

Meeting Summary
Hydrographic Services Review Panel (HSRP)
February 25, 26, 2014
New York, NY

Tuesday, February 25, 2014

On the call of the Designated Federal Official (DFO), Rear Admiral Gerd F. Glang, NOAA, the Hydrographic Services Review Panel (HSRP) meeting was convened on February 25-26, 2014, at the Grand Hyatt New York, 109 East 42nd Street, in New York, NY. The following report summarizes the deliberations of this meeting. Presentations and documents are available for public inspection online at <http://www.nauticalcharts.noaa.gov/ocs/hsrp/meetings.htm>

Copies can be requested by writing to the Director, Office of Coast Survey (OCS), 1315 East West Highway, SSMC3, N/CS, Silver Spring, Maryland 20910. The Agenda is available online at <http://www.nauticalcharts.noaa.gov/ocs/hsrp/meetings.htm>.

Welcoming Remarks and Introductions

Matt Wellslager, HSRP Chair

The meeting was called to order at 8:30 a.m. Chair Wellslager welcomed the HSRP committee members, National Oceanic and Atmospheric (NOAA) and National Ocean Service (NOS) leadership, NOAA staff and other attendees. Mr. Wellslager introduced the distinguished NOAA administration members present and the keynote speaker, as well as the Captain of the Port of New York/New Jersey (NY/NJ). Mr. Wellslager also announced that he would be stepping down as the HSRP Chair and that the committee would need to vote in a new Chair.

Admiral Glang outlined the statutory role of the HSRP. The Chair then invited the panel members to introduce themselves. Dr. Holly Bamford, NOS Assistant Administrator, swore in the newly appointed and reappointed members: Ed Kelly, Dr. Lawson Brigham, Bill Hanson, and Scott Perkins. Chair Wellslager also announced that Steve Carmel resigned his position on the HSRP effective February 24, 2014, and that this resignation would leave a representation gap in the maritime shipping industry.

Keynote Address—Use and Application of NOAA’s Navigation Data, Products, and Services for the Port of New York & New Jersey

Rear Admiral Richard Larrabee, Director of the Port Commerce Department, Port Authority of New York & New Jersey

Admiral Larrabee addressed the HSRP on current and future maritime and navigation challenges and issues facing the Port of NY/NJ. He talked about how the Port Authority

is preparing for post-Panamax impacts and the need for NOAA's navigation data, products, and information to address these challenges. The Port of NY/NJ is the largest port on the East Coast and the third busiest in the nation. It has more first in-calls and last-out calls than any other port on the East Coast, and it is a one-stop shipping port for international and global trade. The Port of NY/NJ has the infrastructure and resources and is strategically located to facilitate efficiency in marine commerce. Admiral Larrabee stated that the Port Authority has invested approximately \$2 billion to upgrade its maritime infrastructure to position the Port of NY/NJ as a major U.S. East Coast port competitor in the global commerce market.

Some port statistics that Admiral Larrabee talked about include:

- Port of NY/NJ receives approximately 68% of vessel calls on the East Coast (first port of call) each year—more than all other East Coast ports combined.
- Port of NY/NJ has six terminal operators and receives approximately 5½ million Ton Equivalent Unit (TEU's) per year—more than any other East Coast port.
- Port of NY/NJ receives approximately 90% marine commerce by ship and the port region has 10 gateways.
- Port of NY/NJ currently receives 33% of the total cargo for the entire East Coast.
- Port of NY/NJ has achieved a 13% increase per year in rail service—which he said is essential for cost effective, efficient supply chain movement of goods.
- Port of NY/NJ has a viable rail system of 1.5 million ton lift capacity per year.

Admiral Larrabee also talked about how the Port of NY/NJ has spent about \$2 billion to deepen the channels to 50-foot depths to support post-Panamax ships, and that the Port Authority is spending approximately \$1.3 billion to raise the Bayonne Bridge up to a height of 215 feet to accept these ships. He also talked about how the Port of NY/NJ needs to become more resilient and better prepared for the impacts from coastal tropical storms, storm surge, and sea level rise. He said this is an important issue facing this region and post tropical storm cyclone Sandy was a lesson learned. Sandy impacted the port region with a 10-foot plus storm surge above the predicted high tide level, port infrastructure incurred major damage from the pounding wind-driven waves, port operations were disrupted and marine commerce halted.

Admiral Larrabee further discussed the collaboration efforts across the federal agencies for emergency coordination, response and recovery. He praised the efforts of NOAA's Navigation Managers and marine pilots for working collaboratively to safely reopen the navigation channels of the Port of NY/NJ. He talked about the accuracy in NOAA's tides, currents and PORTS® information to support these coordinated efforts. Admiral Larrabee addressed the HSRP and NOAA leadership and stated that PORTS is not a funding issue, but rather a maintenance funding issue. He stated that the PORTS information is critical, used by the U.S. port community and should be federally funded.

Opening Remarks from NOS Leadership

Dr. Holly A. Bamford, Assistant Administrator, NOAA National Ocean Service

Dr. Bamford presented before the HSRP on National Ocean Service priorities related to coastal resilience and coastal intelligence and the role that NOAA's Navigation Services offices play in supporting and advancing them. Dr. Bamford's presentation emphasized the fact that the U.S. is very much a coastal nation, with a coastal economy that drives the national economy as well as international global markets. However, coastal communities around the world are vulnerable, and coastal risks associated with weather events and climate change is exacerbated by population growth and development. Weather-related events, such as coastal storms and flooding, have increased significantly over the past 30 years, and sea level rise poses additional threats. Dr. Bamford discussed how Post Tropical Cyclone Sandy has represented a turning point in a national conversation about the importance of coastal resilience. Planning is an important component of building resilient communities—not just for the next storm, but long-term or “blue sky” planning is critical as well. Building coastal resilience requires a robust, accurate information infrastructure—a foundation of geospatial data upon which tools are based and sound decisions made. This “Coastal Intelligence” informs decisions to make coastal communities less vulnerable to coastal hazards and a changing climate, such as by:

- Promoting resilience to coastal hazards and climate change;
- Building a weather-ready nation;
- Supporting community livability; and
- Ensuring safe, efficient, and environmentally sound navigation.

Dr. Bamford emphasized the critical role that NOAA's navigation services play in gathering and disseminating coastal intelligence, keeping maritime commerce safe and efficient, and preserving the health of coastal ecosystems and the long-term vitality of coastal communities. Dr. Bamford concluded with the following questions at soliciting input from the panel on how NOAA can improve and advance its navigation services:

- What should or could NOAA contribute to the issue of coastal resiliency, such as through coastal intelligence?
- Where does informational infrastructure fall in prioritizing the need for infrastructure investment?
- How can NOAA better help U.S. ports be competitive globally? Or drive creation of U.S. jobs?
- How can NOAA better message its role in these developments and priorities of our Nation?

United States Coast Guard (USCG) Sandy Preparation & Emergency Response

Captain Gordon Loebel, Captain of the Port of New York & New Jersey

Captain Loebel talked about the USCG's role in post tropical cyclone Sandy preparation, coordination and emergency response efforts. He began his talk with an overview of port statistics for the Port of NY/NJ and the USCG's responsibility. Captain Loebel stated that

the Captain of the Port is responsible for safe transit of an estimated 7,000 deep draft vessels each week. He said the USCG's Vessel Traffic Service (VTS) is located at Fort Wadsworth on Staten Island and monitors about 1,400 transits per day. Captain Loebel talked about how critical NOAA's navigation and chart information was to the preparation for and response to tropical cyclone Sandy. He said that NOAA's navigation chart data provided the USCG with the information necessary for maintaining situational awareness during Sandy, and it was also used to track the progress for safely reopening the port. He said that the USCG works closely with the NY Harbor Safety Committee and NOAA's Navigation Manager, LCDR Brent Pounds, and other port partners to ensure efficient maritime commerce for the Port of NY/NJ. Captain Loebel stressed that this working relationship is a critical link for ensuring the viability and safety of port operations. Captain Loebel suggested that NOAA should seek ways to innovate their electronic nautical charting information process to support disaster response efforts.

Captain Loebel ended his talk with some suggestions for NOAA to consider:

- NOAA should consider putting all bridge names on its nautical charts along with vertical and horizontal clearances. He cited instances where one name was printed for a group of bridges (not all names were given), which resulted in confusion for those not familiar with the area.
- NOAA should consider mapping and providing traffic interaction and cautionary zones and air gap sensors on the electronic charts.
- Expanding the use of modeling data with PORTS® to provide more complete data throughout the port area, not just at the sensor site location.
- NOAA should update ENC's and Raster Nautical Charts (RNC) more quickly and ensure that their products are synchronized.

Mr. Perkins asked if this information applied to NOAA's shoreline mapping program.

Mr. Aslaksen replied that NOAA's National Geodetic Survey (NGS) can take what data they need, but getting the data out is an issue. Yes, NGS can provide (and does in many cases) high-resolution shoreline and features and could do so if requested. The issue at hand is the limitation of the current ECDIS and ENC formats to portray high-resolution features and attributes due to a limitation in the ENC format that limits the overall file size and therefore how much data can be included.

Current and Future Trade & Transportation Trends for Global Shipping **John Vickerman, Vickerman & Associates, LLC**

Mr. Vickerman presented to the HSRP on current and future trade and marine transportation trends. He has done strategic planning for 63 out of 90 U.S. deep water ports. The global marine industry does not consider North America as a best case practice. Take the most productive terminal in North America, and the U.S. has failed by a factor of 4 to 1—issues such as regulation and management are part of the problem.

The U.S. is not keeping pace with global shipping trends. He talked about the evolution of shipping, showed ships of the past and how cargo was handled, then compared this to today's mega ships and advanced technology.

Mr. Vickerman talked about the first trading route for the movement of goods—the land-based Silk Road across China to the Middle East, and how the “maritime” Silk Road has replaced the overland Silk Road as the primary trading route. The world's largest ports are now connected via this marine Silk Road. Our U.S. ports and maritime commerce system are not keeping pace with overseas ports, especially the Southeast Asian ports. He said “what we know today will surely be different tomorrow.” To remain competitive, U.S. ports must reduce throughput costs and increase cargo velocity securely and environmentally—we must embed flexibility into port planning, design and operations and have an agile logistics supply chain. Europe-Asia is the jugular and nucleus of all shipping globally.

In 2013, of the ten biggest ports of the world—nine were Asian and six Chinese and all had record-breaking volumes. The Southeast Asian market is exploding. He stated that 90% of global trade is carried out on the marine Silk Road and will continue into the future. Arctic routes offer faster and more economic cost advantages for shipping—half the distance and half the time, but they are not used for main shipping routes. Two months out of the year, we can use the Arctic shipping route, but 10 months out of the year this route is unreliable—it will not be used as the predominantly shipping main route. Ninety eight percent of what comes to the U.S. goes through our gateway ports. The alignment of trade and Gross Domestic Product (GDP) is a firm relationship. Growth in trade will increase about 73% per year. Who's driving growth in GDP? The economic engines of the future are Brazil, Russia, India and China, the (BRIC) countries.

Consumers want quality products to be available at a price they can afford—the key driving factor in containerization and rapidly changing global shipping trends. Supply chain logistics is advancing, tonnage is increasing, ship size is increasing, port size and capacity is increasing, and port throughput is increasing. The U.S. is not growing as fast as the rest of the world—we are only a small portion of this global market. The giant driver is Southeast (SE) Asia—the center of manufacturing is now SE Asia. Shippers will get their products from point of origin to consumption with the least cost possible. The lowest cost, best service wins. He talked about some of the key factors in port selection: 1) scheduled shipping reliability and consistency; 2) competitive freight rates; and 3) increased throughput.

Mr. Vickerman talked about the evolution of container ships from the 1st generation container ships that carrier approximately 101 ton equivalent units (TEU's) to the current and 6th generation ultra post-Panamax ships that carry 15,000 + TEU's. He said that the Operating Alliance Network Carriers of Maersk Line, Mediterranean Shipping and CMA CGM (P3) will begin carrying each other's cargo on the ultra ships to maximize volume—the P3 will achieve a 37.6% collective share of all east-west trade. Other vessels such as crude oil tankers, liquefied natural gas (LNG), and dry bulk ships will also be able to transit the Panama Canal opening up non-transit routes that he identified

as the “Emerging New Caribbean Transshipment Center” for “Feeder Services.” Changes in container ship size and the expansion of the Panama Canal, he said, will shift maritime traffic flow to East Coast ports.

Mr. Vickerman also talked about how the Panama Canal expansion may set the stage for the Caribbean to become an emerging shipping route. The centroid of transshipment would be focused on Panama—increasing numbers of smaller vessels to handle the transfer of shipment. These ports will offer competitive robust landside access that seamlessly moves cargo to consumption destinations. He said this would impact U.S. logistics patterns, and that U.S. ports must ensure competitive and robust landside access to the gateway’s inland markets—this will be a key success factor for the U.S. economy and future. System capacity of the U.S. intermodal rail system must address these challenges to achieve economies of scale in U.S. markets. Mr. Vickerman ended his talk with some interesting thoughts and challenges. He said, reliability, cost and speed are essential driving factors of global shipping trends and that U.S. ports must embrace these changes to remain competitive in the rapidly changing international shipping market. The U.S. needs to think outside its own borders, participate, and seamlessly integrate into the marine Silk Road approach. Is the investment in 50-foot channels secure? Or are bigger numbers of transshipments better?

Some interesting statistics he presented include:

- More than 98% of everything we consume, wear, eat, drive and construct is brought to the U.S. via ships through the North American port system.
- World trade is expected to grow by 73% in the next 15 years.
- 90% of the global trade is carried out by shipping via the marine Silk Road.
- GDP economic engines of the future are SE Asia & Latin America.
- SE Asia has seen a 260% increase in container volume globally.
- It cost \$475,000 per/ship to transit the Suez Canal, and this is an unstable and volatile shipping route.
- The BRIC countries are the emerging markets—in 15 years they will achieve 2/3 of the global economic power of the world.
- The U.S. has 386 public port authorities—Shanghai is the biggest port in the world. The throughput of Shanghai and Singapore (2nd largest port) is larger than all 386 U.S. ports combined—growing at 27% compounded annually; 20 mile bridge to Yang Shan deep port; Walmart is 15% of Yang Shan volume.
- 92% of the world’s ship building is in Korea, Japan and China—ship of future design exceeds the Panama Canal third lane capacity.
- By 2016 global post-Panamax vessels will increase to 1,397 with capacity of 15,000+ Ton Equivalent Units (TUEs).
- LNG powered container ships are evolving—Kawasaki Heavy Industries is designing 9,000 TEU container ships to be fueled by LNG.
- The Panama Canal’s 3rd Lane Expansion—\$5.2 billion investment; 16% of Panama’s national GDP; 12,600 TEUs.
- Panama the transshipment center of the Caribbean—five new port container terminals with capacity to handle ships of up to 18,000 TEUs.

Questions from the HSRP:

Dr. David Jay queried about the impacts of larger ships into fewer ports, will U.S. ports lose benefits of efficiency.

Mr. Vickerman responded that cost is a key factor for many shipping companies. Shipping by water is the cheapest, then railroad, truck, and aircraft. He said you can keep cargo on a ship longer and it's cheaper, but demand for products is time sensitive. When consumers go to Walmart or the store, they expect the products to be there. Consumers want just in time delivery—market expectations.

Ms. Miller asked about the U.S.'s inability to rapidly adapt to changing LNG ship designs, and how will this affect the LNG market for the U.S.

Mr. Vickerman responded that the U.S. does not do permitting of LNG ports rapidly enough because of environmental issues. The U.S. does not have the ability to logistically supply LNG—we should consider bunkering—the U.S. needs to plan for these global changes. For example, in the next five years, Vietnam will become the trading apparel capital of world. The U.S is not prepared and needs to be more agile to respond to global market place changes.

Mr. Mayer asked if the Arctic or Northeast/Northwest Passage route is inconsequential in the future for global shipping routes.

Mr. Vickerman replied, no, although the Canadians have established Admiralty there, the northern routes pose logistics limitations for reliability.

Dr. Brigham commented that in the Arctic container ships, bulk carriers, tankers, and LNG ships transit on a seasonal basis and that this will not revolutionize global shipping through the Arctic. He also commented that using the seasonal approach, companies will export resources out of the Arctic to meet China's supply demand. The Arctic, he said offers seasonal non-containerized demand—a niche market important to many countries.

Mr. Armstrong asked that if everything is getting bigger, what kind of things could go wrong. What could be some unanticipated disaster or events for this region?

Mr. Vickerman replied that countries are building bigger and bigger ships—it's the future. As you concentrate resources, particularly on the landside—the U.S. already has congestion at these nodes, and we can't get that connectivity inland. We could have large vessel congestion at our ports. Key ports will have to be at 50 feet (2 feet under keel clearance minimum). But, we will see more feeder transshipment issues. He said that Singapore is at 98% transshipment, Panama is 95% transshipment, and North America 15% transshipment. The future of transshipment in North America is great. We may see a transshipment dynamic, but if we don't prepare, and if GDP and trade is aligned it will cost us more money for our products. The U.S. must be more connected to changes in the global shipping trends.

Mr. Aslaksen asked if the Chinese were investing in a Nicaraguan passage.

Mr. Vickerman said yes. Nicaragua has gone to the Chinese. There is a proposal for Chinese to build a wet canal. There is seven other dry canal proposals begin considered because by 2025, the Panama Canal tolls will increase 6 fold. The Chinese are also building dry canal in Columbia—from the Caribbean to Pacific—a 136 mile rail. It's all based on what the cost will be for Panama. If the Panama Canal gets greedy with its tolls, we will see all kinds of innovative things to avoid the high cost of the tolls.

Luncheon Presentation: An Increasing Coastal Flood Hazard at New York City, 1844-2012: Using NOAA's Historical Tide Data to Analyze NY Harbor Storm Risk

Dr. David Jay, HSRP

Dr. Jay began his presentation by talking about the use of NOAA's historical tide data to help predict storm risk and coastal flood hazards for NY City. He talked about the size of post-tropical cyclone Sandy, its unusual storm track and the meteorological conditions. He said Raritan Bay received the highest inundation levels because of its funnel shape and the fact that it faced into the wind; as a result it got hammered badly. Dr. Jay talked about using NOAA's historical tide data to understand the probability of extreme storm surge to contribute to mitigation strategies for NY harbor. Annual mean storm tide (AMST) time series data is used to calculate storm surge. He said that the annual storm tide levels are increasing based on a 36-year running median. Some conclusions he presented from historical tide analyses include:

- Old data exist to ground-truth proxy estimates of surge risk.
- When more data is used, storm surge risk in NY appears to be higher than what is found in other estimates. Non-stationary nature of risk makes it difficult to determine the present and future risk.
- Storm tide amplitudes have shifted independent of sea level rise.
- Tides show evidence of secular shifts. Hence, some of the increased storm risk is likely due to changes in harbor dynamics.
- More work is justified to distinguish the local anthropogenic influence from larger-scale (North Atlantic Oscillation) aspects.

Dr. Jay also talked about how the NY harbor is topographically complex and responds in a complicated way to surges. He said water gets into the NY harbor from two directions—the NY Bight and Long Island Sound—this is a forcing mechanism that causes surge levels to grow in the NY harbor. Because the East River has been altered and currents are hydraulic where water runs toward the Battery, when water levels are high, water runs up the East River. But, when the wind changes direction the water sits and becomes higher. Understanding why storm surge risk is changing in addition to the bigger scale impacts and sea level rise.

SPEAKER PANEL ON NOAA'S NAVIGATION SERVICES

Dr. Alan F. Blumberg, George Meade Bond Professor and Director, Stevens Institute of Technology

Dr. Blumberg presented before the HSRP on the NY harbor observing and prediction system. He said this is an integrated system of observing sensors and forecast models that serve to observe, predict, and communicate weather, current water levels, salinity temperatures, and waves and makes this data available for public use. Dr. Blumberg talked about the Stevens Institute partnership with Center for Operational Oceanographic Products and Services (CO-OPS) and how the Institute uses the CO-OPS real-time data and incorporates this data into their modeling data. He talked about why estuarine and coastal ocean currents are sensitive to uncertainties in bathymetry, wind, and inflows. The NY Harbor Observing and Prediction System (NYHOPS) takes real-time data, adds in external data and models and distributed inflows and effluents, and produces forecasts for total water levels, three dimension currents, salinity, temperature and wave height data. The Institute's high-resolution forecasting model data shows three-dimensional (3D) circulation 72 hours in advance, based on tidal, meteorological, hydrological and point source forcing data—some of which is collected from NOAA. He said the Stevens Institute uses a “regional” model approach, and NOAA uses a national model. The Institute is coordinating with CO-OPS to do real-time modeling and exchange this information across the partnership.

Dr. Blumberg also talked about how their information goes out to their website and provides forecast modeling data for surface currents and profiles, surface temperature and profiles, surface and bottom salinity, water levels, surface winds and coastal wave data. He talked about the Stevens Institute's storm surge warning system—a regional real-time water level information system used for emergency response planning, evacuation, response and recovery. Dr. Blumberg also talked about the Administration's HUD initiative to Rebuild by Design—a federal grant program for ocean-based solutions to reduce storm damage impacts to the states affected by post-tropical cyclone Sandy. Stevens is proposing building a set of barrier islands 12 to 14 miles offshore. These barrier islands made out of sand will be the first line of defense against storm surge and will protect people, property, and the mainland. He said insurance estimates a savings of \$12 billion in terms of storm damage if these barrier islands are built.

Dr. Blumberg ended his talk with some suggestions:

- NOS/National Center for Environmental Protection (NCEP) data is critical for the NYHOPS forecast modeling system and supports the research to operations partnerships (observations and modeling).
- NOAA should build on the Memorandum of Understanding (MOU) with CO-OPS for improved observation data.
- NOAA should build out PORTS for improved research models.

- NOAA should provide more observation data from mobile sensors, high-frequency radar, tide gauges, drifters and gliders and better “met forcing”—all are sensor data that the Stevens Institute needs.

Chair Wellslager asked what information from the U.S. Geological Survey (USGS) the Stevens Institute collects and manages.

Dr. Blumberg replied that the Institute gets water level, river inflow and turbidity data—key pieces of data for their models and is easily reachable off the internet.

Mr. Perkins asked how scalable the Stevens Institute model is. Can you take the algorithms and apply them to a different geographic model of that area, assuming there is a network of similar sensors?

Dr. Blumberg responded, yes, the Princeton Ocean model. He said about 4–5 thousand people around the world use this model data. It’s scalable for ports, and in fact, the Tampa Bay port system is currently using this data.

Mr. Hanson commented that the USACE has experience in building offshore islands in the Gulf and other areas in the U.S. as well as around the world.

David Leach, North Atlantic Coast Comprehensive Study (NACCS), USACE

Mr. Leach opened his talk by stating that NOAA is an important partner to the USACE. Both agencies have wide-ranging missions of maintaining navigation channels to reducing risk along the coastline, but a common thread is trying to use the best science and data for our studies and analyses to accomplish these objectives. He talked about USACE’s North Atlantic Coast Comprehensive Study (NACCS)—the scope, schedule, and how NOAA and other federal partners are participating in the study.

Post-tropical cyclone Sandy impacted the U.S. East Coast and caused extensive damage from hurricane force winds, coastal flooding, and storm surge to areas of New Jersey, New York, and Connecticut. As a result, Congress passed Public Law 113-2, the Disaster Relief Appropriations Act of 2013. P.L. 113-2 provided approximately \$55 million in appropriations across the recovery effort—Federal Emergency Management Agency (FEMA), Housing and Urban Development, USACE, Department of Transportation (DOT), and other agencies. The Secretary of the Army was directed to “conduct, at full federal expense, a comprehensive study to address the flood risks of vulnerable coastal populations in areas impacted by post tropical cyclone Sandy within the boundaries of the North Atlantic Division of the United States Army Corps of Engineers.”

Mr. Leach said the NACCS is a collaborative effort bringing together experts in coastal planning, engineering, and science to collaboratively develop a risk reduction framework for the 31,000 miles of coastline—within the North Atlantic Division’s (NAD) mission scope that was affected by post-tropical cyclone Sandy. Communication, collaboration and relationships with our partners, he said, are instrumental in USACE’s efforts for

recovery, response and restoration. Mr. Leach said the goals of the NACCS are to provide a framework for:

- 1) Risk reduction strategies for vulnerable coastal populations—a feasible tool that states, local communities and coastal planners can use to address risk reduction and resilience for future application; and
- 2) Promoting resilient coastal communities—ensuring a sustainable and robust coastal landscape system—considering future sea level rise and climate change scenarios—to reduce risk to vulnerable population, property, ecosystems and infrastructure.

Mr. Leach said the NACCS is to be completed by January 2015. He talked about the phases of the NACCS and said the USACE is moving into the third phase. He said the NACCS incorporates expertise in coastal planning, engineering, coastal storm management and other science areas across federal partners and academia—a collaborative effort. The NACCS encompasses the entire North Atlantic coast from Virginia to Maine and is conducted on a regional scale of 35,000 miles of shoreline. The legislation asked the USACE to address institutional barriers and activities warranting additional analysis. The NACCS does not give authorization or appropriation for any additional projects—it does not make recommendations for future projects. The purpose of the NACCS is for coastal risk management and resiliency measures, identifying non-structural and structural measures that can be implemented, and natural and nature-based features that states and communities can use for future investments to reduce risk.

Mr. Leach also talked about the use of NOAA products and services in the NACCS. NOAA's environmental sensitivity index shoreline data were used in GIS analysis to identify specific measures most appropriate to mitigate risk based on shoreline type. NOAA tidal data sets were used to determine the extent of the NACCS area, bay side and riverine components. The NOAA Sea Grant Program Coastal Community Resilience Index and geodatabase was used to create layers in the USACE GIS system for modeling. NOAA's Tides and Current Services for Historical Relative Sea Level Rise data, tidal and extreme water level data, and harmonic constituents and datums for use in numerical models is valuable data for forensic studies of water levels.

Mr. Leach also thanked NOAA for its active participation in NACCS working meetings and collaboration webinars. He said this collaborative participation ensures NOAA input is included in the NACCS framework. Mr. Leach ended this talk with some recommendations and suggestions for improvements to NOAA's navigation data, products and services:

- 1) NOAA should provide more frequent navigation services data collection to assist the USACE Engineer Research and Development Center (ERDC's) NACCS Regional Sediment Budget.
 - Why: Developing a more comprehensive bathymetric dataset through NOAA surveys helps to identify bathymetric changes over time. Shoaling rates can be used to identify sediment transport patterns.

- 2) NOAA should continue to compile navigation services data sets at the NOAA Digital Coast website/server.
 - Why: Data provided via the Digital Coast server is easily accessible.

Dr. Kudrna asked whether in the NACCS growth of urban population on coastal areas there are any recommendations to take back to communities/counties or states about new construction approval to minimize or increase risk in these areas or adjustments to FEMA flood elevations that would reduce the growth of potential impacts. Mr. Leach replied that there will be a component of non-structural tools in the NACCS, recommendations on non-structural alternatives whether it be zoning, building codes, etc. Communities will be able to weight different factors that they value on that community based on population, economics, environment and other factors and assess measures and investments that provide the best risk reductions for the dollars they have.

Dr. Brigham commented that one outcome should be that we need more coastal intelligence data and information to reduce future risk. Do you think this should be an outcome and not a recommendation?

Mr. Leach replied that yes, the key to future risk reduction measures is additional data, the value of data provided by partners, agencies, being key to predicting future scenarios.

Dr. Brigham noted that it might helpful for NOAA's budget that if Congress gets language from stakeholders in support of the need for fundamental data such as geospatial data might be helpful.

Mr. Leach said he would note this suggestion and that Mr. Niles would be discussing how the USACE is using this information.

Mr. Hanson commented that since the Office of Management and Budget (OMB) was briefed on the NACCS, and they liked it—this may not necessarily be good for the long term perspective, meaning that Congress might not spend money. Mr. Hanson said that he was trying to interpret where the supplemental came in because those in the coastal protection and engineering field looked at the Sandy supplemental as being our opportunity to make the case to the nation that coastal protection is critical. Is the USACE going to spend the \$5 billion or leave it on the table?

Mr. Leach responded that the USACE is fully executing the projects appropriated under the supplemental. However the challenge arises with previously authorized projects that were never constructed and other coastal areas that had existing studies that were never completed—state and local communities must garner the support to move these projects forward. We need the support of local sponsors to complete these other projects.

Mr. Hanson wanted to make a note to the panel that the American Shore and Beach is meeting in Washington, DC, this week and that General Bostick, USACE Chief of Engineers (who lived through Sandy personally), is addressing this group. He said the USACE is fully engaged in making the case from the coastal engineering community for

risk reduction, coastal protection and resiliency. Mr. Hanson said that the Governor from New Jersey, as well as representatives from the Governor's Office, are also at this meeting and addressing this group.

Lieutenant Commander Donna Leoce, Chief, Waterways Management Division, USCG Sector New York

Lieutenant Commander Leoce opened her presentation talking about the USCG's Sector New York area of responsibility, which is approximately 153 miles and extends from Troy, NY, to the New York Harbor. She said the responsibility of the Waterways Management (WWM) Division is to ensure the effective and efficient movement of commerce and access to navigable waterways in the Sector's area of responsibility.

The WWM Division executes a variety of authorities by developing policies, overseeing efforts, and conducting activities to:

- 1) Facilitate and manage vessel movement.
- 2) Manage waterways infrastructure.
- 3) Communicate waterway and environmental conditions.
- 4) Support understanding of ocean and waterway environments through marine science and observation.

Lieutenant Commander Leoce stated that the WWM Division's responsibility extends to aids to navigation, regulated navigation areas, limited access areas, marine event permitting, ice operations and waterway analysis management studies, ports and waterway safety assessments, and the harbor safety committee and marine transportation system recovery unit. She said the USCG plays an integral role in NOAA's charting program, and has no issues with this process; however, she would talk about this process.

The USCG regional districts publish chart corrections on a weekly basis in the local Notices to Mariners. Information is received from a variety of sources and may include additions, deletions or changes to aids to navigation; traffic separation schemes; and chart discrepancy reports such as shoaling, hazards to navigation, location of wrecks, anchors, and other features that may affect safe navigation. NOAA and the USCG work closely together to ensure accurate chart update information is provided to mariners. USCG is also involved in relocating traffic separation schemes that must be updated on nautical charts, and it maintains the database of horizontal and vertical information on bridges. The USCG also provides this information to NOAA on a regular basis.

The Integrated Aids to Navigation Information System (I-ATONIS) is the USCG's automated application for collecting and disseminating marine and navigation safety information for better management and improving operational efficiency. I-ATONIS also maintains over 100,000 federal and private aids to navigation. Information includes details on aids, hazards, wrecks, shoals, and chart corrections. The safety notices are disseminated to a broad spectrum of mariners through local Notices to Mariners and the Light List publications. NOAA may receive information that may not have been reported

to the USCG; exchanging this information is critical to ensure mariners have updated charting information. NOAA provides the USCG with over 50% of the chart updates found in the local Notice to Mariners. The final Local Notice to Mariners (LNTM) that is published is a conglomeration of data entered through either the USCG or NOAA pipeline. The USCG's Light List Database is the authority on aids to navigation information for lights and other signals to be displayed on fixed and floating structures located in or near waterways for the safety of marine navigation.

Some suggestions Lieutenant Commander Leoce presented include:

- NOAA creating charts labeled with the major cargo and petroleum facilities for situational awareness—valuable information to assist in day-to-day operations and events like Sandy.
- Displaying all bridge names, as listed on their USCG bridge permit, above the horizontal and vertical clearance. (Bridge owners may have different names, which causes confusion).
- NOAA's chart surveying information and Navigation Response Teams were instrumental in reopening the port after Sandy.

Lieutenant Commander Leoce praised the collaborative working relationship between the USCG and NOAA with regard to sharing important navigation information and working collaboratively to ensure the most updated marine safety navigation information is available to commerce and mariners.

CAPT Jack Olthuis, Executive Director, Sandy Hook Pilots

Captain Olthuis began his talk first thanking the panel for the offer to speak and recognizing Lieutenant Commander Brent Pounds, NOAA's Northeast Navigation Manger. He shared his story about the damage inflicted on the Sandy Hook Pilots station from Sandy, and how the pilots prepared for and manned their station during Sandy. He said that on the evening of October 29th when at high tide the winds shifted from the northeast to the southeast, the station was inundated within minutes. In the days after Sandy, the Sandy Hook Pilots worked closely with the Captain of the Port to assist with coordinating efforts to reopen the port and serving on the Marine Transportation System Recovery Unit (MTSRU). He said the Sandy Hook Pilots station is in the process of rebuilding and taking into account resiliency in their new building design standards.

Captain Olthuis talked about the challenges facing vessel pilots today in piloting with the safe pilotage of the newer and larger ships. Ships of the past were about 600 to 700 ft. in length with a beam of 105 ft., and today's ships are about 1,200 ft. in length with a beam of 140 to 150 ft. in waterways that are tight. NOAA's navigation data is essential for real-time tides, currents, water level and bridge clearance information.

Captain Olthuis also talked about how Pilots use NOAA's nautical chart data for route navigation but use portable piloting units on most foreign flag ships. He stressed the point that today's Pilots are using these portable piloting units and are dependent upon

NOAA's Electronic Navigation Charts (ENCs), which has increased the level of safety for pilots. He pointed out that the ENC updated process works very well and that it's free to Pilots. Pilots also use NOAA's nautical charts for education purposes for water mapping—providing traffic interaction and cautionary zones. The NY Harbor has seen a tremendous increase in recreational and other marine vessels causing challenges for safe shipping lane navigation in a mixed-used waterway.

Captain Olthuis stressed the importance of NOAA's PORTS data, and that the federal government should pay for PORTS. NOAA's PORTS program has grown in scope and is very important—the air gap sensor for the Bayonne Bridge is critically important for safe ship transit and passage. PORTS data provides Pilots with the anomalies—something the pilots cannot see. He said PORTS makes our ports' waterways safer and eliminates uncertainty. Pilots also use the Stevens Institute information and integrate this information onto PORTS. PORTS data on the Internet must be sailor friendly—in terms of how easy it is to navigate.

Captain Olthuis also said the New York Harbor needs a real-time current meter—there is no operating current meter; it was destroyed in Sandy. He said PORTS has been a remarkable tool and reflects NOAA listening to its constituents and responding. CO-OPS, the PORTS program manager and NOAA's Navigation Services Manager actively engage with the marine community—this relationship is highly valued. PORTS has national value and should be maintained and/or funded as such. Captain Olthuis also said that PORTS should be a model-based system rather than a sensor-based system—modeling data of what pilots need to know.

Captain Olthuis talked about NOAA's Operational Forecast System (OFS) data. He said this was the least used by Pilots but is most valuable for planning, loading and scheduling for shippers, agents and lines, that need to project a little into the future to be of greater value. Tide data affects labor and loading and how long a ship is at pier. Regarding hydrographic surveys, Captain Olthuis stated that ships mostly operate in federal channels that are surveyed by the USACE. However, he did say that NOAA has been extremely responsive in surveying areas outside federal channels—even on short notice before or after significant events, and that NOAA's Navigation Manager makes this happen. NOAA and USACE coordination and cooperation is excellent and continues for day-to-day operations and as well as during extreme weather events. Some feedback on NOAA's navigation data, products, and services include:

- Vessel Pilots are still adjusting to the display and symbology of ENCs—issues are differences of features on paper charts vs. ENCs; also symbology is based on European symbology and not U.S., but, ENCs provide ease for pilots to upload the data on portable devices.
- Variations in chart update rate and timing—updates should occur quickly and simultaneously on all chart types. Update time from the LNTM to nautical charts is too long.
- Ping to chart time for both NOAA and USACE could be improved.

- Free updates and new online reader options are excellent—website tools and products are very user friendly and user focused.
- Easier integration of multi-source data using GIS systems is great, but most mariners aren't experts in GIS. Pilots are not able to overlay of USACE surveys onto electronic nautical charts.
- NOAA's Navigation Services Manager program is superb!
- NOAA's Navigation Response Teams (NRTs) are extremely valuable to the local port and marine community.

Captain Olthuis closed his talk pointing out that NOAA's role in post-Sandy recovery efforts was extremely valuable. The Navigation Manager and Scientific Support Coordinator were essential. He said they immediately integrated—they were already members of the port community and meet together through the Harbor Operations Steering committee on a monthly basis. An important part of any port community is that the relationships have to be established and working long before they are tested.

Ms. Miller asked how is PORTS funded at the Port of NY/NJ? She also asked if the Port of NY/NJ used any user fees to fund PORTS.

Captain Olthuis replied that the Port of NY/NJ has scrapped together funding from a variety of sources—a combination of the State funding from NY and NJ, and that the Port Authority served as the conduit for the funding. They also undertook a heavy lobbying effort to get PORTS federal funding, but the PORTS funding request did not make it out of NOAA. He replied user fees are not used.

Dr. Jeffress asked if other commercial users of the waterways use PORTS in real-time.

Captain Olthuis replied the tug and barge community is aware of and uses PORTS, but he was not sure if the Ferry captains use the data. He said most passenger vessels may not have internet connectivity on their boats, but all the pilots use the data. Recreational may use the data, but he has no measure of this.

Captain Dempsey asked are vessels required to still have paper charts on board. She also said the Columbia River Bar Pilots are still carrying paper charts out to the ships as a requirement. Captain Dempsey also asked if the recreational boater is licensed or required to have an operators permit—does this apply to NY/NJ?

Captain Olthuis replied that it depends on the phase-in period of U.S. flag or foreign flag vessels and what level of Electronic Chart Display and Information System (ECDIS) coverage they have. He replied that Sandy Hook is not carrying paper charts out to the ships—they are not port state control officers. They are assuming ships are in compliance with ports state control requirements and International Maritime Organization (IMO) requirements for carriage. Captain Olthuis responded that a recreational boater license is not required in NY but is required in NJ.

Mr. Armstrong asked Captain Olthuis to elaborate on the recommendation that PORTS should be a model-based system and why NOAA's OFS (which is model based) is not used by pilots. He further stated that the operational forecast model could have a larger scale and zoomable areas.

Captain Olthuis responded that what pilots need is what's happening now. Forecasting data that goes out 1 to 2 days in advance helps ships such as break bulk carriers with making the decision of when to load based on predicted tide levels. The Port of NY/NJ does not have the communications and decision making infrastructure—this involves coordination with shippers, pilots and agents, and these are projection forecasting models not real-time information.

Mr. Wright explained that the operational forecast model has NowCoast data, but the data is only provided at predetermined points. The model does not have the flexibility to click anywhere in the waterway for forecast data.

Dr. Bamford thanked Captain Olthuis for his presentation and commented that she and Rich Edwing are discussing having a PORTS summit to discuss lack of standardization, different models, funding, federal funding strategy, model based vs. sensor based. She suggested that it's time for this community to come together and discuss the future of PORTS and a national PORTS strategy. Given the breadth of discussion, it makes sense over the next twelve months to hold a PORTS summit.

Elaine Mahoney, Mid-Atlantic Resilience Liaison, NOAA's Coastal Services Center

Ms. Mahoney presented to the HSRP in her former capacity as FEMA's coastal resilience advisor and part of FEMA's NY Joint Field Office (JFO) during Sandy. Her presentation centered on FEMA's uses of NOAA's navigation data and products and data lessons learned from post tropical cyclone Sandy. She talked about the types of data used for pre-storm conditions, post-storm impact assessments, and for future risk analysis. On pre-storm data she covered the value of NOAA's Hurricane Sandy Rapid Response Imagery and how this data was used by FEMA to overlay with census track information to determine the population affected, extent of property damage, and how many response teams FEMA needed to send out and to where.

Ms. Mahoney said one of the most valuable datasets used for post-storm impact assessments were NOAA's storm surge models. For community recovery planning efforts, NOAA's storm surge maps were the first point for how community planning was done until official insurance rate maps were produced. Graphics presented showed NOAA's storm surge data for the area surrounding the Port of NY/NJ.

For future risk analysis, Ms. Mahoney said FEMA used NOAA's sea level rise data for state and local government and community planning decision making and for future risk assessment in preparation for future events.

Some critiques from the FEMA JFO for NOAA to consider include:

- Enhance interagency data sharing for familiarity of complicated datasets; some confusion with the actual application.
- Provide data in digestible packages. Newer products should have good communications on a lay person knowledge basis. Interpretable packages would be helpful.
- Communication Strategy on Interagency data sharing. Not knowing what agencies “own” what datasets is confusing. NOAA has great resources, but users were not necessarily aware that these resources belonged to NOAA or how to access them. There was a long gap in accessing that knowledge, finding out NOAA owned this information, and knowing how to get it, interpret it, and apply it. Having a pre-prepared index that can be shared with the JFO staff to help in future disasters in knowing what resources are available for agency assistance.

Ms. Mahoney ended her presentation stating that NOAA and USGS were the key agencies that FEMA field office turned to for data, and both agencies were helpful and easy to work with.

Mr. Hanson asked whether NOAA or USACE does more Light Detection and Ranging (LiDAR) work. He said from regional sediment management and sediment movement during storms, it seems that with the tools and ease of LiDAR information FEMA could provide this information for the hurricane season and do an annual or semiannual LiDAR survey to help determine what happens during a storm with sediment management.

Ms. Mahoney said she thought that NOAA does more LiDAR work. She said FEMA uses the USGS shoreline change tool frequently—it was up to date and very helpful, but having an annual dataset would be helpful.

Mr. Aslaksen wanted to clarify that NGS coordinates with USACE and USGS at the Joint Airborne LiDAR Bathymetric Technical Center of Expertise (JALBTCX), but the goal is to do the U.S. on a five-year cycle. The NGS does coordinate its data collection with USACE. The USACE data that is collected ends up on the NOAA Digital Coast product. Mr. Aslaksen referred Mr. Hanson to the National Coastal Mapping Strategy in development. He said a common requirement across federal agencies is collect the data once and use many times.

Dr. Kudrna asked Ms. Mahoney to detail how much response FEMA is getting on tools in other regions of the country.

Ms. Mahoney replied that the tools are widely used in the Southeast—in the Florida region and Gulf Coast area, and that sea level rise tools are popular on the West Coast.

Dr. Callender said he was briefing Senator Markey’s staff a few weeks ago. They were extremely excited to see some of the products from Digital Coast that looked at demographics county by county in terms of jobs and economies facing the coasts.

Ms. Mahoney said that the Digital Coast counties snap shots were helpful and communities were using these handouts at their local planning meetings.

NOAA SPEAKER PANEL ON SANDY SUPPLEMENTAL PLAN: AN OVERVIEW AND AGENCY PRIORITIES

Dr. Russell Callender, Deputy Assistant Administrator, National Ocean Service

Darren Wright, CO-OPS

Captain Jon Swallow, Chief, NOAA's Navigation Services Division

Mike Aslaksen, NGS

Ashley Chappell, IOCM

Dr. Callender opened the discussion of the NOAA Sandy panel with an overview of NOAA's activities under the Sandy Supplemental Spend Plan. He outlined the \$309.7 million that NOAA received in the Sandy Supplemental for forecasting, coastal safety, and resiliency efforts. Dr. Callender said that NOS created a Sandy Work Integration Group (SWIG) to 1) improve the execution of NOS supplemental spending and 2) look for new ways of doing business. Strategic key activities of the SWIG include more resilient coastal communities, protection from storm surge, integrated coastal mapping and more resilient NOAA facilities. He also presented budget breakdown information for these key activity areas. Dr. Callender said that under each key activity area there were specific efforts that NOAA was focusing on.

More Resilient Coastal Communities:

- All hazards response plan
- Marine debris assessment
- National disaster recovery framework
- NOAA coastal storms program

Protection from Storm Surge:

- New surge models
- Hydrographic surveys
- Near shore elevation data
- Coastal inundation benchmarks
- Sea level rise planning tools

Integrated Coastal Mapping:

- Hydrographic data acquisition
- Collection & processing of topobathy LiDAR data
- Shoreline change analysis
- Marine debris mapping & removal prioritization and updated environmental sensitivity index (ESI) maps

More Resilient NOAA Facilities:

- Repairing facilities
- Replacing lost, damaged or compromised equipment

- Promoting recovery strategies
- Improving observation stations and systems

Mr. Wright began his portion of the NOAA Sandy panel by restating that NOAA is implementing a Sandy Supplemental Integration Strategy (SSIS), and some key goals for integration include preparedness, response, recovery and resiliency. He presented a background on NOAA's Hurricane QuickLook products that provides real-time water level and meteorological information, round-the-clock updates and data updated every six minutes. NOAA's Hurricane QuickLook provides valuable tide and water level information for emergency response and for other key decision makers. Mr. Wright said that NOAA is spending \$3 million on repairs for National Water Level Observation Network (NWLON) and PORTS stations impacted by post-tropical cyclone Sandy extending from Puerto Rico to Virginia and to Maine. He also presented information on funding and costs that the NOAA Integrated Ocean Observing System (IOOS) program received for either repair or hardening of their ocean observing equipment and sensor systems. He said the Vertical Datum Transformation (VDatum) program received \$1 million for installation of approximately 35 water level stations during FY14 and FY15 to provide updated tidal and geodetic data for VDatum for the NJ and NY coastline and to include Rhode Island and Connecticut. Mr. Wright also stated that CO-OPS received \$2.2 million for water level support for tide gauge installation and data requirements to support NOAA's hydrographic surveys. CO-OPS is also using Sandy supplemental funding for enhancing the Web-Based Water Level processing tool to improve efficiency of data and processing of tide data.

Captain Jon Swallow talked about how NOAA's ship *Thomas Jefferson*, a hydrographic survey platform, and the Navigation Response Teams (NRTs) were immediately deployed in response to Sandy. NOAA field units initiated hydrographic surveys of the Port of NY/NJ harbor within one day of Sandy's landfall—this effort enabled the port to resume modified operations within two days and completely reopen the waterways for marine commerce in just five days. NOAA's Navigation Managers worked closely with the USCG, USACE, vessel pilots, port officials, and terminal operations to coordinate the surveying schedule. NOAA surveyed 20 square nautical miles in five days—ensuring that all shipping channels in the Port of NY/NJ were clear of hazards. Working with the USCG's Maritime Transportation System Recovery Unit (MTRSU), NOAA surveyors provided real-time updates on underwater object detection (including shipping container debris) that allowed the USCG Captain of the Port to make decisions on port status and operations. Captain Swallow noted that NOAA received \$14 million for Sandy recovery hydrographic surveys.

Mr. Aslaksen talked about the efforts of NGS' Remote Sensing Division (RSD) in response to the Sandy Supplemental Spend Plan. He focused his talk on the response strategy, requirements of response and priorities. RSD crews flying in NOAA's King Air turboprop and Twin Otter aircraft surveyed over 1,649 miles of coastline to document the coastal damage and impacts to navigation. Mr. Aslaksen said that the data provided in these aerial surveys provided emergency and coastal managers with the information they need to develop recovery strategies, facilitate search-and-rescue efforts, identify hazards

to navigation and Hazardous Materials (HAZMAT) spills, locate errant vessels and provide documentation necessary for damage assessment through the comparison of before-and after imagery. He also said that RSD received \$12 million for topobathy LiDAR observations and \$2 million for Gravity for the Redefinition of the American Vertical Datum (GRAV-D) collection. Mr. Aslaksen also talked about and showed slides on the priority data collection areas, flight coverage of the NOAA aircraft, topobathy and LiDAR mapping areas, GRAV-D flight plans and aerial damage pictures. He also talked about how NGS' elevation data is used and showed some of the sensing equipment on the NOAA aircraft.

Ms. Chappell talked about NOAA's Integrated Ocean and Coastal Mapping (IOCM) efforts. She stated that improved end-to-end response, recovery, restoration and resilience are required for a more resilient U.S. coastal zone connectivity of mapping efforts. Ms. Chappell said the IOCM team started supplemental planning and coordination immediately after the storm response settled and initiated the use of SeaSketch to aid coordination within and outside of NOAA. The USGS and NOAA discussed overlaps, modified plans for best outcome, and ended up maximizing taxpayer dollars to acquire more data. NOAA's National Geophysical Data Center was funded to work with USGS on improved digital elevation models in the impact area.

Ms. Chappell also stated that \$2 million funding was allocated for the IOCM Center for:

- Integrated Ocean and Coastal Mapping Center Proof of Concept;
- \$1 million grant to University of New Hampshire for R&D elements; and
- \$1 million contract for data processing and multi-use product development.

Dr. Callender closed the NOAA Speaker panel with a few lessons learned from Sandy:

- Increased integration on response within NOS and between NOS and other parts of NOAA is possible and yields greater success.
- Proactive "blue skies" planning is needed in advance of the next emergency.
- There is a need for improved communication between different components of NOAA, and between NOAA and its stakeholders, in order to share information and leverage capabilities, among others.

Public Comment Period

Mr. Dasler commented that the age of data on NOAA's nautical charts gets overlooked and that NOAA needs to be more proactive to correct this problem.

HSRP Panel Discussions

Matt Wellslager, HSRP Chair

Mr. Perkins asked whether NOAA/NOS could have a pre-scripted assignment to let FEMA know what NOAA's response capability is.

Dr. Callender responded that NOAA is pulling together its assets and capabilities now.

Mr. Perkins asked what more does NOAA need, and how could the panel help.

Dr. Bamford responded that NOAA needs more training. NOAA needs to promote the importance of blue skies planning, develop pre-scripted mission assignments and integrate the goals of preparedness, response, recovery and resiliency.

Dr. Brigham commented that NOS needs an internal “lessons learned” or best practices from Sandy.

HSRP Panel Discussions & Deliberations **Matt Wellslager, HSRP Chair**

Dr. Brigham suggested that the HSRP consider the PORTS message to be a “national” message. Maybe NOAA could hold a PORTS summit venue to focus on national PORTS issues. He also commented that it would be beneficial to include educational presentations on PORTS.

Dr. Kudrna suggested that the HSRP establish an informal working committee to consider changing the name of the HSRP to reflect the concept of “coastal intelligence.” He suggested maybe names like National Coastal Advisory Committee or Advisory Committee on Coastal Intelligence.

Ms. Miller posed to the panel that they consider how NOAA can better communicate their navigation services.

Chair Wellslager responded that if the panel proposed to coordinate a national PORTS summit, the committee needs to carefully consider what would be the outcome and the strategy to present to NOS. There would need to be discussion across all ports. However, this might help the HSRP address sustainability issues.

Dr. Brigham questioned what’s the level of services we expect from the ports?

Mr. Hanson responded that before the panel holds a PORTS summit, they need to do some research into other countries to see how the national approach works and to see if this is something NOAA/NOS is interested in.

Ms. Miller asked whether NOAA and the panel could do some information gathering or put together some baseline information such as how do you fund it. For example, does NOAA use user fees, etc.?

Mr. Kelly asked who is going to pay for a national PORTS program. He stated that the panel needs to find that out first, and that funding is crucial.

Dr. Kudrna suggested that the panel think about how NOAA elevates the message of national PORTS and to put it in a clear fashion.

Admiral Glang commented that NOAA needs to understand how to make navigation safer for the mariner on ships, and we need to know the technical requirements.

Adjournment

The meeting was adjourned at 6:00 p.m.

Wednesday, February 26, 2014

The meeting was called to order at 8:30 a.m.

Chair Wellslager opened day two of the HSRP public meeting discussing committee business issues. First, he asked all members and meeting attendees to participate in the pledge of allegiance and for public attendees to sing in for recording purposes. Mr. Wellslager opened the floor for discussion and debate on new Chairmanship and Vice Chairmanship for the HSRP. They opened the floor for nominees for these positions. Members Mr. Hanson and Dr. Lawson had to leave the HSRP meeting early and requested that this committee business be done in the morning while they were present to participate in the nomination and voting process. Dr. Lawson nominated Mr. Scott Perkins to serve as Chair and Dr. Jeffress seconded this nomination. Mr. Perkins stated he would be honored to serve as the HSRP Chair. Chair Wellslager asked if there were any further nominations for Chair. Then, he asked if there were nominations for the Vice-chair position. Carol Lockhart nominated Bill Hanson to serve as Vice-chair. Chair Wellslager asked if there were any further nominations. He closed the floor for nominations and said he would continue this in the afternoon.

Chair Wellslager talked about the stakeholder breakout sessions, the purpose and objective of these sessions. He asked each breakout session to come up with at least 1–3 key recommendations to be briefed back to the full committee. These recommendations would help drive the letter of Recommendation to the NOAA Administrator.

Dr. Lawson suggested that at the next HSRP meeting there should be an update from all the HSRP working groups—updates on their strategies and plans. He said he would like to report on the Arctic working group efforts.

Mr. Hanson suggested that with the Steve Carmel shipping expertise gap on the HSRP that the panel should try to get this vacancy filled as soon as possible.

Chair Wellslager asked Admiral Glang what is the policy and procedures on filling this type of vacancy on the HSRP.

Admiral Glang explained the procedure of publishing a federal register notice announcing membership solicitations. He suggested that NOAA would solicit for this vacancy with the next call for membership in June 2014. Admiral Glang encouraged panel members to reach out to their stakeholders and interested candidates to apply for membership when the notice is published.

Importance & Application of NOAA's Navigation Data, Products & Services for the Port of New York & New Jersey

Ed Kelly, Executive Director, Maritime Association of the Port of NY/NJ

Mr. Kelly welcomed all attendees to New York and thanked the leadership for allowing him to serve on the HSRP.

Mr. Kelly opened his talk with some history and current statistics of the New York harbor. He said the harbor was established by the Dutch as a trading hub. Until the 1880s, the NY City U.S. Customs House provided over 40% of the total federal budget—NY was the heart and soul of international trade. Currently, NY Harbor is the largest port on the East Coast and has about 62.5% of all North Atlantic cargo.

Mr. Kelly talked about the Maritime Association for the Port of NY/NJ (MAPONY/NJ). He said the Maritime Association has been around since 1873 and started out as a maritime exchange but evolved into an association. MAPONY/NJ is a conglomerate of international shippers, marine terminals, labor workers, tugs/barges, vessel pilots, vessel repair facilities, shipping agents, marine underwriters, Admiralty attorneys and draymen/distributors. The MAPONY/NJ has over 500 paid corporate and individual members. Its mission is safety of navigation, security of maritime assets, sustainability of the marine environment, and competitiveness of port services. He said they also run committees such as the Harbor Safety Navigation and Operations Committee (Harbor Ops), and an Education committee to reach out to the public and educate on the importance of the maritime transportation and shipping for NY City for products and services. He also presented some statistics on the Port of NY/NJ: a local/regional and national gateway. In 2010 the Port of NY/NJ received \$175.8 billion in general cargo, 5,292, 020 TEUs, a regional petroleum port, 4,873 international arrivals, and over 400,000 harbor transits per year.

Mr. Kelly also presented that the Port of NY/NJ is a powerful economic engine for the region. In 2010, he stated that the port provided 279,200 full-time jobs, \$11.6 billion in personal income, \$37.1 billion in business income, \$3.6 billion in federal tax revenue and \$1.6 billion in local/state tax revenue. Some environmental benefits attributed to the Port of NY/NJ include: most fuel efficient, minimal infrastructure, reduced roadway congestion and emissions, electronic terminal equipment, etc.

Mr. Kelly highlighted some pressing concerns for the Port of NY/NJ. He said the port is currently dredging a 50-ft. channel to accept post-Panamax ships and to take on bigger vessels such as articulated tugs and barges, but the port is problematic because its waterways are narrow and restricted. Bigger and wider ships mean more commercial

movement in the waterways, and you have increased recreational users. As a result, river operations and ship traffic is becoming more and more congested. Personal and commercial waterfront growth is increasing and we have limited resources. He said post-tropical cyclone Sandy caused major inundation issues for NY City/Manhattan and other low-lying areas. There were toxic contamination issues, neighborhoods were flooded and destroyed and landside infrastructure was significantly damaged. NOAA's historical data is invaluable for preparing for inundation. Mr. Kelly stated that inundation is an area that NOAA needs to play a bigger role in.

Mr. Kelly also talked about how NY City has created significant maritime industrial and protected zoning areas. The port has 183 federally restricted operations and permitting and regulation is horrific and time consuming and Sandy elevated this issue. He said the harbor has tremendous amounts of shoaling and silting from upstream, and the City needs to find viable and reduced cost ways to dredge the port. Some infrastructure issues he talked about were the raising of the Bayonne Bridge for safe post-Panamax transit. He said this is a real estate issue and PORTS data is essential for ensuring safe marine transit. Coastal shipping is increasing, and intermodal terminals are expanding—there is a transit connectivity concern. This system needs to connect with landing ferries and need to connect to public transportation. There are ballast water issues with the pump out stations, and shore-side power is also a big issue for larger vessels. Some opportunities he talked about is the maritime industry's need to better educate the public and increase community outreach for local support to address these challenges. He said NY/NJ is a multi-jurisdictional region, and cooperation is essential for communications and marine infrastructure improvements.

Mr. Kelly also talked about NOAA's data and products for the port of NY/NJ. PORTS, he said, is the most essential product for the Port of NY/NJ. They use PORTS for maritime domain awareness for planning, safety of transit—this should be federally funded! He said NOAA does not recognize how extensively the PORTS system is used and by how many different people. Users include the NY police department, NY fire department, emergency managers, recreational boaters, beach managers in NJ for algae blooms and beach closures, academia and research and the military. PORTS are a broad-based and vital system, a component of safe and secure port operations.

He also talked about NOAA's NRTs and NOAA's Navigation Manager—NOAA's NRTs and surveys are absolutely essential for safe and efficient port operations. The natural depth of the harbor is approximately 18–19 feet in some areas, and the harbor draws ships with drafts of 47 ft. We need to know the validity of our channel depths and surrounding areas, berths and non-navigable channels. NOAA's Navigation Managers and the NRTs are vital to safe navigation and U.S. economic port operations. NOAA's coordination and surveying efforts to help get the port reopened in record time was a tremendous asset. Mr. Kelly also talked about NOAA's nautical charts. He said NOAA's nautical chart data is used extensively, and the ENC has potential for layering. If the ENC product could provide layering and live information this would enable pilots and recreational and other marine users with real-time data for safe navigation.

Mr. Kelly ended his presentation with emphasis on some improvements:

- PORTS should be federally funded, and PORTS data should be displayed on the Automatic Identification System (AIS) for information such as forecasting near term data and depth data for shipping.
- NOAA should increase hydrographic surveys. NOAA is behind on scheduling—need to complete 50-ft. channel and shoreline surveys.
- Integrate non-NOAA assets—incorporate data and products into other sources, i.e., CO-OPS and Stevens Institute partnership as an example. Applications should be designed for multiple uses.
- Increase mobile apps for recreational and other marine users.
- Enhanced layering/dynamic layering on nautical charts—actual live charts with filters. The maritime industry still uses older data and formats. Layering could show shore-side capabilities, dock yards, recreational boat slips, etc. Also, right whale locations of restricted areas could be a layering capability.

Dr. Jeffress asked what datum measurement is used for the dredging of the 50-foot channel in the Port of NY/NJ.

Mr. Kelly responded that he would have to ask someone from the USACE on this.

Mr. Niles of the USACE replied that the NY District is using mean low lower water consistent with NOAA. He said there had been some issues with datum in the Gulf, but are working to convert the chart datums.

Dr. Kudrna questioned what NY dredges allowed open water disposal. For USACE maintenance dredging, who is the local sponsor?

Mr. Kelly said that NY is a silting port; most of the dredge material needs special remediation, and standards continue to improve, and cost factor keeps getting higher for disposal of contaminated materials. NY has dredge teams that organize locations of disposal of dredged materials for beneficial use such as land fill, shopping centers, golf courses, etc. He replied the Port Authority takes the lead, as a land lord, they do not own or operate terminals—but, he said, the states are active in this role.

Recreational Boating in NY/NJ—Post Sandy
Susan Shingledecker, Vice President, BoatU.S. Foundation

Ms. Shingledecker provided an overview of BoatU.S.'s role in hurricane preparation and response, using NOAA's products and services in hurricane preparation and response, lessons learned to increase marine resiliency, Sandy's impacts on recreational boating and other issues in recreational boating. BoatU.S. is the boat owners association of the U.S. They are the largest association of recreational boaters with over 500,000 members. BoatU.S. offers a range of services to include insurance, the largest fleet of on-the-water tow boats, roadside towing, membership association with lobbyist and a non-profit for educating boating safety.

Ms. Shingledecker talked about the goals of hurricane prevention for the recreational boating community to prevent loss of life, limit damage to boats, limit damage to marina infrastructure, limit damage to other coastal infrastructure and limit damage to the environment. She discussed BoatU.S.'s role in hurricane preparation—they have a hurricane resource center and work closely with NOAA to update storm track and notification and provide planning guidance for boaters and marinas. In regards to response efforts she talked about BoatU.S.'s Catastrophe (CAT) Teams. The CAT Teams are made up of a network of non-BoatU.S. employees that include professional surveyors, salvors, and claims adjusters, who are on the ground immediately after major weather events. Immediately after Sandy, the CAT teams held three webinars with marinas and NOAA to help the marinas with reconstruction and resiliency. The CAT Teams reached marinas in NY and NJ less than 24 hours after the storm made landfall and remained in the field through that Christmas to assist the recreational boating community. Ms. Shingledecker showed a short video of the CAT teams response and recovery efforts to Sandy.

Ms. Shingledecker talked about ways marinas look at the built infrastructure and how to design for resiliency, especially after the devastating damage from Sandy. Boats that were secured to floating docks fared better than boats secured to fixed docks. Floating docks with sufficiently high pilings were the only place where large numbers of boats survived the wind and storm surge damage from Sandy. Boats and fixed docks did not fare as well in the high winds from Sandy. What worked well, she said, were moorings. Moorings offer a viable alternative for keeping boats safe in high-surge storms, but only if all moorings in the basin are properly constructed, maintained and prepared for the actual conditions. Impacts to the recreational boating community and marinas included 65,000 boats damaged or destroyed at over 500 marinas and boat clubs in the area, boat homeowner check refunds used for home repairs and for loss of income, and a major loss to marina access and infrastructure.

Ms. Shingledecker presented some suggestions for improvements to NOAA navigation services and modeling information for the recreational boating community.

- 1) A surge model that shows the worst case scenario on an easy-to-access interface like Google maps.
 - a. Show inundation above ground level not sea level for the non-technical person to understand.
 - b. Historical inundation data for the human perspective of potential risk.
- 2) Better communication on the warning and risk so that people will understand and do the right thing.
 - a. Is there a Safford Simpson scale for expected surge level to help in preparation efforts? The preparation at a marina is different for a high wind event vs. surge event. A better understanding of what marinas are looking at will significantly help in the preparation stage.

- b. Terminology of the use and term “hurricane” and when the storm became extra tropical and it was no longer a hurricane. What did this do to people’s perception of risk and how can they work with that? The term hurricane also triggers different things in the insurance world.

Other areas of recreational boating issues she discussed are the move to Print-on-Demand (POD) charts. She said the recreational boating community is pleased that NOAA is keeping the POD nautical charts. She said that the recreational boating community is also pleased that NOAA is keeping the Magenta Line on the Intracoastal Waterway—it’s a function of boating safety. Virtual Aids to Navigation and Lighting obstacles is an issue of concern with the recreational boating community. The recreational boating community wants the USCG and NOAA to keep these visuals on the charts for safety.

Dr. Bamford commented on the value of these face-to-face deliberations and said she will continue to push for in-person committee meetings. She said the agenda and talks are excellent and continued discussions are focused on issues that allow for thoughtful discussions and deliberation. These discussions, she said, raise the awareness and value of NOAA’s navigation services. The information that the speakers provide is valuable and we want to continue to use this information to improve our products and services.

Ms. Miller asked how does BoatU.S. handle the numerous amounts of boats that are piled up on top of the one insured boat?

Ms. Shingledecker replied that it depends on the situation. BoatU.S. does not have to deal with houses and businesses and that they work with the municipality or marina to move boats and negotiate a salvage contract.

Dr. Jay said he was concerned with Susan’s distinction between high surge and high wind event. He suggested that it may not be so good to emphasize how extreme the surge is because that’s what happens when there’s a big storm on the East Coast.

Ms. Shingledecker replied that maybe elevation plays a role when surge comes in. For the NY/NJ area, she said possibly because the infrastructure is older and the pilings shorter, they were not able to get the boats up high enough and there was a denser amount of boats and no place to move the boats.

Admiral Glang asked Ms. Shingledecker how NOAA can best reach out to recreational boaters—NOAA needs to understand this better. And second question, how many boaters are there in the U.S.? How is this measured?

Ms. Shingledecker stated that there are about 17 million recreational boaters. BoatU.S. has 500,000 members, but reaching out through the states to identify how many boaters that register boats is one mechanism. Also, the USCG is doing a nationwide recreational boating survey to correlate hours on the waters with accidents and fatalities as a measure and metrics. She said that BoatU.S. would work with Admiral Glang offline to help determine measures they use.

Dr. Kudrna questioned what is BoatU.S. doing to increase boating safety requirements?

Ms. Shingledecker replied that BoatU.S. supports boating education and offers a free online boating course that's approved in 32 states.

Dr. Tuell commented regarding the discussions of Sandy in high wind vs. high surge. He said the National Weather Service (NWS) measured tropical storm wind force winds over a 900-mile expanse of coastline from Bangor, Maine, to the Outer Banks of North Carolina. The storm force winds covered a large expanse area and had persistent northeast winds in the upper right quadrant at high tide—Sandy was the worst case scenario. It was a unique storm in terms of size, scale, and complexity of the storm. The NWS is working to modify the terminology to avoid public confusion.

Updated Nautical Charting & Consistency in Standards

Tony Niles, Assistant Director for Civil Works R&D, USACE

Mr. Niles opened his presentation talking about USACE's Coastal Navigation mission that includes 1,067 navigation projects, 19 lock chambers, 13,000 miles of channels, 929 navigation structures, and 844 bridges. He said the USACE spends about \$1 billion annually dredging. One of the primary responsibilities of USACE is to assess channel conditions by producing soundings and contours of the channels.

Mr. Niles stated that 33 Code of Federal Regulation Section 209.325 requires the USACE to provide results of hydrographic surveys to NOAA within one month of the survey. USACE provides this information through a tabular channel condition report and digital survey and navigation framework data. However, Mr. Niles did point out some challenges to this data—since USACE Districts use varying data formats, reporting frequencies, and methods of dissemination—the result is an inconsistent framework. He talked about some issues the USACE is facing in their Coastal Navigation mission: budget reductions, dredging costs are increasing, there are dredged material placement capacity issues, the environmental issues of when dredging can be performed, and low use of navigation products. He said that with current funding, the USACE is only able to maintain ½ of the channel width at 35% of the time. The USACE is working to make their channel data quantitative, objective, repeatable, consistent and straightforward enough that it can be applied rapidly and affordably to all channels in the navigation portfolio of projects.

He talked about the USACE's eHydro application and reporting process. eHydro is a GIS application for processing survey data to ensure consistency and reliability in the survey data. Some products of eHydro are the channel plot sheets for navigation will have standardization and channel frameworks, channel condition reports, channel indices, metadata about the datums and a web map display of all channels surveyed.

Mr. Niles also provided an update on the e-Hydro deployment status. He said that 18 districts are ready to begin the operational use of all High-use channels, and that four districts need to develop channel templates. An operational order is to be issued this

week, and all 22 districts are to be operational with all High- and Moderate-use channels by the end of FY14.

Mr. Niles ended his talk about the USACE's new channel products for navigation interests. He said their goal is to have S-57 overlay of the latest channel condition data for the Southwest Pass. The channel survey data can be overlaid on the NOAA ENC. No modification or preparation is needed by the ECS vendor, and it's compatible with data and display standards. He said that the USACE is now in the data development, data production, quality assurance, and data conversion and dissemination process. This product will help determine the need and feasibility for surveying other channel areas. Mr. Niles ended his talk by saying that the USACE's channel condition and framework data is quantitative, objective, repeatable, consistent and usable.

Questions from the HSRP

Chair Wellslager questioned if the Mississippi River overlay project is an opportunity where users can access both USACE and NOAA chart data from a common website.

Mr. Niles replied yes. The USACE is working with NOAA on this, but he did not know all the details of whether it will be a link or on the cloud. But, the USACE is looking to get common access for users.

Integrated Ocean & Coastal Mapping, Modeling & Resiliency

Carrie Grassi, Senior Policy Advisor, New York City Mayor's Office of Long-Term Planning and Sustainability

Ms. Grassi provided a thought-provoking presentation on how the New York City Mayor's Office is addressing, planning and preparing for future risks of climate change and severe weather events. She talked about how the Mayor's Office of Long-Term Planning and Sustainability use NOAA datasets, tools and resources for a stronger, more resilient New York. In response to post-tropical cyclone Sandy, the City set up the Special Initiative for Rebuilding and Resiliency (SIRR) program. The goals of SIRR are to 1) rebuild neighborhoods not just as they were, but better and 2) identify ways to strengthen critical infrastructure systems. SIRR used three key questions to help NYC achieve its goals: 1) What happened during Sandy and why did it happen that way—this information helped inform planning and decision making, 2) What could happen in the future that's important to this process—that we plan for the future and effects of climate change for the City and 3) How does NY City rebuild post-Sandy and prepare for a future with climate change?

Ms. Grassi said that the Mayor's Office of Long-Term Planning and Sustainability used NOAA's storm surge and wind modeling data to set the stage of the catastrophic impacts for the NYC area. Using NOAA's digital elevation model and tide data, she portrayed a projected future scenario of what sea level rise may do to the NYC area.

She also talked about NYC's vulnerability to coastal storm surge flooding. Using NOAA's inundation modeling data, Ms. Grassi was able to point out that if Sandy had hit about nine hours earlier, many more areas of NYC would have experienced major flooding and inundation.

Ms. Grassi presented on some key lessons learned by New York City:

- Building codes work—older timber structures were nearly 73% of heavily damaged structures; new development and better constructed fared much better.
- Infrastructure systems are linked and regional—power outage affects other systems; supply chains outside the City need to be hardened against emergencies.
- Prepared communities bounce back more quickly—neighborhoods with strong ties and effective local non-profits recover faster; underlying challenges hamper response, recovery and resiliency efforts; and the current flood insurance regime is broken.
- We must reject the false dichotomy of green vs. grey infrastructure—the right solutions are locally tailored and utilize hybrid solutions.
- Sandy wasn't a worst case scenario—the timing of the storm both relative to the tide and to the time of year determined its impacts; sea level rise will continue to make flooding more likely.
- We are vulnerable now and must act to reduce our risks—risks of extreme weather are here now; Sandy supplemental funds provide a unique opportunity to invest now to reduce future costs.

Ms. Grassi said that the City's plan to build resiliency and make all New Yorkers safer is a multi-layer approach—strengthen coastal defenses, upgrade buildings, protect infrastructure and services, and make neighborhoods safer and more vibrant. She talked about the critical role of NOAA's navigation data, products and services in helping make risk-based decisions that were fundamental to the City's response efforts. NOAA's tide gauge data was important for understanding historic trends, monitoring emergency situations and operations. Tide and surge interpretation tools such as VDatum and Probabilistic Hurricane Storm Surge (PSurge) is important for real-time emergency planning and critical asset protection. Continued collaboration and coordination with NOAA is critical for resiliency planning.

Recommendations for NOAA:

- 1) Need for additional tide gauge stations. Tide gauge station information is important for understanding historic trends, monitoring emergency situations, and daily operations.
- 2) Tide and Surge Interpretation Tools. NOAA's PSurge model is important for real-time emergency planning and critical asset protection. Suggest that NOAA add additional visualization to help infrastructure operators understand what the model is showing.
- 3) VDatum is needed for operations and resiliency planning. However it's difficult to use, but there is potential for refinement.

- 4) Staff Time and Resources. NOAA support helped with translating and troubleshooting tools—tailor solutions for situations—the NWS and National Hurricane Center (NHC) plays a critical role.
- 5) Coordinated messaging—acknowledgment of local initiatives such as climate projections is important and more work needs to be done on coordinating communication tools and visualization.

She ended her presentation saying that bold thinking about resiliency can transform neighborhoods and provide for enhanced safety, economic development and stronger communities. Continued collaboration and coordination with NOAA is critical for resiliency planning. She said the federal government plays a critical role in helping NY City make risk-based decisions that are fundamental to response efforts.

Questions from the HSRP

Dr. Jay stated that he was impressed that the City is taking into account oceanographic information into planning and asked whether this is common on the East Coast.

Ms. Grassi replied that this approach is new and is the City's attempt to understand the coastal modeling that goes into planning for preparation, response and recovery—which was all brought to the forefront by Sandy.

Mr. Hanson asked whether Ms. Grassi thought that the City would continue to carry through with these ideas or if they would fade away as elections come and go.

Ms. Grassi replied that keeping the issue central is a real challenge, but that the City acted quickly to lay the ground work for the plan. It is not a political plan. City staff is trying to look at the data, see the potential solutions and take advantage of federal monies for Sandy impacts. She said this is one thing that they built into the plan. The Plan is to be updated every four years. It was designed so that the next Administration will be able to take the lead and build on the momentum of the plan.

Mr. Hanson cautioned that relying on federal money is not a commitment, but an urgency and responding to the immediate requests. He suggested that there must be commitment at the state and local level for a project like this to stand.

Ms. Grassi replied that one of the goals is to build this resiliency planning into City agencies' budgets and do communications and engagement/outreach to local and state elected officials for input and support.

Post Tropical Storm Sandy Geospatial Response: An Interagency Success Story & NOAA's Role

Julia O'Brien, Acting Emergency Analyst/Geospatial Coordinator, DHS/FEMA Region II

Ms. O'Brien presented to the HSRP an overview on FEMA's geospatial efforts for post-tropical cyclone Sandy. Pre-storm preparation efforts involved FEMA's Modeling Task Force (MOTF) team using NOAA's Sea, Lake, and Overland Surges from Hurricanes (SLOSH) and PSurge modeling data to create a predicted GIS surge data layer used in preparation strategies. The USGS also deployed hundreds of storm surge sensors to measure depth of water at structural levels which included real-time surge and rapid deployment gauges. These sensors provided FEMA with access to real-time assessment data as the Sandy made landfall. NOAA and the National Geospatial Agency prepared their flight crews to collect imagery post-storm. Also, the Civil Air Patrol (CAP) prepared their flight crews for assessment assistance.

Ms. O'Brien talked about how NOAA aerial flight information provided FEMA with geospatially referenced, high resolution and GIS-ready imagery. The NOAA planned flight line data was overlaid onto FEMA's MOTF Risk Matrix data and helped FEMA identify areas of highest impact where the agency could set priority response activities. The NOAA data was posted online within 48 hours of Sandy landfall. She also talked about how NOAA's hind-cast SLOSH model data and the USGS's high water mark data provided valuable information on areas highly subject to flooding. Ms. O'Brien showed some aerial photos of before and after damage to NJ and NY shorelines.

FEMA's response efforts to post-tropical cyclone Sandy included CAP flights of the most impacted areas, using NOAA's surge models to prioritize the flight areas, CAP crews were in flight within 24 hours of landfall, completed over 157,000 geo-tagged images captured and over 250 personnel and staff were involved in this agency effort. FEMA was able to conduct structural assessments with their ImageCAT data using NOAA's surge model and CAP imagery data.

These geospatial structural assessments were used to:

- Deliver expedited assistance to over 44,000 applicants for temporary shelter assistance.
- Determine priorities for housing inspection teams.
- Direct operational forces to be concentrated on the most impacted areas allowing a stretched response effort to maneuver without wasting man-hours or effort.
- Determine potential long-term housing requirement priority areas to support Individual Assistant Housing planning efforts in NY/NJ.

Ms. O'Brien also talked about how FEMA used NOAA imagery for damage assessment to determine what homes were affected and whether the damage was major, minor or destroyed the home. These data were posted to the FEMA GeoPlatform for use by states and other agencies to determine the level of damage to home structures. She also talked about how the use of the NOAA and CAP imagery data allowed FEMA to post aerial imagery for home owners to see if their homes were damaged and provided thumbnails for larger viewing. Having this information is important for the public to not only see, but also understand the level of damage to housing structures.

Post Sandy LiDAR surveys (both topographic and topobathy) were taken of open coastal areas from Cape Hatteras, North Carolina, to Long Island, New York. NOAA nautical chart data provided navigation information but it is not GIS-compatible—it did not match up with the rest of the data. Those who are interested in land-borne assets also want to use the NOAA charts, but there is not a widespread understanding of how this is possible. NOAA’s nautical chart data is not just used for water navigation, but sometimes ties into the land. She suggested that anything NOAA can do to make this easier for the user community to understand the chart data would be much appreciated. She said the coordination and collaboration across the federal agencies to collect and share this data enabled FEMA to provide immediate response and recovery to disaster victims.

Ms. O’Brien ended her talk with a memorial tribute to Chris Barnard, Remote Sensing Advisor for the Department of Homeland Security and a champion of geospatial coordination and innovation in disaster response.

Questions from the HSRP

Ms. Miller asked whether it was possible to get NOAA charts into GIS.

Admiral Glang commented that Coast Survey now has all nautical charts available for GIS in ENC online, and this was just upgraded—a two-year project. He stated that NOAA charts can be pulled down in GIS-ready form, as a shape file, arc file and other formats. Users can also disaggregate the pieces, such as pulling just shoreline, or just the sounding data—these pieces can be pulled out in a ready GIS format.

Dr. Kudrna asked whether FEMA planned to modify the Flood Insurance Rate Maps (FIRM) in the Sandy impact area.

Ms. O’Brien replied that the FIRM maps don’t deal with surge, but with flood, using a different modeling process based on rainfall. The modeling process does not take into account past storms.

Ms. Grassi said she is the City’s point person working with FEMA Region II on the map update processes. She said FEMA’s modeling data was only up to a point when Sandy occurred and FEMA is not going back and incorporating Sandy data into the probabilistic modeling.

STAKEHOLDER BREAKOUT SESSIONS

Breakout sessions were held with stakeholders, partners, users and other public attendees to discuss issues and/or challenges with the use and application of NOAA’s navigation data, products and services. Each breakout session focused their discussions around specific thematic areas and produced recommendations for each of these areas.

Updated Nautical Charting & Consistency in Standards

Issue #1: *Need for better cartography in channel—how should we be depicting the data available in the federally maintained channels?*

Recommendation:

- Channel tabular data of dredged areas continue for now—Pilots are responsive to USACE PDF, but tabular data is not what Pilots will use. NOAA should explore alternatives and ask regional stakeholders if this is something that should be dropped off the charts.
- Experiment with overlays (SW Pass, Crescent City pilots requested – beta test).
- Investigate alternative ways to chart channels.
- Panel supports USACE transition to e-Nav.

Issue #2: *Product pipeline issues in ENC's vs. RNC's vs. Paper Charts*

Recommendation:

- Panel recommends accelerations of this transition.
- Recommend ENC source should be applied initially for ENC's to become the premier chart as soon as possible.

Issue #3: *How does Coast Survey get data from USACE from non-federally maintained channels?*

Recommendation:

- Continue process as usual.
- Any additional data can be absorbed through e-Nav process and sent to NOAA.

Issue #4: *Crowdsourcing*

Recommendation:

- Panel endorses NOAA's plan to use crowdsourcing as a complement to authoritative sources.

Issue #5: *Facilities on charts*

Recommendation:

- These are not necessary Nav applicable products—would have to be navigationally significant to warrant being applied to the chart.
- Cut down on chart clutter.

Questions from the HSRP

Chair Wellslager asked regarding crowdsourcing—a policy needs to be in place to determine what is the Quality Assurance and Quality Control process and does the data provided meet the standard.

Admiral Barbor replied that NOAA is saying the data is available in identification of hot spots and that they are supplementary data that can add value.

Dr. Kudrna talked about a liability issue with crowdsourcing data. He said there is a liability for NOAA to use these crowdsourcing data, and for recreational boating areas that are not on the priority list to be recharted—some non-NOAA mechanism might be developed and established to provide supplemental information for these areas.

Ed Levine commented on crowdsourcing and that nearly all NY City police boats have state-of-the art hydrographic equipment, but they do not know how to use this technology. Working with the USCG and NOAA's Navigation Manger LCDR Brent Pound they held a training session on hydro surveys for the police officers. He suggested that this could be a more qualified source of getting survey data than from the general public. NOAA could utilize these officers as a resource for surveying if our NRTs cannot respond. Mr. Levine also suggested that NOAA consider putting an NRT on one of these police boats when needed.

Ms. Miller commented that NOAA should have trusted sources of data for validation purposes.

Admiral Barbor responded that the Nautical Charting group discussed the concern of collecting aids to navigation data from various sources such as the Power Squadrons and USCG Auxiliary.

Nicole Bartlett commented that NWS Eastern Region developed crowdsourcing through a low-cost web-based product called Storm Reporter. This product collects storm damage impacts such as photos, data, etc., information that helps state emergency management people deploy resources and helps the NWS calculate their forecast post-event.

Integrated Ocean & Coastal Mapping, Modeling & Resiliency

Issue #1: *Term PORTS implies seaports are the only user, but is a much broader context and characterize its benefits.*

Recommendation:

- Establish a working group to consider name change for PORTS and a broader context for PORTS.
- Use ports as a metaphor—as an information-gathering system to meet many uses.

Issue #2: *Mechanisms and incentives*

Recommendation:

- Top down buy-in of leadership.
- Streamline/expand Agreements and MOUs (Memorandums of Understanding).

Issue #3: *Improve on existing IOCM coordination efforts*

Recommendation:

- Data catalogs, registries for planning, pre-planning.
- Expanding suite of partners, states, regions—such as Sea Grant, IOOS RA (Regional Associations).

- National Coastal Mapping Strategy—coordination is key and a working relationship that ensures that this information is more easily available.

Issue #4: *New Technologies for Ocean Coastal Mapping multiplier effect*

Recommendation:

- UAVs with National Coastal Mapping Strategy, ASVs, other sensors. Some future opportunities for technology advances for making these activities easier.

Questions from the HSRP

Ed Levine commented that he recently attended a meeting at Stevens Institute Department of Homeland Security Center of Excellence that was looking at strategies to protect ports. He said they were looking at different sensor arrays to protect ports. He suggested this could possibly be another add-on opportunity for NOAA's PORTS program to collect this data and integrate it into PORTS through USCG or another system. He said there are new cutting edge technologies that people are looking at.

Dr. Kudrna agreed that the quality and certification of data should be used in a common format and broadly available.

Integrating Federal Emergency Response Efforts for Coastal Resiliency

Captain Swallow briefed the HSRP on the Emergency Response breakout discussions and consensus of the group. Discussions were broken down into themes listed below.

Issue #1: *Is federal agency coordination better or worse post-Sandy?*

Recommendation:

- Increase awareness of NOAA and USACE capabilities, both at FEMA and the local level.
- Travel cost cuts are decreasing opportunities and prohibiting progress that could be made in this area.
- NOAA should get more integrated into the Incident Command System
- Gap—One NOAA voice is needed. One key response person at NOS like the Operations Director—doing the talking for the organization.

Issue #2: *Pre-scripted Mission Assignments (PSMAs)*

Recommendation:

- NOAA has some draft PSMAs, but should implement the PSMAs.
- Some NOAA survey work could be tasked under USACE PSMA—could be explored.
- Remote Sensing Division has experience with the assignment, but it was difficult for NOAA to process the paperwork to get the funding.

Issue #3: *Improve Common Operating Picture across NOAA, other agencies*

Recommendation:

- Good example is that ERMA & Digital Coast is working well.

- Gaps: OMAO ships, Sandy response polygons, need compatible formats and common datum to integrate when necessary.

Issue #4: *Improve Interagency Response Coordination*

Recommendation:

- Explore potential NOAA/USACE MOU on SOPs for survey response to ensure “one voice” to Incident Commander/Captain of the Port.
- SOP for national security/law enforcement events, e.g., Inauguration, OpSail, unidentified objects.

Questions from the HSRP

No questions from the HSRP.

Luncheon Address: NOAA’s Advances in Storm Surge Modeling & Prediction

Dr. Jason P. Tuell, National Weather Service Eastern Region, Director of the North Atlantic Regional Team

Dr. Tuell opened his talk saying he wanted to leave the HSRP with some key take aways. First, NOAA’s goal and vision is a holistic-integrated approach to storm surge modeling. NOAA needs to integrate tide information with surge forecasts—we need inundation forecasts. Second, NOAA needs to integrate tropical and extra-tropical surge into our models—we need to produce surge forecasts. We need to do wave run-up forecasts—it’s the waves on top of the surge that creates a lot of the damage. We need to be able to characterize the impact of waves. Lastly, NOAA needs to make information easily accessible and understandable. During Sandy, when the name was changed before landfall, this affected public perception of the seriousness and what the public can do with the information presented. Data needs to be GIS enabled to fuse with other data sets to enable decision makers to make pre-, during-, and post-event decisions.

Dr. Tuell talked about NOAA’s storm surge and forecast modeling products. With Sandy supplemental funding, NOAA is investing in computer upgrades for more high-speed computing and higher resolution models; investing in observation, more higher resolution bathymetry, and higher LiDAR measurements; physical science research; social science research and surge forecasts. He said NOAA’s goal is to improve these products for prediction, preparedness, resiliency and recovery.

Dr. Tuell talked about the components of NOAA’s model production suite of what users are getting from the Sandy supplemental funding and some benefits to include:

- Storm surge modeling upgrades.
- Acceleration of flood inundation graphics.
- New Tropical Training & Outreach.

Dr. Tuell talked about NOAA's storm surge modeling and how this data can be integrated with tide data to provide a valuable probabilistic tool for decision makers for planning and evacuation purposes. But NOAA needs to do training on how to interpret the probabilistic data. He talked about how NOAA is producing updated surge flood maps and making this information easily available to users and the public. NOAA is also improving its extra-tropical surge and wave run-up forecasting model data to validate what areas are vulnerable to wave and surge impacts.

Dr. Tuell also talked about how NOAA is conducting training and outreach to engage social scientists, emergency managers, and other users on how to interpret this information for decision making in preparation, response and recovery. He said one thing that came out of Sandy is that across NOAA—all offices should use the same datum. He said that NOAA's Ocean Services is working with the NHC to alleviate the confusion over using different datums. These offices will work together and coordinate the use of the same reference data—this data will be on NOAA's Storm QuickLook website. NOAA is envisioning that by 2015, the NHC and Weather Forecast Offices will begin issuing experimental tropical cyclone storm surge watches and warning. This information will greatly assist emergency managers, media, and the public to prepare for and recover from storm events.

Questions from the HSRP

Dr. Jay asked whether for the inundation data you need a detailed grid model—with a storm like Sandy can you really run a detailed grid along 1,000 miles. He also asked is the tide included in the SLOSH model.

Dr. Tuell responded that NOAA is taking harbors and areas of vulnerable coastlines, modeling these areas and creating static inundation maps based on thresholds—you get the surge and tide combined. Dr. Tuell said yes, the tide forecast is included in the PSurge and SLOSH models.

Ms. Blackwell commented on the need for improved DEM (digital elevation models) and the geodetic land side of the data. She said there is information out there that is not up to date, but that NGS is working with NWS to improve the information on the land side for a common geodetic datum. She said from Sandy supplemental funding, the NGS is creating a new vertical datum based on airborne gravity datum the GRAV-D, and they have about 1/3 of the data collected. In 2022, the new horizontal and vertical datum for the nation will enable the use of GPS to get accurate height, and users will be able to reference to sea level and use the datum for DEM and LiDAR—a more accurate measurement. NGS will produce an experimental GEOID model and have GRAVD data incorporated into the GEOID model, and we will know what this new datum will look like and how to apply it and what challenges it will present.

Dr. Tuell stated that when he talked with the storm surge modeling people, they did not reference this new GEOID model. He said that there are some challenges in working in large agencies—not knowing what other programs are doing.

Mr. Perkins asked if NWS uses PORTS data in their modeling.

Dr. Tuell replied that yes PORTS data is used in their ocean modeling data.

Dr. Jeffress talked about water level prediction and tropical storm surge modeling. He said that in Texas they have the densest tide gauge network—they have very good accurate data for these points along the coast. They have been using artificial neural network (intelligence software) to measure the predicted tide level on a point basis. But, they want to add physical parameter data from a point out in the middle of the Gulf. If they could do this, they will get a good idea of what storm surge could be.

Ms. Miller commented that in Hawaii buoys are offshore and used to predict tide levels.

Dr. Kudrna asked about the link to the riverine model, when the surge goes up river does this link to the actual conditions in the riverine, does this add to the flood stage level?

Dr. Tuell replied yes, that the hydrologic models apply wind stress for wind-driven surge on flooding, but it's an area for more investment for a national solution.

Mr. Edwing commented on the NOS and NWS collaboration on the datums and QuickLook products. He said the consistency of how NOAA messages these is important, but partners like the Weather Channel and CNN media centers have embraced this new terminology and using the same terminology is important.

Dr. Tuell said he recognized that partners and other users are part of the external outreach and NOAA must communicate on the same terms.

HSRP Panel Discussion

Matt Wellslager, HSRP Chair

Chair Wellslager presented to the panel for discussion to open the floor for nominations for the HSRP Chair and Vice-chair positions. These positions are elected by the full committee. He opened the floor and there were no further nominations. Chair Wellslager asked for votes on Mr. Perkins to serve as Chair—a majority of votes concluded Mr. Perkins to serve as Chair. Then, Chair Wellslager asked for votes for Mr. Hanson to serve as Vice-chair—a majority of votes concluded Mr. Hanson to serve as Vice-chair. There were no oppositions to the voting.

Dr. Kudrna presented some ideas from the planning committee for the HSRP to consider:

- 1) Develop clear and concise messaging regarding the benefits to the nation and the need to continue and improve the HSRP services.
- 2) Develop an advocacy committee (Vice-chair to “chair” this committee). This committee would communicate the messaging of #1 identified above to the public and decision makers.

Dr. Kudrna discussed that recommendation #1 is modeled after the Science Advisory Board—these working committees get a charge from the Federal Advisory Committee (FAC)—charge talks about what the product will be. This committee would be made up of members of the committee and get advice from outside experts. He suggested that NOAA could schedule hill briefings and take this message to Congressional committees or to the Department of Commerce (DOC). The HSRP could have products and have a process that takes this messaging to a higher level. He suggested that the HSRP establish formal working committees on topics that are appropriate such as the renaming and scoping of PORTS. This could show that broader constituents support PORTS and take the message to a higher level.

There are other opportunities for similar issues—messaging of the HSRP committee on the benefits of what is achieved by the HSRP. He suggested that the panel could bring in communicators to develop a crisp, concise, solid message and have this approved by the full HSRP committee. Dr. Kudrna suggested that this recommendation be developed as a “process” and draft several topics—working with Admiral Glang and NOAA staff to develop a charge and present this at the next HSRP meeting. Dr. Kudrna also talked about interactions of HSRP Chairman and Vice-Chair with other NOAA and federal FACs to share information or attend FAC meetings and to begin to develop a common agenda or products.

Chair Wellslager discussed that these were very good recommendations. He said that he and Mr. Perkins have reached out to other NOAA FACs but that some of the missions were similar and some disparate. Chair Wellslager discussed that the HSRP Planning Committee could develop some ideas for reaching out and/or connecting to what other DOC advisory committees are working on and present this to the full committee.

Mr. Perkins followed up that he and Chair Wellslager did have teleconference calls with the other two NOS advisory committees. He said that the Marine Protected Area (MPA) committee felt that there was not a close connection with their missions. However, the HSRP is coordinating a joint teleconference call with the IOOS DFO to discuss what each other’s committees are doing and working on. Mr. Perkins said he also attended the USCG Navigation Safety Advisory Council (NAVSAC) advisory committee meeting and found that some of the marine navigation issues and challenges were interesting and it was very helpful to find out what external DOC advisory committees in the marine transportation arena are working on. He said that the HSRP is already taking steps to coordinate discussions with other FACs but also suggested that formalizing the working groups and connecting with other FACs could be the missing link to elevating the work products and benefits of the HSRP.

Dr. Kudrna suggested that the HSRP could reach out to the IOOS committee on the topic of certification of IOOS data from their Regional Associations—this could be a perfect segway for common work project areas.

Mr. Perkins said he liked the idea of the working group committees and reaching out to other FACs to discuss potential areas of collaboration. He suggested the HSRP could

think about holding monthly teleconference calls with other FACs and publishing a Federal Register Notice announcing these monthly scheduled calls.

Dr. Kudrna further discussed that with working group committees you could solicit external information and build a network of strong nominees for future HSRP membership consideration.

Chair Wellslager said these were things the HSRP would follow up on and report back to the full committee.

Mr. Kelly raised the discussion of the HSRP educational fact sheet. He said this type of communication is a very good product but should expand on other marine navigation issues. He suggested it's not a good idea to put a Taiwanese ship on a document that is selling American jobs, and that this type of tool should reach the entire marine transportation community—local and regional, in addition to the international maritime community.

Mr. Perkins said that he had used this fact sheet and presented to Congressional committee members as part of legislative briefing he did as a non-HSRP member.

Chair Wellslager discussed that the HSRP fact sheet was a first attempt to have a deliverable for the Administration and recognized that there needs to be more work on the document. He appreciated all comments and input from the HSRP members and is asking the HSRP to rework this document. He said this is a work in progress.

Captain Dempsey said that she has a family member that is a professional business communicator and could help with the verbalization of an HSRP fact sheet.

The HSRP continued in-depth discussions on the listing of recommendations from each of the stakeholder breakout sessions. They talked about how the panel needs to “communicate” their recommendations to generate Congressional funding support for NOAA’s navigation services programs—whether or not this should be with a plan or a strategy of how NOAA could fund specific navigation services. Discussions were that funding needs to be sustained and expanded, that there needs to be a strong branding of NOAA’s navigation services products—the perception of a public good needs to be convincing the right people on the value of the product.

They said the HSRP should develop a plan of action for the NOAA Administrator to embrace or consider such as a strategy or plan. Discussions were that this plan should integrate applications and navigation solutions to meet multiple needs—this should be put together into one package. Coordinated observations may have a better chance for sustained funding. They discussed the HSRP Chair having an annual in-person meeting with the NOAA Administrator to discuss strategy, recommendations, and committee activities. After these discussions, the committee agreed to finalize their recommendations in a report out letter to the NOAA Administrator.

The panel had lengthy discussions around the topic of PORTS and funding issues. They said there are issues with the branding and sustaining funding of PORTS. PORTS started out as a commercial product—it used to be the only system to provide real-time data, but now all systems provide real-time data. There was discussion on how to approach the issue of NOAA to fund PORTS. Discussions were that the panel could develop a plan or strategy of how NOAA can fund PORTS. Suggestion was for NOAA to fund the “sustained” maintenance of PORTS, not necessarily the installation. Further discussions were for the Chair to meet with NOAA leadership and provide an integrated navigation solution that meets multiple needs that can be sold as full funding.

The panel had lengthy discussions around the topic of crowdsourcing as a use for hydrographic data or for charting. They suggested a broader application of crowdsourcing and working with trusted partners. Admiral Glang commented that NOAA Coast Survey could offer the HSRP a webinar presentation on how NOAA is approaching crowdsourcing—how NOAA is using the information and applying it. Admiral Glang suggested that the HSRP also think about “outside source” data—how NOAA is using satellite-derived bathymetry to produce data that can be put on the chart.

There was some discussion on the issue of putting bridge names on NOAA nautical charts. Admiral Glang said that NOAA can sensitize our Navigation manager on this issue—we can educate both our Navigation Managers and stakeholders through the Harbor Safety Committee about how we do name bridges and features. There are some gaps in how we get that information, but there’s some discovery to do and some singular examples of where we can fix this. Admiral Glang suggested that crowdsourcing topic not necessarily be a bullet recommendation.

Another discussion was the concern of the green tint on the chart and that it’s probably something internal for Coast Survey to work on. Admiral Glang said he just received the source document for Penobscot Bay deep water routes that came out of the Maine New Hampshire Ports Safety Committee and was pushed over to USCG and then to OCS. Admiral Glang said he would send to Eric Johannsen how NOAA does this in the context of the ENC. He said OCS is open to discuss this issue.

Admiral Fields raised a concern that there does not seem to be succession planning for NOAA Corps Officers. Chair Wellslager said that he would talk with Admiral Fields and Admiral Glang offline to discuss this concern and whether or not the HSRP needs to consider this topic.

The HSRP agreed on the below recommendations to submit to NOAA for consideration.

Emergency Response for Coastal Resiliency—the panel decided to submit two recommendations forward for NOAA to consider: 1) NOAA should have a detailed Pre-scripted Mission Assignment (PSMA) plan ready for implementation; and 2) NOAA could improve its Common Operating Picture across the agency and with other federal, state, and local agencies.

Updated Nautical Charting and Consistency in Standards—the panel decided to submit two recommendations forward to NOAA for consideration: 1) a modern IOCM model to ingest new data into a database from which ENC's, among other products, are generated and 2) NOAA Office of Coast Survey should coordinate with USACE to develop an efficient mechanism for delivering channel depth information to enhance safety of navigation in federally maintained channels.

IOCM Modeling & Resiliency—the panel decided to submit two recommendations forward to NOAA for consideration: 1) NOAA should prioritize IOCM activities with top-down buy-in, including funding specifically for IOCM project and making IOCM an element in performance measure for appropriate management personnel and 2) NOAA should make it a priority to communicate to OMB and legislators the importance of stable federal funding for PORTS in order to ensure navigation safety and security for the nation and should include federal funding for PORTS in future budgets.

Public Comment Period

John Dasler commented that the issue is not the installation of PORTS, but the problem is the long-term maintenance funding for PORTS. He suggested that there should be a funding source to maintain the PORTS systems that have already been installed.

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Matt Wellslager, HSRP Chair

Chair Wellslager also presented for discussion that with Steve Carmel's resignation there is a gap of commercial shipping representation on the panel. The panel discussed among themselves and agreed that this vacancy should be filled by a high-level representative from the shipping industry. The HSRP DFO suggested that the panel could wait and fill this vacancy when NOAA publishes a notice for solicitation of membership (summer 2014) for five potential vacancies that may occur near the end of the current year. The panel agreed this was the best approach to take to fill this vacancy.

The panel discussed possible locations and strategies for their fall 2014 public meeting location. They discussed that the panel should consider what navigation stressor issues are there at one port location over another. The ended this discussion that their fall meeting should have an "integrated navigation" theme, but they did not reach a consensus on the meeting location.

Admiral Glang stated that he wanted to thank Jeff Carothers and Steve Carmel for their work on the HSRP. He also thanked Chair Wellslager for his service and leadership for the panel. Admiral Glang commented that the HSRP has the full support of NOAA and NOS leadership, and they are supportive of NOAA's navigation services.

Adjournment

The meeting was adjourned at 5:30 p.m.

HSRP VOTING MEMBERS IN ATTENDANCE:

Rear Admiral Kenneth E. Barbor	U.S. Navy (retired), University of Southern Mississippi
Lawson W. Brigham, Ph.D.	Distinguished Professor of Geography and Arctic Policy, University of Alaska Fairbanks & Senior Fellow, Institute of the North
Captain Deborah Dempsey	Columbia River Bar Pilots
Rear Admiral Evelyn Fields	NOAA Corps (retired)
William Hanson	Great Lakes Dredge & Dock Company
David A. Jay, Ph.D.	Professor, Portland State University
Gary Jeffress, Ph.D.	Professor of Geographic Information Science, Texas A&M University, Corpus Christi and Director of Conrad Blucher Institute for Surveying and Science
Ed Kelly	Executive Director, Maritime Association of the Port of NY/NJ
Frank Kudrna, Ph.D.	Kudrna & Associates, Ltd.
Carol Lockhart	Hydrographic Surveying/LiDAR Hydrography
Joyce E. Miller	Joint Institute for Marine and Atmospheric Research, Research Corporation, University of Hawaii
Scott R. Perkins, HSRP Vice Chair	Quantum Spatial Inc.
Susan Shingledecker	BoatU.S. Foundation for Boating Safety and Clean Water
Matthew Wellslager, HSRP Chair	South Carolina Geodetic Survey

HSRP VOTING MEMBERS NOT IN ATTENDANCE:

Steve Carmel	Maersk Line Ltd.
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HSRP NON-VOTING MEMBERS IN ATTENDANCE:

Andy Armstrong	Co-Director, Center for Coastal and Ocean Mapping, Joint Hydrographic Center, University of New Hampshire
Larry Mayer	Co-Director, Center for Coastal and Ocean Mapping, Joint Hydrographic Center, University of New Hampshire
Juliana Blackwell	Director, National Geodetic Survey, NOAA
Richard Edwing	Director, Center for Operational Oceanographic Products & Services, NOAA

DESIGNATED FEDERAL OFFICIAL:

Rear Admiral Gerd F. Glang	Director, Office of Coast Survey, NOAA
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NOAA STAFF PRESENT:

Mike Aslaksen	Chief, Remote Sensing Division, NGS
Dr. Holly A. Bamford	Assistant Administrator, National Ocean Service, NOAA
Paul Bradley	NOS/PPAD
Dr. Russell Callender	Deputy Assistant Administrator, National Ocean Service, NOAA
Ashley Chappell	NOS/IOCM
Tiffany House	NOS/NGS
Rachel Medley	NOS/OCS/NSD
Capt. Shep Smith	Chief, Marine Chart Division, Office of Coast Survey
Capt. John Swallow	Chief, Navigation Services Division, Office of Coast Survey
Kathy Watson	HSRP Program Coordinator
Darren Wright	NOS/CO-OPS

SPEAKERS AND ATTENDEES:

Dr. Alan Blumberg	George Meade Bond Professor and Director, Stevens Institute of Technology
Carrie Grassi	Senior Policy Advisor, New York City Mayor's Office of Long-Term Planning & Sustainability
Rear Admiral Richard Larrabee	Director of the Port Commerce Department, Port Authority of NY & NJ
David Leach	USACE North Atlantic Coast Comprehensive Study
Lieutenant Commander Donna Leoce	Chief, Waterways Management Division, USACE
Captain Gordon Loebel	Captain of the Port of NY & NJ
Captain Jack Olthuis	Executive Director, Sandy Hook Pilots
Julia O'Brien	Emergency Analyst/Geospatial Coordinator, DHS/FEMA Region II
Elaine Mahoney	MidAtlantic Resilience Liaison, Coastal Services Center, NOAA
Tony Niles	Assistant Director for Civil Works R&D, USACE
Dr. Jason Tuell	Director, NWS Eastern Region & NOAA's North Atlantic Regional Team (NART) Lead
John Vickerman	Vickerman & Associates, LLC

PUBLIC ATTENDEES:

Nicole Bartlett	NOAA/North Atlantic Regional Team
Donald Chesley	DBA Stavway Labs
Larry Cocchier	USACE North Atlantic Division
Jason Creech	David Evans & Associates, Inc.
Jon Dasler	David Evans & Associates, Inc.
Ann Fraioli	NYHS/NYHF
Greg Gahlinger	URI Grad Student
John Gerhard	Woolpert
LT Matthew Guanci	USCG Sector NY
Syed Hogue	NY Harbor School
Stan Honey	US. Sailing Americas Cup Event Authority
Eric Johannsen	Tug & Barge Center
Karl Keininger	Maritime Association of the Port of NY/NJ
Kris Kesting	USCG
Jonathan Kemmerley	Delaware Pilots
Ed Levine	Office of Response & Restoration, NOAA
Elliott Loving	NY Harbor School
Ron Ohrel	NOAA/ORR/MDP
Bruce Parker	Stevens Institute of Technology
Brian Limage Puebla	NY Harbor School
Will Rogers	USACE/North Atlantic Division
Jon Sarubbi	NJ Pilot Commission
Ken Schnetzler	USCG Sector NY
Tyler Silvestro	WXY Studio
Aaron Singh	NY Harbor School
Mike Zieserl	JOA Surveys