

**48th Meeting of the NOAA Science Advisory Board
Washington, D.C.
November 19-20, 2013**

Presentations for this meeting have been posted on the SAB website at:

<http://www.sab.noaa.gov/Meetings/meetings.html>

SAB members in attendance: Mr. Raymond Ban (Chair), Ban and Associates Consulting LLC; Dr. Susan Avery, President, Woods Hole Oceanographic Institution; Dr. Michael Donahue, Vice President, Water Resources and Environmental Services, URS Corporation; Mr. Walter Faulconer, President, Strategic Space Solutions; Dr. Jeremy Jackson, Senior Scientist Emeritus, Smithsonian Institution; Dr. David Lodge, Professor, University of Notre Dame; Dr. Jennifer Logan, Professor, Harvard University; Ms. Jean May-Brett, STEM Partnership Coordinator, Louisiana Department of Education; Dr. Stephen Polasky, Professor, University of Minnesota; Dr. Lynn Scarlett, Managing Director for Public Policy, The Nature Conservancy; Dr. Jerry Schubel, President and CEO, Aquarium of the Pacific and Dr. Robert Winokur, Consultant

NOAA senior management and Line Office representatives in attendance: Dr. Kathryn Sullivan, Acting Under Secretary of Commerce for Oceans and Atmosphere and Acting NOAA Administrator; Dr. Russell Callender, Deputy Assistant Administrator, National Ocean Service; Dr. Louis Uccellini, Assistant Administrator, National Weather Service; Dr. Richard Merrick, Chief Scientist, National Marine Fisheries Service; Dr. Robert Detrick, Assistant Administrator, Oceanic and Atmospheric Research; and Captain Brad Kears, Office of Marine and Aircraft Operations

Staff for the Science Advisory Board in attendance: Dr. Cynthia J. Decker, Executive Director; Jennifer Bosch and Mary Anne Whitcomb

Call to Order

Ray Ban, Ban and Associates Consulting and Chair, SAB

Introduction

Ray Ban welcomed everyone to the 48th meeting of the NOAA Science Advisory Board, particularly the new members. Kathy Sullivan introduced Mark Schaefer, new Assistant Secretary. Dr. Schaefer also welcomed the SAB. He said NOAA is facing a series of stressors on the oceans while funding is reduced. He and Dr. Sullivan are examining the best uses of NOAA resources while ensuring the agency's work rests on a strong science foundation coupled with a robust observing program. He looks forward to the SAB guidance as NOAA strives to address these challenges.

NOAA Update

Dr. Kathryn Sullivan, Acting Under Secretary of Commerce for Oceans and Atmosphere

Summary

Dr. Sullivan thanked everyone for attending and said she enjoyed meeting new SAB members who come from all of the country and bring key expertise to NOAA through the SAB:

1. Michael Donahue, Water Resources and Environmental Services, URS
2. Walter Faulconer, Strategic Space Solutions
3. Robert Hicks, the College of William and Mary, Department of Economics
4. David Lodge, University of Notre Dame, Department of Biological Sciences
5. Jennifer Logan, Harvard University, School of Engineering and Applied Sciences
6. Stephen Polasky, University of Minnesota, Department of Applied Economics
7. Lynn Scarlett, The Nature Conservancy
8. Robert Winokur, U.S. Navy (retired)

NOAA Leadership changes since the last SAB meeting:

- Dr. Mark Schaefer is the new Assistant Secretary of Commerce for Conservation and Management and Deputy Administrator. He is responsible for driving NOAA's policies and programs in areas ranging from enabling marine transportation to managing our nation's fisheries and protecting and preserving coastal resources.
- Amy Kerrigan is the new Director of External Affairs. She previously worked as a policy advisor for Senator John Kerry and interim Senator William Cowan.
- RADM Michael Devany will become Deputy Under Secretary for Operations on January 1, 2014, replacing David Kennedy.

Impacts of the Federal Government Shutdown

The government shutdown impacted everyone very hard and NOAA staff were glad to be back to work when the government reopened. NOAA staff are dedicated to the work they do throughout the organization. NOAA core business systems came up very rapidly after the shutdown; however impacts on the NOAA mission due to the shutdown are more serious. In science there were compromises to observing systems, delays of supercomputer improvements, delays of post-Hurricane Sandy weather improvements; cancellation or delays of fisheries stock assessments; delay of fishing permits and rulemaking across the country; delays of coastal impact assistance grants. As a result of the compromise of numerous weather, climate, ocean

and coastal data sets, none of the information normally provided through NOAA websites and laboratories was available.

Regional Updates

One year ago, Hurricane Sandy struck the east coast. NOAA forecasters were able to provide reliable, actionable information four days before storm to emergency managers and officials, which undoubtedly saved lives. This was critical because emergency managers need information three days out for planning.

Hurricane Sandy Task Force Rebuilding Strategy, a collaboration between federal agencies, including NOAA, provides the agency with an opportunity to discuss what it takes to build resilient communities as changes in the planet continue. To support post-Sandy rebuilding and resilience for the future, NOAA is putting Sandy Supplemental funding to work through NOAA programs, partners and grants. NOAA received \$309.7 million to: help the region recover, provide more accurate predictions and better services, and to be better prepared to forecast and respond to storms.

Climate News

This summer the President released his National Climate Action Plan and Executive Order to Prepare for Climate Change which is intended to streamline coordination on these issues across federal agencies. The Executive Order establishes a Council on Climate Preparedness and Resilience whose membership includes the Department of Commerce; NOAA is playing a key role in this council as well as other initiatives including the Action Plan.

The Intergovernmental Panel on Climate Change (IPCC) Working Group One Climate Change Report will be released in early 2014. Once again, NOAA's great science and scientists contributed to the report, with 16 NOAA staff scientists participating as either lead authors or reviewers. The NOAA Arctic Report Card 2013, a collaboration of 147 scientists worldwide will be released at the December 2013 meeting of the American Geophysical Union.

Improved Infrastructure

The transition of the National Weather Service (NWS) operational weather, climate and ocean modeling suite to the new Weather and Climate Operational Supercomputing System was finished in July, ahead of schedule. The NWS computers are now more than twice as fast in processing models to provide more accurate forecasts further out in time. These upgrades are a huge advance for the public and private weather industry. In addition to the benefits to NWS forecasters and products, the upgrade will provide private sector partners with better information to enhance their services.

Ocean Exploration

Expeditions to the Northeast U.S. Canyons and at Mytilus Seamount this summer provided critical deep water environmental intelligence to support NOAA's Habitat Blueprint, state and federal discussions about potential offshore energy development, interagency partners' interest in recent and potential submarine landslides, and fisheries management council interest in deep water coral conservation efforts. During these cruises, public views of the live video feed surpassed 670,000, approximately a 1000% increase over 2012.

NOAA Ecological Research

Ecosystems

NOAA and partners published the first study to give comprehensive results of the Deepwater Horizon spill's effects on deep-water communities at the base of the Gulf of Mexico's food chain. This work examined soft-bottom muddy habitats, specifically looking at biological composition and chemicals at the same time at the same location. The deep-sea soft sediment ecosystem in the immediate vicinity of the 2010 spill will likely take decades to recover.

A Great Lakes mapping tool was released and features the most comprehensive collection of environmental contaminant data in the region, as well as information on natural resources, habitats, weather, water levels, and currents.

Corals-climate change adaptation

A recent study suggests that coral reefs may be more resilient than previously thought because past studies did not consider the effects of possible adaptation. The study projected that, through genetic adaptation, the reefs could reduce the currently projected rate of temperature-induced bleaching by 20 to 80 percent of levels expected by the year 2100, if there are large reductions in carbon dioxide emissions.

Fisheries

The Geophysical Fluid Dynamics Laboratory (GFDL) has been partnering with NMFS to advance understanding of climate impacts on fisheries in the Northeast and in the California Current Large Marine Ecosystem. NOAA is incorporating climate variability into its understanding of population-specific vulnerabilities to inform salmon recover plans and improved modeling of ocean drivers of salmon survival.

NOAA 5-year Research and Development Plan

NOAA released an updated 5-year Research and Development Plan in September 2013. Dr. Sullivan thanked the SAB and the scientific community for its input into the final document. The Research and Development Plan publicly presents NOAA's management of research and development projects and promotes collaborations with partners inside and outside the federal government.

Priorities for 100 days ahead

As Acting NOAA Administrator, Dr. Sullivan has had several priorities:

- Sustain the momentum, keep us moving on critical areas;
- Build on partnerships within NOAA, in the Department, Administration, and external partners;
- Hold listening sessions with each Assistant Administrator to discuss people, mission, plans and problems;
- Get up to speed on issues new to her (i.e., fisheries)
- Keep our satellite and weather programs on track.

If confirmed, she will expand her focus toward a larger vision and strategy for the agency. She is traveling the country to meet with NOAA employees to hear from them directly how the agency is doing and how it can improve. However there are some things she knows will be the cornerstone of any strategic initiatives. Her belief is in Mission first; People always.

Achievements

The President awarded the Greengov-Climate Change Champion category to the team that built and released post-Sandy flood mapping tool. This team included five NOAA staff.

Mark DeMaria was named finalist of the 2013 Samuel J. Heyman Service to America Medals (Sammies) for career achievement. Dr. DeMaria was honored for his impressive body of work that has become the bedrock for the nation's hurricane forecasters.

The 100th installment of Science on a Sphere was made in Silver Spring.

Empowering Science at NOAA

NOAA is close to establishing a science career track. Approved earlier this year as official NOAA policy and expected to be operational in early 2014, the science career track provides opportunities for scientists to advance in their careers based on their scientific productivity and stature, as their academic counterparts do, and not based on the accrual of administrative and management duties.

Department of Commerce Priorities

Commerce Secretary Penny Pritzker has four key goals for the Department: Trade and Investment, Innovation, Environment, and Data, all supported by a commitment to operational excellence. So far Secretary Pritzker has been a strong supporter of NOAA and is interested in finding ways to help advance the agency's mission.

While NOAA has faced challenges this year, Dr. Sullivan believes NOAA has the momentum needed to navigate the challenges of the future and capitalize on the opportunities that arise. Finally NOAA has the Science Advisory Board members using their knowledge, talent, and dedication to help NOAA meet its mission.

Update on NOAA Cooperative Institutes

Philip Hoffman, Director, Cooperative Institute Program Office, NOAA OAR

Summary

Philip Hoffman updated the SAB on the Cooperative Institutes (CI) and provided an introduction to the CI program for new SAB members. CIs are a long-standing way NOAA provides funding for research and development. Funding for CIs represents 26% of the total NOAA research budget and 45% of what OAR spends in basic and fundamental research. NOAA CIs are a long-term relationship between NOAA scientists and the academic community to conduct NOAA mission science for which NOAA does not have staffing and expertise. These institutes are also used as a training ground for future workforce personnel through the support of graduate students and post-doctoral staff. Many CI scientists have world-renowned expertise in their field. For example, the Intergovernmental Panel on Climate Change (IPCC) has several members who work at various NOAA CIs. Today there are 16 CIs, with a total of 41 universities spread across the country working on science issues.

The guiding principles of collaborative research, education, training and outreach that started 50 years ago are still valid today. The first CI was established in 1967 with University of Colorado at Boulder; the Cooperative Institute for Research in Environmental Sciences (CIRES) continues today. In 2004 the SAB recommended that CIs be established through a competitive process and re-competed every ten years. A NOAA working group evaluates NOAA's research needs to determine desired research themes for a CI. The competition is approved by the NOAA Administrator; NOAA then solicits proposals for a new CI through a Federal Register Notice. The applications for a CI are then evaluated by internal and external reviewers and the line office Assistant Administrator, under which the CI will reside, approves the final selection. The institutional award does not convey any money. Funding for the CI comes from amendments to the award. At end of the first five years the CI must pass a performance review based on SAB Review recommendations in the fourth year. After ten years, the CI is re-competed for another ten years.

CI funding has been relatively stable over the years but decreased in 2013 due to sequestration. The benefits of a CI to NOAA include high caliber foundational and applied research, students, post-docs, access to university infrastructure (vessels, high performance computers, laboratories), coordination with other state and local organizations, reduced indirect costs (at some CIs), and leveraged funding from other partners. All CIs have directors and professional administrative and financial staff. Many CIs that are co-located with federal facility have federal employees as adjunct staff.

Recently the CI headquarters office has reviewed the SAB advice to NOAA during previous reviews to assess if there are any commonalities across the CIs. Communication and outreach efforts were the most common areas that review teams suggested could use improvement. Overall it was recommended that NOAA be more proactive in engaging CIs regarding long-term planning of the CI. NOAA and the universities should also create a communication strategy for sharing information and encouraging dialogue among participants on CI information and management needs. With regard to education and outreach efforts, it was suggested that NOAA could assist CI's by encouraging interaction with education and outreach contacts within NOAA (e.g. local Sea Grant offices) that can help with program development. Mr. Hoffman concluded by inviting any available SAB members to attend the next Annual CI meeting in Silver Spring (March 17-18, 2014) to learn more about specific CIs.

Discussion

Walter Faulconer asked how many CIs are up for re-competition this year. Philip Hoffman replied that 2014 is a year off between competition cycles so there will be none up for recompetition in the next year. He also noted two CIs (Cooperative Institute of Ocean Satellite Science - CIOSS, and the Cooperative Institute for Climate Applications and Research – CICAR) are being discontinued after 2013 by their sponsoring organizations (National Environmental Satellite, Data and Information Service – NESDIS, and Oceanographic and Atmospheric Research – OAR, respectively).

Bob Winokur asked if the funding number shown was a NOAA-wide aggregate. Mr. Hoffman replied yes. Mr. Winokur asked if CIs are more vulnerable than other programs to budget shortfalls. Mr. Hoffman said because CIs are an integral part of research and development at NOAA, the agency is trying not to cut them more than programs are cut. It is not known whether this can be sustained if there are further cuts through sequestration.

Robert Detrick mentioned the OAR budget declined 18 % but the CI budget dropped by a lower percentage. Given the uncertainty in federal budgets, many labs are reluctant to bring on permanent federal staff and CI employees are filling vacancies. As the proportion of federal staff declines, the CI staff increases. In labs with co-located CIs, CI staff are completely integrated with federal staff.

Susan Avery, as a former director of the CIRES and as a host of a CI at Woods Hole Oceanographic Institution (Cooperative Institute for the North Atlantic Region - CINAR), said there is an advantage of long-term partnerships. These partnerships allow the CI and agency to establish relationships between individual projects with broader programs, meeting scientific goals that translate to products NOAA can use. In most universities, with NSF funding, scientists don't make the science connection or synthesis they do within NOAA CIs. This is an important value to having CIs.

Mr. Faulconer asked if more demographic data were collected besides just numbers of staff hired by year. Mr. Hoffman said they collect data on the completion of graduate degrees of CI graduate students. With universities involving undergraduates, the CIs provide data voluntarily but do not have data on where undergraduates go after their studies are completed. The challenge is that the official NOAA responsibility for collection of these data falls to the NOAA Office of Education. Reporting requirements should be specified in the initial agreement at the beginning of the 10 years. Many agreements do not contain a requirement for such detailed metrics.

Mr. Winokur asked if any CIs were in partnership with any Minority Serving Institutions (MSIs). Mr. Hoffman said there were no MSIs leading CIs, but some MSIs are part of consortiums. MSIs are funded specifically through the Educational Partnership Program (EPP) in the Office of Education. They are called Cooperative Science Centers (CSCs) focusing on the education piece of the partnership. There are alignments between Cooperative Science Centers and CIs but CIs have a research center model and NOAA doesn't want to complicate that or to take away from the CSCs.

Kathy Sullivan said she has been to some EPP sites where they are generating master's and PhD degrees. These activities show there is a potential for complimentary work between CSCs and CIs.

Ray Ban said establishing a CI today's in fiscal environment is a difficult task. Mr. Hoffman said if there are sponsors in NOAA who need a CI and it is doable administratively, those potential sponsors should consider academic partnerships. They do, however, need clear sense of the science questions to be answered, the funding, and a justification for why the work can't be done at an existing CI.

Dr. Sullivan noted that NOAA is talking with Congress about the insufficiency of resources for the CIs that already exist.

Ray Ban thanked Philip Hoffman for a great report.

Review Report on the Cooperative Institute for Research in the Atmosphere (CIRA)

Ray Ban, Ban and Associates, SAB Member and Chair, CIRA Review Panel

Summary

Ray Ban presented the external review report on the Cooperative Institute for Research in the Atmosphere (CIRA) that was conducted May 21 and 22, 2013 in Fort Collins, CO.

CIRA was founded in 1980 to foster collaborative projects between what is today the Earth System Research Lab (ESRL); the National Environmental Satellite, Data, and Information Service (NESDIS); and the Department of Atmospheric Science at Colorado State University. The collaboration includes NESDIS' Regional and Mesoscale Meteorology (RAMM) Branch that was imbedded within CIRA from its inception in 1980. The vision of this collaboration has remained constant over the years. Work on CIRA's themes related to satellite algorithm development, modeling, process studies, and data distribution are all traceable back to the origins of CIRA.

In addition to Fort Collins, CIRA personnel are co-located with Earth System Research Laboratory of the Office of Oceanic and Atmospheric Research (OAR) in Boulder, the Aviation Weather Center in Kansas City, and the Center for Satellite Applications and Research of the NESDIS in College Park.

Overall Assessment

CIRA has created extremely productive partnerships between academia and government and leveraged an impressive array of research support to add value to NOAA, other agencies, and society at large. CIRA, and therefore NOAA, has become a leader in understanding satellite observations and atmospheric modeling and the effective transfer of research in these areas to operations. CIRA research is vital to meeting the NOAA strategic objective of a Weather Ready Nation and supports Climate Adaptation and Mitigation. The ability of CIRA to fully realize its potential is limited by short term funding challenges which inhibit longer term planning.

Recommendations

Strategic Plan

CIRA should seek to maintain its partnerships, while working with NOAA to assure adequate support for NOAA's objectives.

CIRA must continue to strengthen the collaboration between personnel in Fort Collins and Boulder in order to bring to bear the most robust satellite observation and atmospheric modeling expertise upon NOAA's research portfolio.

CIRA must insure communication and processes are in place to fully enfranchise and leverage personnel in College Park and Kansas City into CIRA.

The Satellite Algorithm Development, Training, and Education research theme should consider having an on-site presence at College Park to guide and mentor CIRA personnel.

The Regional to Global-Scale Modeling theme should re-invigorate and strengthen the collaboration between the Boulder Finite-volume Icosahedral Model (FIM) and Non-hydrostatic Icosahedral Model (NIM) modeling efforts and the Fort Collins observations/processes research themes.

The Data Assimilation (DA) theme could enhance its R2O impact by collaborating more closely with NCEP.

CIRA is doing a great job from the strategic plan viewpoint; the Institute is aligned with NOAA plan and working well. The review team suggested thinking about how the collegiality and passion that exists Colorado State and ESRL is infused into the other locations at College Park and Kansas City.

CIRA has a strong background of activity in research themes. The panel made some recommendations to have an onsite presence to guide and mentor CIRA personnel and to develop a closer collaboration with the National Centers for Environmental Prediction.

Education and outreach.

CIRA should set aside or enable the delivery of set funding to support E&O capacity building and the staffing and development of E&O activities on behalf of the agency. There should be increased attention and resources should be considered for the societal impacts objective in order to establish a competitive program. Efforts are in line with CIRA's themes and the nation's need; most of efforts funded by the university and it would be great to be more effectively funded from NOAA.

Science Management.

CIRA management needs to ensure staff located in College Park and Kansas City has an adequate level of access to the CIRA collaborative/scientific culture and management.

Employees should be rewarded for designing and executing projects that result in the transition of CIRA research into NOAA operations.

NOAA should implement new formula for Task 1 funding and strategies to reduce the burden of reporting and proposal writing.

NOAA should develop and execute an aggressive schedule to establish renewal agreements in a timely manner to minimize disruption in work and funding. They should also consider funding multi-year CI research projects that are high risk/reward.

Overall Rating

The review panel unanimously agreed that CIRA should be continued and ranked the Institute's performance as "Outstanding", based on the guidelines for CI reviews.

Discussion

Christian Kummerow, the CIRA Director, thanked the review team for the report. On multiyear funding, Dr. Kummerow emphasized that great graduate students want to work on key projects but to do this CIRA needs more than one-year funding. It would be great to have multiyear funding sources for high risk, high reward issues that graduate students could work on.

Bob Winokur said he didn't hear NESDIS mentioned except at the beginning of the presentation and asked who is setting the tone and direction for CIRA. He also asked where CIRA's money comes from. Chris Kummerow said half of CIRA's funds are from OAR and half from NESDIS. NESDIS funds activities in Fort Collins and College Park; OAR funds activities in Boulder and Kansas City. Philip Hoffman added that a number of OAR-managed Cooperative Institutes (CIs) often receive funds from the National Weather Service which sends these funds to OAR.

Susan Avery asked how much of CIRA is funded by NOAA funds, university funds and other sources (other federal and other private funding). Chris Kummerow said that in addition to the CIRA agreement with NOAA, Colorado State also has a CI with the National Park Service and the Department of Defense, for a total of \$18 million, of which NOAA is \$12 million. Dr/ Avery then asked if the university support of education and outreach is in-kind support. The answer was yes, support included faculty salaries of about of about \$500,000.

Dr. Avery asked if this effort reviewed of all CIRA work, including National Park Service or just NOAA. Ray Ban answered that while only the NOAA science was reviewed, other work was mentioned in the review and this work was noted as a positive for CIRA.

Ray Ban asked how CIRA compares to the Cooperative Institute for Research in the Environmental Sciences (CIRES). Susan Avery replied that 60% of CIRES funding comes from NOAA, 40% comes from other sources. Ray Ban said the struggle in review was to look at all pieces integrated together and the challenge was to get NOAA to think about leveraging capabilities beyond NOAA. CIs offer a broader portfolio as a benefit to NOAA.

Bob Winokur asked if there is a standard format used across all reviews. Ray Ban answered yes; the review has a very standardized format. In preparation for the review, there is a template with questions used for all CI reviews so they can be compared.

Jean May-Brett said, as a former chair of a CI review, NOAA does a great job of setting up the reviews. She added that, in the CIRA report on education and outreach, there is a discussion of K-12 audience. In earlier presentations on Cooperative Institutes Philip Hoffman, OAR CI Director, showed a slide on journal articles on CIs. She noted CIRA should consider publishing in other refereed education journals that would highlight the success of the educational parts of the program.

Ray Ban reminded the members there is a transmittal letter that goes with the report to the NOAA Administrator and they could mention Ms. May-Brett's ideas in this. He asked her to please provide language to the SAB office that could be included in the letter.

Steve Polasky asked what societal impacts questions are being addressed. He wanted to know if these were natural science programs that have societal impacts "bolted on." He further asked who is involved and what would be required to make this part of the program successful. Ray Ban responded that there is a modest focus on the societal impacts area; the program is not just added on but the team agreed that this theme is still in its developmental stage. He agreed the social science area which still needed more work.

Chris Kummerow said CIRA really didn't have any money for societal impacts; that part of the program started because they had someone working on physical science who later got a degree in psychology. CIRA gave him a small amount of funds and this has been growing slowly. One topic they are exploring is how the public perceives the warnings that NOAA provides.

Bob Winokur asked if there were any weaknesses or outstanding problems with CIRA. Ray Ban said while not a weakness there is a need to focus on the enfranchisement of the Colorado State and ESRL culture into the other CIRA locations. The other area is the societal impacts and whether it should be ramped up or reconsider how it is being addressed.

A motion to approve the report was made by Bob Winokur, seconded by Jean May-Brett and passed unanimously.

Action 1: Jean May-Brett will work with the Cooperative Institute for Research on the Atmosphere (CIRA) to provide suggestions for CI education and outreach metrics.

Action 2: The Science Advisory Board accepted the report from the CIRA Review Team and will transmit to NOAA.

NOAA Response to the SAB Satellite Task Force Report

Mary Kicza, Assistant Administrator, NOAA National Environmental Satellite, Data and Information Service (NESDIS)

Summary

The purpose of this presentation was to present and discuss NOAA’s response and actions following the SAB’s Satellite Task Force (SATTF) report and recommendations: *A Review of NOAA’s Satellite Program: a way forward; November 2012*. The SAB Satellite Task Force report focused on NOAA’s long-term satellite architecture and the SAB recommendations are consistent with input from the Satellite Independent Review Team and other reviews with a short and intermediate-term focus.

The SATTF report described four primary areas of challenge:

1. Increasing satellite system costs and uncertain fiscal environment
2. Maintaining satellite continuity
3. Balancing requirements push and technology pull
4. Sustaining Partnerships

Eight core recommendations were included in the SAB report, with recommendation number 8 identified by the SATTF as the central recommendation. NOAA accepts all recommendations; more detailed is provided below.

Summary of SATTF Recommendations and NOAA’s Response

Specific Recommendations from SATTF	Summary of NOAA’s Response
1. Create, at the NOAA leadership level, a stable funding environment and management environment to support satellite activities	To improve the management environment, the DOC/NOAA chain of command oversight was streamlined, with standard metrics implemented. Top management monthly reviews focus on strategic issues, portfolio assessment and external engagement in order to support satellite projects.
2. Establish a prioritized list of threshold space-based observational requirements that maintains high impact capabilities.	NOAA is continuing a significant effort to apply a “value tree” methodology to improve

<ul style="list-style-type: none"> a) Define NOAA core functions and align them with national space policy and agency guidance b) Coordinate with all stakeholders (including national and international), with respect to prioritization of requirements and architectural tradeoffs c) Update the prioritization process database regularly with current information from subject matter experts 	<p>understanding of the impacts and value of all of NOAA’s observing systems and requirements to NOAA’s key mission areas. This analysis is being coordinated with the priorities of NOAA’s national and international stakeholders.</p>
<p>3. Create a Chief Systems Engineering function within NESDIS to address the end-to-end link from goals, to architectures, to concepts of operation, to individual system development and finally to delivery of the integrated systems across the organization</p>	<p>A Senior Systems Engineer has been retained and is advancing the recommended functions.</p>
<p>4. Develop a cost-capped implementation plan for a NOAA Enterprise Ground System building on the recently completed study and analysis of alternatives</p>	<p>NOAA continues a significant study for consolidating assets into an Enterprise Ground System capable of saving money and increasing flexibility and is establishing a senior leadership assignment with responsibility to lead the ground enterprise.</p>
<p>5. Develop an integrated master schedule addressing the entire satellite system architecture, including identification of the critical path(s)</p>	<p>Schedule management is a part of the new NESDIS Quality Management System, a comprehensive effort to elevate NESDIS-wide governance activities to better serve the mission of the organization. An integrated master schedule has been developed to show the key drivers impacting each satellite program.</p>
<p>6. Develop a tailored overarching risk-management plan consistent with alternative architectural decisions to ensure a sustainable future satellite program</p>	<p>NESDIS is developing a tailored risk management plan that assesses viable alternative satellite architectures and considers all levels of risk to ensure a sustainable future satellite program.</p>
<p>7. Create a plan and a process for developing innovative and contingency options to mitigate gaps and potential reductions in capability and capacity</p>	<p>NESDIS continues to explore a variety of approaches to mitigate the likelihood of a satellite gap and the operational impact should a gap occur. Of highest concern is the</p>

<ul style="list-style-type: none"> a) Establish a small, agile team to create the plan and process b) Capitalize on technology developments across all sectors, e.g., industry, academia, national labs and other agencies c) Consult other innovative organizations with space architecture experience; for example, DoD’s Operationally Responsive Space (ORS) office provides one model for rapid response and lower capability alternatives, especially for observational reconstitution in the case of single instrument failures d) Balance Technology Readiness Levels (TRL) with the criticality of the measurements 	<p>afternoon polar satellite (the JPSS system), which has been identified as a significant gap risk. A small team explored an array of mitigation alternatives and developed a comprehensive plan. Additionally, NESDIS continually monitors technical developments, considers commercial alternatives and collaborates with other innovative organizations, including the Operationally Responsive Space office. NESDIS also works with international partners to reduce risks and develop mitigations to potential and actual loss of observing capabilities.</p>
<p>8. Given the ten year timeline required to develop new satellite systems conduct an analysis of alternatives, starting in FY2013, considering cost, performance, risk and resiliency, and assessing trade space vs. requirements for at least the following approaches:</p> <ul style="list-style-type: none"> a) Continue JPSS and GOES architecture, b) Pursue new multi-sensor satellites, c) Establish a hybrid of current polar and geostationary satellites, d) Investigate a federated architecture with defined missions for individual partners, and e) Develop a new distributed architecture. 	<p>Early trades have already occurred for the JPSS program regarding gap risk and cost. NESDIS’ new systems engineering function will explore the suggested approaches and more undertaking analysis of alternatives for promising alternative satellite system architectures.</p>

.Discussion

Lynn Scarlett asked what does NOAA perceive as key implementation risks: both external risks and internal risks. If all recommendations are implemented, what does success look like? Mary Kicza said the external risk is the budget. In FY13 there was a cut of \$110 million from the Joint Polar Satellite System (JPSS) and a cut of \$55 million from the Geostationary Operational Environmental Satellite-R series (GOES-R)—all cuts were in the same fiscal year. Internal risk is the requirements and balancing them for users and those who expect continuity. NOAA users take whatever assets are available to deliver better products and services and create an expectation that these facilities and products will be available in the future. It is hard to manage expectations given the budget environment. Success is continuity of capabilities for users to

deliver products and services. The strategic objective is maintaining continuity for the NOAA mission.

Walt Faulconer asked if there was a risk control board in NOAA to address these issues. The response was yes, there is a risk control board and two new positions have been created to work on that topic. Walt Faulconer asked Ray Ban if these staff could be on the agenda at a future meeting.

Susan Avery asked, in addition to the risk control board, if there are mitigation plans. Yes, they do have mitigation plans. Susan then asked if, on the management side, the JPSS program director has direct authority. Mary Kicza responded that the JPSS director, Harry Cikanek, has 30 years' experience in NASA and is facile in dealing with options for the budget. Susan Avery asked if systems integration has a good team. The response was there are levels of systems integration; Mr. Cikanek has a chief systems engineer and staff reporting to him on JPSS. Susan Avery asked if NOAA considered the research community needs in terms of the requirements for products and services. The response was yes, absolutely; the integration team has been looking at all requirements across the Line Offices, what is needed and the impact if the systems are lost.

Bob Winokur thanked Mary Kicza for the response and the cooperation the Task Force got from NESDIS while doing the report; he is happy to know NOAA is moving forward on the recommendations. He still worries about requirements definition process, however, and the prioritization of the top five requirements. Mary said GOES-R has completed a requirements identification process; JPSS has also completed the process this past year.

SAB members and NOAA NESDIS representatives discussed this report in the context of other studies that have been conducted in recent years that included NOAA satellites.

Ecosystem Sciences and Management Working Group (ESMWG): Background on Working Group and Current Activities

David Fluharty, University of Washington and Jo-Ann Leong, Co-Chair, University of Hawaii ESMWG (presentation by phone by David Fluharty)

Summary

The purpose of the presentation was to provide background information on the Ecosystem Sciences and Management Working Group, as well as an update for the new SAB members on current activities. The ESMWG will be requesting the approval of new members at a future SAB meeting.

In discussion of current activities, David Fluharty provided some detail on issues to be discussed at the next ESMWG in-person meeting in 2014. At this meeting, members expect to finalize

recommendations on Ecosystem-Based Fisheries Management (EBFM) and Coastal Habitat Restoration. In addition, discussion will begin on how to frame a review of Ecosystem Services Valuation across NOAA and how to provide advice to the SAB to strengthen NOAA's strategy for Arctic science programs.

Discussion

David Lodge asked for a clearer context for what this group is doing. He wanted to know how advice from this group to the SAB is transmitted to NOAA and how NOAA works with the group. David Fluharty said the ESMWG work comes from questions posed from the Line Offices through the SAB. The ESMWG discusses those questions during its open meetings, which include NOAA staff participating in those discussions as appropriate. Recommendations are presented to the SAB, and, if approved, are transmitted to the NOAA Administrator, who sends the recommendations to the relevant NOAA line or program office. In 6-12 months NOAA responds back to the SAB on actions taken or proposed to be taken based on the recommendations. Ray Ban added that, as an example, at this meeting the SAB heard Mary Kicza's response to the SAB Satellite Task Force report.

David Lodge said there were broad questions the ESMWG is working on and he wanted to know the Line Offices that work on these issues. David Fluharty responded that the National Marine Fisheries Service asked for the advice on Ecosystem-Based Fisheries Management and the recommendations will go to NMFS for a response. On Arctic science programs the request came from NOAA and the recommendations will go to the specific Line Offices with responsibilities in the recommendation areas.

Rob Hicks asked if Ecosystem-Based Fisheries Management is a model for what the working group is doing. He specifically wanted to know whether, in examining the adequacy of science, is the ESMWG looking at availability of ecosystem indicators or the working of the ecosystem. David Fluharty said the group looked at all of those elements. In the NMFS regions, the ESMWG saw strong efforts to identify appropriate indicators, ensure adequacy of data and develop long-term monitoring. The ESMWG looked at coupled human systems, where decision-making in regional Fisheries Management Councils was done based on factors other than just the ecosystem. A key issue is increasing the use of ecosystem factors in the way decisions are made in Councils.

Report and Proposed New Members from the Data Archive and Access Requirements Working Group (DAARWG); Background on the Working Group and Current Activities

Eoin Howlett, President of Applied Science Associates, and DAARWG member.

Summary

Eoin Howlett provided an update on past and planned meetings of the DAARWG. A virtual meeting was held in May 2013 while the federal government shutdown impacted plans for a

November 2013 meeting. While there was a follow-up teleconference on November 7, 2013 there are plans for a February 2014 meeting.

Eoin Howlett requested approval of two new members, Chelle Gentemann and Karen Stocks and approval of a second term for current members Chris Lenhardt, Krish Narasimhan and Beth Plale. The CVs of the new members are posted on the SAB website.

GOES-R Level 0 Data Retention

DAARWG received a briefing on GOES-R Level 0 data retention plans at May 2013 meeting and had a lengthy discussion about whether or not Level 0 data should be kept longer than current two-year retention cycle. While members understand this policy is a result of prior practice, planning, and budgetary constraints, the DAARWG has some unease with the notion of discarding the raw data and would like to have an opportunity to explore further the rationale for keeping the data (or not), potential alternative technological solutions, and the potential trade-offs among these options. Therefore, the DAARWG recommends to the SAB that the working group be allowed to explore this through the use of a “tiger team” subset of the DAARWG.

Discussion

Ray Ban explained the process for submission of new members for SAB working groups. Working Groups will put forth nominations to SAB 60 days prior to the meeting in most cases. The Board member will review those nominations and will express any concerns to the SAB office and the SAB office will work to resolve those concerns prior to the meeting. For member renewals, it is understood that the Working Group wants the person to continue and the person is willing to do so. Cynthia Decker explained that for this process, new SAB members were not included in the distribution of CVs for early evaluation as they were not yet SAB members at that time.

David Lodge asked if the new members should vote. Cynthia Decker said it is up to them. For those new members who had the opportunity to review the CVs, she asked if they had any concerns. Mike Donahue asked if the candidates would accept membership if approved, Eoin Howlett said yes, the candidates would accept the membership. A motion made by Jean May-Brett to approve new members; Jerry Schubel seconded the motion which was approved unanimously. Jean May-Brett made a motion to approve members for renewal; Susan Avery seconded the motion which was approved unanimously.

Discussion on Recommendation for Review of GOES-R Level 0 Data

Ray Ban asked for discussion on the recommendation for a “tiger team” on the retention of GOES-R Level 0 data. Bob Winokur asked about the current policy on data retention; Eoin said the policy is to retain the data for two years. Eoin said there was concern about data being

discarded because there could be value in keeping the data longer so the DAARWG members recommend they study the issue. Jennifer Logan asked if anyone has asked if they keep it longer. Susan Avery said it is her understanding that there has not been demand and asked why study this for 6-9 months. She wondered if this could be done more quickly and more informally. David Hermreck said the satellite constituents want to keep information permanently but to do so would drive up the costs for NESDIS. If there is a demand to keep data, NESDIS will consider it, otherwise the line office will discard data after two years. Ray Ban asked if NESDIS would be in favor of the study by a tiger team and David Hermreck said yes. Jean May-Brett asked if this group would meet face to face; Eoin was not sure but imagined most work could be done virtually. Ray Ban asked if team members would be only from DAARWG or would include external subject matter experts. Eoin said external subject matter experts should be included. Ray asked if DAARWG would run this group and the answer was yes.

Bob Winokur asked if they were trying to solve a problem that did not exist. Ray Ban said Working Groups are diligent and competent and their thoughtful process should be considered. Jerry Schubel added that the SAB should respect the request. Walt Faulconer asked about the expected outcome of the report- would it include consideration of the cost if data retention is extended beyond two years. Bob Winokur wondered if NOAA would accept the DAARWG recommendations because of likely cost.

Ray Ban said the subgroup would report first back to DAARWG. The DAARWG could accept or reject report. If the group accepted it, it would present this to the SAB. The SAB would then decide whether to accept, request or modify. If accepted, it goes to NOAA, which has the option of accepting or rejecting the recommendations.

Jerry Schubel made a motion to approve DAARWG's request to establish the tiger team to evaluate retention of GOES-R Level 0 data, including the evaluation of all implications including cost. Walt Faulconer seconded the motion which passed unanimously.

Action 3: The Science Advisory Board approved three members of its Data Archive and Access Requirements Working Group (DAARWG) for renewal and two new members. The SAB Office will send letters to all individuals regarding the renewals and new membership.

Action 4: The Science Advisory Board approved the DAARWG to set up a task force to consider a retention policy for GOES-R satellite Level 0 data. The DAARWG will report back to the SAB on the recommendations from this group.

Gulf Coast Ecosystem Restoration Science Program Advisory Working Group (RSPAWG) Membership Update

Susan Avery, Woods Hole Oceanographic Institution and Member, RSPAWG Selection Committee

Richard Merrick, Chief Scientist, National Marine Fisheries Service and Member, RSPA WG Committee

Summary

This was an informational briefing about the formation of the Gulf Coast Ecosystem Science Program Advisory Working Group (RSPA WG), including a review of the RSPA WG membership approach; a review of the RESTORE Act background and science program overview; as well as an update on the selection of RSPA WG members.

Membership Approach

As stated in the Terms of Reference, the RSPA WG shall be composed 15-20 individuals from three groups of outstanding scientists and leaders with a broad interest in Gulf of Mexico RESTORE related activities:

Group 1 – Representatives of science-related organizations in the Gulf of Mexico

Group 2 - Ex-officio members representing other funding organizations

Group 3 - A rotating group of external subject matter experts

Representational members were solicited directly by letter from the SAB to the agencies and organizations listed. Subject matter experts (SMEs) were solicited through a Federal Register Notice put out by NOAA that identified specific areas of expertise sought and by letters to relevant professional societies and programs. Due to the federal government shutdown in October 2013, final selection of the subject matter experts has been delayed.

RESTORE Act Background and Science Program Overview.

Section 1604 of the RESTORE Act of 2012 authorizes NOAA to establish a Gulf Coast Ecosystem Restore Science, Observation, Monitoring and Technology program, in coordination with U.S. Fish and Wildlife Service and in consultation with the Gulf States Marine Fisheries Commission and the Gulf of Mexico Fishery Management Council.

To achieve the broad categories articulated in the RESTORE Act, the legislation states that research shall focus on four areas:

1. “State of health” for the Gulf, incorporating environmental, socio- economic, and human well-being benefits and elements
2. Integrated analysis and synthesis of data
3. Ecosystem processes, functioning and connectivity studies through integrative field/laboratory efforts

4. Holistic approaches to observing and monitoring

The NOAA priority is on integrated, long-term projects that address management needs. Funds may not be used for any existing or planned research led by NOAA, implementation or initiation of new NOAA regulations, and development of, or approval of, a fisheries catch share program.

The NOAA grant program will be managed by the National Ocean Service. There will be a Gulf-based program director who will be hired and program staff from both NOAA and USFWS who will work on the program. There is an internal oversight board of senior NOAA and USFWS leadership for the program.

The major role of the RSPAWG will be to provide advice to NOAA through the SAB on the science plan and how NOAA moves forward with grants.

Next Steps

The Selection Committee will move forward to select the subject matter experts and identify *ex-officio* and representational members. The representatives for the Centers of Excellence will be identified after those have been established. The Committee expects to have selection of SMEs and *ex-officios* completed by end of the year; representational members will be named soon after as permitted by RESTORE Act processes.

Discussion

Bob Winokur asked about the definition of whether observing system expertise should be space-based or *in situ*. The response was it was both. Jerry Schubel asked what success will look like. Richard Merrick responded that success will be a long-term integrated observing system in the Gulf of Mexico and associated research. Susan Avery agreed that observations are on top of her list as well; specifically an observing network that provides data products and a biophysical/ecosystem modeling system that will help with making decisions in the Gulf. Jerry Schubel agreed that data are no good unless transformed into science and then into decision-making.

David Lodge said he wasn't clear on what outcomes are expected from the program. Richard Merrick replied that better stock assessments is one thing Congress wants but there is also a need for process studies to understand reasons for change in stocks, e.g., impacts of an oil spill, climate, restoration etc. Susan Avery said an outcome would be having an ecosystem approach in place to determine if there is a healthy ecosystem, based on the services it delivers and the biological functioning.

Steve Polasky said he has been on a National Research Council committee on ecosystem services impacted by Gulf. While there are an infinite number of data that can be collected, what is important is to keep the system people care about functioning. Susan Avery said the science is

not there to understand the functioning of the biological system one can have a service being delivered but the system is still quite sick. Richard Merrick added that NOAA is the only agency authorized funding for science; other agencies have funding for restoration.

Jeremy Jackson said the Gulf area is more subject to change from factors like sea level rise than any place in the world. Habitat is discussed in a static sense but habitats are dynamic and uncertain and wondered if this kind of coastal science will be addressed. For example, marsh restorations might be flushed out due to climate change. Is there some way to build this science into the program? Richard Merrick said there is funding for subjects like that but it is the Restoration Council that has the money for that. Kathryn Sullivan said NOAA has a seat on National Fish and Wildlife Foundation (NFWF) that will spend \$2.5 billion over twenty years; she agrees that these are good questions but it will be up to NFWF to address them. The best NOAA can do is to bring this up during the proposal review process. NOAA may be an advisor to the RESTORE Council and will push for consideration of issues such as this. Richard Merrick added that NOAA funding is the only funding that can be used for science in blue water; other funding must be used for coastal restoration.

Lynn Scarlett said billions will be spent on restoration and there are three key points: examining the impacts of these projects, examining the influence of science on those projects; adjusting long-term projects over time to address changes in climate. It is important to define the relationship between the RESTORE Council and the people providing the science advice so they can make these connections, Richard said the RSPAWG does not inform the RESTORE Council, only the NOAA science program. Lynn Scarlett added that this division of responsibility should not preclude the relevance of having conversations so the key challenges can be understood and everyone is aware of issues that can undermine projects.

Kathy Sullivan said these facts make it incumbent upon NOAA as an action agency to be an ambassador and science agency to the RESTORE Council. As it provides advice to the SAB, RSPAWG it could charge itself with a role as a synthesizer of information and translator of science for the RESTORE Council. With respect to adaptive management, NFWF has long term projects and assessing whether projects are having the impact expected. NFWF is looking at a formal structure will hold back some money to respond and adapt plans and ensure recipients are asking those questions. Cynthia Decker added that the RESTORE Council will need to set up science advisory mechanisms. Richard Merrick agreed and said NOAA is pushing RESTORE Council to take a more proactive stance on science.

Michael Donahue said the Water Institute of the Gulf convened an adaptive management working group to establish a protocol to review the RESTORE Act projects; that example may be relevant to other states in the Gulf.

Richard Merrick said this program focuses on ecosystem science; the NOAA program does not feed into the restoration programs. NOAA made it clear that those programs should set aside

funds to do that science. David Lodge said the bigger pot of money should allocate money to monitoring. Richard Merrick said if the NOAA money is not protected, it would be taken to do restoration science and would not do synthesis research, i.e., on whether the ecosystem is healthy or unhealthy.

Kathy Sullivan added that, in designing science monitoring plan for this program, a question was raised about what areas are covered. The answer was from the shoreline out to deep water but not inland waters. Benthic issues are not covered, just green water and blue water. Kathy Sullivan asked whether there have been discussions on the design and distribution of science within the coverage. Richard Merrick responded that these decisions have not been made.

Ray Ban asked the SAB if there was a need to cast a broader net to find subject matter experts for the RSPAWG and members agreed.

Action 5: Science Advisory Board members will send the names, affiliation and links to CVs/bios for potential nominees to the Gulf Coast Ecosystem Restoration Science Advisory Working Group (RSPAWG) to the SAB Office for consideration by the Selection Committee. Area of expertise particularly needed include physical oceanography, marine mammals, ocean observing systems, and social sciences, including economics.

Public Comment

Phil Bye, Poldacker Group, supports the National Ecological Observatory Network (NEON) and wonders if Dr. Avery might fit it into the coastal observation program. Susan Avery said she would have to look at NEON to answer that and the same thing could be said about the coastal observatory system initiative and why the system off the northeast could not be transformed into a system for the Gulf of Mexico. The group can capitalize on what the National Science Foundation is funding and they should look at it.

Wednesday, 20 November

Discussion of SAB Working Groups - Meeting Policy in a Budget-Constrained Environment

Ray Ban, Ban and Associates and Chair SAB

Summary

Ray Ban set up the background for this discussion. He said in the current fiscal environment, NOAA has had to balance budget issues with the need for SAB working groups to have face-to-face meetings. Each working group is supported by a different Line Office or Offices and each

Line Office in FY 013 made decisions on whether to have face-to-face meetings on an *ad hoc* basis. There has been some disparity between working groups in the number and type of meetings held this year.

Ray Ban proposed a guideline for this discussion. The proposal is while the decision on the meeting policy will be determined by the sponsoring NOAA Line Office in discussion with working group chair(s), it is suggested that there be at least one in-person meeting per year. However working group meetings should be as frequent as necessary and may be virtual or in-person, depending on the need.

Discussion

Michael Donahue asked if working group meetings are tied to the SAB meeting schedule. Cynthia Decker said Line Offices have not typically done this because there are different people who attend working group and SAB meetings.

Bob Winokur added the Satellite Task Force could not have done its work without multiple in-person meetings.

For standing working groups, Ray Ban noted that, for example, if the DAARWG needed to accomplish a high priority task and required multiple in-person meetings in a short period of time, this would need to be dealt with on a situational basis.

Bob Detrick contacted the NOAA sponsors for SAB working groups; they all thought there was a need to have at least one face-to-face meeting per year. But they would also like the flexibility, if circumstances arise, to have more than one in-person meeting per year if necessary.

Susan Avery agreed that at least one in-person meeting was critical but asked if working groups ever have ended. Ray Ban responded there was an analysis of working groups completed three years ago to see if the current working group structure made sense. The attempt was to align the working groups with the four goals of the NOAA Next Generation Strategic Plan (NGSP). There was a matrix and report presented by NOAA and the discussion concluded that, as strategy and needs evolve, working groups can be stood up or discontinued.

Walt Faulconer asked if all working groups met at least once. Cynthia Decker responded that all working groups met in-person at least once this calendar year except the DAARWG, which had to cancel its meeting because of the government shutdown. In previous years, working groups met in-person 2-3 times per year.

Jeremy Jackson noted that the first full-length SAB webinar meeting [in March 2013] was successful because it wrapped up issues from the previous in-person meeting but the second SAB webinar did not work as well. He suggested the SAB could have fewer meetings for a longer time, perhaps three days. The group would need to plan for that.

Marshall Shepherd said perhaps as an alternative the working groups could have *ad hoc* meetings during the larger American Geophysical Union (AGU) or American Meteorological Society (AMS) meetings. Ray Ban said the EISWG leveraged AMS annual and summer meetings for *ad hoc* meetings of a substantial number of members.

Rob Hicks agreed with a minimum of one in-person meeting per year, given the difficulty of interaction by phone. Chris Lenhardt, Chair of DAARWG, said that there is an issue of momentum with meetings; the DAARWG was impacted by sequestration and other restrictions. Dr. Lenhardt agreed that there is a need for a clearer commitment for their meetings with a minimum of one face-to-face meeting per year.

Ray Ban said for the Board meetings, he agreed that the first webinar meeting in March 2013 was more effective and followed from the November face-to-face meeting. The second webinar meeting in July 2013 had some technology issues and the momentum stalled and didn't click as well. He suggested perhaps the SAB meetings should also follow the proposed guideline, including some creative ways, such as leveraging professional meetings, to add another face-to-face meeting during the year.

Kathy Sullivan added the SAB started discussions on long-term planning. She wants the Board to consider the value proposition with regard to working groups. Perhaps the SAB should consider more work by the Board as a committee of the whole and targeted topical panels rather than standing working groups; this discussion could inform the discussion of how often the SAB should meet. This is just a thought; she was not necessarily saying the working groups are not doing good work, but this is another option to consider.

Bob Winokur agreed with the value of in-person meetings; this in-person meeting was critical with so many new SAB members. For an informational meeting only, the SAB could have a webinar. The real issue is when there is substantive work, such as writing a report, or having NOAA briefings, it can't be done on a webinar. The key issue is to think of the work plan for the meeting and then see if it should be done in a face-to-face or webinar meeting.

Susan Avery noted that there is some difficulty for virtual interaction due to NOAA technology. National Research Council meetings are run very effectively with WebEx. There is need for a moderator of the chat room for the meeting to work well with a large group, WebEx software is better than a conference call.

Kathy Sullivan added that NOAA uses WebEx for National Weather Service briefings. The National Research Council has moved further down the road and trained a cadre of people to moderate WebEx.

Cynthia Decker said the SAB office has GoToWebinar software that has much the same attributes as WebEx but it is also a matter of training the staff running the webinar. Jeremy Jackson worked on a group that had one meeting a year and then had subgroups that worked

independently. When the group had a plenary in-person meeting, it received the information from the subgroups in advance and the full group had a good discussion at the in-person meeting. Walt Faulconer noted that webinars could work well but 50% of value of the meeting was the conversations outside the meetings, during breaks, etc.

Kathy Sullivan said there are budget pressures that would preclude the expense of in-person meetings but that clearly won't work. There is a need to focus on the work plan so the type of meeting would follow from the work plan. Alternatives could include swat teams, discussion of fewer topics for a longer time, and more work for the group as a whole rather than working groups. One in-person meeting per year for working groups is a minimum but not a maximum; a better model is obviously more time together. NOAA will figure out how to do this.

Ray Ban said the SAB doesn't need a motion or action on this guideline; for now there is agreement that one in-person meeting per year as the desired minimum and this will be managed on a case-by-case basis. He added that, if at some point NOAA doesn't have the resources to support the SAB meetings, it may be better not to do them at all and explore a different alternative; this is a new world order with the U.S. economy.

Marshall Shepherd asked if there had been a discussion of need and new role for Federal Advisory Committee Act (FACA) committees in general in a budget-constrained environment. Dr. Sullivan responded that this is something that is being reviewed as the agency reduces its efforts. Dr. Shepherd had similar discussions with the National Aeronautics and Space Administration (NASA) and wondered if there was a broader government-wide decision. Dr. Sullivan said that she was not aware of any discussion at a national level, such as by the National Science and Technology Council, on this topic.

Jeremy Jackson said there are good scientists in NOAA who can't travel to science meetings and that concerns him. The U.S. was not represented during the government shutdown at important international ocean meetings. He said he would rather have the important scientists of NOAA go to meetings [rather than fund the SAB] because that is an important part of mission. Kathy Sullivan noted that NOAA is dealing with this issue but the travel restrictions continue to be a problem that has impacted all federal agencies. Some of these restrictions are easing but due to the sequestration budget reductions, travel will not go back to pre-sequestration levels. It is a concern and the shutdown impacted a lot of important meetings.

Action 6: The Science Advisory Board and NOAA leadership, including the Assistant Administrators of the Line Offices, agreed SAB working groups should have at least one in-person meeting per year, with flexibility with respect to additional meetings. The SAB Office will incorporate the approved guideline on in-person meetings into the SAB Working Group Concept of Operations.

Discussion of the Environmental Information Services Working Group (EISWG) and the Climate Working Group (CWG) comments on the NOAA Response to the Climate Partnership Task Force (CPTF) Report

Ray Ban, Ban and Associates, and Chair, SAB

On the phone: Heidi Cullen, SAB member and CWG liaison; John Dutton, CPTF Co-Chair; Jennifer Faught and Wayne Higgins, NOAA OAR Climate Program Office; Ed Johnson, NOAA National Weather Service; and Tom Karl, NOAA NESDIS National Climatic Data Center.

Summary

Ray Ban provided some background on the impetus for the CPTF report. In late 2011 NOAA was in the process of proposing to create a Climate Service. The agency suggested that one area on which the SAB could provide advice was how the climate community could benefit from interactions between the public and private sectors of the climate enterprise. The SAB was asked to assemble a rapid-response task force to examine what can be learned from the weather enterprise on roles and interactions between these sectors. The task force included co-chairs Warren Qualley and John Dutton, members from the Environmental Information Services and Climate Working Groups respectively, as well as a number of other members external to those working groups. The CPTF took nine months to identify findings and recommendations on this topic. In addition to addressing an important need, the task force was an experiment to see if the SAB could provide advice to NOAA on a quick timeframe. About the same time as the CPTF report was completed, there was another report completed by the EISWG on Open Weather and Climate Services (OWCS). When response from NOAA was presented to the SAB, both reports were addressed in a joint presentation. The EISWG and CWG reviewed the response and thought the CPTF response was woven too much into the OWCS response and did not receive appropriate attention. As a result, the EISWG, CWG and CPTF chairs drafted a letter to Ray Ban, as chair of the SAB. This letter was provided to the SAB prior to the meeting to consider.

Ray Ban said once the SAB advice is provided to NOAA and NOAA provides a response the SAB normally takes no further action. However, he added that he believed this specific issue does deserve some consideration by the SAB.

Discussion

Warren Qualley, CPTF Co-Chair, said Mr. Ban covered the facts well; the letter speaks for itself. The main concern was that the CPTF was tasked on a quick timeframe at the request of NOAA and was a top-down report. The Open Weather and Climate Services report was developed from the bottom up by the EISWG. When the CPTF members saw the NOAA response, they were surprised at the great overlap NOAA chose to make between the two reports and felt that NOAA did not address all the CPTF recommendations.

John Dutton said the response was disappointing because the CPTF thought there was a real opportunity to work with the private sector to create something important and the NOAA response did not seem to show any intent from NOAA to follow up on the recommendations.

Ray Ban asked Ed Johnson and Tom Karl to provide comments.

Tom Karl said he hoped the NOAA response was not lost; NOAA is eager to exploit climate data and modeling capabilities with the private sector. This is not an issue that should be addressed with letter responses; there are tangible things that can be done and NOAA is ready to start working with the private sector on this.

Ed Johnson said part of the context was that NOAA was in the process of creating a climate service and that did not happen. That resulted in some disconnection between the original request and the response from the agency. NOAA needs a more effective way to coordinate climate services in the current structure, including NCDC and OAR capacity and the Climate Prediction Center in the National Weather Service (NWS). His sense is that we need mechanisms to coordinate climate services across those organizations.

Wayne Higgins added that NOAA should have emphasized the agency is moving ahead with an internal Climate Board that includes the Assistant Administrators in NOAA accountable for proceeding on climate initiatives. One key initiative is advancing societal challenge projects drawing on global observing, modeling and development of services. An important element centers around partnerships - internal, external, and international. The goal is to make progress on the public-private partnership component in addition to making progress across Line Offices.

Tom Karl added that he has talked to Walt Dabberdt and Nancy Colleton, Co-Chairs of EISWG, and will discuss this issue further at the EISWG meeting in December. There is a need for a more formal structure to bring together the public and private sectors for the long term. One idea is a 501(c) (3) organization that brings together public and private partners and is independent from NOAA and focused on identifying information needed for sustainable infrastructure ensuring NOAA is responding to the community.

Wayne Higgins added that last November there was an executive roundtable held at the University of Maryland on climate information responding to user needs. Climate risk managers from 15 major companies attended; the meeting was led by the private sector and organized around the societal challenges of NOAA. The group formed three subgroups to identify industry pilot projects that will be pursued in the future by NOAA and these partners.

Tom Karl added that the Cooperative Institute for Climate and Satellites (CICS) at the University of North Carolina helped organize six meetings with the private sector on a number of topics. There is a need to ensure that these events are institutionalized so they can be better coordinated in the future. NOAA would like to work with the EISWG to explore this idea further.

Susan Avery said the conversation so far is focused on NOAA work with the private sector. However NOAA has been funding regional studies through the Regional Integrated Sciences and Assessments (RISA) programs. She wondered why the academic sector was not included more in these discussions through the RISAs.

Wayne Higgins agreed that RISAs are involved in regional pilots, and are important in moving ahead in this area. Susan Avery added that the original report doesn't include RISAs and the NOAA response did not mention them. John Dutton said that the report followed the charge to look at NOAA and the private sector and not take on the broader groups of academia and international groups. Warren Qualley agreed the original charge was limited to private sector although there was some discussion of the academic sector by the task force.

John Dutton said it appears that NOAA is now responding in ways not included in the original response. Warren Qualley added that NOAA did not recognize or take credit for the accomplishments in its response and he thinks that good things are happening and would like to see them continue. Ray Ban said he was excited to hear Tom will be at the EISWG meeting in December. John Dutton said that Tom Karl should also come to the Climate Working Group. Ray suggested that Climate Working Group members be invited to call in to Tom Karl's presentation at the EISWG meeting.

Kathy Sullivan said the importance here is an ongoing conversation on this issue; it is much better to address issues rather than parse sentences on documents. The model going forward in climate will grow in a similar way to the NWS partnership model. She said members of the private sector claim there is a branding issue and costs that the public sector could suffer in going forward. Under the four Department of Commerce goals, Dr. Sullivan said there are specific points that reflect NOAA's intent to maximize Commerce data use by the private sector and other partners. As with the weather enterprise, publicly-owned and privately-shared data is a rich area for partnership with the private sector for developing value-added products. At virtually all of White House meetings on the Executive Order on Climate Adaptation and Preparedness, it has been NOAA reminding other agencies about public-private partnerships. NOAA can't maintain its momentum in the weather-climate enterprise without customer engagement to make sure NOAA is meeting customer needs.

Ray Ban thanked everyone for the conversation. He reiterated the value of the CPTF report and said he hopes these partnership initiatives will grow.

Ocean Exploration 2020: A National Forum-A Report of the Forum

Jerry Schubel, President and CEO, Aquarium of the Pacific, SAB member and liaison, Ocean Exploration Advisory Working Group (OEAWG)

Summary

Jerry Schubel provided a summary of the Ocean Exploration Forum that took place in July 19-21, 2013 at the Aquarium of the Pacific. It was the first-ever gathering of the ocean exploration community, with 112 attendees. The Forum was sponsored by a number of collaborators and partners. Attendees were charged with identifying a global ocean exploration program to be carried out by 2020.

Major findings included:

- Strong community support for a coordinated, collaborative national program of ocean exploration that combines the public and private sectors.
- Strong community support for NOAA to play the leadership role it has been authorized to play in PL 111-11
- Strong community endorsement of the present NOAA ocean exploration program model
- Strong community endorsement that priorities should be set by the ocean exploration community, recognizing national priorities.
- Initial priorities identified included Arctic, Western Pacific; water column; and areas affected by ocean acidification
- Strong consensus that it is not NOAA's responsibility to be a major developer of new technologies, but that it needs to be a leader as an early adapter, setting standards and providing validation.

Jerry Schubel proposed that the SAB convene a conference call with the Ocean Exploration Advisory Working Group and NOAA Leadership to be briefed on NOAA's Response to the Gaffney-Ausubel Decadal Review of the Ocean Exploration program.

Dr. Schubel said, in conclusion, that all elements the community talked about in the last ten years are on the Nautilus and Okeanos Explorer, worked well, and can be on other vessels. Jerry Schubel said he hoped members of the SAB can participate on a future ocean exploration expedition.

Discussion

Jamie Austin, University of Texas and member of the OEAWG, said ocean exploration connects with the next generation; the number of kids participating in the public part of the Forum and their enthusiasm was unparalleled, in his experience. Larry Mayer, University of New Hampshire and co-chair of the OEAWG, reiterated nothing he has seen in NOAA can capture the imagination of the public as well as ocean exploration

Michael Donahue asked if the Forum had any focus on Great Lakes and, if not, were there any applications appropriate for that area. Jerry Schubel responded that there was no emphasis on

that region in this Forum but there was a recognition that the Great Lakes need to be included in future discussions.

Bob Detrick attended the Forum and said what made it unique was the public-private partnership as well as the private sector attendance. The synergy that developed between government, private sector and academia was unique.

Jerry Schubel added that a second forum, proposed for 2014 in Baltimore, he hopes will be even more successful than the first one.

Working Group Updates

Climate Working Group Update

Holly Hartmann, Chair of the Climate Working Group (CWG), reported that since the last meeting an issue being discussed was the level of NOAA response to CWG input, specifically the Open Weather and Climate and the Climate Partnership Task Force recommendations. The group has seen improvements in interactions with NOAA, specifically in interactions with Wayne Higgins, Director of the Climate Program and Bob Detrick, Assistant Administration, Office of Oceanic and Atmospheric Research; they have also seen improvements in NOAA processes. One improvement in process-was the establishment by Wayne Higgins of an action tracker on CWG items, a great way to keep track of what is going on with discussions between the CWG and NOAA. Another process change was the use of subgroups to engage with specific programs in NOAA, with the subgroups reporting back to the CWG. Dr. Hartmann stated that these changes are heading the group in the right direction. The CWG will be looking at two themes across programs – the first theme involves partnerships, including both domestic and international, in the production of science products and the delivery of services. The second theme is research to operations and operations to research. The last in-person CWG meeting was held in April 2013 and they are working on recommendations to NOAA on: advice requested for principles in dealing with budget cuts in FY 14; a multi-modeling ensemble in the climate test bed; and the process for moving from research to operations. The CWG is also looking at the Tropical Atmosphere Ocean (TAO) network- prioritizing the array and identifying the impacts of budget cuts on reductions in data. In the area of external relations, the CWG is cultivating a set of stakeholders who are enthusiastic in supporting NOAA and helping NOAA develop those external relations.

Bob Detrick thanked Holly Hartmann for her work in chairing the group; the last in-person meeting was great and NOAA was pleased with the interest and enthusiasm of the new members.

Wayne Higgins echoed the willingness of NOAA to engage and move forward. Dr. Higgins said face- to-face meetings are important in working together to make progress. Dr. Higgins wants to

explore establishing an executive director for the Climate Working Group to provide updates to the CWG and to track actions. Kathy Sullivan noted that the title of executive director connotes a different authority than what is intended here; perhaps the title should be executive secretary or liaison.

Ray Ban added that on the Climate Partnership Task Force discussion, Tom Karl is scheduled to give a talk at the EISWG meeting and it may be useful for CWG members to call in.

Environmental Information Services Working Group

Ray Ban, SAB liaison to the Environmental Information Services Working Group (EISWG), said the EISWG Terms of Reference have been updated; the EISWG's responsibility originally focused on the National Weather Service (NWS) was broadened to other Line Offices. Additional members and disciplines were added to fulfill that broader charge.

The next EISWG meeting will be held in December and include updates by Louis Uccellini, Assistant Administrator, NWS. Tom Karl, Director of the National Climatic Data Center will talk about public- private partnerships including the possible creation of a 501 C3 to manage the partnerships. Majority and minority staff from the U.S. House of Representatives will talk about the proposed Weather Forecast Improvement Act.

On the topic of Open Weather and Climate Services, there is a large amount of data being generated by the National Centers for Environmental Prediction that are not released to the community due to technology and philosophic issues. Through a private/ public partnership there can be a gateway to get that data out; there will be an update on this topic at the meeting. Dr. Mark Schaefer, the new Assistant Secretary for Conservation and Management will also address the EISWG. Mary Kicza, Assistant Administrator, National Environmental Satellite, Data and Information Services, will talk about data gaps with satellites.

Susan Avery asked if the TAO array issues would be discussed at the EISWG. Bob Winokur responded that perhaps the data from the array would be discussed. Dr. Avery suggested that information on RISAs (Regional Integrated Science and Assessments programs) and how they engage with public- private partnerships be brought to the group.

Ray Ban said there may be an interaction between CWG and EISWG to look at these issues. Dr. Sullivan said she is looking at this kind of overlap for these working groups and the SAB Working Groups as a whole—what is the stated goal and outcome of these groups and how should these groups be organized for these key thrusts. Ray Ban noted there is some overlap of issues between CWG, EISWG, and DAARWG and as NOAA goes forward this should be discussed.

Richard Merrick said the Departments of the Interior and Agriculture have significant climate expertise. Is it worth having ex-officio members from these agencies for SAB Working Groups?

Dr. Sullivan responded that until NOAA has addressed the first order issues with SAB working groups, she would be hesitant to add any other issues.

Meeting Adjourn

The meeting adjourned at 11:30 AM.

Summary of Meeting Actions

Action 1: Jean May-Brett will work with the Cooperative Institute for Research on the Atmosphere (CIRA) to provide suggestions for CI education and outreach metrics.

Action 2: The Science Advisory Board accepted the report from the CIRA Review Team and will transmit to NOAA.

Action 3: The Science Advisory Board approved three members of its Data Archive and Access Requirements Working Group (DAARWG) for renewal and two new members. The SAB Office will send letters to all individuals regarding the renewals and new membership.

Action 4: The Science Advisory Board approved the DAARWG to set up a task force to consider a retention policy for GOES-R satellite Level 0 data. The DAARWG will report back to the SAB on the recommendations from this group.

Action 5: Science Advisory Board members will send the names, affiliation and links to CVs/bios for potential nominees to the Gulf Coast Ecosystem Restoration Science Advisory Working Group (RSPAWG) to the SAB Office for consideration by the Selection Committee. Area of expertise particularly needed include physical oceanography, marine mammals, ocean observing systems, and social sciences, including economics.

Action 6: The Science Advisory Board and NOAA leadership, including the Assistant Administrators of the Line Offices, agreed SAB working groups should have at least one in-person meeting per year, with flexibility with respect to additional meetings. The SAB Office will incorporate the approved guideline on in-person meetings into the SAB Working Group Concept of Operations.

