

Meeting Summary
Hydrographic Services Review Panel
August 30 - September 1, 2016
Cleveland, OH

Tuesday, August 30, 2016

On the call of the Designated Federal Official (DFO), Rear Admiral Shep Smith, NOAA, the Hydrographic Services Review Panel (HSRP) meeting was convened on August 30-September 1, 2016, at the City Club of Cleveland, 850 Euclid Avenue, Room 200, Cleveland, OH. The following report summarizes the deliberations of this meeting. The agenda, 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.

Welcome and Meeting Overview

Bill Hanson, HSRP Chair

The meeting was called to order at 8:31 a.m. Chair Hanson welcomed the attendees and introduced the HSRP's new DFO, Rear Admiral Shep Smith.

RADM Smith encouraged Panel members to advise him on what they felt his role should be in the meeting. The HSRP is an important part of Office of Coast Survey's strategic mission and he hopes the Panel will help guide NOAA in its long-term objectives.

Chair Hanson called for introductions. Dave Holst, NOS Chief of Staff, delivered the oath of office for two new HSRP members, Anne McIntyre and Gary Thompson.

Guest Speakers

Captain Paul Arnett, Chief, Prevention Division, 9th Coast Guard District for the Great Lakes and Saint Lawrence Seaway

CAPT Arnett discussed the 9th Coast Guard District's responsibilities in the binational area of the Great Lakes Region and how they interact with NOAA and NOAA's products. He discussed the organizational structure of the District and their capacities, as well as its close collaboration with its Canadian counterparts. The Coast Guard relies on its partnerships with NOAA, Army Corps of Engineers (USACE), and federal, state and local agencies, leveraging assets to be more effective in performing their missions. Scientific Support Coordinators are a tremendous asset in responding to environmental situations. The Great Lakes' extreme weather makes NOAA's forecasts absolutely essential. The Coast Guard and NOAA worked together to formulate the Cooperative Maritime Strategies to establish priorities in promoting a safe, sustainable marine environment, enhancing regional collaboration, and fostering innovation in science, technology and youth education. The Coast Guard is working with NOAA and the University of Alaska to explore the possibilities of an ice prediction model. He mentioned the difficulty in trying to parse out the divisions within NOAA. Other areas of partnership with NOAA include offshore energy, waterfront development, marine sanctuaries, and invasive species.

CAPT Arnett reviewed HSRP's recommendations to NOAA and expressed the Coast Guard's support for each of the items. He added that the Coast Guard would like a return receipt and tracking option when they report chart errors or discrepancies. The Coast Guard is currently testing electronic aids to navigation (ATONs). They are discovering greater value in them as they experiment but also encountering challenges, particularly with chart clutter. People are rediscovering the nation's waterways as recreational opportunities, making navigational accuracy an absolutely essential safety feature. In addition to increased use by small boats and paddleboarders, marine sanctuaries at the site of shipwrecks have become major attractions to divers. An effort is underway to mark the wrecks with private seasonal buoys that would also provide a safe mooring location.

Member Shingledecker asked what kind of issues the Coast Guard encounters with recreational boaters and how they are working with NOAA to address those issues. CAPT Arnett said that cities across the nation are investing heavily in making their waterways destinations and it has become very easy for anyone to get out on the water without having any understanding of its complexities. The Coast Guard has been working through the recreational communities, marinas, and Harbor Safety Committees to bring some awareness of the dangers large vessels can pose. NOAA's role in this effort is to ensure accurate charting so that large vessels have deep draft water to be in, leaving other boaters outside of its hazardous reach. Member Shingledecker added that virtual ATONs are an exciting possibility but that the vast number of recreational boaters will not have the technology onboard to access that information.

Dr. Mayer asked what the survey requirements are in establishing a shipwreck sanctuary and if they have been fulfilled. CAPT Arnett briefly discussed NOAA's process for establishing a sanctuary and said that there is an opportunity for public and interagency comment. The wrecks are already charted and not all are eligible for buoys to be affixed to them. Of the wrecks being considered for buoy placement, the closest to a shipping channel is about a mile and a half off.

Member Kelly asked if there was anything CAPT Arnett wanted to bring to the HSRP's attention regarding the Coast Guard's interaction with Canadian entities. CAPT Arnett said they have an outstanding relationship with the Canadian Coast Guard, operating as one fleet during the icebreaking season and collaborating on various missions throughout the year.

Josh Feldman, Chief of Operations, Buffalo District, Great Lakes and Ohio River Division, U.S. Army Corps of Engineers

Mr. Feldman discussed the USACE's operations on the Great Lakes and their economic value of the lakes to the nation. The area's navigation system is vastly different from the coastal navigation system. It is a non-linear, interdependent system of 140 deep and shallow draft ports. This requires using a systems approach to prioritizing investments. The Great Lakes system saves the nation \$3.6 billion each year over the next least costly mode of transportation. There are four main categories to USACE's navigation mission on the lakes: dredging; dredged material management; navigation structures; and locks. The lynchpin of the Great Lakes' navigational system is the Soo Locks, which connect the upper and lower lakes. 70% of the commercial commodities transiting the Soo Locks are limited by the size of the aging Poe Lock. There is currently no redundancy for the Poe Lock. The economic impact of a 30-day unscheduled closure of the Soo Locks would amount to \$160 million. Through the O&M program, two major efforts are underway to improve reliability of the Soo Locks: maintaining an existing Asset Renewal Plan and constructing a new lock with the same dimensions as the Poe Lock. USACE tries to address all of the harbors that see commercial traffic on the lakes and Congress has begun providing additional discretionary funding to address harbors that may not be in the President's budget. Although 2014 and 2015 were good funding years for the lakes, funding for recreational harbors has been historically declining and it is not expected to improve any time soon. Dredged material management is the Corps' most challenging issue. There is very little capacity left in confined disposal facilities, and rather than putting it into the open lake, they are looking at other ideas for sustainable, large-volume

disposal. Great Lakes navigational structures are deteriorating with over 80% exceeding their typical 50-year design life. 45% of these structures have never undergone any significant repair efforts due to funding constraints. The Water Resources Development Act has directed Congress to renew focus on the Great Lakes and navigation funding is starting to trend in a more positive direction, getting closer to a sustainable funding range.

Chair Hanson asked about the District's annual capacity and how much extra funding they would be ready to put to use if it were made available. Mr. Feldman said that 90% of USACE's work is done by contract and the contractors' capability determines how much can be done. About \$160-170 million of extra funding could be put to use immediately, which is far more than can be reasonably expected.

Vice Chair Miller asked Mr. Feldman to outline what NOAA's most important services are to the Corps. Mr. Feldman said USACE has a robust hydrographic surveying capability that complements NOAA's products. Providing project condition surveys requires NOAA gauges and charting. NOAA's data and resources are invaluable to the Corps mission.

Member Perkins asked what new technology USACE is embracing on the Great Lakes to bring more efficiency into their hydrographic surveying. Mr. Feldman said USACE has some ROV capability and they are looking into unmanned aerial vessels. USACE has made the greatest advances by staying at the state-of-the-industry in vessel mounted equipment and software. All of their crews are multibeam survey-capable and the Corps recently recapitalized their fleet to ensure reliability in difficult weather conditions. Because of these changes, USACE has shrunk its crew sizes and produced more data in a given year than ever before.

Member Lockhart asked if the hydrographic data the Corps collects is submitted to NOAA for charting. Mr. Feldman said they do not explicitly provide it to NOAA but it is available through USACE's website in multiple formats. He recommended having a link to USACE data on the NOAA charts. Because the Corps' data is enormous and updated regularly, it probably makes more sense for NOAA to link to it rather than USACE feeding it to NOAA. RADM Smith said he is very interested in improving this process and would follow up with Mr. Feldman.

Member Brigham asked about the extension of the navigation season and the impact on the Soo Locks. Mr. Feldman said that the ice closure season is well-coordinated with Coast Guard and the lake carriers, but it is primarily driven by maintenance requirements. There is a lot of push to keep the outage as low as possible by getting as much maintenance work in while the locks are operating.

Dave Holst, Chief of Staff, NOS, NOAA

Mr. Holst said NOAA leadership recognizes the importance of HSRP in providing innovative ideas on how NOAA can improve its navigation programs, products, and services. The Panel's guidance also helps to shape and define NOAA and industry roles in a thoughtful and effective manner for both independent and collaborative efforts. NOAA looks forward to RADM Smith's leadership in OCS and in his role serving as the Panel's DFO. The upcoming Presidential election will bring new political leadership to NOAA. This will require those within NOAA to forge relationships with the new team and educate them on OCS and the importance of the products and services they provide. The transition process will begin almost immediately after the election. Mr. Holst encouraged the HSRP to begin thinking about how to strategically message to the next Administration the unique value of the Panel and of NOAA's hydrographic products and services. He commended the Panel's work on the issue papers that have been published and looked forward to the next round of papers and to hearing from the Panel on how best to maximize their impact, particularly with the upcoming transition. NOS shares the HSRP's concern about the aging hydrographic survey vessel fleet. The effort is starting to gain Congressional support and is a major priority going forward.

The House and Senate Appropriations Committees have passed the FY17 NOAA funding measures, both of which came in below the President's budget across the board for NOS. The House proposed \$11.8 million below the President's budget; the Senate \$2.5 million below. An \$11.8 million reduction would obviously have significant impacts on NOAA's hydrographic products and services. A continuing resolution will almost certainly be in place to start the year, so NOAA will be operating on FY16 funding levels until a budget is passed.

NOS is a partnership-based organization and that is evident in the Great Lakes region. Mr. Holst was pleased to announce a new partnership between CO-OPS and the Lake Carriers Association to maintain support for sensors on the Cuyahoga River. Without this support, those sensors would likely have gone out of operation. He highlighted some of the various activities in the region including the Great Lakes Environmental Research Laboratory (GLERL), two National Estuarine Research Reserves (NERRs), National Marine Sanctuaries, CO-OPS' Harmful Algal Bloom (HAB) Forecasts, the Great Lakes Coastal Forecasting System, Great Lakes Observing System (GLOS), and LIDAR technology development to help support nearshore areas on nautical charts. Electronic navigation charts (ENCs) for the Great Lakes region should be completed by the end of 2017. OCS has launched the final phase of its Chart Tile Service, which provides users faster and more frequent updates.

Chair Hanson asked which positions in NOAA will turnover with the change in Administration. Mr. Holst said the political leadership consists of the Administrator, the two Assistant Secretaries, Chief of Staff, Chief Scientist, and several staffers.

Member Brigham commented on the ominous financial numbers presented and said it is clear that the Panel needs to redouble their efforts emphasizing the economic security issues related to these services. It will also be important to stress the Arctic's hydrographic needs to the new Administration.

Mr. Edwing presented a plaque to Glen Nekvasil, Vice President, Lake Carriers Association, commemorating the establishment of the Cuyahoga River PORTS.

Navigation Services Program Updates

Rich Edwing, Director, Center for Operational Oceanographic Products and Services

Mr. Edwing discussed the seven-year effort to update the International Great Lakes Datum (IGLD). The project has been a bilateral coordinating effort with Canada. GLERL has been assisting with education, communications, and outreach, as well as helping to identify and connect with stakeholders. The IGLD combines the geodetic and water level datums. A large component of this relies on seasonal gauging. The need for the update is due to the fact that the Great Lakes are tilting, with the western end still rebounding from glaciers retreating a millennium ago and the eastern end subsiding. The update project will begin in 2017.

Mr. Edwing discussed CO-OPS' FY16 efforts and accomplishments, including: enhancing the NWLON network, particularly the transition to microwave water level sensors; the ongoing large-scale current survey in Puget Sound; VDatum water level surveys in the Pacific Northwest; new PORTS added to the network in Savannah, Cape Cod, and on the Cuyahoga River; enhancements to current sensor technology; enhancements to the Lake Erie Operational Forecast System; the development of a Lake Erie HAB Forecast Initial Operating Capability for a new HAB Model; development of a beta Inundation Dashboard product for Hampton Roads, New York City, and Coastal North Carolina. CO-OPS has developed a formal training program on sea levels and coastal resiliency, as well as a regional sea level trends product to assist coastal communities without a long-term tide gauge. Observation Network partnerships in FY16 included collaborating with NWS to install a new Arctic water level station in Unalakleet, AK, working

with National Park Service on long-term sea level monitoring networks, and operating and maintaining the Texas Coastal Ocean Observation Network.

Mike Aslaksen, Chief, Remote Sensing Division, National Geodetic Service

Mr. Aslaksen presented on behalf of NGS Director Juliana Blackwell. NGS' major effort has been the replacement of NAD 83 and NAVD 88 and the related projects to ensure the 2022 transition will go smoothly. He discussed the international collaboration to ensure consistent terminology and approaches. A geodetic slope validation survey will be conducted in FY17 to ensure NGS is using the correct approach. NGS has a quarterly National Spatial Reference System (NSRS) newsletter that HSRP members should read to stay up to date on the progress of updating the datums. NGS will host the 2017 Geospatial Summit on April 24-25 in Silver Spring, MD.

Airborne gravity has been collected for over 53% of the US, a critical component to the vertical datum update. In addition to manned aircraft, NGS has successfully tested unmanned systems. NGS hosted an International Airborne Gravimetry for Geodesy Summer School offering training to participants from 14 countries. NGS has completed its transition to a Regional Geodetic Advisor Program to further its customer engagement efforts. NGS has also been releasing short educational videos in layman's terms to inform stakeholders and the public on a variety of topics.

Mr. Aslaksen reviewed NGS' FY16 VDatum accomplishments, coastal mapping accomplishments (10,783 miles of shoreline mapped, 37 ports updated, 35 ports analyzed for change), georeferenced oblique imagery collected in Alaska and around the Great Lakes, and topographic bathymetric (topobathy) LIDAR projects focused primarily on Puerto Rico and off of the Florida coast. NGS is seeing more requests for imagery during response efforts.

Rear Admiral Shep Smith, Director, Office of Coast Survey

RADM Smith discussed the drivers shaping NOAA's navigation products and how partnerships with the commercial industry and other governmental agencies will bring navigation into a new era. OCS is looking more closely at the decisions their data is supporting and adjusting its approach accordingly. For the last 25 years attention has been focused almost exclusively on deep draft traffic going into ports. The remaining work on that issue is less compelling than what has already been accomplished, whereas the work that has been pushed aside over the last 25 years has left coastal charts badly out of date. The resultant chart clutter has trained users to ignore potentially serious hazards. Smaller waterways serve our coastal communities and drive the vitality of their economies; the aggregate impact of recreational boating and small commercial boats is huge, but justifying the same level of care/expense for less economically impactful users is a challenge. OCS is looking to partnerships and remote sensing to address these users' needs these more efficiently. More detail is now being included on ENC's than could be put onto paper charts. In addition to chart clutter, ENC users often complain of too many alarms, discontinuous depth areas, and unclear symbols. OCS is looking towards an ENC 2.0 that goes back to source for a lot of these issues. This will be a big effort but crucial to medium-term planning for improving chart products. This effort will include validating recommended courses.

RADM Smith discussed some of the recent work with satellite-derived bathymetry, unmanned surface vehicles, and crowdsourced bathymetry. OCS has been working to improve the network between them and the chart production distribution chain in order to enhance the end-user experience.

Dr. Larry Mayer and Andy Armstrong, Co-Directors, NOAA/University of New Hampshire Joint Hydrographic Center, Center for Coastal and Ocean Mapping

Dr. Mayer provided an overview of the Center for Coastal and Ocean Mapping (CCOM) and Joint Hydrographic Center (JHC). Operations began in January of 2000 and have continuously expanded. In

2010 and 2015, JHC was awarded federal funding for five years to further its goals of being a world leader in the development of hydrographic and ocean mapping technologies and approaches, as well as to expand the scope of ocean mapping clients and constituencies through the development of innovative applications and collaborative work with both the private sector and government labs. JHC works to educate a new generation of hydrographers and ocean mappers that can meet the growing needs of both government agencies and the private sector. UNH won a competition sponsored by the Nippon Foundation and GEBCO to train bathymetrists from around the world, creating a wonderful network of hydrographers for UNH, NOAA, and their partners. JHC's primary customer is OCS. CCOM is strictly a UNH entity, independent of NOAA and free to enter into contracts/grants with many organizations. JHC and CCOM are complementary centers both with an emphasis on the use of visualizations and tank facilities. Dr. Mayer described some of UNH's vessels and their capacities. Research themes at the Centers have been focused on sensor technology, data processing, seafloor and habitat characterization/water column mapping, visualization, the chart of the future, Law of the Sea mapping, and the Integrated Ocean and Coastal Mapping program. Programmatic priorities outlined in 2015 Federal Funding Opportunity that JHC was awarded include innovate hydrography; transform charting and change navigation; explore and map the continental shelf; develop and advance hydrographic and nautical charting expertise. Each of these items have research requirement prescribed to them in the FFO. The FFO also directs JHC to look into the potential impact of sonar systems, particularly multibeam, on marine mammals. Dr. Mayer discussed some of the projects underway on these four priorities, as well as education and outreach.

Member Saade asked when the research on sonar and marine mammals would be available. Dr. Mayer said they are currently going through a NEPA process, at the conclusion of which he believes that they can make their findings public. Mr. Armstrong added that there are two components: the regulatory process allowing the researchers to proceed with their echosounding and then the research goal of a more generalized understanding and modeling. It will probably be 6-12 months before they get through their internal regulatory issues. Member Saade suggested speaking with industrial partners for vessel platforms from which to conduct their research.

Member Brigham suggested that the partnerships outlined by the panelists be cited as examples of successful public-private, federal-state, and interagency partnerships in the Panel's letter to the Administrator. Chair Hanson added inter-academic partnerships to the list.

Great Lakes Navigation Challenges Panel

Glen G. Nekvasil, Vice President, Lake Carriers Association, introduced and moderated the panel. He briefly discussed the kinds of cargo being moved on the Great Lakes. 135-142 million tons of dry bulk cargo a year transit the lakes. Iron ore, coal, limestone, and grain make up the largest portion of tonnage, but salt, cement, and gypsum also account for a large part of cargo on the lakes. The industrial significance of these materials and the volume of cargo moved on the Great Lakes is why NOAA is charged with providing so many services to the region and why those services are so important to the nation.

Betty Sutton, Administrator, Saint Lawrence Seaway Development Corporation, Department of Transportation, discussed the operations of the St. Lawrence Seaway Development Corporation (SLSDC) and related innovations in vessel traffic management. The SLSDC is a government organization housed within DOT that operates the St. Lawrence Seaway transportation system, maintaining locks and infrastructure in the seaway, in addition to their trade development and economic activity missions. The St. Lawrence Seaway is an environmentally sensitive transportation route providing maritime access to 1/5th of the world's freshwater, almost 1/4th of the continent's population, and 1/2 of America's Fortune 500 companies. The economic benefits of maritime activity in the Great Lakes/St. Lawrence Seaway system annually sustains 227,000 jobs, \$22.6 billion in business revenue, \$14.1 billion in wages, and \$4.6

billion in taxes. A major binational recapitalization effort is underway to rehabilitate and modernize the system. The Draft Information System (DIS) Initiative was undertaken to explore the use of technology as a means to safely prevent or delay draft reductions and, when possible, make better use of the available water column. AIS messages were modified to transmit and flag estimated water level readings. The system approximates the squat of ships in a given navigation environment and provides a look-ahead feature informing the mariner of the minimum distance that it would take a vessel to come to a full stop. The benefits of the new technology include increased safety, improved traffic and fleet management, climate change mitigation, and increased productivity and competitiveness of the Seaway. As of the beginning of the 2016 navigation season, there were 43 vessels equipped with DIS in the St. Lawrence Seaway.

Member Kelly asked if the DIS carried any immunity from liability or whether ship owners are using the technology for informational purposes only. Ms. Sutton said there is no sovereign immunity; the SLSDC allows for its use but does not mandate or operate it. Mariners are responsible for ensuring that the DIS is used to its technical specifications. Member Kelly said the integrity of the data is the main issue. Ms. Sutton said most of their survey information comes from the Canadian government.

Vice Chair Miller asked if there have been any cross-links between NOAA and the DIS system. Gary Magnuson, NOAA, said there had been some interplay between NOAA and the DIS program and that it may be time to revisit that. RADM Smith said that LA-Long Beach's Precision Navigation System was inspired by DIS, but for reasons raised by Member Kelly, they decided not to take on the DIS project. Ms. Sutton added that this is an example of where, because of their size and structure, the Seaway corporations can innovate in ways that others cannot.

Mr. Edwing asked if an economic benefits study has been conducted on their use of DIS. Ms. Sutton did not believe any existed.

Captain George P. Haynes, Vice President, Lakes Pilots Association, Inc., discussed Great Lakes weather and commercial navigation. After polling lake pilots on which NOAA products they are using he found that older navigators tend to use text-based products and younger pilots lean towards web-based interactive products. In his own experience, he finds the Operational Forecast Systems to be the most useful product. A major issue for pilots on the Great Lakes is that foreign ships often do not have the equipment to link to NOAA data, leaving pilots reliant on their smart phones. On the open lake, a pilot can be out of reach of cell service for 12-14 hours with only VHF weather reports. Including water levels and wind speeds/directions on NWS radio broadcasts would give pilots a better idea of lake conditions and reduce costs for industry users. CAPT Haynes described the seiche effect that Lake Erie is prone to and presented Toledo as a place that could really benefit from PORTS. Water levels in Toledo can drop 4-5 feet in a matter of hours and the seven bridges create many clearance issues. He described the Maumee River currents and how critical the current meter there has been.

CAPT Haynes recommended: (1) Continue maintaining the Toledo/Maumee River current meter; (2) broadcast water levels and wind speed/directions on NWS VHF continuous broadcasts; (3) develop more PORTS for the Toledo, South Chicago (Calumet River), Milwaukee, and Duluth.

Mr. Edwing said CO-OPS will work with NWS on broadcasts and asked if boats on the open lake are able to receive AIS data. Captain Haynes said they do get AIS but because the pilots are on all types of ships (including foreign) the equipment is not always reliable. Mr. Edwing said CO-OPS is working with the Coast Guard to integrate PORTS, water level, and maybe even modeling data over AIS. The current meter on the Maumee was installed as a demonstration project and there will come a day when CO-OPS will not be able to continue operating it without O&M money.

Mike Piskur, Program Manager, Conference of Great Lakes and St. Lawrence Governors and Premiers, discussed a regional strategy for the Great Lakes-St. Lawrence Maritime System. The maritime system is the backbone of the region's \$5 trillion economy. The conception of the lakes and St. Lawrence Seaway as a system has informed the strategy developed by the Conference. The Conference has identified some of the system's critical component and what investments can be made that will have the greatest return on investment for the entire region. A task force charged with developing recommendations for improving the efficiency and competitiveness of the system highlighted the need for a maritime system inventory, regional priorities, and the creation of a regional maritime entity. The task force became this entity and will coordinate regional maritime governance on behalf of the states and provinces. They are also charged with developing a regional maritime strategy built around the Governors' and Premiers' priorities and goals of doubling maritime trade, shrinking the environmental impact of transportation, and supporting the region's industrial core. This has been a collaborative process including government, NGOs, and other partners. Mr. Piskur outlined some of the 40 recommendations of the strategy. He looks to NOAA's tools to be able to better inform current conditions and assess the viability of expanding the shipping season. NOAA's involvement would be also beneficial in the effort to acquire better metrics on system performance. The regional strategy is available online at www.cglslp.org.

Chair Hanson, who participated in the Conference, said that the process was very enlightening. One of his biggest takeaways from the meetings was optimization of the seasons. He asked each of the panelists to discuss the seasonality of their business. Ms. Sutton said that an extended season would not necessarily translate into more volume with dry bulk cargo, but since there has been some diversification in the ships on the Seaway there is more interest in the potential benefits. Mr. Nekvasil said that the season is already 11 months for domestic lakers, to extend it further would definitely require more Coast Guard icebreaking resources. One of their goals is to get the federal government to build at least one additional heavy icebreaker for the Great Lakes. Canada used to have seven permanently stationed on lakes, now they only have two, both of which are coming to the end of their lives. He said that in addition to the environmental considerations, time is needed for boat maintenance. Mr. Piskur said that a particularly cold winter recently resulted in \$350 million of lost business on the US side due to halted shipping, whereas one icebreaker costs about \$250 million. The closure of the system for the winter is probably the single biggest barrier to increased container shipping on the Great Lakes. CAPT Haynes said that international freighters have sufficient horsepower to move during winter, the problem is the locks. Another issue for international freighters is that they line cargos up two months in advance and if conditions are worse than expected a lot of their cargo may get left on the dock.

Vice Chair Miller asked to what extent the lakers are ice-strengthened. Mr. Nekvasil said that a number of them have ice-strengthened bows, but icebreakers are still needed because the cargo ships are designed to maximize carrying capacity not break ice.

Adjournment

The meeting was adjourned at 2:40 p.m.

Wednesday, August 31, 2016

The meeting was called to order at 8:07 a.m.

Chair Hanson welcomed everyone to the second day of the meeting and Vice Chair Miller provided a recap of key points from the previous day's sessions. Chair Hanson noted that the Panel had not yet received a response from the NOAA Administrator on the Panel's previous Recommendation Letter. Mr. Aslasken suggested trying to reinstate a quarterly or biannual meeting between the HSRP Chair and the Administrator.

Discussion

HSRP Planning and Engagement Working Group

Vice Chair Miller reviewed the three issue papers submitted after the Panel's previous meeting covering the topics of NOAA's need for hydrography vessels, the Hampton Roads Regional Pilot Project, and Arctic issues. She read each of the papers the HSRP is currently working on and led a discussion of each paper.

Hydrography, A Core NOAA Mandate

The Panel had previously agreed that all of the recommendations that could fit into two pages have been included. The Panel wordsmithed the hydrography paper and discussed whether the title should be changed to Ocean and Coastal Mapping. Given that hydrography is included in the HSRP's name they decided to use it. Member Maune said that this paper has received a lot of feedback already and is ready to go. Pending some minor edits, the paper was approved.

Replacement of the North American Datum of 1983 and the North American Vertical Datum of 1988

Member Maune recognized that paper recommends what NGS intends to do anyway, but he felt it was important to emphasize to the Administrator and anyone else that may read it that major changes are coming. Member Thompson asked Mr. Aslasken if the statement "all state plane coordinates systems will change" should be left in given that there is a possibility some states will keep their coordinates systems. Mr. Aslasken suggested stating "will or will not change" and to further stress the need for a push at the state legislative level across the nation. On the issue of whether or not the paper was too technical, Member Maune said that he felt it was necessary to convey some of the complexities involved in the process. Dr. Mayer and others said that the technical detail was appropriate but the paper needed some way to connect the issue to people's everyday lives, particularly users of common technologies like GPS. Member Hall agreed to work on an opening line.

PORTS

Vice Chair Miller said the Panel has been struggling with this paper. It is very important to certain stakeholders. The paper addresses PORTS, Precision Navigation, and high-resolution bathymetric surveying in a very shortened form. Member Brigham suggested citing sources for the statistics included in the paper. Helen Brohl, Committee on the Marine Transportation System, commented that the commonly stated "95-99% of US trade is on water" is incorrect; that is a world transportation number. For the US, 72% of international trade by volume and 44% by value is maritime, according to Bureau of Transportation Statistics. Vice Chair Miller said that NOAA could help in the final edit to ensure the cited numbers are correct. Dr. Mayer said that it is critically important that the numbers align with other numbers cited by NOAA to avoid undermining credibility. Vice Chair Miller said that the paper could be

followed by individual papers addressing PORTS, Precision Navigation, and bathymetry. Member Kelly said there are many overlapping issues and space considerations makes tackling this complex issue very challenging. Some of the overview and background information may be extraneous given the target audience. He suggested making one PORTS paper and one Precision Navigation and bathy paper so that more detail can be included, including the need for expanded modeling and forecasting and identifying users beyond commercial maritime. He added that the paper needs to state clearly that PORTS should be a federal obligation. Member Brigham and others agreed that the paper should be entirely focused on PORTS, followed by a more technical paper addressing Precision Navigation and bathymetry. Member Shingledecker recommended inserting a graphic that displays where PORTS is needed and where its funding situation is vulnerable. Certain Panel members will meet with NOAA staff to prepare a PORTS-only paper for the Panel's consideration at the following day's session.

Future Issue Papers

Vice Chair Miller said that a Precision Navigation paper will need to be drafted; Member McIntyre will take the lead on it. Member McIntyre presented a demonstration of how information received over AIS is used by Columbia River Pilots and the importance of being able to layer and integrate information. RADM Smith said that if this is the right model for displaying the information, OCS should change their approach and include more information at lower cost through official navigation distribution channels. Member Kelly said that the issue of data is how it is processed; the beauty of these charts is that the user can layer based on their needs. Vice Chair Miller said the Panel keeps hearing that recreational boaters do not know where to get the information they need. Member Shingledecker agreed and said that if there is a way to make NOAA's products more dynamic that would be great. Member McIntyre said the points she would like to cover in her paper would include accuracy, the need for an understanding of what the data is based on and how it is integrated. CAPT Smith, US Coast Guard, suggested including whether NDGPS is valuable.

Member Saade said the Technology Work Group is still working to decide what to focus on in its paper. Member Shingledecker said the earliest she could get a draft paper on recreational boating would be in January. Vice Chair Miller suggested a paper on NOAA's or OCS' role in emergency response, and agreed to start the paper. Member Kelly said he would help, citing the lessons learned from Superstorm Sandy. The issue is very broad and it may be limited to an informational paper.

RADM Smith commented on the Circuit Court ruling on the liability for the Athos tanker grounding and oil spill. As the government's hydrographic services are currently organized, it is nobody's responsibility to do object detection surveys in channels. Some of the most critical waterways in the US are surveyed at a lower standard than many coastal areas. RADM Smith has had high-level conversations with USACE on the subject, but there is not yet a clear path forward. Member Brigham said the topic of overlap and underlap between federal agencies might make a useful paper; Chair Hanson will take the lead on this paper.

Hydrographic Services: The Foundation of Great Lakes Water Resources Management and Restoration Panel

Deborah H. Lee, Director, Great Lakes Environmental Research Laboratory, NOAA, introduced and moderated the panel. She briefly described what makes the Great Lakes unique from the ocean coasts

and how NOAA services are foundational to the management of the Great Lakes. GLERL anticipates numerous challenges for the watershed in the coming generation, including a growing population, increased demand for water withdrawal, and the need to continue to prepare for a changing climate.

John T. Allis, Chief, Great Lakes Hydraulics and Hydrology Office, U.S. Army Corps of Engineers Detroit District; U.S. Chair, Great Lakes Coordinating Committee, discussed Great Lakes water level testing and forecasting. USACE is the US lead for international water level regulation on the Great Lakes, producing official coordinated lake level forecasts, providing technical expertise to the International Joint Commission's Great Lakes Boards of Control, measuring flows in the connecting channels, and monitoring hydrologic conditions of the Great Lakes. He highlighted the control points on the lakes. The Lake Superior Control Works on the St. Mary's River is the true outflow point for Lake Superior. The Soo Locks, gated structures, and hydropower plants are used to control the outflow from Lake Superior and are the only regulation for Lakes Huron and Michigan. Lake Ontario Control Works on the St. Lawrence River controls outflow from Lake Ontario, while an International Control Board ensures treaty minimums of water flow from the Niagara River into the lake are met. Even with the control points, nature drives the direction of water levels for all of the lakes. The guiding principle for the binational boards of control is trying to keep Lakes Superior, Michigan, and Huron's water levels as close to the long-term average as possible. In order to do understand the water balance of the Great Lakes, the boards need to better understand lake precipitation and evaporation, which is very difficult to measure. NOAA has installed eddy covariance meters to measure the fluxes and translate that data into evaporation. This is starting to fill a major information gap. Runoff from the lakes into the watershed is another area with very limited available information. NOAA and Canadian gauges provide extremely important datasets for developing lake-wide average levels. Water levels on the connecting channels are important to monitor as well for conveyance changes. Mr. Allis discussed the glacial isostatic adjustment occurring in the region and the need to understand how water levels are changing relative to the datum of the lake. The Coordinating Committee of Great Lakes Basic Hydraulic and Hydrologic Data is composed of US and Canadian federal agencies key to water management on the lakes; they coordinate key data in support of regulation to include water levels, precipitation, evaporation, datums, and flows.

Member Kelly asked if, absent controls and regulation, the Great Lakes are rising or falling and what the projection is for the future. Mr. Allis said there isn't a clear trend in one direction; water levels have been fluctuating between extremes and predictions suggest this will continue. Member Brigham asked if the observing network is up to the task of providing the necessary information. Mr. Allis said that modeling enhancements are needed in order to answer questions of predicted over lake precipitation, evaporation, and runoff.

Ms. Lee said that one of the challenges they had while conducting a large study to understand why Lake Huron was falling relative to Lake Erie's water levels was that complete hydrographic surveys of the entire St. Clair River were not available. They have not been able to answer questions about when, where, or why the channel has changed.

Helen Brohl asked if there are other regional versions of the national hydrologic data groups elsewhere in the country and how the information the Corps gathers is fed into a national observational network or historical data records. Mr. Allis said that the data they collect is very regional and does not tie into the

national Corps picture. They have been pushing for their information on subjects like gridded precipitation estimates to be included as part of NOAA's comprehensive dataset.

Robin Russell-Trinko, Passenger Vessel Association, submitted a question from the webinar: Does the Corps monitor lake temperatures and/or invasive species? Mr. Allis said that the Corps does not but GLERL tracks lake temperatures.

Member Saade asked if the lake level fluctuations are a relatively new phenomenon. Mr. Allis said it varies by lake. The historical range of water levels for Lakes Michigan and Huron over the last hundred years is about six feet. If you look back every decade or so, water levels do tend to fluctuate within that range. Man's intervention has not been a driving factor on these two lakes, but Lakes Superior and Ontario have had much more compressed ranges.

Dave Conner, NGS, said there will be a new International Great Lakes Datum related to the overall American datum but developed in conjunction with Canada. NGS has not yet determined what the differences in elevation will be.

Thomas R. Crane, Deputy Director, Great Lakes Commission, discussed collaborative efforts addressing regional sediment management, dredging and nearshore restoration challenges in the Great Lakes. Two topics he wanted to emphasize were the importance of partnerships in the Great Lakes region and how critical NOAA and NOAA's data are to those partnerships. The Great Lakes Commission is an interstate compact agency composed of 3 to 5 Commissioners appointed from each Great Lakes state or province to promote the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes basin. Mr. Crane highlighted some of the regional collaborations and how NOAA interacts with and supports these working groups, including GLRI, Great Lakes Water Quality Agreement, GLOS, HABs Collaboratory, and Great Lakes Dredging Team (whom Mr. Crane has been working to get NOAA more engaged with as a full member). NOAA's observing systems, ecosystem dynamics and ecological monitoring, and water level monitoring network are all vitally important to Great Lakes management and restoration. Mr. Crane's recommendations to NOAA for support in Great Lakes restoration were: (1) update Environmental Sensitivity Index Maps, (2) maintain an in-basin presence of Navigation Team staff for the Great Lakes, and (3) maintain real-time flow meters in the Maumee, Cuyahoga, and St. Clair Rivers. Mr. Crane also requested that NOAA ensure the Great Lakes receive the same attention as ocean coasts, that GLRI funding does not supplant the base funding necessary to support programs, and that programs are coordinated across the different branches of NOAA. NOAA should also have a stronger nearshore program in the Great Lakes built upon the successes of GLRI and coordinated with NCCOS.

Mr. Aslasken said that lake level shoreline data, the basis for Environmental Sensitivity Index Maps, is available and simply needs to be updated with the classification type by the Office of Response and Restoration. NGS is also collecting oblique imagery of the Great Lakes, which will be publicly available once complete. Mr. Crane said that Canada has been doing risk assessments and "ESI-light" and it is important to coordinate those activities so that the approach is as consistent and uniform as possible.

RADM Smith asked for elaboration on the value of flow meters in the rivers. Mr. Crane said the GLC works to help support the stream gauge network nationwide. In addition to supporting navigation, the flow meters can be used for nearshore work. Ms. Lee added that the St. Clair River stream gauge is the

only real-time flow measurement in that connecting channel. It also provides year-round information which is rare in the Great Lakes. In the Maumee and Cuyahoga Rivers it is helpful for measuring nutrient loading.

Chair Hanson asked which universities in the region are most interested in coastal issues. Mr. Crane said that the land-grant universities from all of the states are heavily involved in this work. He specifically mentioned the University of Michigan, Michigan State University, The Ohio University, University of Wisconsin, and Purdue University. Many universities are playing a key role in nonpoint HAB research.

Member Brigham commented that the US Coast Guard icebreaker fleet is an underutilized resource for wintertime observations.

Jackie Adams, Environmental Scientist, Great Lakes Restoration Initiative, Great Lakes National Program Office, U.S. Environmental Protection Agency, discussed the use of NOAA's hydrographic services by EPA and GLRI. As of FY16, approximately \$2 billion in funding has been allocated to GLRI to address the most urgent issues facing the Great Lakes. In accordance with their action plan, specific measures of progress have been developed to track all actions implemented. Under Action Plan I, GLRI resources helped fund the cleanup actions required to delist five Great Lakes environmental degradation areas of concern and to formally delist the Presque Isle Bay area of concern, among other projects. GLRI's Action Plan II focus areas such as toxic substances, invasive species, and nonpoint source pollution impacts on nearshore health, habitats, and species, and foundations for future restoration actions. Since its creation, GLRI has helped to supplement some of NOAA's hydrographic services, which have accelerated getting those products operationalized. The EPA and other federal agencies use NOAA's bathymetry for navigational information and charting courses, as well as for determining sampling locations and for targeting specific depths to capture a range of depositional regimes. GLRI's hydrographic services collaborators would like to have included up-to-date bathymetric data of at least Lake Superior and bottom mapping of the nearshore and open water areas. Updated bathymetry would aid in sample design and ultimately lead into habitat classification. International agreements have highlighted the need for bottom mapping. To fully address Annex 7 of the Great Lakes Water Quality Agreement, the US and Canada need to jointly support an integrated remote sensing delivery system to develop habitat assessments over the entire basin. Information needed to meet this goal include wetland change mapping, water extent and elevation change mapping, invasive species mapping, sonar for detailed mapping of deep water habitats, and seamless topographic-bathymetric LIDAR for coastal zone areas and inland wetlands. NOAA and USGS have developed a Great Lakes Bottom Mapping Work Group to address these needs but investments in a regional fleet may be needed. Other NOAA data that supports GLRI implementation includes operational forecasts for HABS, runoff risk advisory tools, nutrient information, and circulation models.

Vice Chair Miller asked if an OCS staff member was part of the Bottom Mapping Work Group. Brandon Krumwiede, OCM, said that he was a part of the ad hoc group and it is open to anyone that is interested.

Member Saade said that Canada has collected hydrographic LIDAR and asked if that data has been made available to the panel members. He said that something similar to the IOCM map that shows where data is being collected would be useful. Ms. Lee said that one of the things they struggle with in the Great Lakes is how to make everyone aware of what data is available. Mr. Krumwiede said he has been in regular contact with Ms. Chappell and the needs that they hear of will be fed into SeaSketch and IWG-OCM.

Member Brigham recommended including the panel's needs for improved modeling and observations in the letter to the Administrator.

RADM Smith said the panel made a great case for bathymetry and asked what resolutions would be needed for the various projects. Ms. Adams said fine-scale high-resolution bathymetry is needed for habitat and substrate mapping, but any additional data that can be provided would be useful.

Member Perkins asked if GLRI resources could be used to fund NOAA hydrographic surveys. Ms. Adams said the funding is meant to supplement and not supplant base funding, so it would have to be combined with NOAA funding. Ms. Lee added that the money has to be tied to a restoration initiative and the focus area measures of progress. Mr. Krumwiede discussed the two shallow water bathymetric data collection proposals they put forward for FY18 for the St. Louis River Estuary and Chequamegon Bay. Ms. Lee said the FY18 proposal didn't make the cutline for funding at the President's budget level, but if Congress appropriates additional funds these projects can be reconsidered.

Ms. Lee asked how the organizations within the Great Lakes can better communicate their needs to NOAA and the HSRP. Chair Hanson said that the more they connect as a system the more strength they will have. Mr. Aslasken suggested engaging the State Advisors and Navigation Managers more regularly. Glenn Boledovich said that when the Great Lakes organizations come to the DC area they should reach out to OCS to touch base informally.

Public Comment

Helen Brohl commented on her past experience as Executive Director of the Great Lakes Shipping Association. Water level challenges in the late 1990s brought to light how NOAA's network had fallen into disrepair. The Great Lakes Commission was able to secure earmarked funding for quick repairs on major water level gauges. GLOS was born out of this effort because PORTS was not practical at the time. GLOS was a result of the shipping companies' interests along with NOAA's work to install current meters in areas that posed significant challenges to mariners.

NOAA's Liaison to the Office of the Oceanographer of the Navy commented via webinar that the NOAA and Navy partnership has recently taken steps to become stronger and more efficient. The HSRP will serve as a terrific venue for collaboration and CAPT Rick Brennan, OCS, will be the point of contact.

Vice Chair Miller read into the record the NOAA Administrator's response to the HSRP's previous Letter of Recommendation.

HSRP Discussion

Chair Hanson acknowledged Gary Magnuson's departure from NOAA and wished him well.

The HSRP discussed their takeaways from the water resources management and restoration panel. Chair Hanson said that a consistent theme across HSRP meetings is how to accomplish the needs of the nation for bathymetry with the assets available. Dr. Mayer said he heard a great need for backscatter for bottom mapping and seafloor characterization. Member Brigham asked for clarification on whether there was a NOAA representative on the Great Lakes Dredging Team. Tom Loeper, NOAA, said he will be getting in touch with Mr. Crane about joining the team. Chair Hanson said that disposal area management issues

have become more pressing and encouraged NOAA's participation. Member Shingledecker said that, in addition to adversely affecting drinking water, HABs are having a major impact on recreational boating, especially in Florida. Additionally, the gap in funding for dredging shallow water harbors is a concern for recreational boaters.

National Updates

Helen Brohl, Director, Committee on Marine Transportation System (CMTS), U.S. Department of Transportation, provided an update on CMTS. Over 30 federal agencies across many departments are engaged in the Maritime Transportation System, each with a defined role for specific reasons. CMTS was created to guide all of these agencies toward a common vision and provide a way to communicate regularly on the MTS. Current priorities for CMTS include producing an MTS Assessment Report to Congress, updating the 2008 National Strategy for the MTS, MTS infrastructure investment, US Arctic marine transportation, navigation services and technology, maritime data coordination, and promoting the value of the MTS. She encouraged the HSRP to forward their thoughts to NOAA when the National Strategy for the MTS goes through interagency review. In the past, there has been communication to ensure that the recommendations the HSRP is putting forward are complementary to the Coast Guard's NAVSAC recommendations. Ms. Brohl addressed the issues of infrastructure investment and discussed some of the activities of the CMTS Integrated Action Teams.

NOAA has made clear to CMTS that it is time for federal agencies to fully embrace the S100 framework and be aligned with geospatial standards. The CMTS Waterway Harmonization Project (jointly managed by NOAA, USACE, and USCG) is working towards alignment between federal agencies of the digital identification and geospatial definition of waterways within the navigable waters of the US. Another component of this effort is eMSI which is how agencies will communicate information to outside stakeholders.

RADM Smith said that the fundamental reason the systems are not compatible is that USACE data is designed for engineering purposes while OCS data is designed for navigation purposes. CAPT Scott Smith said that this is the necessary groundwork that will allow marine safety information to be done digitally.

Chair Hanson asked about the effort to get full federal funding for PORTS and what message Congress needs to hear. Ms. Brohl said she testified before Congress that for academia to take over environmental observations for ship operations would be inappropriate given the operational nature of the business. As long as PORTS has the appearance of being an ideal public-private partnership, Congress won't see the need to fund it. The major challenge is how few in Congress understand PORTS.

Ashley Chappell, Coordinator, Integrated Ocean and Coastal Mapping (IOCM) program, provided an update on the National Coastal Mapping Strategy (NCMS) and IOCM program. IOCM is planning, acquiring, integrating, and managing ocean and coastal geospatial data and derivative products for easy access and use by the greatest range of users. IOCM works to make data available and usable for a variety of users. The National Coastal Mapping Strategy is charged with developing coastal LIDAR elevation for a 3D nation. The public comment period on the strategy has ended but the HSRP's comments will be folded in to the feedback process for Version 1.0. The four components of the strategy are: (1) the Annual Coastal Mapping Summit for coordination, (2) common standards, (3) whole life-cycle approach to data,

and (4) R&D on new tools and techniques for data collection and use. NCMS Version 2.0 will build on agency inputs such as NOAA Hydro Survey Priorities and BOEM priority areas for survey and will include offshore, acoustic, and aerial photography. IOCM has issued a contract to conduct a scoping study for a National Enhanced Elevation Assessment update, as well as a coastal/offshore elevation requirements and benefits study. The US Federal Mapping Coordination site allows IWG-OCM and 3DEP agencies to use SeaSketch and other tools to share information on acquisition plans, data needs, and coordination. Fiber optic cable-laying company Quintillion has agreed to share their Arctic hydrographic data with NOAA. Other highlights of the IOCM Team focus for 2016-17 include hosting Regional Coastal Summits and the Ocean and Coastal Mapping Integration Act re-authorization.

Member Saade said Fugro tells everyone they work with in the Arctic to donate their data and it's great to hear that someone actually did it. He also said that the SeaSketch tool is very useful and Fugro has been using it for commercial purposes around the New England area.

RADM Smith said NOAA should emphasize and publically laud Quintillion's data donation, not only because they deserve the praise but also to encourage other private interests that may wish to have similar praise heaped upon them. Ms. Chappell said that the data can be considered a charitable donation, but they need to figure out how to claim it for tax purposes. Dr. Mayer said one of the Quintillion lines is exactly one that the Healy was going to run and when they learned of it they shifted their line. This began conversations with the International Cable Protection Committee and he would like Ms. Chappell to attend an upcoming ICPI meeting where they will discuss making private data available. Sam DeBow, NOAA, asked if anyone has reached out to the oil patch industry about acquiring their datasets. Ms. Chappell said she has not been able to establish good points of contact within oil companies. Member Saade added that there are a lot of issues with proprietary data where oil companies are concerned. Fugro is working with IOCM to find ways to decimate the data in a way that would still be useful to NOAA and acceptable to the oil companies.

HSRP Discussion

Member Thompson discussed the NCMS paper his Work Group had been reviewing. He complimented the coordination with USGS, liked the common standards, and thought the paper was well-developed. Vice Chair Miller made some minor suggestions. She also said that it would improve the document if common data formats were addressed. Member Thompson said the document was ready to be finalized.

RADM Smith announced that the agreement with USACE was signed a few weeks prior to the meeting. HSRP made that recommendation at their September 2014 meeting.

The HSRP discussed the Planning and Engagement Working Group's three issue papers. Vice Chair Miller made three minor changes to the hydrography paper – changing percentage of US overseas trade as recommended by Ms. Brohl, added a clarifying statement that the paper focuses on the bathymetric data and charting aspects of hydrography, and a wording change. Mr. Edwing made additional recommendations to clarify which hydrographic services are being referred to.

For the Reference Frame 2022 paper, Member Thompson presented the new opening sentence designed to connect the datum changes to the general public and common technologies. The sentence was refined and accepted.

Member Kelly said that the PORTS paper may need some slight tweaking but is ready to go. It highlights the value of PORTS, the many users of the system, and that NOAA has been charged in the HSIA to fully fund the system. Member Maune said a graphic depiction of where PORTS are and where they are needed would be useful. Mr. Edwing provided a more complex graphic and suggested making it an attachment to the paper. Member Hall suggested zooming in on one part of the graphic to serve as an example of the PORTS situation in a particular region. Chair Hanson said it will be important to demonstrate regional relevance.

The Panel discussed locations for upcoming meetings. The next HSRP meeting will be in Seattle, WA, in the spring of 2018. The following meeting's location is tentatively scheduled for Silver Spring, MD, however if the new Administration is not yet in place it will be moved to Durham, NH. Fort Lauderdale, FL, was also discussed as a future meeting location.

Member Brigham provided an update on the Emerging Arctic Priorities Working Group. The Work Group received a response from the NOAA Administrator in regards to their Emerging Arctic Priorities Report. Member Brigham would like to hold a Work Group meeting to follow up on the report and to discuss the changing US maritime Arctic. The Coast Guards' Port Access Route Studies aim to create marine highways in areas with no tide-combined CORS and minimal reference points. Member Brigham also proposed a joint Technology-Arctic Work Group meeting to discuss how technology might impact the future of surveying in the Arctic. He suggested that HSRP members provide some input to the IHO through RADM Smith and the Arctic Region Hydrographic Commission. He noted that the new IMO Polar Code goes into effect on January 1, 2017.

Member Saade provided an update on the Technology Working Group. The Work Group has discussed how to take NOAA's data and present it in a form that people care about, similar to the Weather Channel. Another possible issue for the Work Group to address is significant successes of R&D developed under NOAA's charting activity, particularly applications for bathymetry combined with backscatter and water column detection, presenting cost-benefit analyses on how the benefits to the greater industry. These are good platforms from which to advocate for additional R&D and NOAA hydrographic charting in general. The proposed Work Group outputs include (1) an issue paper on value of transfer of R&D to broader industry, (2) a recommendation for further analysis by OCS of complete workflow metrics to better identify issues to prioritize projects, R&D and options for alternative approaches, (3) the preparation of a concept paper on how to expand the maritime transportation network similar to the Aviation Network, including funding and full spectrum.

RADM Smith said he would like the opportunity to brief the Panel on OCS's unmanned system activities and their thinking on the subject. Vice Chair Miller said she was hoping the Work Group could provide internal information for HSRP members on state-of-the-art technologies. Member Saade said that technology briefings at every HSRP meeting would be great and relatively easy to set up. Member Lockhart volunteered to give a presentation on LIDAR at the next HSRP meeting. Member Gee gave a remote presentation of the Nautilus exploration vessel's telepresence abilities from its survey on the Cascadia margin. He said that when federal funding is provided for research, it is important to have mechanisms in place to demonstrate the value added to industry and the nation. RADM Smith suggested taking up the topic of performance metrics at the next meeting since one of NOAA's processing centers is

located in Seattle. He stressed the importance of making good use of the available data and asked the Work Group not to focus solely on doing hydro better, but to consider all the way to the societal benefits.

The Panel discussed the issues they wanted to include in their letter to the Administrator, distinguishing those that were high-level NOAA-specific recommendations from those that would be conveyed to OCS.

On the issue of recommending an in-basin Navigation Manager, RADM Smith said there is a great deal of sensitivity among NOAA leadership on federal advisory committees giving personnel recommendations.

On the issue of recognizing the Lake Carriers Association for providing funding to keep a current meter in operation, Member Hall said that the paper should be clear that the Panel is not suggesting that is how PORTS funding should work. It is intended as an example of the many successful public-private partnerships in the Great Lakes region. The paper should also highlight state and international partnerships.

RADM Smith said there may be negative value to recommending full federal funding of PORTS in another Recommendation Letter. Mr. Boledovich said that the PORTS issue paper does a good job expressing the importance of full federal funding.

On the issue of the various types of survey needs around the Great Lakes, RADM Smith said that he would love to see a recommendation that OCS think more broadly about survey needs in its prioritization process, rather than just large ships going into major ports.

The Panel discussed possible solutions to AIS clutter on electronic charts. Member Kelly suggested mentioning that the Panel recognizes the underlap between USACE and NOAA in detecting small navigation hazards and will be considering it in the future.

Mr. Edwing suggested mentioning the need for partnerships for the IGLD update in smaller harbors.

Member Brigham suggested mentioning that the robustness of the observing network is insufficient for providing navigational information or for understanding natural variability or anthropogenic change. Mr. Edwing said that additional water level stations and current meters wished for in the area would have to be PORTS. From a climate change perspective, some of the really big data gaps are over lake precipitation and evaporation which would lead to a better understanding of the hydrologic cycle. These are things NOAA is working on, but not in Navigation Services. Member Brigham added that the data does not capture the winter season.

Mr. Armstrong said the need for nearshore observation program and bathymetry was compelling but needed vetting.

Public Comment

There was no public comment.

Review of Day Two and Adjournment

Chair Hanson and Vice Chair Miller reviewed the key points of Day Two. The minutes of the March HSRP meeting were reviewed and approved. The meeting was adjourned at 5:35 p.m.

Thursday, September 1, 2016

The meeting was called to order at 8:02 a.m.

HSRP Discussion

Vice Chair Miller led the Panel in a discussion of key points and observations from the previous days' sessions. HSRP members found the meeting highly informative of the many issues present in the Great Lakes and St. Lawrence River region. The area contains a robust trade network and the waterways should be viewed as a single system. Mapping needs around the Great Lakes are still very pressing. Members stressed the importance of interagency cooperation with USACE in addressing not only overlapping efforts, but also gaps in areas of responsibility. Members Perkins and Thompson said that NOAA needs a PR campaign to convey what the changes to the NSRS will mean for users, particularly recreational boaters. Mr. Aslaksen said that informational videos with simplified terminology have been the most effective tool for disseminating NGS' message to people lacking a scientific background. He suggested a recommendation that NGS attend more nontraditional conferences in order to increase their outreach.

Member Maune announced the topics for four new issue papers that are being drafted: Precision Navigation; NOAA Emergency Response; NOAA and USACE; and Recreational Boating. Pending minor revisions, all of the previous issue papers are finished. Member Thompson proposed drafting a second paper on vertical datums written in layman's terms. Mr. Boledovich said NOAA has received the HSRP's message of the need to inform the public and has plain English communications staff that can work on it. What is needed is a more public-facing mechanism, such as a spotlight in national media. Mr. Boledovich also said that NOAA intends to use the papers to advise the current and incoming Administrations but did not anticipate that the agency would conduct any outreach on the papers themselves. Mr. Armstrong suggested informing relevant newsletters once the papers are publicly available. Member Lockhart requested that data be made available on how many views or downloads the papers get on NOAA's website. Member Brigham has received feedback from the academic community that the papers are useful but said it was unclear on how NOAA is going to make use of them. Ms. Mersfelder-Lewis said that the papers have been taken to the Hill in the past and proved very effective in conveying their message to Congress and staffers. Vice Chair Miller proposed that the Planning and Engagement Work Group develop a strategy for how best to use the papers.

Discussion on HSRP Recommendation Letter

Though the Panel heard about several issues present in the Great Lakes area, they determined that there were no particular driving issues that would necessitate an HSRP recommendation. The Panel decided to present the issue papers to stand as recommendations on their own and to describe what they heard from regional stakeholders under four main categories: Great Lakes mapping issues; partnerships; communication; and PORTS and water levels. They will convey a request for more information from OCS or other parts of NOAA on the issues raised by the speakers. The Panel created a first draft of its Recommendation Letter and Vice Chair Miller will continue editing it before sending it out to the entire Panel for comment within two weeks. There was discussion on the need for bathymetry in the Great Lakes and for clarity on whose responsibility it is to chart obstructions. In response to a question about

how much high-resolution mapping had been done for the Great Lakes, Mr. Krumwiede presented images from the NOAA Lake Level Viewer. NOAA is in the process of updating the Viewer to include a combination of topobathy LIDAR, bathy LIDAR, USACE dredge surveys, and National Park Service multibeam data to create a seamless digital elevation model of the coastal nearshore environment at three meters spatial resolution. For some users, this resolution may be inadequate. The Great Lakes Bottom Mapping Work Group formed to inventory data holdings and mapping capacities from academic, commercial, and federal sectors.

Discussion on the next HSRP Meeting

Proposed agenda items for the next meeting included: a LIDAR presentation from the Technology Work Group; a presentation by a recreational boating representative; speakers from environmental groups, NGOs, and Tribal groups on how they use NOAA products or interact with the agency; a presentation on how Sanctuaries have built mapping into their management of marine protected areas; participation from a Congressional representative; and a tour of either (a) one of NOAA's icebreakers or (b) technology in use at a local academic center. RADM Smith suggested three topics that he would like to discuss in an upcoming meeting: a report on unmanned systems; the charting of channels and anchorages; and NOAA's hydro processing workflow.

The first week of May, 2017, appeared to be the best time for the spring meeting to be held in Seattle, WA.

Other issues

RADM Smith asked for the Panel's input on how make monthly teleconferences more productive. Vice Chair Miller said she appreciates the consideration given to differences in time zone. She also asked that the business portion of the meeting be conducted first, followed by the presentation. The entire meeting should last no more than 30 minutes including questions. Member Hall said that the presentations need to be more interactive, even if that requires more preparation on the part of the Panel members. Member Lockhart said that keeping to the schedule would help members planning to attend. She also suggested using technology that allows members to view webinars at their convenience.

Public Comment

Dave Conner, NGS, speaking on a topic raised in the Panel's Recommendation Letter, cautioned that Lakes Huron and Michigan are really a single body of water and the unexplained changes in water levels apply to all of the Great Lakes, not just Lake Huron. Vice Chair Miller said she will make the change to the Recommendation Letter.

Closing Remarks and Adjournment

Vice Chair Miller thanked the HSRP's new DFO and all of the NOAA staff for putting on the meeting. The meeting was adjourned at 10:19 a.m.

HSRP VOTING MEMBERS IN ATTENDANCE:

Lawson W. Brigham, Ph.D.	Professor of Geology and Arctic Policy, University of Alaska Fairbanks
Kim Hall	Director, Global Technical & Regulatory Affairs – Operational and Security, Cruise Lines International Association
William Hanson, HSRP Chair	Vice President of US Business Development, Great Lakes Dredge & Dock Company
Edward J. Kelly	Executive Director, Maritime Association of the Port of NY/NJ
Carol Lockhart	Owner, Geomatic Data Solutions
David Maune, PhD	Senior Remote Sensing Project Manager, Dewberry Consultants
CAPT Anne McIntyre	Pilot, Columbia River Pilots
Joyce E. Miller, HSRP Co-Chair	Director of Seafloor Data Services, Hawaii Mapping Research Group Research Corporation, University of Hawaii (retired)
Scott R. Perkins	Director Federal Programs, Surveying and Mapping, LLC
Edward J. Saade	President, Fugro Pelagos, Inc.
Susan Shingledecker	Assistant Vice President and Director of Environmental Programs, BoatUS Foundation for Boating Safety and Clean Water
Gary Thompson	Chief, North Carolina Geodetic Survey

HSRP VOTING MEMBERS NOT IN ATTENDANCE:

Larry Atkinson	Slover Professor, Old Dominion University
Lindsay Gee	Hydrographic consultant
Salvatore Rassello	Director of Navigation, Carnival Cruise Lines

HSRP NON-VOTING MEMBERS IN ATTENDANCE:

Andy Armstrong	Co-Director, Center for Coastal and Ocean Mapping, Joint Hydrographic Center, University of New Hampshire
Richard Edwing	Director, Center for Operational Oceanography Products & Services, NOAA
Larry Mayer, PhD	Co-Director, Center for Coastal and Ocean Mapping, Joint Hydrographic Center, University of New Hampshire

HSRP NON-VOTING MEMBERS NOT IN ATTENDANCE:

Juliana Blackwell	Director, National Geodetic Survey, NOAA
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DESIGNATED FEDERAL OFFICIAL:

RADM Shep Smith	Director, Office of Coast Survey, NOAA
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NOAA STAFF PRESENT:

Mike Aslaksen (for Juliana Blackwell)	Chief, Remote Sensing Division, NGS
Glenn Boledovich	NOS
Ashley Chappell	NOS/OCS
Philip Chu	GLERL
Dave Conner	NGS
Jennifer Day	Great Lakes Regional Coordinator
Sam DeBow	OCS
Brandon Krumwiede	OCM
Christa Johnston	NOS
Deborah H. Lee	Director, Great Lakes Environmental Research Laboratory
Tom Loeper	NOS/OCS

Gary Magnuson	NOS/OCS
Lynne Mersfelder-Lewis	HSRP Program Coordinator
Rachel Medley	NOS/OCS/NSD
Russ Proctor	NOS/OCS
Greg Schweitzer	ORR
Darren Wright	CO-OPS

SPEAKERS AND ATTENDEES:

Jackie Adams	Environmental Scientist, Great Lakes Restoration Initiative, Great Lakes National Program Office, U.S. Environmental Protection Agency
John T. Allis	Chief, Great Lakes Hydraulics and Hydrology Office, U.S. Army Corps of Engineers – Detroit District; U.S. Chair, Great Lakes Coordinating Committee
CAPT Paul D.J. Arnett	Chief, Prevention Division, 9 th Coast Guard District for the Great Lakes and Saint Lawrence Seaway, USACE
Helen Brohl	Director, Committee on Marine Transportation System, U.S. Department of Transportation
Samantha Bruce	QPS
Thomas R. Crane	Deputy Director, Great Lakes Commission
Marvourneen K. Dolor, PhD	St. Lawrence Seaway Development Corporation
Josh Feldman	Chief of Operations, Buffalo District, Great Lakes and Ohio River Division, U.S. Army Corps of Engineers
CAPT George P. Haynes	Vice President, Lake Pilots Association, Inc.
Scudder Mackey	Ohio Department of Natural Resources
CDR Tony Maffia	9 th Coast Guard District for the Great Lakes and Saint Lawrence Seaway, USACE
Lee Mersek	Student observer
Glen G. Nekvasil	Vice President, Lake Carriers Association

Mike Piskur	Program Manager, Conference of Great Lakes and Saint Lawrence Governors and Premiers
John Ramos	Lake Carriers Association
CAPT Scott Smith	U.S. Coast Guard
Betty Sutton	Administrator, Saint Lawrence Seaway Development Corporation, U.S. Department of Transportation
Lorne Thomas	9 th Coast Guard District for the Great Lakes and Saint Lawrence Seaway, USACE