Regional Climate Priorities & Project Workshop

Sponsored by
New York Bight Sea Grant
Regional Ocean Science Council

Workshop Summary

June 29-30, 2010
University of Connecticut, Avery Point Campus
# Table of Contents:

- Introduction  
  Page 3
- Planning Region  
  Page 3
- Workshop Process and Structure  
  Page 4
  - Plenary Speaker Summary  
    Page 4
  - Step 1: Defining Pilot Projects  
    Page 5
  - Step 2: Priority Needs  
    Page 6
  - Step 3: Defining Pilot Projects  
    Page 7
  - Step 4: Workshop Next Steps  
    Page 10
  Page 11
- Annex 2: Participant List  
  Page 19
- Annex 3: Regional Needs from Previous Planning Exercises  
  Page 21

Introduction:

On June 29 and 30, 2010, a workshop sponsored by the New York Bight Regional Ocean Science Council was held. The workshop participants focused on the regional-scale projects to address adaptation to climate change. The workshop was attended by approximately 60 individuals representing federal and state agencies in the New England and New York Bight area as well as several non-governmental organizations actively engaged with climate adaptation. A full participant list is provided in Annex 2.

Goal of the workshop:

Identify priority needs and pilot projects that will enhance a regional response to climate change with increased partnerships and capacity-building.

Objectives of the workshop:

- Identify a **unified set of regional needs and priorities** required to address climate issues and deliver climate information;
- Identify **3-5 pilot projects** that leverage existing and potential collaboration opportunities and will facilitate regional understanding of climate variability and change; and Begin high-level discussions on **financing and implementing multi-partner pilot projects** in the region.

Region:

The “region” considered for the workshop and represented by the participants reaches across the New England and New York Bight areas including the watersheds of the Hudson River and the Connecticut River (Figure below). The New York Bight ranges from Cape Cod, Massachusetts to Cape May, New Jersey.
Workshop Process and Structure:

In order to successfully realize the workshop objectives, the steering committee developed an agenda containing a sequence of steps. As an introduction, two keynote addresses provided both a federal and a state perspective on the magnitude of the climate adaptation issue and the need to improve state and Federal coordination and collaboration. After two keynotes and a panel to discuss the scope of several sample projects conducted on regional scales, the workshop proceeded to a facilitated discussion directed towards defining suitable criteria for regional climate “pilot projects” (Step One). Step Two was to reassess priority regional climate needs. Enabled by this discussion, the workshop proceeded to critical Step Three which involved developing pilot projects that reflected the needs and incorporated the criteria. The initial pilot projects were then prioritized collectively and participants signed on to the four highest ranked pilot projects. A more detail discussion of each step follows.

Plenary Speaker Summary:

Claudia Nierenberg, National Oceanic and Atmospheric Administration (NOAA), The Federal Viewpoint and the White House Climate Change Adaptation Task Force (WH CCA TF)
- Providing an integrated policy view on the Federal climate science enterprise
- Critical to define a regional framework to organize how federal agencies will respond to climate change
- President’s Executive Order that federal agencies will offer recommendations for climate adaptation in one year (at Copenhagen Dec. 2009). Thus, the WH CCA TF (or, the Task Force).
- The Task Force has many workgroups, including climate adaptation planning within Federal agencies, science input to climate policy, water resources and climate adaptation, international resilience to climate change, and sectors including insurance, health, fish/wildlife/plants, urban areas, coasts and oceans, and land.
- Gaps in the US capacity include the ability to extend science to decision-makers. This challenges the system at all levels including coordination, assessments, service delivery, and partnerships.
- Solution? Regional constructs can serve as integrators at all levels (Federal, state, local). Regional efforts are the most robust in terms of coordination and collaboration. They know the challenges, the opportunities, and the viewpoints.

Grover Fugate, Rhode Island Coastal Resources Management Council (RI CRMC). The State Viewpoint and Experiences with the RI Special Area Management Plan (SAMP)
- SAMP climate chapter works on a projection to the year 2100, with a spatial extent 30 miles offshore, to include mitigation, adaptation, and the energy sector.
- The SAMP addresses the potential for serious coastal impacts with climate change, primarily with flooding, snowmelt, precipitation and delivery of non-point pollutants, ocean acidification, sea-level rise, and the magnitude and frequency of storm events.
Additional areas of focus include: ecological impacts (fisheries management and the loss of demersal fish with a gain in pelagic fish), coastal development, infrastructure, loss of wetlands, and the protection of existing and potential resources.

Panel on Sample Pilot Projects

Hector Galbraith, Manomet Center for Conservation Sciences
- Pursuing climate adaptation and implementation of adaptation plans using vulnerability assessments and cost-effective solutions
- Our region, an incubator for thinking and for implementation of adaptation strategies
- Regional thinking is required, NOT state-by-state
- National Wildlife Federation (NWF) along with United States Fish and Wildlife (USFWS) and others have been working to map habitats, bring in resources and expertise, and work on needs-driven research on climate adaptation.
- Need to identify concrete actions and apply that process to climate change

- Strategies and multiple objectives at work on the Connecticut River watershed including flow management, reconnection of habitat, and floodplain restoration.
- Large group of partners on the project, with shared goals, matching funds across states, federal agencies, and Non-Governmental Organizations, and a hot stakeholder issue (so they find money for you as well!).
- Creating hydrological models as decision tools and working with dam owners
- Also working on policy changes and permitting processes

Mark Tedesco, Environmental Protection Agency (EPA)
- Funding from EPA’s Climate Ready Estuaries program
- Focusing on pilot projects in specific communities to address vulnerability threats and roles at different levels of government
- Need good information on changes in the system, suggest sentinel monitoring, indicators, and the ability to transfer to other sites.

Keith Robinson, US Geological Survey (USGS), CT River partnership
- Large watershed in New England, initial focus on a watershed atlas for the region
- Also a focus on long-term sustainability issues in the region such as fisheries resources and hydrology
- Atlas serves as an information tool, and an interactive Geographic Information Systems data viewer, as well as a tool to which resource managers can point.

Step 1. Defining Pilot Projects.

This step provided the criteria for selecting pilot projects. The intention was to identify projects that leverage existing and potential collaboration opportunities and will facilitate regional understanding of climate variability and change. This included a large group discussion to
discuss characteristics and attributes of ideal pilot projects as well as providing examples of ongoing projects. The criteria were separated into two tiers: Tier One included criteria that were primary for consideration and Tier Two included important, but secondary criteria. The final working criteria agreed upon by the participants is summarized herein:

**Tier 1:**
- Promotes approaches and actions that are regional in scope, replicable, and scalable
- Fosters unique integration of expertise amongst federal partners/states/Non-Governmental Organizations
  - Multi-state; multi-federal; Federal-State-Non-Governmental Organizations
- Integrates multiple objectives and responds to identified needs
- Identify existing resources and support: Funding, in-kind support, State/Federal and Non-Governmental Organization investments
- Urgency exists for undertaking the project
- Does not duplicate other efforts in the region
- Has well-defined metrics to measure success

**Tier 2:**
- Leverages or enhances existing and/or potential collaborative opportunities
  - Builds on and advances previous research, policy and management efforts/projects
- Facilitates a broader understanding of regional climate variability and viable response strategies
  - Project has an education/outreach component
  - Actively engage the public
- Provides a foundation for future work
- Geography: Balance final choices between Land-based, Ocean-based, and the Land-Ocean connection
- Balances place-based and thematic-based pilot ideas.

These criteria were meant to provide guidance during the workshop in the development of regional climate pilot projects. These criteria should in no way be construed to reflect the absolute requirements of any of the agencies or organizations present.

In addition to these criteria, the participants added a number of other considerations that may be important to consider when deliberating on the characteristics and attributes of particular pilot projects. These include:

- Access to financial resources
- “DO” -- Move beyond thinking to implementation
- Need to partner with the private sector
- Low-hanging fruit
- Remember that land use decisions are local
• Focus below the state but larger than local
• Use a no-regrets approach
• Flexibility in the face of uncertainty
• Public health
• Get beyond climate as a singular driver for support
• Value natural resources
• Break down stove pipes


Regional needs. This step defined regional needs required to address climate issues and deliver climate information. This step allowed participants to work in small groups to answer key questions that when answered will define key climate change and vulnerability and adaptation issues in the region. A summary of these discussions is included in Annex 1.

Priority Needs. Each group identified their top regional “Needs”. Once presented, all the participants voted on the collective list needs to provide general guidance as to which needs were most important. The level of priority (first, second or third) are in brackets and were assigned based on total votes received. The first five bullets are general themes that cut across several groups. The sub-bullets under these are the specific needs presented by the five individual groups.

• Messaging (First)
  o Best practices guide on communication (i.e., communication toolbox).
  o Development of standardized clear messaging strategy to engage public in the issue – case studies.
  o Improve/facilitate science and climate conversation. This includes literacy and education, messages to change attitudes and behavior and attention to private sector.
• Roles and Responsibilities (Second)
  o Agencies need to clearly define roles, responsibilities, and funding strategies - Who does what and with what funds?
  o How to determine jurisdiction?
• Monitoring (First)
  o Availability of improved regional datasets—inventory and sharing
  o Monitoring data needs to have standardized accessible, identify and address data gaps
  o Regional monitoring strategy
  o Monitoring at national, regional, and local scales. Focused on signals versus noise of climate variability/indicators.
• Tool Kit/Update Laws & Policies (First)
  o Compendium of case studies on climate change adaptation
Step 3. Defining Pilot Projects

This multi-staged step identified 3-5 pilot projects from each of the five breakout groups that leverages existing and potential collaboration opportunities and will facilitate regional understanding of climate variability and change. Each of these pilot projects was described in the attached Project Summary Sheets. The projects were sorted into HIGH, MEDIUM and LOW groups. The actual number of votes is indicated in (parenthesis). Once the priorities were identified, the workshop participants were asked to select which pilot project teams they will be engaged with. Suggested champions for engagement with the individual pilot projects were also identified.

Adapt New England, Regional Climate consortium HIGH (30)

- **Goal:** Create a regional consortium that would identify areas of regional needs to work together.
- **Champion:** Northeast States for Coordinated Air-Use Management (NESCAUM) with many partners. 18 months.
• Funding: Approximately $50,000. Sources: In-kind, Foundation, New York Bight Sea Grant Funds.

New York Bight Sentinel Monitoring Strategy / Network HIGH (29)
• Goal: Establish network of sentinel monitoring sites to inform development of adaptation plans and measures results to inform adaptive management
• Champion: New England Interstate Water Pollution Control Commission (NEIWPCC) and Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS)
• Resources: $100-200,000 for strategy

Google Mapping of Regional Inundations Vulnerability HIGH (28)
• Goal: Get information to end user. Increase awareness. Assist in planning. Maps of present inundations areas. Relating areas to infrastructure/critical habitats, show it may change in future.
• Funding: Federal partners pull together. Sea Grant. Federal Emergency Management Agency, Utilize existing information on an ongoing basis.
• Major tasks:
  o Gather existing data
  o Decide on what to show and criteria for doing
  o Decide on how to interact with Google
  o Decide on who will lead information
  o Build some demonstrations maps – get user feedback and modify as necessary
  o Complete Google Application
  o Make flexible for future enhancements.

Climate Adaptation Messaging – General Use and Historical Data HIGH (23)
• Goal. Educate the public, homeowners so they can make informed decisions to affect behavioral change, homeowner choices, building code changes, flood map changes.
• Funding ideas: Home Depot Foundation. NSF. $50-100k

Connecticut River Basin Forest, Flood Plain, River Corridor, Wetland Health Initiative MEDIUM (14)
• Goal is to establish, maintain, and increase resilience of forests, river corridors, floodplain and wetlands services and functions in the Connecticut River Basin. The
project would provide habitat connectivity as well as increased flood resilience to communities and municipalities.

- Champion: State agencies, The Nature Conservancy, United States Fish & Wildlife Service, New England Interstate Water Pollution Control Commission
- Resources: Vermont Department of Environmental Conservation Technical Assistance.

**Ecological Relevant Climate Response Predictions in New York Bight** MEDIUM (21)

- Goal: Scientifically defensible forecasts and uncertainty estimates (areas of high temperatures, thresholds low temperatures, salinity, DO, etc)
- Champion: Northeastern Regional Association of Coastal Ocean Observing Systems, United States Geological Survey, Environmental Protection Agency, National Oceanic and Atmospheric Administration and States
- Resources: Existing programs in agencies with additional funding needed

**RFP Demonstration projects of adaption** MEDIUM (18)

- Goal: Demonstrate and communicate on the ground adaptation strategies.
- Champion: Sea Grant, Environmental Protection Agency, National Oceanic and Atmospheric Administration, United States Fish & Wildlife Service and United States Department of Transportation. Department of Energy may have funding for this.
- Funding: $200,000 for up to four demonstration projects and implementation. Potential matching sources including possible in-kind match.

**Catalogue of Adaptation Actions** MEDIUM (12)

- Goal: Promote awareness of what adaptation is and share solutions.
- Champion: Sea Grant, ICLEI
- Funding: $150,000. Sea Grant, Foundations, Federal Agencies

**Watershed Management in an Uncertain Future** LOW (12)

- Goal: Planning tools that are replicable focusing on: water quality and supply. Focus process: Watersheds, planning and adaptation. Multi-sector. Improved decision making
- Champions: Environmental Protection Agency/United States Geological Survey, state, watershed regional water authorizes, water utility climate alliance, watershed initiative (Environmental Protection Agency)
- Funding: National Oceanic and Atmospheric Administration-Climate and Societal Interactions Program water; United States Geological Survey-water census. $500,000

**Northeast 2020 Call to Action** LOW (9)

- Goal: increase awareness and literacy. Clarify uncertainty and actions to take (adaptation). Build support at community level. Foundation building.
- Champion: Non-Governmental Organizations, academic, regional associations.
- Funding: $350,000. Source public and private dollars.
Backyard Climate Literacy LOW (4)
- Goal: To place climate literacy in places where public can be engaged. Increase accessibility of climate information to urban/multi-cultural audiences.
- Champion: National Oceanic and Atmospheric Administration
- Funding: $300,000-$400,000. Sources: National Oceanic and Atmospheric Administration-Ocean Exploration, Environmental Protection Agency, National Park Service, Universities, National Audubon, Agency year-end funds

Survey Needs and Impediments LOW (10)
- Champion: ICLEI
- Funding: Undetermined

Step 4. Workshop Next Steps
- Compile Notes, distribute to full group
- Organize conference calls to coalesce teams around priority projects
- Project teams revise descriptions and prepare proposals for potential funding
- Project teams identify possible funding sources to connect with
- Submit final report to Connecticut Sea Grant to be included in the Regional Ocean Research Plan in Support of Ecosystem-Based Management for the New York Bight.
Annex 1.

**Group Reports on Priority Needs.** This is a summary of the conversation from each of the groups as they discussed issues and needs. Their top five needs are presented in the previous section of this document.

**GROUP 1**

**Issues**

- Scale of responsibility—who has jurisdiction? Who has the funding and the means to carry out adaptation?
- How do you get to the ‘do something’ stage?
- Connections make tough decisions tougher (e.g., local politics).
- No regional jurisdiction or authority.
- Home rule
- Who pays and who takes the risk of adaptation? E.g., Should my tax dollars go to rebuilding houses along the shoreline when they are damaged by storms?
- Communication—lack of interest, lack of adaptation literacy, the validity of climate change debate still ongoing
- Overwhelming sets of information
- Removing the words “climate change” gets people to focus on the problem
- Making adaptation personal
- What are zoning requirements going to be in the future?
- Enable communities to help themselves.
- How to communicate across timeframe, especially when politicians think in terms of election cycles?
- Using science as a communication tool
  - Uncertainty—how do we quantify and communicate it and still be able to use the science?
  - Need a tool to simply communicate.
  - Need to talk in people’s timeframes.
  - Need simple paradigms or decision tools.
  - Message needs to be conveyed by someone who both knows the language and be able to simply communicate it while commanding respect and authority.
- Knowing your audience and your speakers is key
- Tension between having an exact science and action
- Who do we go to find out the “numbers” especially different needs
  - Who are the six states going to trust to come up with the numbers?
  - How do you then inspire people to take action? Or when do you take action?
- Which portion of the adaptation picture is regional e.g., if the waves crash on Connecticut Long Island Sound, Vermont won’t be affected
Needs

- Definition of roles and responsibilities for state, federal, local and Non-Governmental Organization partners.
- “Political Cover” i.e., top down regulation to alleviate public pressure on local governments
- Inundation mapping—a picture is worth a thousand words
- How do you frame the message (e.g., The Nature Conservancy report communicating conservation)?
  - Use techniques used by other communicators and disciplines (e.g., Smokey, German Marine Spatial Planning, shocking pictures, videos of live erosion)
  - Narrow window between informing people so that they are concerned but not despondent
  - Decision tree for communities
  - Codes, engineering standards
  - Compendium of case studies of what is working (need to give communities options of what they can do to adapt to climate change with their priorities)
- Data needs—downscaling but need to set a point when we will act on and not wait until ultimate certainty
- Regional planning and leadership—still no coordinating body or effort to bring the efficiencies and scale
- Inventory of infrastructure, etc.
- Public Health Assessment
  - What is the population at risk
- Data sharing

Top Needs (5)

- Compendium of case studies on climate change adaptation
- Best practices guide on communication (i.e., communication toolbox)
- Regional datasets—inventory and sharing*
- Regional leadership*
- How to determine jurisdiction?

GROUP 2

Regional needs required to address climate issues and deliver climate information.

Issues

- Prioritization is key.
- Capacity to plan and to act is a limiting factor.
- Discipline specific needs (infrastructure, health, natural resources, agriculture, water, energy), organizational role and responsibility needs, prioritization needs, and politics/legislation needs.
• Monitoring, engagement, economics, social analysis.
• What is likely for success? What is likely to get partners? How do we measure change?
• Infrastructure / Built Environment (bulkheads, roads, sewer/water lines)
• Regional Assessment: merge databases, models/additional analysis (i.e. flooding hydro models), map areas at risk, information release via web pages and brochures, community outreach use of information, Risk & Reliability United States Army Corps of Engineers etc, scale? Global -> Fed -> regional -> state, state -> local, monitor/assess/demonstrate change, re-analysis of historical data
• Response Tools – Massachusetts Institute of Technology Climate ready tool?
• Standard Assessment Method that translates to different levels: qualitative and quantitative, check lists of sectors, current and future infrastructure – Geographic Information System
• Geographic Information System for safe locations regarding climate change
• Codes reinforcement and incentives
• Public Health
• Food security
• Natural Resources (water, air,)
• Agriculture
  o Aquaculture, sea food
• Water Resources
  o Flood Storage Capacity (loss of marsh, increased flooding in coastal communities, with increased drought how do we capture floods and flows?, water security)
• Economics (cost of action/inaction)
• Education (outreach/communication = engagement; capacity building)
• Energy
• Emergency Response – capability and capacity
• Political response? No real solutions?
• At what level do we act? State? Local? Federal? Who should be doing certain things? Reframe solutions to get real solutions (to “win”)
• Lack of state enforcement due to legislation?
• Control – what does a locality control vs. state vs. federal?

**Needs:**
• Policy to work together – overcome institutional barriers and turf, policy/legislation to move beyond politics and get system to work for you, work with others legal and business (industry and insurance)
• Performance Metrics
• Regional dialogue, management needs
• Data, hi-res tops & bathy Light Detection and Ranging, forecasting and response
• Regional adaptation plan, x-geopolitical
• Standard decision criteria for Climate Scenarios and Response Standards, freeboard and flood insurance and building codes, federal -> regional (pick a climate change scenario – Intergovernmental Panel on Climate Change)
• Engagement - YouTube, beach interviews, persuasion science/social science, i.e.-smoking cessation, creating believers, fear, competition, incentives, demonstration of the science and change, needs science and assessment, accessibility
• Monitoring / Demonstrate change
• Legal Implications

**Top Needs (5)**

• Standard Decision Criteria for Climate Scenarios and Response Standards – Federal Common Message

• Common Regional Assessments in Specific Disciplines – infrastructure, water, health, natural resources, agricultural, energy

• Engagement – YouTube, persuasion science, social science, incentives

• Response Tools – Legal, retreat policies, freeboard height, roles and responsibilities, best practices, interactive databases, step-by-step guides (where to go)

• Economic & Legal Implications – cost of inaction, scenario costs.

**GROUP 3**

**Issues:**
No clear roles and responsibilities; Lack of Communication

• What should be happening where and who is responsible for what;
• Multiple centers funded by different federal agencies, different climate centers;
• At the federal level of government our model is to provide tools and then localities implement using those tools;
• should be happening vertically and horizontally;
• 3 different agencies to model storm surge; happening on the state level too; also communication issues (i.e. no one knows who is doing what) between government and Non-Governmental Organizations; there is also modeling going on in the private sector (e.g. power plants along the coast);
• ultimately not sure which models to use, which scenarios to plan to;
• may need multiple models to get the entire picture; like air models (for emissions, transport, etc.); will likely require

Multiple central repositories

• id specific roles/responsibility for each
• Avoid redundancy/ clearly define each group’s niche
• identify which model is most applicable
• What range of scenarios should be planning to?
• Which model best to use for which scenario
• Local needs: what is the range of options for scenario planning for?
• Tools: visualization, scalable, economics, result of inactions vs. action

Education/ Policy – Human Response
• Winners + losers in this climate education needs to address this/accept this – can’t protect everything /one
• Basic talking points on climate change
• What it is/ next steps to take/ potential impacts
• As region – make decision on what expect/plan for + all work towards it – same range of predictions – all working off them.
• Local stakeholders may not want to think on regional level
• Way to feed up local data for synthesis
• Make data available / accessible
• Standardized data collection

False Barriers – Between bunnies and trees and coastal and water;
• no vulnerability assessment for infrastructure, for wetlands;
• can you make vulnerability assessment that is larger and leverages different needs;
• pilot projects are small but scalable

Northeast – most states = “home rule”, “carrots” to dangle to localities to prompt action
• Climate change is an organizational challenge
• Agencies are not really charging their programs
• Pilot – need to challenge us to change
• Bureaucratic barriers – need to be prospective

Learn from mistakes, don’t repeat them
• Ex – Sewage treatment plant rebuilt in same place/ as before (Rhode Island)
• Issue however is that because of urban density no other alternative
• Risk map (Federal Emergency Management Agency) – map modernization program; instead of just 100 year frequency but shorter periods like 25 year floods
• Bureaucratic barriers: what are we doing to incentivize bad decisions or require them?
• Culverts undersized: new replacement infrastructure standards; we can agree that design standards need to change.

Technical Paper No. 40 (Rainfall Frequency Atlas of the Eastern United States for Duration from 30 minutes to 24 hours and Return Periods from 1 to 100 years) hopelessly outdated
• Need: money to weather service to update TP-40
• Office of hydrologic development

Communication Issue
• Regional stories/ examples to demonstrate need outcomes from outdated info/data.
• Use to educate about climate/ changing environment (literacy)
• Transform public opinion – aggregate case studies + share more broadly
• Information sharing part but also strategic.
• Pilot projects are just what make it exciting/interesting/personal. May not be caused by climate change but real tangible benefits.
• If the culver/strut is removed by a storm the federal dollars will only get it replaced to size it was when it was washed out.

Economic Impacts – Need to understand + communicate
• “we already know what to do”
• Ex. Massachusetts
• “Experts panel” of state agency folks – embrace + move concepts forward
• empower decision makers – take advantage of in-house stuff; don’t need to conduct more vulnerability assessments
• turn decisions into action/ opportunity (ties back into top bullet), example. ICLEI work w/ communities

Final Brainstorm:
• Standardized climate change education – risk messaging (maybe without saying climate change)
• Use actual examples (e.g. culvert sizing, flooded mall, etc.)
• Improve ability to look “big picture” – combine mitigation, adaptation, planning, function
• Be ready to react when opportunity arises to get things done
• Development of a clear messaging strategy to engage the public on climate change adaptation

Needs:
1) Development of standardized clear messaging strategy to engage public in the issue – case studies

2) Agencies need to clearly define roles + responsibilities + funding strategies – who does what + with what money?


4) Monitoring data need to be standardized accessible, identify and address data gaps

5) Inventory and asses available tools and models as ensemble to provide range of possible outcomes (experts)

GROUP 4

Issues:
• National Oceanic and Atmospheric Administration, Army Corps of Engineers, Bureau of Reclamation, Federal Emergency Management Agency project look at national needs; need to look specifically at regional info needs
• Models
• Decision support tools (mapping?)
• Observations/impacts/monitoring
  o consensus on changes attributable to cc
  o What do we know already?
• Basic Research
  o on ecosystem processes; drivers
  o can we tie observational data to future predictions? Ground-truthing global models at the regional scale
• Communication
• Policy
• Integration

Needs:
• Climate Change impacts on society, economy, environment
• Looking at species range-wide rather than state by state; and how climate change has affected ranges
• Need to assess management (coastal, wetlands, coastal structure permits, building permits, etc.) approaches and policies, federal, state and local and how those may need to be adapted to allow for climate change adaptation. How do existing governance structures facilitate climate change adaptation or do they need to be changed
• Key critical needs that are more important for regional work?
• Need to better integrate terrestrial and marine data and models
• Coordinated habitat and ecosystem distributed mapping across region. → More Efficient monitoring
• Need model that is regional in scale, that will show impacts of shoreline armoring, beach nourishment etc on adjacent states, beaches, areas
• The Nature Conservancy working on resilience project in 14 states; ongoing, will be valuable when completed. (add to needs assessment reports)
• Social science data and integration;
• Research on changing attitudes; behaviors (some Rhode Island Sea Grant research on this)
• Improve sharing among states as well.
• Discharge records and measurements; i.e. Millstone has lots of proprietary data but will not share it. Permitting should require sharing of this data
• A summary of all needs assessments that are underway? Very doable.
• Need also to look at how derived – look at science behind it. Avoid duplication. Also not all assessments will be comparable. Expert opinions. Vulnerability assessments are a means to an end, not an end in and of themselves.
• Science isn’t always there or accessible.

Ground-truthing of Models → simulations that predict actual observations
• More observations
• More comparisons between observations and modeled output
• Downscaling models need to be verified for relevancy, accuracy
• Some inherent limits based on model output; not down scalable to any scale → limits on resolution
• Stationary is dead
• Embedded model for New England
• Need predictions that explain observations
• Make sure you’re modeling systems in New England with most consistent and appropriate models and is consistent with good observational data
• Disc about Connecticut R modeling;
• Need model that will tell us what cc impacts for New England will be
• Have regional downscaled data but not good
• What data do we have know that can help us know what impacts are assoc with climate change
• Appropriate scale
• Useable form
• Who are the experts? Individuals, agencies, who has the resources available? Integrate and make available to those with need

Identify laws, regulations, policies that are workable for climate change adaption or need to be changed and how.
• Sea Grant document focused on state adaptation strategies (needs assessments)
• Federal Emergency Management Agency, United States Army Corps of Engineers, state, local, federal
• Identify impediments and tools that can be used
• Insurance companies – incentives and disincentives – reflect true risks

Improved sharing among states, academia, private sector
• Cornell has been updating precipitation data for storm water sizing (1930s-1050s data used in past models)
• Insurance industry also has long term data sets that would be good to have access to
• Project to identify valuable datasets across region that are important to climate change adaptation and how can the data be made available
• Regional monitoring strategy to identify key species and habitats, for long term monitoring. Coordinated effort to look at sentinel sites and species across states and agencies.
• Range wide identification of key (vulnerable) species and habitats; compile across states
• Regional process for dialogue
• Gulf of Maine has ESIP project (Ecosystem indicators partnership)
• United States Fish & Wildlife Service Refuge Systems inventory monitoring
• United States National Park Service ecosystem monitoring
• Long Term Ecological Research and ad hoc Long Term Ecological Research like Barn Island studies – need to identify and account for these ad hoc Long Term Ecological Research where there are long-term datasets. identify gaps and protocols
• Create incentives for non-structural means of adapting to climate change
• Develop non-invasive tools for dealing with sea level rise
• Need better understanding of marine ecosystems in general
• Different systems have different data needs; need integration
• In coastal ecosystems
• Marine ecosystems
• Inland (riverine) systems
Social science data
• Don’t get far with implementation without social science piece
• Need to get people to accept adaptation changes
• Economic arguments important driver to gain public
• Need to understand impacts on different socioeconomic and industry/business sectors
• Need to elaborate cost-benefit analyses to drive policy decisions

**Top Needs (5)**
• Calibrate projections to observations
  o What is data we have now
  o Standardize data sets to look across region
  o Who are experts
• Regional monitoring strategy
• identify policies laws and tools
  o Decision making tools
• Range wide data for key species and habitats
• Social science data, modeling, and integration
  o Include ecosystem services and valuation
### Annex 2: Participant List

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<th>Last Name</th>
<th>First Name</th>
<th>Affiliation</th>
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Annex 3: Regional Needs from Previous Planning Exercises

Science; Research; Information Gathering and Access

- Regionally downscaled climate models that include climate signals and impacts.
- SLR models and scenarios at a regional/local scale for municipal decision makers.
- Understanding uncertainty involved in downscaling climate models - need for Federal guidance about modeling, downscaling and uncertainties.
- Improved understanding of regional and local impacts from hazardous events.
- Establish baseline of current conditions to enable identification of changes.
- Mapping of habitat and species distributions to document and assess likely climate impacts.
- Improved understanding of regional and local impacts on habitats and species.
- Network of watershed monitoring/modeling sites – changes due to precipitation/urban growth.
- Evaluation adaptation strategies implications.
- Ocean acidification observations and research.
- Improved coastal flooding and inundation models/tools.
- Guidance on application and interpretation of SLR modeling/tool outputs.
- Updated GIS layers for historic and existing natural resources and existing coastal armoring.
- Enhanced environmental monitoring.
- Better understand water budgets and water resource demands in a changing climate.
- Improve/create coupled models of: ocean/atmosphere; fisheries/climate; water supply and quality/climate; human health/climate, etc.
- Improve data sharing among federal agencies and universities.
- More precise forecasts describing uncertainty, closely coupled to impacts on segments of society & economy.
- More data on: human health, SLR (cryosphere and thermal expansion, high res topography and bathymetry), extreme events (floods, droughts, heat waves, storm surge, severe storms), invasive species, oceanographic conditions (salinity, biotoxins, temperature), paleo-climate conditions, inter-decadal climate variability.
- Improved access to climate data and analysis including seasonal forecasts.
- High resolution projections of future climate change.
- Improved access to data and services between federal agencies, state agencies, universities, and NGOs.
- Improved understanding of climate change impacts on society, economy and the built environment.

Partnerships; Services; Engagement

- Coordination across multiple groups on climate issues (feds, states, NGOs); prevention of non-coordinated, redundant activities going forward.
- Coordination/Collaboration across federal agencies – DOI/FWS LCCs; NOAA – RISA; USGS – RCS; NOAA – CSC.
- Consistency between State Wildlife Action Plans – Climate Change Addendums.
- Ecosystem/Science based management and policy development.
- Assess societal perceptions of risk and vulnerability.
- Evaluate community resilience to climate change on an economic, social and environmental level.
- Management of water quality and quantity in a changing climate.
- Establishment of demonstration sites within networks to harness/focus research & strategy implementation.
- Incorporate SLR and storm surge into state/local planning and long-term planning efforts.
- Incorporate SLR and storm surge into risk and vulnerability assessments.
- Regional to local vulnerability assessment & mapping (natural resource, agriculture, health infrastructure).
- Assist decision makers with info on regional climate impacts, what to expect and how to plan.
- Assistance in identifying and evaluating adaptation strategies – forests, freshwater, coastal/marine.
- Assistance preparing and implementing long-term adaptation plans at state and community levels.
- Training for coastal and freshwater managers on mapping and shoreline/floodplain delineations.
- Guidance on best practices and tools for vulnerability assessments and adaptation plans.
- Visualization tools at relevant scales for planning (some good ones exist but for limited geographies)
- SLR, storm surge, floodplain planning tools and technical assistance for local planners.
- Improved climate literacy amongst general public and target audiences (i.e., private foresters).
- Improved communication and outreach to foster action, particularly by decision makers (local to regional).
- Improved governance structure to enable commitment and decisions.
- Approaches to helping stakeholders and the public understand the economic implications of climate change.
- Partnerships between researchers, private sector, and the user community.
- Identification and application of market-based strategies via private sector and NGOs.
- Incentives – local to regional – to enable adaptation.
- Increased capacity of local and provincial/state leaders to more effectively respond to climate change.

Reference and Reports used to compile regional needs listed above:

- NOAA - SARP projects in the region
- NOAA - RISA project in the region (Urban Northeast, Columbia University)
• NOAA/ NWS local multi-disciplinary climate workshops (e.g. http://www.erh.noaa.gov/ilm/ClimateConference)
• Federal Partners (http://collaborate.csc.noaa.gov/nroc/shared%20documents/forms/allitems.aspx)
• Federal Partners interagency meeting, June 2009, meeting notes (http://collaborate.csc.noaa.gov/nroc/shared%20documents/forms/allitems.aspx )
• NROC (http://collaborate.csc.noaa.gov/nroc/default.aspx)
• Mid-Atlantic Regional Council on the Ocean (MARCO) agreement, activities document, and report from stakeholders summit: climate priority (http://www.midatlanticocean.org/index.htm)
• Cape Cod Transportation Pilot with DOT and other FedPartners, draft Scope of Work
• Groton, CT pilot (http://www.icleiusa.org/action-center/planning/climate-adaptation-planning-resources/groton-connecticut-coastal-climate-adaptation-workshop-presentations)
• NOAA/NMFS and NOAA/OAR/GFDL modeling meeting, June 2009 (http://www.gfdl.noaa.gov/fisheries-and-climate-workshop )
• DOI Climate workshop, March 2010, post-mtg report and notes (http://www.fws.gov/northeast/climatechange/conference/ccmidatlantic.html)
• NMFS/NERO Project: “Environmental Effects on Marine Mammal Stranding Trends and Habitat Distribution”
• NOAA/NOS/NCCOS research program on Coastal Ecosystem Effects of Climate Change (http://www.cop.noaa.gov/stressors/climatechange/default.aspx)
• NOAA/ NOS/NCCOS program on the Ecological Effects of Sea Level Rise (http://www.cop.noaa.gov/stressors/climatechange/current/slr/slr_new_intro.aspx)
• Recent NOAA workshop on Coastal Habitat Conservation in a Changing Climate (focus on mid-Atlantic), June 21-23, Wilmington, DE
• State Initiatives for Conservation of Coastal Habitats from Sea-level Rise, RI Sea Grant report
• Gulf of Maine Council, Climate Change Network (http://www.gulfofmaine.org/)
• State activities; state climatologists’ report
• NJ and NY information from Monmouth University’s "Life on the Mid-Atlantic Coast 2009" survey results
• Coastal Sensitivity to Sea-Level Rise: A Focus on the Mid-Atlantic Region. A report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research.
• CLIMATE CHANGE IN NEW YORK STATE: DEVELOPING A RESEARCH STRATEGY -- Background paper for discussion at the New York Academy of Sciences & New York State Energy Research and Development Authority (NYSERDA) Research Planning Workshop on April 10, 2007
• The Garden State in the Greenhouse: Climate Change Mitigation and Coastal Adaptation Strategies for New Jersey (January 2007)
NEW JERSEY: Assessing the Costs of Climate Change -- National Conference of State Legislatures and the University of Maryland’s Center for Integrative Environmental Research (2008)


