Summary Record
Hydrographic Services Review Panel (HSRP)
May 4-6, 2011
Honolulu, HI

Wednesday, May 4, 2011

HSRP Public Meeting Convenes
Ed Welch, HSRP Chair
Capt. John E. Lowell, Jr., Director, NOAA Office of Coast Survey, HSRP Designated Federal Official (DFO)
David M. Kennedy, Assistant Administrator, National Ocean Service

On the call of the Designated Federal Official, Captain John Lowell, NOAA's Hydrographic Services Review Panel (HSRP) meeting was convened on May 4, 2011 at the Waikiki Beach Marriott Resort and Spa, 2552 Kalakaua Avenue, Honolulu, Hawaii. The following report summarizes the deliberations of this meeting. Presentations and documents are available for public viewing 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/archive/2011/May/Hawaii_agenda_final.pdf.

HSRP Chair Ed Welch called the meeting to order at 8:47 a.m., Hawaii-Aleutian Standard Time. The HSRP is a Federal Advisory Committee (FAC) created by statute whose purpose is to advise NOAA leadership on improving NOAA's navigation services, products and information. **Captain John Lowell** introduced himself and welcomed the nine new Panel members and one reappointment. **David Kennedy** swore in **Susan Shingledecker** and **David Jay**, the two new members who had not been previously sworn in during the March 2010 Orientation meeting in Silver Spring, Maryland. Chair Welch congratulated the new members and introduced the keynote speaker, Lt. Governor Brian Schatz. The HSRP, he said, was eager to come to Hawaii because of its unique status as an island state positioned in a strategic part of the Pacific Ocean.

Keynote Address
The Honorable Brian Schatz, Lieutenant Governor of the State of Hawaii

Lt. Governor Brian Schatz welcomed the HSRP to Hawaii. The Panel's work, he said, is vitally important to Hawaii. NOAA plays an important role in ensuring economic vitality and environmental protection in Hawaii. The Lt. Governor expressed his appreciation for NOAA's work in Hawaii, including tsunami early warning systems, coral reef monitoring, fisheries management, seafood inspection, and management of the Hawaiian Humpback Whale Sanctuary and the Papahanaumokuakea Marine National Monument.

The Lt. Governor emphasized that, in our current economic and political environment, it is more important than ever to reach out and explain the importance of NOAA's work. Policymaking and budgeting may be done with very little information about or understanding of NOAA's programs. Those who benefit from these programs must loudly and clearly communicate their value. It's critical to have public leaders who understand applied science and who understand that infrastructure matters. The Lt. Governor concluded by reiterating his support for the HSRP's work.

Chair Welch asked about the recent Pacific tsunami's impact on Hawaii. The Lt. Governor responded that the Pacific Tsunami Warning Center provided early warning. $20 to $30 million worth of damage was done to Hawaii's infrastructure. A downturn in tourists coming from Japan also affected Hawaii. However, the Lt. Governor felt confident that the Japanese market will recover, and that Hawaii's relationship with Japan is stronger than ever. He predicted that the private sector will recover from the tsunami by the end of 2011, and the public sector by a year after that.

Member Joyce Miller asked about plans to renovate Keehi Harbor. The Lt. Governor responded that FEMA money will be available to repair tsunami damage to the harbor, although more renovation is needed.

Member David Jay asked whether the State of Hawaii directly funds the University of Hawaii Sea Level Center. The Lt. Governor replied that the University of Hawaii receives block appropriations. Hawaii continues to be a leader on plans for dealing with global climate change and sea level rise; the State and the University of Hawaii will together develop a plan to protect private and public property. Member Michele Dionne inquired about how aware the citizens of Hawaii are of sea level rise. The Lt. Governor said that Hawaii, in general, has a high degree of environmental awareness; however, people tend to focus on immediate issues, such as the need to balance protection of natural resources with the need for housing and commercial development. Because Hawaii's economy is so dependent on tourism, dealing with sea level rise must be conducted carefully, with attention to what signals Hawaii is sending to the international community.

Welcoming Remarks and NOAA Update
David M. Kennedy, Assistant Administrator, NOAA National Ocean Service (NOS)

Mr. Kennedy addressed the challenges facing NOAA and the HSRP's role in this work. He suggested that the HSRP might get engaged with NOAA more actively between meetings. NOAA's budget for 2011 is somewhat stable, but the 2012 budget remains uncertain. NOS strives to send the message that navigation services are important in moving the economy forward and creating jobs. NOS is matching some of its objectives, as outlined in the NOAA strategic plan coastal goal and with the new National Ocean Policy priorities. For instance, there is agreement on the following goals:

- Coastal and marine spatial planning
- Ocean, coastal and Great Lakes observations and mapping
- Changing conditions in the Arctic

Marine spatial planning is a response to the fact that the ocean is used for more and more new purposes. The basic idea is to bring stakeholders together, along with the appropriate data, to make intelligent decisions about how to manage increased development of the ocean. For example, how do wind farms fit in with shipping, fishing, and petroleum exploration? However, many see marine spatial planning as simply a cumbersome, bureaucratic set of zoning restrictions.

NOAA's recent Arctic Vision and Strategy sets out several goals:

- Forecast sea ice
- Strengthen foundational science to understand and detect Arctic climate and ecosystem changes
- Improve weather and water forecasts and warnings
- Enhance international and national partnerships
- Improve stewardship and management of ocean and coastal resources in the Arctic
- Advance resilient and healthy Arctic communities and economies

The changing environmental conditions in the Arctic are an opportunity as well as a challenge, since as sea ice melts, shipping and petroleum exploration become easier. Navigation services are needed to plan for the Arctic's future. The NOS plan for the Arctic includes efforts to upgrade shoreline data, work on Gravity for the Redefinition of the American Vertical Datum (GRAV-D), expanded surveying, and the Arctic Nautical Charting Plan. Another NOS goal is to strengthen and integrate ocean observing systems, data collection platforms, sensors, data management, and mapping capabilities. The National Export Initiative, the Harbor Maintenance Trust Fund, and the expansion of the Panama Canal also present opportunities.

Mr. Kennedy concluded with an overview of HSRP's role. HSRP should ensure NOAA’s navigation services programs align with NOAA and Administration priorities, such as the National Ocean Policy and National Export Initiative. The economic and social benefits of NOAA’s navigation services programs should be quantified and publicized. Outreach efforts to strengthen stakeholder support are important, and NOAA’ navigation services programs must meet user needs to provide maximum value.

Member Miller asked about how budget uncertainty affects navigation services. Mr. Kennedy replied that it dramatically affects their ability to plan future funding. Capt. Lowell added that spending money, and therefore collecting data, is more difficult in such an uncertain environment. Member Jay and Mr. Kennedy discussed how responsibility for the budget process is spread among different groups, such as the Office of Management and Budget (OMB) and various Congressional committees.

Member Jacobsen asked about the possibility of getting funds from the Harbor Maintenance Trust Fund. Chair Welch explained this fund to the Panel. The Trust Fund is a statutory program created by Congress according to which an ad valorem tax is imposed on the value of cargo imports and passengers coming into the United States, and the money collected from this tax goes into the Trust Fund. This money is then appropriated by Congress to fund dredging and maintenance of U.S. ports. However, several Congresses have not appropriated as much money as they have collected; therefore, while dredging needs are unmet, money piles up in the Trust Fund. Many

dredgers and port authority workers want to use this money for its original purpose, to rebuild ports and physical infrastructure, but on the other hand, others want to use the money for more tangentially related purposes. Mr. Kennedy responded that efforts to get access to the Fund continue, but so far without success. Mr. Paul Bradley informed the Panel that OMB is interested in using the Harbor Maintenance Trust Fund to fund some of NOAA's base programs. Showing how NOAA's PORTS® program helps industry might help attract industry support for this use of the Fund. Member Jacobsen added the PORTS® can help make dredging more efficient.

Member Jeffress informed the HSRP about a project in Texas in which the Army Corps of Engineers is using GPS positioning for dredging—using real-time water level oscillation data to do three-dimensional dredging. This will increase efficiency and potentially save millions of dollars.

At Chair Welch's requests, all the members introduced themselves and spoke briefly about their areas of expertise.

Challenges Facing NOAA and the HSRP
Captain Gerd Glang, NOAA/National Ocean Service

Capt. Gerd Glang offered a strategic framework for the HSRP to consider. He recalled the advice of NOAA Chief of Staff Margaret Spring, the current Chair of the Committee on Marine Transportation Systems (CMTS). He said, Ms. Spring asked for the HSRP's thoughts on what CMTS should focus on; suggestions about how NOAA's navigation services can support the National Export Initiative; what should be NOAA's role in National Ocean Policy; and how NOAA's navigation services can help to "win the future", as suggested by President Obama in his State of the Union address. He also said that Ms. Spring drew the HSRP's attention to the Resilient Coastal Communities and Economies Goal within NOAA's Next Generation Strategic Plan.

Chair Welch raised a number of questions for discussion:

- What role can the Federal government through NOAA have in investment to ensure the development of a trained community of American hydrographers?
- How do we balance the relative roles and importance of NOAA and of private companies engaged in doing hydrology? In a time of shrinking budgets, how much should we rely on private sector resources?
- Does an expanded concentration on Arctic programs necessarily mean diminished concentration on other areas? Is there a way of comparing the effort needed to chart in the Arctic as opposed to the mainland?
- Whether and how should we renew NOAA vessels and other physical resources?
- Are there new types of technology, such as unmanned vessels, which can take a larger role in hydrography?
- How can the PORTS® system (a real-time observing system in many commercial harbors) be funded over the long term?

- Should users of NOAA products contribute financially towards the cost of their production? For instance, should the oil industry support NOAA's nautical services in the Arctic? Or should the Department of Defense contribute to NOAA's baseline surveys of harbors for counterterrorism purposes?

Member Lawson Brigham commented that many ships operate in the Arctic, but only six to seven percent is charted to international navigation standards. Member Brigham also stated the environmental stewardship and economic security should be balanced.

Mr. Kennedy suggested that it might be useful for the HSRP to comment on the National Ocean Policy, in terms of what the policy leaves out and which parts should be stressed. Chair Welch said that perhaps representatives from the White House Council on Environmental Quality, which is the coordinating agency for the National Ocean Policy, should make a presentation to the HSRP.

Member Miller asked how the HSRP can help NOAA get funding. Chair Welch responded that it may help to give NOAA a non-agency document to buttress the case they have to make to OMB and the Department of Commerce, sending the message that more charting and more effort is needed to achieve NOAA's goals. The Panel can also give advice about what NOAA's priorities should be, given a constrained budget. The HSRP's Most Wanted Hydrographic Improvements document helped to make the case for stimulus funding for navigation services and charting.

Mr. Kennedy added that Dr. Lubchenco, the Administrator of NOAA, does take advisory committees seriously. The HSRP is important in drawing attention to the function of navigation services within the government.

The meeting was recessed for a short break.

Member Jeffress spoke of the need to highlight how PORTS® plays into exports, even in non-coastal states. Also, we can expect to see an increase in American agricultural exports, which will be facilitated by smoothly functioning ports. Member Jay pointed out that the tragic tsunami could be used to point out the importance of navigation services. Member Shingledecker made the point that navigation services could perhaps be promoted as the foundation of any marine spatial planning. Chair Welch replied that marine spatial planning is being perceived in a political way, and may not be a reliable way to get support for navigation services.

Chair Welch shared with the HSRP a letter which the Panel received from Captain Peacock in northeastern Maine. The HSRP had received testimony concerning Cobscook Bay in Maine, where there had been many commercial fishing accidents because of uncharted obstacles. The HSRP then recommended to NOAA that this bay be charted. Within a week after that recommendation, NOAA's Navigation Response Team was on the water in Cobscook Bay, doing a complete survey and conducting public outreach work to change the safety philosophy of fishermen. Because of this work, no fishermen or vessels were lost between October 2010 and April 2011. Chair Welch declared that government is truly fulfilling its function when it preserves people's lives and livelihoods.

Member Hickman expressed her disappointment that the Panel's Most Wanted Hydrographic Improvements have not yet been dealt with, and that the new NOAA vessel is not yet running.

Member Brigham pointed out that NOAA's definition of navigation services may not jibe with the bureaucratic definition. Unmanned vehicles will not replace humans on ships.

Member Miller said that ships should be used efficiently. When ships are crewed and ready to go out, it is wasteful to make them wait for a NOAA decision on when they can go out. Capt. Glang responded that budget considerations affect fleets and may lead to underutilization of resources.

Member Jay noted that NOS has almost a century of innovation to look back on. The U.S. has perhaps the best historic tide record in the world. However, this historic data is often not available on the CO-OPS website. Oceanographers are realizing that treating tides as non-stationary phenomena can lead to better information. We could do much better in innovative analysis and prediction.

Member Hickman brought up the subject of charging user fees when NOAA resources have to be taken off-task. Member Perkins agreed that user fees should be explored; a fee-for-service or fee-for-rescue may not be best, but there are other user fee models. A tax on GPS or other spatially enabled devices might help solve NOAA's funding problems. Vice Chair Wellslager agreed that providing free services may no longer be possible. Beyond incidental reimbursable services, a long-term, sustainable way to pay for NOAA services should be found. Chair Welch asked whether NOAA has a record of how frequently assets have been taken off their normal mission to respond to an unexpected event.

Member Carothers wondered whether unused NOAA vessels might be made available to commercial markets; Capt. Lowell responded that there might be legal barriers to doing so. Chair Welch added that scheduled missions may have to be delayed or called off because of budget problems; this is one of the reasons NOAA vessels sometimes have extended downtimes. Member Hickman brought up the problem of making sure that the fines NOAA assesses are actually paid. Chair Welch suggested that, when making electronic nautical charts, temporary information (like seasonal special conditions) could be included during those times it is needed. Member Perkins agreed that the technology available for car GPS units ought to be extended to electronic nautical charts. Mr. Bradley suggested that a teleconference or working group might take up the issues of user fees, NOAA ship time, and seasonally managed areas in more depth.

Capt. Lowell and Chair Welch expressed their sympathies for the decease of Roger Parsons. The meeting was recessed for lunch.

Navigation Services Office Updates
Captain John E. Lowell, Jr., NOAA, Director, Office of Coast Survey (OCS)

Capt. Lowell introduced the Office of Coast Survey, one of NOAA's three line offices which is responsible for hydrographic and bathymetric data collection within U.S. territorial waters.

Capt. Lowell gave an overview of OCS's response to the recent tsunami, which affected the West Coast as well as the Pacific and Japan. Navigation response teams were deployed to Crescent City and Santa Cruz. OCS has six navigational response teams: typically two on the West Coast, one in the Great Lakes, and the rest on the Gulf and East Coast. OCS also responded to a ship adrift in the Bering Sea, and to the Deepwater Horizon disaster. OCS hydrographers assisted NCCOS (National Centers for Coastal Ocean Science) with data acquisition so that that bathymetric data can be used to update NOAA's navigational charts.

Capt. Lowell listed a few of OCS's recent accomplishments:

- Relocation of Arctic native village
- Collection of comments on draft Arctic charting plan
- Bathymetric data to aid Mississippi restoration
- Wreck cleanup in Cobscook Bay, Maine
- Hydrographic survey to support transit of coal ships
- Bathymetric data to aid recovery of Gulf recreational fishing

In fiscal year 2012, OCS will continue its Arctic mapping efforts, work on bringing the NOAA vessel *HASSLER* online, implement Rolling to Deck Repository (R2R) to prevent loss of data, and continue to decrease the time taken from survey to chart. OCS is actively seeking out IOCM (Integrated Ocean and Coastal Mapping) participation. Finally, OCS will finalize its strategic action plan for the mapping component of the National Ocean Policy.

Capt. Lowell then discussed his testimony before the House Committee on Oversight & Government Reform, Subcommittee on Government Organization, Efficiency, and Financial Management. The Subcommittee asked about the distinction between the two government agencies who create nautical charts: NOAA and the Defense Department's National Geospatial Agency. Capt. Lowell testified that there is no duplication of effort, since NOAA and NGA serve different customers. Member Brigham asked whether perhaps, as DoD is forced to cut programs, some NGA and Naval Oceanographic Office responsibilities might eventually be transferred to NOAA. Capt. Lowell further stated that after the State of the Union address, the Center for American Progress issued recommendations for reorganization certain agencies; in particular, the Center has suggested that NOAA might fit better within the Department of the Interior, rather than the Department of Commerce.

Capt. Lowell concluded his presentation by reviewing the budget figures for fiscal year 2011. Member Jeffress and Capt. Lowell discussed ways to use bathymetric data to locate oil from the Deepwater Horizon spill. Member Jay and Capt. Lowell discussed how automatic identification systems (AIS) data might be used to map vessel locations.

Navigation Services Office Updates
Juliana Blackwell, NOAA, Director, National Geodetic Survey (NGS)

Juliana Blackwell introduced her office, the National Geodetic Survey. Geodesy is the study of the shape and size of the earth. NGS is focused on land surveying. NGS also has a mandate to define,

maintain and provide access to the National Spatial Reference System (NSRS), which is the framework on which all U.S. mapping efforts should be based. NGS, unlike USGS, does not make maps.

NGS is striving to support the HSRP's Most Wanted Hydrographic Services Improvements:

- Dissemination of hydrographic services, data, and products to achieve the greatest public benefit
  - GPRA (Government Performance and Results Act) measure: Percentage of U.S. counties enabled with accurate positioning capacity
- Modernize heights
  - 2013 GPRA measure: Percent of U.S. enabled to benefit from GRAV-D
- Aggressively map the nation's shorelines
  - Update U.S. shoreline
  - Update shoreline in priority ports
  - Analyze priority ports for changes

Ms. Blackwell touched on a few of the three offices' joint milestones:

- The expansion of the National VDatum Program
- New guidelines for geospatial infrastructure for monitoring coastal and environmental change at sentinel sites and other coastal reserves
- Three CORS (Continuously Operating Reference Stations) at tide and water level stations, in order to monitor sea level and land level changes

NGS has developed a GPS data sharing solution which allows users to submit data to NGS online, receive an answer about their location with regard to the CORS network, and share their information with the public. NGS also collected emergency response imagery in the Red River area to respond to flooding in Minnesota and North Dakota. Aerial imagery was also collected in the Alabama/Mississippi area to capture tornado damage. This work was done in partnership with the National Weather Service.

Another NOAA accomplishment is the Mobile Bay project. All three line offices are working in and around Mobile Bay to establish foundational data and validate their coastal circulation model. NGS is working with USGS and the Harris-Galveston Subsidence District to manage groundwater withdrawal. A new CORS station is being established in the Houston area to improve monitoring capabilities.

A new study of the socioeconomic benefits of NGS's remote sensing products and services has been initiated. Also, NGS has done a scoping study of the NSRS, which has been valued at more than $2.4 billion in potential annual benefits to the U.S. economy, and the CORS network portion is worth an estimated $758 million per year. NGS recently finished procurement of an airborne LIDAR system, to be used to develop remote sensing capability.

GRAV-D, gravity for the redefinition of the American vertical datum, is an ambitious program to redefine the vertical datum of the U.S. by 2021. High-resolution gravity data will be collected and used as the basis for a gravimetric geoid and new vertical system for determining elevations. A new

absolute gravity meter will help with land-based gravity measurements, while saving time and money. NGS has also developed a new horizontal time-dependent positioning model.

In the upcoming year, NGS will:

- Complete GPS positions for the 2015 update of the International Great Lakes Datum
- Install one NOAA foundation CORS site
- Develop operational GPS-interference detection service in cooperation with the Department of Homeland Security
- Complete socioeconomic benefit study
- Complete gravity data collection in most of Alaska, with the exception of the Aleutians
- Complete VDatum model for Puerto Rico and U.S. Virgin Islands
- Provide NOAA Composite Shoreline as a framework data set for the Coastal and Marine Spatial Planning Data Portal

Ms. Blackwell concluded by reviewing NGS budget figures; there has been a slight decline for the fiscal year 2011 budget.

Member Jeffress commented that satellite data is slightly delayed because of the error introduced when the signal travels from the satellite through the ionosphere and the troposphere. CORS data may be used to model the amount of water vapor in the troposphere in order to filter out error and thus improve weather forecasting.

Navigation Services Office Updates

Richard Edwing, NOAA, Director, Center for Operational Oceanographic Products and Services (CO-OPS)

Richard Edwing introduced CO-OPS, whose job is to turn operational physical oceanographic data into meaningful information for the nation.

Mr. Edwing first discussed CO-OPS' mapping and charting support services. This is CO-OPS' internal customer group, within NOAA and other Federal agencies. In 2010, CO-OPS supported 46 different hydrographic shoreline surveys. CO-OPS also did three surveys to support development of the VDatum model. More shoreline and VDatum surveying work is planned for next year. Lastly, CO-OPS is working with a tri-agency group (NOAA, USGS and Army Corps of Engineers) to achieve data interoperability between tide gauge systems.

After Hurricanes Katrina and Rita, CO-OPS is hardening its water level stations in the Gulf. Meteorological sensors have been added to 181 stations. CO-OPS also completed a microwave water level sensor test and evaluation; microwave sensors are set above the water and are less vulnerable to issues such as biofouling and silting.

Mr. Edwing next discussed maritime services. In the area of tide and tidal currents predictions, tidal currents surveys have been done in Hawaii, Alaska, Connecticut, and New York. NOAA Tide Predictions was published, and special tidal currents predictions were released for Miami, Kodiak Island, Prince William Sound, Cook Inlet, and the Hudson River. Additional surveys are planned

for the future in Boston, the San Francisco Bay, the Florida Keys, Fernandina Beach, Florida, St. Johns Pass, Florida, and Kachemak Bay, Alaska.

In the area of real-time data, which improves predictions during unusual weather, CO-OPS has:

- Added visibility and waves to PORTS® parameters
- Published the Columbia River PORTS® Economic Study
- Installed an air gap sensor in Jacksonville, Florida

In the future, PORTS® are planned for New London, Connecticut, Jacksonville, Florida and Humboldt Bay, California.

In the area of operational forecast systems, CO-OPS is transferring its operational forecast systems to high-performance computers, pursuant to the recommendation of NOAA's Science Advisory Board. CO-OPS's suite of hydrodynamic models has been expanded to Tampa Bay and Delaware Bay. New operational forecast systems are planned for the Columbia River and the northern Gulf of Mexico.

Mr. Edwing also discussed the COASTAL, or Coastal Oceanographic Applications and Services of Tides and Lakes program. COASTAL covers non-navigational services. Tide gauges provide real-time, high-resolution data to the Pacific Tsunami Warning Center, and storm surge data is provided to NWS and emergency responders. CO-OPS also issues a product called Storm QuickLook, which provides a synoptic look at all water levels affected by a particular storm. CO-OPS data is integrated into the NWS SLOSH model for storm surge forecasting. More tide gauges are being added in the northern part of Mobile Bay.

With regard to coastal ecosystem management, CO-OPS has received funding to expand its Florida harmful algal bloom forecast model to the Gulf Coast of Texas. In the future, this system will be implemented for the Great Lakes. CO-OPS is also doing water level support for the National Estuarine Research Reserve System. CO-OPS works with the Army Corps of Engineers to incorporate sea level trend guidance into coastal project planning. CO-OPS utilized its access to long-term trends in mean sea level to issue a new publication, *Sea Level Variations of the United States, 1854-2006.* A State Department grant enabled CO-OPS to put a tide station in the Caribbean, in Barbuda, which should be operational within a few months.

Mr. Edwing also mentioned CO-OPS's efforts to gather tide level data in Alaska's challenging environment, and reviewed budget and performance metric numbers.

Member Miller asked whether there are any plans to upgrade or multiply tide gauges in the Pacific. Mr. Edwing replied that many remote Pacific areas have a second tide station, so that if one gauge is damaged, the second system will preserve data. However, there are no current plans to add more tide gauges.

Member Jay and Mr. Edwing discussed the agencies responsible for wave prediction.

The meeting was recessed for a short break.

Pacific Navigation Services Stakeholder Panel
Capt. Steven Baker, Hawaii Pilots Association

Capt. Steven Baker presented on behalf of the Hawaii Pilots Association. He talked about how the Association benefits from new ECDIS (electronic chart display and information system) and AIS tracking, to allow pilots to determine how a ship is moving before boarding, and how NOAA's PORTS® system might also be useful for this purpose. Using an AIS transponder on a Coast Guard buoy might be a less expensive way of getting the same results. Closed-circuit ocean cameras are another possibility.

Capt. Baker spoke about the difficulty of surveying commercial harbors to ensure their safety after the tsunami. Reopening ports as soon as possible after a tsunami, cyclone or hurricane will minimize the economic damage it does. Perhaps a dedicated NOAA survey launch could be used for this purpose.

Capt. Baker suggested engaging in dialogue with mariners who operate near the Marine Sanctuary for the Humpback Whale. The area of the sanctuary is heavily trafficked, and its 13-knot speed limit might need to be adjusted.

Captain Bob Lamb, Matson Navigation Company

Capt. Bob Lamb gave an overview of Matson's shipping routes, serving Hawaii, Guam, Micronesia, China and the U.S. West Coast. Matson would be interested in seeing a NOAA product dealing with open ocean currents.

Capt. Lamb postulated the existence of a countercurrent near Wake Island, which slows down shipping. More information on open ocean currents might allow Matson and other vessels to avoid this current, thus saving time and spending less money on fuel.

Robin Bond, Hawaiian Ocean Safety Team (HOST)

Robin Bond described the Hawaiian Ocean Safety Team, which was founded in 1998 through a mandate from the Coast Guard. HOST works to make the Hawaii marine environment safer, and conducts outreach to educate the public on safe operating practices. HOST's relationship with NOAA has dramatically improved since NOAA representatives Lt. Jeffrey Taylor and Lt. Kyle Ryan came to Hawaii and began attending HOST meetings. In response to a request from HOST, the NWS has constituted weather information systems for each island, so that each island receives information relevant for it. Mr. Bond expressed interest in implementing PORTS® in Hawaii; Coast Pilot is being currently used.

Mr. Bond also asked for NOAA assistance in dealing with the future onslaught of massive amounts of debris from the Japanese disaster. This debris may endanger Hawaiian tourism and the maritime industry; some debris may even be radioactive. We must prepare for this debris before it hits the beach.

Brad Rimmel, Sause Brothers Ocean Towing Company

Brad Rimmel spoke on behalf of the towing industry. Unpredictable currents affect interisland transit enormously, especially on the Hamakua Coast. More information about currents might help with vessel scheduling, saving money for Sause Brothers and its customers.

Mr. Rimmel thanked NOAA for its products and services and expressed his opinion that the average mariner, even when he uses NOAA services, is not aware of everything NOAA does. Maybe NOAA should promote itself and its services more.

Lieutenant Douglas Miller, U.S. Coast Guard, 14th Coast Guard District Waterways Management Branch

Lt. Doug Miller praised the long partnership between the Coast Guard and NOAA. The Coast Guard collects data from buoys, aids to navigation, and other sources, and that data is input into the ATONIS electronic system. NOAA can then pull data from ATONIS. NOAA and the Coast Guard also coordinate on marine debris issues and buoy systems. The Coast Guard broadcasts and publishes Notices to Mariners, to inform people about potential hazards and changes which affect navigation.

Lt. Miller suggested a few areas in which NOAA services could be improved. Electronic and paper charts should be consistent so as not to confuse mariners. Charts should be reliable and at the right scale; chart inserts can also be improved. When a private aid to navigation is still in existence but no longer maintained, should it be charted? And who is responsible for maintaining it? Side-scan sonar may greatly facilitate reopening of ports after a storm.

Questions from the HSRP

Member Brigham asked whether the Coast Guard has put out any safety bulletin on the subject of potential Japanese debris? Lt. Miller confirmed that an announcement was in a Hawaiian Notice to Mariners.

Lt. Miller and Member Carothers discussed the Army Corps of Engineers' role in cleaning up ports after disasters. Jessica Podoski from the Army Corps of Engineers confirmed that the Corps does not have local equipment capable of side-scan sonar. Lt. Ryan said that the Navy's Maritime Transportation Salvage Recovery Unit is willing to share its side-scan sonar equipment in the case of a shutdown of the Port of Honolulu. Richard Balser from the U.S. Navy COMPACFLT stated that the Navy's Fleet Survey Team can provide side-scan sonar and multi-beam capable boats at 48-hour notice in the case of an emergency.

Member Miller recommended that Mr. Bond contact the NOAA Office of Marine Debris regarding the tsunami debris issue. Marine debris may endanger sea life as well as people and ships.

Capt. Baker informed Chair Welch that any foreign-flagged vessel entering Hawaii is required to take a state pilot. The Hawaii Pilots Association provides services to all Hawaiian ports.

Mr. Rimmel described the towing companies currently operating in Hawaii. The tug and barge industry handles 90 percent of cargo arriving in the outside islands. Scheduling is critical in Hawaii, since the islands are dependent on imported fuel and supplies. Since larger barges are being used, berth availability is a problem. Coordinating tug and barge movements with recreational boats may be difficult. Mr. Rimmel also mentioned the need to fix aids to navigation in Keehi Harbor.

Chair Welch noted that several panelists had commented on the possible desirability of PORTS® in Hawaii. However, the key unanswered question here is: how do you fund maintenance of PORTS®? NOAA has little money to contribute to maintenance. Solving the problem of maintenance money would allow users to make a much stronger case for Federal help in establishing PORTS®. Chair Welch also recommended some of the economic studies which have been done on PORTS®. Mr. Edwing offered his office's assistance in providing cost estimates and sharing the experience which other locations have had with PORTS®.

Capt. Lowell asked whether HOST meetings include environmental organizations. Capt. Lamb confirmed that HOST meetings are open to the public; Board members come from diverse backgrounds.

The Panel discussed current modeling in Hawaii. Lt. Miller commented that the University of Hawaii is working on current modeling; almost real-time data is available online. Capt. Lamb added that although the University's work close to the islands is worthwhile, Matson would be interested in more data further out. Member Dionne suggested that a dialogue should be initiated between HSRP and IOOS (Integrated Ocean Observing Systems).

Chair Welch thanked the panelists and asked the NOAA staff in the room to introduce themselves. Chair Welch then opened the meeting for public comment.

Public Comment Period

David Swatland, the Deputy Superintendent for Programs and Policy at Papahanaumokuakea Marine National Monument, commented that the Northwestern Hawaiian Islands are home to an incredible wealth of natural and cultural resources, and as such deserve the highest possible level of protection. This protection is only possible with accurate, comprehensive and up-to-date mapping data. Mapping data is needed to monitor the impact of climate change, habitat change and natural events such as the tsunami.

At Chair Welch's request, Mr. Swatland described the Monument's physical features. The Monument is 140,000 square miles, including atolls, coral reefs and deep ocean habitat. It is home to seabirds, turtles, fish and is the last stronghold of the Hawaiian monk seal. The Monument is managed by seven different agencies, which makes reaching consensus a challenge. Mr. Swatland offered to provide the HSRP with a prioritized list of the types of mapping that would be useful to the Monument. Ms. Blackwell mentioned the possibility of using NOAA's existing contractors to do some of this work. Capt. Lowell encouraged Mr. Swatland to consider NOAA's user update when acquiring data.

The next public commenter was **Daniel Morris**, the Geospatial Officer for the Commander in Chief of the U.S. Pacific Fleet. He expressed gratitude for NOAA's accurate, up-to-date and comprehensive products. Navy oceanographic survey vessels do not overlap with NOAA's survey program, because Navy ships spend most of their time overseas. Mr. Morris advised NOAA to document its processes and solicit support from service users in order to justify its budget. There is a possibility that the Navy might convert the DNC format to ENC at some point in the future.

Member Jeffress and Mr. Morris discussed the Navy's narrow site-specific use of side-scan sonar.

HSRP Discussion

Chair Welch then opened the floor for members' observations and thoughts about the meeting.

Member Dionne commented that she was struck by how well NOAA's three line offices work together to put out a coherent set of products and services.

Member Jeffress described the Texas Coastal Ocean Observation Network's online survey of users. This survey is used to justify TCOON's financial outlays, and might be something NOAA would wish to imitate. Chair Welch warned that the HSRP does not have a mandate to advocate for NOAA to the general public, but the HSRP can choose to impress on NOAA the value of this sort of data collection and outreach.

Member Brigham suggested that the Alaska delegation be given more information on NOAA's work. Member Miller recommended that sonar sensors on NOAA Ship *HI'IALAKAI* be put to more use. Chair Welch pointed out that Congressional support for NOAA is crucial, and that when a senior Senator steps down, we should seek to educate his or her replacement.

Chair Welch summed up the three major themes of the day's meeting:

- The need to think strategically
- Challenges presented by the current state of budget, and specifically Hawaiian challenges
- Input from private sector users

Adjournment

The meeting was adjourned at 5:20 p.m.

Thursday, May 5, 2011

Chair Welch called the meeting to order at 8:37 a.m.

Member Lawson Brigham inquired as to whether members can receive updates from NOAA on the process of the National Ocean Policy. Chair Welch recommended that interested members subscribe to the Council on Environmental Quality listserv, while Capt. Lowell suggested that the topic could become a standing agenda item. Capt. Glang and Chair Welch discussed the upcoming summit on marine spatial planning to be hosted by the World Oceans Council. After a brief morning session, the HSRP made a site visit to the Matson Container Terminal in Honolulu.

Chair Welch reconvened the meeting at 1:04 p.m. He thanked Matson Navigation for arranging the morning's instructive tour.

Vertical and Horizontal Datums Stakeholder Panel

Need for Accurate Elevations in Pacific Islands: Dr. John Marra, NOAA NESDIS National Climatic Data Center (NCDC), Regional Climate Services Director, Pacific Region

Dr. John Marra discussed the role of hydrographic services in climate services.
The National Research Council has defined climate services as "a mechanism to identify, produce, and deliver authoritative and timely information about climate variations and trends and their impacts on built, social-human, and natural systems on regional, national, and global scales to support decision-making." Like the National Weather Service, climate services can become something ordinary people depend on to manage risks and make practical plans every day.

In the Pacific, climate services are being developed under the umbrella of the Pacific Climate Information System (PaCIS), which evolved from the Pacific ENSO Applications Climate Center.

Climate Services encompasses three focus areas:

- Freshwater resources and drought
- Community resilience in responding to sea level rise, coastal inundation & extreme weather
- Marine and terrestrial ecosystems

Dr. Marra listed three core capabilities:

- Education, outreach and user information needs
- Operational climate observations, products and services
- Research and assessment

These products and services are user-demand-driven.

To predict patterns in climate, we need geodetic and tidal datums, topographic and bathymetric data. In pursuit of this aim, the National Climatic Data Center (NCDC) has created focus area

coordination teams; for instance, about 20 to 30 people who are doing work related to sea level rise, inundation, and extreme weather. This sort of cooperation can help to leverage resources and improve efficiency and effectiveness.

NCDC's work on sea level rise or coastal inundation covers a broad range of phenomena, all subject to different parameters which are affected by climate change. In the Pacific, the ENSO (El Nino-Southern Oscillation) signal is very important. The western Pacific experiences sea level variations on the order of one or two feet every six or seven years. Of course, how sea level rises appears and how serious it is varies from location to location. When an island is not very far above sea level, the combination of a high tide and a mesoscale or anticyclonic eddy can lead to severely elevated water levels. The idea that sea level rises by three millimeters a year on average must be considered as a global average, which varies considerably across the Pacific. Each area has its own unique water level signature, within which different components of sea level variance are expressed. These components include sea level rise itself, seasonal cycles, storm surge, anticyclonic eddy and run-up.

NCDC must look at how these components work together in any given situation. Using statistical techniques, NCDC can calculate exceedance probabilities or the likely return interval of high points in water level, either within a given year or projected over the longer term. This analysis is dependent on accurate datums for calculating the mean sea level relative to which water level is measured. The most significant contributor to total water level varies by location. For instance, in Guam, typhoons are of major concern. Tides are of more significance in American Samoa. Hawaii is impacted by seasonal tides and also by extreme events such as hurricanes and tropical storms.

Dr. Marra displayed an experimental data product developed by CO-OPS, which lists return intervals and plots them relative to tidal and geodetic datums. Dr. Marra emphasized the need to have local tidal datums for the Federated States of Micronesia, the Republic of the Marshall Islands, and the northwestern Hawaiian islands. More tide stations in the northwestern Hawaiian Islands might help, but we should also maintain existing stations and continue to conserve their records, conducting data recovery when necessary. Providing climate services in the Pacific requires coordinating information from different data providers, sometimes from different countries. Hence, interoperability of services and the ability to partner with different organizations is key.

Dr. Marra concluded by saying that the need for vertical and horizontal datums may not be universally recognized, but it is absolutely critical to the production of climate services data products which stakeholders need.

Hawaii Leveling and RTN (Real Time Network): Chris Guerin, Hawaii Department of Transportation, Highways Division, Design Branch, Cadastral Engineering Station

Chris Guerin discussed the height modernization program being carried out by the Hawaii Department of Transportation (HDOT). This program is necessary since many benchmarks have been damaged or destroyed because of construction of highways or subdivisions, vandalism, or theft. Moreover, in Hawaii, neither any state agency nor National Geodetic Survey (NGS) has done any type of leveling since the 1970s. The possibility of creating a new geoid model for Hawaii has

been investigated, but there is not yet enough data for NGS to make a reliable geoid model. HDOT's height modernization plan will be carried out in six phases. The first phase is digital leveling for each island. The data HDOT will receive will then be sent seamlessly to NGS's database. HDOT's measurements will be tied to NOAA's tide gauges.

Mr. Guerin's Cadastral Engineering Section of HDOT has completed benchmark recovery for Oahu, with the result that, of 341 benchmarks searched for, only 197 were found. For the other Hawaiian islands, HDOT has not yet started searching for benchmarks, due to time and cost issues. HDOT and NGS currently rely on the engineering, surveying and GIS communities to inform NGS of the benchmarks that still exist. Much work remains to be done on the Big Island, as well as on Lanai and Molokai, where no leveling currently exists. The data from these proposed benchmarks will be submitted to NGS to be included in the National Spatial Reference System.

Phase 2 of height modernization is planned to cover the entire State of Hawaii with CORS (Continuously Operating Reference Station) and VRS (Virtual Reference Station) stations. The plan includes a server on each county, so that if one server goes down, backups are available. The stations will be constructed on state, federal or county property to ensure consistent access. Digital leveling will be conducted from the CORS sites to tide gauges. The HDOT would like at least 20 percent of its stations to go into the National CORS Network. The VRS system will save money and time by eliminating the need for base stations and for a person to monitor the base station.

Three HARN (High Accuracy Reference Network) projects have been completed: one from Kahe Power Station to Kaimuki; another on Ewa Beach and Waipahu; and a third from downtown Honolulu to Diamond Head. Some of this HDOT data can be used by Oahu's rapid transit system.

Phase 3 of height modernization involves doing LIDAR with airborne gravity. Phase 4 will be research and development supporting the development of a new geoid model for Hawaii. Phase 5 is the creation of a reference center for this data to reside. These phases will be funded and implemented in the future. HDOT's height modernization plan will benefit the private sector, the GIS community, the government, the military, and taxpayers in general through reduced costs for surveying and engineering.

Pacific GPS Met Program: Bill Ward, Chief, National Weather Service Pacific Region Headquarters, Environmental Scientific Services Division

Bill Ward presented the National Weather Service (NWS)'s Pacific GPS Met Program. In the Pacific region, NWS's area of responsibility includes:

- Weather Forecast Offices/Weather Service Offices
- The Central Pacific Hurricane Center
- Pacific Aviation Center responsibilities
- Marine Center responsibilities
- Climate responsibilities
- International Tsunami Information Center
- Pacific Tsunami Warning Center

Overall, the NWS Pacific Region is roughly four sizes the size of the continental U.S.
NWS's Pacific Region observing program uses weather surface and upper air observations, satellite ground stations, GPS sensors, buoys, ships and planes. It is used day to day to make NWS forecasts and provides support for its Watch, Warning and Advisory programs.

Mr. Ward mentioned some of the challenges facing NWS Pacific Region. Communications can be a problem throughout the Pacific. Airlines and ships may not be able to safely travel to the most remote locations. Operations and maintenance are a costly drain on limited budgets, and equipment, travel, shipping and contracts are all expensive. Moreover, in some areas, corrosive salt may quickly degrade equipment. Overall, the diversity of offices and services provided by NWS presents challenges. NWS's GPS-Met program is a ground-based system that measures the delay in GPS radio signal caused by water vapor above the surface station. The system uses low-cost commercial off-the-shelf GPS receivers, which are collocated with surface meteorological sensors. The sensors are accurate even when exposed to water; they require no external calibration, and their accuracy is thought to improve with time.

Mr. Ward listed the programmatic areas for which the NWS Pacific Region is responsible for. Among these are:

- Local forecasts and warnings
- Supporting model validation
- Tropical forecasting (including tropical cyclone forecasting)
- Atmospheric rivers
- Tsunami information
- Information on ground displacement for measuring tsunami possibility
- Support from Pacific Tsunami Warning Center and Alaskan Tsunami
- Warning Center
- Elevation datum
- Climate information
- Ground truth/elevation
- Tide station data

GPS-Met adds value to satellite calibration and validation, numerical weather prediction, and climate reference using the Geographical Reference Upper-Air Network (GRUAN). Radiosondes, which are launched every 12 hours, can be used in conjunction with continuous GPS-Met data to measure moisture levels. This can help prediction of the intensity of tropical cyclones. GPS-Met will have future value in initiation of convection and tropical, hydrologic, aviation and marine applications, and may become part of the National Mesonet. Partnerships with laboratories, universities, and seismic and climatology organizations have been useful to NWS. The GPS-Met system will allow organizations to model and understand the movement of moisture across the globe; this will help understand weather patterns not only in the Pacific region, but also in the Continental U.S.

Mr. Ward discussed possible locations for additional sensors. These sensors should be collocated with Met sensors. It may be possible to create automated data sites with GPS sensors in isolated locations. Wind profilers may also be useful, although their cost may be prohibitive. In the future,

algorithms may be developed to help NWS understand satellite integrated precipitable water. The GPS-Met system may also help with the study of the vertical transport of moisture, meridional transport and mid-latitude systems.

Need for Accurate Horizontal and Vertical Datums for Groundwater Resource Assessments in Hawaii and the Pacific: Stephen S. Anthony, Director, U.S. Geological Survey (USGS) Pacific Islands Water Science Center

Stephen Anthony talked about how the USGS provides information to manage, protect and enhance water resources, and address water-related hazards such as flooding. The USGS, unlike many other federal agencies, has no regulatory role; it is a scientific organization charged with providing reliable, impartial, and timely information. The USGS has many partnerships with federal, state and local agencies and universities in Hawaii and the Pacific. Most funding is reimbursible.

Groundwater is one of the most valued natural resources in the Western Pacific. In particular, more than 90% of the public water supply in Hawaii and Guam comes from groundwater. Since the water table of the freshwater lens is so flat, there is the potential for large error in some coastal areas. Because of this consideration, accurate water level measurements referenced to a common datum (such as mean sea level) are essential when conducting resource assessments. For instance, a common datum is used when determining the direction of groundwater flow and the change in freshwater storage in aquifers**.** These measurements are used to assess water availability and to understand how contaminants in aquifers move. It is critical to understand small differences in water level accurately. For instance, USGS found that for several wells in Maui, measuring point elevation had changed by up to a foot and a half since the last survey.

Mr. Anthony concluded by thanking NGS for providing the datums which are the foundation for USGS's work.

GIS Needs Accurate Datums and Transformation in the Pacific Region: Craig Clouet, Solutions Engineer, ESRI

Craig Clouet spoke from the perspective of the Pacific GIS community. This community includes the military and governments who use GIS, private companies, utilities, and coral reef and wildlife protection agencies.

Mr. Clouet discussed mapping new locations for cell phone towers in the Federated States of Micronesia using GPS and USGS maps. The military buildup currently going on in Guam makes access to modern, up-to-date datums necessary. Members of the GIS community need to know how to do transformations between historical and modern datums.

Another data products is SHOALS LIDAR, a type of LIDAR which penetrates through seawater. SHOALS LIDAR can be used for tsunami modeling, coral reef preservation, and navigation. The GIS community wants to see SHOALS LIDAR updated and used in all the islands. LIDAR is also useful when maneuvering large ships in a small harbor such as Honolulu Harbor; in particular, 3D

visualization of data. Vertical datums are critical for disaster response and preparedness, both in predicting tsunami effects and in rebuilding afterwards. Datums help to prevent property damage and deal with slow erosion of beaches.

GIS and GPS is used for cleanup and remediation after ship groundings, and for accurately laying undersea cables and protecting them from damage. Mapping out restricted areas for the protection of Hawaii's unique wildlife is also done with the help of GIS and GPS. Mr. Clouet suggested that the U.S. National Grid could work particularly well in the Pacific as an accurate mapping system for public safety needs, particularly since, in Hawaii, counties, state and federal users all currently use different coordinate systems and different UTM zones.

Mr. Clouet asked for help educating the community about what resources are available and what they mean; some people may not understand how datums work, while some users of GPS may overestimate its accuracy. GIS software is starting to enable a seamless, integrated data set, using a "top of the mountain to the bottom of the sea" approach.

Mr. Clouet introduced Richard Snay's PACP00 spatial reference system for the Pacific. Users may need to understand the differences between PACP00, NAD 83, WGS 84 and ITRF, and be able to transform between these systems. More training and documentation is needed to explain these complex issues to users in a simple way. The GIS community should put Epoch tags on WGS84 and NAD83 to improve GPS accuracy. There is a 1.57 meter difference between NAD83 and the newer HARN/NAD83. Perhaps NOAA and USGS should provide guidance about which system should be used, and about which datum government agencies are using.

Mr. Clouet expressed his appreciation for NOAA's practice of publishing metadata (data about data), which makes it easier to analyze data using GIS.

Questions from the HSRP:

Vice Chair Matt Wellslager asked Dr. Marra about the sources of the tide gauges used by NCDC. Can the data gleaned from these gauges be combined in a uniform way and analyzed by multiple organizations? Dr. Marra replied that the gauges are installed by multiple groups; some are coordinated through GLOSS (the Global Sea Level Observing System) but some are not. The Hawaii Sea Level Center runs the Joint Archive for Sea Level (JASL), which provides quality control and quality assurance on the data from about 350 sea level stations. Unfortunately, Dr. Marra said, interoperability remains a challenge in analyzing global sea level. There is no single place to access data from every tide station, there is no common worldwide data format, and the ways charts are displayed can also differ. Mr. Edwing pointed out that interoperability is one of the missions of the IOOS program, and work is being done in that area.

Member Scott Perkins inquired about the possibility of using cloud computing for HDOT's height modernization project in order to cut costs. Mr. Guerin acknowledged that was a possibility that should be investigated.

Jeff LaDouce, the Pacific Regional Director for the NWS, commented that NOAA is instrumental in helping to produce tsunami inundation maps for the Pacific. He drew the HSRP's attention to the Compacts of Free Association that exist between the U.S. and the Federated States of Micronesia, and between the U.S. and the Marshall Islands; a Compact with Palau is currently going through the Congressional approval process. These Compacts create a unique situation in the Pacific that is not yet understood. Mr. LaDouce thanked NOAA for supporting NWS's Pacific work.

Juliana Blackwell stated that the National Geodetic Survey has begun work on two new datums, one geometric-based, and one geopotential-based, which should help to integrate reference systems between the Pacific islands and the mainland. These datums will be developed with a GRAV-D based geoid model, which will then develop into a new vertical reference system. This system is planned for four to six years from now. Ms. Blackwell suggested that NGS and HDOT may be able to work together on the GRAV-D initiative. She asked about the timeframe for HDOT's leveling work. Mr. Guerin responded that it will take several years to get leveling done. Simultaneously, HDOT will be working on VRS paperwork.

Chair Welch brought up the challenge of conveying the importance of geodetic services to people who live inland. Using datums to locate the best places for cell phone towers might be relevant to them. Mr. Clouet agreed that finding the best locations directly impacts people's cell phone reception. Chair Welch and Mr. Anthony discussed USGS's work on measuring groundwater levels; this is another topic whose importance the average person can understand.

Member Gary Jeffress noted that the Air Force's solution for the problem of cell phone reception is to use air ships which stay above the weather and above the jetstream. These ships are an ideal location for cell communication.

Dan Polhemus of the U.S. Fish and Wildlife Service, who is also the Chairman of the Monument Management Board for Papahanaumokuakea National Monument, commented that the sea level around the Monument rises by about five millimeters per year, a non-trivial amount when dealing with low-lying land. The Monument Management Board's Climate Change Working Group is currently working on a coastal vulnerability assessment. In order to do accurate scenario planning, accurate datums are needed as reference points. Mr. Polhemus expressed an interest in partnering with other agencies who can advise the Monument Management Board.

Marc Ericksen from Sea Engineering commented that his company needs to combine land surveying data with oceanographic and hydrographic data sets. Working within different systems is challenging, since the results given often conflict.

Chair Welch thanked the panelists for their contributions and adjourned the meeting for a short break.

After the break, **Ed Carlson** from NGS presented a short history of NOAA's work in the Pacific region. NOAA's total Pacific area of responsibility is almost twice the size of the continental U.S., but the land area is only about the size of New Jersey. The area spans seven time zones and both the

Northern and Southern Hemispheres. Mr. Ward confirmed that NOAA has responsibility for weather services in the Federated States of Micronesia, the Marshall Islands, and the Republic of Palau.

HSRP Member Presentations

Arctic Issues and the Role of NOAA Navigations Services: Dr. Lawson W. Brigham, Distinguished Professor of Geography and Arctic Policy, University of Alaska Fairbanks

Member Lawson Brigham gave an overview of Arctic issues from the perspective of the Arctic Council. The Arctic area of the United States defined as area north of the Aleutian chain. Different countries define "Arctic" differently. The Arctic Ocean differs from most oceans because it is a marine area with an ice cover. This sea ice is retreating and is getting thinner, but overall there is still an ice cover throughout most of the year.

Member Brigham discussed the Arctic Council's Arctic Marine Shipping Assessment 2009 Report. The key challenge for the Arctic states is the influx of ships, shipbuilders and investors coming in; often people who have little experience of or understanding of the Arctic. In 2004, the Arctic Ocean hosted 6,000 ships making 12-13,000 voyages.

Member Brigham listed a number of different activities going on in the Arctic today. How can marine spatial planning help to mesh indigenous uses and whale migrations with all other Arctic activities?

- Indigenous use
- Commercial shipping
- Marine tourism
- Fishing
- Drilling for oil and gas
- Oil and gas transport
- Mining of zinc, copper, palladium, iron ore, etc.
- Trade between Alaska and Russia
- Exploration of the sea bed

How can Arctic states respond to potential emergencies on Arctic ships? In remote regions, there may not be much infrastructure to deal with a disaster. The future regulatory push will be to require redundant equipment on ships operating in the Arctic. An estimated thirty percent of the planet's undiscovered gas may be located in the Arctic, and there may also be undiscovered oil. Many potential gas sources are located within the EEZ (exclusive economic zone) of coastal states, and thus under the regulatory control of the coastal state in question.

The Arctic Council's recent study concluded with three themes:

- *Enhancing Arctic marine safety*
  - Arctic state linkages
  - International Maritime Organization mandatory polar code, including standards of ship construction

  - Developing uniformity of governance, particularly for marine shipping
  - Passenger ships
  - New search and rescue (SAR) agreement
- *Protecting Arctic people and the environment*
  - Indigenous use
  - Community engagement
  - Invasive species
  - Special marine areas
  - Oil spill prevention
  - Marine mammal impacts
  - Air emissions
- *Building Arctic marine infrastructure*
  - Infrastructure deficit
  - Arctic marine traffic system
  - Environmental response capacity
  - Hydrographic, meteorological and oceanographic data

The Arctic Council is meeting this week in Nuuk, Greenland, where the Arctic states will sign a new SAR agreement. Moreover, a new Arctic Council Policy Document has been negotiated and approved by Arctic states.

The highest-priority Arctic issues, according to a workshop held by the Arctic Ocean at the University of Alaska Fairbanks, were:

- A mandatory polar code
- Full tracking and monitoring of commercial ships (mandatory automatic identification systems)
- SAR agreement
- Indigenous marine use surveys
- Circumpolar Response Capacity Agreement
- Arctic Observing Network Implementation (AOOS)

Member Brigham suggested that compiling an interactive sea ice atlas, using IPCC models, might be valuable for marine spatial planning.

Chair Welch asked whether there are commercial ports or Coast Guard bases north of the Bering Sea. Member Brigham replied that there are not; there is only one working U.S.-flagged icebreaker vessel in the Arctic. Chair Welch noted that the U.S. government's physical maritime infrastructure in the Arctic Ocean is minimal. Member Brigham questioned whether the Arctic needs big container ports; the port of the future for the Alaskan Arctic, he said, is a response port with oil spill equipment and a few Coast Guard ships—not a port where ships stop.

Member Dionne asked about the next steps on the Arctic. Member Brigham mentioned the Arctic Council's new SAR agreement and its planned environmental response agreement. In the future,

although sea ice retreat may increase the time in which the Arctic Ocean is ice-free, ships in the Arctic Ocean will be required to be polar-class ships; the Arctic states don't want to allow free-water ships in Arctic waters.

Chair Welch commented that a system of large container ships is dependent on a stable, consistent operating environment, which will not exist in the Arctic in the foreseeable future. Member Brigham noted that some shippers may not be prepared to deal with the seasonal variations in the Arctic. The window of time in which ships can operate may be narrow, and in winter, even nuclear icebreakers must travel slowly through the ice. When cruise ships enter the Arctic, there may not be enough infrastructure to do salvage in the case of an accident.

Member Brigham responded to Member Jay's question about the Northwest Passage. There are eight different routes, of which the deeper channels are further north. The U.S. and Canada disagree about whether to define these channels as internal Canadian waters or as international straits.

Member Jeffress asked about the degradation of GPS accuracy in the Arctic. Member Brigham responded that all communications are degraded quite a bit when near the central Arctic Ocean.

Recreational Boating Community and the Pacific Region: Susan Shingledecker, BoatU.S.

Member Susan Shingledecker introduced BoatU.S., the Boat Owners Association of the United States. BoatU.S. has about half a million members in the U.S. Members receive discounts and can buy insurance from BoatU.S. BoatU.S. also has the country' largest fleet of towboats.

Member Shingledecker's organization, the BoatU.S. Foundation for Boating Safety and Clean Water, works to educate recreational boaters about how to be safer and more environmentally conscious. Most recreational boats in the U.S. are between 17 and 19 feet; the vast majority is not luxury yachts, and 79 percent of boat owners have an average household income of less than $100,000. Recreational boating has a significant impact on the economy, specifically on small businesses and on jobs; in 2009, over $30 billion was spent on sales and service of recreational boats. Recreational boaters interact, in one way or another, with almost every line office of NOAA BoatU.S. rents EPIRBs (emergency positioning indicator radio beacons) to boaters, and if these beacons go off, BoatU.S. works with the Coast Guard to provide emergency assistance. BoatU.S. works with the National Marine Fisheries Services on recreational fishing issues and with NWS on weather forecasts. National Ocean Service (NOS) and CO-OPS are also important to recreational boaters, who need charts and weather and current data.

Member Shingledecker moved on to the subject of recreational boating in Hawaii. Hawaii has the lowest number of registered recreational boats per capita in the U.S. One reason for this is that boating infrastructure in Hawaii is inadequate, with many harbors in disrepair. Also, boating in the open ocean around Hawaii can be dangerous.

Capt. Lowell commented that perhaps NOAA, short of resources as it is, doesn't invest enough in recreational boating. However, NOAA provides some useful tools; for example, on NOAA's

website, anyone can download NOAA charts in booklet format and print them out. This free service was designed specifically for recreational boaters.

Capt. Lowell, Chair Welch and Member Shingledecker discussed the relationship between BoatU.S.'s towing service and the Coast Guard. The Coast Guard is available in emergencies, but in a relatively safe, non-emergency situation, the Coast Guard may call a commercial tower. Coast Guard commanding officers can use their own discretion in making that decision. BoatU.S. and the Coast Guard both have an interest in keeping boaters safe. Above a certain threshold, large boats are required to carry charts for safety reasons.

Member Shingledecker suggested that the HSRP might, in the future, plan a discussion of the 'chart of the future'. Finding a way to allow boaters to access limited charts on their smartphones might increase safety in a way that is accessible to the average boater. The BoatU.S. Foundation is investigating different charting products to determine which applications work best for different users and different types of boating. Capt. Lowell mentioned NOAA's computer-based product catalogue, which allows users easily to download charts which have been updated; this catalogue is accessible through the iPhone app iNav. Member Jeffress asked about the possibility of producing electronic charts as a layer on Google Earth or Google Maps. Capt. Lowell responded that NOAA data is freely available and several websites aggregate that data, although not Google.

Member Shingledecker responded to Member Brigham's question about the relationship between BoatU.S. and the Coast Guard Auxiliary. BoatU.S. provides online education and a tool to help people find in-person boating safety courses. Chair Welch noted that AIS may be useful for recreational boaters.

NOAA Navigation Services' Role in Supporting Coastal Science and Management in the Pacific: Joyce Miller, Joint Institute for Marine and Atmospheric Research, Research Corporation for the University of Hawaii

Member Joyce Miller listed the primary drivers for mapping in the Pacific region:

- *The Coral Reef Conservation Act's National Action Plan to Conserve Coral Reefs*
  - Directive to "produce comprehensive digital maps of all coral reefs in U.S. States and Trust Territories within 5 to 7 years"
- *Magnuson Stevens Reauthorization Act of 2006*
  - Directive to define essential fish habitat, habitat areas of particular concern, and annual catch limits
- *Endangered Species Act*
  - Directive to define critical habitat for an endangered or threatened species

Due to the presence of these legislative mandates and the several monuments in the Pacific, the habitat mapping that has been done over the past decade has been focused on coral at the 0-150 meter level. There are few lagoons or estuaries in the Pacific. Dedicated ships and launches are critical for mapping in remote areas, and volcanic islands and coral atolls may be very steep.

Member Miller outlined the differences between benthic habitat mapping and ocean charting. One difference is that complete coverage of an area is not always necessary when doing habitat mapping. In the Pacific, the paucity of tide gauges makes it difficult to do charting. Predicted tides may be the only data available.

Some of the purposes of benthic habitat mapping are:

- Identifying coral resources
- Designing biological monitoring protocols
- Finding site locations for biological and climate change monitoring
- Design/evaluation of marine protected areas
- Monitoring fish populations
- Definition of annual catch limits
- Correlation of fish populations with essential fish habitat
- Identification of critical habitat for endangered species
- Determine life history and preferences for overfished or invasive species
- Management needs, such as:
  - Finding energy routes and sites
  - Dealing with ship grounding
  - Creating storm/tsunami models

When identifying where coral resources are, it's important to take statistically valid random samples; in order to do so, a researcher must understand the depth and type of marine environment present. Coastal science and management are both essential for this work. Multispectral satellite data, LIDAR bathymetry and backscatter and launch- or ship-based multibeam solar bathymetry and backscatter are all used in habitat mapping. Acoustic and optical sensors can't locate the bottom of the ocean; to do this, divers, AUVs, ROVs or sonar is needed. Some derivative products (such as hard-soft maps and slope and rugosity measurements) can be created from bathymetry and backscatter data with a limited amount of optical ground-truth data. But to achieve a seamless, integrated mapping product, everything from satellite data to bathymetry and dense optical ground-truth data is required.

Coral Reef Conservation Program data indicates that in most Pacific areas, over 80% of territory has been mapped, although the Northwest Hawaiian Islands and Pacific Remote Island Areas remain largely unmapped. All the bathymetry that has been collected in the Pacific up to the last six months is available online in grid form. The Coral Reef Conservation Program has spent $26 million since 2001 on coral reef mapping, and other NOAA groups and external partners have spent $37 million in collaborative efforts. Many agencies are working together, including the University of Hawaii's School of Ocean and Earth Science and Technology (SOEST), the State of Hawaii, the U.S. Naval Oceanographic Office, the USGS, and others. There are some pieces missing from this effort; more data is needed for the Northwest Hawaiian Islands, LIDAR data is not available in many areas, and there is a 'bathrub ring' or near-shore bathymetry data gap in shallow water that is inaccessible to LIDAR.

Member Miller stated that NOAA navigation services can help Pacific coastal science overcome some of its challenges. These challenges include the fact that costs for using a ship or launch are

rising, while ship time is shrinking. Remote areas of the Pacific are not accessible without a ship. Also, the NOAA process for assignment of ship time is uncertain. Funding uncertainties make maintenance and retention of assets (such as boats, equipment and personnel) difficult. When working collaboratively with other organizations, hashing out the details of funding can be a long and laborious process. Quicker and more effective funds transfer methods are needed.

Dan Morris asked whether the data collected for habitat mapping meets the quality requirements for NOAA's charts, and Member Miller answered that that data has been contributed to charts, although habitat mapping data may not be complete and must be corrected with predicted tides, rather than measured tides, in places where tide gauges are absent or inadequate. Capt. Lowell added that habitat mapping data, although not considered "charting quality", is sometimes the best information available. This data is used only in low-risk areas, and NOAA tries to inform users when data quality is not optimal. Mr. Morris suggested that NOAA may want to help improve the quality of data collected without unduly increasing costs.

Member Jeffress asked about the current health of coral reefs. Member Miller replied that remote Pacific coral reefs are often better off than Caribbean ones in heavily populated areas. On the other hand, some coral bleaching due to higher temperatures has been observed by divers, even in remote areas. Ocean acidification is also a risk. Coral reef pH and calcification is being measured regularly. Member Miller recommended the recent Reefs at Risk Revisited report for more information.

Members Jeffress, Miller and Dionne briefly discussed how coastal science is funded among different collaborative agencies.

Member Brigham brought the subject back to freedom of navigation in the Arctic. The Arctic has tremendous resources and has historically been home to whaling, sealing, and other international commerce. Marine protected areas in the Arctic would restrict navigation and hamper trade. Chair Welch agreed that freedom of seas should be taken under consideration when creating any sort of environmentally protected zone at sea. Member Miller pointed out that, in contrast to the Arctic, the Pacific has few resources in many areas, which makes environmental conservation easier. Chair Welch noted that imposing navigation restrictions using federal authority can be quite difficult outside of territorial waters.

Adjournment

The meeting was adjourned for the day at 5:22 p.m.

Friday, May 6, 2011

Chair Welch called the meeting to order at 8:30 a.m.

Hazards and Coastal Management Stakeholder Panel

Samuel J. Lemmo, Office of Conservation and Coastal Lands, Hawaii Department of Land and Natural Resources (DLNR), State of Hawaii

Sam Lemmo introduced his agency, DLNR, whose responsibility is to protect and conserve Hawaii's natural resources for the benefit of present and future generations. This includes responsibility for terrestrial and marine resources. The Office of Conservation and Coastal Management is similar to a zoning agency in charge of conservation lands. DLNR has been disseminating data on shoreline change and potential erosion hazards around Hawaii.

Mr. Lemmo gave an overview of the Kailua Beach Dune and Beach Management plan, done by his office in partnership with NOAA, and the University of Hawaii's Sea Grant and SOEST.

The purposes of the plan were:

- Anticipate effects of sea level rise
- Preserve and restore coastal dunes
- Develop proactive standards for new construction in the coastal zone
- Increase public awareness and education
- Provide funding and support mechanisms

Overall, the plan provides a simple blueprint for climate adaptation in Kailua, by weaving together science, natural resource management, urban planning and public education. DLNR is working to protect the Kailua dune from vegetation creeping seaward, which changes the dune ecosystem for the worse.

A study done by the University of Hawaii predicts that, by 2104, sea level may rise by one meter in Hawaii. DLNR is planning various responses to this problem by seeking to reverse the trend of increased land use densities in shoreline areas. It may be possible to guide urban development back from the beach. Perhaps a coastal construction line might be drawn. Some areas may be zoned as special planning districts, in order to decrease density of development and, in the long term, move building inland.

DLNR is also looking at non-regulatory strategies, such as educational outreach and acquiring selected beachfront properties. The Hawaii Coastal Hazard Mitigation Guidebook provides the public information about how to sustainably develop property near the shoreline. Some challenges for DLNR are the tendency to make short-sighted rather than long-term decisions, as well as uncertainty over climate science.

John Rooney, Pacific Islands Benthic Habitat Mapping Center/NOAA Pacific Islands Fisheries Science Center

John Rooney introduced the Pacific Islands Benthic Habitat Mapping Center (PIBHMC), whose goal is to produce benthic habitat map products in order to better manage coral reef ecosystems in the Pacific islands region; the mapping center is primarily funded by the Coral Reef Conservation Program.

The center's mapping products are used to:

- Delineate marine protected areas
- Plan undersea pipeline and cable routes
- Designated anchorage areas
- Delineate essential fish habitat and habitat areas of particular concern
- Perform environmental impact assessments
- Characterize fish communities and fish/habitat associations
- Stratification of biological surveying
- Site selection for research
- Tsunami inundation maps
- Safe navigation

The center maintains bathymetry syntheses for each Pacific island group, along with the University of Hawaii's SOEST.

Dr. Rooney reviewed some of the difficulties involved in doing habitat mapping in the Pacific. There is a general need for hydrographic surveying within the entire region; existing chart data can be old or incomplete. The vast distances between Pacific islands present another challenge, as do potential budget reductions.

Dr. Rooney made four requests for recommendations. First, the center operates an eight-meter survey launch, the R/V *AHI* (Research Vessel Acoustic Habitat Investigator). Data from the *AHI* has been used for tsunami inundation modeling. Dr. Rooney suggested that the HSRP recommend that NOAA provide funding to help the center maintain this valuable vessel. Having a dedicated launch in the Pacific is less expensive than sending another vessel to the Pacific from another location. Dr. Rooney drew the panel's attention to the near-shore bathymetry gap previously mentioned by Member Miller. This near-shore area is home to critical physical and biological processes, such as beach erosion, sediment movement, vessel groundings and coastal construction. Dr. Rooney's second recommendation was a systematic program to collect bathymetric LIDAR throughout the region. Third, Dr. Rooney asked for NOAA to support the collection of adequate data for coastal and marine spatial planning. The National Ocean Council has recommended the implementation of "comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States", but without adequate spatial data, this goal will not be achieved. Fourth, Dr. Rooney pointed out that NOAA or other entities should not have to duplicate the data collection efforts of the Department of Defense. He recommended that NOAA initiate a long-term data sharing program with DoD.

Adam Stein, Pacific Risk Management 'Ohana (PRiMO)/Pacific Islands Fisheries Science Center

Adam Stein introduced PRiMO, "a consortium of local, national, and regional agencies, institutions and organizations committed to enhancing the resilience of Pacific communities to coastal hazards and climate impacts." PRiMO is dedicated to collaborating to improve risk management products and services. PRiMO's huis, or groups, work in the areas of:

- Data analysis and decision support
- Data management and observations
- Training
- Disaster communications
- Risk reduction and post-disaster evaluation
- Traditional knowledge and practices
- Education and outreach

Collaboration saves money, builds relationships, allows for integrated service delivery, and broadens perspectives.

Mr. Stein introduced three requests from the risk management community. First, there is a need for improvements in tsunami preparedness and response planning, to provide for national security and the nation's economic health. Second, NOAA should support investments that will help PRiMO improve its work. Mr. Stein also noted the near-shore bathymetry gap. Third, Mr. Stein asked for development of tools like VDatum to improve vertical control in the Pacific. Mr. Stein also recommended increased stakeholder engagement and development of partnerships with valuable organizations like the Hawaii Ocean Safety Team, the Coastal Resilience Networks Program, the National Tsunami Hazard Mitigation Program, and PacIOOS (the Pacific Integrated Ocean Observing System).

Lieutenant Commander Marcella Granquist, Waterways Management Division, Sector Honolulu, U.S. Coast Guard

Marcella Granquist spoke on behalf of the U.S. Coast Guard. The Coast Guard is a multi-mission service, in charge of safety, security and stewardship. In Hawaii, as much as 98 percent of needed products comes by sea; therefore, it is crucial to maintain transit and commerce in the Pacific.

Lt. Cmdr. Granquist addressed the issue of how the Coast Guard deals with recreational boaters in distress. When the Coast Guard receives a request for assistance in a non-emergency situation, first it tries to find a friend or family members to assist the boater. Second, a Maritime Assistance Broadcast is sent out asking for volunteers to assist the boater. The Coast Guard has only 13 vessels in Hawaii, so it may take hours if one of those vessels has to be sent out. Calling Vessel Assist (the BoatU.S. Pacific towing service) is the third option. If none of these actions gets results, the Coast Guard will assist the boater.

In the Pacific, most vessels are very small and do not have GPS. Some do not have marine band radios, and some who have radios may turn them off. It's important to find some means to communicate with these boaters, and the Coast Guard will work with NOAA to find a way to do so.

Lt. Cmdr. Granquist stated that NOAA products are extremely useful to the Coast Guard. The Coast Guard uses NOAA charts, the Coast Pilot and weather data, especially historical data. She thanked NOAA for producing its Tidal Current Information early. The Coast Guard faces two challenges. First, the need to modify harbors to accommodate larger vessels safely will necessitate current survey data. Second, availability of real-time, accurate, and easily accessible data will help inform industry and public users and help prepare them for extreme weather and natural disasters.

Lt. Cmdr. Granquist recommended the implementation of PORTS® at Kalaeloa Barbers Point Harbor on Oahu. This harbor, which contains specialized cargo handling facilities not found in Honolulu Harbor, is subject to unpredictable cross-currents outside the entrance channel, and is visited by increasingly larger vessels carrying more bulk quantities of materials per voyage and visiting the harbor more often.

Dawn Johnson, State Hazard Mitigation Officer, State of Hawaii Department of Defense, Civil Defense Division

The next presentation was from **Dawn Johnson**, who outlined the mission of the State Civil Defense Division: to prepare for and respond to disasters and emergencies, protecting people, property and the environment. Because of Hawaii's location, assistance after a disaster takes three to five days to arrive from other islands or the mainland, so local emergency response services are critical. State Civil Defense plans for a diverse array of hazards, among which are:

- Hurricane
- Flash flood
- Tsunami
- Earthquake
- Volcano
- Landslide
- Urban fire
- Power failure
- Wildfire

State Civil Defense partners with governmental and private organizations at all levels; FEMA is one important partner. NOAA and resources like the DART network and Stream and River Flood Gauge Network can help State Civil Defense mitigate risk and prepare the citizenry of Hawaii for potential disasters.

Ms. Johnson discussed some of the components of the State Civil Defense mission: early warning systems, risk and vulnerability analysis, mitigation, public awareness and education. Per the Stafford Act, each state is required to create and maintain a multi-hazard mitigation plan. The State of Hawaii has a comprehensive plan, which incorporates by reference local plans developed by each county. Hawaii's multi-hazard mitigation plan was one of the first state plans to address

climate change and sea level rise. State Civil Defense, in partnership with USGS, added tide gauges on the North Shore of Oahu to improve warning times and allow residents to get out of harm's way faster, potentially saving lives.

Ms. Johnson reviewed some of the damage done in Hawaii by the recent tsunami. Several harbors and homes were damaged, but fortunately, no lives were lost in Hawaii. Traditional Hawaiian practices and habits keep many people living near the ocean, despite the occasional danger of doing so. The tsunami resulted in almost $10 million in damage to public structures; the damage to residential property and boats has not yet been measured.

Questions from the HSRP

Member Jeffress asked for a walkthrough of the procedure gone through, from the first time a tsunami warning is received to the time the wave hits (about seven hours' time).

Ms. Johnson responded that, first, the State Civil Defense goes into heightened alert. In coordination with counties, a decision is made about when to sound sirens. A targeted evacuation is conducted. Lt. Cmdr. Granquist described the Coast Guard operations during the tsunami, first the ports were cleared from commercial and recreational harbors. Mr. Bob McFarland from the Coast Guard added that it can be difficult to communicate with recreational boaters, and not all boaters are prepared to stay at sea for several days. Member Shingledecker offered that BoatU.S.'s online boating safety course might easily be tailored to include tsunami preparedness information. Digital select calling (DSC) radio technology might also help.

Member Shingledecker and Mr. Stein discussed the potential hazards posed by recreational boats in harbors that are out of repair. Mr. Stein recommended leveraging opportunities for the HSRP to work with the National Tsunami Hazard Mitigation Program.

Member Scott Perkins referred to Dr. Rooney's recommendation to create a data sharing program with DoD. This has been recommended before, but never accomplished. Member Perkins urged that the HSRP form a subcommittee to examine data sharing, cooperative missions and partnerships.

At Member Perkins's request, Mr. Lemmo updated the committee on the progress of plans for new wind farms in Hawaii. Chair Welch raised environmental concerns about derelict wind farms; who will take responsibility when a wind farm is discontinued? Mr. Lemmo responded that any new wind farm must give the State DLNR securities and bonds for the project, which allow the DLNR to decommission the wind farm if necessary.

Member Jay inquired about how tsunami preparedness would work on the West Coast. Lt. Cmdr. Granquist replied that the West Coast is actually better prepared because of its comprehensive vessel traffic systems. Mr. McFarland stated that, in the aftermath of a disaster, the Coast Guard will try to reconstitute ports and restart shipping as soon as possible. For instance, if the Port of Honolulu is closed, Pearl Harbor may be used for cargo operations, subject to the Navy's approval.

Member Brigham asked whether Coast Guard buoy tenders are fitted to do oceanographic observations, and Lt. Cmdr. Granquist replied that they are not, but could be. Member Brigham argued that all Federal ships should be utilized to gather ocean observation data.

Member Dionne suggested that economic analysis of the value of Hawaiian beaches might be useful to the panel in its dialogue with NOAA.

Lt. Cmdr. Granquist mentioned that models of what currents will be associated with a tsunami might be helpful for search and rescue operations and risk assessment. This data helps to estimate a vessel's movement between the time a call for assistance is made and the time the Coast Guard arrives. The current models the Coast Guard uses work well for SAR operations closer to the coast, but they are not real-time and could be improved.

Michael Parke from the Pacific Islands Fisheries Science Center brought up the Hydrographic Survey Office's suggestion that less biological sampling data be collected. Dr. Parke strongly encouraged the HSRP to recommend against this plan, since this data is important for doing habitat analysis. Detailed information should not be lost for the sake of efficiency. Chair Welch suggested that Dr. Parke write to the HSRP to summarize his concerns. The meeting was adjourned for a short break.

NOAA Budget Process and Policy/Legislative Update
Paul Bradley, National Ocean Service/Policy, Planning and Analysis Division (PPAD)

Paul Bradley gave a brief review of how NOAA's budget process works. The HSRP should be familiar with how this cycle works, so that its recommendations can be tailored strategically to the realities of the budget process.

NOAA's budget process starts at least 18 months before the fiscal year begins. Budget recommendations travel from line offices to the NOAA Budget Office, and from there to the Department of Commerce Budget Office and the Office of Management and Budget (OMB). These recommendations are reviewed at every step, as NOAA works with DOC and OMB to revise them. In February, the President will present his or her proposed budget, which is then reviewed by Congressional Appropriations Committees.

A final budget will ideally be completed by the start of the new fiscal year on October 1st. If Congress cannot agree on a budget, it will pass a continuing resolution, which allows Federal agencies to continue their work until a budget is passed. A continuing resolution may prevent agencies from spending money on certain programs; also, money can't be passed between NOAA's line offices. At any given time, PPAD may be working on budgets for three different fiscal years, since the process takes so long.

Congress passes both appropriations bills and authorization bills. Authorization bills are legislation that Congress passes to establish, continue or modify Federal programs, which authorize spending and provide guidance on how the Appropriations Committee should fund these programs. Authorization bills authorize spending, while appropriations bill actually give out money.

On the appropriations side, the Senate Commerce, Justice and Science Committee has jurisdiction over NOAA in the Senate, while in the House, NOAA is under the jurisdiction of the House Commerce, Justice and Science Subcommittee. On the authorization side, NOAA is under the jurisdiction of the Senate Commerce, Science and Transportation Committee, and of three House committees: the House Natural Resources Committee, the Science, Space and Technology Committee, and the Transportation and Infrastructure Committee.

The HSRP discussed what level of political advocacy is appropriate for HSRP Members. As private citizens, members have the right to engage in political speech, but they should not claim to represent the Panel, as the Panel has no position on legislation.

Mr. Bradley discussed some legislation of interest to the HSRP. The Hydrographic Services Improvement Act will expire in 2012. Representative Young of Alaska has introduced a bill that would amend the Hydrographic Services Improvement Act to authorize funds for hydrographic services in the Arctic.

Strategic action plans for NOAA's nine priority objectives in the National Ocean Policy are under development and soon to go out for public comment. NOAA is working with the International Trade Administration on the National Export Initiative, with the goal of doubling exports by 2015. NOAA representatives also serve on CMTS (the Committee on the Marine Transportation System).

Mr. Bradley emphasized the importance of keeping Congressmembers informed about and supportive of NOAA programs. PPAD is also trying to strengthen its relationships with constituent groups and identify additional opportunities for outreach. Inreach, or communicating within NOAA, is also needed.

Mr. Bradley informed the HSRP about some methods for accessing relevant legislation. Chair Welch thanked Mr. Bradley for his presentation and adjourned the meeting for lunch.

HSRP Discussions and Next Steps: Identifying Issues for the Next 2-3 Years
Ed Welch, HSRP Chair

The HSRP discussed when and where to schedule its next meetings. The most convenient meeting times for NOAA are late April to May for the spring meeting and mid-October to late November, for the fall meeting. Some of the suggested locations were LA/Long Beach, New Orleans, Alaska, Corpus Christi, Norfolk, Virginia, and Puerto Rico. Member Jacobsen said that next year might be a better time to visit LA/Long Beach, since then 12,000-14,000 TEU ships will be coming in on a regular basis. The HSRP leaned toward going to the Gulf region for its fall meeting, tentatively set for the week of October 24th. A May meeting in Alaska was determined the best time frame.

Chair Welch asked the panel members to share their thoughts or observations about the meeting. Member Dionne began by recommending that NOAA address the near-shore bathymetry gap which several stakeholders mentioned, doing so in a way which does not harm the core navigation services mission of facilitating shipping.

Member Jeffress opined that there is more economic value in PORTS® data than in weather data.

Member Shingledecker wondered about how best to advise NOAA and what kinds of products the HSRP might deliver. She asked the three line offices whether there were specific topics on which they would like to receive Panel guidance.

Member Miller asked how the HSRP can have an impact on helping navigation services be more effective. She also inquired about the possibility of having a meeting dedicated to internal discussion between the voting members. Chair Welch and Capt. Lowell responded that, since the HSRP operates under FACA (the Federal Advisory Committee Act), closed meetings are only possible under limited circumstances. However, the HSRP could constitute working groups, which are subject to fewer administrative requirements. Chair Welch asked the NOAA staff to email members in order to clarify these requirements.

Member Perkins noted that there are now several new HSRP members, who might benefit from an assessment of prior HSRP recommendations and leftover business from previous Panels. He expressed his belief that the HSRP should advocate for and support the PORTS® system. Member Jacobsen agreed that the PORTS® program should be formalized, given Federal oversight, and funded, so that it can be properly maintained and expanded. Member Perkins also asked for the HSRP to emphasize the need for consistent baseline geodesy to support other programs.

Member Brigham listed some topics of interest, among which were marine spatial planning, wind farms and how they affect coastal navigation, fishing, and IOOS. More should be done in the policy area, especially with the National Ocean Policy.

Member Jay expressed his appreciation for a very informative meeting. He focused on two important objectives: the need to optimize data recovery and use to manage scarce tax dollars and the need to promote coordination among different ocean observation systems, such as PORTS® and IOOS.

Member Carothers expressed his surprise at how many different groups of stakeholders NOAA has, and how low its budget is. NOAA should decide which programs to prioritize in order to get the most bang for its buck.

Member Jacobsen asked for an update, during the next meeting, on NOAA survey vessels. Perhaps NOAA could work in conjunction with port authorities and shipping line associations to find funding for PORTS®, perhaps from the Harbor Maintenance Trust Fund.

Vice Chair Wellslager said that interagency coordination remains a problem. NOAA should do more work with the equipment it has available now. Vice Chair Wellslager also raised the possibility of putting meteorological data sensors on CORS stations for the use of NWS.

Mr. Edwing noted that the meeting has been educational, in terms of highlighting a long list of issues to work on.

Ms. Blackwell said that NGS can present to the HSRP more information regarding its research efforts and pilot projects, and some of the technology which is under development. NGS needs to explain the relevance and importance of geodetic datums. What concrete significance are programs like GRAV-D going to have for the nation?

Capt. Lowell praised the stakeholder panels as a great way of getting regional information. The HSRP should come to consensus about what questions it wants answered, and then the stakeholder panels can be built accordingly. The HSRP should frame its recommendations with efficiency in mind.

Capt. Glang again raised the possibility of forming working groups. These groups should have a relatively narrow scope.

Mr. Bradley reiterated the importance of thinking strategically and thinking about the big picture.

Chair Welch thanked the members for their excellent attendance and engagement. He asked the members to consider what it means to think strategically. The Panel should try to relate the day-to-day activities of each line office with the larger picture of NOAA's strategic plan and the President's National Ocean Policy. Members should strive to familiarize themselves with those documents in order to do so. At the Silver Spring meeting, the suggestion of assigning larger themes to HSRP meetings was mooted. This might be related to the idea of working groups on specific subjects. A meeting in Alaska, for instance, might be planned by an Arctic Working Group, and focus on Arctic issues. Or a meeting in Norfolk might focus on working with the Department of Defense. Chair Welch offered to circulate a memorandum about possible themes, working groups, and strategic areas.

Member Brigham suggested that the U.S. Army Corps of Engineers or the U.S. Navy might be included in future stakeholder panels, since they have an important role in navigation services.

Chair Welch indicated that his term on the HSRP expires beginning of next year. Member Hickman urged HSRP Members to consider who the next Chair will be. Chair Welch agreed that the subject should be considered at the fall meeting. Solicitations for new HSRP members need to go out in the summer of 2011, and Chair Welch asked that members refer any potential new candidates to Ms. Kathy Watson. The HSRP is required to represent diverse areas of expertise, from different geographical areas and representing different organizations.

Member Miller suggested that the IOCM program be an agenda item for a future meeting.

Chair Welch moved on to the topic of a potential HSRP letter to the Administrator of NOAA. This letter would pass on the meeting's recommendations and observations. It will be drafted by the Chair, Vice Chair and NOAA staff, and then passed on in draft form to the members. Member Brigham suggested that the letter include observations, rather than recommendations, one of which could be that marine spatial planning needs to be marketed and explained better. Other topics for the letter might be PORTS® maintenance, interoperability and IOOS, seamless topography to

bathymetry, and more resource allocation to the Pacific region. The letter's observations should be linked to NOAA's strategic plan.

Adjournment

Ms. Watson thanked the HSRP and recognized Lt. Ryan for his tireless work. Chair Welch thanked all the NOAA staff for their help, and the meeting was adjourned at 3:00 p.m.

VOTING HSRP MEMBERS IN ATTENDANCE:

Edmund B. Welch, HSRP Chair	Passenger Vessel Association
Matthew Wellslager, HSRP Vice Chair	South Carolina Geodetic Survey
Lawson W. Brigham, Ph.D.	Distinguished Professor of Geography and Arctic Policy, University of Alaska Fairbanks & Senior Fellow, Institute of the North
Jeffery J. Carothers	Fugro Consultants, Inc.
Michele Dionne, Ph.D.	Wells National Estuarine Research Reserve
Captain Sherri Hickman	Houston Pilots Association
Captain Thomas A. Jacobsen	Jacobsen Pilot Service, Inc./Long Beach Pilots
David A. Jay, Ph.D.	Professor, Portland State University
Gary Jeffress, Ph.D.	Professor of Geographic Information Science, Texas A&M University, Corpus Christi
Joyce E. Miller	Joint Institute for Marine and Atmospheric Research, Research Corporation, University of Hawaii
Scott R. Perkins	Wilson & Company, Inc.
Susan Shingledecker	BoatU.S. Foundation for Boating Safety and Clean Water

VOTING MEMBERS NOT IN ATTENDANCE:

Stephen M. Carmel	Maersk Line, Limited
William Hanson	Great Lakes Dredge & Dock Company
Captain Ramon Torres Morales	Port of Las Americas Authority

NON-VOTING MEMBERS IN ATTENDANCE:

Juliana Blackwell	Director, National Geodetic Survey, NOAA
Richard Edwing	Director, Center for Operational Oceanographic Products and Services, NOAA

DESIGNATED FEDERAL OFFICIAL:

Captain John E. Lowell, Jr.	Director, Office of Coast Survey, NOAA

PACIFIC NAVIGATION SERVICES STAKEHOLDER PANEL:

Captain Steven Baker	Hawaii Pilots Association
Robin Bond	Hawaiian Ocean Safety Team
Captain Bob Lamb	Matson Navigation Company
Lieutenant Douglas Miller	U.S. Coast Guard, 14th Coast Guard District Waterways Management Branch
Brad Rimmel	Sause Brothers Ocean Towing Company

VERTICAL AND HORIZONTAL DATUMS STAKEHOLDER PANEL:

Stephen S. Anthony	Director, USGS Pacific Islands Water Science Center
Craig Clouet	Solutions Engineer, ESRI
Chris Guerin	Hawaii Department of Transportation, Highways Division, Design Branch, Cadastral Engineering Section
Dr. John Marra	NOAA National Climatic Data Center, Regional Climate Services Director, Pacific Region
Bill Ward	Chief, NWS Pacific Region Headquarters, Environmental Scientific Services Division

HAZARDS AND COASTAL MANAGEMENT STAKEHOLDER PANEL:

Lieutenant Commander Marcella Granquist	Waterways Management Division, Sector Honolulu, U.S. Coast Guard
Dawn Johnson	State of Hawaii Civil Defense
Samuel J. Lemmo	Office of Conservation and Coastal Lands, Hawaii Department of Land and Natural Resources
Dr. John Rooney	Pacific Islands Benthic Habitat Mapping Center
Adam Stein	Pacific Risk Management 'Ohana (PRiMO)

NOAA STAFF PRESENT:

Paul Bradley	NOAA/NOS/PPAD
Edward Carlson	NOAA/NGS
Virginia Dentler	NOAA/CO-OPS
Captain Gerd Glang	NOAA/NOS
Laura Hamilton	NOAA/Pacific Regional Coordination Team
Tiffany House	NOAA/NGS
Kristina Kekuewa	NOAA/PSC
David M. Kennedy	NOAA/NOS Assistant Administrator
Jeff LaDouce	NOAA/NWS, Director, Pacific Region
Michael Parke, Ph.D.	NOAA/Pacific Islands Fisheries Science Center
Lieutenant Kyle Ryan	NOAA/OCS/NSD/Pacific Island Navigation Manager
David Swatland	NOAA/Papahanaumokuakea Marine National Monument, Monument Management Board
Bill Thomas	NOAA
Nancy Wallace	NOAA/NOS
Kathy Watson	NOAA/HSRP Staff

OTHER SPEAKERS AND ATTENDEES:

Richard Balser	U.S. Navy COMPACFLT
Matthew Barbee	University of Hawaii SOEST
Arthur Buto	Hawaii Department of Land and Natural Resources
Bob Dupuis	Boat Surveys Hawaii
Marc Ericksen	Sea Engineering
Dolan Eversole	University of Hawaii Sea Grant
Tore Leraand	Leraand Engineering Inc.
Jay Magers	U.S. Navy
Michael MacDonald	Hawaiian Tug & Barge/Young Brothers Towing

Bob McFarland	U.S. Coast Guard
Ray Morgan	Critigen
Daniel G. Morris	U.S. Navy COMPACFLT
Karen Munroe	Critigen
Jessica Podoski	U.S. Army Corps of Engineers
Dan Polhemus	U.S. Fish and Wildlife Service
Kevin Richard	
The Honorable Brian Schatz	Lieutenant Governor, State of Hawaii
Tom Smith	U.S. Army Corps of Engineers
Ronnie Torres	HI-ARNG
Henry Wolter	USGS