FY 2013 Operating Plan

North Atlantic Regional Collaboration Team

National Oceanic & Atmospheric Administration

Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia

October 2012

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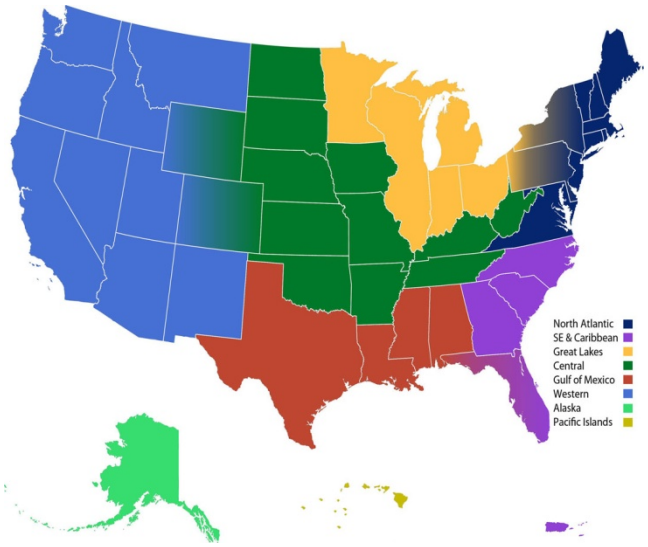
Regional Collaboration

NOAA established the Regional Collaboration effort in 2006 to support integrated, regionally-tailored implementation of NOAA-wide programmatic priorities and to provide a more systematic approach to both internal and external communications. NOAA has a responsibility to produce relevant, reliable and timely scientific information to support decision-makers and fulfill its stewardship mandates. Regional Collaboration enables NOAA to achieve this by identifying and applying NOAA's full range of capabilities, within and across regions to improve our productivity and value to stakeholders.



The Regional Collaboration Team (RCT) network creates a means for people to interact at a geographic scale that invites generation of new ideas on ways to better perform our mission and develop new products and services that are responsive to a changing landscape (e.g. changing with respect to society, economics, political pressures, etc.)

The goals of Regional Collaboration are:

- Stakeholder needs continually and adequately assessed for NOAA science, service, and stewardship;
- Integrated products and services tailored to the needs of NOAA's regional stakeholders and customers;
- Organizational responsiveness to stakeholder needs through the evaluation of and adjustments to products and services;
- Two-way communication with regional stakeholders, including regional governance initiatives, to build understanding, trust, and partnerships; and
- A workforce operating with shared awareness and understanding of its cross-agency missions and capabilities.

NOAA's North Atlantic Regional Collaboration Team (NART) is one of eight regional teams nationwide. Membership reflects the diversity of NOAA within the region and may include NOAA partners in addition to NOAA employees. Current NART members are listed in Appendix B.

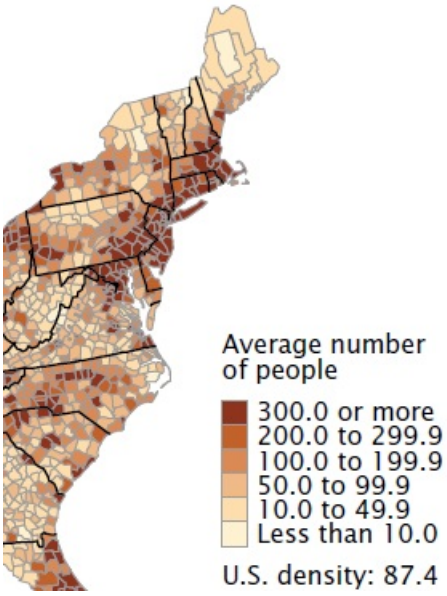
RCTs reach beyond team members to access expertise within the region to meet their goals. The NART does this through standing sub-teams based on an assessment of key regional issues and needs, including feedback from stakeholders. NART sub-teams broaden awareness of NOAA capabilities and encourage coordination of products and services around major priorities areas for the North Atlantic.

The current set of NART sub-teams include: Climate, Coastal & Ocean Uses, Ecosystems, Hazard Resilience and Water Resources. Leads of sub-teams are NART members, and sub-team membership is open to the NART, other NOAA staff, partners, and stakeholders, in order to take advantage of a wide range of expertise in the region. Sub-teams meet regularly, develop and propose annual activities to the NART, and are responsible for tracking progress of these activities through monthly reporting. The NART evaluates the use of existing sub-teams and their leadership/membership annually.

In FY13, the NART drafted outputs and outcomes for both internal and external projects to guide our operations. These logic models were referenced by subteams during project develop and are included as Appendix C.

The North Atlantic Region

Population
NOAA's North Atlantic region extends from Maine to Virginia. It encompasses the marine coastlines of 11 states, as well as Vermont and Pennsylvania, and is home to 70 million people. One hundred eighty coastal counties (and the District of Columbia) constitute 40 percent of the total land area, and 58 million residents, approximately 82 percent of the region's population[1].



Economy
The North Atlantic has four of the Nation's ten largest metropolitan areas, three of the top five U.S. ports (value of fish landed) and five of the Nation's top 20 ports (international cargo volume). The Mid-Atlantic (NY, NJ, MD, DE and VA) is a relatively affluent part of the country, having 43 of the 100 highest-income counties in the nation based on median household income and 33 of the top 100 based on per capita income.

The regional economy is diverse: from dairy farms inland to fish processing and marine construction and transportation on the coasts. The region is also perhaps the busiest portion of the country for tourism. New York City, Boston, Philadelphia and Washington, D.C. attract business, and are centers of art and culture. The cities' large populations drive tourism in the rest of the region, including mountain and seaside getaways like the Berkshires, Newport, Long Island, Cape Cod, and the White Mountains.

The region has significant coastal-dependent industries. In New England, the ocean economy accounts for 200,000 jobs, $6.1 billion in wages and $11.2 billion of Gross Domestic Product (GDP) with seventy- five percent of the jobs in tourism and recreation[2]. In the Mid-Atlantic, the ocean economy accounts for over 600,000 jobs, $20.3 billion in wages and $40.2billion of GDP, with seventy-nine percent in tourism and recreation and another 12 percent from marine transportation[3].

Political Landscape
Gubernatorial races will take place in three of the region's 12 states in 2012 – Delaware's John Markell (D) and Vermont's Pete Shumlin (D) are both up for re-election. New Hampshire's John Lynch (D) is retiring.

There are a total of 98 members of U.S. House of Representatives in the North Atlantic, with the vast majority (77) in the Mid-Atlantic (the Mid-Atlantic is home to 18 percent of the U.S. House membership, compared to five percent in New England.) Congressional redistricting as a result of the 2010 census will go into effect for the 2012 elections. Massachusetts, New Jersey and Pennsylvania lost one seat; New York lost two. The MA seat is of interest to NOAA since redistricting was a factor in the retirement of Barney Frank (MA-4), who has been in office since 1981. Before redistricting Frank represented the significant commercial fishing port of New Bedford, MA.

There are three U.S. Senate retirements in the region in 2012: Four-term incumbent Independent Joe Lieberman CT) (who caucuses with the Democrats), one-term incumbent Democrat Jim Webb (VA), and three-term incumbent Republican Olympia Snowe (ME). There are eight additional U.S. Senate seats up in 2012, seven Democrat (DE, MD, NJ, NY, PA, RI, VT) and one Republican (MA).

[1] National Association of Counties.
[2] "Ocean Economy" is comprised of the following six sectors: Living Resources, Marine Construction, Marine Transportation, Offshore Mineral Resources, Ship and Boat Building and Tourism and Recreation. Source: ENOW.
[3] Ibid.

NOAA in the North Atlantic

NOAA's regional work is done in concert with a host of governmental and non-governmental partners, ensuring we apply the full suite of NOAA capabilities to address the environmental challenges in this geography. Focusing and integrating these capabilities in the North Atlantic region will improve our ability to provide products and services to our constituents.

Fortunately, NOAA has substantial assets within the region that can be focused on addressing the challenges noted above. Assets within the region include significant workforce concentrations in:

Eastern Region Headquarters, NWS Bohemia, NY

- Hampton Roads, VA (OMAO, NOS, NWS, NMFS)
- Silver Spring, MD (NOS, NESDIS, NWS, NMFS)
- Annapolis, MD (NMFS, NOS, OAR, NESDIS)
- Bohemia, NY (NWS)
- Narragansett, RI (NMFS, NOS, OAR)
- Woods Hole, MA (NMFS)
- Gloucester, MA (NMFS)
- Durham, NH (NOS)

There is one National Marine Sanctuary located at Stellwagen Bank and managed out of Scituate, MA. The Monitor National Marine Sanctuary is located off the coast of North Carolina and is managed out of Newport News, VA.

The region is home to the Eastern Region headquarters of NOAA's National Weather Service, 13 Weather Forecast Offices, two River Forecast Centers, and state geodetic advisors are located in two states (VT and DE). The NOAA Marine Operations Center-Atlantic is located in Norfolk, Virginia which is also the homeport of the NOAA ship *Thomas Jefferson*. The NOAA ship *Delaware II* is home ported in Woods Hole, MA, while the newest ship, the *Henry B. Bigelow* is currently based out of Newport, RI. The *Okeanos Explorer* is homeported out of Davisville, RI. In addition, port agents, law enforcement personnel, and others are distributed throughout the coastal areas of the region.

NOAA also enjoys close partnerships with entities in the region, including:

- Four regional ocean governance structures that include the Gulf of Maine Council, the Northeast Regional Ocean Council (NROC), the recently formed Mid-Atlantic Regional Council on the Oceans (MARCO) and the Chesapeake Bay Program
- Northeast Regional Climatic Data Center located at Cornell University in Ithaca, NY
- Nine National Estuarine Research Reserves(NERRs)
- 11 Coastal Zone Management Programs

NOAA Ship Henry B. Bigelow

- 13 Sea Grant Programs
- Four Cooperative Institutes
- Two regional associations of coastal ocean observing systems (NERACOOS, MARACOOS)
- One Regional Integrated Science & Assessment (RISA)

Regional Collaboration works to improve cooperation among these NOAA and partner entities to more effectively address our collective challenges.

Healthy Oceans

Priorities influencing NOAA execution in FY13 include management impacts on commercial fisheries and communities, moving forward on ecosystem-based fisheries management, new developments in harmful algae bloom forecasting, native oyster restoration, and aquaculture.

Atlantic cod

Management Impacts on Commercial Fisheries & Communities: Several fisheries will be the subject of intense scrutiny in FY13: Northeast groundfish, including Gulf of Maine cod and Georges Bank yellowtail flounder; monkfish; butterfish; and American lobster. Due to management measures (including measures to reduce the incidental catch of federally endangered/threatened Atlantic sturgeon) and implications from stock assessments, these stocks will summon considerable attention both within NOAA and by the public in FY13.

Moving Forward on Ecosystem-Based Fisheries Management: Fisheries management councils in the North Atlantic have begun multi-year plans to develop and incorporate ecosystem based approaches to fisheries management (EBFM) and are turning to NOAA for the science. The New England Fisheries Management Council will consider the scope and form of fisheries ecosystem plans and ecosystem production limits in its initial EBFM work and then look at whether it is feasible to combine management plans as a transition strategy. The Mid-Atlantic Council plans to explore explicit EBFM enhancements to existing fisheries management plans. Both strategies are ongoing during FY13 and will require integrated NOAA data, information, and modeling, which dovetails with many of the region's ocean planning needs.

Harmful Algae Blooms (HABs): Blooms in the last several years underscore the need to have protocols in place to more efficiently measure and predict these events in the future. In Long Island Sound in the Spring of 2012, a large toxic Alexandrium bloom impacted shellfish beds. It appeared earlier in the year than ever and New York expanded shellfish bed closures into areas never previously impacted by algal toxins. An advancement in HAB toxin testing known as the PSP dockside testing protocol, piloted by NOAA HAB funding, may help re-open highly valuable Georges Bank shellfisheries according to the Mid Atlantic Fisheries Management Council. This year, scientists at the Wood Hole Oceanographic Institution will begin testing the first regional-scale deployment of the environmental sample processor (ESP) in a five year NOAA Monitoring and Event Response for Harmful Algae Blooms (MERHAB) project. NOAA-supported HAB research in the region has already produced a HAB forecasting and tracking capability in the Gulf of Maine. Current NOAA HAB investments in the region are making this capability operational within NOAA and demonstrating the value of adding HAB biosensors to regional observing systems.

Native Oyster Restoration: Since 1996, the NOAA Restoration Center has supported approximately 874 community restoration projects in the region, benefiting almost 1,500 acres of estuarine and riparian habitat. Oyster restoration in the region is emerging as the favored approach to reduce nitrogen-loading in coastal bays and estuaries. Harris Creek is the first tributary of the Chesapeake Bay selected for restoration by the federal agencies working under the Chesapeake Bay Executive Order. This is an important demonstration project showing how Federal agencies can collaborate with state partners and the community to support place-based priorities.

Aquaculture: Encompassing many facets including ocean mapping, community resilience, shellfish resource restoration and relieving pressure on wild fish stocks, aquaculture is a growing presence in the region. The industry ranges from Virginia to Maine, helping to maintain viable working waterfront communities, and providing needed jobs.

NART Response

The NART identified three projects in direct support of NOAA's healthy oceans goal in FY13.

1. Seascapes II will pick up where the NART's FY12 Seascapes I workshop left off, advancing the development of coordinated cooperative monitoring activities within the IOOS context with special emphasis on the effects of climate change.
2. A regional ecological forecasting workshop to explore the potential to merge NOAA regional capabilities in weather and hydrological forecasting, coastal ocean forecasting and ecosystem modeling into a framework that would advance regional ecological forecasting.
3. A cross-line office information exchange on data visualization to enable more effective communications and illustrate how ecosystems are impacting stocks.

Seascapes II Workshop

Strategic Objective from NGSP:
Oceans objectives: Improved understanding of ecosystems to improve resource management decisions (Increased use of ecosystem information in natural resource decisions); Healthy habitats that sustain resilient and thriving marine resources and communities.

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Kevin Friedland, NMFS/NEFSC,
Kevin.Friedland@noaa.gov

Summary:
Temperatures and other important climate drivers were at extreme levels on the Northeast shelf throughout 2011 and 2012 with sea-surface temperatures ranging from 2 to 5 degrees above normal. Spring phytoplankton blooms during both years were exceptional and occurred early, while the 2011 fall phytoplankton bloom was weak. Furthermore in 2011 saw a strong late summer phytoplankton bloom in the Middle Atlantic Bight. Observations made by fisherman and scientists indicate important changes in the distribution and abundance of fish, invertebrates and other organism have occurred in the mid-Atlantic Bight and Gulf of Maine ecoregions that may be associated with these recent changes in climate and productivity. The overall objective of second seascapes workshop will be to devel**op** playbooks for hypothesis driven cooperative monitoring activities within the IOOS context in mid-Atlantic Bight ecoregion with special emphasis on the effects of climate change. These activities should allow us to allow track physical and biological changes in the ecoregions in a more formal and timely manner with special emphasis on the impacts of climate change.

To achieve this objective we will:

1. Discuss observations of recent physical and biological changes in the Mid-Atlantic Bight and Gulf of Maine Eco-regions made by fisherman and scientists;
2. Develop hypotheses about dominant biophysical mechanisms driving ecosystem change in the Mid-Atlantic Bight and Gulf of Maine Ecoregions;
3. Develop cooperative monitoring priorities within the Mid-Atlantic Bight and Gulf of Maine Ecoregions using observations and hypotheses developed in #2 as a guide; and
4. Review the status and progress of seed projects proposed in Seascapes I workshop.

Why NART?
The NART's cross-line office participation will work with NMFS staff to bring together a diverse group of NOAA and academic scientists to help NOAA further discuss and consider ecosystem based management. The NART is the only cross-line entity in the region that can provide a framework for cross-line science discussions to occur.

Partners:
Josh Kohut, MARACOOS, kohut@marine.rutgers.edu
Ru Morrison, ru.morrison@neracoos.org
Peter Moore, MARACOOS, pmoorefish@gmail.com
Greg DiDomenico, Garden State Seafood Association, Gregdi@voicenet.com

Participating NOAA entities:
NOS, NMFS, OAR, NESDIS

Key milestones (by quarter):
Q1: Review of outcomes/workshop report from Seascape Ecology I (March 2012).
Q2: Form Steering Committee, draft agenda for Seascape Ecology II.
Q3: Workshop held.
Q4: Workshop summary produced, develop plan to implement workshop outcomes.

NART Funding: $4K

Participants at the March 2012 Seascape Ecology workshop at Rutgers University.

Regional Ecological Forecasting Workshop

Strategic Objective from NGSP:
Oceans objective: Improved understanding of ecosystems to improve resource management decisions (Increased use of ecosystem information in natural resource decisions) Coastal Communities objective: Resilient coastal communities that can adapt to the impacts of hazards and climate change (Appropriate science-based tools and information for assessing hazard risk, vulnerability and resilience that coastal decision makers and community leaders can understand and use).

Ecological forecasts predict the impacts of chemical, biological and physical changes on ecosystems.

Contact/email:
Beth Turner, NOS/NCCOS/CSCOR, Elizabeth.Turner@noaa.gov
Kevin Friedland, NMFS/NEFSC, Kevin.Friedland@noaa.gov
Tony Siebers, NWS/NCEP, Anthony.Siebers@noaa.gov

Summary:
This workshop will focus on ecological forecasting in the Gulf of Maine region. Several long-term research programs have resulted in a wealth of knowledge and coupled physical/ecological models that have some skill in predicting ecosystem conditions such as harmful algal blooms and marine population dynamics. In some instances, these models are at the cutting edge of present ecological forecasting capabilities. However, the pathway for these models to be used for operational forecasts is not straightforward. This workshop will explore the potential to merge NOAA regional capabilities in weather and hydrological forecasting, coastal ocean forecasting and ecosystem modeling into a framework that would advance regional ecological forecasting. It builds on previous workshops in the region, notably the RARGOM theme session "Modeling Needs Related to the Regional Observing System in the Gulf of Maine" (http://www.rargom.org/theme/RARGOM_Report%2005-1.pdf), a workshop on ECOHAB-GLOBEC Gulf of Maine Modeling (http://www.cop.noaa.gov/ecoforecasting/workshops/GulfofMaine_wksp_report.pdf), and a CINAR workshop on Climate and Ecosystem Change in the NW Atlantic (https://www.whoi.edu/fileserver.do?id=106104&pt=2&p=106529). At the workshop, regional stakeholders, academic partners and NOAA scientists and managers will explore what types of forecasts are most needed, temporal and spatial domains of most interest, data and interoperability needs for ongoing forecast, potential "homes" for the operational models and forecasting team, and potential delivery systems.

Why NART?
NART is uniquely positioned to provide a cross-NOAA regional perspective on the development and transition of ecological forecasts. NWS has expertise in operational forecasting and delivery as well as weather and hydrological data for forecast development. NOS has long supported ecosystem research programs in the region that provide a scientific foundation for ecological forecast development, and has expertise in operational coastal modeling and HAB prediction. NMFS provides long term ecological data and expertise in ecosystem modeling. Our partners in CINAR and NERACOOS provide linkages to the external academic community and observational data, and have long experience in facilitating similar workshops in the region. In addition NERACOOS funds the Northeast Coastal Ocean Forecast System (NECOFS), an operational hydrodynamic modeling system for the region with nested inundation domains.

Partners:
Regional coastal managers and stakeholders, identified in association with NART and other external partners such as the Regional Association for Research in the Gulf of Maine. CINAR: Don Anderson, Dennis McGillicuddy; IOOS/NERACOOS: Ru Morrison

Participating NOAA entities:
NOS: Beth Turner, Quay Dortch, Frank Aikman, John Kelley; NWS: David Vallee, David Green, Tony Siebers; NMFS: Kevin Friedland

Key milestones (by quarter):
Q1: Attendance of principals at Ecological Forecasting Roadmap workshop.
Q2: Planning team assembled, agenda drafted.
Q3: Workshop held.
Q4: Workshop summary produced, planning to implement workshop advice.

NART Funding: $4K

Data Visualization

Strategic Objective from NGSP: Improved understanding of ecosystems to inform resource management decisions.

Contact/email: Kevin Friedland, NMFS/NEFSC
Kevin.Friedland@noaa.gov

Summary: As NOAA moves to an ecosystem based management approach, it will be important to ensure an understanding of the science available, its application to management and how to best communicate this to the public. NOAA offices have varying core responsibilities that have led to the development of a diverse range of data visualization tools within the agency. Many of these tools have the potential to help solve the data visualization problems of other NOAA offices; however, researchers and managers often do not have a working knowledge of data visualization capabilities developed outside their own office. In FY 13, the NART will initiate a data visualization workgroup designed to facilitate information exchange between NOAA units that have data visualization capabilities and/or requirements to institute ecosystem based approaches to management. The exchange, along with several webinars, should provide an opportunity for units and practitioners to share information and develop synergies for intra-NOAA cooperation.

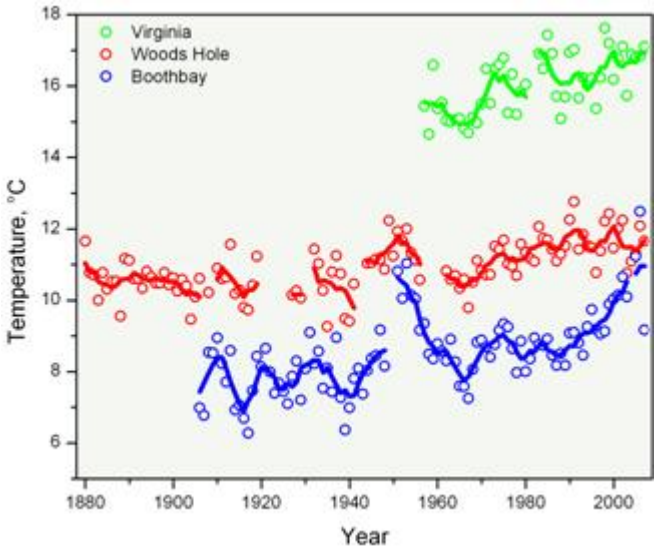
Why NART? The NART's cross-line office participation will work with NMFS staff to bring together a diverse group of NOAA and academic scientists to help NOAA further discuss and consider ecosystem based management. The NART is the only cross-line entity in the region that can provide a framework for cross-line science discussions to occur.

Partners: NA

Participating NOAA entities: NESDIS Environmental Visualization Laboratory, NOS/CSC, NOS/NCCOS, NMFS/NEFSC

Key milestones (by quarter):
Q1: Steering Committee established.
Q2: Initial meeting to discussing visualization needs for EBM.
Q3: Demonstration webinar(s) to share capabilities from within NOAA.
Q4: Final report distributed.

NART Funding: $3500



Sea surface temperature at Boothbay Harbor, ME (blue line), Woods Hole, MA (red line), and Gloucester, VA (green line). Boothbay Harbor temperature courtesy of the Maine Department of Marine Resources. Woods Hole temperature courtesy of Jim Manning, NEFSC.

Resilient Coastal Communities & Economies

Priorities influencing NOAA execution in FY13 include the demand for offshore energy development and those data and management products needed to make the most informed decisions to support it.

Offshore Wind Development: The U.S. Department of Energy estimates that there is as much wind energy available off U.S. coasts as is currently produced by the existing landward power-production infrastructure. The costs associated with transmission infrastructure and technology development are high. The best U.S. examples currently exist in the North Atlantic region; states like Rhode Island and Massachusetts are leading the country in developing the information needed to effectively plan for the development of offshore wind energy sites.

Location is a key component for offshore renewable energy planning, so a comprehensive understanding of the ecosystem parameters (physical, ecological, biological) and the existing or potential future human uses that occupy ocean space become critical. Ocean planning and its integrated, multi-objective approach to ocean resource management is needed to guide the renewable energy planning process and other emerging uses.

National Ocean Policy: The North Atlantic region has been tasked to establish two regional planning bodies (Northeast and Mid-Atlantic) to develop regional coastal and marine spatial plans for these geographies stretching from mean high water out to 200 miles offshore. NOAA is closely affiliated with two regional ocean partnerships in the North Atlantic (NROC and MARCO) that have received over $4 million in financial support from NOAA and other sources to begin the foundational elements of ocean planning in their geographies, primarily through public engagement and data development activities. Work began in FY12 and will continue in FY13.

Regional Ocean Planning Supports Baseline Characterization: There continues to be a strong need for an understanding of the ocean ecosystem, both in terms of its natural and socio-economic state and how we might expect these ecosystems to change in the future. Regional ocean planning has become a opportunity to compile our understanding of these ecosystems, and to collect new information where our knowledge is lacking. Throughout the North Atlantic, NOAA is prioritizing these data gaps through partnerships with NROC and MARCO. FY11 grant funds will support information collection around several major human uses in this geography, e.g. commercial fishing activity and recreational boating trips.
In addition, engagement with major industries such as energy, aquaculture and shipping over the next year will yield important information about current trends and gather insights on how these use patterns may change over time and interact with other uses. This broad picture of key human uses in North Atlantic waters, and the ability to view this information all together on data portals in both New England and the Mid-Atlantic, will give managers and industry alike a much better idea of the human landscape they wish to shape with each project proposed and management decision made.

In addition to new data collection on human uses, NOAA also continues important ongoing studies to characterize the biological, ecological and physical aspects of the North Atlantic ecosystems. The Atlantic Marine Assessment Program for Protected Species (AMAPPS) project is a key example of work where funds are being allocated to collecting distribution and abundance information for marine mammals, turtles, and sea birds. AMAPPS data stresses the importance of a regional scale approach to this information, its management application, and the value of partnerships (BOEM, USFWS, Navy) - critical to agencies that are permitting and reviewing offshore exploration and wind development projects. Finally, there is also a growing recognition of the role of sound in the underwater marine environment. Given that leases for offshore energy development may be granted in the North Atlantic during 2013, new and improved science on the regional continental shelf will be needed.

NART Response: The NART identified three projects in direct support of NOAA's resilient coastal communities and economies goal in FY13.

1. The NART will continue its support for cross-NOAA dialogue to understand our joint capacity and share lessons learned, as well as identify FY13 initiatives that can contribute to regional ocean planning.
2. The NART will broaden line office representation in an OCRM effort to further collaborative opportunities with our state partners.
3. The NART will coordinate NOAA input on BOEM development of Site Assessment Plan survey requirements for offshore wind/renewable energy development in the Outer Continental Shelf.

NOAA Capacity to Impact Ocean Planning in the North Atlantic

Strategic Objective from NGSP:
Comprehensive ocean and coastal planning and management.

Contact/email:
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Tom Bigford, NMFS/OHC, Thomas.Bigford@noaa.gov

Summary:
NOAA is committed to the execution of the National Ocean Policy, and in particular for leading the implementation of coastal and marine spatial planning in the New England and Mid-Atlantic regions. In preparation for the establishment of Regional Planning Bodies in our geography there is a need to explore and identify how NOAA capacity, through our mission areas, skill sets and experience in various aspects of ocean planning, can impact this interagency initiative to our benefit.

This project would support continued cross-NOAA dialogue to understand our joint capacity (mission, skill sets), to identify ongoing or newly funded initiatives in FY13 that could directly contribute to regional ocean planning (e.g., IEAs, habitat classification, human use data collection, biogeographic characterizations, ENOW data and tools, NEFSC habitat work with BOEM), and to share past case studies that could inform regional ocean planning going forward (SBNMS human use mapping and public process, NEFSC ecosystem assessment group mapping products, NCCOS biogeographic characterization of MA Bay/GOM). There has also been increasing demand for cross-line NOAA presence at meetings to support smaller scale efforts, like the Long Island Sound Planning Partnership.

Methods for accomplishing these objectives include:

A. Capacity assessment -> survey NOAA programs and convene meeting to confirm NOAA priorities for ocean planning in N Atl to enable proper representation in RPB and other efforts
B. FY13 project alignment -> in-depth conference calls or in-person meetings with appropriate NOAA program office and NOAA CMSP regional lead.
C. Case study applications to ocean planning -> webinars hosted by subteam open to NOAA programs and perhaps other federal and state colleagues.
D. Modest travel support for NOAA to participate in LIS Planning Partnership and like efforts.

Why NART?
The NART Subteam is in a unique position to serve as the sounding board and liaison to their own programs to share NOAA's positions and contributions to ocean planning in the North Atlantic. There is no other cross-NOAA group that is so appropriately cast for this task and to connect NOAA CMSP leads to their programs for assistance and insights. Ocean planning remains a top priority for NOAA and the NART encompasses the geography most interested in pursuing ocean planning in the U.S. as a result of an organic need in our region to respond differently and more thoughtfully to managing our oceans and our human uses.

Partners:
CT Sea Grant and Long Island Sound Planning Partnership, NROC federal and state agencies, New England Federal Partners, MAPFO federal agencies
Note: the focus of this project is primarily on internal NOAA audience.

Participating NOAA entities:
A. Capacity Assessment work would involve all subteam members (led by NOS/CSC: K Lund for NE, NMFS Habitat: T Bigford in Mid-Atl)
B. Project alignment work would involve all subteam members (led by NOS/CSC: B Nicholson, K Lund and NMFS Habitat: T Bigford)
C. Case Study Sharing would involve:
    - NMFS/NEFSC: M Fogarty, J Samson
    - NMFS – Southeast region: G Fay
    - NOS/SBNMS: B Haskell (overview of sentinel site, high resolution honing in on particular problem)
    - NOS/NCCOS: C Menza/T Battista
    - Others

Key milestones (by quarter):
Q2: Capacity assessments completed for NE and Mid-Atl regions. Project alignment inventory and commentary completed in NE and Mid-Atl regions. NOAA priority setting in-person meeting.
Q3: Case studies shared across NOAA line offices, including subteam members and other interested NOAA staff.

NART Funding: $2K

Supporting the States: New England Roundtables

Strategic Objective from NGSP: This project will support multiple NGSP goals including, resilient coastal communities, healthy oceans and climate adaptation. The specific strategic outcomes will be identified as the round table subjects are selected.

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Adrianne Harrison, NOS/CSC,
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Summary:
The project is focused on identifying collaboration opportunities among NOAA staff working with New England's coastal zone management programs and research reserves, and providing a forum to seed future partnerships between the states and NOAA. It is designed to broaden mutual understanding of our partners' needs, interests and priorities as well as NOAA's regional capacity and capabilities. NOAA has reviewed the state coastal zone management priorities and identified current needs and gaps. These will be matched with NOAA capabilities and corresponding NOAA representatives (no more than 6-8) will be invited to a half-day roundtable discussion with state partners to be held at the respective state's offices. One 3-hour state roundtable will be held each month from October 2012 through February 2013. The audience will include (but will not be limited to) the state Coastal Management Program and National Estuarine Research Reserve. Partners may invite other state colleagues that might be interested to broaden participation (e.g. emergency management, fish and wildlife). NOAA participants will report out at Winter NOAA in New England meeting (March 2013).

Why NART?
NART provides a venue for identifying and creating NOAA partnerships with state coastal management programs. The goal of this project is to connect multiple NOAA offices and programs with coastal management partners in a meaningful way and build relationships that serve beyond this single event. NART also can provide the capacity for NOAA to attend the roundtables in person and fill potential gaps in individual travel budgets.

Partners: State coastal management programs and NERR programs in New England.

Participating NOAA entities: The Steering Committee includes staff from NOS (CSC, CPD, ERD, NCCOS), NMFS (NERO, NEFSC), NART, and NWS. We expect additional participation from NOS (OCS, NGS) and OAR in the roundtables.

Key milestones (by quarter):
Q3: 5 Roundtables completed, including evaluations of NOAA and state partner participation.

NART Funding: $3K

Chilmark Pond Land Bank Beach by Martina Mastromonaco.

Coordinating Guidance for BOEM on Offshore Renewable Energy Surveys

Strategic Objective from NGSP: Resilient Coastal Communities and Economies Coastal and Great Lakes communities are environmentally and economically sustainable.

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Susan Tuxbury, NMFS/NERO, Susan.Tuxbury@noaa.gov

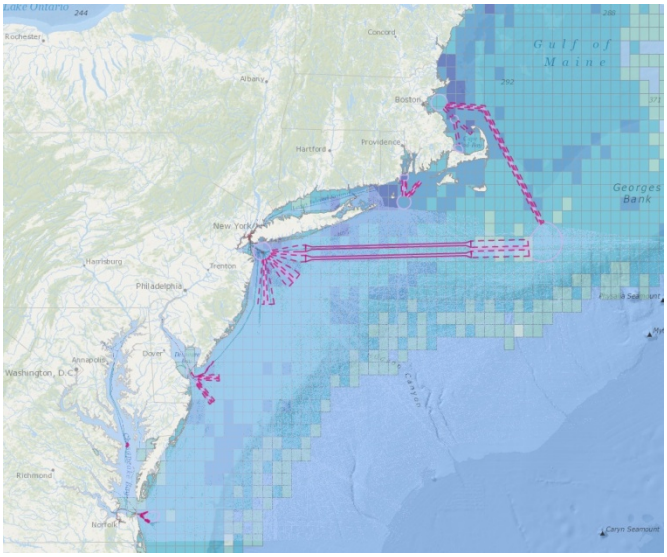
Summary:
The Bureau of Ocean Energy Management (BOEM) is responsible for offshore renewable energy (ORE) permitting in the Outer Continental Shelf (OCS). As described in the Final Rule that governs the development of renewable energy generation on the OCS published in the Federal Register on April 29, 2010 (74 FR 19638), all ORE permit holders must submit a Site Assessment Plan (SAP) which includes *"physical characterization surveys (e.g., geological and geophysical surveys or hazards surveys), resources assessment surveys (e.g., meteorological and oceanographic data collection), and baseline environmental surveys (e.g., biological, archaeological, or socioeconomic surveys)."* BOEM has reached out to different individuals within NOAA asking for support in the development of some or all of the SAP survey requirements for offshore renewable energy facilities. Dr. Mary Boatman (Environmental Studies Chief for BOEM's Office of Renewable Energy Programs), recently sent a bulleted list of issues/questions that BOEM would like input on from NOAA to some Fisheries staff, including *"Survey design – specifically for seafloor habitat characterization, but this could be expanded to the water column. BOEM is preparing guidance for developers for surveys and would appreciate input from the NEFSC to ensure that scientifically valid data is being collected in an efficient manner and meets the needs of EFH consultations."* BOEM has contacted other NOAA Line Offices, but it is not clear who or whether all relevant personnel and/or LO's are currently engaged in providing input into this process. Moreover, BOEM intends to announce the first offshore wind energy lease sale by the end of December, 2012. Once OCS blocks are leased to wind developers, the regulatory clock begins requiring them to submit SAPs for approval and begin conducting surveys. There is still time for NOAA to have substantive input into the survey development process, but we need to engage quickly.

NOAA has a mandate to "conserve and manage coastal and marine ecosystems and resources" that requires us to understand how ORE development will impact the ecosystem and resources. We also have the expertise necessary to provide BOEM with valuable input on all proposed surveys (physical characterization, resource assessment, baseline environmental and socioeconomics). Therefore, NOAA needs to actively participate in the development of SAP survey requirement to ensure they produce consistent, reliable, high quality data from all wind facilities, as these data are essential to inform site selection decisions, evaluate impacts from ORE on habitat, fisheries and other marine resources from construction through operation and compare impacts of different facilities and technologies. The opportunity to provide input to BOEM on these requirements early in the process will not only allow NOAA to ensure the quality and quantity of data produced by individual developers, but should make it much easier to incorporate these data in larger-scale modeling efforts and to assess cumulative impacts of multiple facilities due to the consistency of the data collection effort. Furthermore, providing input on biological studies upfront will be beneficial for NMFS regulatory role in the BOEM lease process. This will ensure study recommendations are consistent throughout the region and will help alleviate NMFS' workload during review and comment of each individual SAP.

NART's role would be to facilitate both cross-line coordination within NOAA and communications with BOEM. Initially, NART project leads would reach out to the appropriate NOAA LOs to determine who should be involved in the survey development process, then produce a list of interested and qualified individuals to BOEM. This group of NOAA scientific and technical advisors should be prepared to provide recommendations on the scale, scope, and extent of data necessary for a particular survey in order to accurately predict risk to organisms and habitats and to ensure protocols, criteria and models are based on objective, scientifically valid information. The NART project leads should continue to maintain communication with BOEM and NOAA advisors to ensure recommendations are being developed, information is being shared and progress is being made on the development of SAP survey requirements.

Why NART? The NART Uses Subteam provides a unique cross-line dialogue that enables efficient identification of problem areas, and contains the membership to help solve them. In this case, BOEM is communicating with several members of the subteam individually, and there is a need to take deliberate steps to bring these NOAA programs together, and identify others, whose expertise is needed to appropriately guide BOEM in their survey

requirements for developers. There is no other group established to pursue regional problem solving of this kind, and there is an urgency to handle this from the field in a coordinated way across NOAA programs.



Screen shot from Mid-Atlantic Data Portal.

Partners: BOEM (essentially the audience/customer for this project)

Participating NOAA entities (participating NOAA programs are binned according to survey types they bring knowledge to):

Physical Characterization Surveys (e.g., geological and geophysical surveys or hazards surveys):NOS/NCCOS/ CCMA (T Battista) for experience for biogeographic characterizations.

Resources assessment surveys (e.g., meteorological and oceanographic data collection): NMFS/NEFSC Oceanography Branch (J Hare) to contribute input on the oceanographic data collection effort,-NWS (TBD)

Baseline environmental surveys (e.g., biological, archaeological, or socioeconomic surveys): NMFS/NEFSC Ecosystem Assessment Program (M Fogarty) to help ensure the recommended survey requirements will provide the needed data to support (or at least allow for) cumulative impact analyses, as well as the NE LME Integrated Ecosystem Assessment process, NEFSC's Ecosystem's Survey Branch (R Johnston) for their thorough knowledge of available survey data, but also important expertise in Large-Scale survey design, NMFS/NERO/OHC (S Tuxbury and others), NEFSC Social Sceince Branch, Stellwagen Bank NMS

Key milestones (by quarter):

Q1: Identify appropriate, qualified NOAA personnel to serve on ORE Survey. Recommend Scientific/Technical Committee by the end of 1st quarter FY13.
Q2: Submit list of Scientific/Technical experts to BOEM by early 2nd quarter FY13 (included delay in submitting list in case some NOAA personnel require approval from Supervisors to participate).
Q3: Work with BOEM and NOAA S/T members to develop timeline for submitting recommendations for each survey type by early 3rd quarter FY13. Deadlines will be based on BOEM's scheduled lease sales and regulatory requirements.
Q4: Schedule follow-up conference calls with BOEM and NOAA S/T members to ensure deadlines are being met. Conference call schedule will be based on deadlines developed in #3. (throughout remainder of FY13).

NART Funding: None

Weather-Ready Nation

Priorities influencing NOAA execution in FY13 are primarily major weather events that did significant damage in the region in FY12, the 75th anniversary of the 1938 Hurricane, the nationwide water census, Marcellus shale exploration, and water gaging networks.

Image from 1938 hurricane.

Hurricane Irene / Tropical Storm Lee / Springfield, MA Tornado Aftermath: On June 1, 2011, an EF3# tornado killed 3 and injured at least 72 in a dramatic 39 mile swath across south central Massachusetts. The forest damage continues to be a stark reminder. In August 2011, Hurricane Irene struck the U.S. as a Category 1 hurricane (lowest designation) in eastern North Carolina, then moved northward along the Mid-Atlantic Coast. Irene made an additional landfall as a tropical storm in the New York City area and progressed inland over CT, central MA, and into VT. Irene dropped torrential rains across the Northeast that caused widespread flooding from which several states, including Vermont, are still recovering. More than 7 million homes and businesses lost power during the storm, and Irene caused at least 45 deaths and more than $7.3 billion in damages. Tropical Storm Lee further impacted the region in September 2011. Moisture from offshore Tropical Storm Katia during helped set the stage for flash flooding in portions of southern New England. There was also considerable damage from record flooding across the Northeast (PA, NY, NJ, CT, VA, MD). Pennsylvania and New York were most affected. Total losses exceed $1.0 billion, with 21 deaths. Finally, although the 2011-2012 winter proved to be exceptionally mild as a whole, an unprecedented October snowstorm dumped heavy snow across much of interior southern New England up to 2 feet deep in the higher terrain and caused power outages comparable to what one might expect from a strong tropical storm or category 1 hurricane.

75th Anniversary of the 1938 Hurricane: Resilience efforts for FY 2013 will leverage lessons learned from past events. September 21, 2013 will mark the 75th anniversary of the 1938 Hurricane, which devastated large tracts of New England and eastern Long Island. Efforts in 2013 to enhance hurricane awareness in the Northeast will involve media partnerships, public forums, web-based information, posting on social media sites, etc.

Nationwide Water Census: The 2009 SECURE Water Act provided a roadmap for the USGS Water Census, which is part of the WaterSMART initiative. NOAA is both a partner and a stakeholder in this effort. The Delaware River Basin has been identified as one of three pilot regions nationally for a focused water availability assessment. While the Water Census will be a detailed catalog of water availability in over 100,000 watersheds across America, it has no forecast component to it. NOAA/NWS does not currently provide the forecast component at the spatial scale that the Water Census aims toward. The Integrated Water Resources Science and Services (IWRSS) project identifies a user requirement for higher resolution range and scale of information needed to tackle complex water resources issue.

Marcellus Shale Gas Exploration and Production

The Marcellus Shale formation extends deep underground from Ohio and West Virginia northeast into Pennsylvania and southern New York. Geologists estimate the formation contains trillions of cubic feet of natural gas. Recent enhancements to gas well development technology, such as horizontal drilling and hydraulic fracturing, has substantially increased interest in the region. The hydraulic fracturing process requires large volumes of water. USGS has developed a draft plan that defines a set of key science issues and topics that are in the Federal interest of responsible development of domestic energy resources. The plan seeks to gain input and concurrence on Federal roles on research topics and perspectives on how to focus collective efforts to ensure the plan is acceptable to all.

Natural gas well pad in Pennsylvania.

Funding Shortfalls Threaten Critical Gaging Networks: Gage measurements have a wide variety of uses beyond flood warning and long-term mapping. The

data is also used, but not limited to, the designing of new bridges to withstand expected water flows, monitoring the quality of the water in streams, understanding and managing habitat needs, helping recreational users with fishing and boating plans, advancing science to help understand future impacts due to climate change, assisting government agencies and businesses manage, conserve and utilize water resources. The need to increase awareness of the importance of stream gages is a constant challenge. Federal agencies such as NOAA are well positioned to help the U.S. Geological Survey increase awareness. The Interstate Council on Water Policy (ICWP) is the national organization of state and regional water resources management agencies; NOAA's continuing presence with ICWP members is critical.

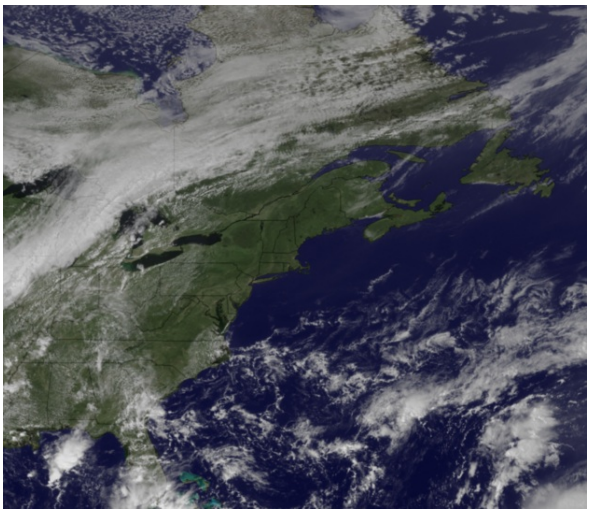
Addressing the Vulnerability of our Coastline:

Coastal inundation from storm surge flooding provides extreme disruption to the lives and livelihoods of people in our coastal communities, sends shock waves through the regional and even national economy, and catastrophically alters habitats. Sea level rise, undisputedly underway and projected to continue, sets the stakes higher with the expectation of more frequent coastal inundation and wave battery. In fact, Rhode Island Sea Grant and the Coastal Resources Management Council encouraged people to document flooding June 2-3, 2012 simply from high spring tides. Multi-year collaborative efforts across NOAA offices in the North Atlantic Region will serve to enhance the response to high impact coastal events. NWS and NOS expect to complete a library of reference maps for various storm tides along the Massachusetts coast by the end of FY 2013. In real time, NWS is called upon to assist other federal, state, and local government entities to respond to critical weather threats. A data collection tool for coastal impact events, called Storm Reporter, has been implemented in New England and just this year introduced to the Mid-Atlantic region. Recruitment and training of employees and volunteers alike continuing into 2013 will make this NOAA conceived tool a valuable asset for real time decision-making and coastal science initiatives in the future.

NART Response

The NART identified four projects in direct support of NOAA's weather-ready nation goal in FY13.

1. The NART will continue to support development of a wave run-up model for selected points along the Mid-Atlantic and New England coasts. An inter-agency agreement was established between NOAA and USGS in FY12 and will support this important cross-region, cross-Agency effort.
2. The NART will undertake a new effort to enhance collaboration between the NWS and Sea Grant using a Sea Grant/Regional Collaboration Team mini-grant.
3. The NART will increase awareness of the Mid-Atlantic River Forecast Center's products and services. This project will also fund a student intern (10-week graduate student or 12-week undergraduate student) through the Chesapeake Research Consortium to explore hydrologic relationships between the Susquehanna watershed and the Chesapeake Bay.
4. The NART will broaden awareness of and NOAA support for an Integrated Water Resources Science & Services (IWRSS) demonstration project in the northeast US formally engaging the Interstate Commission on the Potomac River Basin, the Delaware River Basin Commission, the Susquehanna River Basin Commission, and the Hudson River Foundation.



A strong cold front continues to drop temperatures well below mid-September normals as it crosses the United States. This image was taken by GOES East at 1815Z on September 13, 2012.

Promote and Evaluate a NWS/NOS Wave Run-Up Study

Strategic Objective from NGSP: Weather-Ready Nation: Reduced loss of life, property, and disruption from high-impact events

Contact/email:
Bob Thompson, NWS/WFO, Robert.Thompson@noaa.gov
Jesse Feyen, NOS/CSDL, Jesse.Feyen@noaa.gov
Richard Okulski, NWS/WFO, Richard.Okulski@noaa.gov

Summary: Wave run-up is an important but complex component to coastal inundation. Wave run-up contributes to the total water level behind barrier beaches and determines the incursion of the velocity zone, where the greatest risk from wave battery occurs. The complexity of the foreshore environment and immediate shore topography can make wave run-up calculations too resource intensive for operational applications. This project incorporates a parametization scheme based on algorithms developed by Dr. Hilary Stockdon of the USGS for selected points along the middle Atlantic and New England coasts. The project goal is to produce a stand-alone executable program that will determine whether dune erosion, overwash, or inundation can be expected based on beach morphology and wave conditions input. NART's role is to evaluate a rudimentary version of this new tool and recommend future applications of this tool for operational prototype use. This is a joint project with the Southeast & Caribbean Regional Collaboration Team (SECART).

An advisory group of NWS and NOS stakeholders is to provide periodic oversight and guidance to this project. The board is made up of the following individuals:

- John Cannon (NWS)
- Jesse Feyen (NOS)
- Bob Thompson (NWS)
- Doug Marcy (NOS/CSC)
- Andre van der Westhuysen (NCEP/EMC)
- Richard Okulski (NWS)

Why NART? This collaborative NWS/NOS effort has the potential to fulfill an important missing puzzle piece to the coastal inundation prediction capability along the North Atlantic coast. Wave run-up has long been identified as an important area for future work, and the FY13 milestones listed in this document would build off the accomplishments of FY12. Support of this project leverages past coastal inundation work supported by the NART, in addition to $12K in FY12 ($10K by NART, $2K by SECART).

Partners: USGS. The USGS Extreme Storms and Hurricanes group is well suited to create this tool. The methodology will be based on over 10 years of peer-reviewed research and 5 years of algorithm development. The USGS already uses the codes that will serve as the engine of this tool for real-time monitoring of coastal change hazards during approaching hurricanes. These codes are also being used to create a comprehensive analysis of storm-induced coastal change hazards on the Gulf of Mexico and Atlantic coastlines.

Participating NOAA entities: NWS Eastern Region Headquarters, NOS-led Storm Surge Roadmap Team, selected Weather Forecast Offices, NOS Coastal Services Center, National Center for Environmental Prediction

Key milestones (by quarter):
Q1: Survey selected sites to develop parameterization
Q2: Collect data and feedback at test sites after significant winter storms
Q3: Wave Run Up team evaluates results from test sites with Dr. Stockdon
Q4: Survey additional test sites in preparation or 2013-14 winter season

NART Funding: $4K

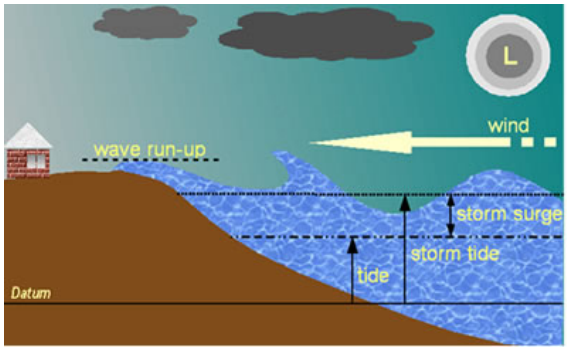


Diagram illustrating wave run-up.

Sea Grant Engagement for a Weather-Ready Nation (Annual NART/Sea Grant Project)

Strategic Objective from NGSP:
Weather-Ready Nation: Reduce loss of life, property, and disruption from high-impact events;
Climate Adaptation & Mitigation: Help resiliency of communities via adaptation to the impacts of hazards and climate change; Seek to create a climate-literate public that understands its vulnerabilities to a changing climate to enable more informed decision-making;
Healthy Oceans: Improve understanding of ecosystems for better informed resource management decisions

Contact/email:
Bob Thompson, NWS/WFO, Robert.Thompson@noaa.gov
Paul Anderson, ME Sea Grant Director, panderson@maine.edu
Nicole Bartlett, NART Coordinator, nicole.bartlett@noaa.gov

Summary:
The United States is subject to a variety of weather disasters every year. These include crippling snow storms, powerful hurricanes, devastating flooding, temperature extremes, damage from severe thunderstorms and tornadoes, severe drought, etc. NOAA's Weather Ready Nation effort seeks to broaden our nation's ability to respond to extreme weather. NWS provides weather information primarily for the protection of life and property and works with partners to enhance the resilience of communities to extreme weather. In turn, Sea Grant is NOAA's primary university-based program in support of coastal resource use and conservation. In the North Atlantic Region, a number of Sea Grant programs have been actively engaged in resilience planning for infrastructure, storm surge, and wave prediction modeling. In fact, Sea Grant has made hazard resilient coastal communities a national priority. Thus, the NWS and Sea Grant have overlapping objectives of enhancing coastal resiliency but have tended to operate more in parallel with limited collaboration.

Historically, NWS and Sea Grant have worked with different sets of local decision-makers on a day to day basis. The NWS closely interacts with the emergency management community, and Sea Grant works more consistently with coastal program managers, town land use planners and conservation agents. The two sets of customers have different areas of focus but share very similar needs and serve to achieve a common goal of community resilience.

This project is designed to increase collaboration between Sea Grant and NWS for a more integrated approach to achieving coastal resiliency, an important dimension of the Weather Ready Nation initiative. This project seeks to knit together two parts of NOAA in a way that will seed long term collaboration, help NOAA get closer to the customer, and elevate community resilience.

More specifically, this project will identify the specific issues and decisions relevant to a broader community of NOAA stakeholders and target products, tools, or services that require feedback. The Resiliency Subteam will facilitate a series of informational briefings for Sea Grant and NWS as a means of achieving general orientation. With the Resiliency Subteam maintaining a facilitator role, Sea Grant will subsequently make recommendations on the best way to obtain feedback on these products and services. It is hoped that a portion of this effort will lead to more effective collaboration on community outreach for various NOAA products and services

Why NART?
NART is well-positioned to better integrate the efforts of line offices to achieve NOAA strategic objectives. There are 14 NWS Weather Forecast Offices (WFOs), 2 River Forecast Centers (RFCs), and 13 Sea Grant Programs in the North Atlantic region. NART's mission is to foster greater integration of NOAA efforts with a regional focus. Coastal resiliency is an important area of focus for the North Atlantic region that cuts across NOAA line offices. NART will be able to leverage its networking capabilities to facilitate more effective means for NOAA to address regional coastal resiliency stakeholder needs via a more collaborative approach between the NWS and Sea Grant.

Partners:
Non-NOAA partners will potentially include NERACOOS and/or MARACOOS.

Participating NOAA entities:
NWS, OAR/Sea Grant

Key milestones (by quarter):
Q1: Informal survey of WFOs, RFCs, and Sea Grant offices; Identification of pertinent products and services; Establish scope of project
Q2: Informational briefings for Sea Grant and NWS on products and services, customers, and how customer needs are assessed
Q3: Conduct stakeholder engagements
Q4: Compile and share project results

NART Funding: $3K

Mid-Atlantic River Forecast Center Capabilities and Partnership Opportunities

Strategic Objective from NGSP:
Engagement Enterprise objective: Integrated services meeting the evolving needs of regional stakeholders. Organization & administration enterprise objective: Diverse and constantly evolving capabilities in NOAA's workforce

Contact/email:
Patti Wnek, NWS/MARFC, Patricia.Wnek@noaa.gov
George McKillop, NWS/ER, George.Mckillop@noaa.gov

Summary:
River flood forecasting is essential to NOAA's mission of saving lives and reducing property damage. To predict floods, the Middle Atlantic River Forecast Center utilizes the Community Hydrologic Prediction System (CHPS), a complex hydrologic forecast model, which uses observed, estimated and predicted hydro-meteorological data. Model output helps hydrologists in predicting water levels. Hydrologic information then gets disseminated through NOAA Weather Radio All Hazards, television, commercial radio and the internet. The Advanced Hydrologic Prediction Services (AHPS) provide users with web-based graphical forecast, guidance and observational information. AHPS hydrologic information assists water resource managers, emergency managers, and other users involved in flood and drought mitigation projects in making better informed decisions, including when to evacuate people and move property.

The RFC provides numerous other services, including providing flash flood and headwater guidance, winter/spring flood potential outlooks, drought guidance, five-day significant flood outlooks, multi-sensor precipitation estimates and precipitation departure information. Information produced by the RFC also helps support ecosystem management programs such as the State of Maryland's Shellfish Harvesting Program, the State of New Jersey's Marine Monitoring Program, and the State of Pennsylvania's Black Fly Suppression Program. The RFC cooperates with numerous federal, state, and local government agencies and private organizations, including other NOAA agencies, the U.S. Geological Survey, the U.S. Army Corps of Engineers, regional river basin commissions, and academic organizations.

In FY13, MARFC staff will invite staff members from the NMFS Northeast Regional Office and the Chesapeake Bay Office to a series of webinars designed to provide an overview of river forecast operations, to include: the Community Hydrologic Prediction System; the Advanced Hydrologic Prediction Services; services and data provided by and available from the RFC; and a review of some of the RFC's unique ecosystem-based management partner programs.

This project will also fund one student intern (10-week graduate student or 12-week undergraduate student) through the Chesapeake Research Consortium to explore hydrologic relationships between the Susquehanna watershed and the Chesapeake Bay.

An internship will make use of data collected by a new NOAA Smart Buoy deployed at Havre de Grace on the Susquehanna.

Why NART?
NART's regional network of partners and constituents span a wide spectrum of service sectors (e.g., river commerce, emergency management, reservoir management, agriculture, hydropower, watershed management, fish and wildlife, municipal and industrial water supply, recreation, energy production, and water quality) and reaches into all four watersheds (e.g., Potomac, Susquehanna, Delaware and Hudson).

Partners: NA

Participating NOAA entities: NWS/MARFC, NWS/ER, NMFS/NCBO, NMFS/NERO, NMFS/NEFSC

Key milestones (by quarter):
Q1: Assemble steering committee for project. Draft intern project description.
Q2: Webinar #1. Solicit internship.
Q3: Webinar #2. Internship.
Q4: Webinar #3: Student intern presentation.

NART Funding: $5K

Integrated Water Resources Science and Services Northeast Demo

Strategic Objective from NGSP:
Weather-Ready Nation: Improved freshwater management; Engagement Enterprise objective: Integrated services meeting the evolving needs of regional stakeholders.

Contact/email:
George McKillop NWS/ER, George.Mckillop@noaa.gov

Summary:
NOAA plans to conduct an Integrated Water Resources Science & Services (IWRSS) demonstration in the northeast US formally engaging the Interstate Commission on the Potomac River Basin, the Delaware River Basin Commission, the Susquehanna River Basin Commission, and the Hudson River Foundation.

The first pre-demonstration phase of this effort will be to conduct in-basin engagements with the respective commissions and their stakeholders to:

- Validate existing and identify new gaps in water resource services
- Quantify the socioeconomic benefit of addressing these gaps
- Demonstrate new IWRSS capabilities to address stakeholder needs

The IWRSS partners plan to identify and document water resource decisions made by the commissions and their respective stakeholders from a spectrum of service sectors including river commerce, emergency management, reservoir management, agriculture, hydropower, watershed management, fish and wildlife, municipal and industrial water supply, recreation, energy production, and water quality.

Based upon the results of the stakeholder engagement activities in FY13, NOAA will develop a demonstration project plan which will enable the IWRSS partners (USGS, USACE, and NOAA) to address stakeholder requirements through the provision of new IWRSS information and services. The demonstration project is projected to begin in FY14.

In FY13, NART water resources sub team and the larger NART team will support Eastern Research Group and NOAA Project Management Team identifying and compiling stakeholder lists for focused in-basin engagements and for a broader information gathering survey.

Why NART?
NART's regional network of partners and constituents span a wide spectrum of service sectors (e.g., river commerce, emergency management, reservoir management, agriculture, hydropower, watershed management, fish and wildlife, municipal and industrial water supply, recreation, energy production, and water quality) and reaches into all four watersheds (e.g., Potomac, Susquehanna, Delaware and Hudson).

Partners: Regional river basin commissions, Eastern Research Group (ERG)

Participating NOAA entities: NWS/ER, NART, NWS/OCWWS HSD & OHD, NOS

Key milestones (by quarter):
Q1: Provide representative service sector stakeholder lists; attend stakeholder engagement meetings.
Q3: Participate in information gathering surveys

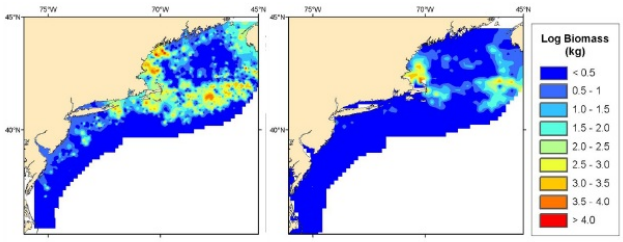
NART Funding: None

Stormwater run-off in Annapolis.

Climate Adaptation & Mitigation

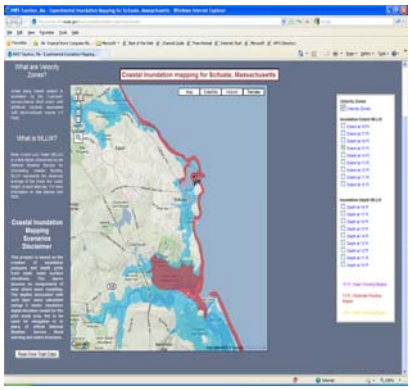
Climate priorities influencing NOAA execution in FY13 are the need for enhanced climate information in the fisheries and coastal sectors, impacts to coastal communities and extreme events.

Integration of Climate Science, Fisheries, and Protected Species: Incorporating climate change information (e.g., ocean acidification, temperature change, projected habitat shifts) in the management of trust resources is a high priority for NOAA. Current work between OAR and NMFS is projecting the effect of climate change on cusk, a fishery species that is also a species of concern. The results suggest that the distribution of cusk will decrease and fragment as a result of warming. These types of detailed studies will continue, but a more general (applicable to multiple species) climate vulnerability assessment process is also being developed. A pilot for that process will be conducted in the northeast region during the summer 2012 and a full assessment of all managed fishery species in the region is planned for 2013. In addition, an upcoming workshop with NMFS/PRD, NESDIS/NCDC, OAR, and invited federal partners will explore methods to effectively integrate climate change science and impacts into management activities under the Endangered Species and Marine Mammal Protection Acts. The workshop will focus on an exchange of information regarding ongoing and planned climate change research, as well as climate change effects on protected species and the status of regional and national efforts to incorporate climate change into natural resource management. The workshop will also benefit from lessons learned with the US Fish and Wildlife Service and their need for climate data to manage wildlife on landscape scales with the Landscape Conservation Collaborative.



Cod distribution moving north, NMFS/NEFSC.

Climate Change and Impacts to Coastal Communities: NESDIS/NCDC is working with NOS and the regional ocean partnerships plan for and respond to the impacts of climate change (primarily sea level rise) on coastal communities, regional infrastructure, coastal habitats, and shoreline management efforts. The objective is to provide federal, state, and municipal programs with state-of-the-art data and tools to advance planning and response to storms, shoreline erosion, and coastal inundation due to projected sea-level rise and climate change.



NWS visualization at Scituate, MA.

Numerous opportunities exist in FY 2013 to leverage NOAA programs and capabilities to address impacts to coastal communities in the North Atlantic, including:

- support the National Ocean Policy's "Resiliency and Adaptation to Climate Change and Ocean Acidification" implementation plan;
- implement strategies and actions articulated in the National Fish, Wildlife and Plants Climate Adaptation Strategy (Summer 2012);
- work with Northeast and Mid-Atlantic state coastal management programs and ocean partnerships to address their climate-related priorities;
- continue support for NERRS Sentinel Site activities to better understand sea level change, coastal flooding and inundation, and facilitate integration into NOAA Sentinel Site Program;
- expand public-private partnerships on climate change;
- integrate storm surge, inland flooding and sea level rise information;
- and design coastal and inland inundation products to improve decision-support and calibrate forecasts.

Two Department of Interior (DOI) regional initiatives - the North Atlantic Landscape Conservation Cooperative and the Northeast Climate Science Center - will be supporting research addressing our common coastal needs for climate information.

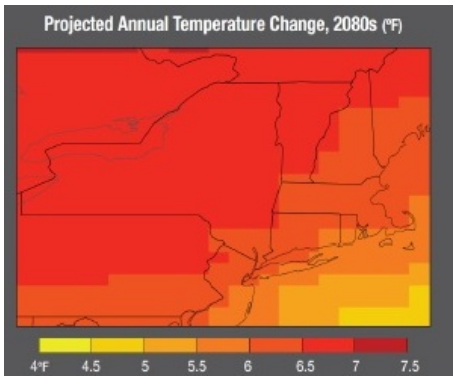
Extreme Events and Climate: Under all climate change scenarios, extreme events (e.g., severe storms, drought, flooding, and heat waves) are predicted to increase in frequency and intensity. Planning for and adapting to the projected impacts from extreme events is a major priority for the region. NWS and NESDIS/NCDC are collaborating

to ensure information on fresh water extremes (drought and flooding) is delivered to states and decision-makers in a timely fashion.. In addition, NESDIS/NCDC and NWS are partnering to ensure that forecasts and information are delivered to states, including information from NOAA's Regional Climate Centers, the drought.gov portal, and precipitation frequency estimates for the New England states. Also, NOAA and our funded partners will be releasing regional climate outlook products to address this and other sectoral impacts from a changing climate and regional impacts.

NART Response

The NART identified five projects in direct support of NOAA's climate adaptation and mitigation goal in FY13.

1. The NART will support refinement of Eastern Region stakeholder needs for climate change products and services.
2. The NART will raise awareness and provide cross-line support for a National Integrated Drought Information System (NIDIS) drought early-warning pilot taking place in the Chesapeake Bay.
3. The NART will enhance NOAA's participation in a Regional Integrated Science & Assessments (RISA) water workshop.
4. Building on a two-day NART-funded workshop in FY12 that explored methods to effectively integrate climate change science into management activities, the NART will support the development of a protected species vulnerability assessment.
5. The NART will support participation by other LOs in an NCCOS-initiated workshop to identify specific threshold events of interest and habitat impacts resulting from climate change.



Predicted changes in temperature by 2080, assuming continued high emissions of carbon pollution. Source: Rosenzweig et al. (2011)

Refining Eastern Region Stakeholder Needs for Climate Change Products and Services

Strategic Objectives from the NGSP:
Climate: Mitigation and adaptation choices supported by sustained, reliable, and timely climate services; A climate-literate public that understands its vulnerabilities to a changing climate and makes informed decisions
Weather-Ready Nation: A more productive and efficient economy through environmental information relevant to key sectors of the U.S. economy
Healthy Oceans: Healthy habitats that sustain resilient and thriving marine resources and communities
Resilient Coastal Communities & Economies: Resilient coastal communities that can adapt to the impacts of hazards and climate change
Engagement: An engaged and educated public with an improved capacity to make scientifically informed environmental decisions Integrated services meeting the evolving demands of regional stakeholders

Contact/email:
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Adrianne Harrison, NOS/CSC,
Adrianne.Harrison@noaa.gov

Summary:
Over the past year there has been a robust effort to collect, compile, and review documents that articulate needs for climate products and services in the Eastern Region, including the North Atlantic. These written materials are being entered into a relational database that will allow NART's climate team to access, filter and synthesize the information. Collecting and reviewing this material provides an essential foundation for a region-wide needs assessment, which is a systematic process for determining and addressing needs, or "gaps" between current conditions and desired conditions or "wants." To gain a more comprehensive understanding of regional needs, it's critical to enter into a dialogue with key regional stakeholders. The starting point for that discussion comes from synthesizing what's been learned from reviewing all the documents: The end point is coming up with a more refined understanding of specific needs and identifying ways that NOAA can address those needs. In some cases, it's as easy as making stakeholders aware of products and services that NOAA is already delivering. In other cases, the identification of a regional need can mobilize NOAA to work across organizational lines to address the specific need.

The NART climate change team is proposing to hold two to three focus groups with key regional stakeholders to review, focus and prioritize some of the needs captured in the literature review. It's expected that one meeting would occur in the Northeast, with another two in the Mid-Atlantic. Approximately 10-15 stakeholders would participate in each session. The meetings would be organized and led by ERCT members, who will be responsible for developing a synthesis of regional needs for review at the meeting.

Funding would be used to support travel for key stakeholders. These meetings would also provide an opportunity to share climate change adaptation lessons, which is frequently identified as a need for North Atlantic stakeholders.

Why NART:
The ERCT represents a wide range of NOAA capabilities for providing climate change products and services. Team participation is designed to increase each individual's understanding of the kinds of climate products and services needed by NOAA offices, partners and stakeholder. The proposed focus groups will insure that team members are operating with the most up-to-date and informed input from our stakeholders. There is no other NOAA group that brings together such a large swath of NOAA climate expertise relative to the North Atlantic.

Non-NOAA Partners:
North Atlantic Landscape Conservation Cooperative, RISA partners, state climatologists, state climate change adaptation representatives.

Participating NOAA entities:
NOS Coastal Services Center, NESDIS Regional Climate Services, OAR Climate Program Office, NOS Office of Ocean and Coastal Resource Management, NOS National Centers for Coastal Ocean Science

Key Milestones:
Q1: Survey to refine state-level priorities.
Q2: Compile results, select topics and locations, and find NOAA reps.
Q3: Face-to-face mtgs, (verify and receive finer resolution from states).

NART Funding: $6500

NIDIS Pilot Project in the Chesapeake Bay Region

Strategic Objective from NGSP:
Engagement Enterprise objective: Integrated services meeting the evolving demands of regional stakeholders.

Contact/email:
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George McKillop, NWS/ER, George.Mckillop@noaa.gov
Chad McNutt, OAR/NIDIS, Chad.McNutt@noaa.gov
Peyton Robertson, NMFS/NCBO
Peyton.Robertson@noaa.gov

Summary:
The National Integrated Drought Information System Act of 2006 prescribes an interagency approach, led by NOAA, for the development and coordination of information to support proactive decision-making that reduces the impacts related to drought. NIDIS has three general tasks under its authorization: (I) Provide an effective drought early warning system; (II) Coordinate Federal research in support of a drought early warning system; and, (III) Build upon existing forecasting and assessment programs and partnerships.

NIDIS has undertaking several pilot projects to prototype and develop regional drought early warning information systems (RDEWS) around the U.S. These include the Upper Colorado River Basin, the Apalachicola-Chattahoochee-Flint River Basin, and California. NIDIS is exploring other possible areas to expand. The Chesapeake Bay (CB) is a likely candidate given its importance as the largest estuary in the U.S. and the diverse and conflicting demands for water resources in the region. Executive Order (EO) 13508 requires federal agencies to draft a way forward for protection and restoration of the Chesapeake Bay Watershed. NIDIS sees the EO as an opportunity to start scoping some of the issues related to drought in the CB. NIDIS would like to hold a workshop in support of the EO that focuses on understanding drought monitoring gaps, how forecast are being used, what indicators and triggers are being used to make management decisions, and relate impacts to the timing and severity of drought. The workshop could eventually be the first step in developing a Chesapeake Bay RDEWS Pilot.

In FY13, NIDIS program staff at OAR/CPO/CASD will continue work with a steering committee, which includes the NART team leader and the climate & water resources sub team leads, to plan for a scoping workshop to determine drought planning needs for the Chesapeake Bay Region.

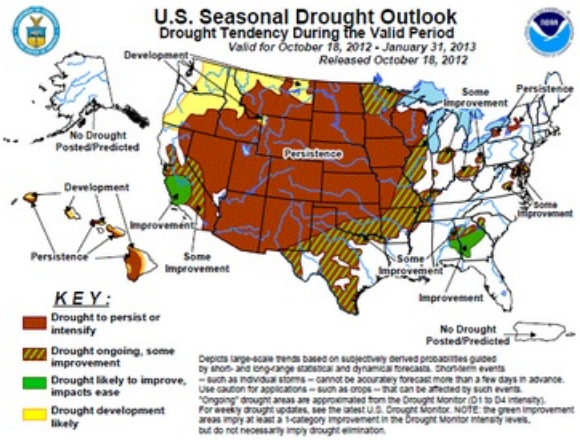
Why NART?
NART's regional network of partners and constituents will inform new partnering opportunities in the NIDIS pilot project. At the same time, NIDIS activities and accomplishments will be shared with a broader regional audience in the North Atlantic.

Partners:
Interstate Commission Potomac River Basin (ICPRB); Susquehanna River Basin Commission (SRBC); NDMC; State (VA, MD, PA, De) Drought representatives

Participating NOAA entities:
NWS/ER; NESDIS/NCDC; OAR/CPO/NIDIS; NMFS/NCBO

Key milestones (by quarter):
Q1: Re-engage OAR/CPO/NIDIS project manager and existing steering committee.
Q2: Engage the state (VA, MD, PA & DE) drought people; participate in search for "a sponsor."
Q3: Attend scoping workshop.

NART Funding: None



Seasonal outlook, NIDIS program.

Participation in Northeast Climate/RISA Workshop

Strategic Objective from NGSP:
Engagement Enterprise objective: Integrated services meeting the evolving demands of regional partners and stakeholders.

Contact/email:
Ed Capone, NWS/NERFC, Edward.Capone@noaa.gov
George McKillop, NWS/ER, George.Mckillop@noaa.gov
Ellen Mecray, NESDIS/NCDC, Ellen..L.Mecray@noaa.gov

Summary:
The rainfall frequency atlases and technical papers published by NOAA serve as de-facto national standards for rainfall intensity at specified frequencies and durations in the U.S. Updated precipitation frequency estimates are published in NOAA Atlas 14. NOAA Atlas 14 is a web-based document available through the Precipitation Frequency Data Server: http://hdsc.nws.noaa.gov/hdsc/pfds/index.html). NOAA/NWS/OHD Hydrometeorological Design Studies Center (HDSC) is currently calculating this information for the North Atlantic region. Revisions for the Middle Atlantic (PA, NJ, DE, MD, & VA) have been published. Work to significantly update the Northeast (ME, NH, VT, MA, CT, RI, & NY) has begun, but is not expected to be published until Sep 2015.

The Northeast Regional Climate Center (NRCC) recently updated rainfall extremes in NY and New England based on discussions with NY State DEC, NRCS regional office, and New England states (precip.net). Proponents of storm water management and dam safety have been expressing a strong interest in getting updated precipitation frequencies in the Northeast. There are differences in the methodologies of the approaches used by NRCC and NWS/HDSC in their updating of the precipitation frequency data.

NESDIS/NCDC has invested funds ($10k) with the northeast RISA (CCRUN at UMass) for their assistance in hosting a workshop in FY13 for data providers of water-related decision information. With NART assistance, NWS will send three hydrologists to the workshop to be held at the University of Massachusetts to discuss the precipitation frequency updating occurring in the Northeast. Workshop participants will include water data providers such as USGS, NRCC, NOAA, USACE, NRCS, and some others. The intention is for participants to benefit from a discussion of NOAA's expected completion timeline, differences in the two updating approaches, and what data are currently available for distribution to decision-makers. This discussion will also inform the RISA's current funded work to meet with water managers to discuss climate impacts and decision-tools.

Why NART?
Leveraging a NOAA-sponsored workshop takes advantage of NART's regional network of partners and constituents and will effectively inform and raise awareness of NOAA science, products and services.

Partners: NRCC, USGS, USACE, NRCS, Academics

Participating NOAA entities: NWS/RFC; NWS/OHD/HDSC; NESDIS/NCDC

Key milestones (by quarter):
Q1: Coordinate NWS hydrologists participation
Q3: Attend workshop

NART Funding: $3K

Protected Species Climate Change Vulnerability Assessment

Strategic Objective from NGSP:
Improved understanding of ecosystems to inform resource management decisions. (Note: The outcome from this proposal will be used internally at first, but also has external benefits.)

Contact/email:
Diane Borggaard, NMFS/NERO,
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Timothy Cardiasmenos, NMFS/NERO,
Timothy.Cardiasmenos@noaa.gov

Summary: The NMFS Northeast Region's Protected Resources Division (PRD) recently convened a two-day NART-funded workshop exploring methods to effectively integrate climate change science into management activities. One information gap identified by participants was the need for a protected species climate vulnerability assessment. A similar assessment is currently being developed jointly by the NMFS Office of Sustainable Fisheries (F/SF) and Office of Science and Technology (F/ST) largely for managed fish species, although the assessment does include some protected fish. As the modeling work is framed on fish and shellfish life histories, the assessment will assist managers in better understanding and handling the reactions of fishery populations to the effects of climate change.

Workshop participants agreed that vulnerability assessments should be expanded to include other protected species, including marine mammal and sea turtle species. The life history of marine mammals and sea turtles is very different than that of most marine fish and shellfish, so the approach under development by F/SF and F/ST would need to be reviewed and modified. Developing a protected species vulnerability assessment will assist NMFS in making scientifically informed management decisions in respect to observed and projected effects of climate change on protected species. Therefore, this proposal requests NART funding to bring together NOAA line office staff with expertise in both climate science and protected species science and management in a focused workshop to discuss modifications to the current fish vulnerability assessment such that it can be tailored to assess the vulnerability of marine mammals and sea turtles. Additionally, the existing model will be considered for conducting a vulnerability assessment of protected fish species that have not been included in the current assessment. Next steps will also be discussed based on the outcomes from the protected species fish considered in the F/SF and F/ST vulnerability assessment.

NMFS has been communicating with other NOAA line offices for service delivery of climate information to be used in fisheries management. This need is evidenced by the formation and function of the DOI Landscape Conservation Cooperatives (for the fish and wildlife sector), the Southeast Community of Practice (as well as the Northeast Regional Ocean Council and the Mid-Atlantic Regional Council for the Ocean) (for managers in the coastal sector), as well as other sectors including transportation and environmental managers. Additionally, this evidence also includes the success of the PRD climate workshop which brought various NOAA line offices together. This proposal will help NMFS managers continue to coordinate with and utilize NOAA climate work. Additionally, it will allow for continued service delivery of NOAA's climate products and services by providing funding for one of the outcomes of the PRD climate workshop.

Why NART? NMFS is an important internal customer of NOAA climate work. The NART has already invested resources into a PRD climate workshop and should continue to support a workshop outcome with regional importance/scope. The proposed work would help provide needed funds to equip PRD with important information in considering climate change effects on protected species to assist with management. Additionally, PRD would bring together NOAA line offices with expertise on the topic.

Partners: No non-NOAA partners identified at this time.

Participating NOAA entities: NMFS (e.g. NERO, NEFSC, Headquarters), NOS (e.g. SBNMS), OAR

Key Milestones (by quarter, FY 13):
Q1/Q2: Develop meeting ideas, agenda, dates, and location; identify and contact invited participants
Q2/Q3: Send formal invitations; complete travel arrangements
Q3/Q4: Convene workshop; develop, finalize, and distribute workshop report

NART Funding: $4K

Climate & Coastal Habitats Workshop

Strategic Objective from NGSP:
Climate objective: Assessments of current and future states of the climate system that identify potential impacts and inform science, service and stewardship decisions (National and regional assessments address particular needs of NOAA's unique stewardship responsibilities for ocean and coastal ecosystems, living marine resources and water resources)
Oceans objective: Improved understanding of ecosystems to improve resource management decisions (Increased development and use of climate considerations in fishery and protected resource decisions and in coastal and marine spatial planning processes)
Oceans objective: Healthy habitats that sustain resilient and thriving marine resources and communities (Climate change impacts addressed in conservation actions to promote long-term resilience and adaptation)
Coastal Communities objective: Resilient coastal communities that can adapt to the impacts of hazards and climate change (Healthy natural habitats, biodiversity and ecosystem services support local coastal economies and communities)

Contact/email:
Beth Turner,NOS/NCCOS/CSCOR,
Elizabeth.Turner@noaa.gov
Ellen Mecray, NESDIS/NCDC, Ellen.L.Mecray@noaa.gov

Summary:
NOS has undertaken a new process to prioritize activities in NCCOS that involves the input of other NOS offices to NCCOS projects. As part of that process, a proposal for a workshop in Charleston, SC on "Impacts of Climate-related Threshold Events on Coastal Habitats" was highly ranked. This activity would:

1. Examine specific climate-related threshold events and habitat impacts
2. Identify relevant research questions, approaches and desired products which NCCOS can deliver to NOS offices and regional stakeholders.
3. Develop an ongoing framework of NOS collaborations to address priority climate impacts.

Threshold events may include high stands of sea level, storms, high temperatures, droughts or floods, all of which may bring about abrupt habitat change and associated consequences to ecosystem services, including water quality, habitat function, and C sequestration.

Through this process we anticipate development of a framework of collaborations to address priority climate impacts. NOS would convene a workshop comprised of NOS/NCCOS scientists, state or regional managers (in coordination with CSC), Reserve and Sanctuary managers, NOAA regional team coordinators, and IOOS regional associations to identify specific threshold events of interest and habitat impacts resulting from climate change. The outcome of the workshop will identify the research approach and desired products which NCCOS can deliver to NOS offices and regional stakeholders. This request to NART is to expand participation in the workshop to other LO representatives and provide enhanced cross-NOAA coordination.

Why NART?
The NART will extend the utility of the workshop and provide for better cross-NOAA integration and planning. The workshop will help to set priorities for coastal habitat work in relation to climate impacts, which can benefit all of NOAA in planning for future research activities. It will also provide input on the development of useful tools and products for integrating climate impacts into coastal habitat and resource management.

Coastal wetlands provide critical habitat.

Partners:
Regional coastal managers and stakeholders, identified in association with CSC and other partners

Participating NOAA entities:
NCCOS: Beth Turner, other internal scientists; CSC: Todd Davison; NERRS: Marie Bundy; COOPS: Steve Gill; NMFS: Roger Griffis, Helen McMillan

Key milestones (by quarter):
Q3: Workshop held.
Q4: Workshop summary produced, including NOS plan for addressing identified priorities.
FY14: Research by NCCOS to address identified priorities
FY15: Production of research synthesis, dissemination of results and products in conjunction with CSC.

NART Funding: $4K

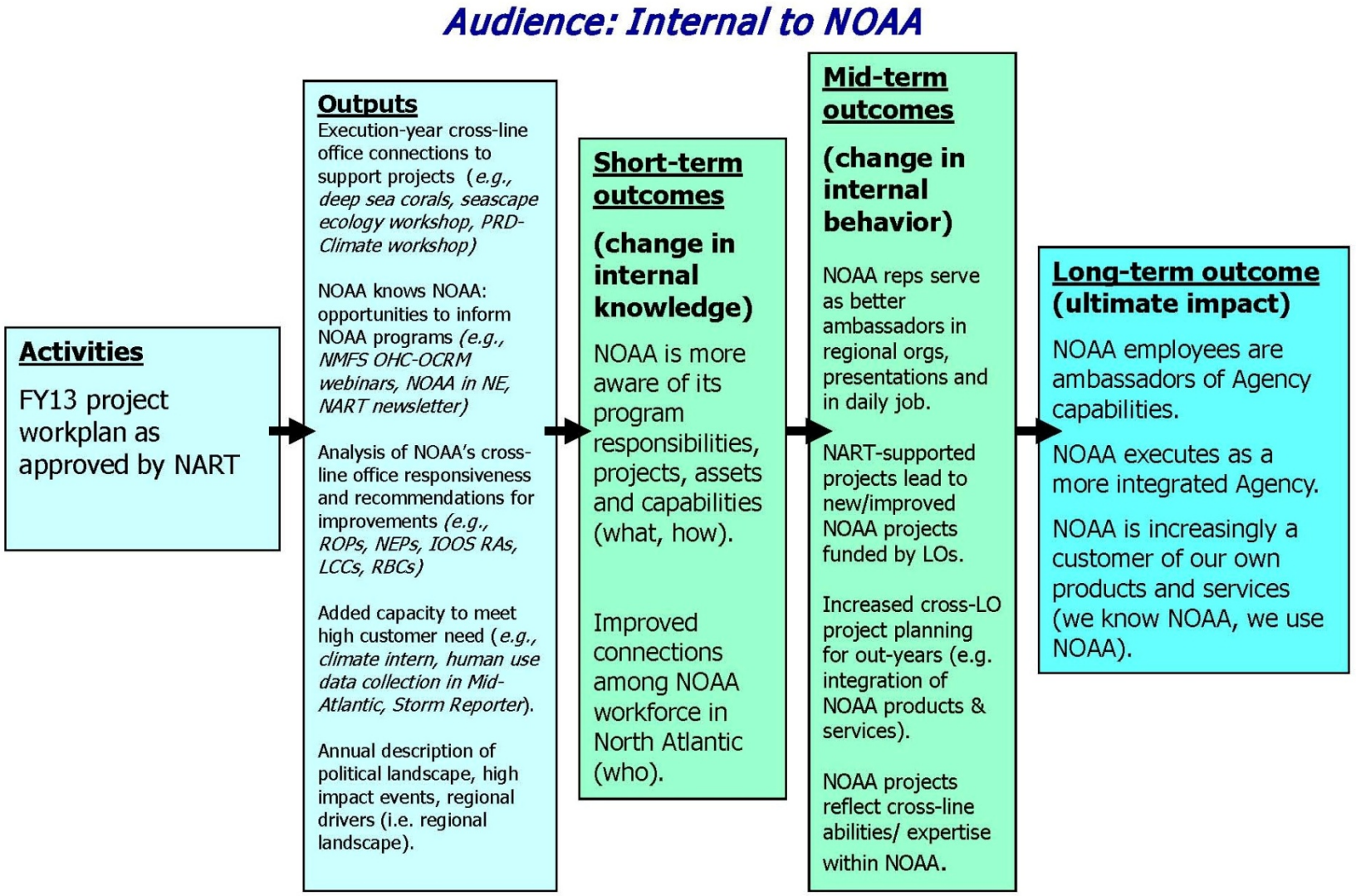
Appendix A. FY13 Budget

	FY13 NART Funding	Other Funding
A. Healthy Oceans		
1) Seascapes II Workshop (Continuation of March 2012 workshop) (Manderson, Friedland)	4,000	
2) Ecological Forecasting Workshop (Turner)	4,000	$4,000
3) Data Visualization (Friedland)	3,000	
B. Resilient Coastal Communities & Economies		
4) NOAA Capacity to Impact Ocean Planning in the North Atlantic (Nicholson, Bigford)	2,000	
5) Supporting the States New England Roundtables (Harrison, Newhall)	3,000	
C. Weather-Ready Nation		
6) Wave Run-Up (Thompson)	4,000	
7) NART/Sea Grant WRN pilot (Thompson)	2,500	30,000
8) MARFC Webinars (Wnek, McKillop)	4,000	1,000
9) Leverage Climate/RISA Workshop in the Northeast to Inform Water Resources Partners and Stakeholders (Capone, McKillop, Mecray)	3,000	10,000
D. Climate Adaptation & Mitigation		
10) Protected Species Climate Change Vulnerability Assessment (Cardiasmenos, Borggaard)	4,000	
11) Refining Eastern Region Stakeholder Needs for Climate Change Products and Services (Mecray, Finch, Harrison)	6,500	
12) Impacts of climate-related threshold events on coastal habitats (Turner, Mecray)	4,000	28,000
E. Engagement Enterprise		
13) North Atlantic Regional Team Administration	12,000	
Total	**$ 56,000**	**$ 73,000**

Appendix B. NART Membership

	Name	Email	Affiliation	Location
1	***Team Lead*** **Robertson, Peyton**	**Peyton.Robertson@noaa.gov**	**NMFS**	**Annapolis, MD**
2	***Coordinator*** **Bartlett, Nicole**	**Nicole.Bartlett@noaa.gov**	**NMFS**	**Woods Hole, MA**
3	Antoine, Adrienne	Adrienne.Antoine@noaa.gov	OAR/Climate	Silver Spring, MD
4	Cardiasmenos, Tim	Timothy.Cardiasmenos@noaa.gov	NMFS	Gloucester, MA
5	Deguise, Sylvain	Sylvain.Deguise@uconn.edu	Sea Grant	Groton, CT
6	Friedland, Kevin	Kevin.Friedland@noaa.gov	NMFS	Narragansett, RI
7	Harmon, Michelle	Michelle.Harmon@noaa.gov	NOS	Silver Spring, MD
8	Larkin, Andrew	Andrew.W.Larkin@noaa.gov	NMFS/NOS	Norfolk, VA
9	Martinez, Catalina	Catalina.Martinez@noaa.gov	OAR	Narragansett, RI
10	McKillop, George	George.McKillop@noaa.gov	NWS	Bohemia, NY
11	Mecray, Ellen	Ellen.L.Mecray@noaa.gov	NESDIS	Taunton, MA
12	Nicholson, Betsy	Betsy.Nicholson@noaa.gov	NOS	Durham, NH
13	Rule, Erica	Erica.Rule@noaa.gov	OAR	Miami, FL
14	Schlitz, Ron	Ron.Schlitz@noaa.gov	NMFS	Woods Hole, MA
15	Siebers, Tony	Anthony.Siebers@noaa.gov	NWS	Camp Springs, MD
16	Thompson, Bob	Robert.Thompson@noaa.gov	NWS	Taunton, MA
17	Ticco, Paul	Paul.Ticco@noaa.gov	NOS	Silver Spring, MD

Appendix C. NART Outputs, Outcomes



Audience: External to NOAA