around in a little 32-foot landing craft and I'm getting calls for cruise ships now because they know my name and they can talk to me, and basically say hey, we have a closing situation. I say, trust me, I'm giving you a wide berth.

 But the fact is it doesn't add to maritime safety by just knowing the name of the vessel. So you call on the radar, you got to know who you're talking to versus a vessel being at Point whatever, some Cape Chachon and five vessels answer. You're not sure who you're talking to. So it doesn't add safety.

 CHAIR WELLSLAGER: Okay, Joyce. The last one of the day.

 MEMBER MILLER: The last one. This is just an idea kind of to foment discussion maybe over lunch. NOAA has something called NRTs, Navigation Response teams. They're single boats, they're trailer-able, they can be deployed anywhere in the country. They were used in Katrina and so forth. A lot of time transport to get them to where they need to go is an issue. You know, if there's needs with these little tiny areas you don't need a ship, you need a launch with a little boat, you know, a launch and people that know how to run it. Is this an opportunity for potential, say some user fees, say some buy-in by the folks that have ferries that are going into this place and want charts?

 You know, is there some sort of possibility that we could make it a consortium here that says, okay, you've got to survey in that place. It's tiny. It would take a week or two. I mean, would you guys be willing to free of charge take it up there to get what you need, et cetera? It's just an idea.

 MR. SMITH: I'd like to respond. Mark with Vitus. I think there's a lot of interesting things that could be done with getting data for these small areas. I'd like to have discussions on depth data and how we could aggregate that.

 There are public sourcing information, Olex software some of the folks know. To me that really impressed me as a group of stakeholders who get together and share data to get specific information. I think when you look at where me and the rest of the industry goes to these small villages if we all had a way to get data that was any sort of reasonably ordered data we could get a lot of information in just a couple of years that NOAA really is looking out a 50-year horizon at getting.

 CHAIR WELLSLAGER: Okay. Thank you very, very much. And gentlemen, please know that there's a standing invitation for each of you to attend and possibly add some more valuable input to our breakout sessions if you're at all possibly available to attend those. It would be greatly appreciated.

 And it is now time for lunch. So we have until 11:30 to 12:30 for lunch and then we will be picking things back up. Oh and a lunch speaker at noon. Lieutenant Faith Reynolds -- oh, okay. Commander Houck, thank you very much. Sorry about that. He'll be addressing the Bering Strait Port Access Route Study.

 COMMANDER HOUCK: Yes sir, thank you.

 CHAIR WELLSLAGER: Okay, very good. Thank you. Can I have a quick hand for the panel members, please?

 (Applause.)

 (Whereupon, the above-entitled matter went off the record at 11:40 a.m. and resumed at 12:07 p.m.)

 CHAIR WELLSLAGER: Commander Houck has graciously accepted an invitation to speak to us today about the Bering Strait Port Access Route Study. Thank you, Commander.

 COMMANDER HOUCK: Thank you very much. Ms. Reynolds extends her apologies for not being able to be here. My staff is even shorter this week in light of my number two and his wife having a new baby and she's covering for the Integrated Command System for the Shell oil spill drill that's going on I believe in this same building a couple of rooms over.

 I wanted to give you an update on the Bering Strait Port Access Route Study and our efforts to move forward in the process of making a joint recommendation with the Russian Ministry of Transport to the International Maritime Organization on a better method and a way to make the traffic which is ramping up in the Bering Strait more predictable and hence safer.

 Much of this data I want to thank Ed Page for. When we originally started looking at the Port Access Route Study we did not have the capability to get VMS or AIS data north of the Bering Strait for much of the year, and we're not able to track where and what type of vessels were actually using the data and which side of the Diomedes they were transiting on, how close to shore. None of this information was available and we were only able to gather the data through reports from the mariners. And no mariner is going to tell the Coast Guard how close they're really going to the shore, we realize that. But with this data it's incontrovertible.

 MEMBER HANSON: AIS has ruined that.

 (Laughter.)

 COMMANDER HOUCK: AIS. It hasn't stopped them from doing it, it just gives us the ability to see where they really are.

 So you can see that using Ed Page's data we can break these down and see that the majority of the traffic or at least the biggest user of the traffic are the tugs and barges who operate through the Bering Strait to supply the small villages to run back and forth between the Red Dog Mine and the lightering operations that you saw earlier through Crowley and Vitus Marine to resupply ports like the Diomedes, like St. Paul Island. Move to the next one.

 These are some of the potential routing measures that we could use to make traffic more predictable. I've given this presentation many, many times and generally I've given it to hunting and subsistence organizations as well as city groups, native corporations, the Russian Ministry of Transport.

 And I want to say up front that most of you are well aware of this, but the International Maritime Organization, its primary concern is the safety of shipping. Anything that we do to shape shipping to preserve subsistence rights or the areas to be avoided for animals and the preservation of those animals has to be tied to safety. So that is my primary concern and I take it upon myself to work those things into the safety recommendations and the joint recommendation moving forward.

 What you see on your left are areas to be avoided. You can see in yellow, and there is a -- what you see here and around the Diomedes and around Cape Dezhnev are areas to be avoided which effectively shape traffic through a negative by forcing them out further away from shore.

 If we go back to the slide that shows the traffic routes you can see that the majority of the traffic, and this is north- and southbound traffic, north- and southbound traffic on both the Russian side using -- or showing all types of ships running close in-shore on both sides. So, the areas to be avoided effectively push that traffic out further away from the shore and further away from the potential grounding areas in these shallower waters.

 Now, as I go through these I need to remind you and remind myself that these are potential measures. These are not -- my final recommendation is not due to be published until November of this year in the Federal Register, okay?

 Another potential routing measure that we're looking at is the traffic separation scheme that you see on the right-hand slide. This would benefit predictability of the traffic in many ways, the biggest of which is in my estimation and what the recommendation is shaping up to be, northbound traffic on the east side of the Diomedes and southbound traffic on the west side of the Diomedes. This would take a bigger level of cooperation with the Russian Ministry of Transport than we've seen at any time in our history. So not being one to want to tilt windmills this is just an idea that is up on the -- up for review right now.

 There is room, but you would -- the beauty of this one is you have straight lines with no intersections of traffic moving in opposite directions. As we all know, intersections, especially with traffic moving in different directions has the potential and for those of us that have operated at sea for any time at all we know that if it can happen it will. It's only a matter of time. Anytime you have two intersecting lines with traffic moving in different directions it is only a matter of time until you wind up with an accident there. And we -- in shaping a recommendation to the International Maritime Organization we're trying to avoid as many of those intersections as possible or reduce them to the smallest number possible.

 So, there is also the possibility of making a recommended route. And you can see that I've outlined that with these light-colored arrows with the route coming in from the south to the north on the east side of the Diomedes with a course change in the vicinity of due south of the Little Diomede Island and then recommended routes on the other side.

 The recommended routes historically have worked not because the mariner wants to make them work but because Lloyd's of London has also, or the insurance company has insisted that in order to insure the cargo that is passing through these international straits they have to comply with the local regulations and recommended routes. So to go against them opens them up to a liability or uninsurability problem.

 So I'd like to, since I feel like I have a little time, are there any questions that I could address before I move to the next slide? Captain Brigham?

 MEMBER BRIGHAM: Yes, I mean you've probably guessed that I would ask the question.

 COMMANDER HOUCK: I did.

 MEMBER BRIGHAM: None of the maps have any ice. The application of routing in ice-covered waters has some implications for the navigator because as any icebreaker person knows, you may go 50 miles out of the way to avoid some sort of rubble field. So these are recommended routes.

 The question is in ice navigation in the winter when it's ice-covered how we were to handle the ice operation kind of navigation which might be slightly different than in free water. It is an issue, true?

 COMMANDER HOUCK: Yes sir, it is an issue. And while right now it's not a current issue, economics shows that as there is money to be made mariners will spend a longer and longer season and find ways to continue to make money in the ice. So that will drive the issue.

 And that's a nice lead-in to the next slide. For those of that don't know, Captain Brigham in one way or another taught me how to break ice. He taught the people who taught me how to break ice. And I owe a lot of what I know about ice and icebreaking and much of my career to Dr. Brigham.

 Dr. Jeffress?

 MEMBER JEFFRESS: Yes. I had a question about the weather. Like, how often is it clear visibility and how often is it restricted visibility going through this strait?

 COMMANDER HOUCK: I would have to base my answer on my own experience and I would say that only about half the time are weather conditions ideal with visibilities greater than 8 miles.

 The non-ideal can vary between ice coverage, fog with visibilities down to where you can't see the bow of your ship to sideways rain to 40-foot seas. So, if there are no other questions I'll move onto the next slide.

 This is the Port Access Route Study process that I've been following. I inherited it and it seems to be working quite well so far with one minor exception. Notice of the study was published in November of 2010. The Access Route Study itself has been ongoing. A recommendation was published in the Federal Register and we are currently in our second public comment period.

 I'm working with the other agency groups and just yesterday got a response from the Ministry of Transport in Russia after going to Washington, D.C. and giving a presentation to them and asking for a point of contact 6 months ago. They are, as you all know, or may or may not know, they are transitioning to a new government and not quick to come to an accord with a foreign government in the midst of their change. And they cite our possible government change upcoming as another reason not to be quick to make agreements. But they are willing to talk which is a huge step forward from where we've been through my time with the Port Access Route Study.

 So this is the sticky point, the joint Russia proposal to negotiations. And then we would move forward to the International Maritime Organization. Up until yesterday I was considering the options of going forward to the International Maritime Organization without Russian concurrence, knowing that this would delay any outcome by at least 4 years.

 But leveraging the International Maritime Organization and their power to lean on our Russian counterparts to at least respond and ostensibly forcing them into if nothing else coming up with their own recommendation and then maneuvering from there. Up until yesterday that seemed to be our only option and I'm really looking forward to working with my colleagues in Russia in at least shaping what we would do for the Port Access Route Study and the joint proposal.

 This is our outreach at a glance, many of the things that we've done. Myself and my number three in the office are the principal authors of the Port Access Route Study so far. And she transfers this summer so we've done as much as we could in background while there were two of us knowing that there would be less effort available come June or July.

 So we've met with these 7 communities, spoke at these 16 forums and today makes 17. Letters and responses and the news outlets have garnered us some pretty excellent results. Lots of people with opinions. The most headway that I made is, you know, here in Alaska we have many who see the sea and the Bering Strait as their -- it is their grocery store, their food source. Their subsistence relies on keeping the ships a certain distance from shore affecting how the ships operate in ice so that they don't figuratively pull the plug and let all the whales and walruses run out into the south Bering before they've had an opportunity to make their harvest.

 I was able to speak to 11 of the hunting and subsistence groups in this hotel about 2 months ago and convinced them that they needed to caucus and come up with one recommendation from one voice rather than 11 or 12 different recommendations and that has helped immensely and is helping us move forward.

 Next up, the 27 submissions during the first public comment period have all been gone through, collated and each has shaped the proposal going forward in its own way. Many of the people in this room have submitted comments thanks specifically to you and you're all welcome.

 The comment period is not closed. The last slide will give the contact information of Lieutenant Faith Reynolds and if you think that you might someday have some input towards shaping it please write it down and don't be shy about getting into contact with us.

 This is an example of a discussion and ideas brought up at a PARS workshop here in Anchorage on 15 August. You can see here is the narrowest point with Big Diomede and Little Diomede in the middle. And these are the different suggestions that were put forward by many of the people who were in attendance at the August 15th meeting.

 The Alaska Marine Pilots have also submitted a great deal of data on the ships that they've taken up through the Bering Strait specifically to the Red Dog Mine and up around to Barrow documenting some of the shallowest areas that they routinely transit. And I will tell you that we need to get a handle on this. There are multiple transits of ships that are carrying 40 feet over areas that I know for sure are at most 41 feet and they're only 41 feet because the last ship went through, dredged the way for the current one. As I said before, it's only a matter of time until one of these goes bad and misjudges his exact line and leaves a bottom on the bottom.

 This is the contact information for Lieutenant Faith Reynolds. This site right here you can look at the comments of other people and use them to either shape your own comments or refute some of the comments that have been made already.

 I appreciate your time and I thank you for having me. Mr. Wellslager, I thank you very much for allowing me to come and present. I will be on a panel after lunch and right now I'd like to open it up to comments or questions. Captain Glang.

 CAPT. GLANG: Gerd Glang. Commander, can you talk a little bit about what kind of analysis you did of the AIS data? It would seem that there's probably certain categories of vessels that are cutting it close around the cape and that they may have particular reasons why they're doing that and how you de-conflict that with the other stakeholders' interests to create areas to be avoided. If there's smaller coastal traffic you're going to be pushing them further offshore so can you just talk about how you did that analysis? Thanks.

 COMMANDER HOUCK: Yes, sir. I'd like to break that down into two parts. First of all, through the Marine Exchange we were able to break out the smaller data, the tugs and local coastal traffic, from the larger vessels that were using the Northwest Passage and the Northern Sea Route.

 And I will tell you from my experience working on the Port Access Route Study down in the Strait of Juan de Fuca that special exceptions can be made for vessels moving through marine sanctuaries and areas to be avoided that would -- I won't way minimize but I'll say reduce the cost of doing business as far as fuel spent to increase the distance from shore. And we are looking at that.

 And there are, just like there are different carriage requirements for different tonnages and types of ships there could also be different routing plans and procedures to be put in place.

 The beauty of -- the beauty of the recommended routes and the areas to be avoided is that they could be tailored to certain times of year and changed. There are certain sections of the Coast Pilot that deal with different ports with approaches in winter. There are sections that talk about approaches with predominant winds from one direction or another.

 We could shape the routing measures to deal with situations where the ice comes in early or the ice comes in late or there is an exceptionally large population of eiders one year and we want to change the routing to ensure that no detriment comes to them.

 These -- I say that and I realize that I have contradicted myself with respect to the IMO and its shaping, but one of the other measures that we're looking at is a scaled-down version of a Vessel Traffic Service that would not have to be local, maybe staffed out of another Vessel Traffic Service. We're not sure how it would work. We're not sure how the funding would work for it but we have shown in every case where a Vessel Traffic Service has been put in place that risk is reduced, not eliminated, but reduced by all the things that Captain Page outlined earlier. Just people behave differently when they know they're being watched. They behave differently when they know that their track lines can be reconstructed from computer data. Yes, sir.

 MEMBER JEFFRESS: If there was a major vessel incident today, either say a cruise ship or an oil tanker, what sort of assets are in place to respond to that right now and how long would it take? And could you answer that if it was either the Russian side or the American side?

 COMMANDER HOUCK: If an accident occurred right now response would be at the very least 10 days out if you were relying on the U.S. Coast Guard. Our closest asset that could respond with anything more than removing passengers and crew members would be the Coast Guard cutter SPAR out of Kodiak, Alaska. I assume you're talking about oil response?

 MEMBER JEFFRESS: Oil or people, if it was a cruise ship or a tanker.

 COMMANDER HOUCK: Yes, sir. But there are many other out-of-the-box ways to get people off of cruise ships and ships by rerouting other large ships to the area. But for oil spill response this time of the year, if it happened right now there is very little that we could get on scene within 10 days. For this summer's operations we will have no fewer than two Coast Guard cutters in the Arctic present for the duration of this summer's explorative drilling operations and transit season for the ice-free season. And they will be very nearby.

 CHAIR WELLSLAGER: Lawson.

 MEMBER BRIGHAM: Back to the question that Dr. Jeffress asked which was insightful because it's like IMO asking the question. When you go to IMO presumably NOAA ROSHYDROMET would provide with a very comprehensive analysis of the environment here, ice, weather, winds and the question that Dr. Jeffress asked. How much of the time in the strait is low visibility? Who knows, 11 percent, 15 percent, whatever it is. I see a role for NOAA in providing backup analysis of data that the Coast Guard wouldn't have but you all have at NOAA, whatever sparse observations there are to define the environment which you must do at IMO I mean I would think to get a handle on risk and why the need for this. Not just because there's shallow water around a few points or a couple of islands or even the level of traffic. It's remoteness, cold, low vis, et cetera, right? So is that part of your package, part of your effort?

 COMMANDER HOUCK: It is, yes sir. Concurrently with the digesting of the data we have just begun working on an Environmental Impact Statement which will take into account the weather, the response assets and predominant currents, predominant ice patterns, that kind of thing as best we can figure them at this point.

 MEMBER BRIGHAM: Who's the we?

 COMMANDER HOUCK: We the Coast Guard.

 MEMBER BRIGHAM: But NOAA's the support federal agency to provide all of that analysis. Satellite data, historical record for 30 years, passive microwave, I mean you name it. I don't know, it just seems like a support effort that NOAA could -- would gladly provide the Coast Guard in this particular effort.

 COMMANDER HOUCK: We are certainly taking every bit of data that they have and they're very willing to help us out with it. It's still not perfect, it's still as Mark Smith of Vitus said the wild, wild west.

 It is one of the -- there are many sub-oceanic bathymetric buoys and studies that are going on to try and catch up. Every week when I sign the Notice to Mariners there are three pages of buoys and beneath-the-surface study items that have to be documented and signed off on. It's just amazing to me how much work we're doing in this area to learn how the environment works and to learn the predominant weather patterns.

 CHAIR WELLSLAGER: Admiral Barbor.

 MEMBER BARBOR: Yes, I -- at least from the hydrographic standpoint a proposal like this to IMO would then be farmed out to the IHB which would ask for member state comments. And obviously NOAA would be expected to comment substantively on the hydrographic ramifications of a particular routing proposal before IMO. And then, you know, the IHO would respond and support it. I would assume WMO would probably do about the same thing on the weather side.

 But clearly to make that proposal you've got to do your homework before it gets sent out to the international forum.

 COMMANDER HOUCK: Yes, sir. My goal is that in order to move this -- we're already behind the power curve. My goal is that instead of farming it out for initial assessment of the hydrographic data and the weather data, that they are just re-contacting people that I've already worked through for confirmation of the data that's presented at the time of proposal.

 CAPT. LOWELL: I just want to add a couple of comments on what both Lawson said and what Admiral Barbor mentioned. Number one is NOAA is heavily involved, we're always assisting the Coast Guard in these PARS. I believe a couple of months ago there's also a PARS occurring on the east coast and we actually housed a group of Coast Guard folks over in our office where we provided direct, you know, GIS hydrographic review, all the things we typically do from my office perspective to help on Agency PARS. We can certainly do that over here with the Bering Strait PARS study.

 And to get Admiral Barbor's comment is any routing measure that goes to the IMO for discussion, there is a requirement for hydrographic review because that's actually where you're telling vessels to go as opposed to a big ocean, go wherever you want. And so there's a certain level of responsibility that is incumbent on the hydrographic offices, in this case both the U.S. and Russia to conduct that review. Thank you.

 VICE CHAIR PERKINS: With the AIS data are you able to track like we do in aviation the near-misses? And are you building that into either your response or your report in the Federal Register to try and help the public understand the necessity for this from a safety of navigation?

 COMMANDER HOUCK: It's not something we're actively looking at right now. VICE CHAIR PERKINS: Am I correct in assuming that you could analyze the AIS data and actually do proximity interference and see how close these ships are coming to each other in bad weather condition?

 COMMANDER HOUCK: It would be an assumption on my part and it would be a historical re-creation of the near-miss data. The beauty of having a Vessel Traffic Service is that all that is captured realtime. I would have to rely on Mr. Page and his limited staff to go back and analyze that data right now. And he's shaking his head yes as vigorously as he can.

 CAPT. PAGE: I won't do it.

 COMMANDER HOUCK: No.

 (Laughter.)

 COMMANDER HOUCK: I can assume -- Mr. Page, tell me if I'm wrong. If we knew of a near-miss we could go back and it would be much easier to recreate the AIS track lines instead of looking at a year's worth of data and trying to figure out where the near-misses were.

 VICE CHAIR PERKINS: Will the proposed traffic separation include spacing?

 CAPT. PAGE: To answer your question we do that routinely now. The Coast Guard has referred to us on past collisions or near-misses or incidents that have happened. So we can play it back. And it's a lot easier if you know what happened than to stare at the screen like you said, like a year of data and try to see if there's a near-miss situation developing.

 I'm sure there's ways you could see if two vessels come within 50 yards or 100 yards or whatever you want, you could probably determine that, but we never really looked at that yet.

 COMMANDER HOUCK: Yes, sir.

 MEMBER DEMPSEY: You know, there was a request of us to report near-misses. I don't know of any ship or sailor that's going to report a near-miss.

 DR. SULLIVAN: In the aviation community by contrast there's a long-established volunteer reporting effort shepherded by NASA, the Aviation Safety Reporting System. And by pilots and to a degree air traffic controllers do report near-misses there.

 And it's for just this reason. You need some cuing to direct you to which bits of data, what points in time are pertinent to examine and extract some lessons learned. So it's been a no harm, no foul, anonymous if you wish, teach the system lessons by letting it examine how did two things come too close, come uncomfortably close.

 MEMBER DEMPSEY: I don't think that's with the maritime yet.

 CHAIR WELLSLAGER: Larry.

 MR. MAYER: Thank you. I'm wondering if you have any indication of what the response of the Russians might be. And I ask because, in recent discussions with them about the sea issues, we were quite taken aback that there seems to be some reconsideration of the respect for the maritime boundary. That seems to be driven by a very strong fishing lobby in that part of the world that's calling into question the maritime boundary itself.

 COMMANDER HOUCK: Yes, sir. The maritime boundary that you speak of of course has not been adopted by either nation at this point. So it is constantly in dispute and I've intentionally drawn the parallel lines for the proposed traffic separation scheme not to align with that boundary so that they wouldn't deny it just on the face of -- that I was trying to confirm that line. I mean that's how international law is formed is by adherence and adoption.

 So I don't know. I've only been -- I've tried to be in contact ever since I took over in this job but only recently have I gotten anything other than a handshake and a "We'll get in touch with you." So.

 CHAIR WELLSLAGER: Anything else? Commander Houck, thank you very much. This was very informative and it's an interesting study. I hope everything works out for the best. Thank you.

 COMMANDER HOUCK: Thank you and I hope to be in contact with some of you if you choose to submit recommendations. I welcome them.

 (Applause.)

 CHAIR WELLSLAGER: All right. We're running a little bit ahead of schedule but if at all possible and if the panel members are here and would like to go ahead and start I think that would be a good idea. So if we could, please.

 MS. WATSON: We need a few minutes to load a few more presentations. We need about 5-10 minutes.

 CHAIR WELLSLAGER: Five to ten minutes, please.

 (Whereupon, the above-entitled matter went off the record at 12:43 p.m. and resumed at 12:55 p.m.)

 CHAIR WELLSLAGER: Well, thank you. It's time for our second panel discussion and we have five people plus one coming onboard again. So what we're going to talk about today is the Alaska multi-mission application of NOAA's geospatial Tides & Currents and Hydrographic Services. Michael O'Hare with the Alaska Division of Homeland Security and Emergency Management. Commander James Houck once again. He will follow up with some waterways management. Aimee Fish with the National Weather Service. Molly McCammon with the Alaska Ocean Observing System. Tom Heinrichs as the director of the GIS Network of Alaska at University of Alaska Fairbanks, and he's representing the Executive Committee for Statewide Digital Mapping Initiative. And then Dr. Bill Hazelton, geomatics, University of Alaska Anchorage. Thank you all for attending and Mr. O'Hare if you would like to start, please?

 MR. O'HARE: Well, thank you very much, Mr. Chairman. I just wanted to say thank you. It's an honor to be here in front of such a distinguished panel. I'm going to give you a brief overview of how emergency management in the state of Alaska utilizes coastal mapping data and who our partners are. Because it was originally requested how we directly utilize this, NOAA's maritime data and to be honest we don't.

 We have great partnerships with the university Geospatial Institute. We also have -- we have great relationships with the UAF/DNR which produces our maps based upon your data for tsunami inundation analysis and provide communities with opportunities to better prepare themselves for evacuation and all-around emergency preparedness. I'll get into that in a minute.

 Also, FEMA uses the geodetic survey data sets for their HAZUS runs as well which provides us a visual perspective for emergency and disaster preparedness, primarily tsunami and flood planning. And as you can see and as I'm sure you guys have talked about some of the data sets are ship track lines obtained 1850 to the year 2000. So you know, we're using a full spectrum of data sets to get information. So essentially we're winging it.

 But again, you know, it's all about partnerships. The state, our division relies on the sciences and the scientists to provide us with good mapping and good modeling for coastal erosion, for tsunami, for wind damage and like I said, and coastal erosion. Pretty much that is FEMA's cross-section and their -- how they use the data sets and their calculations for NFIP mapping in their HAZUS models.

 I believe this is an inundation map of Seward again from the Geophysical Institute in the University of Alaska Fairbanks. Just to give you an idea of what kind of stuff we use. The community uses this to provide to critical information for evacuation routes, good evacuation routes for storm surge and tsunamis. As well as here's a tsunami inundation map for Homer. I'm sure you've probably all seen this thing but it sure gives you a good perspective. It sure gives the local community leadership's perspective and the community planners a perspective on what's going to be affected during a tsunami event and where potential best evacuation routes are.

 And these are communities that are trying to evolve themselves into the Tsunami Ready program. I'm not sure if you're familiar with that but it is a certification from the National Weather Service. They've been providing resources to get tsunami-vulnerable communities better prepared for a tsunami. Public outreach information, awareness to local communities, to local communities, to visitors and residents on evacuation routes and the like.

 And there's also some really good modeling. And I had a great model set up but you know how these things work with PowerPoint, it really stinks sometimes. So they also provide us with some very good wave runup modeling based upon that metric information and data sets that they get. They can run some good models for us. I tried it, didn't work, but I just wanted to show that out for it. You can get to their website. They've got some good runup models.

 So one more item. As you know, increasing coastal and riverine erosion. Some of the communities that are what I call the no-brainers. The communities in peril we've called them in the past for coastal erosion. With the lessening and lateness of the shorefast ice along the coast and the west coast and north we are seeing very, very drastic coastal erosion of the communities. I'll show you a couple of examples of that.

 One more thing I want to put on the slide is we've involved ourselves with mitigation projects, I'll show you one or two of those, with the communities and the Army Corps of Engineers. They've been a great partner. I love that slide though, it's a great perspective.

 And so yes, this is Newtok shoreline. If you can -- and Kathy, you've got the slide presentation. I'm sure you'll have a copy of this thing. It provides some good information. They're looking at -- they're basing their average on the model of this thing and on a coastal erosion of 110 feet per year based upon previous data from I think it was 1996. Yes, thanks. And aerial photo was taken in 2002.

 But as you can see in about 20 years it's going to be -- the community is going to be pretty much eroded out. And so, and the same thing for Kivalina and the other communities that we saw on the previous map. Again, with 110-foot erosion, shoreline erosion per year the community of Newtok has decided to relocate with the help of our federal partners to their new location in Mertarvik. And I think they're looking at about 6 to 10 years out to have that completed, but hopefully they'll do that.

 So these are the options to the community. Either we can help mitigate, physically mitigate the shoreline community from there, or the other option is to move them and it's very costly.

 Some of the mitigation techniques that we've put forth. Of course those barrier baskets. If you fill them with the right material they work better. If you fill them with sand they tend to not work very well so you live and learn. But these are some of the high-tech designs and getting beat up by low-tech damage and stuff.

 Some of the mitigation projects that we've worked on again with the Army Corps of Engineers and federal resources have been, you know, seawall abutment, enforcement and it is a continuous ongoing and expensive project. Let's see. Going back to the map. As far as the Arctic goes we don't have a lot of population in there so the focus has not been in the past unless there's been a call for distress we will respond of course immediately. But those west coast, northwest coast communities due to coastal erosion have been the biggest focus for the state of Alaska with regards to coastal erosion issues.

 Again, the lack of shorefast ice and the lateness of the shorefast ice. And as we all know we have hurricane storms up here, they just don't call them pretty names. So they are, they are vulnerable. And let me go back. And so that concludes -- just to give you an overview and a quick rundown of how we utilize the data through our partners for preparedness, mitigation, response and recovery for the local communities of Alaska. And thank you very much.

 (Applause.)

 CHAIR WELLSLAGER: Okay. I think what we'll try to do is go through the discussions and then ask for questions at the end. Commander Houck, if you would, please.

 COMMANDER HOUCK: I didn't introduce myself before. I wanted to save it for now. My name is James Houck. I'm a commander with the U.S. Coast Guard. I have 10 years sea time on 5 different ships. Next month I'm heading off to take over another ship out of Homer as interim captain for about 6 weeks. I've operated here in Alaska out of Cordova, Alaska with the Coast Guard cutter Sycamore for 3 of the past 4 years.

 I have six of the most capable, flexible and easy-to-deal-with captains on the six ships that I use to manage the waterways of Alaska. My office is responsible for all of the navigable water in Alaska for marking it, sometimes for not marking it, for deciding whether to mark it and to do the cost-benefit analysis, sometimes after the fact, for not marking a waterway.

 I was asked to come and speak to how we use hydrographic data in the Coast Guard and how we use NOAA's hydrographic data specifically. I'll tell you that the placement of the aids to navigation, the buoys, the towers, the lights to mark the shoal water is critical to the safe navigation and the safe movement of commerce to and through Alaskan waters.

 And we -- there are certain areas where we use and need the data more than others. For instance, the Kuskokwim River, Bechevin Bay, Port Moller, we in recent history, and we've always done this in the Coast Guard. You know, in times past we'd send a small boat in with a piece of line and a weight on the bottom to determine how close we could get to the shore because ever year it changed.

 In recent times we have the ability to do our own single-band surveys of the different ports which has saved a lot of time. Now, I want you to keep in mind I have four 225-foot ships with an allotment between the 4 of them of 8,400 hours a year. Now, I have to divide that 8,400 hours up into training and many other things as well as marking, visiting, reinspecting the aids to navigation that lie along a coast that is larger than the entire coast of the lower 48. You've heard that said many times. To spend 2 to 3 days each time I want to go up into Bechevin Bay or up the Kuskokwim River surveying is not time I have but it's time I must use.

 I will tell you that in my office and in the Coast Guard there are fewer than five areas where in order to allow the captain of a ship to head up into an area to look at it they are given letters of indemnification. In the Coast Guard in general if you touch the bottom with your ship you can pack your bag, you're done. You'll never go to sea again.

 In areas like the Kuskokwim, in areas like Bechevin Bay I personally write a letter of indemnification to each one of my COs that I'm asking to go up there explaining to them that I understand the difficulties and that I expect them to operate with the utmost of care as they navigate up and down these waterways, but that I understand that the waterway changes constantly and that I'm asking them to go up into an area that we don't have good charts for.

 It's pretty tough to ask a commanding officer to create their own chart, monitor the tide cycles, develop their own tide tables and then use those to go and risk everything to mark a waterway to help out with commerce. So letters of indemnification are given in all of those cases.

 And I will tell you that in my 10 years of sea time before coming to Alaska and taking command of the Coast Guard cutter Sycamore I kind of got a chuckle out of how people treated navigation in Alaska, the weather, how fast things could change.

 My first time getting underway out of Prince William Sound and being slapped in the face with one of these 145-knot winds that the gentleman described earlier wiped that smile right off my face. There's a lot to be said for the need here.

 And I realize there are other places in the United States. I was captain of a ship out of North Carolina that marked the Outer Banks where things change constantly. But we have methods and ships where if something goes wrong down there, a major storm comes through, within 7 days it's been re-surveyed, okay? So I use that as a segue way to my next item on the agenda.

 First I want to tell you that throughout my career in the Coast Guard, and I've been in 22 years, I've been from the very beginning the person that they turned to when they think a job just can't be done or is going to be incredibly difficult, go and figure out a way to do it.

 In that light I was sent to Nome. I was the second person in and the last person out for this refueling operation. And my title changed several times. It wound up being the ice boss because I had the experience that Captain Brigham, Dr. Brigham had given me.

 There was a huge storm in November that came through, hurricane force winds, did damage to the brick wall. I knew that going in and I knew that I was asking the captain of the Healy to come into waters that may not be as charted. So I spent several days walking much further out on the ice than I needed to or probably should have drilling holes, taking soundings, verifying depths just to ensure that we could get both the Renda and the Healy in close enough to shore so that we could refuel the city of Nome.

 I wanted to make that for my own benefit, my own selfish reasons because I was also responsible for surveying and helping lay in the hose road. I wanted to make that as short as possible.

 And luckily Captain Havlik on the Healy -- I won't call her a risk-taker but she came a lot closer than she had to in order to make it easier and to make that refueling able to take place in under 2 days. If we had had to run the mile and a half of hose that I suspected we would and that I refused to promise less than a mile and a half of hose to Mark Smith of Vitus and the other folks there. It would have taken significantly longer just by the sheer fact that each one of those fittings, each one of those breaks in the hose had to be staffed around the clock as we started up the operation and through the night to accommodate the refueling.

 These are the ways we use NOAA's surveys. The surveys are inherent to everything that we do from PARS to port access to the marking of the shoals to how we fuel our ships. If one of my ship's captains is heading into one of these areas where I've issued a letter of indemnification they won't even fuel up completely. They'll fuel up just enough to get through the operation so that they're as light as possible and bow down to protect their screws. It, like I say it affects everything that we do.

 And it is sobering to look at a chart and see that you're basing your career on, at the earliest, or the latest a 1939 survey. And I was telling folks earlier, you know, many of the places that we go up in the Arctic over the top, I started going up there in 1994 and I'm sure Captain Brigham was heading up there in 1974. There were many tracks. We were on the track and taking that route solely because that's where the line of pencil soundings, penciled-in soundings was. And there were no soundings on either side of it.

 That's improved some. It's not 100 percent coverage, it's not like steaming into Chesapeake Bay or the Strait of Juan de Fuca where you know within 3 feet of how deep the water is without even a fathometer. But I thank you for your time and Mr. Chairman, thanks for having me.

 (Applause.)

 CHAIR WELLSLAGER: Thank you. Our next speaker is Aimee Fish of the National Weather Service.

 MS. FISH: Thank you very much for letting me come here today and speak to this distinguished panel. There were a few topics that I could have chosen to speak about today when it comes to hydrographic surveying and coastal surveying along Alaska's coast.

 As has been mentioned, bathymetry obviously is critically important. And while I'm not focusing on that topic today I will just say without accurate bathymetry we cannot provide accurate near-shore wave modeling which is critically important not just for boaters, for folks who are subsistence hunters and gatherers, but also for our coastal communities which are, as has already been pointed out by Mr. O'Hare, very vulnerable to the ocean.

 Instead I'm going to focus on water level measurements and tides. And I think the best way to do that is to focus on the storm that has been brought up by Commander Houck and that was the very storm that brought the Renda and Healy into Nome because their fuel ship had to turn away. And that was our big November storm of this last fall.

 What you're seeing on this screen is a satellite image of the storm. And I like your map better, Mr. O'Hare, than mine, but I guess it gives similar perspective.

 So obviously this is our big storm. If you were to map that out, the extent would be really about one-third of the CONUS. What I've also put on this map here is in red. This is where we have water level observation points in the area that was impacted. We have more than that in Alaska but not in the western area that was impacted by the storm. And really mostly these locations were not much impacted, certainly not in the way of communities being threatened by damage. And this observation point here is for tsunami water level monitoring. It's not an NWLON.

 Just a quick recap on what this storm did. More than 35 communities were damaged, received damage. It impacted about 1,000 miles of coastline. It prompted a Presidential disaster declaration and damage estimates are still coming in. Because this happened in November we had a very cold, hard winter that especially in the western part of our state does not quite seem to want to leave yet. The water that came in and inundated these communities froze. So we still don't really know what the total of our damages will be.

 And here's a few of the things that we had to combat in our forecasts. Forty-foot seas were measured by our one buoy that was actually working which would be approximately out in this area. Wind gusts to about 93 miles an hour. That was measured at Little Diomede Island. And blizzard conditions as well as storm surge.

 And again, just to put this into perspective, we obviously do get hurricane force winds and hurricane strength storms here. This particular storm was only 1 millibar of central pressure different from Hurricane Irene and the wind speeds were quite comparable to those that were experienced in the mid-Atlantic states as that hurricane made landfall.

 So as I mentioned, this is the area outlined in red approximately that was impacted as far as the communities in there. And it's a little wide to the west so I could include the Pribilof Islands which did receive damage. But as you'll note there are two water level observation points that are encompassed by this, again, nearly 1,000 miles of coastline.

 And as has already been mentioned this coastline in particular is extremely vulnerable to coastal erosion and storm surge damage. The photograph in the middle, it's a little dark, but this is actually ice that has inundated a home. This was a child's bedroom. So the sea can often be relentless and in this case we did have ice present so it brought a whole new challenge.

 I think to best illustrate our need for water level observing and tidal predictions I'm going to focus on the story of one community. This is the community of Golovin which is on Norton Sound, it's just east of Nome. You can see on the map. And this is a map that our forecast office in Fairbanks, which is responsible for making the forecasts for this area, generated based on historical knowledge, 30 years of trying to forecast for this area what kind of weather makes them most vulnerable.

 The picture in the upper is mean low low water. So essentially, the perspective of what the community looks like. In the lower corner that's what the community looks like inundated with water during a storm of September 2005. I believe the storm of September 2004 one year prior was a bit worse in that community. But yes, okay good, you're shaking your head. My memory could be mistaken but sounds like not.

 So this is a quick look at Golovin. So the area that you saw photographs, this is about that area right here. This includes their school, the majority of where the residents live, their power plant and their water facilities as well. This area closer to their airport is about where they would evacuate if they needed to evacuate their community.

 So these were some of the decisions that community leaders were having to make and asking us for decision support. Should we evacuate due to storm surge, and if so when? Now it's not just like a regular evacuation like you would have with a hurricane. Typically those occur in warm months. In this situation we had a blizzard that was occurring. It was very cold and very windy, and there was one private generator that was available in the area for evacuation and it had limited fuel. If my recollection is correct I think they had about 72 hours' worth of fuel to keep that generator going. So certainly not something that they were eagerly going to be doing if they could have avoided.

 Some of the other issues, their power and their water. Power of course is critical if you're talking about cold, windy blizzard conditions and a community which has elderly people and young children because it's cold and you need a heat source.

 There aren't very many trees that live there so certainly you wouldn't have much in the way of wood to burn so you needed power and you needed fuel. So will the plants be inundated? Should we shut down the water or the power and when? And these were decisions where they were trying to essentially save their power plant.

 If the water came in it would have destroyed their power plant if they had it up and running. So they needed to make a decision of when to turn it down, but also at the same time not put their population at risk because of the elements.

 And of course this was the ultimate question. We heard this over and over again. How bad will it be and will it be comparable to 2004 or 2005? Something of a historical record that they could put into perspective.

 Well, for us that's a little bit difficult to answer because we don't have a record of how bad it got in 2004-2005. We don't have a water-level measuring capability there.

 These are two different charts which our forecasters will use for extratropical storm surge. So this is just pure surge from the storm, pressure-driven surge, with tidal predictions. Now, in Golovin we actually did have tidal predictions and that's this lower green line on this bar. Compared to Nome which you saw on the map is relatively by Alaska standards pretty close by, quite a different tidal pattern.

 Also on the Nome chart you'll see a different color in these X'd marks. This line, the big bold line, that is essentially the total water level prediction based on the surge in the tide. The red hash marks are what was observed. So that's essentially our benchmark, you know, how is the model performing, how bad is this compared to years past. If we have that data we can look at that. We don't have that data for Golovin because we don't have a way of measuring what's going on.

 And as you can see the same part of this storm, quite a difference between what's going on in Golovin and what's going on in Nome. So we can't take one community and make it fit with another, even if it's close by. And as I already mentioned Golovin was lucky because they had tidal predictions. And the key word is "had" because they're no longer available on tide and currents. Luckily we still have them in our model and we're still running our model with the old predictions.

 So the questions that we got from many villages, and we had conference calls with the state and FEMA, and there would be dozens of villages that were in the line of this storm that would be asking very specific questions much like questions we received from Golovin. And they all asked the same things in one form or another, how bad will it be, how high will the water get. And frankly it's impossible to answer these questions when there's no tidal prediction. Storm surge at low tide is a much different thing than storm surge at high tide.

 So then of course the question is when will high tide be. And on our conference calls this is when we had silence on the phone because there in many cases was no answer.

 So here's a quick look at where we do have tidal predictions. And I will point out a lot of these are new in the area of concern. So we're very pleased to see Unalakleet come on this winter, North Bay, Shaktoolik, Shishmaref. I mean, these as has been mentioned are some really critical areas. So these are brand new. Not all of these were available to us for our November storm so progress is great and much appreciated but certainly we have some work to do. And so the question is what can we do.

 Well of course in the perfect world we would have National Water Level Observation Network sites everywhere. We know that's not realistic. So in Alaska we have a saying where, you know, you bring the paper clips, I'll bring the duct tape, we'll make something work. That's kind of our grassroots effort and way of managing things.

 Certainly there's a need for a grassroots effort here, but there's also a need for less expensive platforms. We don't always need a Cadillac. It's pretty amazing what an Alaskan can do with a four-wheeler.

 We also desperately need more tidal predictions. What's interesting is there's actually a lot of historical data but those are not necessarily available in the form of predictions. And I'll use Golovin as an example, again, a site that's no longer available in Tides & Currents.

 And I look back at the historical data and it looks like that was from 1899. Now, I totally understand the deal with bathymetric surveys that are old, I get that, but in our mind even though it's old it's still better than nothing because we were able to provide a service to Golovin that frankly we were not able to provide with some of the other villages.

 And of course we would request that some of the criteria be relaxed for Alaska so we can still get, even though it's about 2 weeks' worth of data and it is extremely old, it's still very valuable.

 So of course the question is is no data worse than bad data, or is bad data worse than no data. And I guess the question is are predictions based on short observations better than no predictions at all.

 Well, let's think of what data is. Data essentially is nourishment for a forecast. So if we use an analogy about nourishment the question then becomes is bad food worse than no food, and in some cases absolutely yes. You're not going to eat a rotten egg, it's going to make you sick. You'd be better off not eating anything at all.

 But what if you have some strawberries that are just not quite ripe? That's not good, it's not pristine, it's not perfect, but is it bad? And our feeling is it's definitely better than no food at all. And I guess that analogy really works for us here.

 It's not -- we're not asking for perfection, we're not asking for the Cadillac of services but we are asking for something that we can work with. Because quite frankly, in Alaska we're kind of used to strawberries that aren't perfect on our store shelves when we can get them, and it's pretty amazing what we can make with them when we're through at the end of the day. So thank you very much.

 (Applause.)

 CHAIR WELLSLAGER: Our next speaker will be Molly McCammon with the Alaska Ocean Observing System. Sorry about that.

 MS. MCCAMMON: That's okay. It's McCammon.

 CHAIR WELLSLAGER: Thank you.

 MS. MCCAMMON: Thanks very much, it's great to be here. I want to acknowledge a couple of people in the room. The chair of my board is Captain Ed Page. So I think he has a better job than I do because I go to D.C. a lot and he goes kayaking a lot.

 And the person who hired me for this job originally is Lawson Brigham in 2003. He was one of the first people who got the funding together to get the Alaska Ocean Observing System started so thank you, Lawson.

 So what and who is AOOS, the Alaska Ocean Observing System? We're a regional program that's actually part of a national integrated ocean observing system that's been codified in law by Congress. So we're part of a congressional act.

 Our mission is kind of multifold. We provide easy access to physical, chemical and biological data. We develop a network of ocean and coastal observations. And our policy is if we can't do it, if we can't provide it, who can and we do a lot of facilitation. We do a lot of bringing folks together, trying to make things happen.

 And then thirdly we develop information products and tools for informed decision-making. Because so often what we find is that people don't really want data, they want the information that data is giving them.

 As I mentioned we're part of this national program and there are programs like us all around the country. When I first started in 2003 with Lawson at that time it was mostly a set of earmarked programs that have been developed. About half of the states were covered with this. We had a total of about $47 million in annual earmarks. We even received several from Senator Stevens to get started.

 Now we have complete coverage of the entire coastal U.S. and we're operating at about half the money. So times have changed and we're trying to do as everyone else, more with less.

 So our founding board members are primarily state agencies, federal agencies, the research community and then we have the Marine Exchange of Alaska. So we do have basically most of the decisionmakers in Alaska at the table who set our priorities.

 But we do partnerships with all kinds of folks. I mean, we're -- Alaska is -- we're the queens and kings of leveraging up here because that's the only way we can get anything done. And I appreciate Larry Mayer's comment about the frailty of programs that are supported by these leveraged resources. But I don't see any other way of being able to do things and accomplish things in Alaska. And at least we're getting things done that way. So if you can come up with a better solution we'll take it.

 Our program is stakeholder-driven. So a typical research program asks questions, science questions, and then they decide what kind of observations and models they need. We start with who are the users of the environment, what are the decisions they have to make, what are the issues they're facing, what kind of observations and forecasts do they need. And then from there what kinds of things do we need in the water, what kinds of information products.

 So we have a whole diverse group of decisionmakers and stakeholders ranging from resource managers to industry to local communities to mariners, fishermen, just kind of that wide swath.

 Because we do have a limited program and we try to be very strategic our focus has been on a couple of thematic areas: marine operations, coastal hazards, water quality and ecosystems fisheries and climate trends. And we try to pick the kind of key areas within those segments of how we can make a difference. Whether it's operating weather stations in Prince William Sound which we've done, whether it's partnering with Ed Page and developing ways to push weather out through the AIS sites, whether it's funding a historic sea ice atlas that Lawson begged for for years and we're now funding it with the University of Alaska Fairbanks so we will have a historical sea ice record for Alaska electronically within another year. Whether it's funding high-frequency radars in the Chukchi Sea so that we can monitor currents, surface currents, or monitor ocean acidification at three buoys around the state and along the Seward Line which is our longest time series. So we do those kinds of things in terms of modeling, forecasting, and observations.

 Part of our -- one of the things we did this past year was develop kind of an optimum 10-year build-out. If we didn't look at money what are really the needs again looking at these thematic areas and how would we develop a program for the state. And we looked it from kind of the large marine ecosystem perspective and then developing it into seven subregions and areas.

 And we used our experiment in Prince William Sound. We started this in 2003 as kind of a -- if we were to do an ideal observing system what would it look like. And we started in the sound because we built on the legacy of the Exxon Valdez oil spill which has a huge amount of research and a lot of different facilities that were there that we could leverage.

 And we showed -- this is 100 kilometers square. So it's pretty small, it's pretty tractable, it worked. We were able to do in one field experiment we did lots of drifters in there. We were able to show how our models worked, how the models worked better when you had realtime observations that you could assimilate into the models. It worked. It's just not cost-effective.

 And then you try to replicate something like this in other areas such as the Bering Strait. And Lawson will recognize this because this one kind of a conceptual observing system that we developed as part of the Arctic Marine Shipping Assessment a few years back.

 When you try to replicate it up there the cost is just astronomical. And this is the map that I like to use. I mean, everyone else was showing the other map, but this is the map I use, especially with my California compatriots because this is -- in some ways we do ourselves a disservice because we put the entire map of Alaska on one slide. And it looks like we have a lot of stuff going on, and boy, you guys are lucky. Look at all this stuff happening.

 But you have to really put it in perspective in terms of the scale of what we're trying to deal with and the remoteness, and the fact that most of these regions have no roads, have limited power, are iced in a good portion of the year, extreme weather conditions, et cetera, et cetera. So I always like to -- and the little purple area down here, this area down here, that's our southern California ocean observing system. So I always like to say.

 Of course then they'll tell me the value of, you know, 1 inch of shoreline of California coast compared to ours. Then we start arguing about resources and whales and fish and everything. But anyway.

 So when we're trying to do this and this has actually been a really good exercise for us because we're looking at what do we really need at kind of these subregional scales. And again, it's kind of course resolution everywhere. We're going to use a lot of satellites, remote sensing models, not a lot of observations, just to give us that big picture.

 But then everybody wants more information about their back yard. So they want more information on the Bering Strait, Norton Sound, the Chukchi right off Prudhoe Bay. You're going to need more point observations, more sentinel monitoring. You're going to need finer scale models and forecasts. You're going to need ShoreZone detailed GIS data layers. So at those little scales like that.

 And we've actually used this build-out plan in a lot of different venues to start talking about how do we collectively as a community build something like this. We don't see this as us, Alaska Ocean Observing System, we see this as the collective community trying to develop this.

 So when you don't have a lot of observations to begin with of course kind of the key is making sure that whatever you do have people have access to it. And when we started in 2003 the only real regional data portal was GINA which Tom is going to talk about which really focused a lot on satellite data and on terrestrial data.

 So we really have put since that time a lot of effort into our Alaska Ocean Observing System ocean portal. And just this year we are now able to integrate and aggregate multiple data layers, from sensors to models to remote sensing to anything with GIS, with a lat-long to project-level point data and integrate these into products that hopefully will be of use to various stakeholders.

 We started this 2 years ago with what was called the Arctic Research Assets Map. And again you see all these little dots up here and it looks like there's a lot going on and there is. And this is all due in the last 5 years to work from MMS/BOEM and the industry, Statoil, Shell and ConocoPhillips and then on the Beaufort side some from BP.

 The industry and agencies asked us to put this map together because all of a sudden there was a lot of things going on up there. There were buoys in the water. They wanted to make sure that everyone knew where everything was so that you wouldn't see your mooring heading towards Canada.

 But it's been incredibly useful over the last 2 years. It's reduced duplication of effort. People have looked at this map and said I was going to put an acoustic recorder there but I see you already have one. I'm going to put mine over here.

 It's allowed us to identify gaps, where are the big holes in monitoring and in research. It's allowed people to avoid collisions. It's given incredible opportunities for collaboration because we also include ship tracks, planned ship tracks and also air tracks. And it gives you a much more holistic view of the research effort.

 And we're now taking this and we're expanding it to western Alaska, the Bering Strait south and then our goal is to have this statewide. Ultimately our goal then is also to link directly to the data from these various sources.

 So we started 2 years ago with first of all making sure that we had access to every realtime sensor in the state. And we have continued to do that and hopefully we'll be getting the industry met/ocean data on here as soon as that comes online through National Data Buoy Center.

 We provide things like winds, tidal predictions, water temperature wherever they have it. We can overlay all these various pieces of information.

 Our most popular page has always been the webcam page and we've put these together for Prince William Sound and Cook Inlet where they're on one page so they don't have to go to multiple sites.

 These webcams come from a lot of different sources. Pilots love them because they can see on one page what the weather is like across the inlet or across the sound.

 This is an example of where you do multiple sensors and multiple information, whether it's water level or the webcam and the winds. And you can see it all integrated on one page.

 We have a model explorer which uses remote sensing data and any models. So we have sea ice, winds, snow depth, water level. Any model that we can get our hands on we're putting that in. And again, you can start layering those as well.

 This includes things like currents which gives you realtime currents in some places plus 4 hours into the future. We have a capacity where in a model like this you can drop a virtual sensor and you can get the data set for that point. It gives you some idea of what it might be at that particular location.

 Our latest tool that we've been developing is for Cook Inlet and this was at the request of the Cook Inlet Regional Citizens Advisory Council. And it incorporates all those various layers. So we've got models, satellite data, all the sensor data and then we also have the ShoreZone high-definition videography and videos.

 You can now fly the coastline, stop at a point, grab a picture of it and see what data is available at that point. And this is something that will be -- our intention is to do this for the entire coast of Alaska at some point. So this has been something we're just in the process of releasing right now.

 And this is Augustine Volcano here and these are the ShoreZone tracks here that you can fly all around here and see the actual coastline. So this is an incredible tool for oil spill response, for any kind of planning, for coastal zone permitting, for planning where you're going to camp on your kayak trip, to see if there's a beach available for anything. And the entire state will be mapped with ShoreZone probably within the next 2 to 3 years. So we're getting very close to doing that.

 So I do want to highlight a little bit the industry-NOAA data-sharing MOA that Dr. Sullivan mentioned yesterday and that was signed by NOAA last year. And the three companies, Shell, Statoil and ConocoPhillips.

 And you know, you always say the devil is in the details, and the detailed annexes have taken way more time than we thought they would. But the Annex Number 1, the top priority for the met/ocean data in realtime and the sea ice images, that's been signed at least on the NOAA side and is expected by the industry momentarily I anticipate.

 Annex 2, historic met/ocean data and non-realtime environmental studies data. That's in the process and is very close to being signed. That's a $40 million environmental studies data set for the Chukchi Sea. You combine that with the $40 to $50 million that MMS/BOEM has funded over the last 5 to 7 years, you have a $100 million data set of environmental studies in the Chukchi. That is a huge resource that is going to become available to the scientific community and the public as of July 1st. So that's huge.

 Annex Number 3, we hope to get this in too is the hydrographic and bathymetric surveys for charting and mapping. That will be on its way and we hope to get that accomplished by the end of the summer. And I know Matt's really chomping at the bit to get that.

 Our data portal is going to be the access point for the industry data, for the non-realtime industry data. And all the NOAA data centers are going to be in archive and also provide public access. So this is a huge thing that we hope to replicate elsewhere.

 Another project that we've been working on is funded by NOAA. We call it the STAMP project, Spatial Tools for Arctic Mapping and Planning. This was part of the regional ocean planning funds that NOAA had, coastal marine spatial planning, that kind of pot of money.

 We worked with the state of Alaska who has expressed a lot of concerns about CMSP. But they've always been very supportive of data integration and data visualization. They were right there with us on that. So we crafted our project to really focus on those pieces of it.

 So we're focusing and we were successful. We reviewed well and we received $760,000 for a year and a half project.

 And instead of focusing on what do you need for the PARS study for shipping or for oil and gas development, we're looking at hypothetically. Right now there's a moratorium on commercial fisheries development in the Arctic.

 So what would you need though if you were to have commercial fisheries? What kind of baseline data? What kinds of decisions would need to be made? How do you start developing those information layers? And oh by the way, they can be used for the Bering Strait shipping issues. They can be used for decisions on oil and gas now because it really is the same kind of information.

 So this project, right now our project manager is in Kotzebue with the Arctic ERMA folks. They're meeting with folks there jointly to make sure that everyone knows how we're working closely together on that. But this I think will be of a lot of value to the Coast Guard and to other decisionmakers.

 And this is -- as part of that we have a new polar projection that is going to come out on our ocean portal. So the Arctic, typically you just see this little band of Arctic and then it gets cut off. So for the Arctic piece of it we're going to have the polar projection so we can really see with Alaska where it should be kind of prominent at the bottom where your eye is usually.

 And this is the sea ice concentration from yesterday. So this is the kind of thing layers will start showing there.

 So just in conclusion I just want to emphasize that all of the stakeholders that we have depend greatly on Hydrographic Services for lots of different purposes and not just navigation. I think Aimee mentioned a few of them, just the need for bathymetry for storm surge inundation models, for ocean circulation models. We -- and it doesn't have to be perfect but we just need to have some and we need to have whatever we have integrated.

 Fish and Game uses winds, bathymetry and sea surface temperatures to gauge the run timing of salmon into the Yukon and Kuskokwim Rivers and that run timing is changing. It has huge impacts on commercial fishermen.

 So we have a really broad mandate and mission, lots of diverse stakeholders but our kind of motto is measure once, use many times. So you get -- if you get lots of hits from multiple stakeholders, you know, you're golden in terms of an observation platform.

 We also have the capacity and are serving now as kind of a key data assembly center and integrator. We look at things as trying to present the ocean in 4D. A lot of mapping services are two-dimensional, they're kind of lat-long. We're looking at the ocean with depth and with time, over time.

 Our system is one that also meets national standards and global standards so we feed directly into a national program and a global program.

 And just lastly I want to say there's lots of interest in the Arctic now and every time you go to a meeting it's a changing landscape of players who are at the table. We're now working with the landscape conservation cooperatives that are Department of Interior. We're working with USGS, their climate science centers. So there's lots of new partners and players. Industry is really at the table.

 And it's something we all have to keep on our toes about because, you know, you just go on vacation and you come back and everything's all changed. So it really is a changing landscape and we appreciate that interest, especially if you come with money.

 (Laughter.)

 MS. MCCAMMON: And with that I'll conclude. Thanks.

 (Applause.)

 CHAIR WELLSLAGER: Thank you, Molly. That was very, very interesting. Our next speaker will be Tom Heinrichs, the director of Geographic Information Network of Alaska and the University of Alaska Fairbanks.

 MR. HEINRICHS: Well, thanks. I'm here pinch-hitting for Ann Johnson of the DNR, Division of Mining, Land & Water who's back in D.C. representing at another meeting.

 So as I mentioned I'm also representing the Statewide Digital Mapping Initiative. Michael O'Hare is one of my co-chairs on that -- board members on that.

 And all right. I'll give you an update on what we're doing in terms of mapping Alaska, both orthoimagery and digital elevation model mapping. So, I'm going to frame it first of all what the goal of the program is.

 Our focus is on three data layers primarily, the first being orthoimagery, the second being DEMs and third being control, to produce those two layers. And we focus on a statewide basis.

 There's a number of projects that are done, you know, say the communities are mapped by census or a given transportation corridor is mapped by DOT to serve a project. The SDMI looks at these broader statewide issues. So we're mapping, you know, 1.7 million square kilometers of orthoimagery and a comparable amount of digital elevation models.

 We also seek to make this data more easily accessible through open standards. I'll show you some of that here. So I'll make a brief digression about my group which is the project managers for the orthoimagery side of this. We're at UAF part of the International Arctic Research Center, and GINA, Geographic Information Network of Alaska is our group.

 We do a lot of direct reception of satellite data. A few of these slides in here just show our deep and long ties with NOAA. We work with the Weather Service all the time. One of the main reasons I'm down in Anchorage this week is to go over to the Weather Service forecast office over on Raspberry Road to work with the forecasters in the Bering Strait WFO, the Alaska Aviation Weather Unit and the Volcano Observatory and the River Forecast Center to introduce some new data products from the Suomi NPP satellite which was recently launched. It's doing fantastic work with the High Latitude Proving Ground which is being scored by the JPSS and the GOES-R programs. So we have a long history that's literally more than two decades we've worked with the Weather Service and others in NOAA.

 We also have a strong partnership with NOAA's primary ground receiving station in Fairbanks which is their primary polar ground receiving station. This station is busier than all of the NASA ground receiving networks combined. So what I'm saying is they receive more satellite passes on these six antennas here in Fairbanks than NASA does globally. But it's a fantastic shop. And we have a high-speed line so we can pretty much tap into that and receive any kind of realtime satellite imagery. I'm not going to focus a lot on that because we do realtime stuff. Wildfires, a big thing this summer, volcanic ash, a huge hazard to aviation obviously.

 This is going to be the only time you're ever going to see Golovin, Alaska used twice as an example.

 (Laughter.)

 MR. HEINRICHS: I had to laugh when Aimee showed this. So I'm going to jump right into a real world example of the problems we're solving.

 So, I'm going to go into this in a little more detail in a second, but we produce what's called the best data layer we call it which is basically a mosaic of the best available imagery. You know, down in the lower 48 you have -- the entire country is mapped every 3 years using high-resolution airborne photos. The stuff you're seeing here in terms of these blocks here is the high-res data we have. And I'll talking about some of that here in a second.

 So we'll be looking at Golovin down there. This is one of the product lines that's come out of our SDMI Ortho program. Here's a color infrared image. And I'm going to zoom in on Golovin here.

 This is what we had in terms of what's available in the public sector. You can do better than this in, say, Google Earth or Bing Maps but in terms of -- if you're an agency you want to be able to print a map using public sector. This is what we had, landsat data, 15 meter pixels for Golovin.

 Through our statewide mapping program we got to this. This is 2 and a half meter pixels. And that shift you saw there is actually not -- that's not an error in terms of image registration, that's actually a problem in the horizontal accuracy of the landsat data. This imagery is more accurate horizontally and of much higher resolution. We also have a color infrared product useful for doing vegetation mapping type stuff. We have a black and white product all derived from the same data set that's used for -- can be used if you want to overlay colored polygons. It's great to have a black and white layer behind that to not interfere with your color scheme.

 What we had before, again this is the USGS topo map for Golovin. That's the best we got from USGS as of recently. Here's the chart.

 So again, that's where we are in terms of natural color. And then we also have through the State Department of Commerce and Economic Development we have 1-foot imagery as well too. And that's all incorporated into this web service that I'll talk about more later.

 So, wherever you go in the state of Alaska you hook up to this particular service and you'll now have 1-foot data or 2 and a half meter data or landsat data, whatever is best available for that area. So these are all enabled through the SDMI program that I'm describing. So again, that's the mission statement again.

 So, about SDMI in general, it's a state-run outfit. These are the agencies that are -- the usual suspects. The land managers, resource managers, university as well.

 In terms of our funding partners for this work I'll show you the extent of the work here shortly. The orthoimagery side is being funded by the BOEM and also the state SDMI through capital appropriation. And on the digital elevation model side the funders are in order of contribution NGA, SDMI, USGS, NRCS and BLM and Park Service. We thank our funders.

 The contracting teams. Aero-Metric is the lead on the orthoimagery side, Dewberry on the IfSAR side.

 And then this map here shows all the new data that's been generated through the program to date. So what we're seeing here is -- sorry. All this area here is going to have new 2 and a half meter spatial resolution, 12.2 meter CE90 accuracy orthoimagery. The entire state's going to be covered wall to wall by the end of the program.

 These are all the new acquisitions we flew in 2010 of 20-foot contour accuracy DEM. And I'll show you there's going to be a bunch of work in western Alaska this summer. I'll show you here in a second. But we've made good progress. This is the past several years of work for us. It went from having much poorer products to this state now. So, again, like I say we'll be covered wall to wall with imagery. We're going to have about one-third of the state done with high-quality DEMs.

 On the ortho side the product line is a 2 and a half meter product that's from the SPOT-5 satellite produced to 12.2 meters CE90 and that's -- this slide is probably -- the horizontal is actually very important for a product like this. We don't have a good -- the base maps for Alaska particularly can be off by several hundred meters in places so having a common reference layer that is good to within better than 12 meters is a fantastic improvement that would enable all kinds of good research.

 We're actually doing much better. We're actually doing about three times as good in our spec. I'll show that table here in a second.

 Again, wall to wall coverage. We started in 2010. We'll be done by June of 2014. We have a broad use license, state, federal, local, tribal government. And anyone can have access to data via our web services including the commercial sector and NGOs. Three and a half million dollars total about split from the state and the BOEM. And we add some additional products to the line as well.

 Here's example products here. Again, from this you can see houses, sheds, trails, power lines, all the good stuff you'd want to be able to see in a product anywhere in the state.

 We've done a huge amount of stakeholder engagement both on the ortho side and the DEM side. We spent probably close to half a million dollars on contractors and various things and surveying people and talking to them, and going to meetings, all kinds of stuff. Here's just one map we had and we're trying to set our priorities for collection a few years or 2 years ago.

 And again, here's what we've collected in terms of source data. We can't produce all this to ortho images immediately because we have to assemble enough scenes to produce a good block for the ortho processing. But you can see we've got about half the states covered at this point. We've got a couple more seasons ahead of us so we're in good shape. And the smaller squares, the blue and yellow squares are what will be produced in ortho tiles. We'll have that wrapped up here in the next couple of months, the final deliveries on this year's batch.

 And again I'll just show this chart here which shows the accuracy. I mentioned the spec is 12.2 meters CE90 which means that it's 90 percent of the points have to be within 12.2 meters of their actual location on Earth. That's the specification. But we're actually exceeding that. We're getting more and this column here is the -- the worst is here, 7.78 meters. We're getting 4.3 meters. That means every pixel is basically within 2 or 3 pixels of its actual location on Earth which again is just a fantastic improvement over what we've got. And if you've ever been out in the field working with this data be it a coastline, be it a site anywhere, it's really frustrating to not have good, accurate maps to start from. We're going to improve that with higher.

 We offer the data for download via this web interface. And I'm going to talk a little bit about -- I'm going to talk about the DEMs next. So we're also producing -- in addition to the ortho products statewide we're doing digital elevation models. The product line here is a 2 meter RMSE product, which is 24 contour equivalents. In 2010 we acquired 28 new 1 degree boundary cells. It's about 10 percent of the state. Six million dollars we spent on that. NGA was the main contributor, $2 and a half million. State put a couple million in, USGS a million and so forth.

 We had -- this is our collection season for 2010. We flew all this. We uplifted some of this that they flew to -- Fugro flew this entire -- Intermap is one company. They flew this area, purchased all that. Fugro flew this area here. We collected -- they collected some of this area on spec which was later uplifted, later purchased by some of the agencies. This area hasn't been purchased yet.

 And this area up here is going to be the collection. This is the definitely funded area for this coming, for 2012. This will definitely be flown. We're probably going to fly some more. I'll show you that here in a second.

 This is the current map of what's probably going to happen this year. So here's the area that's certainly funded. We've actually received another $3.7 million in the state of Alaska in this year's capital cycle. The USGS is going to -- has committed another million and a half or so and then also the Fish & Wildlife Service and Forest Service and Park Service have some funding as well too. So we're going to be able to fly and process this area, this peninsula, plus this whole area to the north here. So we're going to get a good chunk of the Bering Strait and Chukchi Sea coast there which is going to be good in terms of -- because right now we don't have especially like DEMs for things like storm surge modeling, that kind of thing. Not that our DEM is necessarily best for that, but having the larger context is very useful.

 We also have done some other projects like this is -- this is bought from the SDMI contract. The Park Service purchased this other DEM, lower accuracy but much less expensive for the Katmai National Park. This is the Alaska Peninsula right here. So there's other options out there as well too.

 And then finally, the last few slides here. We're working with the USGS. This is really quite exciting. When we say -- when I tell people we are mapping the state of Alaska what they think is they think topo maps, you know. We're not making topo maps. We aren't. We're making digital elevation models and orthoimagery.

 But the USGS has stepped up and they are producing a new line of topographic maps for the entire country but for Alaska they're going to be using the DEMs we produced through the SDMI program and also orthoimagery. So it's really quite exciting. We're going to have new topo maps that will be completely updated for the first time since the nineteen fifties. We had some minor -- done in the late seventies but in general they haven't -- maps for more than 50 years. So this is a fantastic collaboration.

 Again, these are the contours come off the new DEMs we flew. Here's some of the imagery. This is Harding Lake near Fairbanks.

 And then finally what I'll talk about is the -- I mentioned the Open Standards Web Services. So that's what we're really all about in a lot of ways. We provide all these services, all these imagery services out through what are called Open Geospatial Consortium web standards. They work in things like ESRI Arc map, they work in all kinds of -- we work with the Arctic ERMA folks, we work with the Alaska Ocean Observing System as well. We work closely with Axiom, who's model leads the contract on the data side so we can exchange data freely. We were on the same page in terms of that whole approach.

 We do imagery. We do the elevation models as XYZ data point, actual data -- you can do analysis of them via web services. And then again we have a really strong support for the different web-mapping engines. Like you know, if you want to make a map with open layers or Google Maps or Bing Maps or whatever online, ESRI tools, we support all that stuff in terms of the way you actually make those maps using tiles. I won't get into the details of that but the point is we really know that stuff and we really support all the end users including all the programming environments.

 We have a huge number of data sets in addition to the imagery I showed you, high res, low res, charts, USGS topos, grayscale stuff, landsat, LiDAR data, all kinds of stuff is available. And the best spot to find it is we have a data gallery on the SDMI's website which described all this and shows pictures of it.

 A couple of examples. We have done NOAA charts as WMS. So this is actually done on behalf of the -- for the state DNR on behalf of the state Department of Environmental Conservation who wanted some of this information readily available in their web maps for their planning purposes.

 Our high-res layer has, again, these are air photos of Homer Spit here for example. The beauty of this is say you were using a tool like Arc map, you can just basically connect to this web service and then you can pan anywhere in the state.

 So you could be in Homer right now and say what's it look like over in Golovin. And go over there and then the best imagery is pulled in automatically over the web into your map as opposed to you having to go to whomever and download it and re-project it and so forth. So it's really a huge time-saver.

 Very popular services. Again, the trends over the past 5 years have been upwards continuously. Thousands of users. One week, we pulled these stats for one week. That's a lot of use, it really is, in terms of these things.

 My last thing, I had a couple of -- I talked to my colleague Ann Johnson of DNR. She had a couple of -- I said what are DNR's concerns in terms of this audience here. And one is she says she'd love to have more of the NOAA digital coast product, Homer being the sole example for Alaska I believe.

 Another thing that -- my initial was the ShoreZone. ShoreZone is really important. Again, it's really a heavily used data set in Alaska in terms of the oblique photos and also the habitat mapping in the inner tidal zone. It's really important.

 Also, she mentioned for both verifying permits, coastal zone permits, and also looking for trespasses, that kind of thing. It's a good historical record for identifying those situations. And of course we're all interested in doing shoreline updates because the DNR of course is the land manager for Alaska and those 3-mile limits and so forth are of critical importance for how we tax things as you are well aware I'm sure. So those are three issues that came up in terms of what the DNR is concerned with, what the DNR would hope to have addressed for Alaska as regards hydrographic work.

 So I guess my last slide would be thank you and if there are any questions you can catch up with me at the break and I'd be glad to answer them. We're excited to work with NOAA in any way possible. They've been a great partner over the years, all parts of NOAA, including NGS who we're working with on geodetic stuff and GRAV-D as well. So thank you.

 (Applause.)

 CHAIR WELLSLAGER: Thank you, Tom. And our next speaker, Dr. Hazelton, will speak to us. He's from the University of Alaska Anchorage in the geomatics program. And we'll go through a little technical change.

 DR. HAZELTON: My name's Bill Hazelton. As was mentioned I'm from UAA and I'd like to thank you for the opportunity to talk to you this afternoon.

 Principally what I'd like to talk about is the geodetic measurement and product side that comes from NOAA and perhaps NGS in particular. There have been quite a few things that have come up over the last couple of days here that I thought were interesting that I want to just mention first.

 And the first was the big picture. Predominantly NOAA's all about decision support tools and products. And that's really a critical part of where the national economy or the world economy is going to a post-industrial thing. So NOAA really should recognize that it's a central part of that, and that for what's left in terms of the transportation of material goods NOAA has a significant part to play in that as well through its transportation part. So I haven't seen anybody sort of making a big song and dance about this but I think it may be something that you want to sort of just highlight a little bit.

 To move into perhaps more details, looking at some of the responsibilities that were sort of listed there's lots of ways of thinking about them. And at the risk of sort of dragging everybody into my own specialization here we can look at them, at practically all of the things that were listed out on one of the pieces of paper that came around had to do with stuff that required a location. And you could look at it in terms of requiring a good horizontal location or a good vertical location.

 And all of these things tended to come back to the geodetic control that underpinned all of this in order to get the location. So, fundamentally then an awful lot of what NOAA does depends upon the geodetic side of things.

 It's also the foundation for trying to link all of this stuff together. Integration is critical so you've got to have stuff that links together. You can think if you like that a lot of the data that's collected not only has some meaning attached to it but also has some degree of intelligence, and the intelligence being how you link the stuff together to actually form larger data sets that you can work with.

 So the intelligence part is critical. And what underpins that to a large extent is datums. So the fundamental geodetic measurements and the products are what link together everything else that happens. That's a fairly important point I felt.

 So, when you go out collecting spatial data the -- you've got a number of datums like NID83 and geoids and the whole series of tidal datums and various other things to link it together. They're all rather abstract entities. Yes, you can go out and determine sea level approximately but you can't just go out and say well, right over there is the ellipsoid.

 You actually need to realize them in some way which means that you've got to ultimately have something on the ground that you can connect back to. And what this tends to mean is that you've got to have what ultimately comes down to continually operating reference stations.

 Unlike the lower 48, Alaska doesn't have a lot of traditional survey control. One of the main reasons for that is that survey control tended to follow the roads or reasonably close to it and we haven't got a lot of them. So we just simply never got the infrastructure on the ground.

 So we're way behind where the lower 48 is as a lot of people have brought up. So we need to make a significant jump to move ahead which gives us the opportunity to move into something that's more modern. And for us that comes down to these CORS.

 Elsewhere in the country such as Ohio, Michigan, I think bits of Kentucky and a few other places the density of CORS has been enough to allow additional groups, particularly departments of transport, to build more advanced systems such as virtual reference networks and various other products that allow users to use the fundamental system at levels that are not possible without putting in an awful lot of your own personal infrastructure.

 In Ohio, for example, you can get a subscription into the Department of Transport's system. You simply go through your cell phone, connect it into your receivers in the field and it's the same as having your own system sitting over on a high-precision control point connecting in so that all of your work is now substantially better than it would be if you were trying to even connect into the CORS because you're now working with a whole network of CORS simultaneously.

 This wasn't done by NOAA or NGS, it was done by other players who've built on top of the infrastructure. Now, we're not in a situation where we can do that in Alaska yet. Maybe at some stage around somewhere like Anchorage. But we still need the infrastructure in place to even get there. Once the infrastructure is in place then other people can add to it and we can build on it.

 And if you -- I think the NGS has done some preliminary work on cost-benefits of the CORS. I think something like a 7 to 1 return on investment I think was the -- somewhere around about that sort of figure. That seems reasonably profitable to me. If you were getting 7 to 1 on your investments in shares wouldn't you be happy rather than, you know, 2 percent in the CDs if you're lucky?

 So, what's been happening with regard to the data that has been provided so far. Well, if we look at what was happening just a dozen years ago we were using the GEOID99 model up here. And through idle curiosity I went through and I looked at what was happening with the geoid over the last little while just at the location in my office just across the way here in beautiful Anchorage.

 Now, Anchorage is right on the road network. It's right by the sea. It's got lots of people and lots of activity happening. It should presumably be okay. Well, basically sea level if you like or the geoid moved about 2 meters in the period 1999 to 2006 between the different GEOID models. That's noticeable. In Ohio during the same period I think which I was also working in some years ago, I think it moved a matter of a centimeter or two, if that. So the change in the data, rather the change that's been brought about by the additional data has been huge.

 In the shift between GEOID06 and GEOID09 at my place it sort of shifted back by less than an inch. But across the entire region the shift in the geoid has been somewhere on the order of 0.6 of a meter on average. This is just an indication of what happens when you start putting better data in. Now, what does this mean for us in Alaska? As has been mentioned, SDMI is dealing with the -- a new digital elevation model, basically a surface for Alaska as a whole. At the moment because that is being done by interferometric SAR that's ultimately tied back to the ellipsoid.

 We don't have a way of connecting that readily back to how water flows, sea level, or anything at all like that because we don't yet have a really tight geoid model. That's one of the things we're waiting on. So, that data has a disconnect if you like between how we can apply it because we've got this difficulty of converting from ellipsoid to geoid.

 Even when we do that we're going to have some difficulties because we don't have any benchmarks anywhere. If you'll notice there's a road goes from here to Prudhoe Bay and that basically divides the state in half. And west of that road there isn't anything in the way of a connecting road. We may have bridges to nowhere but we don't have roads to nowhere.

 (Laughter.)

 DR. HAZELTON: Not even so we can go and see Russia.

 Now, okay, everybody says great, we'll get GPS, GNSS, et cetera, and this will fix up our positions. We can wander around here and it's going to be wonderful. Well, that's fine. If you're using a single receiver by itself you'll get it to perhaps a couple of meters horizontally and maybe 15 meters vertically. It's not good on vertical. It's not a lot we can do about it.

 And here in the north as was mentioned the satellites tend to be slightly differently configured because of where we are. We do have the advantage we can see the ones over the other side to some extent but it's still, the configuration isn't quite perfect. But we still get by.

 Now, with this level of precision it's good enough for general use. I mean, you want to figure out how do you get to the local McDonald's. You want to get to the other side of the lake. You want to figure out where the trail is. Plenty good enough.

 However, you want to sort out water levels, you want to do some bathymetric surveys, you want to run a LiDAR, et cetera, this isn't going to work. You've got to do much better work so you ultimately have to connect back to a ground system which is ultimately CORS. You need these things scattered around at a reasonable density.

 Now, what this sort of comes down to is that you can have datums and things, but you need to actually realize them. There has to be some way for people to connect into them to make them useful.

 Now, traditionally this was done -- we ran along mountaintops and we triangulated in all directions and we put stations up there for people to connect into. And we came down and put in tighter and tighter control. We don't do that anymore but we still have to have some means for people to connect into real points that mean something. And ultimately that comes back to the CORS.

 And for us without any of the prior existing sort of infrastructure we're going to be totally dependent on GNSS in various forms to provide us with the bulk of our spatial location and measurement type data.

 So, for the surveying geomatics community in Alaska we're going to be very dependent on GPS type stuff. Our total station type work is going to be fine when we're working within a couple of kilometers. Outside of a couple of kilometers range it's going to be totally GNSS. There's just no way around that.

 This is going to be even more interesting when we start looking at having to transfer vertical locations around. There's a certain amount of development going on to the north of Anchorage, for example, up into the valley. If you push on a bit further up into the valley you'll end up heading towards a little town called Talkeetna which is getting towards Denali.

 Somewhere around about Talkeetna there is a beautiful great big gravity anomaly. So GPS data is going to run into all sorts of problems when you try and translate what I get from the GPS results to what happens when I get water moving around. So I may well achieve the civil engineer's dream of making water run uphill, at least as far as the GPS is concerned. But that's going to leave me in some difficulties.

 Now, NGS at the minute is working hard. There's lots of gravity coming. There's stuff from Grace. There's lots of other things that people are doing, basically trying to refine the geoid.

 In the lower 48 the name of the game is get it from about 2 centimeters down to 1 centimeter depending upon frequency. Up here it was sort of hey, let's get it under a meter if we can. And again, we're going to need lots and lots of CORS to actually put this stuff down on the ground.

 So, what's sort of happening up here? I think Joel Cusick back there has mentioned that he's got a national park floating around there is the size of West Virginia and he doesn't have so much as a single control point effectively in it, and yet he's sort of got to do survey work and measurement within it. This makes life a little bit tricky.

 As I was looking at one of the slides this morning with the Vessel Traffic Systems there are more of those around the north and west coast of Alaska than there are CORS. So we can figure out where vessels are going around, shippings going around the coast better than we can actually put control in to develop the hydrographic charting that they need to actually get there.

 The critical areas in this -- that we're looking at here are the northern and western coasts. I mean, everybody's talking about hey, we've got to get to the Arctic, it's the next frontier. And I wish Lieutenant Governor Treadwell was here at the time because we could have mentioned that perhaps we should have changed the Alaska license tags to the Penultimate Frontier since the Arctic is now the ultimate one.

 There's another issue that's floating around as well. Perhaps -- there was some mention I think of the SDMI surface model running out to about 5 petabytes I think by the time it's actually completed with all of the IfSAR data. That's one layer. By the time we get the rest of the data in we're probably looking at Alaska representing somewhere about an exabyte of data. How do we serve that up to people? What happens when we start bringing in all the historic NOAA data? This is going to be a challenge for all of us and for NOAA in particular to deal with these sort of volumes of data that we're going to have to provide to people. It's all very well to say hey, let's gather lots and lots of data, but at some stage it has to go out.

 And you know, if you're somewhere in a village in Alaska and you've got what amounts to a 128k line it's going to take a long time to download something that you, some information that you're wanting. So we've got to look at how that sort of stuff works as well.

 So, some things that would be nice to have from the sort of surveying mapping geomatics sort of community. It would be nice to have a nice stable modern geoid for Alaska. This would sort of tighten out the vertical across the whole region. Alaska will actually make this interesting because being in a tectonically active area we're likely to actually have a dynamic geoid. We'll actually see changes because of the earth movement and various effects around here. So this gives us sort of an interesting bleeding edge of geodesy type of thing.

 We need a dense network of CORS as well and this will allow us to actually realize the horizontal and vertical datums. And there's been a lot of talk about increasing partnerships. I would like to just emphasize that.

 Also, the idea of crowdsourcing data. We're now in a time when a lot of people are producing an awful lot of data. Can we work out ways to suck it into how we're processing it to include it in what's going on? Maybe not so easy at the geodetic end of things, but in the more general data there's lots more possibilities.

 So, just to sort of finish up here, in the surveying, mapping, geospatial community we realize just how far we've come and how much NOAA has put into making it successful here. And we're really very appreciative of this.

 We'd like to help NOAA figure out how to operate more efficiently. We know that the budgets are going to be tight. How can we actually work towards helping you people do this better from what we can do locally. And also it's important that we all help get the message across to the people that are funding you about why what you do is important not only for us but for the nation as a whole. So thank you.

 (Applause.)

 CHAIR WELLSLAGER: Thank you, Bill. We've heard some compelling, interesting, very interesting and compelling and thought-provoking presentations. Are there any questions from the panel that we would like to address? Yes, Deborah.

 MEMBER DEMPSEY: Molly, do AOOS and NOAA compete for the same funds?

 MS. MCCAMMON: I should mention that our program is an interagency program but it's -- NOAA is the lead federal agency. And all of our main source of funding comes through NOAA. So we don't compete. We're within National Ocean Services. Dr. Bamford's division, line division, is where we're housed. But at the regional level we get a broader suite of funding sources. But really NOAA's the only federal agency that's really stepped up to fund the Ocean Observing System. So no.

 MEMBER DEMPSEY: Thank you.

 CHAIR WELLSLAGER: Yes, Larry.

 MR. MAYER: Also a question for Molly. You shared some very nifty tools, the Arctic Research Assets Map and the STAMP I think that was called. Has there been any kind of cross-pollination between what you're doing and with the ERMA effort?

 MS. MCCAMMON: Yes, we've actually worked really closely on that. When the Arctic ERMA folks were here for their workshop last year we participated in that. We've -- in fact we've had a lot of discussions on it because what's happened is -- and we want to avoid this -- is that a lot of our stakeholders and communities are being asked for the same data sets. It just gets kind of annoying when you're asked by three or four different data portals to provide your data for it.

 And so we're working on a whole letter of agreement on how we're working together and who's kind of taking the lead and which kinds of data and how we're putting it together.

 They're clearly the tool for hazard response in the field and for planning. I think our system is a bit broader. We have a bit broader group of stakeholders but they definitely dovetail with each other. But yes.

 MEMBER JEFFRESS: This is a question for Bill. Bill, I know Alaska has got a lot of federal lands and the Bureau of Land Management does a lot of surveying up here. Do they show any interest in supporting CORS networks up here?

 DR. HAZELTON: They haven't sort of been leaping out to sort of throw money at us about it yet, no.

 (Laughter.)

 DR. HAZELTON: They have had a significant era of budget-cutting themselves which seems to go through cycles. They laid off a whole lot of people and now they're putting a whole lot of people back on again. But they don't seem to have been hugely enthusiastic at this point yet.

 CHAIR WELLSLAGER: Dr. Sullivan?

 DR. SULLIVAN: Yes, I'd like to come back to Molly. A point of wisdom in all aviation communities is you're going to fight like you trained. So I guess back to the question of Arctic ERMA as a planning and response tool but Alaska OOS as a more commonly used perhaps tool among multiple stakeholders.

 Have you thought about that level of human reality, that habit patterns and experiential comfort that people build up through the day to day use or the consistent use of a set of tools will pattern the tools they most naturally go to when there's an event? ERMA arose in the heat of battle out of need because there wasn't such a thing, but if you had a significant event somewhere in coastal Alaska I think one really needs to think through the people who would come together to respond to that, the affected folks in the communities, the operators.

 Are they very familiar with AOOS tools and that would be their natural default set of places to go and you'll have another common operating picture challenge between some cadre of folks who come in from the federal side, for example, with Arctic ERMA presumed as a default but everyone locally is intuitively and with a good base of experience working fairly fluently in a different tool set. How do you prevent that tool set split just at the moment that you most need to be on the same page?

 MS. MCCAMMON: That's a good question and it's a challenging one. I think that's -- I mean, we like to think that an agency or whomever in an emergency would use the best tool and the best information out there. So from an emergency responder like the Coast Guard use, if they're used to a certain set of tools like ERMA which I think is very familiar to them, especially after Deepwater Horizon, then we want to make sure all of the data and the information that we have can filter into that tool to be accessible to it. For other purposes maybe the AOOS tools are more useful.

 And sometimes it's good to have more than one tool, to have two just for comparisons. When we had our field experiment in Prince William Sound we tested our circulation model, the ROMS model we had. We had NOAA come and test the GNOME model. We had Alyeska test their model, their ATOM model. And then we did comparisons of -- and they all used the drifters and they all tested their own models in comparison there. Of course we thought our model performed better, you know.

 It's a question of -- this is a challenge actually all across the country because often kind of the smaller systems, the academics are doing things maybe a little better, maybe a little more innovative. But then the federal agencies have to deal with doing things operationally that is more standard across the country and it's always this challenge of do you go with kind of that cutting edge a little bit better versus something that's familiar and standardized across the country. So I don't have a good answer for that but I think there's a role for both.

 And certainly the Cook Inlet tool that we developed, there wasn't an ERMA for Cook Inlet. We wanted to see, especially -- and Arctic ERMA is being developed. There's not a lot of, you know, people want a lot of stuff in Arctic ERMA and there's not a lot of data that's all, you know, aggregated and put together there. I think they're doing a great job of pulling bits and pieces and putting into it.

 But Cook Inlet had a lot more data and so we wanted to see what could we do with something that had a lot more data and do something for the Regional Citizens Advisory Council. Now, whether it would be used by the Coast Guard in the event of a spill, we hope it would, but.

 CHAIR WELLSLAGER: David.

 MEMBER JAY: My microphone, I always forget my microphone. David Jay. We've heard repeatedly today about how people in Alaska are doing for themselves because the Federal Government simply isn't big enough and doesn't have enough reach out here.

 I can't help in the, you know, this illustration of well, there's no tide data. Are you collecting tide data? And if not, why not?

 MS. MCCAMMON: We're not directly collecting tide data now. We've done a lot of stakeholder surveys about it and what it comes down to is it gets into a little bit what Aimee was talking about.

 For predictions you want a certain level of precision and then for kind of planning you can accept a different level of precision. And so how do you balance those two needs out when you have kind of two very different stakeholder needs there and how do you balance out the costs and benefits of it. So, we haven't done tide gauges. It hasn't risen to the top of ours yet.

 We've been working with Western Alaska Landscape Conservation Co-op and some others to get some more water level observations in different places, but we've focused more on waves and currents.

 MEMBER JAY: I guess I have to say that, you know, there are various useful intermediate places and I've worked with a lot of historical data. They aren't perfect but they're better than no data. And there are things that can be done and you can transition to a higher level and eventually sell it to NOAA kind of thing. It seems like in the complete absence of data that would be a good way to do it. If you could make a compelling case to the state that there is a need based on these disastrous storm incidents.

 MS. MCCAMMON: We actually put in a capital budget request this year through the Northern Waters Task Force and it didn't get funded this year but we'll try again next year.

 CHAIR WELLSLAGER: Joyce?

 MEMBER MILLER: Yes, just another question for Molly. Is ERMA and your database on common platforms or have they gone in different directions?

 MS. MCCAMMON: They're both open source. I'm not a techie so my level of understanding is about to here.

 They're both open source so in that sense they're a common platform. Our platform uses Flash which apparently is a little bit different and so we can do things like incorporate the ShoreZone videography and high-definition video which ERMA can't at this point. So there are some things that we can do that the ERMA platform isn't able to do. But we're both open source, yes.

 CHAIR WELLSLAGER: Okay. Bill, actually I've got a question for you. In South Carolina we're slowly developing a CORS network. We have realtime reference stations also. But we've investigated and have created memorandums of understanding and agreements with the DOT and with the railroad, and have been able to work with them and they've been able to actually fund the installation of CORS stations at facilities they have.

 Now, granted we don't have roads to nowhere because we're a very small state. You could probably fit about 1,000 South Carolinas in Alaska. But the idea would be where you did have roads or the DOT had facilities there's a possibility that perhaps they could help work with something like that. And the same would hold true for the railroads I would assume. Have you thought about possibly approaching either of those two for, you know, help in trying to establish a network of CORS stations?

 DR. HAZELTON: Well, actually the DOT is one of our strongest supporters. I'm hoping to actually work with them in the latter part of this summer to prioritize where we should be placing CORS as we can fund them. They're keen to try and work them into the budget. We tried putting something into the capital budget last year which didn't make it through. But yes, they're definitely keen.

 The railroad doesn't really go anywhere that there isn't a road nearby by and large, so to some extent that's a duplication. The big advantage with the DOT however is that they also have a big involvement in air fields and airports right across the state. And that's another area we can use.

 Another one is actually on telecommunication towers because they've got an internet connection and power, and that's actually one useful place we can look at connecting. So there's lots of different possibilities here. School buildings in villages where there's generally somebody there right around the year. There's lots of different ways that we're looking at how we can sort of spread the load and the cost and particularly the maintenance across a wider community.

 CHAIR WELLSLAGER: The idea of the school buildings is probably actually very good in that you're going to have a solid foundation to work with. Telecommunication towers move.

 DR. HAZELTON: Just a bit.

 CHAIR WELLSLAGER: Yes. They have a tendency to kind of sway a little bit. And afterwards I can give you a card. We have actually manufactured -- or I could give you some specifications on brackets that you could permanently mount to sides of buildings that have been accepted by the National Geodetic Survey for CORS installations. And we've had good fortunate with them.

 DR. HAZELTON: Thank you.

 CHAIR WELLSLAGER: Juliana.

 MS. BLACKWELL: Juliana Blackwell, the director of the National Geodetic Survey.

 I just wanted to follow up on a few things that Bill said and that Tom alluded to for the benefit of some of the panel members and the audience here related to CORS and some of the work that's gone on with Gravity for the Redefinition of the American Vertical Datum or GRAV-D as was in some of the slides.

 Just to give you guys a little bit of an update on CORS to start. The Continuously Operating Reference Station network has grown to about 1,900 stations. Less than 5 percent of those stations are owned by NOAA. It really is a collaborative effort in which NOAA is, NGS in particular taking in the data and processing it on a regular basis, on a daily basis, providing coordinates, providing information about those stations that individuals can then use free of charge for positioning purposes, for monitoring purposes, for whatever their applications are.

 The primary use for the National Geodetic Survey is as the backbone of the National Spatial Reference System, the starting points, the foundational points that provide latitude, longitude and elevation as well as other information about the reference system that we use for all mapping and surveying and geospatial information.

 So I know it is esoteric in some senses but it really is, as Bill pointed out, the starting point for, you know, what we do as far as positioning things. We just like to do it very accurately and precisely to start with and then everybody else can take it as they need it and do what they need for their purposes.

 But realizing that it is a difficult concept to talk about geodesy and geoids and things that, you know, don't quite -- can't really draw a good picture of without using mathematical symbols and lots of funny things up there on the screen to try to explain.

 It is important to be able to talk about the benefits of CORS and the National Spatial Reference System. And back in 2008 the National Geodetic Survey did a scoping study, a socioeconomic scoping study on the National Spatial Reference System and CORS in particular.

 And the information is available on the NGS website but just for the benefit of the group here the study found that the NOAA CORS network alone provides an estimated $758 million per year in benefits to the nation. So, even if it was off a little bit, I mean that's still a really good return on investment as far as potential, the benefits that the CORS network provides.

 So things like having these studies, being able to talk about the applications is important to our programs to be able to communicate that to our users and to those who are making decisions as far as where resources go.

 And looking at how we can partner because this network wouldn't be possible if it wasn't for all the investments made by all the other groups, universities, state, local, other federal entities who are putting these resources out there and then giving us the data so that we can manage it and provide it back out to the public. So, the CORS network is extremely vital but it really is a group effort. And we all want to share in the benefits that it's giving to the nation.

 Another socioeconomic study that was done and this doesn't necessarily fit into one of the presentations that was given, but the Coastal Mapping Program, and we've heard all about the shoreline and how it's important to have updated shoreline for charts, et cetera.

 Recently we provided another scoping study through the National Geodetic Survey that showed that there is a $100 million direct economic benefits per year for our Coastal Mapping Program. And that is a $35 per dollar spent by return on investment there.

 Again, that's also just a very high-level scoping study that was done but even so the idea is that being able to provide this type of information, you're really getting a lot more benefit out of it than it's costing. And there are many more applications that could be utilized and developed in the future that will even improve those figures I'm certain.

 As far as partnerships and the work that's being done here in Alaska, the National Geodetic Survey is very pleased to be able to say that groups such as NGIA, National Geospatial Information Agency, the Bureau of Land Management, USGS, Naval Research Lab, we have had a variety of federal partners who have come to the table offering platforms and resources to be able to co-collect data on airborne platforms.

 And it's really made a huge difference of how we've been able to do our program GRAV-D and try to stay within budget and on time for doing that. And we welcome future collaborations too because it's still going to be 7 to 8 years out before we actually get all of the information collected. So, we've done a lot of work in Alaska, still a lot more to go, and a lot more work to go in the lower 48 as well. So I just wanted to mention those ongoing opportunities.

 And the fact that the work that's being done by the State Digital Mapping Initiative to create the digital, the train models is critical for us to be able to utilize in making our geoid -- validating the geoid models that we'll be producing. So, we want to continue to build that relationship and feed off one another into the future about how our collections are going and how they benefit each other.

 So thanks for speaking to that today, Tom, and appreciate everything that you guys are doing too. Thank you.

 CHAIR WELLSLAGER: Joyce?

 MEMBER MILLER: Yes, a question for Juliana. How many CORS stations are currently in Alaska and/or planned in the future?

 MS. BLACKWELL: I would say there are probably about 50. I don't know if the folks that are here have any better recent counts. There are about 50 CORS stations? Anybody? Bill, do you have any idea?

 DR. HAZELTON: It's around about that figure. There are a very large number of stations around the south coast that are there with the Plate Boundary Observatory. But not all of those are able to be converted to CORS.

 Where we're sort of very thin on the ground is around the west and north coasts and a fair bit of the interior.

 MS. BLACKWELL: The National Geodetic Survey doesn't have any planned at this point in time but we're certainly happy to take the data from any other group that would like to establish CORS. Especially -- I mean there's -- it's a difficult place to put CORS, especially in the -- anywhere north of Anchorage, right?

 So, there certainly is a need and certainly being able to put CORS where there's a lot of change going on is important to be able to see what's actually happening at those locations. So, if there were other folks who are interested we'd certainly want to work with them and be able to incorporate those stations into the network.

 CHAIR WELLSLAGER: Gary.

 MEMBER JEFFRESS: I have a question for Juliana. Juliana, is NGS working with the FAA towards aircraft using GPS to navigate and for air traffic control so that they can better utilize air space and reduce their fuel costs?

 MS. BLACKWELL: We work closely with the FAA as far as airport surveys and knowing or trying to keep in touch with what their vision is for WAAS and LAAS implementation for their aircraft navigation.

 There are a lot of concerns with the FAA related to datums and the fact that, you know, they have to think internationally and work internationally. And we know that, you know, 10 years from now we'll be in a much better place when we have our new datums established to be able to have something that works better in an international reference frame.

 But in the meantime, you know, they're going down their path for WAAS and LAAS implementation, Wide Area Augmentation System and Local Area Augmentation System, for their control of their aircraft. We work primarily with them on datum issues and quality assurance/quality control of airport survey data.

 MEMBER JEFFRESS: The reason I ask is our campuses are responding to a request by the FAA to fund six centers of excellence throughout the United States to help come up with the policies of innovating unmanned aerial systems with commercial aircraft throughout the United States. They want these policies in place by 2020 and a lot of hinges on collision avoidance which is precise positioning in three and four dimensions which is going to be based on precise GPS which has got to use the CORS network. So I was just wondering if any discussions have started along those lines.

 MS. BLACKWELL: While we have the CORS network available we are not really in the -- a realtime positioning service hat. We don't wear that hat, we don't want to wear that hat, that's not what we're about. All disclaimers here. So we wouldn't be talking to them regarding the actual positioning of aircraft in realtime.

 I will say, however, that the CORS network is beneficial in post-processing aircraft positions. So that when data is being collected on airborne platforms, after that data is collected post-processing can be done so that that -- where that aircraft is is very well known which only improves the information about the data that's being collected on the ground. So, after the fact positioning of aircraft I would say is something that we're involved with and supported as far as CORS -- what the CORS capabilities are, but not the realtime positioning of aircraft.

 CHAIR WELLSLAGER: Anybody else? Yes.

 DR. BAMFORD: So a question for Molly. And I'm just thinking with the CORS station how getting to that network you've got to have some kind of baseline standards and you have to make sure everybody's connected. You were talking about up in Alaska I think the number was 3,000 or so parameters you want to try to get into the AU system and all those measurements. How do you verify the QA/QC and if you have two tide gauges or two similar parameters really close to each other and you're getting variations in measurements, how do you control that or ensure that the quality and the reliability is there when you're inputting all different information? Or do you have some kind of baseline standard you're requiring everybody as part of the system adhere to to ensure that consistency?

 MS. MCCAMMON: I think ideally you would have those kind of baseline standards. But it's one of those sometimes even not necessarily the most robust data is better than no data.

 But we do look at things like that and we do look for outliers and anomalies. And we would call whoever the data provider is and say there's a problem with your sensor. You know, it's winter and it's showing 70 degrees temperature or something odd or something. We would let them know that it's off.

 But we leave it to the provider, the data provider, to do that QA/QC. But we do some level of overseeing it. But that's, you know, we've got 3,000 sensors coming in and they're from all different kinds of providers, but it's -- they're for the most part pretty reliable folks. And we have the metadata that they use, we have that source so we can look at that too.

 CHAIR WELLSLAGER: Well, okay. Once again thank you very much for your participation.

 And again, you have a standing invitation to come back tomorrow and sit in on our stakeholder breakout sessions. We'll have the baseline data collection requirements for NOAA's navigation data, emerging Arctic priorities, Alaska geospatial framework and Alaska tides and currents. I think your information and input would be invaluable to help us come up with some recommendations for our letters to administration. So thank you very much. This has been very, very informative.

 (Applause.)

 CHAIR WELLSLAGER: And for the panel we have 5 minutes before our break. I think we might be able to break now then. And again, for those interested Kathy has arranged a site view of Mount McKinley for the HSRP and NOAA. We can meet in the hotel lobby for the escort up to the observation deck here. And if you have a camera, bring it.

 MS. WATSON: Right. And Matt, could you please let all the speakers know that when we return to Silver Spring all the presentations will be posted on the website?

 CHAIR WELLSLAGER: Did you hear that? All the presentations, if we could have those from you, will be posted on the website. Thank you. And we'll meet back here at 3:30.

 (Whereupon, the above-entitled matter went off the record at 2:54 p.m. and resumed at 3:34 p.m.)

 CHAIR WELLSLAGER: Okay, we have an hour and a half to discuss the stakeholders presentations, come up with some recommendations for NOAA and talk about the agenda for tomorrow.

 A couple of things. I have one request, and I was asked if I could bend protocol a little bit for the public comment period. Joel Reynolds would like to address the HSRP and he's going to have to leave very shortly. So he has about a 5-minute presentation that he would like to ask to present right now to the panel. So, Dr. Reynolds.

 DR. REYNOLDS: Thank you for the opportunity. Sorry I have to leave early but I appreciate your flexibility doing this.

 I'm the science coordinator for the Western Alaska Landscape Conservation Cooperative. For those of you who don't know, the LCCs are a DOI-funded program to try and address -- more efficiently address shared science needs among land and resource management agencies. Basically the mission for western Alaska is to promote coordination, dissemination and development of applied science to inform landscape-level conservation including terrestrial and marine linkages in the face of landscape-scale stressors with a focus on climate change. I had to actually look up what my mission was so that I'd get that right.

 And I just wanted to make a couple of real brief comments to emphasize the importance of some of the data gaps that you heard about this afternoon. Just from the perspective of some stakeholder groups that you maybe don't think about in your day-to-day life which are the wildlife and habitat resource management agencies and user groups like subsistence hunters in the villages in western Alaska along with recreational and sport users.

 And so the LCC is pretty new. About a year ago we had as part of our strategic planning process we had a science workshop here in Anchorage to identify sort of pressing science needs that are held in common across these management agencies and user groups with a focus on climate change impacts.

 The two biggest landscape-level process changes that came out as the greatest sources of uncertainty had to do with changes in coastal processes and changes in hydrological processes which both have links to NOAA and NWS.

 Out of that we decided that this year the LCC would take its vast $600,000 of DOI funding for projects and apply it as -- this is year 1 of a 2-year pilot program focusing on changes in coastal processes, specifically coastal storms and their impacts on biological resources more or less.

 Almost all of that money we had an RFP. We got a number of about 20 or 30 proposals. We funded 11 of them. Just to point out where we're putting our money because these end up being the greatest needs for our user groups we funded two ShoreZone proposals that we're leveraging with things that the Park Service and Fish and Wildlife funded and the Arctic LCC.

 We've put money into three different proposals that have to do with storm surge modeling that basically effectively want to do a lot more finer scale storm surge. You may or may not know that the Yukon-Kuskokwim delta is the world's most important breeding area for migratory waterfowl. This is a worldwide important resource. If you want to investigate historic impacts let alone begin to project climate change impacts on migratory waterfowl in that very low elevation gradient area then you need to be able to do storm surge on the spatial resolution of 10 and 20 meters which the Army Corps, the existing Army Corps work is way beyond that. And so we actually gave funding to a project that Robert Grumbine with NOAA is leading as a very small chunk to just try and push some of that work.

 From delving, beginning to understand storm surge modeling and stuff it's really driven home the complete -- the huge limitations on near-shore bathymetry data, tidal data, DEMs, coastline location maps, things like that in western Alaska. We have the technology to begin investigating how climate change projections will impact these important habitat areas in terms of inundation and salinization and deposition but we realize that the baseline data you need to drive those models and do those investigations doesn't currently exist.

 So I just wanted to take the minute to sort of let you know that this is important enough to us, all the work you guys do is important enough to us that we're taking what, you know, relative to what your budget is a very tiny amount and putting all of it into this for the next 2 years. So I appreciate your time and I will be here tomorrow for the breakout session so I'll give you more detail then. Thank you.

 (Applause.)

 CHAIR WELLSLAGER: Well, I guess we had a chain reaction. The ball's rolling right now, so Bob, would you like to address the committee as well?

 MR. PAWLOWSKI: Sure. Yes, thank you. For the record, I'm Captain Bob Pawlowski, NOAA retired. I'm talking on behalf of the University of Alaska as an adjunct professor.

 I'll give you a slightly different perspective on users because in -- with the original Hydrographic Services Improvement Act that was the navigation advisor up here. And John Rayfield was up talking with Bill Sherron, Don Young's chief of staff, who promptly said so what are you guys going to do to hire Alaskans? We're going to put money up here to address the survey backlog in Alaska. What are you going to do to hire Alaskans?

 John Oswald who has JOA Associates, Tom Newman with TerraSond, myself and Orson Smith at the university said we'd create a one-semester 400-level hydrographic surveying class. And in that semester we would fully introduce the students to enough information that they could go to work in the industry.

 It was taught every fall until 2 years ago and now it's every other year. This last class had 20 students in it. But we start off introducing to charts. Let me step back one.

 In 2005 we finally got a textbook, the IHO Manual on Hydrography. Prior to that the texts were totally inappropriate because GPS and multibeam were dominating everything and there was nothing out there other than on side-scan and on single-beam. It was in the Corps of Engineers Engineering Manuals and then we were able to bring in NOAA's specs and deliverables.

 So we put this curriculum together. In the process we would start off looking at what is the uses, what are the sources. The chart got -- chart one, all of the navigation stuff, teaching the fundamentals of working on a chart and planning.

 And then we would step into the whole process of acoustics in the ocean, the sonar equation and how the sonar equation works. What is the role of thermoclines, et cetera. And then step into tides and currents and establishing vertical datums, not just in the coastal zone but because this is co-joined with Corps of Engineers we have to deal with rivers, locks and how it goes up in the inlet. It's still hydrographic survey.

 So once we got them into understanding the datums then for datums they would often go over to John Oswald's shop and look at the tide gauges, look at the instruments, get the presentations over there.

 We would then go into single-beam, multibeam, side-scanned and LiDAR and run through all those with practical examples, et cetera, and assignments on total propagated error, on pulse repetition rates, et cetera, et cetera, et cetera. Enough to give them -- this is 400-level. Enough to give them the response to it.

 Mid-term they would have to take all their notes, all their information and fundamentally work through a dozen questions. And I guarantee, I don't know why it takes 3 hours but graduate and undergraduate students can use 3 hours to try to answer 12 questions. Be that as it may the second half of the curriculum, because we are looking at people going to work. We want them in these companies. Was to actually give them survey planning and survey practices standards, what goes on with all of your patch tests, what goes on in length of duration of establishing tidal datums, just run them through all the practical stuff so that by the time we got to the end of the class they would understand contracting language, what is Brooks Act and IDIQ.

 They would be able to look at what's the responsibility of meeting the standards. What are the statistics of errors that allow for a 95 percent confidence level in your data, all of these details. And they would also be introduced to a statement of work and a cost estimating sheet.

 And the final exam, because I want them to go to work and be successful, they were given 3 hours with a statement of work and the responsibility to say was it more effective to charter and outfit the boat, or was it more effective to use your own integrated launch. And in 3 hours it was give me a plan and give me a price. There is no right answer, it's only the answer that you can justify.

 But what we found was we can teach an entire semester introduction to hydro enough so they can go and work with -- they know what CARIS has brought in. Matt did a great job bringing the NOAA data sets in and showing all the access to all of this.

 We found that we can get in one semester a complete overview of hydrography, give them 500 megs of public information in the hydro manuals and the other things that are online, the NOAA tides documents, great complex documents, and send them on their way and the companies can grow them.

 And we've got company, we've got them in the university. We've got them at PND, the architect engineering firm. They're in John's shop, they're in Tom's shop. And they're also in other companies around the country. So thank you.

 CHAIR WELLSLAGER: Before you go that sounds like a very productive program. Not knowing the application process, but have any of the students gone on to apply for and possibly receive the ACSM inshore and offshore hydrographic certifications?

 MR. PAWLOWSKI: I don't know. I know that Nathan in John's shop went back to UNH. What? IHO. Yes. Okay. And I don't know how many -- I don't know if Andy did it out of Fugro and went on.

 I know that they're all introduced to the certification processes there. But we teach them a class. They've got to get the 5 years of field experience and happily we met the responsibility of hiring Alaskans. Other questions?

 CHAIR WELLSLAGER: Did you want to say something, John? Or Dr. Sullivan?

 MEMBER CAROTHERS: Jeff. Yes, Jeff Carothers. You said the program is not still running?

 MR. PAWLOWSKI: No, it is still running, it's just every other year. We also teach a coastal measurement and analysis class that fundamentally would be using the portal that Molly had and bringing all that up. Because I can walk into a classroom and I can say okay, turn on your computers, we're going to Adak. I'm going to need to see what technology you're going to give me for landing a fiberoptic cable based on the Unified Soil Classification System and hydro. Other questions?

 MR. DASLER: Jon Dasler. I'm glad you brought that up, Bob, because I think that's probably the only undergraduate program in the U.S. I mean, there's geomatics programs and most of them are graduate programs.

 MR. PAWLOWSKI: It's the only one-semester -- to my knowledge it's the only one-semester hydro class in the nation.

 MR. DASLER: But that brings up I guess in the 2010 HSRP document one of the recommendations is developing a lifetime career program that fosters the hydrographic profession and continues the NOAA tradition of national and international leadership in hydrography. And really trying to push that forward, how do we get kids excited about that and get people into the programs.

 I know recently at the Canadian Hydrographic Conference there was a huge discussion on the need for training. And so I guess I would just urge the HSRP to continue pushing for that and NOAA moving forward on that.

 There was a point I think when NOAA was talking about what they call NOAA certified. You know, it doesn't really necessarily need to go to that but I think there's a real need that a lot of hydrographers are getting a little more gray hair, or less hair I guess.

 CHAIR WELLSLAGER: Or both.

 MR. DASLER: For that effort. I think that's really important. I'm glad to see that program is moving forward.

 MR. PAWLOWSKI: During the 1998 hydro conference when Hydrographic Services Improvement Act was going we did an 8-hour short course specifically to give the industry the choice of did they want to buy into the technology and bring it into the company or did they want to look at contracting for it. We still do a 3- to 4-hour short course because surveying to maintain your land surveyor status you need -- and your engineering status you need continuing education units. And so we can do a 3- or 4-hour short course that just hits the highlights of what's in the manuals and what's the emerging technology. So we keep current on that. But it's a very important subject up here because we have so much to do and we want Alaskans to be doing it.

 CHAIR WELLSLAGER: Well, thank you very much. And I'm very happy to hear that.

 (Applause.)

 CHAIR WELLSLAGER: Bill, did you have a question that you wanted to address the committee with?

 MEMBER HANSON: Actually I've got a comment and a question. And the comment first thing is I mentioned this to Matt earlier.

 We talk a lot in these panel meetings about things that we need to do and there's a little bit of grousing, a little bit of complaining that goes with it and that's part of the program. But once in awhile we actually do something and do it well. And our last session in Norfolk you remember we had a gentleman from NOAA come and talk to us about LightSquared.

 Well, I think you guys, mostly you know that LightSquared declared bankruptcy last week. So congratulations to not only this panel but the rest of the industry that kind of got behind that and showed some strength in being able to defend what we do.

 It's one of those things that may never go away. Somebody else may take up the banner but we have to understand what it is we do and be able to explain to others what we do and do it well. So first off, congratulations to the group for that.

 Secondly, there was a House appropriations bill that had some language, committee language in it that called for NOAA -- or called for GAO to do a study on NOAA products, data collection products particularly. And we're wondering, first off I understand it's just in the House bill. I don't know if it's in the Senate, don't know if it'll eventually pass and be required, but can you give us any sense of the background on that and what -- who's pushing that? And maybe how NOAA would respond to GAO.

 DR. SULLIVAN: This is Kathy Sullivan. We actually are asking ourselves some of those same questions and working through our staff contacts to see, to find our more conclusively if we can what the back story is and whether there are particular motivations or just a broad sense of things.

 You know, as a general rule if GAO is being tasked the underlying surmise is that there's a view that there's redundancy and duplication that ought to be identified and removed. But whether that's, you know, broadly across the efficiency of the observing systems or it's particular in some domain is not yet clear from the intelligence that we've been able to gather.

 And if I could loop back to your LightSquared comment, I'll add my applause to the committee's efforts to make the voices of these industries heard. But the driver behind LightSquared is the competitive pressures on spectrum and in particular a variety of the space-based segments in and around L-band that are used for not only GPS but a number of NOAA applications.

 Those pressures are not going to go away. The desire for commercializing portions of those spectrum and deriving the revenues, both government revenues from the auctions and then commercial revenues from ongoing services are not likely to fade. They're likely to persist. So I think it's important to keep an eye on that space in the interests of this industry.

 And the other thing that the industry might well do, I think there probably is a point of validity in one of the arguments that LightSquared made about the way in which receivers to date largely have been built. It has really not been necessary to be as effective in the receiver designs or the general public common user receiver design as one can be at different price points. But that's the other side of the coin to look at is how our receiver technologies in the commercially available sets for both precise surveying purposes and general applications, how are they being built and can they be more resistant to bleedover from nearby frequency usage.

 CHAIR WELLSLAGER: Joyce?

 MEMBER MILLER: A related question from the document that was in our packages, the House -- is this the House mark? It specifically restores the navigation response teams in this document. We discussed this last, I believe in Norfolk. During that meeting the navigation response team after the hurricane there in Norfolk had significantly enhanced NOAA's image in there and there was a lot of praise for the navigation response team. And in the discussion of the panel we thought that was important.

 We had seen that it was not in the budget. Can anybody address what the status of that is, of the navigation response teams? Because if it's not in the budget I think it's something that the panel may possibly want to, you know, address.

 DR. SULLIVAN: So, the President's budget submittal for `13 did propose to terminate funding for the nav response teams in response to the set of pressures that we were under to get it to certain caps and other ground rules that came along with the budgeting process.

 The Senate mark did not reverse that proposal. The House mark does reverse it. I think this is the House mark, not the bill that was passed last week. The House did take their bill to the floor but have yet to get to conference. The Senate has yet to take their bill to the floor. So the status is we are in that stage of competing in varied proposals from the White House, from the Senate and the House, and not yet moved into a reconciliation phase. So limbo basically.

 MEMBER MILLER: But I mean what is NOAA's kind of position on it? Is NOAA pushing restoring the navigation response teams to the budget or not?

 DR. SULLIVAN: Well, we like all executive branch agencies once our discussions within the administration are complete and a budget goes forward are obliged to support and defend the President's budget.

 CHAIR WELLSLAGER: Okay, well, thank you very much and I appreciate your bringing that up, Bill.

 The next thing on our list of agendas is the discussion of stakeholder presentations. And I'm not really sure how to launch into this so if anybody wants to step up to the plate by all means feel free.

 We had two different groups, the regional needs for NOAA nav services that was this morning and then this afternoon more of a session for the geospatial tides, currents and hydrographic services.

 Going back and thinking about this, is there anything that stands out collectively within the panel that you think should be a recommendation to NOAA? And while you think about that Lawson had to leave so he could get ready for things tonight, but he gave me a letter and I'll read this to the panel because this is something that he strongly believes in.

 And it states, "I believe in our letter to the administration we have a comment regarding the Port of Anchorage to access navigation issues. I was not impressed with the responses regarding current depth and the need for improvement. I brought up the national security aspect for Anchorage. This issue is a high-profile one for economic security reasons. HSRP should highlight this critical need."

 I think I can understand a little bit of what he's talking about in the fact that there is shoaling and there is a concern for water underkeel as ships are coming into the harbor. But I also think that what we're looking at for nav services, especially hydrographic services, we're just -- the shipping industry is going to have to pay a little bit more attention to the tides.

 They still have water under the keel that they can use to navigate through the shoaling areas with. The window of opportunity might be a little bit less but at the same time I think the point was also noted and correct me if I'm wrong, but there was a -- the shoaling was actually receding somewhat along MacKenzie Point. So I think if some type of a study were done we might see that as with every other thing with Mother Nature there's ebb in the flow.

 And is this necessarily a matter of national security? I'm not sure but far be it from me to say yes or no of something like that. Does anybody have any opinions on that and could you at least clarify thing for me? Is there that study and was there some indication that the shoaling was receding?

 LT. FORNEY: Yes. So currently -- this is Matt Forney, by the way. Yes, currently there's actually two shoals that are in question. There's the Knik Arm Shoal which is where the navigable channel is and then also further down that range line there's the Point MacKenzie shoal. That shoal indeed is from I do believe it's last year's, or excuse me, 2010 data to 2011 it has receded. And there's going to start kicking off this year a 5-year planned study by the U.S. Army Corps of Engineers which by the way they have actually signed on and said that they will collect that data to a NOAA standard so that we can ingest it and put out a navigation product from that data. So yes that study is underway.

 And then the other area is and I do believe Steve did say this earlier this morning, is that there is a plan and actually I think he said it was out for proposal, a dredging plan for the Knik Arm Shoal.

 CHAIR WELLSLAGER: So I read this to you and I want you all to chew on this a little bit. This is one of 15 panel members and has a vested interest in what's being said here. And I don't know. I'm coming at it with mixed feelings myself.

 Beyond that it was interesting and at least in the last panel session I've had to deal with mapping issues myself and I've had to deal with geodetic control issues. And one thing that I think Mike and Aimee and Tom, I brought to their attentions was everyone pays an enhanced 911 tax on their cell bill, cellular service, and that money could be used to help fund possibly a tide gauge or the mapping initiative that Tom was working on, or Mike could use for emergency 911 practice in mapping or possibly monitoring the shoreline because of homeland security. And it has been successfully used in the states of North Carolina, Virginia and Indiana.

 Things like this need to be brought to their attention but I think things like this in work with recommendations that we might be able to make could open up avenues for them because with Aimee and the need for predicted tides, if she were able to use monies made available to her with something like this, the installation of an NWLON station or a tide gauge and use with expertise from local kids to help do other forms of innovative measurements perhaps. They could do some constructive things. So I think outreach plans might be beneficial.

 The money's there in some ways. I don't know how the services are collected or how the taxes are collected here but it's a pot of money that we have tried to use in South Carolina unsuccessfully because of legislation that was written, but have -- know of other states that have been able to do something like this. So I think that would be something that we could address possibly tomorrow in the breakout sessions as food for thought to see where things might go with that if they had the monies to work with.

 Other than that, Michele?

 MEMBER DIONNE: Well, the reserve system has been through working around the edges of developing what they call sentinel sites for patterns of inundation in the wetlands that they characterize most of the reserves. And they have fairly well developed education program. At the woman at Estuarine Reserves Division in Silver Spring might well be interested in talking to somebody from HSRP about that. Her name is Laurie McGilvray and she's, as far as I can tell, she's excellent. So she might be interested in developing a collaboration of some kind or at least discussing what one would look like.

 CHAIR WELLSLAGER: Okay. Larry, did you have something?

 MR. MAYER: Yes and I'm almost hesitant to bring this up. And I guess I speak as a taxpayer. You're talking about potential sources of revenue. I always look for ways to gain efficiency and try to be more efficient at what we do so we can get more done with less money.

 And I have to admit, I was very, very concerned at the, at least in my mind apparent redundancy between much of the Corps of Engineers effort and the NOAA -- and Coast Guard needs too. I'm not sure what this panel can do because I'm not sure it's a NOAA issue but there seemed very much to be an attitude of treating NOAA as a stakeholder.

 And that is so funny to me. Yes, NOAA is a stakeholder but they're also an Agency that's charged with collecting very much of the same data in the same places. And yet there wasn't that apparent recognition of that. That's very concerning. I think as taxpayers we should be always on the lookout for that kind of redundancy and trying to address that.

 CHAIR WELLSLAGER: So if I understand what you're saying correctly then, we have a mutual interest from various sources and we should all try to work together towards a common goal?

 MR. MAYER: Yes and I think there are great efficiencies to be gained in doing that. But I haven't seen -- let me just leave it at that.

 CHAIR WELLSLAGER: Okay. Okay, very good. Scott?

 VICE CHAIR PERKINS: On that note, Larry, there is a draft piece of legislation, "Map it Once, Use it Many" that was taken to the Hill for the 112th Congress. So maybe we should put that on the legislative affairs action list for this group.

 MR. MAYER: I know that legislation very well. Yes, that's exactly right.

 CHAIR WELLSLAGER: Okay Scott, thank you. Frank.

 MEMBER KUDRNA: I want to follow up on that and I have a specific recommended action. And when Steve Boardman discussed all the Corps projects for potential new harbors and expansion of existing ports and those type of things, and then talked about the lack of a link to NOAA charting that is going to be necessary as soon as every one of those things is finished, the question I had asked him was is there an opportunity instead of having a joint cooperative agreement to have a three-party cooperative agreement with NOAA and the Corps of Engineers and the local sponsors so there would be some resources so that when these new capital improvements took place the charting and mapping would be in place.

 And his comment during the open session was it was an intriguing concept. And I talked with him afterwards and he thought that could be very helpful. I said well, how do we do this and he suggested that there's a brand new Chief of Engineers in Washington just installed right now and it really is an appropriate time for a high-level NOAA discussion with the Corps of Engineers on how the charting and mapping portion of NOAA could be integrated into the Corps of Engineers project and cooperative agreement.

 And that could also provide some potential resources to supplement NOAA to do this. Because right now when they build these projects they're creating hazards out there because of the lack of adequate charting that's available for the approach to these new facilities. So I would make the recommendation or suggest that one of our recommendations be to encourage NOAA to have this high-level meeting with the new Chief of Engineers to discuss the possibility of begin entering into three-party cost-sharing agreements for future projects with the Corps of Engineers.

 CHAIR WELLSLAGER: Yes, Rich.

 MR. EDWING: So just following up on that. Following Hurricanes Katrina and Rita, and everybody remembers the failure of levies down there and there was lots of studies done as to why that occurred. One of the findings was because the Corps was not using proper datums for design.

 And there was a policy that came out, issued after that that said -- told districts thou shalt use NOAA tidal datums and NOAA geodetic datums for all of your coastal projects.

 And you heard Mr. Boardman's assistant, I don't recall her name. She said the CEPD project. Well, that's their project to try and get all of their coastal projects onto NOAA datums. It's not made a lot of progress since then and a lot of it's kind of funding and that's the way the Corps' funded by a project by project basis. So I think try not to encourage the --

 MEMBER KUDRNA: I understand. And I served on the peer review for all the standards for the Corps on Katrina's reconstruction. But I'm saying I think there's an opportunity with a new chief at a high level to have that discussion to try and integrate that process.

 And I don't mean just using NOAA data, I mean incorporating the updating of the appropriate NOAA charts into a project so that when there's a new major facility or construction there would be the appropriate charts available and it would be cost-sharing.

 MR. EDWING: And I agree but I'm just pointing out the policy is in place to kind of start.

 CHAIR WELLSLAGER: Right. Okay, Joyce, then David, then Gary.

 MEMBER MILLER: Yes and I think Evelyn had a comment too.

 What I wondered was this whole -- the Army Corps and so forth. And it's kind of a follow-up on what I brought up right before lunch. I mean, to redo most of these places that people are talking about including the Port of Anchorage you don't have to have a ship up here. All you need is a couple of launches or a contractor. I mean, it's just -- there, you know, Anchorage is a big project, there's no doubt about that.

 But I mean, and the other question I have in terms of Army Corps is don't they do post-dredge surveys and why isn't that getting on the charts? I mean, doesn't Army Corps do post-dredge surveys?

 CAPT. LOWELL: I do show my fingernails a lot during these meetings for many reasons. Number one, let me assure everybody that we do coordinate fairly closely with all the Coast Guard districts that we deal with, and we typically deal with 21 of the 40. There's quite a few Army Corps districts.

 We are challenged in several ways in doing that because of the way they're funded. I think there was some inference of -- by Mr. Boardman they get money for specific projects. This is just the way they run. Surveying is attached to it but maybe not directly funded.

 I've even heard stories of some districts saying we never survey outside of a channel because the money is meant to be spent in that channel. And in fact even if there's a spur off to the side of another associated channel that isn't attached to the funding mechanism they have that they don't even feel they have the authority to redirect survey assets. So, it's not really clear.

 Actually perhaps Mr. Miles could comment on some of these things coming from the Army Corps. By the way, everybody does recognize Mr. Miles is a past district commander for the Army Corps.

 But the key here is all of the data that's provided to NOAA from Army Corps we do process and process as quickly as we can and we get it out to the end users as fast as we can.

 I think there are a number of different flavors of the data, how we can get it out. Do you get out higher resolution point data or do we just do quarters as we were discussing in the past? But all of that is in place.

 We get condition surveys, we get -- we typically don't apply pre-dredge surveys because it's going to change, but we do apply post-dredge surveys pretty much post haste. So it's not like it's falling apart at this point, it's just 21 different moving parts that we have to deal with taking a very distributed work effort and trying to pull it into a national program of charting. So it's just challenging.

 CHAIR WELLSLAGER: Okay, Dave.

 MEMBER JAY: David Jay. I was going to follow up on what Joyce had said. It's been my impression watching Corps district operations over the years that, you know, as you just said, Captain Lowell, that the mandate for survey is interpreted very tightly. They've got the assets and a lot of times the operation doesn't look like it's very efficient or working very hard. And a lot more could be done if there was a mandate for them to do it and if what they're doing it is up to standards. And I'm not sure, you know, whether it always meets your standard is something I wouldn't be able to -- wouldn't know.

 CAPT. LOWELL: Just one more clarification is, and maybe this gets a little bit to what Larry was talking about, but the way we deal with Army Corps data is Army Corps is responsible for federally authorized channels. Typically they would dredge it, they would survey it and they would provide the information to us.

 We do not put our own standards onto that. We actually view the Army Corps as the owner of that channel and if they tell me it's 48 feet I put 48 feet on the chart. The only time we get a little hitch in our giddy-up there is if it comes in on different datum. Then we actually have to figure out what datum was it collected to. We have a charting standard which is mean lower level water. What is the relationship between those datums. And then we might actually make a correction if we can, especially of a broad area that get's a little more challenging. But they own the channel and we let them tell us what that depth is.

 CHAIR WELLSLAGER: Gary?

 MEMBER JEFFRESS: On this same subject about -- following up from what Frank said about agencies getting together and being more efficient. The same applies with coastal mapping and FEMA flood inundation mapping along the coast.

 I don't know if you noticed today or this afternoon. Michael O'Hare from Homeland Security had a slide up there when he talked about HAZUS software and also he had a line there that FEMA does their mapping to National Geodetic Survey vertical datum of 1929. Did you all notice that?

 In Texas, in Corpus Christi, Texas the 1929 mean sea level datum is now a foot and a half below mean sea level that it is now. It's like 2 feet in Galveston. So they're way behind the times when it comes to modern sea level and they're basing millions and millions of dollars' worth of flood insurance on these erroneous elevations. That also needs a higher level communication between NOAA and now Homeland Security which FEMA comes under.

 CHAIR WELLSLAGER: Steve, please. I agree with you.

 MR. MILES: Thank you. So Steve Miles. I did 27 years with the Army Corps. I finished up as the Portland District Engineer. And so what I would just add to is I wouldn't read too much into Steve Boardman's language of how he maybe addressed a sister federal agency. Because I would say where I left the Army Corps of Engineers NOAA is a great partner just like the Bureau of Reclamation. I put a lot of pride in being, you know, interagency, smart government like our President wants us to do. Let's work as hard as we can for our taxpayers given the rules that we operate.

 And so until you're in the Army Corps of Engineers to the panel member down here to the right is it's a project-funded organization. And it can be a great organization to hate but we're given authorization and appropriation. So we work within the federal channel and we survey that survey.

 Once we survey that area for dredge surveys which may not be good for navigating large vessels we'll share that information with anybody that would like to use it. And like what Captain Lowell said, a lot of times that's not great survey data to be navigating on but it is shared with as many agencies as we can.

 And so I'd just -- but unfortunately if the district engineer could have been here for the Alaska District, I know he's packing out this week with his family, you would have gotten a whole different perspective on how Colonel Koenig works with other agencies. And I think it would be great, I applaud the recommendation over here with General Bostick who just took over as our next Chief of Engineers for our nation is for NOAA to engage and talk about the Arctic with General Bostick. And say let's go up there and let's collaborate together. NOAA, have the Commandant of the Coast Guard. I think it would be a great, you know, tri-agency recommendation coming from the panel to get General Bostick, the Commandant of the Coast Guard and the Administrator for NOAA together and say let's craft a policy for how we can work together in the Arctic here in Alaska. Thank you.

 CHAIR WELLSLAGER: Evelyn, did you have something?

 MEMBER FIELDS: Yes. This is Evelyn Fields. I was just going to agree with what Frank said. If the Corps of Engineers at this point here in the Alaska area is looking at priorities for new areas, up and coming ports or whatever, it would seem to me that NOAA's priorities or should be involved in knowing what those priorities are so that if they start work you should know that so that your surveying priorities could integrate with whatever they come up with.

 And I'm not saying that you have to follow them, but it would seem to me that as soon as they come up with a laundry list or a priority list the next thing that's going to happen is somebody's going to say well, we need surveys in those areas. And it would seem that those two things should go together as opposed to each doing their own thing. And I think that's what Frank was -- I think that's what he was saying. Okay.

 CHAIR WELLSLAGER: Okay, just a second. Bill, did you have something you wanted to say?

 MEMBER HANSON: Yes, I just wanted to follow up with Joyce's question about the after-dredge surveys. And we do -- 75 percent of our work is for the Corps of Engineers and we work all over the country for them. And every project has an after-dredge survey. Sometimes they have both their contractor surveys and the government surveys for contractual purposes, but also for acceptance.

 A lot of those surveys are on the web for most of the districts. I can't find it here on Anchorage's but it's, other districts it pops up very quickly.

 The pilots. We've been talking about Portland which is one of the better districts in the country has an excellent relationship with their pilots. Most of the districts do. There are some that struggle a little bit but it's a very big country with a lot of needs and districts do things a little differently. But for the most part they do a really good job of providing that. So I think as Frank's alluded to, getting together with headquarters and talking about some bigger issues.

 I have talked to Corps headquarters, we talk to them frequently as well, and they think they have a very good relationship with NOAA. So we might want to explore that a little bit and define what that means. Because at the end of the day as users of the channels and uses of this data we just want the data. We don't care who it comes from we just want it out there. And if it's floating around in somebody's pocket or website let's get access to it.

 CHAIR WELLSLAGER: Frank.

 MEMBER KUDRNA: I would just add that the point I'm trying here is if an authorization takes place between the Corps and a local sponsor, and it has the narrow parameters of the navigable channel that's in the authorization and there isn't a discussion and a third-party presence of NOAA that has to deal with the approach channel that might be considerably larger and have hazards and very important elements in it, a major element is missing in that project. And the collective project could be much better, there would be an opportunity for some cost-sharing for mapping and charting by NOAA and be a participant.

 And the place for that -- the time for that to take place is before there's a project agreement with a very narrow scope. To have NOAA and the Corps of Engineers discuss how there might be three parties to achieving a successful project rather than two and NOAA fitting in on the back side.

 MEMBER JAY: I'll remember the microphone this time. In response to what Mr. Miles has said, you know, I understand the Corps has limitations, but on the other hand if you're in charge of maintaining a channel one of your major issues is where are you going to put the material which implies you should be learning from where you put it last time which means you need to be surveying outside the channel. Otherwise you have no idea where all the material goes.

 I mean, I think there is scope and I think there's also hope. What I'm hearing from my colleagues at the Corps is that they now have a directive from headquarters to think about things in much more holistic system-oriented ways rather than fragmented. The headquarters is trying to get them to stop thinking about I've got this project, it ends here, this is the next project downstream, it starts there and the two never speak to each other. So I think there is room for dialogue and progress in this area.

 CHAIR WELLSLAGER: Okay, good. Not to cut you off, Gary, but getting back to that -- did not FEMA, weren't they regulated to switch to NAVD88 instead of using `29?

 MEMBER JEFFRESS: FEMA, no. The Corps has, yes. The Corps is finally working up after Katrina that they need to adopt the National Spatial Reference System datums. But FEMA has not come to that realization yet.

 CHAIR WELLSLAGER: Jeff?

 MEMBER CAROTHERS: Yes, we just worked on a large flood plain mapping project mapping the San Joaquin Valley in California, Sacramento area and the Sacramento River. All of that and it was funded mostly by the state of California. However, all of the results were going to FEMA to draw the new flood maps. And they were very specific about 88 being used and even hired special people to come in and make sure that everybody used the same datum and it was all up to 88. So, different states I guess different things but I know in California it was very specific on that one project.

 CHAIR WELLSLAGER: Matt?

 LT. FORNEY: So Matt Forney, nav manager of Alaska. I think we can clear up -- hopefully, I don't want the panel to think that Army Corps of Engineers and NOAA only talk at this. We don't.

 There has been a survey request submitted to NOAA's Hydrographic Services Division within Office of Coast Survey. That survey request actually came from a joint effort between myself and Army Corps of Engineers.

 Cook Inlet is actually a re-survey area. It's generally surveyed right around every 4 or 5 years. We're right now on our fifth year. Next year will be six. It's not an emergency priority because by definition emergency priority states that no traffic can move through the area. And that's not the case here in Cook Inlet. There is traffic moving, there is commerce moving around.

 So it is -- I did assign it the highest priority I could which is the number one priority non-emergency. With that said we'll see what FY `13 brings for us. And you know, I'll be working very closely with the folks who do assign these surveys projects to push for that being a main priority for 2013.

 Also on that same scale with the cutting areas and the disposal of the dredge areas, those were actually one of the main areas that Army Corps of Engineers said hey, if you can get to it first can you go ahead and survey those areas. And it's been put into the survey requests.

 Also, I'll I guess change gears here and go to a datum type of discussion for the inundation because that's actually a question that has come up around here is that really the local datum is what is still used. If you go to most areas, and actually Mr. Hazelton over there along the wall might be able to provide a little bit more information about this. But really the local datum is what is still used, especially for inundation. Recently I do believe approximately 8 months ago they actually went and redid some of the FEMA maps in Homer and it caused quite an uproar because they actually tried to take it to NAVD88 and all of a sudden a lot of the local communities saw their insurance premiums shoot through the roof. And of course it caused a huge uproar. So they actually had to take it back to a local datum based on water levels. Which I guess leads me to say that we can't wait to have some GRAV-D new G08 brought to the area.

 CHAIR WELLSLAGER: Bob?

 MR. PAWLOWSKI: This time I'll put on my legislative staff hat. I worked in the Alaska State Senate. And I want to follow up on first off the importance of introducing the Kotzebue chart because we have been working with Corps of Engineers, the state, DOT and NOAA in a previous life trying to find ways to develop Kotzebue Sound. But without the survey to indicate loss of area there was no way to move any farther forward because we didn't know how long the causeways had to be. That was one of those classic situations where the survey had to -- there was a lot of dialogue in the process. 2008-2010 we've had more and more work on the Arctic ports, but the important one is and the state has mentioned that is three-part -- the federal. The state's put a million bucks into an Arctic port this last appropriation to continue to work with.

 We're looking at getting those site-specific surveys to come into places. The survey that was completed on the transect across Port Clarence to Teller made the Nome Port Clarence a complex that we could look at for charting. Now we can discuss are we putting $10 million into the causeway, $50 million into the causeway at Nome? Is Nome going to be -- these are all dialogues going on in the legislature.

 But the important one is wherever they need to come forward the Corps of Engineers is involved very much but they really need the fundamental survey and the tidal datum and the Corps of Engineers storm data all to be brought together so it can actually be proven along with the ice. But thank you.

 CHAIR WELLSLAGER: Interesting. What would be the possibilities of -- to build on some of the things Joyce had said, if the Corps of Engineers said I want to have a port here, infrastructure was in place and the facility looked like it was a go. And keeping in mind my knowledge of the Alaskan shoreline is poor at best what would be the possibilities of bringing up a navigation response team or possibly two teams to come in and do the survey since the cost factor to try to get a ship up here to do something like that and the time involved would be prohibitively expensive. And that's a question I guess that would come to either you or Dr. Sullivan. Could something like that actually happen?

 I mean, we're looking at another way of getting or possibly getting it out to a contractor.

 CAPT. LOWELL: I would say it's probably more likely that we would go the contract route in this area. I mean, we've had good success in this area. The NRTs are fully occupied down south at this point. Basically when something arises high enough on the priority list then we do our best to act on it based on our resources.

 CHAIR WELLSLAGER: Okay. Michele?

 MEMBER DIONNE: Is there any -- are there any examples of using drones to collect this kind of data? Coastal, you know.

 CHAIR WELLSLAGER: Drones to collect this kind of data?

 MEMBER DIONNE: Yes. Elevation data.

 VICE CHAIR PERKINS: Autonomous underwater vehicles are available in the contracting community right now. If the MOU is in place between NOAA and the Corps, and the Corps has a private sector already in place under contract it's simply a task order requesting a funding issue. Private sector could respond to this need to get this inlet out here surveyed in rapid fashion. The private sector capability is there in place. Contracting vehicles are there in place.

 MEMBER DIONNE: What about from above the surface?

 VICE CHAIR PERKINS: I would say the turbidity of the water out there would preclude the use of bathymetric LiDAR. Just that's an unprofessional observation. Yes, the Secchi depth looks to be very insufficient for airborne.

 CHAIR WELLSLAGER: Admiral Barbor, you wanted to say something?

 MEMBER BARBOR: I've been involved for the last 6 years in the next generation LiDAR. It looks like it's going to be a very good turbidity LiDAR. So, yes. We just flew validation flights in the Mississippi Sound which is about as turbid as you could get. And we're getting, you know, I think we were starting to see 5 meters, 6 meters with it which, you know, does a pretty interesting job.

 MR. MAYER: I was going to reiterate that. And one of our speakers today said that their real problem is less than 12 feet, zero to 12 feet. And when we're talking about that and with the new generation of LiDAR, I think there is potential there.

 MEMBER BARBOR: I'd like to -- yes, I was kind of waiting for the cooperative Army Corps-NOAA thing to die down and pick up one other thing. It really kind of stems from the chairman's comments.

 You know, I look at this job as two fundamental enablers. One is water levels, the other is positioning. And in both cases this seems to be an extremely poor area for. And what sort of innovative things -- you were tugging on the tide gauge sort of innovations and I think whatever we can come up with innovative ways of helping the establishment of additional CORS.

 Gary's got a good network, you're working a good network, Mississippi has a great network. A lot of that's earmarks which aren't going to happen now, but to that extent what sort of innovative ways can they find funding for establishment of the start of a coordinated CORS network. And I think along with a water level network that would go -- which ought to be, you know, the sentinel buoys or the sentinel stations are the ideal situation but obviously an expensive solution. In this I think we might need a less expensive solution.

 MEMBER MILLER: And something struck me when both Aimee spoke and I think Molly. Both of them said some phrase that we don't need it to be perfect, we just need data. And that sort of, you know, the GPS isn't the greatest, et cetera, but you know, that doesn't fit well with what you need to do nautical charting. You know, you need it to be as close to perfect as you can get it and yet isn't some data better that nothing. I mean, that's essentially the question they were asking. And so I just -- that had just struck me when two people said we just need data, we don't have to be perfect.

 MEMBER JAY: This thing always gets me. I'm looking at you, not at the microphone. David Jay. Along the lines of innovative things to do, the gentleman from the Alaska State ferry brings up the situation. The BC ferries, I think it's the one from Tsawwassen over to on the Victoria side on Vancouver Island that has been fitted out with an ADCP. These guys, you know, they cover large areas in Alaska where there are no current data and it's not -- the main effort is in processing the data. I mean, it's not -- it's a pretty simple thing getting that Doppler profiler in there. Once it's in there it really is not an effort for the crew at all and that would be a way for them to get quite a bit of current data which they certainly lack.

 CHAIR WELLSLAGER: Yes, sir.

 MR. CUSICK: Joel Cusick, National Park Service. I'm a GIS specialist.

 Keep doing what you're doing. NOAA and NGS are the pins in our maps and the GIS professional community understands scale and we understand a 60,000 scale chart is going to meet the needs and we'll wait. Just pick up the rate a little faster and to leverage it is lean on us feds.

 Fish and Wildlife, Park Service, we're in some really remote spots but we've got a cabin you might not know about. You might not like it but we'll put you in an aircraft and you'll land on a beach like this, but we'll get you there and we're OAS-certified. That helps. And all our skippers have at least got a six-pack, okay? But we can save you money on the logistical side big-time. So liaisons like Matt Forney and Kris Holderied. We were almost pulled off a tidal gauge station on the west side of Cook Inlet. The only one that we would have had in the Park Service shoreline. We almost got there and we were coordinating it but it just takes talking to us. We've got some very willing people out there and just keep us informed.

 CHAIR WELLSLAGER: Don't sit down. So what happened? Why didn't you get it?

 MR. CUSICK: It was the Tide & Current group that's coming up here. I think -- are they here now?

 MR. EDWING: We were looking at modifying the project that was being done with the Alaska Energy Authority which was to put out a bunch of tidal current meters and create a model to assess the energy budget in the area. And there was a recommendation that came up maybe to do a current meter or two less and pull it into this tide gauge. When we looked at the benefit to the model and the project that we were involved in, the benefit wasn't there to the AEA in that project. So you know, we couldn't justify using the partner funds to also help out the Park Service in this case.

 We looked for the collaborative opportunity there but when we looked at the numbers it didn't really -- we couldn't justify, you know, the benefit to the project. DR. SULLIVAN: Was that because the geography -- this is Kathy Sullivan -- the geography or the ADCP or the tide gauge would have been helpful didn't fit within the --

 MR. EDWING: We had some historic data that really could be used to, you know, help improve the model. Putting a tide gauge in wasn't going to buy us enough improvement to the model to justify the cost.

 CAPT. LOWELL: I don't know if I'm applying the wrong logic here, but if we were to think about the IOCM concept of simply understanding what the differential is could that be applicable to that? Obviously the cost associated with a new tide gauge to the single project you were working with was not cost-effective but perhaps if other users weighed in on other requirements could be met based on that.

 Is there a coordinated way to do that or do we corporately simply look at things project by project and you know, if we were to look wider to apply IOCM to tides how would we do that?

 MR. EDWING: Well, I know on a national level we are engaged with the Park Service. Anywhere now where we're going to be doing a project we inform the Park Service ahead of time to give enough lead time to both sides to be able to make it -- in fact, we did this in North Carolina where we were doing a VDatum project and we adjusted the locations of some of the VDatum gauges to also meet the Park Service needs for -- I'm not sure what they were using it for.

 But you know I think in this case there wasn't quite enough time. We just kind of came up -- it was kind of a last-minute thing. And putting a tide gauge in in the west side of Cook Inlet is no trivial matter. And again, this wasn't our funds that were being expended, it was also partner funds. And when we looked at those partner funds were to do the energy budget we couldn't, you know, putting the tide gauge wasn't going to make a big difference to that project.

 MR. MAYER: The National Academy study, National Needs of Coastal and Ocean Mapping that led to the IOCM legislation had another recommendation in it that I don't think made it to the legislation. And that was for a national registry, a registry of surveys that are going to be done that are funded but also a database of desired survey areas. And I think it didn't make it into the legislation because it's hard to formulate how you actually legislate that.

 But it seems to me that this is something that can address all these different issues. If you can look ahead a year or two or three years, you know, we really want to survey here. And the other agencies say well, gee, the Corps is surveying over there, we have some needs over here. And that's what sets up the mechanism for doing this leveraging, for what we call the incremental surveys. We pay 10 percent more to collect the appropriate tide data on a Fisheries survey and we have a Hydrographic survey.

 And so I don't know if this maybe is a group that can try to push back for that concept of a registry.

 MEMBER JAY: The state of Alaska has a reduced but still substantial revenue stream from gas and oil revenues and they distribute money to the taxpayer each year I guess. So, maybe they could, if they saw a benefit to their citizens of supplying the state with tide gauges maybe they could be persuaded to buy the equipment and pay the maintenance. It's not a -- it's a substantial but it's not an enormous cost.

 MR. EDWING: Rich Edwing. So there's lots of different ways to partner and we're, you know, I guess we've got all sorts of different partnerships out there where sometimes people buy the equipment and we provide expertise and do, you know, do data-processing.

 The work we've done with TCOON and Gary's group is kind of one end of the spectrum where there's 26 tide gauges operating in Texas using the same technology we use and they process the data and compute tidal data using the same methodologies we do. And they're really interchangeable with us, you know.

 To the other end of the spectrum where there's somebody who just needs one tide gauge in in an area and doesn't have any expertise. And at that point it comes down to really resources. But there's -- we're pretty flexible in the ways we can work with people.

 CHAIR WELLSLAGER: Joyce.

 MEMBER MILLER: One thing that would have helped me understand better what was happening was if we had had maybe just a 10-minute presentation from the three of you about what projects are active in Alaska right now. Because when you get all these stakeholders saying we need this, we need this, we need this and if the panel doesn't know what's actually happening, what's active, you know, what surveys are planned, what you're doing with National Park Service or something we're kind of -- so what is NOAA doing I guess would be my question.

 So, just maybe for future meetings just a brief summary of what the current NOAA projects, current and planned NOAA projects are. It's just a suggestion for better understanding of the panel.

 CHAIR WELLSLAGER: Juliana.

 MS. BLACKWELL: In many of the past meetings we had provided updates and appreciate that with the new members certainly at this meeting and the past few meetings those would be extremely helpful.

 We felt like we were in a -- I'm not quite sure when all the feedback came, but we were in a pattern of sort of doing these updates and maybe they weren't really the most efficient use of time. But certainly we'll take that as a note for the next meeting to make sure that we do highlight those things early on in the meeting so that you do get that update and sense of what's happening with the four offices that are involved in, you know, the navigation services. So you get an initial perspective.

 MEMBER MILLER: Well, specifically when you're in a region something very focused and targeted about what's happening in this region, not sort of what's happening in a global sense I guess would be what I would be looking for.

 DR. SULLIVAN: Joyce, this is Kathy Sullivan. Would that be most useful to you as a pre-read to paint a background picture before you arrive in the region, or is it something -- and maybe have a small unit of time in the opening session if there are particular questions about what you read rather than using agenda time to work through a presentation?

 MEMBER MILLER: Possibly, but I think it might be useful to the stakeholders who were here as well to get some idea of the scope.

 For instance, when we met in Honolulu I had an expectation that I'd hear what was happening in the Pacific region, you know, partly as a panel member but partly as a stakeholder. And you know, and I can understand that a long presentation, yes. We got a couple in the previous meetings. But just, yes, something pre -- and maybe a handout for the stakeholders and then a brief, you know, 10-15 minute session just to discuss it.

 DR. SULLIVAN: Okay.

 CHAIR WELLSLAGER: Deborah.

 MEMBER DEMPSEY: Just to comment. And I appreciate that, Joyce. As a brand new member I just got the sense today that -- and yesterday that Alaska is doing their own thing, you know, and that's not the case. So it would be most helpful. And it was, Juliana, for you to update us on some of that. So thank you.

 CHAIR WELLSLAGER: Okay. Interesting discussion. Tomorrow we have the breakout panel sessions and there was a spreadsheet that was sent out by Kathy for all of us to sign up and decide which of the four we wanted to participate in. And I'll make an assumption that everybody did that, but that's an assumption. You know what that means. So please make sure that you are going to participate on one of those and is the sign-up sheet in the back. So if you haven't done that yet please sign up on the sheet so we have an idea of who all is going to participate in this.

 One other thought that I had. Has everybody filled out and signed your blue folders and gotten them back to Kathy? If you haven't, that needs to be done as well.

 The other thing is I need -- we need a head count of who's going to Lawson's House tonight because -- no, no, it's going to be driving. We need to know just how many vehicles we're going to need to have. So if you're going to -- how do you want to do this?

 MS. WATSON: Excuse me, can I -- before we jump to that?

 CHAIR WELLSLAGER: Please.

 MS. WATSON: Just going back for the stakeholder breakouts tomorrow, some logistics. After we come in here at 8:30 in the morning we're going to hear -- is it Christian? I'm sorry, what is her -- Michele. Michele is going to do a demo tomorrow morning.

 CHAIR WELLSLAGER: Right.

 MS. WATSON: Okay. And the Alaska Baseline Stakeholder will be meeting here in the Aleutian Room. The Arctic Emerging Priorities will be in the Cook Inlet Room. And the Alaska Geospatial will be in the Prince William Room. And the Tides & Currents will be in the Lupine Room.

 And they're going to have -- it's on the first level. As you go down, you go back down this way and they'll have on the header boards for those rooms. Okay?

 And Lawson wanted us to get to his home by 6:30 so we should be leaving by 6 o'clock.

 CHAIR WELLSLAGER: Okay. So could we please have a show of hands of those on the panel that are planning to go?

 MS. WATSON: So there's about 22 of us. Okay. I have a van that carries six people. Aimee has -- she can take seven. And Matt?

 LT. FORNEY: I have two vehicles. I'm going to take my vehicle and hopefully we can ask --

 MS. WATSON: So I would recommend we all meet in the lobby at 6 o'clock like we did for the site visit. We'll divide up into the vehicles.

 CHAIR WELLSLAGER: Okay.

 MS. WATSON: Okay?

 CHAIR WELLSLAGER: We can do that.

 MS. WATSON: Thank you.

 MEMBER DIONNE: What time does he want us there?

 MS. WATSON: Six o'clock.

 CHAIR WELLSLAGER: Six o'clock.

 MS. WATSON: And I have driving directions.

 CHAIR WELLSLAGER: Okay. So the last little bit of work we have left is we had a public comment period. Some people spoke. Is there anyone else that would like to address the panel for public comment? Once, twice. I'll say that's a negative. No.

 That being said, unless there's any other thing -- yes, Frank.

 MEMBER KUDRNA: I have a request for the FACA from the Science Advisory Board. And the Administrator has asked the Science Advisory Board to have a working committee to deal with the subject of the research enterprise of NOAA.

 And there's a working committee. I happen to sit on that working committee. That's why I got the charge to carry it to you. And that committee has been asked to approach all the other FACAs requesting no more than two pages' comments and input concerning their views on the subject of research. And a short questionnaire with I think four or five questions has gone to Captain Lowell and Kathy.

 So they're on a fairly short timetable and I would ask that maybe for tomorrow morning we could have a copy of that distributed to the panel. And whatever your preference, Mr. Chairman, whether we maybe have a little discussion somewhere in tomorrow or have a subcommittee respond to that. I think that would be appreciated.

 CHAIR WELLSLAGER: Okay. That will be done. Yes, thank you.

 MEMBER KUDRNA: And I might add, there's two direct references to that in the appropriations budget, one in the House report and one in the Senate report. And the Science Advisory Board is asked to brief the Congress on this within 30 days of completion of the report by the House. And there's also specific direction by the Senate. So it's an important issue.

 CHAIR WELLSLAGER: So you need the reply yesterday.

 MEMBER KUDRNA: Well, no. They're going to meet in another month so getting replies from all the FACA committees is important.

 CHAIR WELLSLAGER: Yes, that will be an item of business then on Thursday. Very good. Anything else?

 DR. SULLIVAN: Mr. Chairman?

 CHAIR WELLSLAGER: Yes.

 DR. SULLIVAN: I've also been asked by the Administrator to shepherd innovation efforts within NOAA. Government agencies are not notoriously good at innovation, but you've seen good evidence I think in a number of the people who have spoken here today out in the field, 1 over R-squared, far away from headquarters. You know, lots of good things do get done just because lots of smart people do find ways to get good things done.

 So I've had that percolating in the back of my mind through our discussions yesterday and today. And I would like to float a very broad thought to this group. And I would be interested in your comments back and whether it enters any of your own thinking or recommendations or not.

 Joyce, I'm really starting from one of the places that you came from. We heard from a number of folks, we heard from everybody how data-sparse the region is.

 We heard implicitly from a number of folks and explicitly from others in so many cases some data is better than the no data that I have. Not always, don't need the rotten eggs, but in a lot of cases it is. And a number of us had a big discussion last night over dinner about crowdsourcing. It's also come up in the session discussions here.

 And I keep wondering whether there's a more profound way that we should be thinking about the kinds of opportunities that Alaska offers, not just the challenges. It's a big state, data-sparse, long list of things to get done in tight budget times. That's the challenge list.

 What's the opportunity list? Should we be finding some way together to be turning the telescope around and thinking of the state in collaboration with state partners of course, as a very unique and important test bed or innovation sandbox almost where we could make some progress by finding out what it means to adopt pragmatic evolutionary standards, and move in a progressive fashion towards the preferred and optimum standard.

 What is crowdsourcing actually and how might it work? Challenges to be sure, but there's a big opportunity space here as well.

 Talent development. We've got a one-semester course. We have a talent development model that centers on the NOAA White Ships hydrographically and survey launches, professional science masters, short courses. What can this place teach us about more innovative ways to develop the kind of talent that we need which may go a different pathway or even to a different endpoint than we have traditionally thought of?

 And finally, in a really wild metaphorical leap, you know, back in the sixties and seventies a lot of us were watching the development of communications across the continent of Africa evolving in concert with the evolving space age and telesat communication age.

 Africa never pulled copper fiber to establish continent-wide comms. They skipped over that step. They didn't follow the path that we followed in the continental United States. They just did a leapfrog to an entirely different technology basis for establishing that communication.

 And I keep thinking of that as a metaphorical analogy to the scale of opportunity and challenge in Alaska. So it's just been too persistent a thought all day long. I wanted to offer that to the panel for thoughtful consideration. Maybe there's a pony in that stall.

 MEMBER DIONNE: So can we pursue that tomorrow?

 DR. SULLIVAN: You may do that whenever you wish starting from not at all to anytime you desire, madam.

 (Laughter.)

 MEMBER DIONNE: Thank you. I was going to make one comment about the survey that was just mentioned and was -- I received it somehow.

 And one of the first things you do is a pulldown list of what part of NOAA you work for or do science within. NOS isn't on the list at this point, so. I mentioned that I work for the Reserves but internally NOAA doesn't really necessarily know that we exist. So, anyway.

 DR. SULLIVAN: We'll be sure the Deputy Administrator -- Assistant Administrator knows that.

 (Laughter.)

 CHAIR WELLSLAGER: David?

 MEMBER JAY: Innovation is funny. You know where crowdsourcing started in the tides world? The very first tide surveys in the world by Britain in the eighteen thirties came from a scientist, William Whewell, writing to all the missionary societies, you know, everybody he could think of in the far-flung British Empire with instructions about collecting -- how to collect tide data. That's how the first global tide surveys were done.

 CHAIR WELLSLAGER: Anything else? I think we're supposed to meet in the lobby what time? Six a.m.? Eighteen hundred hours. MS. WATSON: I'm back on east coast time.

 CHAIR WELLSLAGER: Meeting adjourned.

 (Whereupon, the above-entitled matter went off the record at 4:56 p.m.)