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2 million for the shoreline.

So money, some 2 million went into the charting. As everyone knows, there will be a slide coming up where we're kind of reengineering our production system, and so that's helped us move that along.

Data archiving went out to NGDC to help build some stuff, some equipment out there, and VDatum, which I think Juliana -- no, Rich is going to talk more about in depth.

Who -- is one of the three officers going to talked about VDatum in depth

JULIANA BLACKWELL: Yes.

CAPTAIN LOWELL: Good. There you go. NGS will talk about it tomorrow.

Already hit the numbers and some updated shoreline in LA.

Well, there's the leveraging. I'll go ahead and mention that. US portions of the Great Lakes, NGA flew with some other money, and so a lot of that money from the ARRA funding is going to take the NGA data, run through our contractors and get it to a nautical chart, so we'll have a complete new

shoreline of the US side of the Great Lakes, not including Michigan, because that wasn't on the border, so NGA did not collect that.

So there's -- there will be a lot of bang for your buck on that one.

Next.

Continuing on with this, assertive vessels, THOMAS JEFFERSON, FAIRWEATHER. TJ has been out for a little while. I believe FAIRWEATHER just got underway for the 2010 schedule.

We have a very aggressive schedule. We have a -- the CO of the TJ has taken a bone, and he is going to get more mileage out of that vessel than anybody has ever done before, so we'll see how he does.

And this year we do have the FAIRWEATHER deploying up to the Arctic. They'll be doing a coordinated survey with the Navy. We'll be doing the area in the chokepoint there on the Bering Sea. The Navy will be working south of us in undisclosed locations, but we will be getting any data collected that applies to the NOAA products.

So we'll see -- we're starting to get our feet wet in working in the Arctic, so that's kind of the bottom line there.

So next slide.

If anybody really wants to see and run through all the projects that are scheduled, there they are. I don't think we need to walk through those. This will be on the slide. It will be on the website here shortly.

Next.

A couple of things I did want to mention, and we've actually briefed this up to several of the senior leadership within NOAA, is on the hydrographic side, everyone's aware we had backlog in place. The data was coming in faster than we could get it to the products.

I'll refer to that as ping-the-chart process improvements that we've been working on. This is a quick walkthrough. This is the field collects the hydrographic data. Then the data is delivered to our evaluation group, our division or branch, and their job is to validate it, was it done right, how was it done. And then they'll create the first

product from that that is then delivered to the chart division for application to the charting product, and that's the third bullet there.

Of course any -- any dangers to navigation that are noted generally get caught by the field and circumvent that whole process anyway. They go out as a dangerous vehicle -- dangerous to navigation -- upon notice, immediately get routed to a different process. It's an accelerated way to get out to the mariners.

And that's via the local Notice to Mariner process that the Coast Guard runs.

Okay. Next is a quick slide just to give a little history of the number of surveys in. You can see the actual acquisition numbers are going up, up, up.

There's a little spike back at 2000, which was a dump of about 65 Navy surveys all at once, so that's kind of an aberration.

But the trend is we're just collecting more and more and more. As everyone is aware, these datasets are bigger, more complicated, and there's just a whole lot more information that's got to be plowed through.

So the tail of the process has to catch up with all of this.

Next slide.

Here's a little bit of history. There's been some improvements in the field acquisition. The GPS was a great timesaver. Multibeam, computer processes. We've been working very, very closely with our commercial off-the-shelf vendors, the Carriers, the Hi-Packs, the various hardware manufacturers, to build more efficient processes and capabilities to manipulate these data much faster, much easier. New twinsets, things of that nature.

So we have increases in field units. That's part of the big trend upward. We'll be getting more -- everybody is actually getting more and more output.

Office processing, in HSD -- that stands for Hydrographic Surveys Division, that's one of our Office of Coast Survey divisions -- could not keep up. The backlog was in HSD.

At the peak, we had 390 surveys in the queue, and that was pretty much awaiting for

somebody to compile a product to move to the nautical chart, and we were not very comfortable with that situation, as you probably can imagine.

Next.

So what happened here, putting in a lot of these improvements, what we did is upon receipt, is there was a quick evaluation of the data, and if there's any kind of acquisition issues, we immediately get back to the field unit to make changes so we don't have perpetual problems as we're -- they're nipped in the butt, so data comes in cleaner.

Clean data is the key here to a good process. So the cleaner the data is, the faster we can get it through.

The details here are the total time it takes to deliver the data. You know, back in March of '08, I don't know if you guys can see that, but in the far left of this slide, we were looking at 1400 days. And those -- the solid bar, I believe, is a moving average. The other ones are points.

And most of that time was queue time,

which was just sitting on the shelf. Nobody was dealing with it.

The pink line is actually the hands-on time that we were calculating at the time. And so with the focused effort is -- what's happening is we're getting more surveys out than we're getting in at this point, and so the queue itself -- the queue time is getting much lower, which is the upper blue line.

The hands-on, simply due to the graph itself, the hands-on time itself has also been decreased significantly from over 400 days to just over 200 days, so we've seen a 50 percent improvement in our throughput time.

And of course the actual backlog reduction, eventually we're going to get down to where they're very, very close, and you'll just have kind of a working inventory at that point. So they'll come in, process them, and get them out. And that's where we want to be.

Next slide.

So there you go, as a summary, we made great strides. In FY09, the numbers, we had 168 surveys in and 284 out, so that kind of

gives you those trends.

Looking ahead, we're focused on continuing to reduce those inventories. We are supporting the IOCM, which is a whole other dataset. Everyone here is aware of the Integrated Ocean Coastal Mapping effort that's going on out there.

The whole idea about map once, use many times, it's really easy to say, but to use it many times takes a lot of resources. And so suddenly you get this access to all of these new data streams, once we're aware of them, they're discoverable and we can bring them in, and then it becomes work for us. So we have to keep an eye on that.

And then, of course, trying to get the data available from NGDC. We're posting all of our raw data at NGDC almost on receipt, and as soon as it's deemed usable or passed verification, it's available to anybody at any time through that process.

And I also believe they've shifted to a BAG format, which is kind of the next-generation format to be looking at high

resolution datasets.

Next.

Here's one that, of course, Andy made me put in, but -- not really. It's all part of the -- the Law of the Sea, which I believe Admiral West brought up a little while ago, is although we are not signatories to the Law of the Sea, we're certainly not ignoring the requirements that are on there, and it's part of our I believe it's Article 76 of the Law of the Sea allows sovereign nations to extend their claim via the extended continental shelf rules that are written in Article 76.

It's a complex series of bathymetric and geomorphology that's out there that allows a nation to -- to extend the continental shelf.

And a lot of this work, it's -- I do believe Andy is the lead on bathymetric side of that ECS work, and that's a cooperative effort between several different agencies, including the USGS, NOAA, Department of State.

Who else?

LAURA FURGIONE: NSI.

CAPTAIN LOWELL: There's a whole lot of

people involved, but the potential benefits to the nation are pretty significant here.

So in 2009, basically there's indications that this continental shelf can be hundreds of miles further than the desk audit that was done maybe three, four years ago by UNH.

There was an expectation it could go a certain distance, and now it's looking like it can go significantly further, simply due to the undersea features that are out there.

It looks like the fourth expedition by NOAA and partners to map seafloor -- is that over or is that next year?

ANDY ARMSTRONG: That's over.

CAPTAIN LOWELL: That's over.

So that activity is going on, and we hope to see some good benefits out of that.

Next slide.

Most-wanted recommendation Number 2 -- I think I'm falling behind. I'm not talking fast. Integrated coastal mapping efforts and ensure federally maintained channels, approaches and anchorages are surveyed to the highest standards.

A big push here is we did finish up today -- there was a NOAA report to Congress on the Integrated Ocean Coastal Mapping initiative that's in process right now, but it's certainly out of our hands. It's in the final review phase. I do believe it should be transmitted to Congress within a month, anyway.

And that was NOAA's way forward on IOCM. Next step is now to do an interagency report. The interagency groups have started to meet. They'll use the -- I mean, NOAA is now on record -- well, should it get to the review process, NOAA will be on the record as to how we're moving forward on it. So you'll see that report go out. But that's all how are we going to deal with this Integrated Coastal Mapping Initiative.

Next.

This is just more information on the working group that's -- that's now standing up. We're getting pretty good participation from the other agencies. I think we're a little slow start there, but things are rolling along right now.

It looks like there's some draft comment specifications for airborne coastal mapping and charting data and coordinated airborne coastal mapping and charting activities. So that's all part of the, you know, why do we want to do IOCMs. If somebody is doing it, we want to try to know they're doing it, leverage it, collect it to accommodate a standard, and then share it.

Move on.

Modernized heights and implement realtime water levels. I do believe Rich and Juliana will spend a little bit more on this HSRP recommendation.

Coast Survey is actively involved in modeling. As -- as I mentioned before on the Deepwater, a lot of our models, specifically the Gulf of Mexico, in this case are underpinning a lot of the scientific work or even the operational applications of science that OR&R is doing on this spill trajectories and things of that nature. So without the models, these trajectories don't work.

We now have nowCOAST, which is an

award-winning website, which is tying multiple data streams into a relatively simple user interface.

I'm would invite anybody to head over to nowCOAST. I believe their latest enhancement was the ability to download it to your iPhone, so you should be able to get nowCOAST information on an iPhone or any small mobile -- whatever they're referred to as.

Next.

Emergency services. Well, this is a topical item. Here's a couple of spills we responded to recently. Here's Port Arthur, Texas. I'm not going to go ahead and read all that. You can read it.

But basically, navigation response teams are there to try to help in any way they can. In this case, it was an oil spill. And other times it's lost gear, and they simply try to find it quickly and get those ports open again, as everybody here is fully aware of what they do.

An interesting thing, which I believe Captain Peacock will be talking about a little

later, is some of the work we -- we sent an NRT up to -- can you pronounce that for me?

CAPTAIN PEACOCK: Cobscook.

CAPTAIN LOWELL: Cobscook Bay. They had a series of accidents on an urchin dragger where there was several losses of life on different boats over a period of time.

Just today, I was told that they started looking across the border to Canada and the loss of life was far more significant than they thought.

And so the NRTs are up there trying to provide closure to the families that have lost loved ones on these vessels. And they've located the vessels and through the current --

This was a very, very difficult place to operate. There's 12 knots of current through this area. Slack waters are 30 minutes, at best.

CAPTAIN PEACOCK: Or nonexistent.

CAPTAIN LOWELL: Or nonexistent.

So the survey windows were tough. And the diving windows, I don't know how they're getting them down there and getting these up,

but they started to recover the boats and recover the bodies for closure for these families.

So good emergency responses we've seen there. Obviously -- go ahead and click it. I think there's one slide on Deepwater, which we've already covered.

We do have three NAV managers down there scattered across the coast working with everybody, trying to get -- trying to get our products out there.

Oceanographic data in the form of modeling. NowCOAST and JHC support, the mapping integration.

We do rely on JHC quite a bit. They're very good on many, many aspects, and they help us move our technologies forward.

Aerial photo missions. Well, this is a nod to NGS here. Water level and current meters, a nod to CO-OPS. You get more and more -- you get more information on both of those tomorrow.

And currently, we have a couple of one-pagers looking at the possibility of the

use of multibeams for seafloor oil detection and damage assessment, which is what Jon Dasler asked about a little while ago.

So we floated those ideas up. We currently have no ship time. We are -- we -- the existing platforms that we know of that are out there working in that area and see how we can leverage some of the work that's going on out there.

So no answers on that. We are asking for some supplemental funding should that fly through there to pursue that as a research.

Next.

Electronic navigational charts. As I mentioned before, we're kind of revamping our charting system from a multiple-production system to a single-production system.

I don't want to go into a lot of details there, but basically it's -- when we get it online -- and right now we should be going into limited production sometime this fall -- we got a small suite of charts out, but the intent is to get it all up and running. It's on an ESRI COTS system, and we're rapidly trying to put in

place now how do we transition from all the old systems to the new systems.

So all the workflows, all the link-backs, all the connections into the -- into the Legacy databases, things of that nature.

So that's the level of work they're at now. So we're committed to the system. We're moving forward, and we hope to see real results on that in the next few years.

It will take -- the estimate right now to clean up the data to get it in there, which is mostly do the edge matching to ENCs, getting the contours of depth areas to line up, things of that nature, it just exists in the old dataset, we want to clean that up before we load it into this new system, because this system is a central database. It's not product-driven.

So we want to try to get those kind of errors out of there before we load it. And that's estimated to take about five years to go through the entire digital dataset of the charts and get them loaded up once we're online.

Last one to be mentioned here is the IMO ECDIS mandate for 2012. Actually, ECDIS is already mandated for high-speed crafts, so this is just the first of the -- of the rest of the fleet, so to speak, I believe.

Cruise ships were the first out of block, although probably most of the big ships probably already have ECDISs on board. I don't mean to speak for Norwegian Cruise Line, but --

And then over a five-year period as more and more ships, different tonnages will be affected, so we need to -- Coast Survey needed to have a complete suite of our ENCs, which is our electronic nautical chart, available for the mariners.

We're currently at about 99 percent on the major ports, but a lot of the interconnects and some of the areas, unfortunately, the cruise ships were going are not done yet, but we should have them in place by 2010, by the end of 2010.

I don't know if everybody has noticed, but when everybody -- whenever anybody talked about a milestone as being in the third quarter or in

a year, it's always the end of the year or the end of the quarter, because it's never in the middle or at the beginning.

Next slide.

Going a little over, and I can see there's a lot of people hungry here, but we did implement a new strategic plan at Coast Survey. We can certainly make it available to everybody, and it might have been made available at the last meeting. I don't recall.

But we're implementing now a strategic implementation plan. So we got these goals and objectives up there, but it doesn't necessarily mean you've got the path through the woods.

So now we've got a team stood up to go, okay, this is where we want to go, this is where we are. How do we move from here to there? And they're establishing some concrete steps that we take over time to get us to where we want to go.

And these are the actual -- the four goals. Be provider of choice of information needed for safe navigation. Survey and chart the US Coastal, Great Lakes and offshore

waters. Expand Coast Survey's customer base beyond the traditional navigation community.

And then achieve organizational excellence -- organizational and managerial excellence. Pretty much trying to get better and better at doing what we do.

Next.

Here's a couple of quick notes, is Bay Hydro II most of you aware of is on the water, operating. It got an award from MIL WorkBoat Magazine.

And all three of the offices are working jointly on coastal and climate change issues. We have a -- we have a tri-office group that gathers over at NOS, and we kind of look at our various skill sets and where we can leverage together.

And we have two projects underway, one down in Mobile Bay, and one on Poplar Island where we're pretty much bringing all the tools and techniques and skill sets to bear on these issues.

Next. I believe this is the last one. This is the mandatory budgetary slide.

So it pretty much tells the story here. The 2011 President's request, the bottom line is mapping and charting is slightly less than the 2010 enacted. Didn't get the -- we're not requesting money for the EEZ surveys and the California sea mapping -- seafloor mapping surveys. They're going on now.

Everything else is pretty much -- with a slight increase in base, but everything else is pretty much flat-funded.

So that's where we are. I believe that's the last one. Hit it. And there you go.

ED WELCH: Okay, Captain, thanks.

Virginia, can you go back to the first slide or two real quick?

CAPTAIN LOWELL: Goodness gracious.

ED WELCH: Back to where you had the stuff on ARRA.

I believe you indicated that there were some 1900 square nautical miles done as a result of the ARRA funding, and I wanted to see -- what was it, 3200 -- go to the previous one, Virginia, please.

So you did 3200 roughly in overall, but

1900 of that was from the stimulus; is that --

CAPTAIN LOWELL: The ARRA money is spread out over a number of years. I mean, we received the money in 2009, but they're still working on --

ED WELCH: Okay. I want to be clear on that. Is it also accurate that -- go one more, Virginia -- that in fiscal '09 because of ARRA, you hit sort of a high point of hydrographic surveys total area in -- for a number of years?

CAPTAIN LOWELL: Well, I would imagine so. We haven't actually looked back --

ED WELCH: I think I saw a chart at one point that basically had a fairly good spike there.

Also --

CAPTAIN LOWELL: Contract assets at that point, so...

ED WELCH: Does NOAA have either up on the Web or internally some data about the number of jobs, private-sector jobs that were preserved or created as a result of this ARRA funding?

CAPTAIN LOWELL: I'm actually kind of looking at Ashley on that one.

Do we have a calculator handy?

ED WELCH: Because I think the administration said they would go in to calculate that.

UNIDENTIFIED SPEAKER: They had to to get the money. That was a prerequisite to getting the money.

ASHLEY CHAPPELL: Yes. We have the money.

UNIDENTIFIED SPEAKER: Because we got the money.

ED WELCH: Can we get that information here at the panel, please?

ASHLEY CHAPPELL: Yes. I think it's actually on the ARRA funding website.

ED WELCH: Okay. All right. Somebody can produce it.

The last comment I would make is that you all -- I mean, I've been complimentary of you of being nimble enough and having some projects/proposals in the pipeline so that when the stimulus came along you were able to present them to NOAA and the Department of Commerce for inclusion in the agency's proposal, and all I always think you ought to

be thinking in terms of what the next thing is, the next opportunity like that is and be ready to take advantage of it, because so many agencies aren't ready to take advantage of it.

These things come up so quickly, and I'm thinking this right now, the supplemental appropriation bill, could there be Gulf Coast shoreline mapping expansion projects that could be ready to go and be part of a -- of a supplemental request?

Are these supplementals, are these stimulus? That's where you really get beyond the confines of the regular budget, and you've got to be ready to take advantage of them and you've got to be aggressive within the agency and within the department to get your case made.

And so if I'm hearing there's going to be a supplemental request, let's see what Hydrographic Services can legitimately contribute to a supplemental request.

Thanks. Are there other comments or questions?

Jon Dasler.

JONATHAN DASLER: I think also not a supplemental -- I'm thinking in terms of just not a supplemental in terms of response but potentially even mitigation, which could -- I mean, I would think that could get rolled into that, a mitigation effort might be expanding and improving, you know, coastal mapping in the event these happen again, that that might be a --

ED WELCH: Well, I don't know whether -- whether -- what the map -- what the mapping and coastal and shoreline stuff is on the Gulf, but you hear about how dynamic the area is.

So unless somebody has done something extremely recently, probably stuff is beginning to get dated down there. And to me, that's connected enough to the spill and the tragedy down there that, you know, it's not too much of a stretch to make a case for including something like that in a Deepwater Horizon supplemental request.

Andy McGovern.

ANDY McGOVERN: Two questions.

First of all, we're having this meeting in

the Northeast and there is no Northeast NAV manager here because there is no Northeast NAV manager.

Is there any idea of when we will be getting a replacement for Matt?

CAPTAIN LOWELL: I can get back to you on that. I know it's an open billet for an OCOR officer. Our priority right now is to get -- Alaska was also vacant, and so we have somebody going into Alaska.

I can find out who is in the pipeline right now and when they're due to go in there, but I'll have to go back and look.

ANDY McGOVERN: Okay. Thanks.

And the other, which doesn't have to be answered right now but maybe since you did bring up the budget, is, you know, we keep talking about PORTS here, but the O&M funding there was a lot of people that got it in the '10 request, and I've been told that it's missing from the '11 request, so it was a one-year blip.

And is there a reason why it was not included in the '11?

CAPTAIN LOWELL: I will defer to Rich, budgetary issues on PORTS.

ANDY McGOVERN: Don't need an answer today, but --

RICHARD EDWING: My budget slides are tomorrow. I'll talk about that.

ANDY McGOVERN: Okay.

ED WELCH: Other comments?

Jon Dasler.

JONATHAN DASLER: I didn't -- I guess the other thing I was going to mention was you mentioned IOCM mapping efforts, so some of that has been happening with the West Coast governors agreement.

CAPTAIN LOWELL: Mm-hmm. It's slowed down.

JONATHAN DASLER: Right.

And so last year some of that effort -- some of that funding is coming out of charting backlog, and I kind of raised this issue when Dr. Lubchenco was giving the budget brief in Seattle this last winter.

And if there is going to be a continued effort in that to support CMSP, you know, can

there be a budget set aside for some of that effort?

And I think the other issue is, you know. some of the charting backlog money is going to that so it can get on the charts, but there are some other surveys that are not following those standards. And so that's data collected.

And how can there be, I guess, a little more push on NOAA's side to make sure that happens?

CAPTAIN LOWELL: You know, obviously it's a balancing act. We want to know when people are going to go survey an area, and we want to communicate our charting -- our acquisition standards to them.

There is an analysis that -- where everybody can kind of look at that and see is it -- can they deal with it in their existing resources, does that meet their requirements.

And if not, we can come in there with perhaps a different scene, that kind of an approach.

I believe we did that down on the -- on the West Coast.

Certainly we don't want to just dedicate all the survey backlog money to mapping these areas, because they're not that navigationally significant. But it gets back to the bang for the buck, throw in a couple of extra bucks to get the data up to -- I mean, we simply couldn't afford to do it any other way, not in a realistic time frame.

So we're just kind of balancing all of that.

I mean, we fund that out of our own hide? The answer is probably no. But we're not against leveraging what other people are doing, even if it's not our highest priority, because it simply can get done then.

I don't know if I answered the question, but --

JONATHAN DASLER: I guess maybe this -- while Laura was still here, but the message is I guess if we're really pushing for a national ocean policy and CMSP, you know, funding to get the data that's needed for that, I mean, currently that's coming out of the charting backlog.

CAPTAIN LOWELL: And it happens both in multibeam systems and LiDAR systems and all of the systems that are out there. There's just so many different standards.

When somebody has a requirement that just doesn't require the high level of work, then they don't want to pay for it, and, you know, it's hard to argue with that.

ED WELCH: Any last comments or questions for Captain Lowell?

Elaine Dickinson.

ELAINE DICKISON: You didn't say, actually, how many ENC's are left to do, nor is it being slowed down with this conversion to the new database.

CAPTAIN LOWELL: Yes.

Actually, everything has been slowed down with the conversion to the new database. We have a significant amount of resources doing the data cleanup on the existing cells, plus we're trying to maintain output on the rasters and on the ENCs, in other words, maintaining this output we've got out there.

We've got just shy of 800 at this point

posted and available. You know, in a perfect world we would have a thousand -- we have a thousand and nine paper charts, something right around there.

But the reality is we probably won't get every one of the paper charts, certainly not -- just areas where there's nobody navigating.

Is there anybody from the Great Lakes here?

We have these new charts up on the border that are very, very shallow. And then some of the other charts are just really -- like the -- you know, North Shore -- the north coast of Alaska, just bad shoreline, it's bad data.

I mean, we could create them. People might think it's knew data, but it's just a different look at the old data. It's really just bad. We need to get out there and do some work.

ED WELCH: Okay.

Anybody else? Thanks, Captain. All right. Well, I think Kathy is going to give us some instructions about lunch, maybe.

KATHY WATSON: Right outside the door

here.

ED WELCH: She's good, isn't she? And -- okay.

Well, then why don't we -- we'll adjourn for lunch. I want to again thank Laura for coming up from Washington and hope you got a flavor for our panel and some of our concerns, and we were glad to have Jennifer here.

We always send a little summary report to the administrator afterwards with some of our observations, and we'll be sure and send you copies of what we produce.

So thanks very much. And I guess we are adjourned until 1:00.

(Luncheon recess.)

ED WELCH: Good afternoon.

We're going to our meetings here for the hydrographic meetings panel, and we're going to take a moment before our stakeholders panel, and I'm going to recognize Larry Whiting.

LARRY WHITING: Isn't it appropriate to make a motion now on -- for somebody that's leaving?

ED WELCH: Sure, Larry. It's all

appropriate for you to make a motion.

LARRY WHITING: Well, if I could make a motion in support of John Lowell's testimony tomorrow and reiterate that now so that he can take a copy of this thing or something when he goes to see the administrator before he testifies.

ED WELCH: Well, I think maybe Virginia anticipated your motion.

VIRGINIA DENTLER: And I'm sorry it's small. I'm sorry it's so small.

ED WELCH: Can you read that, Larry?

VIRGINIA DENTLER: Hold on.

(Pause.)

VIRGINIA DENTLER: Can you read that now?

ED WELCH: We have a little spelling problem with "Arctic" and "hydrographic," but other than that --

LARRY WHITING: I think other than that, that -- you know, therefore supports or fully supports, I guess -- that would be all right with me.

I'd like to make this motion, that we send this thing with John as he gets ready to go out

to testify tomorrow. He's leaving at 3:00 or something like this.

ED WELCH: Is there any second by anybody?

MATT WELLSLAGER: I'll second.

ED WELCH: Matt seconds.

Do we have any discussion of the motion?

ADMIRAL WEST: I would better identify the testimony as Captain Lowell's and the date, so for posterity sake it's in there.

VIRGINIA DENTLER: Change "NOAA's" to "Captain Lowell's"?

ADMIRAL WEST: I think what we're supporting is the -- is the testimony that John showed us today; is that correct?

ED WELCH: Why don't we say supports the May, whatever the date is, testimony.

KATHY WATSON: May 6th.

ED WELCH: May 6, 2010 testimony by Captain John Lowell on behalf of NOAA in support of HR 2864. Let's see how that looks.

VIRGINIA DENTLER: And I got on behalf of NOAA of HR --

ED WELCH: Say "in support of," you are supporting the bill, correct?

CAPTAIN LOWELL: Yes.

VIRGINIA DENTLER: Is now who --

ED WELCH: Okay. Larry, is that satisfactory? Admiral West?

ADMIRAL WEST: Yes.

ED WELCH: Andy McGovern.

ANDY McGOVERN: Another suggestion. Instead of referencing the May 6th, just say "the attached" and attach his testimony.

You have it.

ED WELCH: What's the pleasure of the panel?

LARRY WHITING: I think it's dated May 6th. We could do both, you know, we could have May 6th the attached testimony.

ED WELCH: You know about the guy that was on the East Coast and he got a phone call and it was a funeral director on the West Coast. And the guy says I have your mother-in-law's body here. Do you want me to cremate her or embalm her? And he says take no chances. Do both.

We can do both.

LARRY WHITING: I think we can do both.

VIRGINIA DENTLER: Is that what you want?

ED WELCH: Okay.

Any other suggestions? Any further discussion?

All those on the panel who support this motion, say "aye."

Any opposed, say "no."

The "ayes" have it.

So we will give this motion to Captain Lowell, and he can use it as he sees fit tomorrow. Thank you, Larry.

Okay. Now we come to our part of the program where we have our traditional stakeholders panel.

This is a situation over the past few meetings, the HSRP panelists have looked forward to hearing from various people in the marine and other communities that use NOAA's services to -- hydrographic services to give us their input about how they use those services, how it's benefiting them, where they might be improved.

So it's proven to be very useful to us. We've learned some unexpected ways and

unexpected people that use NOAA hydrographic services.

So with that, we will -- we'll start our current panel, and I think what we'll do is just go with each panelist to make their presentations.

And then we'll hold off questions until all of the panelists have made their presentations, if that's all right.

So if we could, if each -- I don't know that we have any biographical material. We distributed it in advance about the panelist.

So if you wish to in addition to your presentation say a word or two about yourself, that will be welcome.

So we will -- we will start with Dr. Charles Colgan from the University of Southern Maine. Welcome.

DR. CHARLES COLGAN: Thank you, and good afternoon.

I'm Charlie Colgan. I'm a professor of public policy and planning in the Muskie School of Public Service at the University of Southern Maine.

I'm also a NOAA hanger-on of some three decades vintage. I started in life as the -- working in coastal management in the Coastal Energy Impact program. In the '70s I was the director of Maine's Coastal Management program. I once actually paid Gary Magnuson and kept him employed, which I hope he will not blame me these many years later.

I've done a lot of work with NOAA over the years on coastal management issues.

In this past ten years, I've done a lot of work on the economics of ocean-observing systems, and of other NOAA services including hydrographic services and weather services, as a consultant to various parts of NOAA.

So I'm actually very pleased to be here to interact with yet another part of NOAA that I have not yet done much with.

I noticed that the title of the panel was the Navigation panel, and I am going to leave to others the discussion -- more qualified the discussion of navigation issues.

I'm going to bring navigation into a different context, and that is the relationship

between hydrographic services and the measurement of coastal areas and coastlines on the problem of navigating on land, not on water.

As the picture in the title slide suggests, this is going to become more and more of an issue -- indeed, it already is -- in many parts of the country.

This particular picture is in Maine and represents the kind of thing that the coastal communities throughout the United States are beginning to deal with on a more intense level as we try to recognize the effects of sea level rise.

The importance of the kind of relationship between the measurement of coasts and hydrographic services and sea level rise and responses at the local level to sea level rise really can't be overemphasized.

In a workshop that was held with the Coastal Services Center in December down in Virginia talking about how we -- how we communicate to the public and how we communicate to decision-makers issues

surrounding sea level rise, there was a broad consensus among a variety of experts both within and outside of government that one of the critical ways is to be able to translate the sort of technical aspects of the ocean and sea level rise and climate change into day-to-day language that people understand.

And a lot of what we've been doing over the last couple of years at my school, partly with funding from EPA and partly with funding from NOAA, is to begin to look at the question of how do we bring sea level rise and its impacts home to people in a way that they can understand and begin to realize how it's going to affect their lives. And that's what I'm going to talk about a little bit today.

Do the next slide. I just want to point out that -- hit it again. There's an animation on that.

I want to point out that traditional navigation issues will not be entirely omitted from my presentation. This is a picture of York Beach, Maine with a -- the effects on coastal navigation from the Patriots' Day storm

of a couple of years ago.

But mostly what I want to focus on -- the next slide -- is the question of how do we -- how do we come to understand changing sea levels in a way this we can act?

This is the way in which I would say the majority of people are viewing or presenting the idea of sea level rise.

These are rather static pictures in which we basically color in parts of the land area blue to remind them that it's water. This happens to be Back Bay, Boston. The various sites are indicated in the -- with the letters.

But other than this kind of static picture, this has been shown to get people's attention, but then you put down at the bottom that this is somewhere, you know, in maybe the late 21st century, and people begin to say, okay, yes, that's going to be a problem all right. Somewhere down the road. Not enough for me to worry about right now.

So what we've been trying to do is to point out some of the major issues that we're facing right now.

Go to the next slide.

There are two projects I want to talk about. One is a project that we did a couple of years ago where we --

Basically, on the land side we are increasingly able as a result of changes in government statistical series and the development of GIS technologies and geolocation services to very accurately map socioeconomic resources.

This happens to be -- the dots on this happen to be the seven coastal towns in York County, Maine. And the dots on it represent centers of employment. We're able to map where all the centers -- where all the establishments of employment are in your county, many.

And then in the next slide, what we do for the town of Old Orchard Beach, which I'm going to focus on in my presentation a little bit here, is to map the employment locations against the possible impact from storm surge under different assumptions about the possibility about the intensity of storms and the reach inland of storm surge.

The colored dots represent the employment establishments that are at risk from different levels of storm urge under different sets of assumptions.

What we've done with all seven towns and in the next slide, what we're able to do with this data, by accurately mapping employment locations with respect to the shoreline and then using estimated models of storm surge, what we're able to do is to show people by town the number of businesses that are at risk from storms, the annual average employment that could be affected by storms.

The fact that we're dealing with -- here in York County, Maine with a highly summer-dependent population, so we get even more employment effect in the third quarter, and we're able to show the number of the actual annual wages of people that are potentially affected by an understanding of the relationship between the land side and shoreline.

We can do more data, we can do more analysis with the data. In the next slide, we

look at the industrial component of the at-risk industries.

In the summer, if we look at the -- if we look at just within what we can currently model, the so-called SLOSH model, it's tourist industries that are most affected.

But if we push just a little bit further inland, if we assume a little different error rate about where the shoreline actually is or push for a little bit higher sea level rise assumption, in the next slide we see that the economic impacts extend not only to tourism but into health services, retail trade. In fact, a whole variety of industries.

Now, this is the kind of information that local officials and state officials look at and say, ahh, wait a minute, something's going on here that really does affect the way my local economy actually operates.

We're talking about not just wiping out a few restaurants or a few hotels, but in some of these towns, major healthcare facilities are at risk, because we do not fully -- because of the way in which we are envisioning possible sea

level impacts.

Now, this is a relatively static analysis. It's a -- it's one step up from the blue flood picture. So we've got the blue flood picture. Now we're able to look behind the flood picture and say what's going on in those buildings and point to some very specific potential impacts with respect to employment output and the local economy.

This, however, is still not enough to fully understand what's going to happen, and so in some additional work that we're also doing -- let's do the next slide -- again, we're going to stick with Old Orchard Beach.

So here's your traditional flood slide, Town of Old Orchard Beach, Maine.

You can see that some of the beach is just high enough to survive, but the backlands behind the beach is going to be severely affected under this particular climate change scenario.

Again, gets people's attention; but, you know, it's off in the distance.

So we're trying to do more dynamic

modeling of both the land side and the ocean side of the potential impacts.

We're developing a model, which my colleagues have given the incredibly original name of "coast" to, I'm still -- I really wished they'd come up with something else, but -- it's just -- if you look at the next slide, couple of slides, we'll show you what we're doing.

So here's again Old Orchard Beach, Maine. You can see the assumption here about where the coastline is. The green buildings here represent residential -- primarily residential structures, so we're moving beyond employment to look at residential structures that are potentially affected.

Now, by combining models of ocean dynamics and measurements of ocean shorelines with socioeconomic data from property tax records and damage function data from FEMA and other sources, we're actually able to develop more dynamic models of how this will work.

If you look at the next slide, the height of the building represents the possible at-risk

status of that building. So this is not a sudden sprouting of high-rises on Old Orchard Beach. The only high-rises on the coast of Maine are on Old Orchard Beach.

The height of the building here represents the total risk estimate. And then if we look at the next slide, the color of the building represents the amount of damage that we think those buildings could undergo from different storm surge scenarios.

The result of this is that we see a much -- a much more complete picture of how changing shorelines impact the local community.

Now, Old Orchard Beach happens to be the one community in Maine that is primarily located literally on the beach, or a major portion of their town is located on the beach, and also a town with a substantial potential damage from the flooding in the area just behind the beach.

We've done a similar project we're just completing now with Groton, Connecticut.

We're working with the Town of Groton, Connecticut to show exactly this same kind of

damage functions for that town from sea level rise. And we're working to generate the next generation of this modeling by improving both the on-shore -- the on-shore sociodynamics and the ocean dynamics in order to better model the interaction.

We're still in a somewhat I would say comparative statics type of model.

But you can see here how the -- knowing where the coastline is and knowing how that changes essentially drives much of the rest of this understanding.

If you don't know where you start, you have no idea where you're going to finish. So it is along with things like basic property tax records, employment data, the kind I showed you earlier, it is one of the essential foundations for this dynamic understanding of sea level rise and its impact on society, which we think is probably the only way --

Picturing this kind of dynamic interaction between land and sea is probably the only way -- in the computer is probably the only way we're going to get people to fully understand

in tea's world what tomorrow's world is going it look like.

And that's what we're really trying to do here, is to use technology and use better measurements of and better spatial measurements of both the oceans and the land side to create a picture that is both realistic and accurate as to what may happen a different set of assumptions.

Another element of this is -- that we're building into the models is what happens when you do shoreline protection strategies. This is an armoring strategy in Delaware.

What happens when -- inevitably, people come up and say, wait a minute, you're going to wash my house away. Put a rock wall in front of it. Well, we need to model that, too, because not only the costs of that rock wall versus the damage functions, but of course that changes the underlying dynamics of the long-term transport of sand and things like that, which many communities in Maine want to be able to do.

Unfortunately, of course, the problem

merely shifts the -- the issue of damage down the beach further or into an estuary.

So the opportunities that we have now with computer models, with better spatial reference data on both the ocean side and the land side and the measure of the shoreline itself gives us, I think, one of the big opportunities we have to convince people of the dangers inherent in sea level rise and climate change.

It paints a picture of their local communities that they cannot see now otherwise. They cannot quite envision what's going to happen.

We can show them pictures like this of the storms, the storms are -- and the storms are what they remember, but they'll say, well, that was just one storm. It does not reflect Margaret Davidson of Coastal Services Center's point today's flood is tomorrow's high tide. And it is tomorrow's high tide that we are trying to show.

Thanks.

ED WELCH: Thank you, Dr. Colgan.

Our next speaker is Dr. Michele Dionne.

Am I pronouncing it right?

DR. MICHELE DIONNE: Yes, excellent, thank you's.

ED WELCH: From Wells Estuarine Research Reserve. We're pleased to have you.

DR. MICHELE DIONNE: Thank you.

I'm here sort of invited by Allison Allen at CO-OPS, so I am a member of a system of state and federal partnerships between NOAA and the states. And there are 27 of them around the country.

And we have been working with CO-OPS and NGS semiformally for several years now, hopefully some day become more formal in terms of trying to understand how coastal habitats, especially what we call emergent marshes or tidal marshes are going to be affect in response to climate change.

And as Charlie was mentioning, the most -- I'd say the most obvious manifestation of climate change in our neck of the woods, the Northeast, is more intense storms.

The sea level rise piece isn't really necessarily very evident at this point, as I'll

show you with some data.

So I'm glad to be here, and I just put this talk together sort of this morning when you were running your meeting, so bear with me if it's not a --

ED WELCH: Were we really that boring?

DR. MICHELE DIONNE: No, I -- I enjoyed the meeting. So, I mean, it made the slide show construction less boring. So here we go.

Do I have to aim?

VIRGINIA DENTLER: No.

DR. MICHELE DIONNE: Okay. Here we go.

So title, From Hydrography, which is what you folks do, to Hydrologic Regime, which is sort of the master control of coastal habitat response and will determine whether or not our marshes survivor in the Gulf of Maine and indeed throughout the US coastline.

And I hit the red button?

VIRGINIA DENTLER: No, the arrow.

DR. MICHELE DIONNE: Okay. I'm doing something wrong.

VIRGINIA DENTLER: Is it on?

DR. MICHELE DIONNE: That might help.

Maybe I should just do like Charlie and have you do it for me. It's buzzing now.

All right.

So just as I said, there are 27 of these reserves around the country. I never miss an opportunity to let everyone know that the one in Maine is the only one that doesn't receive any state support, so I'm neither a Fed nor a state employee. I'm just somebody who tries to hang on and keep employed and do good things with my time.

So there we are up in -- and I have a pointer, too. We are sort of bracketing the northeastern corner of the coast. And we call this the Acadian bioregion, and these are all supposedly distributed somewhat according to biogeographic province.

And our overall sort of purpose in life, and it's very similar to what Charlie was saying, was to take science and information and package it up in ways that are relevant and useful to various audiences, coastal managers being one of them, but general voting citizens being another, people who own property on the

coastline, lots of audiences.

But just trying to take scientific information -- first of all, collecting scientific information that's really relevant to management and then packaging it so that it can be used is quite a challenge. Because, as everyone knows, it costs quite a bit more to collect the data than it does to package it. So we try to do the whole ball of wax, from soup to nuts.

Here at our site, which is -- consists -- our reserve actually consists of three river systems, starting with this little river system, the Webhannet River and then the Ogunquit River. And I would just preface -- just to give you a sense of this York County piece of coastline that Charlie was talking about, there are probably 20 of these little estuaries that add up to something larger. But they're small, individual units scattered -- sprinkled along the coastline right down to the Great Bay of New Hampshire.

And I'm imagining that they're really the tail ends of a much larger drainage that might

have been more like the Penobscot River once upon a time when sea level was a lot lower than it is now.

Here's our very famous NWLON station, which we acquired maybe five or six years ago. We would know.

We were very lucky, we sort of won a lottery, so to speak, at a meeting one time where Allison was looking for somebody who wanted to have an NWLON station at a NERRS site, and because we just had all the surveying done by the Army Corps of Engineers for the harbor dredge, we won the lottery because we had done a lot of the groundwork for it.

And I must say that it's -- as you will see, it's an extremely useful resource for us, and all the other reserves would like to have something like this at their sites.

Some of them do -- the larger ones, like the Chesapeake Bay, Virginia site, do have one at least.

I was just talking to the folks at the Hudson River, they're way upstream, 100 miles upstream, navigable waters, but their closest

NWLON station is down in New York Harbor, whatever you call it, so they're very frustrated and very jealous.

So anyway, I'm putting in a big plug for growing this relationship between the NERRS and CO-OPS. And if you're going to collect data in a place where it's going to be well-used, the NERRS sites are one of those places.

Well, what are we doing with the data?

Well, one of the things that we're doing, I mentioned we're trying to work with NGS and CO-OPS to use water level data and water elevation data, and what we're very interested in is understanding how our reserve sites, which are generally marshy systems, some of them are more mangrovey and some of them are more open mudflat sorts of places, but mostly salt marsh.

And we really are very concerned about how these systems are going to survive and persist overtime.

We know in Wells these marshes have been very well studied in terms of their geological evolution with CORS. They started emerging as

sea level rise kind of tapered off about 4500 years ago, and they've been sustaining themselves just fine for about 4500 years.

As a matter of fact, they're probably the most stable ecosystem that you can study.

I don't know of any other ecosystem in North America that's been basically doing the same thing for 4500 years.

And so we have been establishing these permanent transects in this particular design to watch vegetation monitoring -- to watch vegetation change over time in response to water level and hydrologic regime, nutrients, various drivers of change.

But this is all linked up periodically, because we do not have enough funding systemwide to do this on a regular basis. So we set these up about five years ago, and now in Year 6 we have a little bit of money to go back and revisit them.

Our setup is -- every reserve is designed a little differently. We follow the same protocols, but we have paired transects, one adjacent to a buffered piece of shore land and

one adjacent to a developed piece, so we're trying to answer some questions about land use as we go along.

Just to give you a better -- stepping back a minute, I thought I had a picture of our loggers, too, our water quality loggers, but we'll get to that.

This is probably one of the least disturbed or altered -- hydrologically altered salt marsh estuary systems in the Gulf of Maine, and that's in our reserve. It's call the Little River.

And it's actually probably is the only place where you have actually a natural inlet. It's never been dredged. It's never been hardened in any way. And so the geologists really love this, just to study what a natural inlet would do over decades. It's quite valuable.

And so here we have our -- what we call a back barrier marsh. This is all barrier beach stuff, as Charlie was mentioning, and it kind of meanders up into what we call a finger marsh system.

Okay. So CO-OPS measures water level. It also measures water level change with the tides. And the tides are the -- you know, the biggest reality that we have to deal with when we're working in intertidal areas. The areas that we work in are defined by the tides.

Everything we have to do has to be -- you have to look at the tide chart first before you go out. So right there, having water levels from CO-OPS and getting on the Web and seeing what's happening is very helpful, because you know that the tide charts are just predictions, and the NWLON data is actually what's happening right now.

We're at mid-tide here in this system. Our marshes have about an average 8-foot tidal amplitude. It can go up to 12, 13 feet on a really good spring tide with a good wind in the right direction.

This is -- I'm calling this New England high marsh. It's not usually this fluorescent. I don't know exactly what happened here with this image, but the high marsh is fairly dry and pasture-like. I actually call them New

England's native grasslands, which they are.

And you can see that there's a bit of a breakpoint right here, and you get to this different species of grass. Grass this is called salt marsh hay. They're both spartina grasses. They're true grasses. That's why I get to call these grasslands. And this is what we call the high marsh, and this is what we call the low marsh.

And it just so happens that the ecology of these two grasses is such that they make this transition right at mean high water.

So actually, mashes have been used very cleverly by geologists in looking through CORS and gating different plant fragments over time. And wherever you see spartina patens, you know that's where mean high water was on wherever that date was.

And that's how they generate sea level curves over geologic time from these marshes. Actually, one of the best sea level rise curves on the East Coast comes from that kind of work on our marshes.

Now down to the low tide, you can see --

you get down below the edge of the vegetation, this is kind of a cut bank, so you don't see it very well, but there would be a shoulder of that low marsh coming out to about mean low water, and then below that is unvegetated because the grasses can't withstand inundation below that point, because they just do have their limits, as all biological things do.

And here's a little bit -- we like to show people -- talking about the [unintelligible] people that sea level rise happens. Well, as the drainages change in these marshes and you get new channels cut, you often will come across an old tree stump. And if you go ahead and date that, that might be 2,000 years old.

That's where upland was 2,000 years ago, and there might be several hundred yards of marsh that have grown beyond it up over the upland in the -- over time coming to the present day.

Okay. As Charlie was mentioning, there acute storm events become very obvious to us in New England. We've been having 100-year storms pretty much every year, it seems, for the past

five or six.

We're getting -- I'm talking about precipitation, not so much -- I don't know so much about the storm surge, but those are obviously a piece of it. But we're getting very altered precipitation patterns that actually cause upland flooding and lots of water dumping down into the estuaries and blowing out lots of infrastructure from the upland side as well.

And we do have problems with land clearing that have been -- become very obvious in the past 20 years, and that doesn't help. And we also have a fairly steep slope, which I guess it's a two-edge sword.

In terms of precipitation, you're going to get a lot of downhill flooding, so nutrients and nutrient loading and all those bad things from a sea level rise perspective perhaps a little bit of protection for the upland owners, but the marshes are going to get this little squeeze thing going where if they cannot accrete an elevation fast enough to keep up with sea level rise, they may run out of room

to persist,

So in the -- as I was saying, tides rule the coastal habitats. And coastal habitats, basically these marshes are formed by the delivery of sediment from the tides or from storm events or even from winter ice, so it's just that arithmetic, that simple arithmetic between how much are you adding and how much are you losing in a given year will tell you what elevation your marsh at and whether or not you're going to keep your head above water enough so that the grasses can persist, and so the plant vigorously depending on this hydrologic regime.

The hydrology also determines that drainage never go up channels and creeks, which is really important for the aquatic organisms that come and go with the tides and take advantage of the nursery habitat, so the movement of fish and the things that they eat.

And then finally, the tides in the hydrologic regime are going to determine the extent to which the marshes can move with sea level over the upland and maintain their --

their place in the world.

As you can see, I have a storm picture, too. On high tide on a good windy day, there's not a whole lot of intertidal habitat to be seen in many areas of the Maine coast.

And the Maine coast is probably, you know, one of the places where you can still some natural habitat at that time. Many other places you might not.

So the -- the NERRS have been talking, as I mentioned, about trying to work together with CO-OPS and NGS to establish a system, a network of sites where we would actually look at very detailed information about sea level, weather, water levels, inputs to the ocean from the upland and coastal habitat response, which would be done in different levels.

It would be the sort large scale, what we call tier one mapping. And then there would be the more detailed, sort of process-oriented understanding a measurement of the marshes themselves.

And so I guess I'm -- here would be a good point to make a pitch for the value, as Charlie

was saying, too, of having detailed maps of that -- that little rim of the coast that gets you up out of the subtidal areas.

And actually, I'm sort of a little bit lower elevation than what Charlie was talking about, but we've got, you know --

We're talking about a fringe of upland that is subject to tidal processes and marine processes where a lot of people live and a lot of property and a lot of investment and a lot of organisms that are -- have evolved to use these habitats live.

So I think that it's a constituency that could certainly use the services of your programs, even though it's not traditionally related to water navigation.

So what's the goal -- what are the goals here? I'm just going to read these. So we want to understand how these systems respond to climate change, and then we want to assess impacts and try to determine some useful indicators of vulnerability and come up with some solutions.

How best are we going to allocate our

resources to minimize the negative changes that could be associated with climate change, negative changes to organism and people?

And I'm probably running out of time -- nobody is timing me, so where am I in my --

VIRGINIA DENTLER: About 14 minutes, slide 14.

DR. MICHELE DIONNE: Okay. I'm probably about halfway through my slides. I think the TEXI [phonetic] slides I can probably skim through pretty quickly.

This is sort of boilerplate from the proposals that I've helped write that we are trying to find a home for or some funding for in NOAA. And as you were discussing this morning, that's a bit of a shell game sometimes.

If they're level funded, if you want to get extra money to do something, NOAA -- either has to come from somebody else or it has to be somebody -- some protecter, some guardian angel is finding money for.

And we haven't really managed to do -- we haven't been successful yet, but we're always

hopeful for the next round of funding.

The questions that we really want to be answering at the very basic data-collection level really have to do with all about water levels and topography and then again, the biological response to the regime that's determined by the elevation of the land and the level of the water.

Here's the blue map, and my point here was the same at Charlie's, which is that you can take your current topography and map your habitats, and then you can say okay, what happens when we increase the water level a foot, which is what happened here. And you can see what is underwater or at least wet.

And that really is a good starting place, but as I was explaining, marshes have the ability to respond to sea level rise. And there is a very nice model that's been in development by Jim Morris down in South Carolina. It's been showing up in lots of proposals that are getting funding right now. He's got the best model for understanding how marshes respond to water levels, and we would

really like to be able to implement that model up our way.

He's only used it -- as you go further south on the East Coast, you use that New England high marsh, and most of the marsh becomes that lower, wetter low marsh. And Jim's model only has been applied mostly or mostly to that kind of habitat.

I'm going to skip that slide. We did that sort of blue map modeling of Casco Bay. We actually found that we had a little bit of a net gain of marsh if you allowed the marsh to migrate.

In other words, we found enough flat areas where water could spread out and create a marsh, more of those than we had marsh pinching, so that was an interesting little exercise.

This is just sort of a box-and-arrow diagram showing you some of the processes involved in marsh response to water levels and how marches accrete and of course climate is the driver.

Let's see. So the model I was just

mentioning would need certain kinds of data inputs, and that's where the ecologists, you know, get to have some fun, and the geologists.

We need to measure things like surface sediment deposition, accretion and loss of elevation, looking at plant productivity and things like that.

I'm a fish ecologist, but I do have to do a lot of geology and plant stuff in my job, because that's the stuff that gets funded. Working with fish is a lot more expensive, so we just try to squeeze that in when we can.

So just some pictures of what -- this is what we do to measure sediment deposition and some data we had to show that the percent of time underwater that the marsh is underwater was directly related to the amount of sediment that was deposited on a surface.

So that sort of short-term spring tidal flooding two-week tide periods for a longer term, do these little sediment elevation tables which measures on an annual or semiannual basis -- semiannual scheduled changes in elevation of the marsh.

And then finally, you can look -- you can put down bits of white clay on the surface of the marsh and measure how much material accretes over it over time.

Now, these two things together will tell you actually what's going on with the marsh, because you can have a sinking marsh, like all the marshes in Louisiana are sinking because of what we call subsidence, but you still can have a lot of sediment deposition on the surface of that marsh, but it's elevation you may still be lowering.

So you have to measure these two things to really understand what's going on within our system. You have to look at accretion, and you have to look at whether that accretion is actually leading to a net change or increase in elevation or whether you're having sinking ing.

So this is a piece of -- this is a -- a set of instrumentation that would be very valuable for the reserves to own and use, and we would share it with CO-OPS, we would do all kinds of surveying for CO-OPS if they wanted to help us find some funding to do this.

The reserve system owns one right now, what we call an RTK GPS survey instrument. There's also optically-based laser photo stations, and then the GPS can get fancy and be used to get highly accurate benchmark systems.

And we're using all of these in cooperation with NGS. We've been going -- having training done with them for reserve staff to go out and do the right kind of vertical control establishment so that we can get good -- we can relay all of this water level data that we're collecting not just with CO-OPS, that's already plugged into the vertical data, but all of our other water level data that we collect with our own loggers so that we can relate it all together and have it make some sense in sum across all of the -- all of the reserves.

I'm going to skip that. This is basically showing -- you're looking at the elevation change, the accretion and the net gain or loss of elevation over time and over a set of years.

This is actually before and after a dredge where we had lots of elevation gain before and

elevation loss after, but in the end we still had an overall net accretion and overall net increase in elevation of the marsh.

And actually on the high marsh, our summary of elevation change was about 2.2 millimeters a year, which is actually what sea level rise is in our next of the woods right now.

So that's kind of nice to know that our marshes are apparently keeping up right now, but we don't know how close to the edge really, because the rates of sea level rise now really exceed anything that came from those geological sea level rise curves that we've generated.

So it's just an open question, and that's why we think we need to start measuring these things a little more accurately. Then just some picture how we measure the veg.

One point I do want to make is I do think that a lot of the coastal erosion that's attributed to sea level rise in our area, this upstream of the York River, is probably more from 85-horsepower boaters going on little river channels, you know, many, many, many

times a day in quiet water systems that never saw that kind of wave energy in their many -- beyond millennia of history.

Okay. So that will sort of give you a picture of this idea of the sentinel sites and trying to address climate change in a way that's relevant to coastal habitat management and to helping people plan better for changes in infrastructure.

But now I'm going to segue into something we've been involved in for a long time and we've sort of been good promoters of this idea of restoring tides to marshes throughout the Gulf of Maine.

And we've been very involved in making sure that that's done, that the data that's collected for these sites is done in a standardized way throughout the region, that's been fairly successful, so that we can actually learn something from all of this NOAA investment in marsh restoration, because most of these projects are funded by NOAA.

So this is a march restoration opportunity that was at the reserve when I got there in

1991. We had about a 75-foot-wide channel crossed by a road, and the only hydrologic connection upstream and downstream was a -- this is 36 inches on the outside, but it sort of mushed down to less than under that the road.

So not a great hydrologic connection. If you did the surface area, the cross-sectional surface area, it's about five square feet.

We have recently changed that to something a little bit better. I still would have liked to have a bigger opening, but this is what we got, what we could afford, what NOAA could afford.

It's a 5-by-4-foot box culvert. And again, talking about working with the public, the public was very insecure about having a wide-open culvert, so we actually had this -- what we called self-regulating tide gate which is adjustable installed. And we have been putting a lot of energy into trying to manage this system the way we think it needs to be managed based on our understanding the marshes and data we collect.

Before that tide gate went in and we had that tiny little pipe -- actually, the pipe had a flapper valve on it that just fell off just before I got to Wells.

And so for about 100 years, this marsh was -- had no tidal inflow at all. This is what we call the Drakes Island marsh. The whole area is about 125 acres. The tidal portion -- the formal tidal portion about 75 acres.

You can see there's some differences in the colors which indicate differences in plant production in this infrared photo. But basically, this whole system has subsided between one and a half and three feet. So it's much lower. It has actually experienced subsidence.

And so when you want to restore the tides, you have to think a lot about the hydrology. Here's another map from a highly detailed survey that we did. This is what the peat of the marsh looks like downstream and what it looked like upstream when I first got to Wells. So it was pretty mushy and yucky, and there'd

been lot of decay, which I could go into why that happened, but we don't have time right now.

ED WELCH: Dr. Dionne, could I give you about a five-minute warning?

DR. MICHELE DIONNE: Yes, okay.

Going to skip through that, that. Okay. These are my last slides, and then I will let the next speaker have their time.

These are data from NWLON stations related to data that we're collecting now at several restoration sites to look at how well the hydrologic regime is being restored.

And I think that's all I need to say. But we need this data and we need the data from the loggers and the mashers to really understand whether or not we're getting it right.

And this is the same kind of data we would collect in a reference marsh or in a marsh that's not altered hydrologically or hasn't been restored really to understand how well the plants and sediments are -- or how they're being driven by climate change by storms and by sea level and by freshwater flows.

So these -- I could go into the details here, but basically this is a reference marsh where the water levels from the low marsh, that transitionary, and the high marsh all look about right for the plants.

When you get into some of these restored areas, you get some really funky-looking patterns which we can't go into the explanations for right now.

But basically this -- this is the Drakes Island marsh which has a very odd tide because of the tide gate. And then this is a marsh that was restored but is way too wet and is probably not going to be survived.

Probably going to be taken over and it is being taken over by that plant I show you a few minutes ago, the invasive plant that loves altered hydrology.

And I think just a few applications of the kind of work that we're hoping to do more of and in a more formal, well-funded way, which would be to identify marshes that are at risk from climate change and come up --

There are some nice living shoreline

approaches to protecting and preventing edge erosion of marshes. And there may be some clever ideas about opening up dams and letting sediments -- stored sediments come back into these systems, identifying areas where marshes can migrate naturally if they're able to keep up with sea level rise, and making sure that they don't get built upon, you know, that we save some space for the marshes to move.

And then also to identify more of these highly restricted marshes -- and there are hundreds of them still left to be dealt with -- that we think would actually be excellent place for marshes to migrate to.

I'll leave it there, and I think there will be questions at the end.

ED WELCH: Yes, good. Thanks very much. And I'm sure we'll have some questions and comments in a few minutes.

Okay. Don Frost from the Connecticut Maritime Association. Don, welcome.

DON FROST: And in the words of Monty Python, and now for something entirely different.

A little bit about myself. I graduated from SUNY maritime. Went to sea a couple of years as a Coast Guard licensed officer, but since then I've been working for the shipping business ashore as a shipowner, ship operator, shipper, consultant, broker, whatever.

Currently, I guess besides my activities with the Connecticut Maritime Association, which I'll talk about in a moment, I'm also working with Columbia University Center for Energy, Marine Transportation and Public Policy.

That center has been around for about a decade, but it's only been functioning on -- focusing on energy. The marine transportation part has just started in the last three or four years, and I'm the commercial advisor to all its academic people.

I could talk about that forever, but that's not what I am here for.

Connecticut Maritime Association, if you don't know, is -- it's big, despite sounding state-specific. We have a little over 2,000 members in 30 states and 32 countries.

Our virtual membership, judging from our website, is probably 8,000 more beyond that. We have been around for 26 years, and we continue to grow. Probably gain a net of about ten new members every month.

And it's really interesting, I just was typing it up the other day for the new letter, the people who joined in April are evenly split between India, Kazakhstan, California, New York, New Jersey and Texas. It's a very, very weird thing.

Our core members are shipowners, operators and shippers. And since the year 20 when Wall Street discovered the shipping industry and the shipping industry started to become an industry, not just a business or a service, bankers have replaced lawyers. Lawyers have gone to number three, I guess.

We have a lot of representation from class societies, ship registries and regulators, both the IMO and the US Coast Guard.

That's just the background here. I have a three-minute -- roughly three- or four-minute video, gave you an illustration of some of the

issues that the shipowners are interested in, and then I'll add some comments to that, and my thing will not be 20 minutes.

Would you, please?

VIRGINIA DENTLER: Do you want to have volume on this?

DON FROST: There is some volume.

This is about an oil spill that happened in Philadelphia a few years ago. I think you'll see where I'm going with the whole thing, so just, you know -- this is a great post luncheon video. It will keep you awake.

(Video played.)

DON FROST: Just one -- we have jpeg here, just a shot of what the anchor looks like, and then I want to it talk a little bit more about this.

I hope you see the relationship to NOAA and hydrographic charting, et cetera.

While -- let me just deal with the facts here. They said they had a 40-foot -- 40 foot in the channel. The anchorage where the ship was briefly was 38 feet, which he drew 35 feet six inches. And nobody -- and then as the ship

was being drawn in, the master knew he had hit something and actually using his depth sounder knew exactly where it is.

But NOAA and the Corps couldn't find it. That's the anchor. But that's the anchor that was described as being the cause of the accident. It is not the cause of accident. There was also a 20-ton hopper -- let's see, no. It was a casing for a turbine that was down here that probably did the damage.

And after the -- after the accident, as the TV piece said, they found not only the anchor and the dredge casing and the -- as well as a 10-ton hunk of concrete, all within the 38-foot anchorage that was approved by NOAA, presumably, or the Corps or whatever. Not here.

I just wanted to give you the illustration here. Ed asked what -- what part of NOAA are the shipowners most concerned about?

Well, aside from the fact that they don't want to run into any of these things, they -- they're not certain what's out there anymore. They're scared stiff.

The issue of criminalization of spills, accidents, has a situation where the shipowners don't want to come to the United States. And if they do, they're going to charge a lot more money to come to the United States.

Go back to the ATHOS I for a second. When the captain -- they pulled -- they tied up at Paulsboro while this accident was happening. The captain said I knew where the heck this thing is because I have it on my echo-sounder.

The captain of the port -- the Coast Guard captain of the port caught a couple of crewmen in scuba suits wanting to go over the side to prove exactly where it is. And he threatened to send them all to jail.

Well, the captain and the owner threatened to go to the press, saying that it was a big coverup by NOAA, the Justice Department and the Coast Guard.

So what they did is the crewmen showed the federally paid divers where the hunk of metal was. That was the housing -- the pump housing.

I think I made that point enough.

I wanted to go to the next step. This is

a -- the conversation I had with Captain MacFarland of NOAA in 2001 at a first industry information fair in Washington, which was set up by Mr. Gary Magnuson.

He asked me -- this was a -- if you hadn't been through this thing, there was -- it was impromptu, and it was held in a tent on the National Mall several blocks from the Capital, and I just happened to wear a nametag.

Everybody else was known to NOAA people because they were either vendors or had Washington connections.

So Captain MacFarland, strangely enough, actually reads my newsletter -- or did, anyway. And he saw my nametag. Pulls me aside. He has a great entourage of all uniformed people from NOAA, and he pulls me aside and says I have to go to Congress next week and I have to testify about dredging, and implying that the shipowners had some part of this dredging issue.

And I -- this is a quote as best I can remember. "If the people of the United States are content to see their cost of living rise,,

the competitiveness of their exports decline and the incidents of accidents and oil spills in their harbors rise because their harbors and waterways are unable to safely accommodate the most economical ship sizes, that's a national decision, and they have to -- and we have it pay for it.

"Shipowners build ships that will be competitive worldwide, not just in one market. If a port can only accommodate a ship that is smaller than ships accommodated at ports of our trading partners and competitors, the consequential higher freight rates as approved to the cardinal interests that use that port, ultimately that cost will be passed on to the consumer or end user."

Shipowners do not lobby. They work with what you give them. And as a -- and so if you want to make your ports, our ports, uncompetitive or unsafe, then we have to pay the price, and there is some evidence to prove that by ignoring our ports for the last at least two or three decades, we have given away, many, many hundreds of thousands of jobs,

literally different them away, not lose them. We've given them away. That point is made, I think.

My last little point relative to NOAA is the economic impact of being competitive is also the use of the smart buoys that used to -- I haven't dealt with this stuff in the while. The so-called PORTS buoys.

And I cannot understand -- this is strictly my commercial view -- why IOOS trumps PORTS when PORTS can actually contribute to our economic well-being and competitiveness.

IOOS may have a long-term goal, but it's not one we'll see any results for for decades, and that's the end of my statement.

ED WELCH: Okay. Thank you, Don.

Okay. Now, Captain Joseph Maco with the Northeast Marine Pilots Association.

CAPTAIN MACO: I'm going to see if I can get my website up here.

(Pause.)

CAPTAIN MACO: Let me introduce -- Captain Joe Maco, Northeast Marine Pilots and Sound Pilots.

That's the area -- as I said in the introduction -- basically everything between New York and Boston. It covers a large geographic area, a lot of small ports, New Haven and Providence are our biggest ports, but everything in between. And we do a lot of deep-draft vessels into Long Island Sound.

A little historical perspective, I. Think it was in 1993, I was an invited guest to the national Research Council's two-day seminar up in Massachusetts Maritime Academy, and some of you may remember this book. And this is why we're here today, because this started the ball rolling.

NOAA was subject to a lot of criticism to being a little antiquated in how they did things, and there was a lot of industry complaints about their performance.

I think we've come a long way since those days. Some of the products are actually hard to keep up with, but the part about the PORTS system --

Also, as you see at the bottom of the picture there, in 2004, Northeast Marine Pilots

got the environmental award from NOAA for our help in distributing information on the right whales.

I've been doing this about 40 years, piloting ships. When I started out, we used to measure the water covering rocks. We had tide boards that were put on pilings, and you see how the tide came up and that determined sometimes when you could bring your ship in or out of port. And now we're into a PORTS system, which I think is a tremendous advantage.

I've been using NOAA products actually longer than that. I started at age 13 as a Sea Scout, and I was learning how to plot charts for 75 cents and 50 cents apiece then, and they lasted a lot longer.

But as part of this national investigation as to the NOAA products, we found out that our chart products could be changed the way NOAA produced them, and I think we're at the point today where the weight for charts are coming out to the mariner a lot quicker than they were 18 years ago.

The funding. We have a PORTS system in Narragansett Bay, which is almost inclusive of all the features of most of the PORTS systems, and we have a PORTS system in New Haven in the areas that we work.

And the PORTS system in New Haven basically gives you the rise and fall of the tide, and that's it, whereas the PORTS system in Narragansett Bay has just about all the features except for the air gap, which when I started we used to call air draft, but now it's called air gap.

And since that's critical to many ports, I think -- and especially since we're talking about some issues with air draft on LNG tankers under the Mount Hope Bridge, it might be beneficial, if and when that happens, to have the air gap feature on the PORTS system here.

Going back to funding, I think it was in about 2000, the State of Rhode Island had a marine accident, and they decided to tax the amount of oil that was moved into the port, and that's the source of funding for the PORTS system.

Unfortunately, it takes sometimes marine accidents to get people moving and changing the way they do business. Unfortunately, you're going to find the Gulf incident is going to result in some of that finding as well.

But in Connecticut, a local fisherman funded the PORTS system and then dropped the funding, and it took me three years to get the Department of Transportation in the State of Connecticut to make a minimum contribution to keep the PORTS system going in New Haven.

So it was very frustrating, but I persevered and finally got the DOT to cut a check.

But my thrust of my presentation will be on ship safety. It's interesting, Don came up here and showed you some slides and -- about what's going on in our ports when you have an accident, and we certainly want to be proactive and not have accidents, and I think your PORTS system is probably one of the finest products that you have.

I'm a little concerned, though. I noticed that nowCOAST came out, and I'm not really

family with the nowCOAST product, but anything that I've dealt with over the years -- and I've done a lot of research for various agencies and entities -- it has to be user-friendly.

My first look at nowCOAST is it's -- it gets a little complicated. So any of your products, I would advise you to have them be user-friendly, because you're doing a lot of different things. You're talking on a VHF radio, you're talking to the personnel on the ship. And when you want to get information, you don't want to have to press a lot of buttons. You want to be able to hit one button, get the information, displayed as quickly as possible. So don't make it too complicated. Keep it simple, stupid, as they say.

Users and beneficiaries of the PORTS system, I think there are a lot of different users. Academics it, fishermen use it. But primarily, here again, for ship safety and trying to avoid the consequences that we all know can happen when you're moving oil tankers around, pilots, I believe, you know, really

think that's a tremendous benefit. Especially in most of the ports we deal with, we're doing tide work.

So when you have a 35-foot project depth and you want to move 37-foot draft, you have to rely on the rise of the tide; and that, to me, is where this comes down. You -- going back, as I said earlier, you know, when you're looking at a tide board or when the water is covering your rocks, that's fine, but when you look at the consequences if you misjudge, it's very important that we have a good product. And that gets into the next issue, reliability of quality.

As far as I know, the NOAA product of PORTS is very good. And if it's not putting out the right data, it won't put out anything. You'll get nothing. So at least you know that they're not putting out false information.

And if you can't get an Internet connection, you have a telephone number. That's another -- actually, that's when I started using the PORTS system. We didn't have laptops -- navigational laptops, so we just

used a cellphone, or even a marine operator if you didn't have a cellphone, to call the number and find out, you know, what the rise of the tide was in an area.

So the economic importance of a PORTS system is very, very important to -- for a number of reasons, for -- and I don't want to get into the shipping companies, how they can figure out how many extra tons of cargo to move or not move in and out of the port based upon the rise and fall of tide; but from the perspective of the marine industry, knowing what certain things that are going on with the -- with the water level and what time we're going to dock a ship or not move a ship and so that the -- all the people that are involved in the maritime community have a direct impact on whether or not the ship moves at a certain time based on the rise and full of the tide.

And, of course, safe navigation, there's a few pilots in the room here, and they'll all know the term "situational awareness."

And it's not only in the maritime field, but they use that -- the higher the situational

awareness, the lower the risk of an accident.

So by having about a PORTS system, you're raising the level of situational awareness of the pilot who's conning the ship. And that, in turn, reduces the risk of an accident because now he has some data, he knows what the under-keel clearance is going to be between the bottom of the vessel and the channel bottom.

We also are getting pressed more and more to move bigger and deeper ships. We have requests to move 60 feet of draft into Long Island Sound. There's coal vessels coming from Indonesia.

And we certainly want to have good soundings, and NOAA has been very cooperative whenever we have requests to NOAA and the people that are out there giving us good information on the soundings.

And here again, one of our pilots was on the QE II, the accident in the Vineyard Sound with the QE II. Found an uncharted pinnacle. And I was acting president at the time, and the Coast Guard commander in charge of the investigation called me up and said we found

the pinnacle. Changed the whole focus of the investigation.

Obviously we had a pinnacle that no one knew about. Maybe some local fishermen knew about it, but it certainly wasn't on the paper chart to keep the vessel out of that track line.

So situational awareness. Again, this is, to me, is a big item. When we teach bridge resource management, it's the general focus. As you raise the situational awareness, there's the less chance of an accident.

And here again, we have small ports. We have ships that have to go in on a tide. You can only move the ships at certain times when they're right under keel clearance. There are other vessels waiting to come out.

So if you can only move one or two vessels on a tide as opposed to three or four, depending on your good information that, again, has a tremendous economic import.

Most of our products are oil products, oil, coal, and so they have to be delivered either for a delivery to an oil terminal or to

a power plant, and that has a direct impact on the cost to the consumer.

That is my navigational laptop, and I'm not sure how many of you are familiar today what pilots do on their -- in their job, but we bring aboard a laptop on the ship, and we access some of NOAA's products, one being National Weather Service, because we can get realtime weather information off of your National Weather Service.

One of the good features is when you know there's a thunderstorm in the area, look for Doppler radar. We can tell if there's a thunderstorm moving through. Gusts of 50 knots might not move the vessel, especially if you're transiting through a narrow channel or a bridge. So that's an important product.

We utilize your navigational charts, both digital and raster, so that's also on the laptop. And then of course the PORTS system itself.

I'm just going to scroll through the PORTS system, and I'm not sure how many of you have ever seen the PORTS system.

What I'll do is click on the PORTS system for Narragansett Bay, and we'll go to Fall River.

We -- here again, we'll show you, we bring coal ships up to a power plant in Fall River that are 755 feet long, drawing 34 and a half feet of water in a 34-foot channel with a three-and-a-half-foot rise in tide.

So you have minimum under-keel clearance. And then we transition the channel, which is 250 foot wide, with 106-foot beamed vessel. And so we have to be careful under currents, because when you get that draft with that minimum under-keel clearance, the vessel wants to go sideways very rapidly when the current -- ship is broadside to the current.

So here again, we access the PORTS system, and when the current is below a certain level, we know we can safe -- when we have to tow the ship out, we want to do it in slack water. Here again, the PORTS system is very important for that.

So I'm just going to boot up there. I'm sorry I didn't have a PowerPoint presentation,

but I hope you're getting the gist of my presentation. Thank you.

(Pause.)

CAPTAIN MACO: So this is your PORTS system from Narragansett Bay. And you can see, there's six locations here. And I'm going to click on the Fall River location, and it will do the composite, which will give us pretty of much all the information you want.

And you can see it, the water level for Fall River is just about high water, predicted height of the tide is 3.75 feet, and the actual tide was higher than predicted, 4.13.

As I said earlier, that may mean that we may being able to move the vessel in a little sooner than anticipated based on the rise of tide.

Also there, it gives us the wind. And further down, as I was saying, there's the -- on the right-hand -- lower right-hand corner, that's the current vector, showing the current of less than a half a knot. And that's the channel that I talked about where you have to turn 90 degrees into a narrow channel with a

755-foot vessel, drawing 34 and a half feet, and it's very imperative that you have current less than a knot when you're making that turn; otherwise, you're going to end up on bank.

And, of course, the other product -- hang on.

Well, I think we'll leave it at that. You get the gist of everything there. Thank you.

Ed, thank you.

ED WELCH: Okay, Captain. Thanks very much. We'll have some questions for you in a minute or two.

Captain Peacock.

CAPTAIN PEACOCK: While she's getting ready, I'd like to thank you for inviting me down.

Yesterday I -- and the day before yesterday I spent some time with Bill Brennan, Dr. Brennan, who is your former acting administrator, and he asked me to give you all his best.

He started as president of Maine Maritime on Monday, and we're very happy to have him. On the board of trustees, we're very happy to

have him.

My history with Dr. Brennan goes way back I was his babysitter when he was 12 years old, so -- I also worked with him at Emr Maine. And believe me, we are very happy.

I'm going to talk a little bit today about something that's good that's happening with NOAA. We've had some pretty bad press with the Fisheries Enforcement and with fisheries policy in New England particularly, and this is something that countered that, and I -- I got to tell you, the press reaction to this particular survey was unbelievable.

We've been on every TV station in New England, and it was pretty extensive. Let's see.

The titled my presentation "Who's Next?"

I'm going to go over 15 deaths. Every time you see a name in red here, these are friends of mine, with one exception.

The boat that you see here is called the LO-DA-KASH, Canadian boat out of Campobello. Four people died in that boat. It's the only one that's been recovered intact with all its

gear still on.

The drag was caught in an uncharted ledge up off of New Brunswick about 10 miles from my house. And there was two guests riding with him. The boat went down so fast they didn't have time to get out of the wheelhouse.

The stern man swam ashore -- 25 yards from shore -- in February and froze to death, and they didn't find him for about a week and a half. Then the captain has never been found.

So I'd like to tell you the sad facts and give you a little overview of the area, the NOAA search, the recovery attempts, which are quite interesting, and the conclusions and recommendations that I came up with.

So the 32-foot dragger LO-DA-KASH departed Campobello in 2004, about 11 miles from Campobello, Blacks Harbour, New Brunswick. She deployed a drag from a high block -- and this is important -- all of these vessels, every single one of them, there's 20 of them, were towing from a high block and -- on an A frame.

And when I say "towing," they were either dragging for scallops or urchins.

In this case, he may have just put his drag down to anchor himself because he had an engine problem, but it was still from a high block.

Paul Wilson was lost, never found. He was a good friend of mine. Trent Gilmor I knew. And Marilyn Ross and Wes Boulter were scientists that were just riding back to their home port from Campobello. They just took a ride, and they both tied in the wheelhouse.

Then on August 18, 2006, about five miles from Lubec, Maine, the BRAIDEN G went down between the Wolves and Campbello. Wade Gallagher was lost, very good friend of mine. He stayed at the radio until the last second, giving his position. And in this case, the Coast Guard from Eastport was able to get out there in Canadian waters, and they rescued Andre Mallette.

Andre was holding onto a box for two hours and at 1:00 in the morning in the middle of the Bay of Fundy, and the Coast Guard found him because of Captain Gallagher.

Then on December 2, Kris Fergerson, who

did some work for me in my fish plant, went out to go periwinkling at night in mudflats south of Lubec, and nine days later his body washed up ashore.

All of these cases, there was extensive searches by both the American and Canadian Coast Guard, DMR and many other -- many local organizations.

Then March 24th, we lost the ALL AMERICAN with Loran Lank and Logan Preston. Loran was 57, and Logan was 19.

What's important here is that boat went down in March, and we found Logan's body on the 23rd of December.

On September 8th, a tourist named John Albotin, who was the head of the nuclear power plant at the Plymouth Nuclear Power Plant in Massachusetts, went across the sandbar that was just starting to get covered by the tide and got washed off, as a tourist.

And his wife dove in, who was able to get ahold of him. They took him out of the water five minutes later, and he died from hypothermia, they believe.

Then -- he's the only gentleman I didn't know. But I did get to meet the family quite a bit. The pilot boat rescued Mrs. Albotin.

And then on the 20th of October, the urchin dragger BOTTOM BASHER went down. Joe Jones was lost. He was the owner. He's still missing. Daryl Cline was found the next day. He was operating it. And Norman Johnson was found on December 19th. That's also quite a bit later than the boat went down.

And it's important, NOAA's -- this had a big -- NOAA had a big impact on this.

Then on November -- sometime between the 10th the 14th, Arthur "Skip" Calder went out very near on the mudflats where these two boats went down, within a half a mile, and he disappeared, and we found him a couple of days later. He was frozen.

And then on January 23rd, the MISS PRISS was lost in Cobscook. On February 1st, the Coast Guard stopped using the LORAN signal. This was the first day that this boat had used a GPS. They'd never used one before.

And they hit a ledge within 20 yards of

where one of these other boats went down that they cleared every time for the previous ten -- ten days going out to go urchin fishing. And the first time they used GPS, they hit it, and they said they were right where they always were on that chart. But there's definitely a difference in the charts between what the LORAN was showing and what the GPS was showing.

Fortunately, a guy name Kirby Schenk took a 14-foot boat off of his dragger and went into 12-knot current and was able to get to these guys and rescue them off the boat just as the boat went out from under them.

And he saved William Feltner, Carl Sizemore and Evan Matthews, all of who worked for me in the past in the fish business.

Then on February 18th this year, we lost a scallop dragger with a whole family -- called the WHOLE FAMILY, from White Head Island, which is just off Grand Manan, and we lost Harold Cossaboom, who was a wonderful man. He was head of the New Brunswick Lobstermen's Association and a really good scientific type fisherman and a great guy to deal with. Then

we also lost Cory Cossaboom, his nephew.

In this chart within a 14-mile radius, we've lost 20 vessels and 15 people since 1989.

From 1989 to 2006, we only lost one person, died. Everybody else, the other 14, have died since 2006 to the day.

So I don't know anywhere else in the country where we've lost 15 people in a 14-mile radius and had such little publicity or little input on it. But one of the reasons is we have the border, and the border runs -- this is Grand Manan, Campobello and Deer Island. The border runs right up through here, and when it's foggy, we call the border opportunity.

But because it's in two different countries, and you have so many different organizations on both sides of the country, they don't talk to each other. So therefore, it's only half of the problem, and that's a big issue we've been working on.

Seven of these boats have gone down within a half a mile of Falls Island. And you can see the current. That's the normal current on the flood tide.

On the ebb tide, you have the same thing going in the opposite direction. And this is the area where we ended up doing a NOAA search, and they were searching in tides with this much tide running.

This is better picture of it. The current runs here about 12 knots on the ebb and maybe 10 knots on the flood.

There's a big rock -- two rocks, you can see them right in the middle of what we call Falls Island. And the first rock is called the Roaring Bull, and the second one is called The Big Mistake.

NOAA sent Matt Wingate up, and if -- any of you don't who know Matt Wingate and if any you wonder why you're in NOAA and if you have any effect on people directly, Matt Wingate is the best ambassador you ever had. He is fabulous.

I've sailed all my life. I was in the military 32 years in the Reserves. I'd take Matt Wingate anywhere with me, and hopefully I'd sail under him anytime. He is a fabulous officer.

Matt Jaskoski was the leader of team that they just threw together to come up quickly, thanks to Howard Danley's work, and he's a great leader. And he was very good at dealing with the 40 volunteers that we had and teaching us how to survey and what they needed.

And he -- he directed Mike Annis and Vitad Pradith, V, those -- two of your technicians out of Silver Spring. I don't think they're working in a navigation team right now. They just grabbed them, said go give them a hand, they've done this before.

They showed up on a Saturday night in this truck with a million dollars worth of equipment on the back of it. We said we would provide the boats, the housing, the food and, you know, give them whatever help we could.

When they arrived, they said where can we put the truck? On the town pier? And I said just leave it. There everybody within 100 miles knows you're here. Nobody will touch it.

And Mike said this is a million dollars worth of equipment on that truck, and I said

put it inside that gate in the Coast Guard station right over there.

So we used -- we had to get the boats fitted out for the gear. They weren't. And we brought prisoners in from the local prison who had been shipfitters for the Washburn and Downey. They both had various problems, but they were fabulous. They worked all night and the next day to get everything ready so that we were ready to go and do the survey. They put all these hard points on.

The NOAA team told us that they could only survey in five or six knots of water, and we told them then we can't survey. And they said, well, then you got to put really good hard points on.

And we ended up surveying in 12 to 14 knots of water, effectively, and that was something that they were surprised that they could do. The equipment was not certified for that.

This is a pilot boat MEDRIC. We put a trailer on it. It was heated. We had generators and we had transmitters so we could

transmit the information between the two boats. We put screens inside.

We used it to bring the press aboard and some of the family members who wanted to watch things to keep them out of the way of the NOAA team working on the whaler. We also surveyed with that boat.

This area is what we actually got surveyed with the KLIEN, and the MEDRIC surveyed the area in red using her sonar. And we did visual searches along the shore and found a tremendous amount of debris from these vessels. It was surprising, so much we had to go in twice and get it off the boat.

The Coast Guard worked with us also and took a lot of photographs and basically we constructed one of these boats.

We found five areas of interest. We call it areas of interest because we didn't want the families to say, oh, you found my husband's boat or my son's boat, and we just -- we didn't know whose boat we found at first until we were able to get divers on it.

This is the first picture, and what's

interesting here is -- I don't know if you can see this point, this is from 60 feet up and looking down. This is the U frame that's under the boat. This is a winch sitting here, and there's another winch right here. We were able to identify later.

From this, we were able to determine that this wasn't the boat that any of these recent people died on, but this is where we found the bodies of two of the other two boats.

These boats were hooking each other. There's no doubt of it.

This is a little bit better picture. You can see the U frame in the side scan.

The equipment -- this KLIEN equipment that NOAA loaned us and with the operators was absolutely unbelievable.

The pictures that we were getting on the screens as we were going over it is even much, much clearer than this.

So we knew we had a boat. We just didn't know which one. These are some of the other objects you can see that we know for sure are manmade.

Some we have not been able to get to yet. We have not been able to get divers down to these, because the current runs so strong here, you've got to do it in daytime at low water on a slack tide, and we have tidal range of 12 to 22, 24 feet. So on a 12-foot tide, you got maybe 30 minutes. On anything over 20 feet, you've got no slack water at all.

It's another picture of some other objects. That was definitely a boat we found out later there.

So these are where the different wrecks were. The first wreck we found, which wasn't one the two guys were on, was right here. And this area had been dragged for three months extensively by maybe 20 boats and never come up with the bodies.

We picked this up in December. We found it in November, we picked it up in December, and these bodies were found within a week later. It's pretty obvious.

You know, you can't say for sure, but the -- I think there's no doubt that this vessel caught at least one, probably two --

both of the other ones, and that's what put the bodies where they were.

This is dive team on the morning they went out the first time. Let me guarantee you, when they came back that night, they weren't smiling like this. They had an education in current like they've never had before. The State Police and Marine Patrol, they risked their lives. They came back five times to try to do this.

And these are the -- the search team consisted of about 40 people from many organizations. Perhaps most importantly is this one right here.

She was very interested in what's going on in this search and what happened and how NOAA helped us, and she was very pleased with the help that NOAA gave us.

I had lunch with her three weeks ago, and I had lunch with Susan Collins a week ago, and she said to tell everybody at NOAA they really appreciate what they've done.

We have three different offices from NOAA that worked on this, and a lot of the local

townspeople and various local contractors donated equipment, time.

And Robert Preston lost his son, David Cline lost his brother, and they were really helpful in trying to get some of this stuff up.

This is from the chart that we're using up here. And this is really important. This area -- this is the area where the boats all went down, right in here. Clammer was here. We know for sure that there's seven boats from here in that are -- that went down.

You'll notice on the date of the survey, 1834. Everything from here in was last done in 1834. In this area in here, in 1899. The Canadians did a joint survey in this area in the 1980s.

And what's really interesting is this. Partial bottom coverage in 1834. We need another survey there. People are dying because charts aren't blown up large enough, and I'm sure there's -- from what we saw from the -- from the scans, there's objects there that are not on the chart.

One of the issues I was talking about,

towing high. This is how you tow low.

When you pull that -- that line in that goes back to the drag here, you move the center of gravity forward of the rudder so you have much more maneuverability. And when you get caught down in the tide, you can turn the boat.

If you're towing from the top of that mast that's behind the rudder, you have no control over that boat.

These boats, we've actually seen one flip, and it went from upright to completely upside down, 180 degrees, in two seconds flat. You don't have enough time to do anything to save yourself.

If you don't have life-saving equipment on, you're going to die.

This is a list of just some of the vessels that have gone down. You notice the ones in Cobscook have gone down.

What's happened, any vessel that you see where there was no deaths with it, they were fishing with another vessel. Not a Coast Guard vessel, another fishing vessel, and they were rescued by the other fishing vessels.

Any one you see where someone died, they were fishing alone.

So what caused the accidents? Fishing alone didn't cause it, but that's reason that you die. Lack stability, towing high. Poor chart presentations based on very old surveys, and that directly affects NOAA.

The economic pressures -- what's happening is the areas are overfished and the state closes them. People are moving into areas where they traditionally didn't fish, so the state is forcing people to go into high-current areas that they normally wouldn't do.

The fishing is very good there because it is a high-current area, and it tends to make the seafood -- the shellfish especially grow better.

So as they close the areas, it's forcing people into places they shouldn't or haven't traditionally worked.

The medical conditions, all of these accidents, every one of them, happened at the end of the day or at night. Every single one of them.

The lack of education for the fishermen concerning stability and surviving in the water. The water is so cold that none of these people can swim and none of them have any survival training. None of them. Or had survival training.

Towing with the tide. If you're going with an 8- or 10-knot current and you're towing and you hang up on something, it just rips the turn stern of your boat right out. You're gone. You're dead. It's instant.

Poor navigation. Some of this is based on the switchover from LORAN to GPS. That will take care of in time. But the charts are a little different between what the LORAN is showing and what the GPS is showing. There's no doubt in that area.

And inexperience in a new area and with new boats.

No PFDs. Not one of these people was wearing a PFD. And part of the reason is they don't want to get caught in a wheelhouse or inside, but with the new manual-inflated PFDs -- we've got a grant request in right now

to a private organization to pay for everybody to get the best equipment they can get for fishing.

So recommend that NOAA resurvey that area of Cobscook that hasn't been done since 1899, 1834. We know there's seven wrecks there, and we know there's some uncharted rocks.

And these wrecks have winches and a lot of steel with them, so they're not just a wreck. They're an obstruction that somebody can hook onto with another drag.

Also, close the area around the Falls Island unless we do three simple things: No fishing alone, wear manual-inflated vests or some other kind of PFD, and tow low. Three simple things will stop all the accidents.

So in conclusion, I ask, Who's next? When I have a meeting with the fishermen, which I just had with them and their families, I looked around the room and said if we don't do something, next year some of you are going to be next. Which one is it going to be?

Nobody on those 12 boats listed there thought that they were going to go out that day

and this is the day I am going to die or my boat's going to sink. None of them.

This brings up a story. On December 24th -- my granddaughter goes to the last two-room schoolhouse in Maine, and she had a Christmas play. And one of the -- little girl came up to me, four years old, and she said, Have you found my daddy yet? It's tough.

So God bless NOAA for all your work and for our families.

Thank you.

ED WELCH: Thank you, Captain Peacock.

All right. I think it's appropriate now for our members of the panel to make comments or ask questions of any of our panelists.

Who would like to start? Larry Whiting.

LARRY WHITING: Captain Peacock, I'm very sorry for all your losses, but there are methods that you can request a survey of that area and there's established ways to do it, isn't there?

CAPTAIN LOWELL: Actually, we have received a letter, request for surveying, signed by both senators of the state.

CAPTAIN PEACOCK: Which is probably the best way to do it.

ED WELCH: Could I -- Larry, could I ask one question along those lines? Our panel and our recommendations on the most-wanted list have in particular urged NOAA to focus on the most navigationally significant areas.

Would an area like this be considered to be a navigationally significant area or is this another category of waters?

CAPTAIN LOWELL: Unfortunately, this would not be considered a navigationally significant area by the current definitions we're using, which is really driven by tonnage and large capacity, deep-draft vessels with low under-keel clearance.

Obviously there's a lot of commercial activity in here. It doesn't mean we can't relook at what we're doing, but -- but no, it would not fall into our current definition.

LARRY WHITING: I just have one comment. This is Larry Whiting.

Your senator is probably the best place to go to get action on smaller items like this,

and they usually have a good input into small things that need to -- I don't know how big this area is. But it looked pretty small.

CAPTAIN PEACOCK: It is.

LARRY WHITING: And really tight for shipping. John would love it.

CAPTAIN PEACOCK: Our senators both have been under incredible pressure. They asked me to get -- because I was a captain in the Navy for 32 years and Reserves. I know a lot people in the Pentagon.

They asked me to get flyovers from B3s using their (inaudible) equipment because there's so much metal. They called me up and said, Bob, can you get this done? When a US senator calls you up personally and says can you get something done, you generally try to do it.

And then -- that was when the first one happened. Then the second and third and fourth.

So now they're very -- they're under intense pressure politically to get something done there, and they understand -- we've

discussed this, the funding issues of NOAA, the timing issues and just the sheer number of personnel available.

But if anything can be done either to schedule it down the road, anything would be better than nothing at this point.

ED WELCH: Other comments or questions? Sherri Hickman.

SHERRI HICKMAN: Dr. Colgan, just out of curiosity, the -- when you did the models for the -- when it looked like high-rise buildings, the damage or the extent, you referred several times to storm surge and then other times you just said high tide or water rise.

When you refer to storm surge, did you mean water rise from storm surge, like with a storm itself, or just actual rise of water level?

DR. CHARLES COLGAN: The modeling we're doing is on storm surge, not overall increase in water levels.

The effects of sea level rise are going to manifest themselves first in more intense storm surges. It's already the case. And so that's

essentially what we're modeling and trying to represent in these analyses.

SHERRI HICKMAN: So is the damage to the -- like as you showed, does that include wind damage or is it just all due to water?

DR. CHARLES COLGAN: No, it's -- the damage functions we're using are simply from water damage.

SHERRI HICKMAN: Water, okay.

DR. CHARLES COLGAN: Not making any assumptions about wind damage.

Most of the buildings you're looking at, my pictures of the -- of the quasi high-rises, so the highest building there is 12 stories. And for the most part, wind damage isn't the issue.

It's going to be the storm surge, and the flooding potentials along the beach and in the backwater areas

SHERRI HICKMAN: Thank you.

ED WELCH: Matt Wellslager.

MATT WELLSLAGER: Dr. Colgan, just out of curiosity, how did you or what did you use to develop your elevation model, the terrain model

that was used to calculate the storm surge potential?

DR. CHARLES COLGAN: What we're using right now is the elevations that are available from the State of Maine's Office of Geographic Information.

These are -- these are a mishmash of data sources from over the years in terms of the various elevation recordings that have all been put onto a single GIS coverage.

So the -- the actual error in the -- in the data that we're looking at can be on the order of -- in terms of the base levels can be on the order of six inches to a foot or two, depending on what data source they're using.

And that's one of the reasons why the analysis we're doing -- I mean, we're kind of assuming big storm surges, so the difference in six inches of base is not all that large.

But if -- if we're off by a foot in places, then yes, it's going to make a big difference on what kind of damage we're going to see when we model its effects on particular buildings

MATT WELLSLAGER: And I guess I was curious more in the fact -- the historical shoreline that you're working with, is it current?

Have you had a chance to work with anything like LiDAR to get a better idea of what you're --

DR. CHARLES COLGAN: No, there's no LiDAR-based elevations in the datasets we've been working with so far.

It's all based on older surveys that have been compiled at different times.

ED WELCH: Go ahead, Matt.

MATT WELLSLAGER: A few other things.

Dr. Dionne, I'm from South Carolina, and I work with the ACE Basin quite a bit, actually, and the NERRS sites down there.

We have tied in several SET sites to heighten monitorization surveys extensively in Winyah Bay as well as down in the ACE Basin base.

Have you had the opportunity to do that? And what's the density of your SET sites? Because you can really see a lot of biomass

accretion or loss depending upon the proximities.

DR. MICHELE DIONNE: Yes.

We actually -- we were kind of an early a adopter of SETs because the fellow that kind of invented them, Raul Baumans [phonetic], did a postop at UNH years ago, so we have quite a few of them.

And they're kind of the older model versions, but we have about a dozen of them. We don't go out and monitor them regularly. We do it as funds -- if we have a project funded to look at them, then we'll go out and do that, so we don't get annual data.

But yes, we have -- we -- we had the SETs installed. The NWLON came later. Our biggest hangup really is how well do we trust the actual elevation data that we have that we survey those SETs in with, because we now just are acquiring the training and the equipment to do that well.

So we probably will be sort of revisiting that. We are hoping to get some funding to do exactly what you're talking about, and I know

there has been separate funding that had some -- Betty Wenner actually sent me a proposal that was just funded for this kind of work down in the ACE Basin.

And so we're just hoping that we will be able to come up with a reason why the Gulf of Maine is interesting and critical and important and get some funding to work in the Northeast region.

So yes, I do think it's a great model for understanding coastal response to climate change.

One thing I didn't -- I didn't get to the end of my slide show, but one of points I should make, if I have a moment, is that we like to say that your best defense against sea level rises are healthy coastal habitats.

Salt marshes are very frictional systems. They don't do well right on exposed coast, but once you're behind some kind of protection, which is where most of the coastline is, very good at slowing down storm surges, collecting sediments, so they're great buffers against storms, and so that would be an economical

reason why to protect them and keep them happy.

ED WELCH: Tom Skinner.

TOM SKINNER: Thanks, Ed.

I have two questions, if I might, one for Charlie Colgan. I had the pleasure over the last 20 years or so of always running into Charlie once every five years or so, so I'm glad we're on schedule once again.

Have you found that -- you talked about the static qualities of the inundation photographs.

And I know that there is a former coastal zone manager and we have our former coastal geologist, Mark Borrelli, who is going to be talking tomorrow, it's very hard to change behavior with static models.

The ones that you developed showed a lot more information, but they still are sort of a point in time that's sort of hard to conceptualize.

Have you found that the additional information and the economic impact has changed behavior either at the government level or among property owners?

DR. CHARLES COLGAN: I can't say yet that there's greatly changed behavior. I can say that there's greatly increased attention to the issues, which is the necessary precursor to actual changes in behavior.

We have communities like Old Orchard, Wells, and my colleague, Sam Merrill, has been working in Groton, Connecticut that have -- with the local officials and local public kind of has known about sea level rise and potential impacts; but until we showed them how many jobs were at risk or which buildings were at risk for what kind of damage, it was vague and somewhere off in the distance, which is the way, in fact, research shows a lot of people view climate change and sea level rise.

So the -- we are working now with -- in sort of -- the next phase of our work will be one improving the dynamics of most the land side and the seaside elements of the models, but also working a lot more closely with communities to figure out what they can do to respond to the difference scenarios that we're presenting to them both in terms of land use,

planning, regulation, and in some cases adaptation response and mitigation responses to sea level rise.

TOM SKINNER: Thank you.

And, Michele, I wanted to help you make a plug for the NERRS systems, so this is sort of a softball question.

DR. MICHELE DIONNE: Hope I get it right.

TOM SKINNER: Correct me if I'm wrong.

In the NERRS systems, each one has a -- a geographic area; it's not just that location?

DR. MICHELE DIONNE: Absolutely, yes.

TOM SKINNER: So that it's misleading when you look at that map, you see little dots up and down the coast, when actually you're covering a wider area that's similar in geology.

DR. MICHELE DIONNE: Sanctuaries.

TOM SKINNER: So I guess my pitch is that not only is it a wide area, but you also get researchers descending upon you when this notice appears from all over.

And it seems like a great connection to make within NOAA to have you sort of dealt in

laboratories that also have a very important connection to the states, which would be another important partner for many of the hydrographic offices of NOAA.

DR. MICHELE DIONNE: I do think we are fairly well plugged in to local communities, so we are pretty good kind of mouthpieces for the things that we care about.

Thank you, yes.

And, you know, our site, we -- we sort of adopted, you know, the whole southern half of the Gulf of Maine. There are a couple other reserves that we collaborate with, but we do have a very regional approach to our work.

TOM SKINNER: Thank you. I thank the whole panel. It was five excellent presentations, I thought.

ED WELCH: Admiral West.

ADMIRAL WEST: Yes. A couple of quick questions.

First, Captain Peacock. You are on the cutting edge of diving and current. It's fascinating. And I'm sure there's some lessons learned that you came up with or your divers

did, and probably Admiral Bailey's crowd has shared with that.

But have you passed it on to the DoD guys and stuff like that? Because it sounds to me like you're right on the cutting edge of that.

CAPTAIN PEACOCK: The state police dive team doesn't normally -- they do a lot of inland work and recovery on -- evidence recovery. Boston's looking for their collar on the water system right now.

They weren't used to the -- only one of them was used to diving in the ocean currents. The other four were not.

The marine patrol divers were very used to it. They had some real problems. We had one of the young state police divers get away, and they picked him up a mile and a half away 14 minutes after they lost him. So they got very nervous.

And the colonel on the state police said we don't want you diving anymore up there. And I went to the governor about it, and the governor has been with me many times in my boats and ships, and he told me from now on

when they dive you're there with them and you tell them when they go in the water as far as timing. They can decide to go or not go, but you'll do the timing.

So the last six dives, I was with the divers each time, and we told them when to go in and not to.

There are some months we can't dive at all because in winter, you have low tide on either end of daylight, and you want to do it at low water with a very low range of tide, and it just didn't work out.

So we've been very limited in what we can do. We're slowly working on it. This summer we'll do more work.

But the marine patrol divers do work with some of the federal divers, and they are very leery about diving, particularly around that island, all of them. And they won't dive unless they have a full team, and they don't devote just two or three people at a time. They want about ten people.

And they won't dive with just one boat. They want three boats. Because if one of them

gets away and surfaces, then you got to stop all your diver operations, go get them.

So we keep at least three boats there, including two whalers, so you can chase these guys down.

It's a very difficult place to work.

ADMIRAL WEST: I agree.

And I just -- two things. You probably got some good lessons learned, because the DoD doesn't often have a chance to determine when they dive. They have to go then and there.

And being on the cutting edge of what you can do is always something you're looking at.

So you might want to pass this along to DoD. They can learn something and get some recognition for the divers up there, because that was pretty heroic stuff.

The other question is to anybody. Nobody mentioned AIS, and in this group we usually get to AIS sooner or later.

Anybody got any thoughts on AIS? Good, bad, works, doesn't work?

CAPTAIN JOE MACO: I guess I left it out because I thought I was talking about the PORTS

system and your products.

AIS is, as far as I'm concerned, is like transitioning from sail to steam.

I've been in the navigation business -- I was telling one of the members of your panel, I recall in 1967 as a second mate coming back across the North Atlantic from Europe with only a DF it to find Nantucket, an that's where we were 35 years ago and today. It's working fine. Here again, we get on some ships and their AIS presentation is not correct.

And just as we had in the and degree I don't door I can't stock hold, radar induced collision you can have AIS something groundings if you're not careful.

So here again, the standards for some of this information should be raised a little bit. I think that -- and we -- we use AIS on our pilot boat to go out and find out where the ship is because you normally call on the VHF radio and you say no answer, but is he out there? Of course if you can access the AIS information, you find out where he is, an that's very beneficial.

I mean, I can get into the whole -- I can spend, you know, half a day talking about AIS, but I didn't use that because as far as I'm concerned it's not really a product that NOAA is concerned about.

ADMIRAL WEST: Well, I think this panel is, and I think it's one of the factors we put in with -- because, I mean, the information overload for, you know, safety at sea now just -- it's like somebody mentioned switching from LORAN to GPS and all of a sudden they had to start all over again.

And I think the transition -- as this technology comes along, even with the charts, is of serious concern to NOAA and the Coast Guard as far as sending people out there knowing what the hell they're doing and what they're using.

And if AIS is going to create problems, then maybe somebody out to do something about it.

CAPTAIN PEACOCK: We just started using AIS on May 1st, because we're under the Canadian Coast Guard traffic system at

St. John, otherwise known as Fundy Traffic, and they just got theirs certified and running on May 1st.

So we've had some experience from ship to ship or pilot boat to ship, but now we have the shore-based system that we work under, which is a fabulous system.

They just got it up, and running and so far I've had one ship using it through the traffic system and it's excellent.

DON FROST: A comment that what I hear, all the shipowners love AIS, but the people I deal with are more the shipowners, not the ship operators.

But then I go to Washington or read in the newspaper, AIS is a CVP operation as far as they're concerned. All they're worried about is security, security, security, when, in fact, if the system was only beefed up a little bit, it could be used a lot more effectively

CAPTAIN JOE MACO: One other item, of course, there's concern about AIS information and your right whale slow zones, management areas where you're requiring vessels to go less

than full speed, and some owners are reluctant to put AIS information out because they may be violating the speed restrictions.

And that brings us up to -- I'm a little concerned about sometimes when you have the right whale people enclosing an area to vessel traffic as far as full speed. And when you're transiting a 50-mile stretch and you're talking about fatigue, when you're going at 10 knots of 18 knots, it has a lot of ramifications.

And my only concern -- and as I said in my presentations -- in 2004, we were very instrumental in informing the maritime community with handing out placards and then later disks concerning the right whale.

But here again, good scientific information is at the basis of anything, and if we don't have any right whales in Block Island Sound or Rhode Island Sound and they're 50 miles away, why are we requiring a lot of commercial vessels to incur greater costs in transiting those areas?

So there again, going back to your question about AIS, a lot of vessels are not

using their AIS information because they don't want to be ticketed.

ED WELCH: Anything else?

MINAS MYRTIDIS: I have a question for Captain Peacock. I think you've got quite a compelling story there, and I'm certainly sorry for your losses. And I think you made some excellent points.

However, I do recall at one point in time you mentioned that these boats tip in seconds or flip in seconds.

Now, my question is -- and I apologize, I don't mean to put anybody on the spot -- despite surveying and everything else, couldn't you guys consider looking at the construction of these boats or what you can do to increase stability?

And if you excuse me ignorance, why don't you put the protocol out there not to tow high, like you said, if that is so dangerous?

CAPTAIN PEACOCK: The Maine marine patrol and the Coast Guard have asked me to present some seminars, which I've done, and we start with this and then we bring in a tank and we

bring in the actual models of these things that are three, four feet long, and we show the people how much --

It's basically an education course in stability. And then I get the wives at the A&P or at the grocery store, and I talk to the wives and say if you don't get your husband to start towing low, you're not going to have a husband.

And we've gotten about half the fleet to switch in the last 12 months.

And I -- when I say "we," I'm not talking me. The wives are getting the husbands to switch. And it's been dramatic. And, you know, you begin to figure out how much power the ladies of the house have when their husbands are out there fishing. You see them putting in a couple of thousand dollars worth of equipment to make sure they can tow low.

So we're slowly -- fishermen don't like to change anything they're doing traditionally, and I'm sure it's the same in Greece and it is in Maine. They tend to want to do the same thing. If it works, do it.

But this obviously isn't working. And we've gotten the Coast Guard on board. We've gotten marine patrol and the wives on board, and that has made a huge difference, and I think over time we'll get them all to switch.

And it may be by regulation. We had our first public hearing, regulations to the -- all vessels in Maine would have to tow low, but that was -- actually, it's the only thing that the fishermen agreed on. They all agreed that they should tow low.

So I think we'll get there eventually.

ED WELCH: Andy McGovern -- I'm sorry, Dr. Dionne.

DR. MICHELE DIONNE: I was just curious, was it something that they -- that that cause was identified right away or did it take a few --

I mean, who figured it out that that was one of the real problems and how did that occur?

CAPTAIN PEACOCK: These accidents have been occurring about two years apart, as you can see from the timeline, until just recently.

We've had a bunch of them.

And because of NOAA's work and coming up there, it put a spotlight on this, and we started doing the research into it.

And when I come up with a list of those 12 boats, every single one of them was towing high at the time they had the accident. And the problem is it's on both sides of the border.

And nobody talks -- none of the government agencies from Canada to the US talk to each other about these accidents.

And Transport Canada does the best job I've ever seen in the world of accident -- you know, like national -- the Canadian National Transport Board, same as our NTSS, they're doing that kind of work.

And when you start reading these reports you put them all together and we publish this in the paper and show everybody, it's time to start really looking -- this is the single cause. Whether you live or die after you flip is whether you're fishing with somebody else or not.

But certainly -- you could still have a

problem where you're towing low, could you go over, but so far nobody has.

ED WELCH: Captain McGovern.

ANDY McGOVERN: Thanks.

I guess one of the observations is fishermen are fishermen and not necessarily sailors, so they don't get into the stability calculations, et cetera, and they don't like wearing PSDs, which is another issue, and they generally don't swim.

So put all those together and you can -- you run into a problem. That's why they call it the world's most dangerous profession, because half of it is self-made.

But one of the issues that was brought up by both Donald Frost and Joe Maco was on the ports and surveying, et cetera. I just want to kind of highlight that.

I think pilots' jobs and NOAA's job have evolved over the many years pretty much in parallel. When I go out and talk about what does a pilot do, I say, well, you know, many years ago we were hired by the ship to protect the ship from, you know, the hazards of --

along the coastline and in the ports, et cetera.

And I think the beginning of the coast survey, it was all the same thing. It was to protect shipping from the hazards of going in and out of, you know, the US.

But it's a evolved to the point where now my job -- and I believe NOAA's job is the same, is to make sure that everything that's in that ship stays in that ship, instead of the other way around.

And to do that, we need, you know -- I need to have my knowledge, but where do I get a lot of, you know, that local situational awareness, as Joe mentioned before? I get it from NOAA products.

So therefore, you know, NOAA has to -- and you can see it with the oil spill down south. I mean, they're saying that's a lot of oil. It's not. If you figure out what's in the average-size tanker that comes in and then you look at some of the big tankers that come in, it's a very small percentage of what's on one ship. One.

So, you know, if you think this spill is big, you know, NOAA's other jobs, you know, protecting fisheries and the environment and everything like that, it all fits into keeping marine transportation safe, because one big spill and you can spend years rebuilding a fishery, protecting marine mammals, all the other stuff. It's all gone in a day, all of it.

So I think -- I know that the focus -- you know, the -- this agency is under the Department of Commerce, and I think it's there for a reason. Commerce is not going to go away, you know, because we all like to buy stuff, we all like to eat, we all like to drive cars, we all like a warm house. And until we change that, which I don't see anybody changing, you know, things are going to move and things are going to move by ship because it's the most economically viable and actually environmentally sound way to move large, you know, quantities of cargo.

So I think that if NOAA looks at it that way, that, you know, keeping the Marine

Transportation System safe by their products, everything else kind of flows underneath that.

And I think, you know, maybe that's a way of looking at it and prioritizing what's going on, because I see the ebb and the flow. As I mentioned before, I think we're ebbing and maybe we should be flowing. And maybe this oil spill -- unfortunately, sometimes government needs to be -- it's always reactive instead of proactive, and maybe this will kick us off into that for another reason, but --

I just wanted to reiterate what they were saying. Thanks.

ED WELCH: Sherri Hickman.

SHERRI HICKMAN: Just to -- I know you addressed that the AIS wasn't a NOAA product, but I believe Mike Szabados had informed us that they're working on the actual AIS unit on the vessel, you're going to be able to pull up the real -- a lot of the realtime PORTS system information on that screen. Just to let you guys know that.

ED WELCH: Okay. Yes, Captain Lowell.

CAPTAIN LOWELL: Thank you, Ed.

I just wanted to comment on a couple of quick things here.

One of the AISs is -- it's not necessarily a NOAA product, but we're interesting in using AIS to communicate information from the various sensors to the decision-makers on the bridge.

We actually have a CMTS-integrated action team -- I believe it's the navigation technology one -- where NOAA is working very closely with the Coast Guard and with UNH on how to mechanically do that or put it in place, and that will feed into our next-generation type products, which will then give you, you know, not necessarily the water to the datum but what is the water level now.

And so it would physically change over time based on both data feeds coming in, and it's envisioned that will be added to start with and then maybe something else in the future.

So NOAA is involved in a lot of that, certainly at a research level and a standards and specification levels right now.

The second thing that hasn't really come

up, but it's tied to both AIS and of course the ECDIS/ENC mandation over the next few years, and that's training.

I think we kind of bounced around that here. You know, is that information coming in. Even if it's all to the right standard and all to the right quality, people have to know what it is, what they should be using it for and then how to use it, of course.

Make that interface very clear, very simple to get to one of the panelist's comments a few minutes ago.

All of these things are really important, but the training aspect of all of this frequently gets overlooked. And, you know, training in a whole lot of -- I don't know what the estimate of professional mariners is right now, but it's something, you know, hundreds of thousands of people to learn these new technologies and systems, and it's coming online real fast.

It's going to be a big challenge.

ED WELCH: Yes, Captain Maco.

CAPTAIN JOE MACO: As I said in my

presentation, though and I've been involved in electronic charting for 35 years, I've been in -- I started on the ground floor. People would just invite me in, and I was sort of the test case, and we'd do different scenarios with electronic charting, so --

And all of those after you're done with the simulation or the scenarios, you're asked to fill out, you know, a questionnaire on what's this, that and the other thing.

And one of the things that I said in my presentation is simplification. You don't want a crew member flying halfway around the world getting on a ship and sailing and have to read a 500-page manual on what all these buttons and gadgets mean. And so it's very important that all of this new technology is kept simple.

And as I said, I looked at your new website. NowCOAST, it's got a lot of buttons, and it -- and, you know, we want to keep things -- you click on one or two buttons and you get the information you want and not have to scroll through six or seven different buttons to find the information.

So keep that in mind. And appreciate, you know, what you said. Thank you.

ED WELCH: Don Frost, did you have a comment?

DON FROST: Yes.

Per example of what Joe is saying, what we're speaking about is the COSCO BUSAN in San Francisco a year or so ago.

If you read the Coast Guard final report, the master had only been on the ship for six hours before he left the port, and he didn't know how to use ECDIS at all.

I mean, he misidentified the radar signature for the center of the bridge for one of the abutments, I don't remember all the details.

The point is, the training isn't just the United States. The verification of the training has to be part of the new -- what's it called?

ED WELCH: STCW.

DON FROST: STCW. Thank you very much.

ED WELCH: Andy McGovern.

ANDY McGOVERN: Just a recommendation.

As you mentioned, you know, carriage requirements are coming, and along with carriage requirements, I was just at the STCW meeting, and we have required training to go along with the required carriage requirements or ECDIS.

The US, I do believe, has volunteered to write the model course for ECDIS training, and it would just make sense that the chart-makers would be part of that model course development, such as just maybe reach out to the Coast Guard and see if they're -- who's doing that, maybe have some -- some of your people part of that, you know, that group that's going to put that together.

ED WELCH: Thanks.

Well, I think we're going to have to conclude this panel if we stay on schedule.

If I could just make a couple of comments to the panelists and thank you very much.

Dr. Dionne, your presentation was very much in synch with a previous presentation we had from some folks down in Chesapeake Bay about how they use NOAA products as far as

marsh restoration and protection.

Don Frost, on your Philadelphia incident, that sharply shows the need for updated charts.

And in this particular case, since it was a navigable channel, we were talking about a situation where it was the Corps of Engineers as opposed to NOAA, but the principle is still the same. And it's interesting that in the end, that shipowner was deemed to be completely not at fault.

But do you have a rough estimate as to how much that shipowner incurred in costs as a result of everything?

DON FROST: He's suing the US Government for over a hundred million dollars, and that he can validate with no problem at all. That's exactly how much the government asked him to put up.

ED WELCH: And --

DON FROST: The actual cleanup was many, many times more than that.

ED WELCH: Well, that was my next question, is if you count his expenses and government's expenses and everybody else's

expenses, from one relatively small oil spill in the scheme of things, we're talking well in excess of $100 million and probably approaching $200 million; are we not?

DON FROST: Yes. Very, very, very good numbers.

ED WELCH: And how much would it cost to do a bottom survey of the Delaware River? That's -- nobody has to answer that.

Captain Maco, I was really interested in your comment about Rhode Island assessing a tax on oil to pay for the -- the Narragansett Bay PORTS system.

Do you have more information about that or could you provide us with direction as to how to find more information about that?

ADMIRAL WEST: I'm not paying it.

CAPTAIN MACO: I have a handout that I can -- if you can make a copy here or I'll fax it or email it to you.

But let me preface by saying it wasn't which came first, the cart or the horse. The oil spill money came about before the court system, so there was this pool of money that

was sitting up here, and we were able to access that pool of money to pay for the local contribution to the PORTS system.

It wasn't a tax put on, you know, to fund the PORTS system, per se.

ED WELCH: So it was money that was sort of unspoken for, shall we say?

CAPTAIN MACO: Yes.

And we lobbied hard to get it taken out of general fund to put it -- put it back to a maritime use, and that's how that whole 1 came about, I believe.

I wasn't really involved in that, but I believe, you know, after the North Cape oil spill where the tug caught fire and the oil barge went up on the South Shore of Rhode Island --

ED WELCH: Right.

CAPTAIN MACO: -- that somebody decided to help, you know, have a fund to pay for all this cleanup and fishermen who lost their livelihood temporarily to have a fund.

And here again, you know, once they get money, they want to spend it on something else,

so it reverted -- some of it reverted back to the PORTS system.

ED WELCH: So it's fair to say that policymakers in Rhode Island connected a tangible oil spill and money from that to the concept of PORTS, even though that spill didn't have anything to do, I don't believe, with, you know, a navigation fall.

But they saw that there was some nexus in the future, and they connected those two.

CAPTAIN MACO: That's correct.

And I had a discussion briefly with someone, I can't recall, there is a -- a federal fund called the Harbor Maintenance Tax.

ED WELCH: There's also a fund called the Oil Spill Trust Fund.

CAPTAIN MACO: Yes.

A lot -- sometimes you may think about, you know, lobbying your legislators to get some of that money put into a system such as PORTS, because, as I said, there's two factors besides, you know, an AIS, knowing where the ship is all the time, electronic positioning, you also are concerned about your under-keel

clearance.

And the PORTS system is the perfect, you know, vehicle for figuring out what the under-keel clearance is. And then also good sounding data, whether it's the Army Corps in a dredge channel or in the lower part of the bay where NOAA found a wreck that was -- no one knew was there off of Prudence Island that we thought we had 88 feet of water there, and we found out there's only 39 feet of water because there's a wreck sitting on this ledge.

ED WELCH: And what would you estimate to be the annual operating costs the Narragansett Bay PORTS system?

CAPTAIN MACO: I don't have that figure, and I'm not sure what the local -- you have two entities. You have the NOAA funding and the local funding, and I don't know what the annual --

And here again, NOAA sometimes instead of -- at least this is what I've been told.

Instead of when the local funding stops taking out the system, they sometimes will lower their local contribution request just to

keep the system running.

ED WELCH: Well, from the mariners' standpoint, they don't care whether it's the federal government or local government or some captain volunteering to pay for it out of their pocket. They just want to know the PORTS system is up and running and producing good information.

Okay. And, Captain Peacock, you were pointing out the relationship between Canadian waters and US waters and how that sort of complicates people's awareness of how much of a problem there is up there with casualties.

Is that going to get in the way of proper surveying of those waters?

In other words, does there need to be some surveying of Canadian waters as well as the US waters? And is there a way of -- if there's going to be a project to survey the important waters up there, can it be done jointly?

CAPTAIN PEACOCK: The last surveys that were done were done by the Canadian Hydrographic Service on contract to NOAA in US waters, so we're already -- we're doing that

back and forth.

They only went to a certain point because they didn't feel there was any shipping beyond that point, not realizing how much fishing activity was up above it.

So NOAA contracted BOOT Canada [phonetic] to do the work and we do that, and the American boats have come up and done some of the Canadian areas, so it goes back and forth a lot.

ED WELCH: I'm just thinking if the fishing industry -- if there's going to be a survey up there from the fishing industry, it wouldn't make a whole lot of sense to stop at the US border if there are equivalent waters in Canada that need the same type of work.

It would seem like it would be prudent for the Canadian authorities and the US authorities to figure out some way of doing it all together at one time

CAPTAIN PEACOCK: Most of the Canadian areas have been recently surveyed in the last 20 years.

ED WELCH: Okay.

CAPTAIN PEACOCK: Ninety-nine percent of it.

ED WELCH: Okay.

And would it be my impression that the calls of the contours up there and the depths and the challenges, that we're probably not talking about traditional NOAA hydrographic surveying vessels, but we'll probably be looking for vessels of opportunity or contracted vessels, or am I incorrect about that?

Andy Armstrong says either way?

ANDY ARMSTRONG: Yes, either way. It could be a contract vessel or one of NOAA's smaller vessels, I think.

ED WELCH: Okay.

Well, we're going to -- first, I want to thank these panelists, all of you.

(Applause.)

ED WELCH: We love hearing from our friends at NOAA and the government, but we also get special insights when folks like you come in and talk about your view of hydrographic activities and services from the standpoint of

different users or constituents that use these NOAA services.

So this is very helpful. We -- we thank you very much. We're going to take a quick break. We've gone a little bit over. Let's take about ten minutes.

Do we need to do our temporary designation for Juliana now or can you wait until you come back?

Are you going to come back?

CAPTAIN LOWELL: Yes, but I don't think there's anything formal here for me to do.

ED WELCH: We had a couple of member -- we had a couple of the members of panel that were alarmed when they looked at the schedule and it says Captain Lowell delegates DFO responsibilities to Juliana Blackwell, and they were worrying what was -- you know, whether you burned out or somebody was moving you aside or is this a coup by Juliana.

JULIANA BLACKWELL: It's temporary.

ED WELCH: Okay.

So we basically -- of course Captain Lowell won't be with us tomorrow, and we need

an acting designated federal official, so I guess that -- do we have to swear you in?

JULIANA BLACKWELL: No.

ED WELCH: Okay. All right. Let's take a ten-minute break. And thanks to the panel.

(Recess.)

ED WELCH: If you're doing a double-take about our designated federal official, yes, there has been a little bit of a change. Welcome, Juliana.

We have an administrative item. We're making reservations for dinner tonight at a restaurant called Hemmingway's, which is a seafood restaurant. And first we need to find out how many people want to go so we can make those reservations, and then we need to sort of collectively figure out exactly what time we want those reservations.

So who -- who is interested in being part of the group going to Hemmingway's tonight?

And who is going to count all the hands?

SHERRI HICKMAN: Those of you who are not raising your hand, I want to know why.

MATT WELLSLAGER: Those interested in not

going are?

ED WELCH: Kathy is the organizer of this. Is this something we can walk to? Do we have to arrange transportation?

KATHY WATSON: I think I'm going to try to see if we can get the shuttle. I have to check on that.

ED WELCH: What time is everybody's pleasure. 6:30? Later? Earlier? 7:00?

TOM JACOBSEN: 6:45.

ED WELCH: Meet at 6:30 down here in the lobby?

TOM JACOBSEN: That's good.

ED WELCH: All right. That's what it is.

Who is paying for this, Kathy? Oh, we all are.

Okay. Is that all you need, Kathy?

KATHY WATSON: Yes, thank you.

ED WELCH: Okay, very good.

And Hemmingway's is here in Providence and is not in Key West. Okay. Great. Okay.

We're going to resume our program now, and Admiral Bailey is scheduled to talk about NOAA fleet recapitalization.

So welcome, Admiral, thanks.

ADMIRAL BAILEY: First of all, thank you. Good afternoon, and thank you for the opportunity to present to this group.

It's my first time in front of the HSRP, and I don't know how I slipped away for two years or two and a half years.

I've been in the job for about two and a half years now, but it's the first time I got A chance to come and speak to you folks.

What I'd like to talk about is just what that introductory slide says, is some of the recapitalization issues that we're dealing with and some of the fleet issues.

Next slide.

Overview. Got to talk about budget. I can give you an idea of what OMAO's budget looks like. I'll show you what we did with $100 in ARRA funding.

Fleet maintenance, where we are and where we're going. Ships don't run without good crew. Talk about crew retention and some of the issues there.

Utilization comparison, that's a chart

that was provided by the Office of Coastal Survey. They do a debrief with us at the end of every field season. They hold us accountable for the service we provide.

We appreciate the fact that they do have those numbers out there and come and discuss with us how we can do a better job of providing them with service.

And, like I said, recapitalization. FSV is Fishery Survey Vessel. We have four of those, just awarded another contract for the fifth. Talk about the HASSLER. And the NSV is the NOAA Survey Vessel. And then some of the acquisition issues that are -- that we're dealing with.

Also embedded in here are some performance requirements that will hopefully provide an understanding why we think that acquisition process should change.

There's the budget. Comes in two chunks. Your typical PAC -- procurement, acquisition, construction -- and your OFR, operations, research and facilities.

You can see a bit of a bump-up in '09. We

got an extra $19 million in '09 which helped us deal with some of the shortcomings and staffing on the ship and also helped us deal with some of the maintenance backlog issues.

The fleet recapitalization plan was approved in 2008. The interesting thing to note there is we had larger PAC bump-ups prior to that than we do now. I just throw that out there as a point of interest.

But that recapitalization plan, like I said, was done in 2008, and we've had some changes with -- certainly with the budget, also with change of administration, so I'll talk to that a little bit.

What's not captured there is about an extra 35 million that you could add to each one of those bars on that graph which takes care of NOAA core retirement, healthcare for those retirees and active duty healthcare.

The uptempo is about 3400 operating days for 2009-'10, and that's proposed for 11.

The operating days have remained fairly consistent since 2005. I provided this slide for a presentation to the UNOLS folks, so

that's why it breaks out NOAA fleet operating folks, commercial and the UNOLS stuff.

I don't have any control over the UNOLS and the chart data. That's done by the line offices themselves.

ARRA funding. NOAA got about 830 million in total ARRA funds. I received about 100 million of that. Twenty was used to address more maintenance and repair backlogs.

As John mentioned this morning, there was -- there was extra money there for the RAINIER MRP. I'm not sure of the complete history -- "MRP" is major repair for the RAINIER.

I believe it started $10 or $12 million. It was cut down to six at one point. And then of course we augmented that with some ARRA funds to get it back up to 12.

It was delayed s a year. It was supposed to happen last year. It was delayed a year because we had significant budget impacts due to the high cost of fuel, so we had to use that money that year just to keep the fleet going.

Covers the major repair period for the

OREGON II. It also -- which is not shown on that slide -- enabled us to accelerate the design and planning for the major repair period the MILLER FREEMAN.

MILLER FREEMAN is one of our fishery vessels who's got significant hull fatigue issues.

And as you can see, almost $74 million was allocated for FSV 6. Why they call it 6 is because FSV 5 is a shallower draft version of the -- of the FSV class.

6 will be the same as the 40 class or the Dyson class, so that's the fifth of those.

That award went to Marinette Marine up in Wisconsin. We just ordered that a couple of weeks ago, so we're excited about working with Marinette.

They've got a fairly decent track record. They put together a great proposal. They built a number of Coast Guard cutters up there. They've got the LCS program up there.

They're also one of the finalists for the ONR ocean class research vessel, which is going to one of the UNOLS folks, so they're one of

two -- I believe it's Marinette and Dakota Creek are in the finals for that.

Fleet maintenance is always an issue. A number of these ships are quite old, in excess of 40 years in age. So, as many of you know that operate equipment like this in the environments that we operate, they take their toll.

So typical line item for maintenance in my role is -- has been around $17 million, and then I spread that across 18 to 20 ships. Doesn't take a rocket scientist to do the math. There's just not enough money there to maintain a fleet like this with an operating tempo of 200 to 225 days each year for each one of the ships.

What we're trying to do to address the overall maintenance issues is we've established a fleet maintenance office at headquarters. We're starting to staff that office.

We're looking at baseline reviews of the classes of ships. We have six of the T-AGOS class vessels we got from the Navy. Those are kind of stopgap vessels until we got the fleet

recapitalization plan put in place.

Of course the FSVs I talked about and the NSVs are the vessels that -- the NOAA survey vessels that replaced six of our oldest ships, and we're working on the acquisition strategy for that one.

Like I said, you can't operate a fleet without good people. We struggled in the past years for a number of reasons. Uptempo is one of them, fatigue. Industry is -- commercial industry has been good. We're always competing with the other federal agencies, MSC and Corps of Engineers, EPA.

And so this slide just gives you an idea of what our vacancy rates are, authorized billets, where our vacancy rates are, and you can see the one note there, the dip in '09, we got down to the low, got down to about 12 and a half or 13 percent on the vacancy rate. That's because we were given that extra $19 million to deal with that issue.

Crew retention, recruiting and retention, like I say, you can see in 2004 we had significant retention issues there. When I

started two and a half years ago, it was about 23 percent attrition rate. And I'm not so naive to believe that some of the things we've done have led to that.

I mean, certainly the economy has helped stabilize that, but we have put a couple of programs in place. We've reconstituted our staffing models. We've established processes whereby we can provide relief for the crew.

We've established standards for how long somebody should have to go to sea. And then after that period of time, you're allocated time and also a flight home to your home base.

So the rates are certainly trending in the right direction. However, I just found out a couple of days ago that MSCs' thinking about -- not thinking about. They're going to add nine new ships to their fleet.

So when the economy starts coming back again, we've got to be cognizant of the fact and not be complacent and make sure that we continue to work some of these personal and quality-of-life issues.

But the other thing we did establish in

this crude model is a relief pool. We -- we're staffing the vessels about 87, 88 percent of the authorized billets. And then we provide -- we have a relief pool that we have and use, and we don't pay them if we don't use them.

So those folks provide relief for the folks that are full time on the ship. So it's -- it kind of -- it's a new way of doing things. It seems to be working right now. So we're going to continue down that road.

On the utilization front, I've explained a little bit what this slide -- this is a slide that came from Coast Survey.

This is the one I explained that they brought to us, and this is dealing with their three ships. I wish there were four ships up there, but there's only three, of course the THOMAS JEFFERSON, FAIRWEATHER and RAINIER.

I can give you a snapshot of what's up there. The fleet average is the average of those three ships. It's not the fleet average of the 20 ships across the NOAA fleet.

But for the TJ line up there, in 2007, there were 161 days at sea, 176 in '08 and 172.