[The public meeting reconvened at 1:03 p.m., September 23, 2009.]

MR. WELCH: Welcome back to the afternoon session of the Hydrographic Services Review Panel. We're at the part of our program where we will hear remarks by various users of NOAA hydrographic services and products. We are delighted to have a number of what we call regional stakeholders. Thank you for agreeing to be part of this. I think you will find what we have found as panel members that the stakeholder presentations have really been informative to us because we get a better sense as to where the services are fulfilling needs or where there might be some needs that need some additional attention. So we will go ahead and start. I think we have as much as 20 minutes per speaker, if you need that. So don't feel compelled to finish up faster than you intended. What we'll do is we'll go ahead and I'll just have each panelist come up and I'll introduce you in the order in which you are listed here.

First, we have Mr. Richard Morey from the Minnesota Department of Transportation. Welcome, Rick, and thank you. The floor is yours.

MR. MOREY: Thank you. As was said, my name is Rick Morey. Obviously I'm in government, because I believe my title is, Assistant Directory, Surveying and Mapping Section, Office of Land Management, Minnesota Department of Transportation. So it's obviously government.

I'm here today to talk a little bit about from MNDOT's perspective, our use of NOAA products, services and some partnerships. While it won't be quite as focused on what this morning was talking

about, you will see as I talk that there is some tie into at least two of your five major emphasis areas that you had in your report. I want to talk first off about our use of National Weather Service products, and then I'll be talking about the National Geodetic Survey products we use focusing on the CORS and the height modernization GEOID model improvement effort. That's where I think you'll see the tie in that I mentioned. [Next slide.]

First off, the National Weather Service. At MNDOT we make use of the National Weather Service's services to help us predict floods and storms to help as figure out whether or not we need to close roads for the traveling public safety, whether we need to close roads for the safety of our own crews. Whether it's advisable to send a crew out at this time or hold off. Also, on what would be the left-hand side of the screen there is a print of what we call our "511 road information page." The portion down below the picture is a list of different locations throughout the state with a hotlink to "what is the weather conditions" in each of those locations. So, again, we're linking to the National Weather Service's weather information to provide information to our traveling public in that respect. [Next slide.]

As I said, we also use this in the wintertime which seems to be most of the time in this part of the country. We make use of the National Weather Service's storm predictions for scheduling our snow and ice efforts, our plowing crews. Outside the metro area, we use that to determine when should we actually start sending those

crews out so that they can actually be effective rather than just getting caught in the storm. Within the metropolitan area we tend to operate for major snow storms what we call a "split shift." That is, we try to maintain 24-hour plowing operations and we use the storm forecast to determine when should we go to that split shift; when should we have those shifts start in order to minimize the amount of time we have people sitting around twiddling their thumbs, waiting for the snow to hit, and also to minimize the amount of overtime that has to be paid. Again, we use these services and this information to help us be more efficient and more cost effective in what we do.

Also, the National Weather Service in conjunction with the Minnesota Department of Public Safety conducts an annual winter hazardous awareness training to provide training to our crews out there on what kind of hazards to be aware of in the wintertime, so, again promoting their safety. Another aspect that promotes employee safety for us is the sky warn training. While our people don't necessarily provide feedback on that, the training does give them the information and skills they need to recognize when hazardous weather is developing so they can make a determination of whether or not it is safe to stay in the field.

So, like I say, from the National Weather Service perspective we use it for scheduling purposes to save us money, we use it for training and road closure purposes for both the public's safety and the safety of our employees. [Next slide.]

Also, as I said, my initial slide was product services and

partnerships. One of the things we have going with the National Weather Service is they are actually pulling data from our CORS stations. I'll have a little bit more on our CORS stations later, but we have a number of stations throughout the state that are constantly operating and receiving data and the National Weather Service is pulling information from those to help in their atmospheric modeling to use for their storm prediction. So it is a two-way partnership that we have. [Next slide.]

The area that I deal with on a more regular basis, National Geodetic Survey CORS system. I'd just like to say that a year ago about this time -- actually, almost a year to the day -- I was down in Savannah, Georgia, talking about civil GPS. At that time I pointed out that there were six NGS CORS stations operating in the State of Minnesota. Today there are 31 NGS CORS stations operating in the State of Minnesota. A very significant improvement and one we're very happy to see.

That is happening in large part because those additional CORS stations are stations from our state CORS network that are being incorporated in and we'd like to see that. In fact, we have about a hundred more that we've submitted for incorporation. Now I don't realistically expect that everyone of them will be, but as many of them as we can get in there we'd like to. One of the things you'll notice about the map over there is, if you look at it, the northwestern part of Minnesota is sort of sparse as far as CORS stationing goes. I'm going to bring that item up again a little later

on. So I just want to point it out now that we have fairly good coverage through most of the state, but northwest is kind of a little shy. [Next slide.]

As far as the users in the use of the NGS CORS, state government uses it, local government uses it, the private surveying community uses it. A big use the private surveying community puts to use for this is the CORS and the OPUS to get information on stations they're trying to establish. A big use we have for the CORS is it serves as the backbone for our state CORS system. The NGS CORS is what we base it on and what we use to adjust it. That's another reason why I'm eager to give as many of our state CORS stations into the NGS system as possible because that means every time there's a new adjustment comes out, you guys will take care of that for us and that saves me staff time and money. I'll be mercenary -- I'll be honest about it, I'm mercenary enough. [Next slide.]

As I said, we have a state system. Right now the state system has 116 stations either up or on the verge of being up and running. By the time we're done, we anticipate 123 stations. Our system is running 24/7. We provide both the capability of post processing, like the CORS system. We also provide the capability of a real-time, RTK, operation. We provide it free and it provides survey grade accuracy. [Next slide.]

We have been tracking how the users have grown on this and especially over the last few years it seems like we're seeing a virtual doubling every year in the number of users. I'm not sure how

well that green line stands out. Can you all see where the green line is, the one that is really shooting up the side there? That represents private users. So we're really seeing basically an exponential growth in the use of this system is in the private sector. I'll touch upon that a little bit more in a minute. [Next slide.]

Some of the uses this thing is being put to. It's being used in the construction industry. We're using it to guide our snowplows when they are out there in the whiteout conditions and can't see. They have heads up displays in the snowplows. They tie into the CORS and use that to guide their snowplow. The University of Minnesota has what they call a "smart bus." Basically, a bus being guided by tie into the VRS network. And they have just joined us in partnership where they set up six stations into our network, and they're going to be running this bus along the shoulders of 35 W, if any of you are familiar with that in the metropolitan area. So they are going to be running this 8-foot bus down a 10-foot-wide shoulder using the system to navigate it. [Next slide.]

We also use it for surveying, obviously the surveyors use it and then precision agriculture. When I said before about the phenomenal growth in private sector use, precision agriculture is where we're really seeing the jump in this. Precision agriculture, one of the things that's doing is providing a lot more efficient use of their resources and fertilizer and that which is helping minimize runoff into the waters and contamination.

In 2006 Ziegler Corporation did a study of VRS and CORS use

and on their conservative side of their estimate figured that this was saving the people of Minnesota $370 million a year between efficiency, fuel savings, environmental damage that isn't being done, they estimated about $370 million a year in savings. Again, this is all based off what we're -- we're operating this. Our basis for this is the NGS CORS. [Next slide.]

Again, I said before the northwest part of Minnesota there's not much in the way of an NGS CORS presence up there. You'll notice we have a fairly good presence up in the northwest part of Minnesota. On the other hand, we're kind of empty still over on northeastern part of Minnesota, but it is my understanding that the NGS station a Grand Marais is being looked at needing to be refurbished.

I'd just like to say, if you're interested, we're more than interested in entering into a partnership where we're willing to share some of the cost and equipment if you can meet some criteria, so that we can incorporate the Grand Marais station into our real-time network. That would help us cover the hole we have. Of course, if we are successful in getting you to adopt the bulk of our CORS stations into your CORS network, that would provide the coverage in northwestern Minnesota that currently is not there through the NGS network. So I see several opportunities in this area for partnership and a cost savings on both ends. [Next slide.]

Just talked about height modernization and the GEOID model improvement. The map there -- the green dots probably don't stand out

too well, but there's a bunch of little green dots which represent where what, mathematically should be corresponds pretty well with what we get from field results. The red and blue dots are where we have some variance. While we've got a lot better model now than we had before, as the blue and red dots show there's still room for improvement. It's kind of interesting that the blue and red, those are the two extremes of plus and minus between the difference between field and mathematical for elevation. And it is interesting that the blue and red are kind of sitting side-by-side. So it's not like one part of the state seems low and one part seems high. There are still some issues with the model that need to be addressed. So that is one of the things we're really looking forward to is when the new GEOID model comes out hoping that will address some of these issues. [Next slide.]

What this gives us, tighter control -- tighter control, of course, greater accuracy, more consistency when we move from one project to another. It also allows us greater flexibility. We can react sooner to a new project cropping up in an area where we previously didn't really have a lot of control established. This in turn all equates back to cost savings for us in our operation. Not just us but, but for the private surveying community as well. [Next slide.]

Again, what are the impacts of height modification? Well the GIS community is using it. It has an impact on their work. It has an impact on the construction side of the house, especially as we

try to get tighter control on the vertical element to be able to use it for machine control and machine grading. It comes in to use on the hydrocologic surveys and it comes into use in mapping DEMS and those sorts of things. So those are all impacted by the GEOID model improvement and the height modernization effort. [Next slide.]

Again, partnering. As this map shows as far as the height modernization effort goes, you'll notice that big blue area in the north central part of the country and with the exception of an $80,000 grant we received last year from NGS, we have done that all on our own using our own money. I say that because what I want to stress here is when I'm talking partnering, I'm not looking for a handout. I'm looking for a helping hand and I'm extending one as well. What I really need to be successful is I need to have a good partner. For a good partner what I need from the national level is I need guidance. You need to tell me what you want and how you want it. Then I need to have commitment that when I provide something, it's going to be used.

I've been in my current position for 7 years. Twice in these 7 years I've been on the verge of buying a gravity meter because I was told that the national effort was going to be working on improving the gravity model and if we could provide gravity information, that would be great. Both times I cancelled purchasing that gravity meter because nobody could tell me what they actually wanted out of it, nor could they give me any kind of a commitment about what they we're going to do with the information if I gave it to them. [Next slide.]

The last thing, and it kind of flows from that, is results. I need to have results that I can bring back to the people that control my money that I can show them, here's what we're getting out of this effort. All I want to say is if I have good guidance, if I have a strong commitment that we're going to get results, and I have results that mean something, I can get the funding to hold up our end of the operation. So, again, what I am looking for is a helping hand and a partner, I'm not looking for a handout.

With that I would just like to thank you for the opportunity to get on the soapbox for a moment, but also I'd like to thank you for what you have done with and for us up to this point, as well as thank you for those things that I am confident that you are going to do with and for us as we move forward. Thank you.

MR. WELCH: Thank you, Rick, for an excellent presentation.

We'll go ahead and hear from our other two panelists, and then we'll have various back and forth with the panel members. Now we are going to move out of Minnesota and move across the border to Wisconsin and Mr. Morris Luke from the Wisconsin Department of Transportation. The floor is yours.

MR. LUKE: Good afternoon. I don't have a presentation. I'm just going to speak on NOAA's goods and services. Again, my name is Morris Luke. I'm actually a traffic engineer with the Wisconsin Department of Transportation out of Superior. I've got an extensive background in GPS surveying, research, and that's taken me kind of full circle now to where my position is today.

Some of the NOAA services that the Wisconsin DOT uses is the NOAA -- the same thing as MNDOT. National Weather Service, the NGS CORS stations, height modernization program.

What I'll talk about first is the National Weather Service. I'm also a Regional Incident Management Coordinator for our region office. You might ask what does that entail. We respond to incidents. There's a certain staff member through our operations department who is on call every week through the year, 24/7. Our state traffic operations center also has 24/7 coverage. They receive National Weather Service alerts, whether it's blizzard, flood warning, tornado warnings, they'll pass it on to the respective regions.

Say we've got a blizzard warning coming to Superior -- anywhere from Superior all the way down to Eau Claire we'll get that warning. We'll then take a look at the warning and look at radar. We'll have to get our certain counties on call and ready. Unlike MNDOT, Wisconsin has the counties clear their roads for them. So it is a little bit more entailed trying to get everybody on board and scheduled. So the person who is on call for that week would call the county and say okay -- and, you know, the counties do get the weather alerts also. So, you know, they don't want to have all their staff on standby paying out, so that's why we need good, accurate data from the National Weather Service. So in turn we're not spending a lot of extra taxpayers' dollars for having people on call and on standby.

Other things we do is, you know, when we do get alerts and if it does look bad, we try to get certain things deployed out on the

road to assist the traveling public. So, yes, there is a partnership between NOAA and the DOT's with the National Weather Service to get good, accurate weather forecasting and the data that comes across.

On the height modernization program -- to jump ahead now, the northern half of Wisconsin is just starting to, you know, get densified. It's been awhile since -- the southern half is fine and dandy, but we always joke at the DOT, everything north of Highway 29 they forget about. It's not part of Madison or not part of Milwaukee. So for the surveying community, for, let's say I'll go outside the DOT and say the DNR, the U.S. Coast Guard -- or not the Coast Guard, the Army Corps of Engineers for datum to get good, accurate height data we need good model up in the northern areas, especially for wetland surveying, flood predictions.

Say the DNR is using one height, or datum, Army Corps of Engineers is using another datum. These datums don't match what the the U.S. Coast Guard is saying whatever. Maybe the DNR is saying, no, that's not a wetland or vice versa. Even for flood predictions, you know, it's very important to have good, accurate datums, you know. Our bridge engineers are using them. They're using them for the flood. Okay, what crest are we going to be worrying about before it hits our bridge? So there's the partnership there.

I'll echo a lot what Rick said, you know, between the two DOT's there's a lot of the services that we use and very much can partnership with NOAA. Rick touched upon the gravity model. The gravity model up in northern Wisconsin. I don't know if anybody's --

how in depth people have studied it and how it is going to affect some of the height mods. But it's important to keep on -- keep on doing that, keep on studying it, and get the data out there for the general public. Thank you.

MR. WELCH: Thank you. We'll come back to you in questions and answers.

Our third panelist is Mr. Scudder Mackey with Habitat Solutions NA. Scudder, please go ahead.

MR. MACKEY: If you don't mind, I'm going to stand up and wiggle around a little bit when I talk. My name's Scudder Mackey. I'm actually an independent environmental consultant. I'm based out of the Chicago area. I do a lot of work with state and federal agencies in the United States and also with Environment Canada and the Ministry of National Resources, primarily focused on environmental issues in the Great Lakes. I also have some marine experience, but since my home is in Chicago now, and I used to work for the Ohio Department of Natural Resources, I'm pretty much a freshwater guy. [Next slide.]

What I'd like to do is just give you an idea of the types of things that I do, but also that some of the people that I work with do and that will give you a feel for how we might be able to use some of the NOAA products. I will also be giving some examples of that as well.

Primarily, the focus of a lot of my work and work of the Great Lakes Fishery Commission and many of the natural resource management agencies here in the Great Lakes and in the provinces as

well is to identify, map, and evaluate coastal margin in nearshore habitats. Primarily, to better understand and actually manage sustainable fisheries and wildlife populations in the basin. We use a number of different types of tools to do this work in addition to putting people out in the field and research vessels out collecting fish or tagging deer or whatever. In particular, we use remote sensing tools and geophysical tools.

I have my own sidescan sonar and have collected probably around 6,000 nautical line miles of sonar data over the last several years. Primarily, in shallow water nearshore areas of the basin. And probably about 70 percent on the U.S. side, but I also work for the Province of Ontario as well. [Next slide.]

The Great Lakes Fishery Commission shares hydroacoustic equipment where they're actually attempting to detect schools of fish in the Great Lakes, and then try to tie them back to various types of habitat characteristics whether it be in the water column, or whether it be in terms of the substrate types. We also work with a a lot of the geographic information systems and various types of statistical software to look at historical data and also look at the spatial and temporal distributions of not only habitat -- aquatic habitats in the Great Lakes, but also the associated wildlife and fisheries data. [Next slide.]

Then there's another group of folks that are focused very much on the coastal margin areas and river mouth areas of the Great Lakes, primarily the wetlands. In that respect, we're worried not only from

a habitat perspective but we're also worried about hydraulic connectivity with water level fluctuations which are very important.

In terms of how I approach my work, I'm basically a physical scientist. I'm a geologist by training. To let you know how far toward the dark side I've gone, I've also now joined the American Fishery Society which probably not too many geologists have done that. But my interests are in linking fundamental physical processes and looking at erosion and sediment transport and how it actually structures and maintains habitat in the Great Lakes. It's these processes that are very, very important.

Then trying to develop, working with aquatic ecologists and fisheries biologists trying to develop the linkages between various life stages of fish or organisms and tie those to the habitat. It is very important because it is only within the last 5 to 7 years that many of these biologists have coupled the fact, at least here in the Great Lakes, that habitat might actually be important and that many of these organisms populations may be habitat limited. [Next slide.]

Other things that we have been involved with -- especially when I was with the Ohio Department of Natural Resources we worked with other states as well -- and that's the coastal hazards issue. Coastal erosion has been and will continue to be a major problem along these coasts and this goes right to your coastal change mapping, or change detection mapping. One of the things -- I was having an interesting lunch discussion here and I was talking about how I use the NOAA charts on a regular basis, and I'll give a couple of

examples, but it's very unnerving to be collecting sidescan sonar data on land based on the NOAA chart, because the last time some of these coastlines were updated would have been in the 1880s. So from what I understand there's supposed to be a very robust effort which will be upcoming fairly soon to remap a good portion of these Great Lakes coastlines. Because we've had some areas a significant erosion; literally hundreds, if not in some cases thousands of feet of land has actually disappeared. [Next slide.]

Flooding issues are also important. In particular, we just had a couple of examples talking about more riverine types of flooding where you have flood plains that are inundated. But along the coast during major storm events, particularly in the shallow lake such as Lake Erie, you can have what they call seiche events where the wind actually pushes water from one side of the lake to the other. Some of those water level changes are very short term, they'll last over periods of 12 to 24 hours, but you can get water level changes on the order of 6 to 8 feet over that period of time.

In fact, I used to own a fairly large boat, a 34 footer. I was in East Harbor which is on the west side of Lake Erie where I kept my boat. Fortunately I had pulled my boat out. It was in the fall. We had a really good storm out of the southwest and it drove all the water to Buffalo and the water levels went up there about 6 feet, and in my marina where my boat used to sit was completely dry. In other words, the floating docks were sitting right on the mud because it literally blew the water out. These are short-term events, but they

have significant potential for flooding.

We've also had other types of events where we've had some significant property damage due to these flooding events as well. This points out the importance. When I was with the Department of Natural Resources we actually maintained a couple of water level gauges which are also tied in with the NOAA water level gauges. And fortunately, we we're able to monitor these gauges and we we're able to provide a couple of hours warning to the local communities before some of these events hit and they were able to take certain types of protective or proactive steps to protect their properties. [Next slide.]

The other issue in the Great Lakes are changing water levels. There are five Great Lakes. The water flows downhill. It flows from Superior down to Lakes Michigan and Huron; down through the St. Claire River into Lake St. Claire; down through the Detroit River into Lake Erie; down the Niagara River across the falls; down into Lake Ontario. Only two of those lakes have water regulation structures on them. That's Lake Superior. There are water control structures at the head waters in the St. Mary's River, that's where the Soo Locks are located; and there's also water control structures down at the bottom side of Lake Ontario as it starts to flow in the Thousands Island area before it flows down into the Saint Lawrence Seaway. The other lakes are basically unregulated.

I'm involved with a current study with the International Joint Commission. It's the International Upper Great Lakes Study

where we're in the process of reevaluating plan 1977-A which actually sets the criteria for how water levels are released through the St. Mary's, through the Lake Superior water structure. I'm the Project Manager for the ecological evaluation where we actually have a series of different scenarios of how you would actually monitor -- actually manage these water levels. Part of our job is to assess what are the potential environmental or ecosystem impacts which are very important. [Next slide.]

So tied to that in the longer term are the climate change impacts. I was in here a little bit earlier and I know the general paradigm is is that on the marine coast we have sea level rise. You get waters melting off Greenland, you've got waters coming off Antarctica. If the Arctic melts, sea level's not going to rise because it's already floating on water. It's like an ice cube, it melts, the water level stays the same. But the point is here in the Great Lakes we have the opposite problem. Virtually all of the climate change models that have been run show that the average -- the annual water levels in the Great Lakes are going to be decreasing by between a meter to a meter and a half, and perhaps more over the next 30 to 50 years.

So we have to deal with a different type of problem. That problem has implications in terms of water resources and water availability. When you think about what would the potential impact be on some of the large water intakes that many of the major communities along the Great Lakes use. And also we're looking at the potential

ecological impacts as well.

In virtually all of the workshops that I've been involved with for the last decade or so in the Great Lakes, talking about various types of environmental issues related to the coastline or the nearshore zone, we ask, "What are the critical types of data that are necessary for you to evaluate what the potential impacts are going to be?" Bathymetry. Bathymetry, bathymetry is always number one or number two on that list. This is for the biologist, this is for the physical scientist. I will tell you right here and now, we do not have adequate bathymetry at appropriate resolution or spatial coverage in the shallow water nearshore zones. That's a major drawback, and as a stakeholder, I'm telling you that is something that someone really has to focus on. [Next slide.]

Other issues related to the Great Lakes. Water quality issues. I'm not going to go into that in much detail. We do have the Great Lakes Water Quality Agreement. In the states we have the Clean Water Act. We've seen significant improvement in water quality. I'm sure many of you remember the Saturday Night Live skit where you had the Lake Erie bass-o-matic. You take Lake Erie water and you put the fish in there and run it through the blender. Well right now there is actually a slide -- I don't have it here -- but there's a slide in Erie, Pennsylvania, a billboard actually, I think it was Bud Light and it says, "Fresh and clean, just like Lake Erie," then has a Bud Light thing. So that tells you how far we've come where they're actually saying the water in Lake Erie is pretty clean now. We also have the

quagga mussels and the zebra mussels to help for that.

Then the water quantity issue is a very important one here in the Great Lakes region. There was great concern about the threat of diversions, diverting water out of the Great Lakes to the west. This is something we really don't want to see and there's been a number of governance issues -- or steps and governance that have occurred between the states and the federal government to ensure that there is local control over the water resource. [Next slide.]

Now this is just sort of setting the stage for some of the things we actually do. As I say, when I do my work and when I work on the various fisheries research vessels in the basin, virtually all of them have real-time mapping capability and most of them use the NOAA digital charts. I use it on all of my work. I run at least two computers simultaneously; one that has the charts up, I use the Maptech software, offshore navigator; and then the sidescan sonar software I use automatically embeds those charts and so I can see what I'm collecting real-time on the charts as we go.

I also use these charts to help me set up the surveys. They give me an idea of what the water depths are, whether or not I need to use a hydrographic wench or whether I can just throw the fish over the side and tow it in shallow water. They give me a good idea of where the obstructions are going to be, if I'm going to hit the bottom -- which, in every survey, no matter how hard I try, I always do hit the bottom at one time or another. Even when I was working with the U.S. Coast Guard in 600 feet of water, we managed to put the

fish in the bottom of Lake Superior. That's another story. And the nice thing is that it gives us a realtime view of exactly what we're going over when we're actually collecting the data.

These charts are run on different size vessels. This is actually a 140, a Coast Guard vessel. Is I was on the Alder 3 years ago, a 225. You may have gone by it down here on the spit. This is a 28 foot ODNR Fisheries Research vessel. I actually run these charts on my 17-foot twin V catamaran in shallow water environments where I'm running in between the breakers actually running my side scanner.

So these charts are incredibly useful. I will tell you this right now. Your charts -- I would not be here. There have been at least three times where your digital charts have actually saved my life. We got caught in life threatening situations out on the lakes through no fault of our own and it was only by having these charts there that we we're able to navigate safely to get back to shore. And I know this is also the case on some of the fisheries research vessels as well. So, thank you very much for at least making those charts available. [Next slide.]

The other thing I wanted to talk about is the high resolution shallow water bathymetry. As a stakeholder I said this is something that has come up to the top of the list time and time and time again. I know it's not necessarily your mandate. You're looking at navigation criteria or building charts for larger maritime vessels, but there's a large body of stakeholders probably recreational boaters as well, but also in the scientific and academic community and the

natural resource management community that are saying, "We need information in shallow water." I'm sure you've heard this in other places, but I'm telling it to you again. This is really, really important.

This type of data can be used, again, to evaluate sediment transport, erosion. There's a special type of erosion that goes on in the Great Lakes where we have cohesive clays exposed in the nearshore. It's called "lakebed down cutting." Erosion just doesn't occur where the shoreline retreats, but there's also erosion of the lakebed. So the water actually gets deeper nearer the -- near the shoreline as well. The result of that is is that you have more wave energy, it actually accelerates the erosion rates. It also allows us to evaluate lateral sediment supply, how much sediment is moving through the system. Benthic and shoreline habitat. It would be nice to know where we have aquatic macrofites which are submerged plants. That's a different type of habitat. It's tough to map, but, you know, given the information on substrate and water depth, we can take some guesses there.

The other thing is exposed shoreline during periods of somewhat lower lake levels. I talked about the seiche event. If you're a shore -- I'm not a birder. Believe me, I'm not a particular fan of birds, but if you're into shorebirds, you'd really like to know where you're going to have shoreline intermittently exposed because that's the that type of habitat the a lot of shorebirds. [Next slide.]

Coastal margin habitat. Again, related to this International Upper Great Lakes study one of the things that we're really looking at is: If we change the regulation plan on Lake Superior, how is that going to affect water levels in Lake Superior and also Lakes Michigan and Huron. One of the most sensitive barometers to that is how the wetlands are going to respond. Because it's that change in water level, the variability in water level that builds wetland diversity and creates a lot of the habitat diversity which most of the Great Lakes ecosystem relies on.

Then finally, as I mentioned before, climate change impacts. What is going to happen to the wetlands if we drop water levels by a meter to a meter and a half? There are not going to be wetlands in many places. But in order for us to tell where that's going to occur, we need the bathymetry, and we don't have it. [Next slide.]

The last thing, and we talked briefly about this, the water level monitoring and regulation. I know there's a series of NOAA master gauges and other gauges in the Great Lakes. The coastal benchmarks, I think there was some discussion about that. You have IGLD in the Great Lakes. You need to tie that back into more conventional datums if you wish. I think we were chatting and I think there's an adjustment due in another 10 years or so, another decade. Then, of course, there's the water level issues as well. [Next slide.]

And couple of examples how we use NOAA charts. This is

actually a Coast Guard project. We were under subcontract. I was on board the Alder for a week and a half here in Lake Superior. This is Duluth right here. This is a NOAA chart and what we've done is actually highlighted areas where this was temporary regulations that the Coast Guard had in place that regulate what types of materials could be swept off the decks of bulk carriers in the Great Lakes. We're talking about coal, taconite, crushed stone. And there's grain and other things, but a lot of times when they load these vessels there's material on the deck. It's a safety hazard. This stuff is hosed off or swept off the decks into the lake and it's been going on for over 100 years. All of a sudden EPA said, "If you're going to modify and make certain regulations permanent, what are the environmental impacts of taconite on the bottom of the lakes? Does anybody know where these deposits are? And how thick are they, and how are they distributed?" We had no idea.

So what did ended up doing was, in the ship logs they are required to report when they start to release these materials into the water and when they stop releasing these materials in the water. So this is the GIS plot here, all these green dots. There's also red dots. The green dots are the start points and the red dots or the the stop points when they were blowing these materials off and by looking at these patterns over a period of years you can start to get an idea of where these materials may be distributed. Again, plotted on a NOAA chart which shows the shipping lanes.

The initial assumption is that all these materials --

there's going to be like a big pile of material where these shipping lanes are and after that, there's nothing on the flanks. So what we did is we went out with a sidescan sonar which is here. It happens to be my sidescan sonar and this is the edge of the Alder. And this is another NOAA chart that shows a track line plot using offshore navigator. We had an area off here in Duluth and we we had an area off Silver Bay and these were an area where we did detailed mosaics, but we also ran some lines perpendicular to see, okay, is there a pile of material in the middle of these lake carrier lanes or not. And it turns out that these materials are ubiquitous everywhere. They're not just concentrated in one location. [Next slide.]

This is just an example plot. It may be a little out of focus. This is where we were doing a turn. It's actually located right there off Silver Bay. I know it's a little difficult to see, but there's a whole series of linear streaks. You'll see them all oriented the same way. If you plot those up, those are within a degree or so of the orientation of the lake carrier lanes which suggest they are indeed ship derived materials.

The end result was is that we -- I had to identify very specific sampling locations. U.S. EPA sent their research vessel the next spring to those locations and dropped core and sampling equipment over. Here's a core that was taken. These are taconite pellets that are sitting on the lakebed. That's what we picked up with the sidescan sonar. So your NOAA charts were incredibly important to us in terms of determining where we went to not only survey these sites,

but also to sample these sites and it shows what we did and what the relationships are. [Next slide.]

Another example, very quickly. This is in the very western end of Lake Erie. This is Toledo. This is the Maumee River. This is the western -- and this is the western basin of Lake Erie. Just an example of how I would go about doing some sidescan sonar work. This is a recon survey I did for the Ohio Department of Natural Resources. Very difficult to see, but these little black lines here are the track lines that I laid out, again, on a NOAA navigation chart. It gives me an idea of the water depths and the features that I might see. This right here is the Toledo ship channel. Then this is what it looks like when it comes -- when I'm actually doing the survey, and this is after the survey has been completed. But these red and black lines show the port and starboard channels of the sidescan and show the area that we actually covered. And then what I've done is I've taken the data, mosaiced it -- in other words, put all the sidescan data in its proper position -- and this is the actual sidescan data plotted on a NOAA chart. And these dark areas and light areas represent different types of sediment and materials. So we could actually start mapping out the substrate distribution here and tie it to water depth as per the NOAA chart. So for us, it is very important. [Next slide.]

Now something that is really important, at least from a scientific perspective. Your NOAA charts are good. They are good for what they do, but they are not good enough for the work that we need to do. We have to work at much finer scales than most of the NOAA

mapping is done. This map right here is a one meter bathymetry map. They exist for four of the five Great Lakes. This is work that was done by the National Geophysical Data Center. They went back and extracted all of the historical data sets, lumped them together. I don't know what all the detailed processing was, but then recontoured all of these lakes at a one meter resolution.

This is an area that separates the eastern basin of Lake Erie with the central basin of Lake Erie. I would say -- Erie, Pennsylvania, is down here, Long Point is up here. This is Canada. The international line goes about here. This is the NOAA chart -- the equivalent NOAA chart that is available and you're seeing the same feature. If you follow this contour line, you'll see this sort of boot-shaped thing that comes up like that. That's basically what we're looking at here and it comes around and comes out like that. This is at a 10 meter contour interval. It's a regional chart. Because, if you see these big black boxes, we don't have a chart that actually covers this area at a higher resolution, so I'm stuck to using this big chart of Lake Erie. [Next slide.]

This is the one meter bathymetry and all of a sudden this is the Long Point Ridge, this is the Pennsylvania Ridge, and this is what we now call the Clear Creek Ridge. There's a lot more detail in here and from a biological perspective, it's very important because in here there's a series of sub basins. We talked about the dead zone in Lake Erie, the anoxic zone in Lake Erie. That's primarily in the central basin over here. Each of these sub basins could easily go

anoxic as well. I've actually run a fair amount of sidescan data across this. We're actually looking for lake trout spawning habitat. It's never really been looked at again.

So these types of data exist for four of the five Great Lakes. Is there a way that somehow this can be incorporated in, and/or distributed by NOAA? Most of us in the field, we call this one meter NOAA bathymetry. Now whether it's NOAA bathymetry or not, I don't know. We don't use it for navigation purposes, but we use it for science. [Next slide.]

I'm just about done here, folks. This is also "the one meter bathymetry" and this is for Lake St. Clair. This is the small shallow basin. The St. Clair River comes out of Lake Huron which is above here and flows down here. This right here is the St. Clair delta. It's the largest freshwater delta in the world. Canada pretty much splits this basin in half. Detroit would be down here just to the left. This is the ship channel. This is the headwaters of the Detroit River and this flows down past Detroit into Lake Erie.

This is a one meter NOAA bathymetry and I've polyganized it which means I've actually connected together in a series of discrete polygons so I can actually generate the relationship between water depth, surface area, and volume. But more importantly, I can say, "Okay. The climate change models say water levels drop by a meter." the area in light green here is the area that will now be exposed based on that bathymetry. In the areas of the delta, we're going to move the shoreline by more than six kilometers lake ward. That's big

coastal change.

What's even more important, at least from an ecological perspective, all of these red dots here are documented spawning sites for a broad range of different fish species. What I've done is I select on the GIS that says show me all the red dots that fit within the light green area. These are all the fish spawning sites that are now going to be severely exposed. They are going to be high and dry. These are some of the numbers that come up, I don't need to go into details, but this is the type of analysis that one can do to say, "Okay, what species are at risk, what are not at risk? What do we have to do to manage the fisheries resources in this basin differently if indeed this climate change scenario actually happens?" Without the bathymetry, we're left out in the cold. We don't have a clue what's going to happen. That's another case why it's important for us to have a better handle on the shallow water nearshore bathymetry. [Next slide.]

Almost the last stuff here. Most significant, common complaint is lack of high-resolution bathymetry where we need it. Particularly in nearshore waters. I don't think anybody is going to argue where they are in deep water. But -- and I made this point at lunch when we were sitting at lunch. Where do human beings interact with the water the most? At the shoreline. Where do we use it the most? At the shoreline. Big boats going out in the middle of the channel, you've got lots of water. Yeah, you need to be aware of obstructions and things of this sort, but if you really want to make

the bathymetry or make your data useful for a lot of stakeholders, focus on the nearshore areas. [Next slide.]

This is what we'd like. I'm not sure we can obtain it. More accurate coastlines as I mentioned before. It is unnerving to collect sidescan sonar data on the land. It's sort of tough. One comment I would make is that LIDAR coverages do exist. A lot of it has been collected by the U.S. Army Corps of Engineers. Some of it is distributed through NOAA. Accessing that data has not been easy until just recently; very, very difficult. And there are some major quality control issues. I requested LIDAR data for Saginaw Bay. They said, "Yeah we've got it. 2007 data. It's been processed. You can have it." I wanted it not just for me, but it was going to be distributed to several of our site coordinators for this International Upper Great Lakes Study to evaluate what the potential impact of different water level regulation plans would have on the wetlands in Saginaw Bay. It's a shallow embayment. It's going to be impacted big time.

So I got the files. About 23 percent, almost a quarter of them were either corrupted or when they plotted up they had georeferencing problems. They ended up in Tanganyika someplace. So I can only use 75 percent of the data files. I understand, I had to go through the back door to get this data. The files were large, they could not easily be downloaded. So there's an access and a distribution problem. I know the resource limitations, but all I'm saying is that if data is going to be distributed publicly, make sure it is the best quality data.

That goes to to the second thing here, what I call "vaporware." Promises, promises, promises. And you say, "okay." I'm going to call you on this thing. I want the data, we need it for this work. And it's weeks, or they say, "We really don't have it in a format that we can give it to you." Then don't tell me that you have it, and don't tell me that it's available for use, because it's not. So make sure that whatever you put out there has gone through appropriate Q/A and is accessible and usable. Otherwise, it's really tough to convince me that the products that are coming out are going to be usable. Now, again, this is not necessarily NOAA's fault. I'm just saying that as a general package, the mud sticks. These types of data are critical for climate change and path assessments.

One question I have. Right now the NOAA digital charts are available in a BSB format. It's a proprietary format through Maptech. You guys can correct me. Are these charts available in other types of formats at this point where they can be used with different types of software? Just asking the question.

CAPT LOWELL: We don't create them in any other formats. Perhaps other vendors do, but not through [inaudible].

MR. MACKEY: Just curious because I would think that you would get a broader distribution and a broader utilization if they were available in a format other than BSB.

CAPT LOWELL: [Inaudible.]

MR. MACKEY: I'm not familiar with all of the terminology, I'm just a poor user and abuser of your data sets.

The other thing would be a lot of times I'm out on the water with sidescan data in particular and I run across a feature, I run across a wreck or something like that. It's not where it's supposed to be. How do I go about making either digital corrections or reporting those errors to NOAA so that those charts can be corrected? It's not clear to me at all and for many of the people that use these charts it's not clear. In general, I am absolutely amazed at the accuracy of the charts for the most part. The sidescan lays right down on it, but there are times when it doesn't. Sometimes that's just because the data sets -- half of the data in the Great Lakes were collected prior to the 1940s and GPS in the 1940s didn't exist. [Next slide.]

Okay, this is the last slide; comments and questions. This is a sidescan image of the George Stone. It's off Grubb Reef between Point Pelee and Pelee Island. It's on the Canadian side. This is what the sidescan should show you. This is a really nice wreck. It's 282 feet long, sunk in 1909. I think they lost 17 lives when that ship went down.

MR. WELCH: Thank you. And thanks to all three of our panelists.

Do we have some comments or observations or questions by folks here?

MS. BLACKWELL: I'm Juliana Blackwell, the Director of the National Geodetic Survey. I want to thank you all very much for your insight and your comments on the good and the bad that we have to offer. I'd like to just take a few minutes to address some of the

concerns just so you have this information and we can elaborate more later.

We'll start with maybe the most recent, and, Scudder, some of the items you brought up, including the LIDAR data distribution. We are aware of the issues and we are working with the appropriate offices to try to mitigate the problems that we're having with the data and that is through NOS, but through a different office that is not represented here today. But we are aware of that and we can provide you some additional information on that offline that would be helpful.

I also want to say that we are working within the other offices within NOS where we have data distribution and other products and services. Doing things like detailing people into those offices so that we can get more one-on-one collaboration with our data and how it is best used to distribute as well as to build on so that other groups within NOAA themselves can understand what the geospatial and the datum issues are related to a lot of the products and services that we all provide.

Jumping onto the text topic of the IGLD and the datum of 2015 which we are going to talk about later on this afternoon in some of our updates. So we'll give you a little sneak preview into some of the work that's currently being done to address a new vertical datum realization for the Great Lakes area, and that's again a joint effort with the Canadians, something that Scudder brought up.

Tomorrow afternoon, Mike Aslaksen who is here from our

Remote Sensing Division is going to do a presentation on the shoreline mapping and do a general overview about shoreline mapping and concentrate some of his discussion about what's currently happening in this area which you alluded to hasn't been updated in quite a while. So hopefully that will answer some of your questions to see where things are in the process. If you're not able to stay for that, event, please see Mike and talk with him.

MR. MACKEY: We sat together for lunch, so this is the second time he's heard some of these comments.

MS. BLACKWELL: That's all right. He likes hearing them.

Because there were so many things that related to geodesy, gravity, and our CORS network, I think it's important to just elaborate a little bit on the gravity effort itself. You're going to hear me talk about it briefly with our GRAV-D, airborne gravity collection initiative. The fact that we do have a plan in place to improve the vertical datum using gravity measurements. But I want to just point out that because this is a rejuvenation of gravity data collection utilization for the GEOID, that we don't have everything planned out and ready for people to give us their data until we can get a more definitive way of how that data format should be and what we need.

So I appreciate the enthusiasm for collecting gravity and having it be an important part of our update to our GEOID and to our vertical datum, but we are being careful in how we do this, and we are coordinating our efforts with the other countries in North America,

primarily Canada and Mexico because when we do this effort, we want it to be a seamless North American GEOID update for the future. So we are trying to take the conservative, smart approach in how to do this, and that goes down to how we collect the data; absolute, relative, airborne, and making sure that we do it right as we do it along. So we will be asking for help in collecting things and partnering efforts, but for right now we need a little bit more time to get those things lined up so that we can give the specifications and the standards as well as guidelines as to how to do this work. When we come to the area to do our airborne gravity work, that will really be the opportunity to do on-the-ground terrestrial measurements to help with the bigger initiative.

I guess the last thing I would just like to point out in talking about NOAA's national CORS, Continuously Operating Reference System Network, NOAA doesn't own those stations. NGS as part of NOAA coordinates the data collection, the data dissemination through our web page. NOAA does own a small number, let's say 5 percent approximately, of those CORS stations. But for the most part, those are all partnership efforts with over 200 organizations; state, local, universities, other federal agencies. And so we are a data sharing mechanism in a lot of ways, but all of that data is used for a lot of research as well as to determine changes at those areas. And we appreciate all of the partnering to has been done thus far, but just wanted to make it clear that we don't have control over a lot of those stations. We provide guidelines and certain standards so that those

can be brought into our network. And I'll talk a little bit more about the benefits of those things when I get my other 15 minutes later on. With that, I'll be quiet. Thank you.

MR. WELCH: Thank you, Juliana.

Other comments?

MR. DASLER: First, I want to thank you all for presenting today. I guess if you won't talk about it now, I'll mention a little bit. What was great -- and both Rick and Morris brought this up, is the integration of these CORS stations into a virtual reference system. This is a huge benefit to the surveying and mapping community that I think is really underestimated. It is not something that is the wave of the future, it's happening now. As we move on into further mapping efforts and even into hydrography this is the way things are going to be done. You're not going to be going out and occupying GPS stations on monuments.

Right now, Oregon and Washington are the same thing. They have virtual reference networks so where we can get correctors by cellular modem integrated right into our inertial systems on the boat. Corps of Engineers is using it now on the Columbia River. We've started to integrate it. So this is really where things are headed, and I really want to compliment the Department of Transportation from the states that are really coordinating this and putting it together. Because I think they've really taken the initiative to build off of the CORS stations, put in additional sites to really augment that and build a real meaningful system that's a real benefit to the surveying

and mapping community. My hat's off to the efforts that are going into that because there is tremendous benefits, as I said, that are coming out of that.

As that moves forward to working more efficiently off of ellipsoid heights and surveying, like I said, carrying on into the hydrographic realm, but it is happening now. You saw the slides of machine grading where actually equipment, bulldozers are grading levees down in the south or on highways up here where it's all GPS controlled and height controlled. So it's not out into the future as far as you think, it's really here, and it's something we really need to push on the hydrographic end as well.

MR. MOREY: If I could just kind of expand on that. Right now we have a network in Minnesota that's based on datum recording system being used in Minnesota. Iowa has a network. We have made arrangements with Iowa that we're sharing data between each other as far as the stations along the border. The problem is that we are getting the data from Iowa and then feeding it out in our datum, Iowa's getting information from our stations and feeding out in their datum, so if you're working in that area, you can work in one or the other. But it's not like you could do the work in one and it's usable by the individual across the state line.

And just to tie into what Jon was saying, Wisconsin's building a network right now. It's down pretty much in the Madison area. Eventually it's going to work its way over to the west part of their state which will be up against our border and we'll probably be

looking at sharing there. It will also be covering part of Great Superior. Eventually we're going to cover that northeastern part of Minnesota. We'll be providing information at least 30 miles out into Lake Superior. It would be probably a benefit to the people doing navigation on Lake Superior if Wisconsin and Minnesota were feeding the same information out of their respective VRS's to the poor guy out there trying to navigate using it. That's an area where I'd be looking at some, if you will, national guidance on the regional integration of the state efforts. Thank you.

MS. BLACKWELL: To address those issues, NGS has drafted a document along with the help of a 60 member team on real-time network guidelines which basically are setting those guidelines for the real-time networks, the virtual reference systems that you're referring to of how to tie their networks, whether they're state or local or private networks that are being established back to the National Spatial Reference System. So if everything goes back to the NSRS, the national system that we have a mandate to provide and should have a mandate to use as well that has things brought to the national datum so it at least has a mathematical connection to transform back to the NAD83 and the NAVD88. The things that are accepted across the country as a National Spatial Reference System, then those things can go away. You won't have to worry about the state boundaries and things not matching up. But until those networks get on board with tying to NSRS and using the national datums, then there is going to be a problem.

We are trying to help with this effort, so if you're not currently a member of the reviewing team, that document should be available for review by our office. Bill Henning is our real-time expert within NGS and I can give you his name and contact information and have you be a part of that effort at least to see what we're currently doing to help address some of those concerns and be aware that we are making progress on trying to get those guidelines out to folks so that they can get their networks hooked into the national endeavor. Thank you.

MR. WELLSLAGER: Rick, I am the Program Manager for the South Carolina VRS, and we're actually sharing data back and forth with North Carolina right now. So the issues with the state lines can be resolved as long as you are working on the same datums. It has worked out well. The surveying communities have paid off and very, very happy with what they've seen for results.

We actually met at CGSIC last year at Ion down in Savannah and talked about that. The manual and the reference documentation you're actually alluding to is being presented down at CGSIC at Ion this week. So quite a bit has been done in a relatively short amount of time, and it's going to be very helpful information to have.

Curiosity; when you were working with the network you had over 400 users and you're not charging for access to the network?

MR. MOREY: That's correct. We are not at this time charging for our work. I was asked about a year or so ago to take a survey of the other states to see which ones had networks or were aware of private

networks and what was being charged, who was charging what. And out of the 50 states I got 15 responses back which basically boiled down into: five had a network, five were thinking about it, five didn't. And it was all across the spectrum as far as charging and not charging.

At this point I would say to charge or not charges is, for me at least, a philosophical issue. And my philosophy is, I work for the taxpayers of the State of Minnesota. The taxpayers of the State of Minnesota have already paid me, they've paid my people, and they paid us to buy and operate the equipment we're operating in. To me it's philosophically not right to turn around then and ask them to pay a second time for what they've already paid for. That's philosophically.

From a practical standpoint, I'd rather not get caught into the whole administrative hassle of billing and all that kind of thing. The other thing is right now we're providing it free. We run it 24/7, but we don't provide 24/7 support. If it goes down, well when our guys come back on duty we'll get up as quick as we can. Whereas, if I'm charging people for it, we're now taking on another level of liability I'm not sure my bosses want to take on.

MR. WELLSLAGER: Right. Unfortunately, we are having to charge for ours. While I understand what you're saying, the issues with maintenance for contracts and for keeping software up-to-date, I'd like to talk to you offline about how you all are actually getting the funding for that if you're not facilitating it through a charging

regime to have the users come online.

MR. MOREY: I can just say as far as funding goes, our network is -- we've been building it over years, piece by piece. A lot of it is partnerships where like the local government will provide us with a site and we'll provide the receiver to put there. Maintenance, right now we're paying for it out of our office budget and, again, it's a year-by-year justify the funds and so far I've been able to justify them because, like I say, I'm able to point to the uses, I'm able to point to the benefits that are derived from it.

That's why I said, if I can get that kind of thing, if I can get results and commitment that I'll get those results, I can justify to my bosses funding. But if I don't have those things it's a little hard to get them to say, "Yeah, here, Rick, have some money. We don't know what you're going to spend it on, but have fun."

MR. WELLSLAGER: Understood.

MR. DASLER: I guess I just wanted to comment again on the stations, Rick. I think you mentioned six of those stations are NGS stations. Thirty one are cooperative but then there's a hundred submitted to get approved. I think I've heard that before and I guess a question to Juliana is, do you have enough support in moving this forward because I think there's a lot of submittals of trying to get stations accepted as cooperative NGS stations, but it may be sort of inundating your resources to move that forward; is that correct?

MS. BLACKWELL: We have people that work on bringing new CORS into our network, but as you can imagine we are limited by our

resources as to how many people we can put on that task. So we do the best that we can, and if there is a state that's got hundreds of them versus, you know, other states that have a couple, we have a queue that things go through the process and the CORS project manager is involved in having a committee that looks at the ones that are coming online and how quickly we can get that data in and get all the metadata associated with it. So we do the best we can with what we have.

MR. DASLER: I didn't mean that as a criticism, but maybe just as an observations that maybe a recommendation could be that there could be a little more focus on that front. Because I think integrating this in, if, as I understand it, if they can be cooperative CORS stations that kind of goes through that whole Q/A Q/C process so if a lot of the surveying and mapping community are using these stations, it's a huge benefit to the nation if they are a part of that cooperative network.

DR. JEFFRESS: Rich, I'm very impressed with your network up here. I assume you don't have any private networks -- GPS controlled networks in Minnesota?

MR. MOREY: I'm not aware of any right off the top of my head operating in the state. Like I say, we have lots of private users and we do have several of our stations are privately owned, so we have private partners within our network. As I said, we pretty much try to establish an open network.

DR. JEFFRESS: Fine. And everybody benefits from that network.

I just want to bring to the panel's information. Probably the worst case scenario is the Dallas/Fort Worth metroplex in Texas where there are two Topcon private networks. There's one big Liker network, and there's one big Trimble network all privately operated. There are numerous Texas DOT, Texas Department of Transportation, CORS stations in the same area. The Trimble dealer in Texas has actually asked Texas DOT not to provide real-time data because they think it's competing against their private network, and it's a real mess. I know the two -- the Topcon networks works on a different elevation datum than the rest of them.

RADM WEST: Thanks for joining us. Scudder, did you mention that if you find something through your work that's not on a NOAA chart you don't know where to go to tell NOAA about it?

MR. MACKEY: Occasionally.

RADM WEST: I'm concerned with that. Don't you have a trouble desk or somebody can say, "Hey I found something out here."

MR. MACKEY: I'm just busy keeping my fish from hitting the bottom.

CAPT BARNUM: There is a hotline. NOAA operates a hotline. It's available on the NOAA Coast Survey website. There's also information in the Coast Pilot how to submit changes to recommendations for a chart, so there's several avenues for that. Certainly their local navigation manager, Brian Link, here in this region is the direct conduit for getting that information up to the compliance.

MS. DICKINSON: Yeah, it's come up as an issue and we usually --

if we get a call from a boater who wants to report something, we steer them to either the regional manager or there's a place on your website, I think, you can report chart discrepancies online. We should probably publicize it more to people.

MR. LUKE: Kind of on that same note, this isn't a surveying community now, but on published NGS points, bluebook points, say you get out and you find a discrepancy with the description. Is there another avenue for that to get corrected?

MS. BLACKWELL: Yes, there is. There's an online description format that you can go in and update the description and send us that text online.

MR. ARMSTRONG: Again, thank you all. I have a question for Scudder, a couple of them actually, on the bathymetry. You indicated that one of the greatest needs is bathymetry in shallow water in particular. We've heard that before in other places as you suggested we probably have. In the case of the lakes and this area, sort of what is the depth range that you need that data in?

MR. MACKEY: I would say that depth range would be probably less than 10 meters, less than 10-meter depth range.

MR. ARMSTRONG: Thanks, and when you talked about the depth resolution that you needed, you said 15 to 20 centimeters was desirable. Was that the resolution of the depth or was that the sort of spatial resolution of the depth measurements?

MR. MACKEY: That would be vertical. And this is -- I can live with not quite that tight, but this is coming from some of the

fisheries people particularly from the wetlands people where relatively minor changes in water level for certain periods of time can have a significant impact on the plant communities. That was their recommendation. Right now we're nowhere near that type of resolution in terms of the available data at this point.

MR. ARMSTRONG: Just one last personal item. I saw your survey out there in western Lake Superior. I hope you found the depths accurate there because I did those depths in the 1980s.

MR. MACKEY: They were within a tenth of a centimeter. Otherwise known as a millimeter. So they were absolutely perfect. We didn't take into account the sedimentation rate since that time, but that's okay.

MR. WELCH: Do we have any other questions or observations for this panel of stakeholders?

[No response.]

MR. WELCH: If not, Rick and Morris and Scudder, we very much appreciate you being a part of our session here today and your suggestions and observations. Thank you. We'd like to stay in touch with you.

We are scheduled for a 15-minute break. It seems like we just got started. I guess we have a 15-minute break.

[The public meeting recessed at 2:27 p.m., September 23, 2009.]

[The public meeting reconvened at 2:48 p.m., September 23, 2009.]

MR. WELCH: All right, we're ready to proceed with our second user's panel. Mr. Carlson and the Power Squadron folks are not here yet and he's not going to be able to come but we may get a substitute, so we'll just see. But in the meantime Lieutenant Jannusch and Mr. Goltz or here. So, Lieutenant, we'll go ahead and start with you, please.

LT JANNUSCH: Good afternoon, everybody. My name is Lieutenant Doug Jannusch, obviously with the U.S. Coast Guard. Just a little about me so you can kind of understand where I'm coming from. I've been in for about 7 and a half years. This is my third assignment to a ship. I also spent 3 years in Hawaii and our program manager for the type of ship that I'm on which which is a Waterway Management Department. In Waterway Management we actually do a lot of chart corrections. We updated all the nautical charts for our respective area out there in the Pacific. We got involved with marine debris recovery. We updated our light list. We submitted updates for Coast Pilot, and we manage all the Aids to Navigation work for the three buoy tenders that work for us out there.

I was on Alder for the first time from '04 to '06 and now I am back. Thankfully I call Duluth my home. So it is good to be back. I've sailed through all five Great Lakes. My first time on Alder I was the Operations Officer and now I'm the Executive Officer.

We would have normally had other representation or somebody maybe a little bit better able to speak to all different Coast Guard

missions. Unfortunately we have a commanding officers conference this week, so all of us number twos are in charge. We wanted to make time to come talk to you because we value the products and services that we receive from NOAA. I've interacted with NOAA quite a bit thus far in my 7 years.

Some of the products that I have used, we use Coast Watch got quite a bit. I'm not sure if that deals exactly with the hydrographic services, but that's one product. We use the online chart viewer quite extensively; of course, Coast Pilot. A number of weather products, and I understand that weather is not the main focus of this forum, but we obviously use the VHF weather radio quite often, and we use the weather messages, near shore and open water.

We also have a partnership with the National Data Buoy Center which is based out of Stennis, down in Mississippi. We have three NOAA weather buoys on Lake Superior that we service, plus others throughout the lakes. I talked to our search and rescue people down in district. They use the GLERL, Great Lakes Environmental Research Lab, by NOAA which actually feeds data directly from current wind and weather, sea states, all that stuff. It feeds that data straight into our SAROPS program, and then based on using that data they're able to -- with drift rates and wind and various things they are able to predict with the highest probability where somebody may have drifted that got washed ashore -- or got washed overboard or what have you. So that's very beneficial for us.

Of course, I was the Navigator on Alder so we use -- I was

navigator before, and I am a now for a little while. Of course, we use electronic charts extensively. We have a very sophisticated -- I would say fairly sophisticated ship. Even though we're using circa 1993 technology primarily, they did upgrade us and we do have access -- an EKPINS system that uses all different versions of charts plus we keep a portfolio of all the paper charts that we need throughout the Great Lakes. We don't actually correct all the paper charts because we have a primary and secondary electronic navigation system. So we're able to flip -- at a moment's notice flip to our secondary if we have to for redundancy. We also have primary and secondary redundancy with our differential GPS systems and a lot of other systems on board.

For those of you that are not familiar with the Coast Guard, I thought I would talk a little bit about some of the different things. One thing I can't really speak to much to is the marine safety field. That's a whole different component of the Coast Guard. Here in the Great Lakes, obviously, that field is directly involved with preventing the introduction of invasive species, nonindigenous species, inspecting ballast flaw, or that kind of stuff. We also do pre-arrival inspections for ships coming into port. And then, of course, a lot of the Coast Guard is involved with homeland security and port waterway coastal security, identifying vessels of interest and various things, and then providing security for that.

I would direct you -- there are a couple of fact sheets that the Coast Guard has posted on the public information's website that they have for Coast Guard District 9. If you did a search for

"Coast Guard District 9 information," you'd probably find it very easily. They have fact sheets dealing with invasive species and lake levels and fishing regulations and various things like that. Granted, that's not hydrographic related, so you may not be that interested in that.

In general, I was going to say that we are very, very happy with the products that we receive and that we use from NOAA. Even when I was in Hawaii we interacted closely with -- I remember I interacted with Lieutenant Jeff Taylor out there. We were trying to work with NOAA to modify your charts so they covered areas that we -- better covered the areas that we transited all the time and where we ATON.

One of the things about ATON that you might find interesting is when we're operating with electronic charts we are actually zoomed into a much greater scale than what that chart is designed to support. Because we are working in terms of like, 5 yards, 10 yards, very small distances. So even at that level though, we find that the charts are very accurate. I understand that's, you know, thanks to NOAA's expertise in designing those charts. I know it's getting better. We've been getting great support as far as our electronic chart portfolio and the monthly chart updates that gets sent to us via CD. So we receive those on a regular basis and we operate off of very corrected charts.

Our paper charts, we like to get the most current edition that has all the updates. I don't want to misspeak here. We ended up

ordering -- you know there's a private service called OceanGrafix that can provide charts to us that are certified NOAA charts. I've been told that they are a little more current as far as the level of local notice to mariners that are updated on that, but you've got to pay for that service. Whereas, if you order like a NOAA print on demand paper chart, it may not quite be up to that. Like I said, we don't operate primarily off paper charts, so it doesn't become a huge issue.

Other ways that I've interacted with NOAA, we publish -- out in Hawaii I published a local notice to mariners. To do that you actually have to basically advertise all the different events that are going on in a particular area of our responsibility. That also includes any chart corrections that might occur. NOAA's been great about feeding us those corrections. Then we do a pre-review before we actually publish it, so we have a very low percentage rate as a result. NOAA's support has been absolutely great for that.

I didn't have any feedback insofar as ways that we could propose improvements to the charts that we get. Like I said, I use the online chart viewer quite often, and I find that to be a very handy tool. One thought I had was, because we're underway a lot, we have limited bandwidth. While we're underway it might be nice to have a downloadable portfolio that we could put onto our server so we don't have to go through the Internet to download those. Other than that, that has still been a great service.

Related to the weather side of it, I just wanted to throw it out there. One of the guys that I work with who works with -- you

know, we all work with your weather data quite often. One thing we use -- let me ask a question. Does Coast Watch kind of fall under the purview of this forum? Is that accurate, or not? Well, anyway, Coast Watch provides satellite images, you know, wind, wave, forecast models.

I do a lot of icebreaking on Alder. One thing that I've used quite often is, you take a satellite image of Lake Superior, Lake Erie, Lake Huron, St. Mary's River, what have you and you, at a glance, see where the ice field is out on the lake. So we use that quite extensively. The wind forecast, the wave forecast, those are outstanding.

I don't have a lot of other things to talk about. I apologize I didn't have a prepared presentation. But I will be open for any questions when we're finished here. Thank you.

MR. WELCH: Okay, Lieutenant, thanks. I think we will have some comments or questions for you in a few minutes.

Representing the U.S. Army Corps of Engineers is Mr. Don Goltz. Don?

MR. GOLTZ: Hi, Don Goltz here. Probably should have had somebody higher up on the chain of command here. I'm a hydrographic surveyor for the Duluth area office of the Corps of Engineers. I've been working here 25 years. Went from lead line to tag line to electronic systems. Single beam mainly, sounding, provided updates to NOAA for their navigation charts and for the Great Lakes shipping industry.

I'm glad to hear that the next update for IGLD85 will be in 2014, because I will be retired. I won't have to go through hydraulic correctors, I hope. And I hope NOAA will take care of hydraulic records in the next update. If anybody is not familiar with that, it's a datum conversion that the Corps of Engineers has to use on the Great Lakes to adjust dynamic height of benchmarks published from NGS and NOAA to convert to IGLD85. Every harbor is different, and it's been a hassle converting from 55 to 85 and explaining it to the public.

As far as NOAA gauges, I'm glad they are on the lakes. I use them all the time on a daily basis, especially in Duluth where we have 26 miles of channeling to navigate and survey. Can you put a couple in Keweenaw waterway, please? We used Ontonagon and we also use Grand Marais. I do use the weather quite a bit since I am a surveyor and not a boat captain. I want to know how high the waves are going to be when I'm getting out there. We were in Keweenaw waterway in a 16-foot Jon boat last week, and I was glad to have the weather.

I guess the gauging is the most important thing that we use in Duluth. Now I know the chart district uses quite a bit of your products as far as outflow for the Fox River Valley for the dams and predicting the water heights on the dams. But as far as my main concern is just condition surveys and charting for Lake Superior.

That's all I have.

MR. WELCH: Thanks to you both. Do we have some comments or

questions for these panelists?

MR. DASLER: Thank you for your presentations. We were talking at lunch and there was a comment you made about that there's some sections on the nautical charts -- maybe you want to address that --

MR. GOLTZ: I'm glad you brought that up. I was just going to say because we talked about that. On the NOAA charts you have a lot of white space where it shows the federal channel, but there's no information in those white space. We have a lot of information that covers that white spaces on the Corps of Engineers charts. However, if you go to our website and if you go to your map, there's no cross reference between the two, to show where you can find out the information outside the white areas or inside the white areas for your charts and outside of the channel limits from our charts. We only survey 100 feet past the tows of the channel lines. That's all the distance we carry out. So if a shipper wants to know or a boater wants to know any other information, I was thinking there should be a cross-reference somewhere on our maps and somewhere on your maps showing how they can get that information easily and accessible off our web page and via off your maps or a web page.

MR. WELLSLAGER: This is more of a question about topics that might have to do with the Coast Guard than anything else. Does PORTS® support or is there PORTS® support in the Great Lakes area or since there's such icing that something like that use would not really work well in situations like is this? Because it sounds like the PORTS® setup would play into effect somewhat with what the Coast Guard is

trying to do with weather predictions, tides -- not necessarily tides, but currents, waves, that type of thing. I was just kind of curious more than anything else.

MR. WELCH: Do any of our -- Mike?

MR. SZABADOS: With our water level gauges in the Great Lakes which we have 53, a good percentage of those have meteorological stations which we provide to the weather service, so we do contribute to that weather forecast. As well as the CORS stations I know which are collocated some of them with the water level stations are used by the weather service for the atmospheric conditions.

MR. WELCH: But is it accurate that we don't have true PORTS® installations here in the Great Lakes?

MR. SZABADOS: We have at Soo Locks.

MR. DASLER: So actually this is a question for Mike. Don mentioned the hydraulic adjustment that needs to be made on the gauges and if that's possible and changing that moving forward. I guess for the benefit of myself and the panel, what that involves and is there a way to do what Don is asking?

MR. SZABADOS: I would have to get back with that answer.

RADM WEST: Hey, Doug, with your redundancy in electronic navigation, is it a ship decision to carry the paper charts, or is that a Coast Guard requirement?

LT JANNUSCH: That's a Coast Guard requirement. Because we have redundant electronic navigation systems, we don't have to have corrected paper charts on board, but we still have to have paper

charts.

RADM WEST: Is that true of the -- are you a buoy tender?

LT JANNUSCH: Yes.

RADM WEST: I thought they had gone without paper a while back; no?

LT JANNUSCH: No, not completely.

MR. WELCH: Lieutenant, in your experience, or the Coast Guard's experience, when you, in Hawaii or here, detected information that you felt like needed to be transmitted to NOAA for them to take account on the charts. Have you had any problem or difficulty in knowing how to transmit that information, or is it personal relationships, or is there established procedure?

LT JANNUSCH: I have not had any personal difficulty transmitting that information. I've done waterway studies. I did an extensive study to Duluth Superior harbors resulting in a number of corrections to Coast Pilot that we submitted using the information provided at the end of Coast Pilot. Some of it, obviously, once we started developing relationships we didn't have to follow official means to transmit that information, but we knew what those official means were.

For instance, there would be independent contractors out surveying Honolulu harbor and they would come across something and they would let us know. And we would examine it through the sector Honolulu and our office, but then we'd also forward that information on to our contact at the time which was Kevin Shaw at NOAA in D.C. area. He's the guy that also previewed all of our corrections before

we published our local notice to mariners. So, no, we never really ran into any difficulty with communicating that information.

MR. WELCH: Just for my recollection, District 9 of the Coast Guard, does that embrace all the Great Lakes?

LT JANNUSCH: That's correct. Everything from the western edge of the St. Lawrence seaway all the way through western Lake Superior, up through Lake of the Woods. Any local water that crosses an international border or borders interstate border, falls within Coast Guard jurisdiction. I believe it covers down to portions through the center of Illinois, like part of the Chicago, Illinois, canal that's down there as well.

MR. WELCH: And the district headquarters are in Cleveland?

LT JANNUSCH: That's correct.

MR. WELCH: Other comments, or questions, or thoughts?

MR. GOLTZ: I use a product of yours that is quite useful but it's hard to find on the Internet, to find the site. There's an 800 number you can call and you can punch in the gauging station for any of the Great Lakes gauging stations and it will give you the current gauge and the weather for that site. But it's very difficult to find it on the web page to try to tell people where it is. Just a recommendation.

MR. WELCH: Whose jurisdiction does that come under, designing the web page?

MR. SZABADOS: Mine. That's on our Great Lakes online product.

LT JANNUSCH: One thing, I guess what I was going to point out

before I didn't get to. We use five or six different weather products. Also and viewer products like Coast Watch online. But you have to have the independent links for all of those. Like if you would go to like a National Weather Service site for your ZIP code, you're offered everything that is related to that particular ZIP code. Just as a recommendation for improvement, we were suggesting that it might be good to say, every weather product related to Lake Superior is in a nice, easy to find location. That would make some of our job a little bit easier. I'm just offering that as a suggestion. I don't know who's responsible for that.

RADM WEST: Why don't when you put the ZIP code you get not only weather, but you get the ocean conditions and the Great Lakes conditions and everything on the same sheet.

LT JANNUSCH: Obviously, ZIP code is more terrestrial. The wind conditions and everything are quite a bit different off Keweenaw peninsula, or whatever.

RADM WEST: We're going to have ZIP codes for marine spatial planning. I agree with you. My recommendation is NOAA should do forecasting on a global marines, not necessarily just weather not just terrestrial, and not just the oceans. It should be an environmental forecasting organization.

MR. WELCH: Don, this may be beyond your area of jurisdiction, but can you give us some sense as to the status of the Corps planning for new locks at the Soo and what that might mean for NOAA in terms of its hydrographic products?

MR. GOLTZ: Well --

MR. WELCH: -- I apologize if I'm putting you on the spot in the area that you're not familiar with.

MR. GOLTZ: I'm not familiar with that, other than that they've broke the ground for the Coffer dams and the Coffer dams are going to be built here this year. That's the only funding they have right now. How it would affect NOAA as far as the navigation charts? It's going to be the same depth as is there.

MR. WELCH: I meant more their hydrographic services -- some of the other hydrographic services. It would seem like to me that if I were a contractor working on new locks and all that type of stuff, I would be interested in water levels and currents and things like that and how that might affect my construction.

MR. GOLTZ: It's going to be in a dry situation on the Coffer dams. That's why they are putting the Coffer dams in, I believe.

MR. WELCH: Okay.

MR. DASLER: In conferring with my NGS geodetic advisor -- I guess -- getting back to the hydraulic grading issue. It may be just an adjustment that VDatum handles in correcting type data and actually gets on to, I guess, another question is the progress of VDatum on the Great Lakes. I'm assuming there must be, even in the networks or the columns there must be cooperative sites with Canada and part of that. So one thing that could help moving forward is the final development of the vertical datum model which may get rid of this gradient issue changes.

I guess also, maybe back to Mike is; a little different conditions on the Great Lakes, but is the datum changing often? How often do you do datum adjustments on the Great Lakes? And do you do that in coordination with gauging sites in Canada?

MR. SZABADOS: We'll get into that a little bit later on during our presentations, but that is something that we do collaboration with Canada and NGS GLD, and that's something in the planning works right now.

LT JANNUSCH: One thing I would be remiss if I didn't bring up was something my boss wanted me to bring up. Like I said, we do National Data Buoy Center stuff, so we have three weather buoys that we have a MOA with NOAA to service -- or not to service, but to retrieve every fall and put back every spring, and those provide the most -- I understand this panel may not be completely focused on that, but I wanted to bring it up.

The mariner -- those buoys of data they provide is considered to be very valuable and ironically the later it gets in the season is when the data becomes most valuable through the gales of November and the ice and the sea states and all that. But of course the decommissioning dates in the fall for those fall on November 1st. Usually we try to decommission or pull them out as late as possible. So right now we're looking at like a November 14th date. There has been talk about possibly putting more ruggedized type equipment on, more better are able to withstand ice accumulation and bad weather, but understanding also you can only do so much if you have a lot of

ice buildup. So I only put that out there for consumption. I don't know what, if any, solution would exist for that. That was all I had.

MR. WELCH: What are the Coast Guard constraints about how late you can go before you can retrieve them safely?

LT JANNUSCH: When you get into early December then you're starting to look at harbor freeze up in Lake Superior -- or in Duluth and those buoys are out there in the open lake. They don't freeze. A lot of places that they're at, like in eastern Lake Superior they wouldn't freeze for the whole lake, but, of course, shipping season stops by mid January, and then also you have significant risk of ice buildup if you sail in the month of January with below zero temperatures and that sort of thing.

So to answer your question, that's a good question. Some people would want to leave them out there as long as possible, but that also limits our ability to go and get it because the weather windows or smaller. So I think that that would just be open to more discussion between those responsible for maintaining the NDBC program and us supporting you. So I don't have a specific recommendation off hand.

MR. WELCH: Is there a mechanism where we can transmit this observation to the right folks within NOAA?

MR. DUNNIGAN: Sure.

RADM WEST: Just out of curiosity, can commercial shipping run as long as they want to, or is there a restriction from the Coast Guard, or are the locks shut down?

LT JANNUSCH: They do shut down for a short time usually for maintenance.

RADM WEST: Usually 1 December or something?

LT JANNUSCH: January 22nd, there about.

RADM WEST: So if the ice is free, you can sail right up until then, if you want to?

LT JANNUSCH: You can, and actually until the shipping season actually closes the Coast Guard is engaged in various --

RADM WEST: -- That's my question. How do we -- is there some official date it closes, or is there rules, or when does it stop?

LT JANNUSCH: Coast Guard engages in significant negotiation with Lake Erie's Association in the Great Lakes and with the Army Corps to arrive at what day they're going to close the locks, what day is going to be established as the last day of the shipping season. Often times you still have late sailors. Like even though the locks might close, you have people that are going from Sault Saint Marie to Duluth or Duluth to Taconite Harbor or to Marquette because they've got to deliver coal or what have you. They want to get one more run in.

In Lake Superior, at least, we have a partnership with the Canadians to break ice -- or we had, but often times, like, the Canadian icebreakers might lock through down into Huron or whatever before the locks close, so then Alder would be like, for instance, the only "icebreaker" left in the Great Lakes. But Alder is only an ice strengthen vessel, it's not a true icebreaker, so it runs the risk of -- it's not able to back into ice to break, so it runs the risk of

getting beset even while it might be assisting a laker to get through the ice. Then you have a significant problem on your hands with the Coast Guard ship beset, not able to help. The Mackinaw is a true icebreaker built on, I think, a Finnish design. It can back and go forward and break ice. So because of the risk, you know, at some point it becomes unfeasible to continue the shipping season so they shut it down.

RADM WEST: So it depends each year, it's not some fixed date?

LT JANNUSCH: It's usually on our about the center of January is when they stop. And then also at that point then you also have like Superior Midwest Energy Terminal, the Taconite Terminals, all of them start to break because it's too cold to operate their belts so then it takes up to 12, 16 hours sometimes to load these ships, so everything just becomes more problematic.

MR. WELCH: Some of us were talking at lunch about Coast Guard icebreaking in the Arctic and the age of the ships up here. But the Mackinaw is a -- which is the Coast Guard Great Lakes' icebreaker, is new, what, 3 years old or somewhere in that neighborhood. But it is the sole Coast Guard true icebreaker on the Great Lakes.

LT JANNUSCH: The 140's are true icebreakers also. The 140-foot tugs are, but the Coast Guard is suffering from lack of maintenance dollars. Alder is even experiencing problems with that. The 140's are much older than Alder and basically, we're trying to hold them together with chewing gum and Band-Aids. That's not official.

MR. WELCH: Do you want us to have the court reporter strike your

words?

LT JANNUSCH: Sure.

MR. ARMSTRONG: I wasn't familiar with Coast Watch, but I just brought it up here a second ago and looked at it. It seemed in some ways similar to the nowCOAST product. I wonder if you're familiar with nowCOAST; and, if so, do you use it?

LT JANNUSCH: I am not familiar with nowCOAST.

MR. ARMSTRONG: So, if you would, take a look at that and then maybe you can send us some comments on the side in comparing that with what you do use. Hopefully that might be helpful.

LT JANNUSCH: Is that a NOAA product?

MR. ARMSTRONG: Yes, it is. It is a product of the National Ocean Service in NOAA as distinct from the Great Lakes lab.

LT JANNUSCH: I'll look at it. Thank you.

MR. ARMSTRONG: If you just Google "now coast," you'll get it.

MR. WELCH: Doug and Don, we very much appreciate your presence here, your contribution and thanks very much.

Okay. We're a little bit ahead of schedule, but if people don't object, we'll just go ahead and proceed. We are now at the point of the program where we hear from the various NOAA offices about some of their updates.

Juliana, you're scheduled to go first.

MS. BLACKWELL: Since we're early, I guess I get all the time until 4:30 when I have to relinquish the lectern. I will not go that long, but it does give me a good opportunity to kick off with some of

the things that the National Geodetic Survey has been doing. These are not specifically geared towards recommendations one, two, three, four, or five out of the 2007 report, but keep in mind that all these things are supportive of the aggressively map component of the hydrographic services that we are all here talking about today.

From geodesy side, you know, we are focused on precise positioning and the information, the National Spatial Reference System. The models and tools that help identify and give information regarding the land side. You really cannot do mapping and you really cannot pinpoint things until you get the land right. So whether it's marine spatial planning, hydrographic surveying, or water level datums, it all starts back on land. [Next slide.]

Before I get too far into this, today NGS officially released GEOID09. For those of you who use our products and services and do GPS surveying you will have that available. It's on our web page today. This is a different slide, but it did get made live today, so that product is available and will certainly improve the relationship of the GPS data related to the vertical datum that we have. Please go out and test that out if you haven't seen the preliminary products along those lines before now.

The first thing I'd like to highlight in my truly prepared slide is the socioeconomic scoping study that I mentioned back in April when we met in Baltimore. This is something that was done earlier this year and has been available on our website and is still there on our home page. There is a one page version if you just want

to see the specific short version, and then there's a multipage version that goes into a lot more detail.

This is something that we undertook last year in order to get the message out of how important the very basics of what we do are to the big picture. So if you just look at the numbers in general, the National Spatial Reference System, the thing that is the basic infrastructure for all mapping and geospatial needs and products that we use here in our nation, the initial estimates that the value of the NSRS are at $2.4 billion per year. It's invaluable. It really is. That's a lowball number. You cannot do anything, you cannot relate things to one another unless you have an accurate national system in which you are doing that. You can do it. You can't do it well and you can't do it efficiently.

Our CORS, our Continually Operating Reference System, that we mentioned earlier during the panel sessions; the value of that operation itself is $758 million per year. And I know that the gentlemen from Minnesota was talking about the $370 million that they were estimated in benefits from the CORS in their state. They are looking at things using real-time and it went down into a much more detailed study. Our scoping study alone values the product at $758 million per year. That number would only go up if we got a full blown socioeconomic study completed.

Then our GRAV-D initiative which is separate from gravity which is the basic component that this is built on. The GRAV-D initiative, once it's completed, is valued at over $4.8 billion over

15 years, including 2.2 billion in avoidance costs from improved floodplain management. I'll get into that in a little bit more detail shortly.

This study we've completed and we had a rollout to Congress. Several staffers and other individuals interested in our products and services were in attendance at a June 15th event, and it was very well received and we've gotten a lot of follow up calls and interest on finding out more about what this means to the nation. [Next slide.]

I know some of you are very in tune with what we do, but let me back up just for a minute to talk about what GRAV-D and why the GEOID and all this gravity information is important. If we can nail down this basic component, the geoid, using gravity, we can get -- you can use GPS and other satellite positioning systems to get a vertical height, a vertical elevation good to within 2 centimeters that would be relative to a local mean sea level. In other words, it would eliminate the need for huge leveling networks and transferring of validation from point to point to point to point. Something that we had to do years ago when we first developed the vertical datum. If we can nail down the geoid, that sort of goes away and the need to do that on a national level.

Think of it as in before we had telephones in order to talk to somebody on the telephone, you had to have telephone wires connecting one end of the country to the other. Now we have -- and we had to do that with our surveying network as well. You had to go from

point to point to point in order to transfer elevations, transfer angles, make all that fit. Same thing happens with telecommunications as with geodetic positioning.

Now we use satellites. Now you eliminate the need to have this point to point connection because you have satellite based and improved models. So now just like you can use your cell phone -- not everywhere, but mostly everywhere -- the same will be true if you take GPS out and you want to get an accurate position. You can go out, set up somewhere. You won't necessarily need any lines or connections of benchmarks in order to get the information that you need using GPS. You can get horizontal as well as vertical positioning to the accuracy at a 2 centimeter or less level. That's what GRAV-D and our use of our CORS network is bringing to fruition. It's going to take several years to get there, but in the interim we are trying to continue with the products and services that we have, as well has grow new products and services for the future that will make this happen.

So the airborne gravity using an airplane to collect this gravity information across the entire country is going to make this improved model possible. Tied to that is going to be a need for terrestrial gravity data to quality control ground control this information. So those are the types of gravity holdings that we are wrestling with to make sure that we can define what we need to collect and use that data appropriately to create an improved model which will then lead to a new vertical datum. We've used the date of 2018 for a new vertical datum. That is dependent on the resources that we have

and that we can apply in the next year so that we can make that happen.

So 2018 is our target date and it will enable orthometric heights or elevations on maps good to 2 centimeters anywhere. Being able to use that and being able to track the changes in heights using just GPS is going to be a tremendous benefit to the country. Gravity for the nation will benefit things, including the imagery for the nation. LIDAR for the nation, elevation for the nation, whatever you're using, or whatever you need, having that basic GEOID model that's going to be available -- vertical datum that's going to be available through GRAV-D is going to be the very infrastructure that helps build that. [Next slide.]

So we've been starting out on this process over the past couple of years with acquiring the basic tools that we need, personnel and instrument. And then basically developing specifications to do the work so that once we get this basic specifications and guidelines completed we will be able to share that with others. It is a slow process. We have been growing this program internally and using our own resources to do this through our height modernization effort.

In FY10 there is $4 million in the President's budget to begin GRAV-D as an additional add on to our regular budget. We'll have to wait and see what happens. That is still not complete yet. We're hopeful to be able to launch on a greater effort next year to get GRAV-D the next step down the road. [Next slide.]

So we've done some of the prototype work in Alaska. We've

done some gravity collection in Puerto Rico, Virgin Islands and actually have completed those islands for the airborne gravity and terrestrial gravity. And we've done some work along the Gulf Coast from western Florida all around to southern Texas and that data is being processed and we hope to be able to have beta models available for those areas for people to test out and to touch and use on their data so they can see how they match up. Hopefully that will be available some time mid-year 2010.

MR. WELCH: Juliana, excuse me. If your fiscal '10 budget request comes through and you get that $4 million --

MS. BLACKWELL: -- four million.

MR. WELCH: -- Yeah, 4 million --

MS. BLACKWELL: I thought I heard "billion."

MR. WELCH: No, that was wishful hearing on your part. What specifically do you plan to do with it?

MS. BLACKWELL: One of the first areas that we'll be covering is Alaska. So that is the primary target for the use of funds for 2010, if that money comes through. Alaska is the first place we'd go.

MR. WELCH: Is there a priority list in terms of need, and who sets that? Or is it more who is a potential partner that's willing to step up and provide some resources?

MS. BLACKWELL: I'm glad you asked that. It's a hybrid. We have set in our GRAV-D project plan, which is available on our website, there is a plan as to how we would do things given, you know, here's money and go off and do where you think the greatest need is. It

starts with Alaska, the coastal areas of Alaska and then it basically goes to coastal areas around the country.

Now we've also been in discussion with the Great Lakes areas in trying to fit that in soon so that we can have that be part of IGLD. So it will also depend on the priorities of where things are needed the most as well as who we can partner with. So because we have sent out partnership letters to seven other federal agencies, we've already done some work with Naval Research Lab and NGA, as well as U.S. Army Corps of Engineers looking at where they are going in their project areas is also going to play a part in this. So the answer is "yes," both. If we had her own funding and we could set our own priorities and if we're partnering with other agencies, we will do what we can to fit those in as well.

MR. WELCH: Thank you. One last question. Do you require special aircraft to do this or can you modify just about anything or do you use your own NOAA aircraft resources?

MS. BLACKWELL: We want to be able to use a variety of platforms. And so last year we did a lot of it primarily on our own aircraft that has now been -- or in the process of being retired. We are looking for opportunities to do it on other platforms. The NRL plane was a much larger plane and so there's all sorts of specifics as far as how high the planes go, how fast they go, and all those things we are looking at so that we can identify the cut offs for where we can actually -- what types of planes we can use. I would say there are a variety of platforms that can be used and the specifics are the things

that our project manager is working out right now and what type of aircraft and what are the conditions that it can be -- airborne gravity can't be flown at. So it's not just one type of airplane.

MR. WELCH: Thank you.

MS. BLACKWELL: [Next slide.] So moving a little bit away from the GRAV-D. Just reporting out on some of the other performance measures in general that the National Geodetic Survey has accomplished this year. One of our goals is to fully enable U.S. counties with accurate positioning capacity. We do this in a variety of ways for folks that use our CORS network and upload their own data into our OPUS product as well as people that send in leveling or GPS projects that get submitted into NGS and included in our integrated database. As well as for those areas those county surveyors and engineers that use our products and services and say that NGS is reaching their county. We've got performance measures, and our goal for FY09 was 69 percent, and although quarter 3 numbers are up here, we have met these goals. You can't see it very well, it's in a light blue or a light green, but the FY09 goal of 69 percent for this year has been met.

Likewise, the second item up here, "update the U.S. shoreline" the FY goal of achieving 3.3 percent of that has also been met this year, and we're going to hear more about shoreline mapping from Mike Aslaksen tomorrow afternoon. I think that translates to approximately 5500 miles of shoreline that's been mapped for FY09. The next two, "updating shoreline in priority ports," the FY09 goal of

16 percent, I believe that translates to about 28 ports that have been accomplished and completed this year. And then "analyzing priority ports for changes," the goal of 14.9 percent has been met and that, I believe, translates to 27 ports. I don't know the difference between 27 and the 28 numbers, but we'll ask my Mike later.

MR. ASLAKSEN: The percentage of 185.

MS. BLACKWELL: Thank you. [Next slide.]

So here, just recapping on the FY10 budget, the President's budget as I mentioned. The President's budget did include the $4 million above our base for GRAV-D. And height modernization; a question I get often is, how does height modernization and GRAV-D -- what is the relationship there? The way I like to explain it is, national height modernization started before we had the plan, the technology, the capability to even think about doing an airborne gravity geoid model. GRAV-D is really going to be the technical fruition of a height modernization for the nation.

In the meantime, height modernization and things that have been done through our states, through the grants -- this year I believe we issued nine grants for height modernization projects and outreach and education to states. That communication, that outreach and education is really critical, not only for GRAV-D but for all that we're doing and bringing things into the future. Having a change in a datum is traumatic. As you've heard them talking about IGLD. This is a big deal. Getting legislation and getting people thinking about the issues that are going to be -- need to be addressed before rather than

later when it hits and people don't know what to do with it. It's a big outreach and education effort.

So I would say that national height modernization program does a lot with the nuts and bolts in a statewide effort and helps with CORS and some of the on the ground stuff that needs to be done. It also helps educate users in the way the nation is going and the way NGS is looking to partner for ways to improve the gravity and geoid model for the next generation.

The second part of this slide just addresses our mapping and charting base. The fact that there is $2.95 [sic] million in the President's budget for mapping and charting and our shoreline mapping numbers are $2.4 million, basically the same from last year. [Next slide.]

I just wanted to show what we're planning for potential milestones for next year, so that I can report back to you the next time I'm here on how we're doing on these types of things. But being able to, like I said, go to Alaska and do half of what's needed around the coastal areas of Alaska primarily for our first collection. Helping define how users will access our new gravity-based vertical datum, getting people set, getting the basic documents and explanations developed for the user community and planning for our 2018 type of rollout for our new vertical datum.

Jump down. Finalizing and announcing the definition of a new geopotential datum in preparation for redefinition in the next 10 years. Same type of thing; getting folks prepared. Going to more of

a CORS-based National Spatial Reference Systems so that you're using CORS as those cell phone towers, let's say, for your basis for your surveying and our real-time networks and what we'll be doing real-time in the future. Not having to rely so much on passive monumentation. Getting people to think about how it's going to be at ITRF, an International Terrestrial Reference Frame, that's going to be adopted sometime in the future to base all of our work on. There will still be a national datum, but thinking more in an international standards sort of way with what the future holds.

Then being able to estimate the vertical velocity of our CORS stations. We've done a really fantastic job of showing change in horizontal motions of what's happening with CORS, but being able to use the vertical motions and change to improve our models and tools is something that we're going to focus on for next year.

Then looking at completing our OPUS suite of -- or maybe not completing, but at least completing OPUS projects which is something that, if anybody submits GPS data to NGS knows, it has been a long time in coming and is something that folks have been asking for. So that they can submit their data, the metadata, and get their projects into NGS and sort of that stamp of approval on them in a much quicker timeframe than we've done in the past. [Next slide.]

It has been mentioned a few times and I know Mike is going to talk about it in his update, but the -- maybe we should start with that. Why is there going to be an update to IGLD? Because, as we mentioned, there's a lot of change going on. And over a 30 year

period of time the goind itself has got some problems in it that's going to be on the range of 40 centimeters. So having an updated geoid even in this area is going to bring significant change to the vertical datum that we have today. I think there are probably areas where current elevations have meter level accuracies due to the poor gravity set that we have available. If we can get the airborne gravity flown and incorporate that into the IGLD for 2015, that will be a huge success that will allow centimeter level accuracy just with using GPS in the future.

The big red arrows are obviously the ones that I want to point out that are the significant changes in the vertical changes that have been measured and you can see the yellow arrows are going in the other direction. So it's not a uniform change that is happening and it is sort of split. So having this revisited on a -- I don't know, it looks like it's a 30-year cycle, but I won't say that it's always every 30 years there's a new IGLD. It's approximately been 30 years since the last one was done. Working with the Canadians in order to identify how that's going to be -- what we're going to do for 2015, and what we're going to hold fixed, and how we're going to make these adjustments that are going to be required from both sides of the border is something that is going to be an ongoing effort next year. [Next slide.]

Three other highlights. One is our use of our CORS network to provide users with the ability to send in their data, their single point data and get a position emailed back to them. This has

something that a lot of folks have used for their projects to set control for their project areas. Something that we've been able to add on to bring like a rapid static flavor to our OPUS, Online Positioning User Service, and now looking at being able to allow folks to submit projects online in the future so that they can do this with less complicated formats than we've had in the past.

Basically, people submit their RINEX GPS data to NGS. It gets processed using three CORS sites that are in the area and they get back a very accurate position with a whole bunch of metadata associated with that. It's been a very popular product, and I think will just continue to grow as folks stop relying so much on the data that's out there now, the benchmarks and the survey marks, but also to validate what's out there now. Because we know the Earth is dynamic. We know that just because an elevation was good 50 years ago doesn't mean it's good today, and you need to have a way to check this. This is one product that we've made available to allow people to have that feel for whether or not the information that's in our database is still valid and accurate. [Next slide.]

Then for those who love to submit leveling projects, this is a new service that's available. We're calling it LOCUS. It provides a tool for users to submit their vertical control data the leveling data to NGS to have it apply the same type of reductions and correctors that we used to do by hand. It is all being done now using our programs, but it makes it a lot easier for folks to get that information back and then they can use it without having to wait for

NGS to load it into our database and go through a time consuming process for that. It's in beta mode right now. Folks are beta testing it for us and it should be released early in 2010. [Next slide.]

Lastly, I just want to take a moment to introduce a couple of our state advisors. NGS is one of the groups within NOS that has folks all over the country, just not in the coastal and the Great Lakes area. We don't have an advisor for every state. You're going to hear some more about the state advisor program tomorrow from Doug Brown, our Geodesy Program Manager who is here with us today as well about what the future looks like for the state advisor program and some recommendations that he's gotten from the study that he's recently conducted.

We have Dave Zenk who is here from Minnesota, and we have John Ellingson who is here from the State of Wisconsin. This is a cost sharing program. These are NGS employees, but the states that we have agreements with provide office space as well as partial funding for these individuals. So these are our folks that are out in the trenches basically being our points of contact for what the user community is doing and needs as well as providing them with information about NGS and NOS and NOAA products and services. We have a great number of them around the Great Lakes area. So if you haven't met them, whether you're in the Great Lakes region or somewhere else, I would invite you to contact a local state geodetic advisor and see what they can do for you.

The last thing I just want to mention is, Ronnie Taylor, who I think a lot of you know, was recently selected as the Deputy Director of NGS. So things relating to Florida no longer go to Ronnie Taylor. We have a new advisor who is going to be coming on board, actually he's onboard this month, John Newcomer who is our new Florida State Geodetic Advisor. We also have a new advisor for the State of Oregon, and that is Mark Armstrong. And Dan Prowdy (ph) will be starting as the state advisor in Texas later this month. So we do have a few new folks, and Ronnie has now got added responsibilities and has been grounded and stays in Silver Spring most of the time which is a constant battle for me. Anyhow, it's my gain to have him as my Deputy. I just wanted to make sure folks knew about that change.

I know I took more time than I was supposed to, but do we have time. Any questions?

RADM WEST: Juliana, I've got a question. Who is responsible for shoreline mapping? Is it you, or USGS?

MS. BLACKWELL: It's Mike.

RADM WEST: Yeah, but you're standing up there.

MS. BLACKWELL: We are.

RADM WEST: Whatever happened to the national map?

MR. WELCH: That's USGS.

RADM WEST: Yeah, but that's supposed to go right down to what; what water line?

UNIDENTIFIED MALE: [Inaudible.]

RADM WEST: I've asked this question for the last 4 years, by the way.

MR. ASLAKSEN: They say mean sea level, but the actuality of it is that they will derive a shoreline at the time of flight. If they're actually flying coastal counties anymore for updating the quads. Their limited resources have really not allowed them to do updates of quads on a recurring basis. So what you're actually seeing out there often is sometimes satellite driven, sometimes from NOAA. Lots of different sources make up a national map at this point in time. As Juliana alluded to, there is something called imagery for the nation. This is being driven out of National States Geographic Information Council. Basically consolidating all federal funds for imagery acquisition to remap the country on a regular basis, which USGS is behind.

But to answer your question, yes, we define the national shoreline, the official shoreline that's used in boundary determination, middle manage service, those type of things as depicted on the larger scale nautical chart. NGS is the source of that data.

MS. BLACKWELL: Any other questions?

MR. DASLER: The comments you had about 2 centimeter everywhere and with the GRAV-D, I think that is a great effort that NOAA's doing moving that forward. I think sometimes there's a misconception that you can use GPS heights for accurate vertical observations and differential height measurements, and I think it even gets confused among different line offices within NOAA. Because even on some of the

presentation it seemed a little conflicting when you say you can do an OPUS height to very accurate position in elevation data. I'm just making some observations and actually welcome your comments back and input on this.

So the professional surveyor and you out using GPS for differential height measurements. I mean, obviously you're going to be doing checks into the path of monuments and in the long run you'll be able to extend baselines and move that forward, but that's not to say that can't use GPS heights for very accurate elevation data now, and I think it's creating some confusion that -- where that's not being moved forward. So other methods that are less accurate are being used just because it kind of seems a little scary, I think. Can you speak to that?

MS. BLACKWELL: Sure. GPS can be used now to get an elevation. It's going to be based on the ellipsoid. If you're confident of your starting point, your orthometric height, the vertical datum height that you want to start with, you can use that and you can keep going back to that same point and using GPS to see if there is change. Or you can take another measurement on another mark and get a height differentiation based off your GPS ellipsoid height even. That's possible today.

What a lot of folks want to be able to do is use the vertical datum, the information that's been on the benchmarks that was established over the last 70 years and use something that is relative to a means -- a local mean sea level type of height. We know there

are problems with a NAVD88, and so we're in this transition period of saying, "Yes, you can get 2 centimeter heights now," but in a lot of places you can't get a true 2-centimeter height just using GPS because it's not the type of height that all surveyors need getting an ellipsoid-based height. There are places where there isn't a vertical network that's been validated or updated in the past several years to give them that orthometric height that they may be looking for.

Using GPS is going to get a lot of the big errors identified if you're trying to use that in the geoid model that we have today. Truly the key to this is whole thing is nailing down the geoid model so that you can eliminate any of the past vertical datum issues that have been put into the system or the fact that heights have changed. If you can take GPS out and do a measurement and do it repeatedly every time to check that height or to determine the velocity of that change in height, then that's where we're going to be in 10 years.

Right now, yes, GPS can do it, but it doesn't give everybody the heights that they are looking for because a lot of them are referenced to a more of a vertical datum that is referenced to a geoid or gravity information. I don't want to get too much in depth, but there are ways to use GPS now that can give a lot of folks what they need, but it doesn't do it all yet.

MR. DASLER: I guess it just depends on how you do it, because I think the ultimate answer is heights relative to what. And if you say NAVD88 is defined relative now to all the monumentation. For example,

we know there's a lot of problems along the Columbia between Oregon and Washington because it was conventional level runs that were run and there wasn't a way to bridge the gap. So GPS was able to identify a half a foot elevation difference between monuments right across from each other across the river. And actually it was the use of OPUS solutions on that that was able to resolve those issues to where you could -- because you couldn't rely on benchmarks on either side and have the river grading slope across, you know, half a foot, just across the river bank.

So using methods that ties into that in differential measurements and then hopefully identify these anomalies. One of the other areas -- actually the U.S. Army Corps of Engineers is about to do a treaty with Canada on flows of the Columbia River and these red areas are all of the areas in Oregon, Idaho, Washington, Montana that there's going to be LIDAR flights and model of the flows of the Columbia River. So they're relying heavily on GEOID models and vertical datum as you get out to the coast to cover a lot of these areas.

One of the real problematic areas is Hell's Canyon. We do a lot of work for Idaho Power and through Hell's Canyon and they basically gave up on trying to get anything on NAVD88 in Hell's Canyon and have done everything off of ellipsoid heights.

MS. BLACKWELL: Again it's kind of alluding to having all those wires across the country. If you had to continue to update those wires to keep your phone service in, then when things go out in a

certain area, it may take a long time to get service restored.

Same type of analogy, there are areas, there are pockets where there's no way we're going to be able to go out there and re-level a huge area to get those accurate elevations to an orthometric height that you're looking for doing things that are geoid-based, modeling-based are a much more efficient way and will continue to improve the accuracy of the height information that you can get based on a geoid model, especially in pockets of areas that are subject to a lot of change or are difficult to get to in order to updated any other way.

MR. DASLER: So last week we had a meeting with the Corps of Engineers because we were worried about this and establishing a control because all of this, even though it will be aerial topographic LIDAR, but it's all going to be GPS controlled. So the decision was made to establish all monuments based on OPUS solutions, so don't rely on local monumentation. So they'll be putting in a network of OPUS position sites that are going to control the whole survey. I guess that said, I know you had some list of where you could get funding, but this is a pretty big effort moving forward by the Corps of Engineers. I would suspect there could be some significant funding to resolve some of those and would NGS be open to --

MS. BLACKWELL: -- We would love to to talk to the Corps of Engineers in that region. So we can talk later. We are looking for partnership efforts. Whether it's federal partners, or state, or even universities if that's a possibility to share resources, whether it's

plane, people, whatever we can barter with. Those are all opportunities we are looking into and we've already had some success and we're looking forward to future successes as well. Thank you.

MR. WELCH: Thank you, Juliana.

Next we have Mike Szabados, CO-OPS.

MR. SZABADOS: For all those who think that storms only happen when the salt water is involved, here's the Ludington lighthouse here in Michigan. So having some personal experience on Lake Erie, I know how a quick it can kick up out there. [Next slide.]

I'm going to summarize my presentation to the Five Most Wanted. The first one I want to talk about is, again, aggressively to map the shorelines and the waters, you need a vertical reference system. Not just along the ocean coast, but obviously here in the Great Lakes. It's an effort collaborated with NGS, CO-OPS, and the Canadians. It's about every 30 years. It doesn't have to be 30 years, but, I think one of the major reasons why is the resources it takes to do it. It's a major undertaking an important one. I won't get into too much into it. Juliana did a great job explaining the necessity of it with the isostatic rebound going on in the Great Lakes and the other challenges with, obviously with the watershed. But the great need for it. I did want to talk a little bit about what we are planning and the scope of it. [Next slide.]

We're looking at over 120 short-term water level stations as part of the process. It's about 20, 25 a year we're looking at over a 5 to 6 year period. Right now in our planning process of doing

that, again, we have to coordinate with the Canadian side, as well with our partners in NGS and the collaboration with the CORS, the GRAV-D, all those components. So it's a major undertaking. Even though it probably could happen -- a need for it more frequently, I think, logistically with resources it's going to be on a 20 or 30 year cycle. [Next slide.]

Also integrating the coastal data sets. Another important thing is the reference frame. I'm going to emphasize the geodetic as well as the water level. [Next slide.]

One of the things I mentioned at the last meeting, the Army Corps adopting the NGS and CO-OPS standards for geodetic and water levels. That's critical, again, not only does NGS geodetic but CO-OPS is responsible for defining sea level for the United States. That means mean sea level as well as the tidal datums. That's really important for IOCM as far their integrating with different data sets from different federal agencies that we're all on the same reference system. Again, NGS and CO-OPS and the Army Corps are collaborating on this.

I know over this upcoming year in FY10 we have some specific activities. We have training, we've got training manuals. The Corps has established datum coordinators in each of their districts. We are working on a certification process with the Corps, with NGS and establishing those standards. This is going to go a long way to a greater sharing of data between the two agencies. [Next slide.]

Under modernizing heights, implementing real-time water level and current observing systems in our major ports. I want to highlight that first of all, we updated the number of our full-time stations from 205 to 210 in the United States this year. In addition to that, we did some major upgrades to some of our stations. Particularly here in the Great Lakes. We've updated, I think, five in Michigan, and two more in Michigan in FY10. I just want to highlight some of that a little bit. [Next slide.]

The previous slide had the station. It's like the top of an iceberg. You see an ice station, but what's below it is -- in here in the Great Lakes because of the environmental conditions of the lakes freezing over we have to develop with the wells and intakes to go out to the lakes. It's a major undertaking. We do this in collaboration with the Army Corps. The Corps has provided the engineering support for this. But this is a major undertaking and so far over the past 3 years we have upgraded seven of these systems and these systems were installed over 50 years ago. So it's important to maintain these stations, to maintain the quality of the information. [Next slide.]

In the area of updating tidal current tables we used a major work plan in FY10 in Alaska as well as Long Island Sound. We have plans for updating 38 of the tidal current tables in Long Island Sound, 22 in Dutch Harbor, and 11 in Glacier Bay and Cross Sound. We just recovered over 40 stations up in the Aleutian Islands around Kodiak Island with 100 percent data return, so things are going well

as far as the current reader updates.

PORTS®. As I highlighted in the spring we were planning to do Lake Charles late spring. We successfully installed that. We had a great ceremony with Adam in Lake Charles and lower Mississippi this month is going operational.

We have a little story here. While we were installing the lower Mississippi on the Huey P. Long Bridge the is an air gap sensor which we were installing. It was installed, but not operational, but we were contacted by Northrop Grumman and the Navy. The USS New York was being built just upstream of the Huey P. Long Bridge. I don't know if you know it, but the U.S.S. New York, the bow of that ship is made from the steel from the World Trade Center. So -- every Navy vessel is important, but this one is somewhat special.

Their height had extreme water levels in the Mississippi River and there was a question of the height of Huey P. Long Bridge and whether the ship could fit underneath it. They found out that we had a sensor on there. Unfortunately, it was not working, but we turned to, we recognized the importance of it. So prior to going operational later this month we made it available. We turned it on and actually I had the privilege of being aboard the ship and providing the information. Part of the story here is when you see the ship go through, it was not the first stack but the second stack that's important. They can flood the back of the vessel, but if they flood it too much, the front stack comes up. It was the back stack which is the highest, they stripped it down as much as they could and

based on the computations by Northrop Grumman and the height that we provided they had a clearance of 2.1 feet. [Next slide.]

MR. WELCH: But, Mike, if I could. See that might be something that we might want to feature in an update in the Most Wanted Report.

MR. DASLER: Is that a radar gauge that's being used for that?

MR. SZABADOS: It is a microwave gauge, yes.

[Video played here.]

There goes the first stack. Also notice the trains on there. That was not planned. As we were heading down I had a few choice words about why we had a train on the bridge when we were going underneath it with only 2.1 feet of clearance. Fortunately, we had the real-time information and Northrop Grumman's computations were correct and so were ours. So it safely went to sea for sea trials.

MR. DASLER: What kind of accuracy do you think you were getting with that?

MR. SZABADOS: I would say, based on our computation and actually the measurements were within inches. [Next slide.]

Under number four, strengthening NOAA's navigation services for emergency response and recovery. Along with our water level gauges which is important for a storm surge, we're also implementing real-time meteorological sensors and at the end of this year we'll have over 165 and an additional 29 are planned for 2010. I think five of those are for the Great Lakes for a total of 194 stations of our 210 will have Met stations. The remaining ones don't have the Met because Met everywhere isn't suitable because you might have a

structure, a tree, and it's not appropriate to have a Met sensor with wind speed and direction. So, basically, by the end of 2010 every appropriate NWLON station will have real-time water levels and meteorological conditions. All that information is not just used by us, but sent to the National Weather Service for their forecasts. [Next slide.]

In the areas of providing this data in other areas besides navigational services. If you recall, last spring I talked about our sea level product and how it is available. What I do want to highlight is some of the work that we're doing with the Army Corps. The Army Corps is using this information as their basis for all their engineering new construction in coastal areas. The Army Corps has come out with a guidance document which we work with them in how to utilize this information as the basis for sea level change, and a copy of it has been provided to you in your pamphlets. But basically it takes the sea level rate of change at our stations and provides a guidance of different scenarios of sea level rise so they can take that into the planning of their engineering projects. Again this is a good application of using our navigational information on sea level and applying it in construction. [Next slide.]

Also along this line of monitoring the sea level, when we look at our real-time information and put out predictions, occasionally we'll have a storm surge and we'll see an anomaly, but sometimes there will be an anomaly which is not associated with the storm. As Jack indicated, this occurred this June and July where we

got reports of our predictions being off as much as 2 feet. And we were actually monitoring it and noticing that difference. Again there is no major storms going on and so we did a quick analysis.

We first put an alert out that we had such a condition for safe navigation. Also we gave it to the Weather Service because there was reports of rip tides and other activities going on. So we put out an alert on our website as well through the Weather Service. But we did a quick analysis and interesting enough we found two factors which contributed to it.

First of all, there was a persistent northeast wind which was not particularly strong, but persistent which would push water up against the east coast. This was an event going on from Maine down to Florida. That is the extent of it.

But a second thing, in looking at the Florida current there was a reduction of the current coming up from Florida, a reduction in the the Gulf Stream and reduction in the Gulf Stream. Well when you have the Gulf Stream going up the east coast, there's water -- not just goes up, but it pushes the water to the right a little bit. I won't go into the oceanography, but it pushes to the right. When you have reduction in the Gulf Stream a relaxation sort of comes down and the slope reduces and the water comes up against the east coast. So that along with the winds resulted in this and we just got this publication out. And again getting to the public -- getting that information in real-time not just in predictions is critical. [Next slide.]

This year we did a survey. There's a national survey -- there's a company that does a national survey for the U.S. government on customer satisfaction. It is a contract with the Department of Transportation, and the National Weather Service is using that contract to assess how well it is doing. We had the opportunity to join the National Weather Service and get an assessment of our products and services. The company is CFI. It was about a 3 month process where they came in and did a survey of our customers.

Basically the report back was -- first of all, why do I have sailboats up there? I should have known this, but our number one user is the recreational boater. Thirty-eight percent of our users are recreational boaters by this survey. But our scoring was 82.1 which was somewhat higher than the average for the government of 68.9. When I did ask, "Well what can we do to improve that?" They said, "Well really you just want to try to maintain it. You don't need to improve it, just try to maintain that because that's a very high level." We're overachievers. We're going to try for 90 or higher. [Next slide.]

This breaks it down to some of the categories they looked at. This was how it was rated. They looked at accuracy, timeliness, met the user's needs, clarity, organization of information. Obviously there's always room for improvement. Like with the Great Lakes line it seems like we need to do some more work in making that more accessible or easier to get to. But, overall satisfaction -- it also breaks down to 88.4 percent of the users were going to take action

based on this information and 87 percent showed a confidence in CO-OPS. [Next slide.]

Just to break down the budget plan for FY10. For the first time, I think, since the 10 years I've been Director, I've seen the House mark and the Senate mark the same. This is a good thing. Normally the Senate's up here and the House is down here, but they are both at the President's request which is very promising.

On the Senate mark -- well we haven't seen the whole Senate mark yet -- I take it back, not the Senate mark. The Senate has not voted on it yet. This was a subcommittee markup. There is $3.8 million for PORTS®.

I also did want to highlight a little bit how we're using stimulus funds. About $1.8 million; we have a 3 year contract to develop something similar to OPUS, but it's what I've been calling an ATM window for processing water level data where the contractors for coast survey or even the Army Corps, people who collect water level data want to process it to our standards and come up to our datum computations. We're developing a software package which is web based where people can come, enter the metadata, process the data. I think this is going to hopefully improve the process of getting contractor data into coast survey, as well as a collaboration with other agencies like USGS and Army Corps.

Also some of the funds are getting people on board to -- coast survey is doing a lot more surveying, and so to be able to handle that workload in validating that data and processing some of

that information we're bringing some contractors on.

That's basically it. Any questions?

DR. JEFFRESS: Mike, why wasn't there a request for PORTS® O&M when this panel has continuously requested that NOAA seek funding for O&M for PORTS®?

MR. SZABADOS: Good question. Let's say there is a NOAA budget process which we do request some funding. What is represented here is what is submitted by the President. This obviously is the FY10 budget. I can't talk about the FY11 in a public meeting; can I?

MR. WELCH: You can, but you might not be in your job much longer. Let's recognize Jack.

MR. DUNNIGAN: So I think the answer to the question is that nothing has changed yet. The continuing discussion within the government is that there are some specific beneficiaries of the PORTS® system and the basic business model that we use today of having the government design and install systems and then having private partners be the operators and the maintainers of the system is a fair way to do it. Not everybody believes in that argument. But that is still the one that is prevailing within the administration's consideration of what budget to propose. I don't think I'll lose my my job is saying that.

MR. WELCH: Of course, that argument doesn't prevail with the National Weather Service data where there is a whole host of private folks that benefit from it. But the government seems to fund the installation as well as the operation and maintenance of a lot of the

Weather Service products.

MR. DUNNIGAN: Well they have too big a host of people who benefit from it. The argument is that for PORTS® systems you have a port that is an aggregation of businesses where there's a lot of economic focus where they can generate the funding to support those. That's the argument. There are other arguments that some of us make from time to time, but so far that hasn't changed.

Now, President Obama didn't really do much with the FY10 budget. He looked at it for a couple of weeks and just made some marginal changes for some major policy things that he cared about. So there will be another crack at this in '11. I'm not hopeful that the position is going to change. I am hopeful that the position is going to change, I'm not expecting it to. But the arguments are still being had on a year-to-year basis.

DR. JEFFRESS: My point is here that I think the panel has agreed at all the meetings that I've been to that the transportation system -- maritime transportation system, particularly the pilots that are responsible for the safe navigation of vessels in and out of port, rely on this data more so than the public relies on the weather data. It's that important. That's just my assessment of what we decided.

MR. WELCH: Other comments or questions for Mike?

RADM WEST: Mike, was there any language with the Senate mark?

MR. SZABADOS: Yes. I don't remember it verbatim.

RADM WEST: I don't think that's enough to maintain all of them; is that right? So obviously that's geared to somebody's port.

MR. SZABADOS: That's funding to -- that's correct.

RADM WEST: Which is what we want to get away from. That's worse than -- so there is attached some language to it?

MR. SZABADOS: It doesn't have specific locations. But we do get guidance from appropriations.

RADM WEST: Remind me, again, how much it cost to maintain one a year, roughly?

MR. SZABADOS: It varies on the size. About a quarter of a million dollars, let's say on the average.

RADM WEST: Okay.

MR. SZABADOS: It varies on size of the PORTS®. By the way, the USS New York going under the bridge was $1 billion.

RADM WEST: It cost $1 million.

MR. SZABADOS: $1 billion. The ship.

RADM WEST: Oh yeah, a piece of cake.

MR. SZABADOS: I don't know about the bridge and the train on it what it would have been.

MR. WELCH: Any other comments or questions?

MR. DASLER: Mike, can you give an update because I know the PORTS® system on the Columbia was moving forward and then -- it was my understanding that that was going to be the first port that was going to start integrating the use of AIS. Do you have any update on that? Has that been operating yet, and if so, how well that's been working?

MR. SZABADOS: AIS is still under testing and integration. I don't have a specific date when they're going to go operational. That

is going to be a Coast Guard decision. I can say this is that I know the Coast Guard is concerned about some of the future funding for AIS, so some things may slow down.

MR. MCBRIDE: Mike, I want to talk about datum references for just a moment. This may be more detailed than you're ready to deal with today. One of the issues we are facing right now is that the Corps is moving to change the datum it uses on the channel references in the Calcasieu Channel. I don't remember exactly which one they're using. It's either mean low or low gulf, or mean low or low water. The difference is about 10 inches, and it is going their way. So they are actually counting how much money they might save if they change the reference on a 40-foot channel, and now only have to dredge it to about 39.2. I'm using the old reference. So we're having that debate with them.

At the same time we looked into what's going on over in Texas to see if they're having the same problem. The Corps in the Galveston district uses a different datum, mean low or low tide. Earlier in your presentation you mentioned the need for the Corps to adopt your datum so we can get some consistency through those processes. Do you have any hope that that might ever occur?

MR. SZABADOS: Yes, I do.

MR. MCBRIDE: What's the basis of that hope?

MR. SZABADOS: First of all, there's a directive from the General of the Corps that they will do it. They've actually established a team to implement that and part of that, in each district there is a

new position which I'm going to call a "vertical officer." I'm not sure if that's the title, but he's the vertical officer and he's going to be responsible to make sure that each district project is meeting those standards set out by the general which are to utilize the NGS and geodetic datums and the sea level datums that we establish.

Now in terms to your specific issue of the Corps dredging to mean low gulf, or something like that. That was a fixed datum which was never ever changed. Actually I think some -- it was explained to me some of the concerns that legislation has been, "you shall dredge to this depth." Well what we're doing is to work with the Corps to understand the difference between that depth and mean sea level as we define it, or mean low low water. So our intention is for them -- not to have them change -- they could still dredge to a certain specific depth, but it will be referenced to mean low low water. That's the key thing that it's referenced to the same reference system. Now there may be different interpretations how some people may want to leverage that.

MR. MCBRIDE: I appreciate that. In fact, we're having that debate with them. But whether they win this foot and all the money that goes with it, certainly all of the petrochemical industries up and down this channel or our channel then are --

MR. SZABADOS: I appreciate your position. I understand --

MR. MCBRIDE: What is the official CO-OPS -- refresh my memory, what is the official CO-OPS datum that you use in the Gulf?

MR. SZABADOS: It's mean low low water. That's chart datum.

That's official chart datum.

MR. MCBRIDE: So their authorization is to mean low or low gulf and they are supposed to make this change and --

MR. SZABADOS: Again, they are supposed to make the adjustment again. If the language is to a certain depth. They just need to make that correction so when they present the data it is to mean low low water.

MR. MCBRIDE: This is one of the challenges of these differing datum reference points and different jurisdictions. As we heard earlier the white spaces that exist on the NOAA charts versus the Corps charts, et cetera. There's a significant need nationwide to make some sense of all these jurisdictions and different reference points. Thank you, Mike.

MR. DASLER: Just to comment on. So post-Katrina -- I mean, the Corps kind of recognized the need for that and so they've actually now -- and Don can correct me here -- but it's a vertical datum specialist that's assigned in each district and then there's the technical lab, TEC, in Arlington, James Garster (ph) I know has been doing a lot of work on that front. So they recognize that need and as a result of that, they've assigned a vertical datum specialist in each district to help resolve those things and hopefully that's also going to include water levels in working with Mike's group. So, hopefully you're involved with vertical datum specialists from the Corps --

MR. SZABADOS: -- NGS and CO-OPS are both doing that. Let me just say that I commend -- I'm sorry, go ahead.

MR. MCBRIDE: I just want to point out, Jon, that it was nothing quite as clear cut and definable as Hurricane Katrina or Rita which blew through our neck of the woods. They were instructed by Congress 10 years ago to make the change, and they're kind of getting around to it now, sort of maybe thinking about it. That's just the way -- I mean, the Corps moves at that pace. They were instructed and awarded, I believe, 10 years ago to convert to these other reference points. It's the Corps.

MR. SZABADOS: I would just like to sort of commend the Corps right now. The team that I see put together and implement this and the commitment. Let's say it is a great team and I compliment the Corps because it's a challenge. It's going to cost them quite a bit to make this transition and they're struggling with that.

DR. JEFFRESS: I think I can add to this. I've been working with the Corps on this problem. The title is "Datums Coordinator" is what each district is being appointed. They are struggling to fill those positions with qualified people. They've lost a lot of their surveyors over the years. A lot of people don't particularly understand what a datum is. But the two datums your referring to, the New Orleans district the language that funds the dredging there specifically says that you will dredge 40 feet below mean low gulf which was established in 1911. So between 1911 and now we see there's a two and a half foot difference. So if they move from mean low gulf to mean low low water, there's two and a half feet of dredging they don't have to do until that fills in.

In Galveston they use a datum called mean low gulf which was established in Texas in about 1935. They're still using that because according to the way they are funded, those two datums are specifically mentioned in the legislation that comes out of Congress. So it's a political thing now. It's not a science thing.

MR. MCBRIDE: I quite understand, but if you're a ship owner and you got 40 feet on your ship, there needs to be 42 feet of water in that channel so you can safely get up there. Call it what you will, measure it in raisin lengths or something, but there should be a whole bunch of them.

MR. WELCH: Mike had a slide a couple ones back where he was indicating some of the achievements of the past fiscal year and one of them was the installation of the PORTS® system at Lake Charles.

Adam, do you have any comments about how that went or how it's going or what you know about it?

MR. MCBRIDE: Thank you, Ed. There's been a lot of interest in our community. Our navigation director and I have been asked to speak to a lot of local groups. There's really a substantial number of individual users. Some problems on startup and, I think, probably predictable kinds of availability or reliability issues, but Mike, I think you're working on those, kind of got them all in hand, and it's going well. The pilots, by the way, love the system. There's the air gap indicator and the current water depths are being used all the time on these deep drive vessels.

MR. SZABADOS: Thank you. Just to comment on that again. Any

start up you have some issues. One of the concerns on the issues was communications and some of the communications we set up we had some initial issues we had to resolve.

MR. WELCH: Okay. Thank you, Mike. We appreciate the updates as always.

Next up is Captain Barnum.

CAPT BARNUM: Okay. Thank you. I'll give you a brief update on Coast Survey activities over the past year and what's coming up here in the future. [Next slide.]

FY09 performance metrics. We acquired 2750 square nautical miles that does not include the AARA funding which will include another 1700 square nautical miles which is underway now. We expanded our VDatum effort to include New Orleans and the Pacific Northwest and we added 56 ENC's to our chart suite for a total of 700. That exceeds what our goal was for 40 for FY09. So our goal is a parody of our thousand paper chart suite to meet the goal of 2012 for full coverage ENC's. I'll talk about that later. [Next slide.]

NOAA was in the news quite a bit. At one point we were featured for NOAA joins other agencies and Canada to survey the Arctic continental shelf. This is the front page of NOAA. We were also a feature of our NOAA Oregon State University map seafloor and coastal partnership. And we were also featured for Hydropalooza providing better understandings for Alaska's Kachemak Bay. So, three of the top six stories were charting and hydrographic services. And, of course, you can see there, smooth sailing is one of the features in marine

transportation system. [Next slide.]

The Hydrographic Surveys Review Panel Most Wanted certainly aggressively map with AARA funding, $40 million stimulus was certainly a godsend in this respect. It certainly helped us to push forward in helping us to aggressively map. Essentially all funds were out of the door as of August 23rd. It buys roughly 1700 square nautical miles on top of the planned 2009 I already talked about already.

There was a very successful press event down in Norfolk, Virginia, that Jack Dunnigan talked about earlier. The Secretary pretty much spent the morning with our local constituents, the pilots, the port authorities, and others. Then had a press event where he spoke to the local constituency. From then he went and visited the contract vessel with David Evans and Associates and had a very successful press conference there where he talked about the meaning of this hydrographic survey work and what this stimulus money means to the hydrographic surveying community. Keeping these valuable assets continue to work and how this data continues to give not only after the influx of the dollars into creating the -- keeping the contract community at work, but also how this data continues to give to support the marine transportation system and many other uses that we've heard today for habitat and coastal management. [Next slide.]

So the breakdown of that money was $32 million for eight areas, eight contractors for hydrographic surveys; water levels $2.5 million. Mike talked about that. Shoreline $2 million for contracts for a compilation of shoreline. $2 million for aggressively again --

just as we look at this data from an end-to-end process, it's not only the collection of the data, but looking at how do we process this data for the whole pipeline and not just for all of the data effort at the beginning of collecting the data. So we just put some money into the nautical charting system to address this data and to speed up that process. Data archiving, again, the final resting place where this data has to go. Then to speed up VDatum, the implementation of VDatum. [Next slide.]

The Hassler Swath. We've talked about this in the past. There's been some delays with the Hassler, but it was launched this past weekend, put in the water -- lifted in the water. It's not launched as you were. They actually took a crane and after about 3 hours picked it up and set it into the water. So it is actually now floating. There's still a long way to go as far as fitting this vessel out. We expect delivery of June 2010. [Next slide.]

Other news. The port security surveys -- wait a second, did I miss a slide here? No, sorry. Port security surveys. CMTS, Committee and the Marine Transportation System implementation priority. That will be coming up in future meetings of how do we address this issue of surveying our ports for port security. In May of 2009, I addressed the mine warfare conference down in Panama City, Florida. There was a lot of discussion about this issue. The Navy was very concerned. The Coast Guard was there. I was there representing NOAA and basically my message was to this community, NOAA has the capability -- when I say "NOAA," it's NOAA, our in-house

assets and our contractor assets -- have this capability, but we're not resourced to do the job. Plus there is no firm requirement for NOAA to do this job. So, again, this issue resides in the CMTS to be further fleshed out between the primary agencies and decide how to move forward on this issue of port security surveys.

It's important to know, and we've talked about this in the past that these port security surveys are for imaging the ports for potential compromise by a mine or an improvised explosive device. So if the Navy has this information, they can much more quickly open the ports and if somebody puts something in the water. They do something called change analysis. They look at the imagery before, they look at the imagery of what -- the mine hunters would come in and collect and look for differences as opposed to looking at every single object that may be on the ocean floor.

If they don't have that imagery -- that before imagery, it can take many more weeks to open a port. So the economics of the situation is, the faster you can open the port, the less impact to the United States economically by keeping the goods flowing in a port; the fuel, the energy, the containers everything that comes and goes, grain, et cetera. So not only do you get additional benefit of this imagery of keeping the ports open, but also the additional benefit of updating the nautical chart, again, using the data for many different purposes. Updating the nautical chart much more frequently. [Next slide.]

So we continue to support the Navy on these requirements

and the definition: We continue to support the Navy in an as able basis. We work with them on areas of opportunity where our assets happen to be located and there's two examples of that this year. One was the Thomas Jefferson approaches to New York which was she's currently working on now. The navigation response team work in Mayport, Florida, which happened earlier this year in May. So, again, as I mentioned earlier, NOAA and our contractors have the capability, but we just lack the capacity and certainly what the intentions of the other agencies to do this work.

MR. WELCH: Steve, could I interrupt real quick?

CAPT BARNUM: Sure.

MR. WELCH: You were saying that to the extent that you were tasked with this and the resources are made available for you to do this, you can combine the Navy's mission with your basic hydrographic charting mission without denigrating either one of them? In other words, do them at the same?

CAPT BARNUM: Absolutely.

MR. WELCH: That really is key.

CAPT BARNUM: Absolutely. [Next slide.] Some other partnerships. We've talked about the California seafloor mapping project in the past and also the new partnership with Oregon to continue similarly the the west coast governors' agreement where they want to map the coastal waters of the west coast states. Again, this is for purposes such as tsunami modeling and coastal habitat management changes for climate change, et cetera, et cetera. Not for

charting, but, however, we're going again through this partnership not only collect this data for these other purposes, but also update the nautical chart. And we have updated the nautical chart in regions where we have not surveyed in well over 80 to 100 years and have discovered many, many dangers in navigation.

One of our contractors, Fugro, turned in almost 60 dangers to navigation we were unaware of. Certainly some of these dangers to navigation were near shore. Would a big ship go there? Regularly on a transit, probably not; but if they were in trouble and seeking harbor refuge they could have certainly gone from a bad situation to a worse situation. [Next slide.]

Again here's some photos of some of the work that was done in California and I talked about again this is a cooperative mapping effort that is going to give over 7550 square kilometers of high-resolution bathymetry and acoustic backscatter data for California's coast. This is a partnership, I'll point out, between the California Coastal Conservancy, USGS, NOAA, Fugro, and others. So this is a multiagency -- I think it's a great success story of a lot of people coming together to accomplish a project. [Next slide.]

And, again, I talked about the Oregon State. There's a quote from the Oregon State Governor that these projects help Oregon prepare for future challenges. I mentioned we can model tsunamis, identify marine habitat, select alternative energy sites. I didn't mention that earlier, but as we look for alternative energy, bathymetry is a going to perform a key data layer for how we site

these energy sites for whether it is tidal or wind and identify geological hazards. And finally to enhance safe and efficient marine transportation. [Next slide.]

VDatum next steps. 2010 is scheduled for North Carolina and Florida. The 2011 Massachusetts to Maine, Puerto Rico and the Virgin Islands, the contiguous U.S. done by 2011 is the plan. Priorities are being determined for Alaska, the gravity as we heard earlier are key to that and geoid issues we heard from Juliana earlier are one of our challenges and we need to work with Hawaii to have those resolved, including the Pacific Islands. And also, as we move forward with VDatum we have to look at how maintenance and procedures and make VDatum operational for the future support of VDatum, including uncertainty analysis of the VDatum transformations. [Next slide.]

Some more news. A couple of things that NOAA and our contract teams locating the wreck, a 71-foot fishing vessel, Lady Mary which sank 74 miles off the Delaware River, tragically losing four crewmembers. Supporting the search for the missing U.S. Airways flight 1549 landing in the Hudson River, helping to locate those lost engines. Then locating a submerged oil rig, the ENSCO, which was toppled after hurricane Ike near Galveston, Texas.

That's a really, I think, a really good story because I think it tells a story where we heard from the captain of the port in the Gulf out of Sabine where we got a call on Thursday afternoon asking for survey assistance and this is after a ship already hit this

ENSCO rig and discovered it by -- every ship is a survey ship once. So the story was this ship was a double hull tanker and somebody says, "Wow, this is great. Double hull tanker, there was no spill." However, the call from the captain of the port was, "I have a single hull tanker coming next week. I need your help to make sure that this LIDARing area is clear of obstructions."

So, on Friday we turned to and by Friday afternoon we had a million dollar contract signed, out the door. People always say that people in the government leave on Friday. Well, we made it happen, and on Saturday morning the contractor was on scene surveying. So in less than 24 hours we got a million dollar contract out the door and contractor turned to and was surveyed. In fact, the survey showed that there was a 94-foot obstruction, another obstruction sticking up from the ocean floor. It doesn't sound like it's very shallow, but when you have a vessel that's drawing up to 80 feet, I'm not sure if I had a 80-foot draft vessel I'd want to be that close to something on the ocean floor. I think it was a very good success story. [Next slide.]

Electronic navigational charts. Next Generational Nautical Chart System I talked about in the past we had formal acceptance of this system in 2009. One system, John Lowell talked about that earlier. One system, a central database so when we apply changes to it, it propagates through all of our products whether it be raster, vector, POD, et cetera. It's 5 years in development and we're now entering the transition into production.

The challenge is to taking all our data and putting it into a standardized format to load it into this system. So it's going to be certainly a challenge as we move towards putting the system into production. I liken it to akin to rebuilding the Woodrow Wilson Bridge at rush hour, because we still have to put product out the door. We still have to satisfy the needs and the mariner. So with that we have the International Maritime Organization mandate for ECDIS 2012 that was approved by the Marine Safety Council of IMO. There was great discussion at the IHO meeting in Monaco. So NOAA is on track to providing ENC coverage by 2012 for U.S. waters. [Next slide.]

So this was a big deal at the IHO. The ratification of the treaty of the U.S. as a member of the IHO. There was changes to the conference convention which required ratification of the treaty that involved a Senate ratification or approval, followed by the signing by the President. I'll point out that this was several years in the making. It wasn't easy. There was a lot of work that made this happen. This was the first treaty ratified by President Obama and we had the privilege of hand carrying this instrument and delivering it to the Minister of Monaco. So that was the delegation. The Minister of Monaco is sitting to my left and the hydrographic delegation behind us. So it was a major achievement. We're very proud of this. [Next slide.]

And what follows on to that is S100. You've heard about S57 associated with ENC's, and S100 is the future data standard. And it's not only just for the standard or the definition ENC's, it's a

geospatial standard for all of marine information. So it's going to really broaden the opportunities, how we can look to integrate data from multiple purposes for the mariner and coastal management and other uses including, potentially, marine spatial planning. So does it make S57 obsolete, S57 will continue to live, but it addresses the shortcomings of S57. [Next slide.]

2009 enacted and our budget for 2010. It pretty much mirrors our President's request. The major difference is that you'll note that we have our survey backlog and the Senate side at the President's request. What we don't certainly see is what we've seen in the past is the funding from the marine debris and the AARA funding that we've benefitted from.

So that is it. I'll take questions.

MR. WHITING: On your second slide you showed that we've surveyed 2750 square nautical miles? How many square miles were projected for this year?

CAPT BARNUM: 2750. The final number is not in for the 2750, we're still counting because 2009 is not over yet.

MR. WHITING: But 2008 is over; right?

CAPT BARNUM: 2008, yes.

MR. WHITING: We projected 3000 miles, I believe --

CAPT BARNUM: In 2008?

MR. WHITING: 2500 square miles in 2008. We surveyed, it says, 2127 miles. We have the only red mark on your budget summary for Department of Commerce. That's the only red mark on there out of $4

billion and we got $90 million out of that for surveying, and we got the only red mark?

CAPT BARNUM: You're taking about 2008?

MR. WHITING: 2008, yeah.

CAPT BARNUM: Yes. We had some challenges with the NOAA ship, Fairweather, with the startup of that. And so that impeded some of our performance metrics. So she didn't perform as well as we had hoped in starting that vessel up and that was the cause of that reduction in production.

MR. WHITING: Are we going to get another red mark this year?

CAPT BARNUM: She is. We're following that very closely. The Office of Marine Aircraft Operations is a customer -- or a provider of services to the Coast Survey and we're working very closely with them and they are on track and on par with our other operating units to provide us similar level of services, the Thomas Jefferson and the Rainier.

MR. WELCH: Larry, what are you referring to there?

MR. WHITING: I could get her to draw it up. It's -- what, the budget summary for 2010. It's on the Department of Commerce website. She can draw it up.

MR. WELCH: I didn't think anybody else had it, so that's why I asked.

MR. DASLER: I guess first I want to commend NOAA leadership on being able to land that AARA funding for advancing the nautical charting because I think that is really a shot in the arm. The nation

needed to move that forward. I guess along the lines that Larry mentioned is the report, because in our Most Wanted it kind of set the goal -- NOAA's current goal at about 3000 square nautical miles per year and I think that's why that budget mark was red because it was one of the only line items that didn't meet budget -- or their goal, I think, in terms of that.

CAPT BARNUM: That's correct.

MR. DASLER: Which -- and then this year, again it was only about 2750. I guess what's concerning -- and I know a little bit to the answer to this question, but I think it's also troublesome in how we move forward when we're saying we're at 3000 square nautical miles. Where we should be, and what the panel has recommended is going to 10,000 square nautical miles per year. And at 10,000 square nautical miles per year we'll be on 50-year resurvey cycle. So at 3000 -- I mean, you can do the math -- we're going to be way out there. So, that said, it's still confusing to me, I guess, why the significant backlog budget remains the same, when the miles are probably just going to continue to drop as you move forward with that when the dollars is the same. So it's not really getting to where -- what the panel is recommending in going to 10,000 square nautical miles per year.

How are we going to address that, I guess, is part of that, from a budget perspective? Because we're kind of going backwards here, even when it just stays the same year to year.

MR. WELCH: We need a stimulus bill every year.

MR. DUNNIGAN: We need a complete implosion of our economy about every 7 or 8 months to generate that. Remember at the Baltimore meeting we talked a little bit about what our long-term vision of a business model for doing this is. The Rainier -- part of the stimulus money is that the Rainier's major repair period was picked up. So a contract was awarded to somebody in Portland yesterday. So that will give us another couple of years on the Rainier. But we know that the Rainier and the Fairweather are assets that don't have a long-term life ahead of us.

So my question to you then -- and I still have it, was, what are we going to do? What is our long-term business plan for meeting the hydrographic survey needs of the country? We will keep working on that. But I sort of think that the big comment that I've gotten back from people is we don't really see the wolf at the door. We've asked for 10,000 square nautical miles a year, and the political answer to that question is, "Why?" The world isn't falling apart and we only did 2750 this year, plus whatever we got for the ARRA.

I think we have to concentrate on building the pole demand for what we have and make that come alive politically. Otherwise, I can tell you, there are competing interests all over NOAA, all over the government, and everything I'm hearing from every political I'm working with today is: there's not going to be a lot of money. So this is a very tough environment, and we're going to have to be very practical and realistic about what we can do.

RADM WEST: I think you're absolutely right, Jack. So what is

our two sentence answer to, what if we only do this and not 10,000?

MR. DASLER: I thought part of it was aggressively map -- I mean, I thought this was where we were trying to go to address that.

RADM WEST: What happens if NOAA does not do that?

MR. DUNNIGAN: And where is the wolf at the door?

MR. DASLER: Well if you back up to the slide with the ship on the bottom, I think there are multiple wolves out there and maybe it's drawing more attention to some of those incidents that bring that more to light, I guess.

MR. WELCH: Well one implication is that NOAA is going to have to be very smart about setting their priorities as to what areas are chosen on their list for updates and resist efforts to be enticed into areas of perhaps less critical significance.

MR. DASLER: It's difficult, again, because you have, again, not necessarily competing interests, but if you can tap on to what -- I think what the whole idea of IOCM and the California and Oregon and Washington mapping efforts is, if you can tie it in -- some of those areas are not necessarily critical but there's a lot of other added benefits, and if it makes sense to do that. But maybe some of those should come from other budgeting sources other than critical charting backlog or other vehicles, because I think everybody kind of holds back on their funding to see maybe what NOAA would put forward on it.

MR. WELCH: My time on the panel here has been fairly brief, but during that time I don't recall seeing any kind of a graphical representation of what areas are the most current, and which ones are

the most behind, and some kind of a matchup of which really critical areas or really far behind. Has that been produced before; is available?

CAPT BARNUM: Yes. That's through the hydrographic surveys priorities document. We can provide you a copy of that, and it's online.

MR. WELCH: Okay. If you could just direct me to the right place. If most of the backlog is in fairly noncritical areas, well then the level of the problem is one, and if it's starting to move into more critical areas, then you've got another situation.

MR. ARMSTRONG: I think there is a couple of things that sort of -- that I've notice. One is we sometimes have a tendency to scratch the biggest itch right way, and then that relieves the pressure for more funding because we've scratched that itch by addressing an emerging survey requirement from a high priority user very quickly. I'm not sure I would argue that if there really was a high priority that we shouldn't do that; but nonetheless, we tend to beat down the highest priorities first and that sort of creates -- that sort of eases this wolf at the door sometimes when there is really a pack of wolves out in the woods just a little passed the door.

The other thing that I notice is the question that the Admiral asked about the Navy doing some surveys. So those were surveys that were really in NOAA's area of responsibility. I believe that NOAA has the responsibility to survey both for military and civil

requirements inside U.S. waters. So the Navy was able to get funds to survey in NOAA charting areas and somehow NOAA wasn't. So -- I'm not sure how we -- how we can address that as well.

RADM WEST: I'm not sure that that money might not have come from homeland defense. If it came from the Navy it was just reprogrammed from someplace else we were supposed to survey. There's a limited pot there too.

One of the problems I ran into with the Navy is if you come up with these huge backlogs, the bosses just kind of glaze over after awhile. That is such insurmountable, get out of here. I don't know how we solve that, so it's not a problem anymore. So you've really got to bring it down to a scale where it makes a difference and we can work with it.

But I think Andy brings up a good point, is to take advantage of where we can; Navy, Homeland Security, the IOCM, that type of stuff is the new way to do business. Because Jack is absolutely right as far as the budget. You all watch television. My gracious, we're in trouble financially. This nation is in bad shape. So there's not going to be money for -- I would say it's almost discretionary at this point. Unless you've got people falling. I really do think we can't just keep saying, "We're falling behind." Falling behind of what? So we've got to come up with a little bit better recommendation, I guess.

MR. DASLER: I heard the same thing. Some areas where you look at what is designated as critical -- I've heard comments that it

really covers a pretty broad area and it may be worthwhile for NOAA to reevaluate critical or come up with another category. But to refine that so you could start clicking off areas and showing progress. Because I think with just showing a lot of that and not much progress, then it tends to -- you kind of lose your message after awhile and kind of really refining that -- what do you want to call it, supercritical or whatever. Refining that area a little better, I think, would help.

Also just in terms of dollars spent in the U.S. in terms of charting, I mean, I know part of it was this whole IOCM, but, I guess the other part that is kind of frustrating is there's a lot of money being spent in either Coastal Services Center, or USGS, or Corps of Engineers. And just being able to capture that more, more of a cooperative effort or whether it's done under their guidance and direction so that data can be on the chart. Because there's a lot of other, like I said, there's a lot of other survey activities that aren't really helping benefit this and how we can capture funds from other sources.

RADM WEST: I think NOAA needs to, for its own -- I don't want to say "protection," but you've got to have a mechanism to say this is important, this is not. Because some day one of of those areas that you determine not to be too important is going to have the disaster and the thing is going to be, "Why weren't you there?" You have to have somebody to explain, "Well I didn't have the funds, and here's what I did."

I think that's where a federal advisory committee with this type of expertise can help you with that. They say, "We understand your problem now." And there's going to be areas you're not going to get you because we don't have the funds. So you've got to prioritize so if that unfortunate thing happens where it's the lowest priority area and the worst disaster known to mankind, they are going to want to sort through the books and figure out how the hell did you prioritize all that stuff? I think that's what you can use this board to help you do. But I think we have to.

MR. WELCH: If I could suggest, Steve will continue to be with us tomorrow and if we have some follow-up comments on this, I think we can bring them up tomorrow. We still have Ashley to go and then we have a scheduled public comment period. So, if we could, let's thank Steve and have Ashley take the podium and see if we can stay on schedule.

MS. CHAPPELL: I get to talk about Arctic. A place I've never been, but would like to go. I should have Andy up here who just got back from the Arctic.

Arctic has been on HSRP agendas at least since San Francisco. We had Amy Holman (ph) come and talk to us there. In Tampa we had Dave Saris (ph) from the Coast Guard, District 17 come and give us more information on what's happening. Then at our Baltimore meeting we had John Oswald (ph) who came and spoke, sort of off the cuff with some great slides.

So some of the information that I have in this presentation

is really information that you've seen before and my main purpose and the reason I can go through this pretty quickly is just to update you on what NOAA is doing with respect to its strategic plan for the Arctic. My NOAA colleagues, a number of you have heard this a few times, so I apologize for repeating myself.

But just to set the context, set the stage, obviously there is new found interest in the Arctic because of sea ice melt, primarily, and the ability to access the region. Lots of interest there. I think there's -- somebody sends me an article probably every day I get a link to a news article that's published somewhere, and not just in Alaska, about what the potentials are in the Arctic or what the problems are in the Arctic, what the issues are.

We have law of the sea interest for the extended continental shelf and other resource interests there. We have coastal communities along the western and northern coast of Alaska which are seriously threatened. That's obviously of interest to NOAA because of our role there. There's resource extraction in the water as well as on land that we can now potentially increase our use of. There are navigation concerns in the region, and they're international -- we have security considerations, and our international relations with the other Arctic nations. These are some of the things that are swirling around out there. [Next slide.]

Just a very quick update. We had the great newsletters, e-mails from Andy during the course of his trip which I personally found very interesting to read. These are some of the images that he

sent along. The seamount that you all discovered out there. We also had an officer -- we put a lieutenant aboard the Coast Guard Cutter Spar which repeated its summer tour up to -- they were trying to get to the Yukon River, but they didn't get that far because of weather. But we had an officer on.

Last year one of your recommendations was to continue this partnership because we get a great benefit out of it by having a NOAA Corps officer on to evaluate the Coast Pilot, the quality of the nautical charts. The officer on board this year actually had hydrographic experience, but he's currently working in our marine weather shop at NOAA. So he got to sort of do assessments of that capability as well. So I think it was a good summer, a good participation there. Then very recently had a meeting and Steve, Captain Barnum, and Jeff Ferguson to speak to this more, if necessary. But a recent meeting in Silver Spring with the Naval Oceanographic office and surveys in the Bering Strait came up during that, so there are potential draft plans for surveys in 2010. [Next slide.]

So we have with all these things swirling around, last year we started thinking about if NOAA were to act in the region, what would we do? How would we approach it? What has to happen first? What would strategically be smart to do? So we've been actually right close to a year of putting all this information together across NOAA. Not just the navigation, the CO-OPS, the OCS and NGS areas of interest, but across NOAA. Across all the strategic goals: ecosystems, climate, weather and water, and commerce and

transportation, our four NOAA strategic goals have gotten together to pull out, to extract out what really needs to happen. What is the strategic priority for the region and what should NOAA do?

This is the cover of our document. We obviously have some key challenges up there. The nation has key challenges to address, and NOAA has capabilities to bring to bear in the region. We have the scientific expertise, we have mandates and authorities. Obviously, this region is part of our mandate. If we haven't been up there yet because we haven't had to be, it doesn't mean that the area isn't deserving of the same sorts of services that the rest of the nation gets. Deciding to what extent that is, is a different question, but it is certainly part of the United States and, therefore, falls under our purview. [Next slide.]

Just to give you a quick snapshot of the plan. I won't go into great detail on it, but clearly we have a mission and a vision, obviously, to set the tone for what we are trying to accomplish. We talked with Dr. Lubchenco about this and she wanted to make sure that our vision was really quite holistic and broader probably than where my NOAA colleagues generally are comfortable going. But she looks at things in a holistic way. She'll say that, I think, in every venue that she visits. She's looking at the Arctic as a place where we can take action now to get ahead of problems rather than catching up later. [Next slide.]

The plan right now as it stands, it's a draft plan. It's divided into six areas which sort of map to the strategic goals in

NOAA which, you know, since I'm part of that strategic goal process it kind of helped me to take all this information that people were sending me and I would just sort of bin it and put it in places. So we came up with these themes. In terms of needs to be addressed: climate science and services, hazard resilience for coastal communities, obviously weather and water primarily weather services are key in the very near term, marine transportation and homeland security which is where we certainly have a role, green ecosystems and resource management, and then the international -- the Arctic governance and international component.

Interestingly as we put it all together, obviously these aren't things that you can keep in nice narrow stovepipes. The three programs that you all look at here with the Hydrographic Services Panel actually have a role in just about every one of these areas. So we're not excluded from any of them, we're involved in all of them and we have potentially a lot to offer to each one. [Next slide.]

Just to share a little bit more about the plan with you, I just thought I'd hit two themes. The coastal community has a resilience piece and then the marine transportation piece. Your going to get a chance to actually look at the whole document at your leisure, so I'll just highlight these two.

Big requirement for those coastal communities in the State of Alaska is the GIS tools and information needed to develop mitigation and adaptation strategies for those communities to make decisions about: should a community pick up and move back; should it

just give up; what can it do to protect itself and protect those indigenous communities, those lifestyles that have existed for centuries. So the role that our programs have here is helping on erosion, sea level change, mapping. You know, all of the mapping data that we do that you've heard about today, it has multiple uses. It has a role here, it can play a link here, there are human health issues. Then as Juliana and Mike have already described, that foundational geospatial infrastructure, tides and water levels are key there, the geodetic component. Just having that framework from which everyone else can build is really a key piece and we could play a big role here. [Next slide.]

Just drama pictures to reinforce what's happening. I think some of these pictures Amy showed you too, but they are eye catching. [Next slide.]

On the marine transportation and homeland security side. Obviously, Coast Guard has a big interest in good information up there for navigation for what they need to do, and the Navy too on maritime domain awareness. Coast Guard is concerned about search and rescue. We've already -- I can't remember if we sent out the link to the article about the cruise ship passenger who had appendicitis and had to be airlifted off by the Coast Guard off the Aleutians. That's one person. What if it was 500 who were overcome by something or, worse yet, the ship hit something. How do you muster resources to get out there to help them?

And the Navy which is well aware that we have seven other

Arctic nations and we have these boundaries that are fuzzy at best. So maintaining this security and sovereignty of the nation is of interest there. Then commerce and the use of those waters for transportation, whether it is through the Arctic, through the Bering Strait, through the region, not even coming to the United States, but just using those waters. Every vessel is a potential risk for the environment. There is a commercial interest potentially in reducing transit times. They're always probably costs to consider at the same time. Time may be shorter on paper, but it may actually take longer because of ice, floating ice. Regardless, people are looking at it, they are interested it. We had a German ship that was just escorted by the Russian icebreakers that came through with ease.

So the role for NOAA here. A big one is daily to seasonal sea ice forecasts for our particular programs. The geospatial infrastructure again is critical. Acquiring mapping data in a strategic way is important. And supporting our hazardous response activities. We support the Coast Guard a great deal with scientific support on spill response, for example. To some extent, I know that our office of response and restoration has come and talked with you about their role. So there's a lot going up there, and a lot that we could do. [Next slide.]

Again, slides that you've seen, so we don't need to dwell on these. But the shipping routes and the great circle routes that people have their eyes on. [Next slide.]

Then the increasing oil and gas exploration. The leases

that were put out last year. Big bucks. [Next slide.]

Then military and Coast Guard operations. This slide's a little dated. I couldn't manipulate the text on here, it's sort of fixed. But summer '09 was similar to summer '08. [Next slide.]

I don't think that the Spar report comment at the top really has changed. They might be a little bit more polite about it. But this slide shows you the age and gaps in our data in the region. Not just for charting but also for the Continuously Operating Reference Stations and our water level stations. So you can see that north and western Alaska is just sort of a big void in terms of coverages and services. [Next slide.]

So to get to the real point of this, to talk to you about the strategic plan, we are working on trying to get it cleared through the NOAA as a draft. I meet, I think, Friday with Monica Medina (ph), one of our politicals and hopefully we'll get through that gate and make sure that what we have in the plan that we've developed over the past year is in sync with the Administration goals and with Dr. Lubchenco's goals. So we'll touch base again on that. Our plan is to then put it out for our FACA panel review, Science Advisory Board, and you all, HSRP, and then for public comment. So you will be -- we will be asking you to look at this, to vet it and validate it for us.

Then in our budget process -- internal budget process, we are looking at FY12 to 16 alternatives for how we might implement this plan as it is written. And that's where we are.

MR. WHITING: Could you go back one slide, I think it is?

MS. CHAPPELL: Sure.

MR. WHITING: I don't believe that NOAA has surveyed anything up there since, when, in the 1940's? I can't really see when that date is.

MS. CHAPPELL: That's what it says.

MR. WHITING: 1940? Up in the Arctic up above Katsabu or something like that. 1970?

MS. CHAPPELL: Uh-huh. It may -- it says "1940 to 1970."

MR. WHITING: 1970?

MS CHAPPELL: Uh-huh, but that doesn't mean that a lot of that data was 1970.

MR. WHITING: That's what I thought. I thought that the last NOAA crews were up there in the 1940's.

MR. FERGUSON: I think they were on the north slope in the the 50's.

MR. WHITING: In the 50's?

MR. FERGUSON: Yeah.

MR. WHITING: I'd like to submit one thing. I'm a contractor and Tom and I and Bob, we grew up out there. The place to send us is out there if you're going to be surveying out there. Don't send the Rainier and the Fairweather unless you've got good insurance, and that's part of your business plan. Get rid of them all at once. I don't think those ships have any need to be up there and take the production away from the things that are very critical down here.

MR. MCBRIDE: Simple question, Ashley. When will we be able to

look at it with -- you mentioned you're going to be sharing this with the FACA's and this panel eventually. I presume all of this has some budgetary implications as well, and are you able to share what those are and what the outlook is for that?

MS. CHAPPELL: I had hoped to actually have it out before now. It's just the way things have gone. We haven't gotten that far. I'm proposing that we get it out, we get it cleared and out as a draft by November 1. So I'm trying to speed up the timeline given the delays on it.

Budget implications. I don't know how we will be framing what working up there -- I don't know what sort of public documents we might be creating that would articulate what the costs are of doing this work are yet. But as soon as I find out, I will let you know.

MR. MCBRIDE: I guess my question, it has budgetary implications.

MS. CHAPPELL: Yes.

MR. MCBRIDE: Have you estimated or are you estimating what they are?

MS. CHAPPELL: We are in the process of estimating in the ideal world what it would cost and then in a realistic world what it would cost.

MR. MCBRIDE: And your target is FY12 for openers?

MS. CHAPPELL: Yes.

MR. MCBRIDE: So at some time when we're having a private session budget review, will you be able to share those numbers with us?

MS. CHAPPELL: I guess in a private session we could.

MR. MCBRIDE: Okay. Thank you.

MR. WELCH: Ashley, the NOAA strategic plan on the Arctic, what do you consider "the Arctic"?

MS. CHAPPELL: We are defining it according to the Arctic Research Program Act which is Aleutians north.

MR. WELCH: Okay, so it's not a Arctic Circle north.

MS. CHAPPELL: It's Aleutians, Bering Strait and then the seas up there to the Arctic Circle, Beaufort, Chukchi.

MR. DASLER: Starts at the California border and goes north.

MR. WELCH: Of course, any NOAA mission to the Arctic, if it started in the lower 48 it could do a lot of surveying before it ever even hit the Arctic, couldn't it.

MR. DASLER: I think in prior meetings, maybe Ed alluded to this, but, I guess, one thing as I see this I think it is important on how this is tabled, especially based on our prior discussion. I think what can be inferred from this is the rest of the United States is adequately covered, we need to move on to new frontiers and move. So I think that can be a message that people could perceive out of that.

I think when we were in Houston we toured the Coast Guard command center there, and I remember one of the commanders commented on, you know, we're getting hit with all of these requests to deal with homeland security, and their comment was, "Okay, fine, we'll take that on, but don't cut my cutter budget. So that said, is -- I think this is great and there is obviously a lot of need, but as long as it is not cutting into critical areas and other things. It has to be an

independent budget. Or I think it needs to be tabled carefully and how it's presented, because it can be the perception that the rest of the United States is adequately covered and there's no real need and we need to go address this at this time. I get that own perception even just listening to the presentations and priorities because there tends to be this dichotomy, I guess, in the message.

MS. CHAPPELL: I guess with this plan we aren't making the judgment call about what is more important, contiguous U.S. or Arctic, and Alaska, but we're just setting up what we could do if that became the priority.

MR. DASLER: Is the goal to seek independent funding for this, or it will be done out of existing funding?

MS. CHAPPELL: For us the cost of working up there could eat up our entire budget. It would take the whole budget just to do one thing.

MR. DASLER: Hence my concern.

MS. CHAPPELL: Yes. I completely hear you.

MR. WELCH: But there are some things, looking at your preliminary goals, that you could say your current plans are already going to address. For example, the GRAV-D aircraft up in Alaska which you've got underway soon certainly addresses a lot of that coastal community.

MS. CHAPPELL: That is a big part, and it's important to do. There are some other small things that we're doing that we can do. Mike mentioned the current surveys that are happening there. There

are also discussions with CO-OPS and Army Corps about putting water level stations on a pier that they're rebuilding. Those kind of small things can happen. Mike's talking with USGS about potential shoreline mapping work that could happen together. So there are little things that we can do, but when you get into the bigger efforts like hydrographic surveying, the bigger dollar the bigger ticket items, then I completely understand your point.

MR. WELCH: One think I think though is important, is a focus on who is asking for assistance? Where is an -- a real, present, identifiable need? These communities that are having to make decisions and deal with coastal problems. That's clearly an identifiable need. To the extent you've got oil leases sold and people are actually seriously considering following up, that is an identifiable need. Some of these other things are more speculative and I would certainly encourage people to focus the strategic plan, particularly the parts that have immediate budgetary implications or more identifiable needs as opposed to the more speculative or hypothetical types of situations.

MR. DASLER: Also curious. If a graphic like that has ever been put together. I don't think the critical survey graphic really does that for the lower 48. Because I know there's -- I mean, a lot of the charts still rely on blocks, if you look at the diagrams and what the age of the data it that goes back to 1940 and if a graphic like that has produced for the rest of the U.S. territorial waters as well might be --

MR. WELCH: That's a good point. If I could follow up. Jon was saying by making -- by having -- just the fact of having a strategic plan sort of focuses everybody's attention on the Arctic and perhaps implies satisfaction elsewhere. You could have possibly a map -- just having a map that only focuses on Alaska by itself doesn't -- sends out an implication that maybe things are okay elsewhere. Do you have maps that have similar types of swatches in other types of locations?

MS. CHAPPELL: We do.

MR. WELCH: If somebody sees that and they say, "We've got a problem." Somebody sees that and two or three other maps and say, "Oh, we've got several problems. We've got to balance out which problem we want to deal with."

Steve, did you have something?

CAPT BARNUM: I just wanted to mention that, yes, the Arctic is of great interest. I know Navy has approached us and Coast Guard certainly weighed in also about their navigation needs in the Arctic. In addition, the Committee on Marine Transportation System also will be taking up this issue too and helping to define because the Arctic is so vast where potentially shipping routes may be identified. That would help narrow down areas that may need to be surveyed.

MS. CHAPPELL: We've used that preliminary information in talking with the agencies and the CMTS about what their priorities are for surveys. So that's incorporated in sort of our draft thinking here. I'll just remind you that the Arctic has appeared in the NOAA annual guidance memorandum, if you had a chance to read that from Dr.

Lubchenco. It's one of her five top priorities for FY09 and on. There's a pretty significant piece on it in the ocean policy task force documents. It's an issue there. Many other agencies like the Navy and the Coast Guard are doing Arctic strategic plans too, so we're one of a number of agencies doing this. I don't think we would want to not do it and be caught sort of behind on it, if it is an issue that the nation adopts is a priority.

MR. DASLER: I didn't mean to infer that it isn't important, but I think how you table the messages could downplay the other concerns as well. It's just how it's presented, I think.

MR. WELCH: Elaine wants to make a comment about the recreational boaters in the Arctic.

MS. CHAPPELL: You laugh. They're sailing through the Northwest passage.

MS. DICKINSON: I think something like six sailboats made it through this year. One of them was an expedition ship -- or boat, it was a sailboat. It's on a complete circumnavigation of North and South America. It's called Ocean Watch and they set a record. But more and more boats are going through the Northwest Passage because of the ice melt in the summer. The ships are already up there. It's becoming a sea route.

What I was going to point out was that I think that's one of the things that's driving the interest in the Arctic. The ships are already there. There are cruise ships that are planning cruises up through the Bering Sea, and the concern is that absolutely no one

is prepared for a maritime disaster up there. The charts are lacking, the resources are lacking for any kind of sea rescue or anything of the sort. There could be danger of a massive oil spill. So I think all the agencies are looking at this and trying to coordinate some kind of response or some kind of planning.

There is also, as I understand it, massive reserves of minerals, oil and gas that are up there untapped and that could be, you know, another driving factor bringing more and more ships and people to the Arctic region. They're up there. The ships are coming through, and nobody's planning for them.

MR. WELCH: Well I can get away with saying this because of who I represent, but, you know, if seems like to me if you are a customer of an expedition cruise ship and you go into Antarctica where we had a major catastrophe very recently you heard it, or somewhere up there, you can't expect the same level of governmental support and bail out as you can in more subtle areas. I think we may be -- if the government feels like it can provide that type of resource given the whole federal debt problem and budget problem, people aren't communicating with themselves. There is some commercial enterprise that wants to go to the Arctic has got to figure out that they've got to assume more of the financial burden and rely less on the financial resources of the government.

MS. CHAPPELL: I think we're also looking too at our relationship with other countries with negotiations on law of the sea and extended intercontinental shelf. It isn't just U.S. waters and individual

search and rescue kinds of interest or resource extraction interests, there's a sovereignty aspect here too that really does have the attention of the federal government.

MR. WELCH: We need to get public comment, so we'll have Andy recognized, and then I think we'll stop. We're bound to talk a lot more about the Arctic from here on out.

MR. ARMSTRONG: Just an anecdote to follow up what you said. When we were coming ashore on Thursday, there was a sailboat anchored offshore Barrow and he was on the radio calling for the Barrow harbor master. As you might expect, no one was answering.

MR. WELCH: Okay. I think this has been a good presentation. Thank you, Ashley. Do you have any kind of summation you want to give us?

MS. CHAPPELL: Well, actually, I'm going come back up after public comment and talk about dinner.

MR. WELCH: Okay. Thank you. Thanks to all four of our NOAA presenters for the afternoon.

So we have reached the point where we have another scheduled public comment opportunity. Do we have anyone that want to avail themselves to that?

[No response.]

MR. WELCH: All right. Now we're going to dinner.

Ashley, you're back on.

MS. CHAPPELL: Dinner tonight we have 27 people going which is wonderful. I'm glad you're all coming. The restaurant is probably a

bit too far to walk. It's further than Grandma's. So we have the use of the shuttle here. We're going to call for a slightly larger shuttle and that will get about 15 of us there, and we have at least three cars. Does anyone else have a vehicle that I'm not aware of that could drive? No. Okay.

So I think we can get everyone in what we have. We may have to send the shuttle back if it's too crowded. I've pre-ordered some appetizers so that they will be ready pretty much when we get there. We'll get drinks and then they'll get us seated for dinner which you preselected. If you want to add anything like salads, et cetera, that's fine. They just wanted to have a heads up on the major entrees.

The next question is what time would you like to go? Six? Do you want to meet around 6? Is that too soon? I thought 6:30. How about 6:30 in the lobby and we'll shove into vehicles and go?

MR. WELCH: 6:30 at the check-in desk. Ashley, if you're providing transportation to this restaurant, are you providing transportation back?

Thanks everybody for a good, productive day. Thanks to all the NOAA staff. We reconvene at 8:30 tomorrow morning. Breakfast at 7:45. Okay, very good.

[The public meeting adjourned for the day at 5:37 p.m., September 23, 2009.]