



NExUS Needs Assessments Mon Feb 18 14:00:09 EST 2019

Printing 387 of total 387 records.

Data: All

Products: All

Services: All

Scientific Discipline: All

Sector: All

Area of Applicability: All

| Need          |  |
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| Description   | 1. Develop a sustainable, state-of-the-art observational network.<br>2. Develop tool kits for data collection and submission by interest groups.<br>3. Develop a data inventory for all the potential sources.<br>4. Evaluate the feasibility of data sharing with the significant data collection organizations (e.g., DFO, Environment Canada, provincial government).<br>5. Develop a data management and transmission portal concept and pilot project.<br>6. Improve flood warning dissemination through the use of technology.<br>7. Increase public awareness, support, and use of flood forecasting products.<br>8. Enhance overall governance and funding for flood forecasting, management, and damage recovery. |
| Lead Agencies | ACASA  |

| Need        | A multi-agency effort to integrate health and climate concerns into decision making   |
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| Description | A multi-agency effort to integrate health and climate concerns into decision making must address several key questions: (A) What are the threats to health and what groups are vulnerable? (B) What is it that climate change will fundamentally change about health that will require new programs or actions? (C) What existing programs, protocols, and training need to change or receive increased investment to augment their capacity? (D) What areas that cannot be adequately protected should receive stricter development regulations or higher investments in remediating existing stressors? |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |

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| Sector | - Public Health and Safety   |
| Region | - Regional Or State -- Mid-Atlantic  |
| Source | Boicourt K. and Z.P. Johnson (eds.). 2011. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase II: Building Societal, Economic, and Ecological Resilience. Report for Maryland Commission on Climate Change. |

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| <b>Need</b> | A clearinghouse for transportation-relevant climate change information so they officials can plan and adapt  |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source      | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press. |

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| <b>Need</b> | A comprehensive catalog of climate data for the northeast region that includes historical data sets and current observations  |
| Description | A comprehensive catalog of climate data/metadata, including historical and current observations in formats designed to serve an array of stakeholders including modelers, resource managers, coastal managers, and the public at large. |
| Type        | - PRODUCTS: Viewers and Web-based Tools   |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science  |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |

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| Source | Northeast Regional Association of Coastal and Ocean Observing Systems (NERACOOOS) |
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| <b>Need</b> | A consortium to promote collaborative research, monitoring and data sharing on changing forests |
| Description | A consortium to promote collaborative research, monitoring and data sharing on changing forests |
| Type        | - PRODUCTS: Engagement  |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats                                   |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota<br>- Economic Resources                 |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations. 2010.     |

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| <b>Need</b> | A federal program focused on the reevaluation of existing design standards for transportation infrastructure and the continual development of new standards as climate change predictions are updated |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Regulatory/ Policy Guidance   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East  |
| Source      | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press.          |

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| <b>Need</b> | A forum for gathering information on potential impacts of climate change on disease, morbidity, and mortality   |
| Description | A forum for gathering information on potential impacts of climate change on disease, morbidity, and mortality to assist public health programs and inform the public. |

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| Type       | - PRODUCTS: Engagement<br>- PRODUCTS: Viewers and Web-based Tools |
| Focus Area | - Changes in Extremes of Weather and Climate                      |
| Discipline | - Climate Society Interactions                                    |
| Sector     | - Public Health and Safety  |
| Region     | - Regional Or State -- New England                                |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | A framework for making protection, abandonment, and retreat/relocation decisions about coastal infrastructure  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |

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| <b>Need</b> | A GIS compatible climate tool for ecological managers and researchers   |
| Description | A tool that puts spatially referenced point data into climate grid data, downscales current climate data, and is GIS compatible; might incorporate climate model data with empirical data from monitoring stations. |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data)<br>- PRODUCTS: Viewers and Web-based Tools                         |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |

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| Source | Multiple |
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| <b>Need</b> | A mechanism for transportation professionals and researchers to encourage sharing of best practices to address the potential impacts of climate change                                       |
| Type        | - PRODUCTS: Engagement   |
| Priority    | - High   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source      | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press. |

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| <b>Need</b> | A tool to archive and disseminate data about agriculture hazards   |
| Description | Increased monitoring of hazards and events, i.e. crop loss, reduction in dairy production, cost of property damaged should be disseminated and archived.           |
| Type        | - PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Ecological and Biological<br>- Climate Society Interactions  |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Acquisition of spatial and socioeconomic data regarding human uses of marine resources |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies |
| Focus Area  | - Sustainability of Marine Ecosystems  |

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| Discipline | - Climate Society Interactions   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Social and Cultural Resources<br>- Economic Resources                |
| Region     | - Regional Or State -- New England   |
| Source     | The Commonwealth of Massachusetts. 2009. Management and Administration. Massachusetts Ocean Management Plan. Volume 1. |

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| <b>Need</b> | Aid development of public alert systems for catastrophic events  |
| Description | Aid development of public alert systems for catastrophic events to improve emergency response outcomes   |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course, Pennsylvania Climate Adaptation Planning Report, Preliminary Assessment of Rhode Island's Vulnerability to Climate Change and its Options for Adaptation Action |

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| <b>Need</b> | An efficient monitoring program that informs an adaptive management decision framework                                      |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- DATA: Data Stewardship and Provisions                        |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |

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| Source | Massachusetts Climate Change Adaptation Report. September 2011. |
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| <b>Need</b> | Analysis of potential insurance industry policy changes in high risk areas in NJ's coastal zone  |
| Description | As New Jersey attempts to understand the economic risks and benefits of coastal development and redevelopment, it will be important to understand the impacts of changes to economic drivers such as the insurance industry. |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure<br>- Social and Cultural Resources<br>- Economic Resources  |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015.   |

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| <b>Need</b> | Analysis on synergistic effects of climate change and natural thermal variation within the Gulf of Maine   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Physical Science   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | Nye, J. 2010. Climate Change and its Effects on Ecosystems Habitats and Biota. State of the Gulf of Maine. |

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| <b>Need</b> | Analysis on the cost of changes from climate change impacts on the Gulf of Maine ecosystem |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Climate Society Interactions   |

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| Sector | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> <li>- Economic Resources</li> </ul> |
| Region | - Regional Or State -- New England  |
| Source | Nye, J. 2010. Climate Change and its Effects on Ecosystems Habitats and Biota. State of the Gulf of Maine.  |

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| <b>Need</b> | Assess projected impacts of increased flood frequency and volume on municipal water and wastewater utilities   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>                   |
| Discipline  | - Physical Science   |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> </ul>   |
| Region      | - Regional Or State -- South East  |
| Source      | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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| <b>Need</b> | Assessment of climate impacts on transportation infrastructure, and the rail system in particular  |
| Description | Assessment of potential risks to, and opportunities for, the state's rail system   |
| Type        | <ul style="list-style-type: none"> <li>- DATA: Surveys and Preliminary Assessments</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul> |
| Priority    | - High   |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.   |

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| <b>Need</b> | Assessment of coastal risk management at several scales (state, regional, local) and within different socioeconomic contexts |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |



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| Discipline | - Physical Science<br>- Climate Society Interactions            |
| Sector     | - Infrastructure  |
| Region     | - Regional Or State -- New England                              |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Assessments to identify and prioritize undeveloped, ecologically, and economically important lands for conservation that consider sea-level rise and its associated effects                                    |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological  |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |

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| <b>Need</b> | Associated research on climate change impacts on hydrology, and aslo hydropower infrastructure  |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- DATA: Surveys and Preliminary Assessments  |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010.; NOAA, EPA Survey to Determine Cross-sector Needs for Climate Information. |

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| <b>Need</b> | Associated research on the effects of ocean acidification on marine species  |
| Description | Associated research on the effects of ocean acidification on marine species (e.g., shellfish, plankton, corals, protected species, including candidate species and species of concern) and ecosystems. |

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| Type       | - DATA: In situ Observations<br>- DATA: Observing Systems                            |
| Focus Area | - Sustainability of Marine Ecosystems  |
| Discipline | - Physical Science<br>- Ecological and Biological                                    |
| Sector     | - Natural Ecosystems<br>- Biota  |
| Region     | - Regional Or State  |
| Source     | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010. |

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| <b>Need</b> | At least two permanent tide gauges should be established in the upper Bay of Fundy (Cumberland Basin and Minas Basin to begin to establish long-term records of storm surge events) |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Climate Society Interactions  |
| Source      | An Evaluation of Flood Risk to Infrastructure Across the Chignecto Isthmus<br>A Report produced for the Atlantic Climate Adaptation Solutions Association<br>December 2012          |

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| <b>Need</b> | Baseline inventory of location/type of man-made or armored shoreline   |
| Type        | - DATA: Surveys and Preliminary Assessments  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Connecticut Department of Environmental Protection. Office of Long Island Sound Programs. 2010. Updated Assessment and Strategy of the Connecticut Coastal Management Program. |

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| <b>Need</b> | Best available scientific information on past, current and future changes in climate and factors related to riverine habitat  |
| Description | Best available scientific information on past, current and future changes in climate and related factors for habitat conservation managers to design and implement conservation efforts for riverine habitats |

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| Type       | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Surveys and Preliminary Assessments</li> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>  |
| Discipline | <ul style="list-style-type: none"> <li>- Physical Science</li> </ul>   |
| Sector     | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region     | <ul style="list-style-type: none"> <li>- International</li> <li>- National</li> <li>- Regional Or State</li> </ul>   |
| Source     | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010.  |

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| <b>Need</b> | Best management practices that support use of more adaptable crops and effective growing practice to build resilience in food production systems   |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Focus Area  | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> </ul>   |
| Discipline  | <ul style="list-style-type: none"> <li>- Climate Society Interactions</li> </ul>   |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Economic Resources</li> </ul>   |
| Region      | <ul style="list-style-type: none"> <li>- Regional Or State -- New England</li> </ul>   |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.   |

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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Discipline | - Physical Science   |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- Mid-Atlantic  |
| Source     | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.   |

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| Need       | Best practices for approval processes and building codes to incorporate climate change impacts and life-cycle costs in development and construction activities |
| Type       | - PRODUCTS: Training and Capacity Building   |
| Focus Area | - Changes in Extremes of Weather and Climate   |
| Sector     | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Economic Resources</li> </ul>                           |
| Region     | - Regional Or State -- New England   |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| Need       | Better decision support tools are needed to assist transportation decision makers  |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> </ul>                              |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>                               |
| Discipline | - Climate Society Interactions   |
| Sector     | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Economic Resources</li> </ul>                                       |
| Region     | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic -- Central -</li> <li>- Great Lakes -- South East</li> </ul> |

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| Source | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press. |
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| <b>Need</b> | Better definition of high resolution (10 km, one km, 10 degree, or 1 degree variance), so that modelers can make models compatible with fisheries (and other managers') needs. |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Engagement  |
| Discipline  | - Physical Science   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Source      | Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes.  |

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| <b>Need</b> | Better identification of thresholds for increased wildlife mortality  |
| Description | Research determining key temperature ranges of threshold mortality for species of interest  |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments   |
| Focus Area  | - Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats                       |
| Discipline  | - Ecological and Biological   |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes. |

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| <b>Need</b> | Climate based decision tools for strategic water management  |
| Description | Warmer summers will create challenges for water management, requiring strategic water management in the agriculture sector |

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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>   |
| Discipline | <ul style="list-style-type: none"> <li>- Climate Society Interactions</li> </ul>   |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Economic Resources</li> </ul>   |
| Region     | <ul style="list-style-type: none"> <li>- Regional Or State -- New England -- Mid-Atlantic -- Central -</li> <li>- Great Lakes -- South East</li> </ul>   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes.  |

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| Need       | Climate tools that allow temperature and precipitation data to be queried by specific thresholds as opposed to current data deliverables, which often have fixed formats        |
| Type       | <ul style="list-style-type: none"> <li>- DATA: Data Stewardship and Provisions</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> </ul>                                      |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>                                    |
| Discipline | <ul style="list-style-type: none"> <li>- Physical Science</li> </ul>  |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>   |
| Region     | <ul style="list-style-type: none"> <li>- Regional Or State -- South East</li> </ul>   |
| Source     | Dow, K. 2012. Climate Information Needs in the Southeast: Analysis of Requests. CISA Research Report 2012-02. Columbia, SC: Carolinas Integrated Sciences & Assessments (CISA). |

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| Need       | Coastal and Marine Spatial Plan that incorporates stakeholder engagement and recognizes relationship with fishery activities                                |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Plans, Assessments, Studies</li> <li>- PRODUCTS: Engagement</li> </ul>                                   |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> </ul> |
| Discipline | <ul style="list-style-type: none"> <li>- Physical Science</li> </ul>  |

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| Sector | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> </ul> |
| Region | - Regional Or State -- Mid-Atlantic  |
| Source | New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015.     |

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| Need       | Coastal and marine vulnerability assessments scaled so that they are useful for habitat management: river basins, estuaries, and coastal ecosystems                                   |
| Type       | - PRODUCTS: Plans, Assessments, Studies   |
| Priority   | - High  |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>                        |
| Discipline | - Physical Science  |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>   |
| Region     | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic -- South East</li> </ul>  |
| Source     | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

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| Need        | Collaboration between Northeast Regional Ocean Council (NROC) and other federal programs to create mapping products; training for state staff to create mapping products  |
| Description | Share results of Northeast Regional Ocean Council (NROC) mapping priorities effort with NOAA and other federal programs to identify funding or in-kind staff time to create mapping products; Train state staff to create mapping products                      |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> </ul>  |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul> |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |

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| Source | Personal Communication |
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| <b>Need</b> | Collaboration to develop contingency plans to respond to climate change impacts on water supplies               |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Climate Impacts on Water Resources  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Combined water quality and quantity models to address spill mitigation, turbidity, water demand changes, and drought issues                                     |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | - Public Health and Safety<br>- Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.                            |

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| <b>Need</b> | Communicate projections for heat waves, temperature extremes and air quality action days, to inform and prepare local emergency services |
| Type        | - PRODUCTS: Training and Capacity Building   |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England   |



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| Source | New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future. March 2009. |
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| <b>Need</b> | Community partnerships to increase public health capacity   |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance                         |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | Summary: Preliminary Assessment of Rhode Island's Vulnerability to Climate Change and its Options for Adaptation Action. February 2010. |

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| <b>Need</b> | Comprehensive monitoring effort that supports an accessible database to track species range shifts  |
| Description | Comprehensive monitoring effort that supports an accessible database to track species range shifts and other indicators of habitat and ecosystem response to climate change |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Viewers and Web-based Tools           |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Ecological and Biological   |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.          |

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| <b>Need</b> | Continued federal programs to prevent and control adverse health effects caused by flooding and drought         |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |

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| Sector | - Public Health and Safety  |
| Region | - Regional Or State -- Mid-Atlantic   |
| Source | Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations. 2010. |

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| <b>Need</b> | Continuous climatologies for marine estuaries and freshwater, as well as migratory habitats  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul> |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>   |
| Discipline  | - Physical Science   |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> </ul>   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source      | NMFS. 2012. River Herring Climate Change Workshop Report. Report to the National Marine Fisheries Service, Northeast Regional Office. December 27, 2012, 60pp.   |

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| <b>Need</b> | Coordinated effort for consistent ocean habitat classification for the Northeast  |
| Description | Both federal and regional classification systems are used in the Northeast; for ease of understanding and coordination, there should be a consistent method. Perhaps a group can be formed to address this issue. |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> </ul>  |
| Focus Area  | - Sustainability of Marine Ecosystems   |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | Rhode Island Coastal Resources Management Council. 2010. Program Assessment and Strategy for Enhancement Performed Pursuant to Section 309 of the Coastal Zone Management Act of 1972 as Amended.                 |

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| Type          | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building                           |
| Focus Area    | - Changes in Extremes of Weather and Climate   |
| Discipline    | - Physical Science<br>- Climate Society Interactions   |
| Sector        | - Infrastructure   |
| Region        | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East |
| Source        | Federal Highway Administration Climate Change Adaptation Peer Exchanges: Comprehensive Report  |
| Lead Agencies | U.S. DOT, state departments of transportation, metropolitan planning organizations             |

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| <b>Need</b> | Coordinated monitoring and data collection between local, state, and national organizations surveying the Gulf of Maine   |
| Description | Gulf of Maine monitoring and research needs to be coordinated between local, state, and national organizations to detect changes in spatial distribution of marine species and to predict the rate of species invasions |
| Type        | - DATA: Data Stewardship and Provisions<br>- PRODUCTS: Engagement   |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | Nye, J. 2010. Climate Change and its Effects on Ecosystems Habitats and Biota. State of the Gulf of Maine.  |

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| <b>Need</b> | Coordinated risk assessment for high hazard potential dams  |
| Description | Coordinated risk assessment for high hazard potential dams using the worst-case assumptions of climate change impacts |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |

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| Sector | - Public Health and Safety<br>- Infrastructure                  |
| Region | - Regional Or State -- New England                              |
| Source | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Coordinated, statewide tidal and non-tidal wetlands extent data management  |
| Type        | - DATA: Data Stewardship and Provisions   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Virginia Coastal Management Office. 2011. Section 309 Needs Assessment & Strategy.  |

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|-------------|---|
| <b>Need</b> | Coordination of state and regional wetland restoration partners   |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building  |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Rhode Island Coastal Resources Management Council. 2010. Program Assessment and Strategy for Enhancement Performed Pursuant to Section 309 of the Coastal Zone Management Act of 1972 as Amended. |

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| <b>Need</b> | Cost benefit analysis of infrastructure related impacts 50-100 years out, so that infrastructure is neither under nor over built |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |

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| Region | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East |
| Source | 2012 DOT Climate Adaptation Plan   |

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|-------------|---|
| <b>Need</b> | Couple climate change data with environmental data to develop status indicators for key health threats: ozone, pollen, particulates     |
| Description | Couple climate change data with environmental data to develop status indicators for key health threats: ozone, pollen, particulates     |
| Type        | - DATA: Indicator Based Research  |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Public Health and Safety  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East                            |
| Source      | U.S. Global Change Research Program. National Climate Assessment Health Sector Workshop. Charleston, S.C. February 2012. Meeting notes. |

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| <b>Need</b> | Couple climate data with thresholds for disease vectors, and develop relevant indicators  |
| Description | Couple climate data with thresholds for disease vectors, and develop relevant indicators  |
| Type        | - DATA: Indicator Based Research  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East  |
| Source      | U.S. Global Change Research Program. National Climate Assessment Health Sector Workshop. Charleston, S.C. February 2012. Meeting notes. |

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|-------------|---|
| <b>Need</b> | Critical climate threshold monitoring to inform infrastructure planning |
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| Description | From Vermont Agency of Transportation 8/13/2012: Research should be undertaken to identify climate related thresholds that may lead to a significant increase in infrastructure deterioration. The creation of thresholds allows for efficient allocation of resources given the wide range of possible climate scenarios. The use of thresholds is particularly valuable in the case of flooding because of the large uncertainties inherent in future forecasts of precipitation data. Thresholds allow policy makers to avoid costly over-adaptation while maintaining contingency plans for possible climate scenarios. |
| Type        | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | Vermont Agency of Transportation Climate Change Adaptation White Paper: "Adapting Vermont's Transportation Infrastructure to the Future Impacts of Climate Change"  |

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| Need       | Cross-sector efforts that integrate public health concerns into planning and decision-making process related to growth, development, transportation infrastructure, and water resource management   |
| Type       | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance   |
| Discipline | - Climate Society Interactions  |
| Sector     | - Public Health and Safety<br>- Cross Disciplinary  |
| Region     | - Regional Or State -- Mid-Atlantic   |
| Source     | Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase II: Building Societal, Economic, and Ecological Resilience. Report for Maryland Commission on Climate Change. |

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| Need        | Current rates of shoreline change and the maximum vertical extent of wave run-up   |
| Description | Current rates of shoreline change and the maximum vertical extent of wave run-up to strengthen delineation of erosion and flood hazard areas |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate                                   |

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| Sector | - Infrastructure<br>- Natural Ecosystems                        |
| Region | - Regional Or State -- New England                              |
| Source | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Daily measurement of atmospheric variables to support a high resolution atmospheric forcing reanalysis product from 1975-present  |
| Description | Daily measurement of atmospheric variables (wind speed/direction, air temp, humidity, heat flux) are required to support a high resolution atmospheric forcing reanalysis product from 1975- present (analogous to NCEP/NCAR Reanalysis Project and WRF model). |
| Type        | - DATA: Satellite Remote Observations<br>- DATA: Observing Systems  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | Northeast Regional Association of Coastal and Ocean Observing Systems (NERACOOS)  |

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| <b>Need</b> | Daily, watershed-level estimates of freshwater input into coastal oceans   |
| Description | Daily, watershed-level estimates of freshwater input (with USGS streamflow measurements?) into coastal ocean to quantify estimates of salt-wedge location in major rivers and estuaries. |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | - Natural Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | Northeast Regional Association of Coastal and Ocean Observing Systems (NERACOOS)   |

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| <b>Need</b> | Data describing the location, classification, and extent of current and historic shorelines |
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| Type       | - DATA: Observing Systems<br>- DATA: Depth and Elevation Data<br>- DATA: Data Stewardship and Provisions   |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline | - Physical Science   |
| Sector     | - Natural Ecosystems   |
| Region     | - Regional Or State -- New England   |
| Source     | Connecticut Department of Environmental Protection. Office of Long Island Sound Programs. 2010. Updated Assessment and Strategy of the Connecticut Coastal Management Program. |

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| <b>Need</b> | Data on length of extreme heat waves   |
| Description | Data on length of extreme heat waves to assess changing air conditioning demands   |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.   |

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| <b>Need</b> | Data on migration patterns of both 'good' and 'bad' invasive species (i.e. kudzu or maple trees)   |
| Description | Habitat ranges shift predictions are important for determining expansion of "good" species (for opportunity) and "bad" (pests/highly invasive species) |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments  |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological  |



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| Sector | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> <li>- Economic Resources</li> </ul>                        |
| Region | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic -- Central -</li> <li>- Great Lakes -- South East</li> </ul> |
| Source | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes.  |

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| Need        | Data on seasonal and diurnal load patterns to determine energy demands   |
| Description | Changes in seasonal and diurnal load patters (winter peaking=reduced demand due to warming; summer peaking = length of extreme heat waves + changing air conditioning saturation rates)  |
| Type        | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Surveys and Preliminary Assessments</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul> |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Economic Resources</li> </ul>   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.   |

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|-------------|---|
| Need        | Data on warmer winters and shorter freezing periods to assist farmers in adapting crops and variety choices to changing climate conditions  |
| Description | Assist farmers in planting crops and varieties appropriate suited to changing climate conditions. Planting dates, crops and varieties on the farm should be suited to warmer winters and shorter freezing period. Appropriate perennial fruit crop varieties need to be selected. |

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| Type       | <ul style="list-style-type: none"> <li>- DATA: Data Stewardship and Provisions</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Engagement</li> </ul> |
| Focus Area | - Changes in Extremes of Weather and Climate   |
| Discipline | - Physical Science   |
| Sector     | - Managed Ecosystems   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.   |

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| Need       | Data to create a uniform and comprehensive data set of geological information for hazards identification and regulatory use   |
| Type       | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Surveys and Preliminary Assessments</li> </ul>   |
| Focus Area | <ul style="list-style-type: none"> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Discipline | - Physical Science  |
| Sector     | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> </ul>                  |
| Region     | - Regional Or State -- New England  |
| Source     | Maine Coastal Program. 2012. Maine Coastal Plan: Assessment and Strategy under Section 309 of the Coastal Zone Management Act.  |

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| Need       | Data, communication and outreach surrounding the effects of sea level rise on estuaries and coastal marshes  |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> <li>- PRODUCTS: Engagement</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>              |

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| Discipline | - Physical Science   |
| Sector     | - Natural Ecosystems   |
| Region     | - Regional Or State -- New England   |
| Source     | Commonwealth of Massachusetts. Executive Office of Energy and Environmental Affairs. Office of Coastal Zone Management. 2010. Section 309 Assessment and Five-Year Strategy for CZM Program Enhancement (FY2011-2015). |

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| <b>Need</b> | Database of abundance and population density of marine species (whales, sea birds, invasive coastal species)  |
| Description | Database of abundance and population density of marine species (whales, sea birds, invasive coastal species) perhaps maintained as an online resource |
| Type        | - DATA: In situ Observations<br>- DATA: Data Stewardship and Provisions<br>- PRODUCTS: Viewers and Web-based Tools                                    |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | The Commonwealth of Massachusetts. 2009. Management and Administration. Massachusetts Ocean Management Plan. Volume 1.                                |

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| <b>Need</b> | Decision tools to explore costs, risks, benefits, and strategic timing of adaptive upgrades to agricultural infrastructure   |
| Description | Decision tools to explore costs, risks, benefits, and strategic timing of agricultural adaption, i.e., investing in a new drainage system, irrigation system, both, and when |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools<br>- PRODUCTS: Regulatory/ Policy Guidance   |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure<br>- Managed Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic  |

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| Source | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |
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| Need       | Detailed economic model that incorporates societal costs of delayed or inappropriate response to winter storm impacts on transportation infrastructure |
| Type       | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)   |
| Focus Area | - Changes in Extremes of Weather and Climate   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Public Health and Safety<br>- Infrastructure<br>- Economic Resources   |
| Region     | - National   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes.                    |

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| Need        | Determine better means of deciding dike height that balance value of land and infrastructure with degree of risk communities are willing to assume  |
| Description | The report cites the following needs:<br>- Conduct a cost benefit analysis for marshbodies identified by Browning, 2011 as containing significant infrastructure using the methodology of van Alphen (2012) to balance the value of the land protected and cost of required infrastructure as well as degree of risk that the communities are willing to assume<br>- Develop a differential determination of critical elevation incorporating sea level rise and storm surge for dykes protecting valuable infrastructure similar to Pilarczyk, 1998. |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure  |
| Source      | Best Management Practices for Climate Change Adaptation in Dykelands:<br>Recommendations for Fundy ACAS sites<br>September 2012   |

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| Need       | Determine economic risks of hazards and events to agriculture, e.g. crop loss, reduction in dairy production, cost of property damaged |
| Type       | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area | - Changes in Extremes of Weather and Climate   |

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| Discipline | - Climate Society Interactions   |
| Sector     | - Managed Ecosystems   |
| Region     | - Regional Or State -- Mid-Atlantic  |
| Source     | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Determine effects of change in temperature and pH for all life stages of all diadromous species and with this information, model impacts of climate change on species.                                     |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic -- South East  |
| Source      | Greene, K. E., J. L. Zimmerman, R. W. Laney, and J. C. Thomas-Blate. 2009. Atlantic coast diadromous fish habitat: A review of utilization, threats, recommendations for conservation, and research needs. |

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| <b>Need</b> | Determine the minimum area needed to maintain boreal or other threatened ecosystems  |
| Type        | - DATA: Surveys and Preliminary Assessments  |
| Focus Area  | - Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological  |
| Sector      | - Natural Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Develop a sustainable, state-of-the-art observational network for flood monitoring; tool kits for data collection and submission by interest groups; a data inventory. |
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| Description   | Additional needs cited in this report:<br><ul style="list-style-type: none"> <li>- Evaluate feasibility of data sharing among data collection organizations</li> <li>- Develop a data management and transmission portal concept and pilot project.</li> <li>- Improve flood warning dissemination through the use of technology.</li> <li>- Increase public awareness, support, and use of flood forecasting products.</li> <li>- Enhance overall governance and funding for flood forecasting, management, and damage recovery.</li> </ul> |
| Type          | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> </ul>  |
| Focus Area    | <ul style="list-style-type: none"> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>   |
| Discipline    | <ul style="list-style-type: none"> <li>- Physical Science</li> <li>- Climate Society Interactions</li> </ul>   |
| Sector        | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> </ul>   |
| Source        | Real-Time Assessment and Monitoring of Inland and Coastal Flooding Events for Atlantic Canada (March 2012)   |
| Lead Agencies | Atlantic Climate Adaptation Solutions Association<br>New Brunswick Department of the Environment, Climate Change Secretariat   |
| Contacts      | env-info@gnb.ca  |

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| Need | Develop more precise sea-level rise and storm-surge projections for the entire Canadian coast, particularly densely populated areas, and develop a system to regularly update the data and monitor for coastal erosion |
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| Description   | <p>This report offers several policy recommendations regarding improved accuracy of future sea-level rise studies, and the implementation of adaptation measures similar to those quantified in this report.</p> <ul style="list-style-type: none"> <li>•Develop “model” policies that incorporate these strategies, and adopt them at the province and territory level, with protected zones defined by law (e.g. all beaches, dunes, and coastal wetlands, plus a restricted-development area within 30 meters of those zones, as is New Brunswick’s policy), and the ability for local authorities to impose further, but not fewer, restrictions. To prevent a maladaptive rush to develop coastal land prior to implementation, consider a development moratorium in the affected areas while policies are being drafted, and do not allow the adoption process to stretch out for more than one year—even if a choice is made to phase in the strictest measures.</li> <li>• Develop more precise sea-level rise and storm-surge projections for the entire Canadian coast, with a special focus on densely populated areas, and develop a system to regularly update the data and monitor the coastal landscape for erosion and other issues. Greater precision in these estimates will require better elevation data, and a large, well-funded national study to enable far greater local detail in the physical model. Areas at or below sea level should be analyzed more closely, to gauge their exposure to sea-level rise and storm surges and the effectiveness of dikes and other existing barriers.</li> <li>• Strengthen province/territory and local capacity to develop and implement adaptation plans by continuing to fund projects such as the Regional Adaptation Collaboratives; bringing together land-use and environmental experts and enforcers within government (as New Brunswick has done in its Department of Environment); making it easy for local authorities to obtain crucial information and call in experts to assist them; and funding training opportunities.</li> <li>•Educate and engage the public, directly (through the media, websites, etc.) and especially through businesses and professionals likely to interact with homeowners and developers and with a possible stake in mitigating losses—property insurers, banks, real-estate agents, construction companies, architects, landscapers.</li> <li>•Seriously consider the implications of economic and environmental choices beyond coastal zones management: A local-stewardship economy would sharply reduce climate-related losses in the future, but it would require a major shift in priorities. Rapid stabilization of greenhouse gas emissions cannot be achieved by Canada alone, but Canada can choose its role in reducing emissions, and either be a leader, or a straggler. We recommend fostering nationwide debate of these issues.</li> </ul> |
| Priority      | - Unknown   |
| Discipline    | - Climate Society Interactions  |
| Sector        | - Economic Resources  |
| Source        | Costing Climate Impacts and Adaptation: A Canadian Study on Coastal Zones (2010)  |
| Lead Agencies | National Round Table on the Environment and Economy<br>Stockholm Environment Institute  |

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| <b>Need</b> | Development of a Coastal Adaptation Plan, as well as a marine/coastal spatial plan  |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | New Hampshire Department of Environmental Services. 2010. Coastal Zone Management Act Section 309 Enhancement Grants Program Assessment and Strategy. R-WD-10-25. |

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| <b>Need</b> | Development of a coastal adaptation plan/toolbox  |
| Type        | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Training and Capacity Building   |
| Focus Area  | - Sustainability of Marine Ecosystems   |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | New Hampshire Department of Environmental Services. 2010. Coastal Zone Management Act Section 309 Enhancement Grants Program Assessment and Strategy. R-WD-10-25. |

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| <b>Need</b> | Development of wetlands database and tracking procedures  |
| Type        | - DATA: Data Stewardship and Provisions<br>- PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats             |
| Discipline  | - Ecological and Biological   |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | New Hampshire Department of Environmental Services. 2010. Coastal Zone Management Act Section 309 Enhancement Grants Program Assessment and Strategy. R-WD-10-25. |



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| <b>Need</b> | Disease surveillance and training to address new vector-borne infectious diseases   |
| Type        | - PRODUCTS: Training and Capacity Building  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes  |
| Source      | U.S. Global Change Research Program. National Climate Assessment Health Sector Workshop. Charleston, S.C. February 2012. Meeting notes. |

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| <b>Need</b> | Dissemination of results from DOT/FHWA pilot studies as well as other efforts to the state and local entities charged with making transportation decisions |
| Type        | - PRODUCTS: Engagement   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source      | Georgetown Climate Center. Public Comments: 2012 U.S. DOT Climate Adaptation Plan.   |

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| <b>Need</b> | Diverse (fine-scale and long-term) precipitation predictions to meet needs of different users   |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |

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| Sector | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>                                 |
| Region | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- South East</li> </ul>   |
| Source | Dow, K. 2012. Climate Information Needs in the Southeast: Analysis of Requests. CISA Research Report 2012-02. Columbia, SC: Carolinas Integrated Sciences & Assessments (CISA). |

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| Need        | Downscaled models of sea level rise, severe weather events and other climate predictions   |
| Description | Downscaled models of sea level rise, severe weather events and other climate predictions are necessary to identify pier, harbor, and waterway infrastructure likely to need improvement                  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> </ul> |
| Priority    | - High   |
| Focus Area  | <ul style="list-style-type: none"> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>                                       |
| Discipline  | - Physical Science   |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> </ul>   |
| Region      | - Regional Or State -- New England   |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.; Others   |

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| Need        | downscaling of climate change modeling  |
| Description | <p>Additional needs identified in this Vulnerability Assessment:</p> <ul style="list-style-type: none"> <li>- measuring the overall multiplier effects of climate change on provincial economies;</li> <li>- targeted baseline monitoring and reliable inventories for lake, river and groundwater resources, and the condition and capacity of water distribution and treatment systems;</li> <li>- improved understanding and modelling of hydrologic systems and processes (current and historic);</li> <li>- assess extreme weather impacts on transportation and infrastructure systems;</li> <li>- improved understanding of shoreline response to changing water levels;</li> <li>- increased focus on impacts of change of forestry and agriculture; and</li> <li>- studies that derive realistic cost estimates for different adaptation options.</li> </ul> |

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| Discipline    | - Climate Society Interactions  |
| Sector        | - Managed Ecosystems<br>- Social and Cultural Resources<br>- Economic Resources<br>- Cross Disciplinary                 |
| Source        | Adapting to a Changing Climate Change in Nova Scotia: Vulnerability Assessment and Adaptation Options<br>September 2005 |
| Lead Agencies | Nova Scotia Environment<br>Environment Canada   |

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| <b>Need</b> | Drought information to determine thresholds for comprehensive drought management   |
| Description | Comprehensive drought management programs that improve monitoring of water supply storage levels and institute specific conservation measures when supplies decline below set thresholds   |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.   |

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| <b>Need</b> | Dynamic coastal inundation analyses and maps using sea level projections from downscaled climate models  |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data) |
| Priority    | - High   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |

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| Discipline | - Physical Science   |
| Sector     | - Infrastructure<br>- Natural Ecosystems   |
| Region     | - Regional Or State -- New England   |
| Source     | Commonwealth of Massachusetts. Executive Office of Energy and Environmental Affairs. Office of Coastal Zone Management. 2010. Section 309 Assessment and Five-Year Strategy for CZM Program Enhancement (FY2011-2015). |

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| <b>Need</b> | Economic analyses of sea level rise impacts, coastal hazards, and adaptation responses   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | Maine Coastal Program. 2012. Maine Coastal Plan: Assessment and Strategy under Section 309 of the Coastal Zone Management Act. |

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| <b>Need</b>   | Economic analysis   |
| Description   | <p>Economic analysis: In order to estimate the value of local agricultural production, property values for each parcel of land currently pursuing agricultural businesses would be useful to determine the losses in the region if the current agricultural fields were flooded.</p> <p>Farmer surveys: In order to gain a better understanding of what local farmers are experiencing in relation to climate change and what, if any new practises they are incorporating, a surveys should be sent out.</p> |
| Discipline    | - Climate Society Interactions  |
| Source        | <a href="http://atlanticadaptation.ca/sites/discoveryspace.upei.ca.acasa/files/Tantramar%20Dykelands-Agricultural-Adaptation-MtA-2011_1.pdf">http://atlanticadaptation.ca/sites/discoveryspace.upei.ca.acasa/files/Tantramar%20Dykelands-Agricultural-Adaptation-MtA-2011_1.pdf</a>   |
| Lead Agencies | Atlantic Canada Adaptation Solutions Association  |
| Contacts      | Climate Change Secretariat, New Brunswick Department of the Environment<br>env-info@gnb.ca  |

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| Description | Economic cost-benefit analysis of present and future development in coastal hazard areas under various climate change/sea level rise scenarios is necessary. An analysis of the short and long-term economic gains and costs of existing and future development in high hazard coastal areas is needed to inform future decision-making and identify appropriate actions. |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure<br>- Economic Resources  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015.  |

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| <b>Need</b> | Economic impact/Risk Analysis for ocean and near shore uses  |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)                        |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Natural Ecosystems<br>- Economic Resources   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015. |

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| <b>Need</b> | Economic value analysis of coastal resources, including commercial and recreational fisheries, land leased area of aquaculture operations, and total production capacity of offshore renewable energy |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |

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| Sector | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Managed Ecosystems</li> <li>- Economic Resources</li> </ul> |
| Region | - Regional Or State -- New England   |
| Source | The Commonwealth of Massachusetts. 2009. Management and Administration. Massachusetts Ocean Management Plan. Volume 1.         |

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| <b>Need</b> | Economic value of existing uses of coastal resources   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> <li>- Economic Resources</li> </ul> |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015.   |

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| <b>Need</b> | Eddy-resolving models and better understanding of source water dynamics; these things are not captured in global models  |
| Type        | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Satellite Remote Observations</li> <li>- DATA: Observing Systems</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul> |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> </ul>  |
| Discipline  | - Physical Science   |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |

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| Source | Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes. |
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| <b>Need</b> | Educate water resource utility owners and operators on the vulnerabilities of their assets to climate change impacts |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education<br>- PRODUCTS: Training and Capacity Building                        |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                                 |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Education and outreach for owners of property on existing and future floodplains about risk                |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education<br>- PRODUCTS: Training and Capacity Building              |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Economic Resources                                     |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Education on the costs, risks and hazards associated with living in coastal New Jersey   |
| Description | A critical part of coastal zone management, especially in high risk areas, is education of residents and visitors so that they may make informed choices |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education  |

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| Focus Area | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Public Health and Safety<br>- Infrastructure<br>- Social and Cultural Resources  |
| Region     | - Regional Or State -- Mid-Atlantic  |
| Source     | New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015. |

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| <b>Need</b> | Encourage contractor response plans for work zone impacted by high intensity storms  |
| Description | Stronger specifications that require contractor response plans for work zone impacted by high intensity storms   |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.   |

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| <b>Need</b> | Encourage small-scale projects such as increasing the area of pervious surfaces in residential areas to improve storm water management |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- New England   |



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| Source | Massachusetts Climate Change Adaptation Report. September 2011.<br>New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future. March 2009. |
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| Need       | Encourage stream flow management that mimics natural patterns and protects aquatic systems during low flow conditions  |
| Type       | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Focus Area | - Climate Impacts on Water Resources   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Infrastructure<br>- Managed Ecosystems<br>- Natural Ecosystems   |
| Region     | - Regional Or State -- Mid-Atlantic  |
| Source     | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| Need       | Epidemiology studies with climate focus to collect data to identify vulnerable populations and specific risks                           |
| Type       | - PRODUCTS: Plans, Assessments, Studies   |
| Discipline | - Climate Society Interactions  |
| Sector     | - Public Health and Safety  |
| Region     | - National<br>- Regional Or State -- New England  |
| Source     | U.S. Global Change Research Program. National Climate Assessment Health Sector Workshop. Charleston, S.C. February 2012. Meeting notes. |

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| Need       | Evaluate climate effects on ocean resources and develop management options   |
| Type       | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Plans, Assessments, Studies |
| Focus Area | - Sustainability of Marine Ecosystems  |
| Discipline | - Physical Science   |

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| Sector | - Managed Ecosystems<br>- Natural Ecosystems   |
| Region | - Regional Or State -- New England   |
| Source | Commonwealth of Massachusetts. Executive Office of Energy and Environmental Affairs. Office of Coastal Zone Management. 2010. Section 309 Assessment and Five-Year Strategy for CZM Program Enhancement (FY2011-2015). |

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| <b>Need</b> | Evaluate institutional capacity to meet the needs associated with increases in vector-borne diseases  |
| Description | Evaluate and support service providers in expanding institutional capacity to meet the needs associated with climate change induced increases in vector-borne diseases. |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Evaluate potential climate change impacts on emergency response            |
| Type        | - PRODUCTS: Plans, Assessments, Studies                                    |
| Focus Area  | - Changes in Extremes of Weather and Climate                               |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England   |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009. |

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| <b>Need</b> | Evaluate resilience of protected species, candidate species, and species of concern to climate change impacts  |
| Description | Evaluate adaptation strategies and resilience of species (including protected species, candidate species, and species of concern) for handling the effects of climate change |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Ecological and Biological  |
| Sector      | - Biota  |

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| Region | - National<br>- Regional Or State  |
| Source | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010. |

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| <b>Need</b> | Evaluate the use of Transfer of Development Rights, a smart growth technique used to direct coastal redevelopment inland   |
| Description | Seek to reduce the number of vulnerable coastal properties through land acquisition or by conservation restrictions.<br>Evaluate the use of Transfer of Development Rights, a smart growth technique used to direct coastal redevelopment inland |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Expand cooperative research efforts with sensors on fishing boats (lobster gear, trawl nets) to increase data; more data is needed to support models                          |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- PRODUCTS: Engagement   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Physical Science  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source      | Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes. |

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| <b>Need</b> | Expand educational efforts for pesticide risk management, crop adaptation and management, and conservation practices. |
| Description | Expand educational efforts for pesticide risk management, crop adaptation and management, and conservation practices. |

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| Type   | - PRODUCTS: Education   |
| Region | - Regional Or State -- New England                              |
| Source | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Expand technical advice on processing and using LiDAR data, mapping, and the vulnerability assessment |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building                                  |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Sector      | - Infrastructure<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Using NOAA Climate Data in Virginia. Sea Level Rise Planning in Northern Virginia. March 2011.        |

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| <b>Need</b> | Expanded river stream gauging network to monitor long and short term trends in flow and temperature |
| Type        | - DATA: In situ Observations<br>- PRODUCTS: Viewers and Web-based Tools                             |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.                          |

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| <b>Need</b> | Explore public attitudes and preferences for adaptation and minimization of flood risk and vulnerability   |
| Description | Additional needs cited in the report:<br>- Future research should also explore "multi-attribute evaluations of flood management"<br>- "gain an understanding of the human health and well-being benefits of flood alleviation" |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |

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| Discipline | - Climate Society Interactions   |
| Source     | Forecasting Economic Damages from Storm Surge Flooding<br>A Case Study in the Tantramar Region of New Brunswick<br>Prepared by Green Analytics<br>October 2012 |

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| Need        | Facilitate coordination between engineers and climate science data providers to maximize applicability of data for engineering applications  |
| Description | Increase coordination between engineers and climate science data providers to maximize applicability of data for engineering applications (for example, peak flow in cubic feet/second is more useful than total precipitation in a 25 hour period; a related need is for quantitative predictions about extremes to inform infrastructure design. |
| Type        | - DATA: Data Stewardship and Provisions<br>- PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building  |
| Priority    | - High   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.   |

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| Need        | Facilitate fisheries community of practice that includes fisheries management councils and commissions for the consideration of protected species, candidate species, and species of concern   |
| Description | Increase coordination with fishery management councils and commissions for the consideration of protected species, candidate species, and species of concern in ecosystem-based fisheries management as it relates to climate change issues. |
| Type        | - PRODUCTS: Engagement   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems   |

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| Region | - Regional Or State -- New England -- Mid-Atlantic -- South East                     |
| Source | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010. |

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| <b>Need</b> | Facilitate monitoring of current non-endemic diseases for trends, particularly for vulnerable populations |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- PRODUCTS: Viewers and Web-based Tools      |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                      |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Fill in habitat data gaps such as size, distribution and connectivity of habitats   |
| Description | Sensitive ecological areas (such as migratory paths) need to be identified so that state agencies, regional planners, and NGOs can lead effective preservation efforts. |
| Type        | - DATA: Observing Systems<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats                   |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - Regional Or State   |
| Source      | Facing Our Future: Adapting to Connecticut's Changing Climate. March, 2009.   |

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| <b>Need</b> | Flood hazard analyses and flood insurance rate map updates with current precipitation and other data |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)<br>- PRODUCTS: Plans, Assessments, Studies           |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |

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| Discipline | - Physical Science<br>- Climate Society Interactions   |
| Sector     | - Public Health and Safety<br>- Infrastructure   |
| Region     | - Regional Or State -- New England   |
| Source     | Commonwealth of Massachusetts. Executive Office of Energy and Environmental Affairs. Office of Coastal Zone Management. 2010. Section 309 Assessment and Five-Year Strategy for CZM Program Enhancement (FY2011-2015). |

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| Need       | Flood maps to determine which transportation project sites are most vulnerable   |
| Type       | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area | - Changes in Extremes of Weather and Climate   |
| Discipline | - Physical Science   |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- New England   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| Need       | For shellfish: identify pH thresholds for local species, determine adaptive strategies to mitigate the effects of increased disease prevalence and ocean acidification                               |
| Type       | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Plans, Assessments, Studies   |
| Discipline | - Chemical   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region     | - International<br>- Regional Or State   |
| Source     | Adaptation Sub-Committee to CT Governor's Steering Committee on Climate Change. 2010. The Impacts of Climate Change on Connecticut Agriculture, Infrastructure, Natural Resources and Public Health. |

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| Need | Forecasts of low precipitation events for industrial and municipal water supplies |
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| Description | Saltwater intrusion becomes a big issue during low flows, for both industrial and municipal water supplies; drought cant create a salt wedge, which can be then be pushed even further inland by wind and upwelling. |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- South East  |
| Source      | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011.   |

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| <b>Need</b> | Forest monitoring to rack introduction and spread of pathogens, changes in forest condition, physical climate trends, and evidence of species shift |
| Type        | - DATA: In situ Observations<br>- PRODUCTS: Viewers and Web-based Tools   |
| Priority    | - High  |
| Focus Area  | - Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats                                       |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota<br>- Economic Resources   |
| Region      | - Regional Or State -- New England  |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.  |

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| <b>Need</b> | Geo-spatial data to integrate with existing and new habitat and human use data and information         |
| Type        | - DATA: Satellite Remote Observations<br>- DATA: Observing Systems<br>- DATA: Depth and Elevation Data |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological  |
| Sector      | - Natural Ecosystems<br>- Biota  |



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| Region | - Regional Or State -- New England   |
| Source | Commonwealth of Massachusetts. Executive Office of Energy and Environmental Affairs. Office of Coastal Zone Management. 2010. Section 309 Assessment and Five-Year Strategy for CZM Program Enhancement (FY2011-2015). |

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| Need       | Geospatial tools and approaches are needed to help habitat managers to assess habitat resiliency and adaptation under different climate change and management scenarios  |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>   |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Biota</li> <li>- Social and Cultural Resources</li> </ul>   |
| Region     | <ul style="list-style-type: none"> <li>- International</li> <li>- National</li> <li>- Regional Or State</li> <li>- Local/City</li> </ul>   |
| Source     | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010.  |

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| Need       | Guidance on incorporating coastal climate adaptation into the Coastal and Estuarine Land Conservation plan |
| Type       | - PRODUCTS: Training and Capacity Building   |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline | - Climate Society Interactions   |
| Sector     | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> </ul>           |
| Region     | - Regional Or State -- New England   |

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| Source | New Hampshire Department of Environmental Services. 2010. Coastal Zone Management Act Section 309 Enhancement Grants Program Assessment and Strategy. R-WD-10-25. |
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| <b>Need</b> | Guidance with incorporating sea level rise into state/local planning and long-term management efforts      |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance                      |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic -- South East  |
| Source      | NOAA Eastern Region Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated in May 2010.     |

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| <b>Need</b> | Habitat assessments to prioritize beach restoration  |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Physical Science   |
| Sector      | - Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Habitat continuity information to effectively update bridges and culverts for wildlife passage |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate           |
| Discipline  | - Ecological and Biological  |
| Sector      | - Infrastructure<br>- Natural Ecosystems<br>- Biota  |

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| Region | - Regional Or State   |
| Source | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Habitat parcelization and fragmentation need to be incorporated into management strategies   |
| Type        | - PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Regulatory/ Policy Guidance                         |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| <b>Need</b> | Health impact assessments at the state and local levels to identify risk associated with climate change, air quality, and health  |
| Description | Enhance scientific understanding of the relationship between climate change, air quality, and health outcomes by conducting health impact assessments at the state and local levels |
| Type        | - DATA: Observing Systems   |
| Priority    | - High  |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | High resolution coean temperature data, surface to bottom, particularly mixed layer depth and seasonal data                              |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- DATA: Depth and Elevation Data<br>- DATA: Data Stewardship and Provisions |

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| Focus Area | - Sustainability of Marine Ecosystems   |
| Discipline | - Physical Science  |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source     | Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes. |

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| <b>Need</b> | High resolution ocean acidification coastal-scale models   |
| Type        | - PRODUCTS: Hindcasts (climatologies, models)<br>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source      | Partnership for Observation of the Global Oceans. 2010. Speed Installation of System to Monitor Vital Signs of Global Ocean, Scientists Urge.  |

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| <b>Need</b> | High resolution sea level, storm frequency, salinity, pH, temperature, nutrient levels, biological structure and size, currents, and chlorophyll at key locations |
| Type        | - DATA: In situ Observations<br>- DATA: Satellite Remote Observations<br>- DATA: Observing Systems  |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats            |

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| Discipline | - Physical Science<br>- Ecological and Biological                                       |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East                        |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011. (And other state plans) |

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| <b>Need</b> | High resolution topographical data for coastal zone management  |
| Description | Acquire detailed topographical data of the coastal zone   |
| Type        | - DATA: In situ Observations<br>- DATA: Depth and Elevation Data<br>- PRODUCTS: Maps (Imagery, geo-referenced data) |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Higher model resolution in the nearshore to aid in managing highly productive coastal and estuarine shellfish growing areas                                     |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East  |

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| Source | Massachusetts Climate Change Adaptation Report. September 2011; Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes. |
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| <b>Need</b> | Hourly and daily temperature data for energy facilities that need to plan for immediate energy demands   |
| Description | Hourly and daily temperature data for energy facilities that need to plan for immediate energy demands   |
| Type        | - DATA: In situ Observations<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)                                      |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure<br>- Economic Resources   |
| Region      | - International<br>- Regional Or State -- Mid-Atlantic   |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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|-------------|---|
| <b>Need</b> | Identification of ecologically significant habitat (hubs and corridors)   |
| Description | Identify ecologically significant habitat to facilitate conservation of critical habitat impacted by current and future climate change                              |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Maps (Imagery, geo-referenced data)<br>- PRODUCTS: Plans, Assessments, Studies                           |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological   |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report, New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future |

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| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate |
| Region     | - National<br>- Regional Or State -- New England   |
| Source     | The Nature Conservancy. Public Comments: 2012 U.S. DOT Climate Adaptation Plan.                            |

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| <b>Need</b> | Identify and distribute data about thresholds for crop freezes, pest survival, and precipitation   |
| Description | Data about thresholds for crop freezes, pest survival, and precipitation is necessary to identify opportunities for new crops and to phase out less suitable crops, and to identify changes in pest dynamics. This may involve existing data being provisioned in a way so that necessary information is retrievable; for instance, allowing user access to determine parameters (such as number of days without precipitation) so that they can tailor it to crops of interest. |
| Type        | - DATA: Data Stewardship and Provisions<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes.<br>Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Identify and prioritize what ecosystem and habitat features to monitor, and develop new indicators if necessary                                       |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- DATA: Indicator Based Research   |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Ecological and Biological   |

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| Sector | - Natural Ecosystems<br>- Biota  |
| Region | - Regional Or State -- Mid-Atlantic  |
| Source | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Identify human populations most at risk with respect to coastal change impacts   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Identify migration corridors that include wetland areas, linkages between wetlands and upland, and large parcels of connected habitat, both terrestrial and aquatic |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats               |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Infrastructure<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Identify remaining critical coldwater fish habitat areas in order to reconnect high quality habitats by removing in-stream barriers and re-establishing in-stream flows |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |



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| Focus Area | - Climate Impacts on Water Resources                            |
| Discipline | - Ecological and Biological                                     |
| Sector     | - Natural Ecosystems<br>- Biota                                 |
| Region     | - Regional Or State -- New England                              |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Identify resilient forest ecosystems, including forest reserves and actively managed forests  |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies  |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Identify the cumulative impacts of human uses and climate change on oceans   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Physical Science   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | The Commonwealth of Massachusetts. 2009. Management and Administration. Massachusetts Ocean Management Plan. Volume 1. |

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| <b>Need</b> | Identify vulnerable fish species likely to be affected by climate change and practices that may mitigate these effects |
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| Type       | - PRODUCTS: Plans, Assessments, Studies                         |
| Focus Area | - Sustainability of Marine Ecosystems                           |
| Discipline | - Ecological and Biological                                     |
| Sector     | - Managed Ecosystems  |
| Region     | - Regional Or State -- New England                              |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Identify water and sewer facilities susceptible to saltwater intrusion and coastal inundation              |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Improve capacities to conduct vector and human surveillance in order to identify at risk groups and target outreach |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                                |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Improve public awareness of changing risks of drought and fires                            |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education<br>- PRODUCTS: Viewers and Web-based Tools |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |

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| Sector | - Public Health and Safety<br>- Infrastructure   |
| Region | - Regional Or State -- New England   |
| Source | New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future. March 2009. |

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| <b>Need</b> | Improved baseline information about river herring are necessary to predict climate impacts; baseline information includes questions about life history and habitat use  |
| Description | Topics include: Historical level of the population, life history (ocean, habitat, etc.) for all stages and habitat areas (e.g., lake, river, estuary and ocean) using consistent coastwide protocols; Habitat needs include: Downstream studies to see how salt marshes are utilized, assessments just above the tide zone and below a structure, quantitative larval assessment for habitats and 1) Ocean distribution 2) Fishing impact in the ocean environment 3) Migratory patterns coast wide for all stocks 4) Coordination across states to fill-in data gaps 5) Increased river monitoring, not just at the first dam 6) Linking river runs to water temperatures and flow 7) Environmental tolerances and thresholds (e.g., temperature) for all life stages and 8) Laboratory studies that document biological responses to water chemistry and habitat thresholds |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- DATA: Indicator Based Research<br>- PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source      | NMFS. 2012. River Herring Climate Change Workshop Report. Report to the National Marine Fisheries Service, Northeast Regional Office. December 27, 2012, 60pp.  |

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| <b>Need</b> | Improved coastal inundation models   |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)              |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate |
| Discipline  | - Physical Science   |

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| Sector | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems               |
| Region | - Regional Or State -- New England   |
| Source | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010. |

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| <b>Need</b> | Improved collection of/access to data and metrics for local communities to assess vulnerabilities and prevent public health impacts   |
| Type        | - DATA: Data Stewardship and Provisions   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase II: Building Societal, Economic, and Ecological Resilience. Report for Maryland Commission on Climate Change. |

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| <b>Need</b> | Improved data and monitoring program to determine agriculture vulnerabilities  |
| Description | Better data and monitoring programs to help determine risk of crop damage, as well as the risk of emerging insect pest, plant disease pathogens, and increased viability of weeds.                                 |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes.<br>Facing Our Future: Adapting to Connecticut's Changing Climate. March, 2009. |

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| <b>Need</b> | Improved delivery of real-time local weather data from government agencies |
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| Type       | - DATA: Data Stewardship and Provisions<br>- PRODUCTS: Engagement   |
| Focus Area | - Changes in Extremes of Weather and Climate  |
| Discipline | - Physical Science  |
| Sector     | - Managed Ecosystems  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic  |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes. |

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| <b>Need</b> | Improved elevation assessment tools such as LiDAR to help inform decisions about project siting  |
| Type        | - DATA: Depth and Elevation Data<br>- DATA: Data Stewardship and Provisions<br>- PRODUCTS: Viewers and Web-based Tools                             |
| Priority    | - High   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure<br>- Economic Resources   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Improved federal, state, local, and regional integration and coordination of observation systems that detect trends in coastal water levels, elevation and/or subsidence, shoreline change, wetland loss, and tidal influence on estuaries and water supplies |
| Type        | - DATA: Depth and Elevation Data<br>- DATA: Data Stewardship and Provisions<br>- PRODUCTS: Engagement   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- Mid-Atlantic   |

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| Source | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |
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| <b>Need</b> | Improved mapping to identify potential sites for renewable energy systems   |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | New Hampshire Department of Environmental Services. 2010. Coastal Zone Management Act Section 309 Enhancement Grants Program Assessment and Strategy. R-WD-10-25. |

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| <b>Need</b> | Improved prediction for how hydrography (mapping of water's topographic features) will change in the Gulf of Maine                               |
| Description | Considerable uncertainty surrounds how broadscale hydrography will change in the next 50-100 years   |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data) |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Physical Science   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | SourceNye, J. 2010. Climate Change and its Effects on Ecosystems Habitats and Biota. State of the Gulf of Maine.                                 |

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| <b>Need</b> | Improved predictions for lake level change in response to climate change  |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Climate Impacts on Water Resources  |

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| Discipline | - Physical Science   |
| Sector     | - Natural Ecosystems   |
| Region     | - Regional Or State -- Mid-Atlantic -- Great Lakes   |
| Source     | Gregg, R. M., K. M. Feifel, J. M. Kershner, and J. L. Hitt. 2012. The State of Climate Change Adaptation in the Great Lakes Region. EcoAdapt, Bainbridge Island, WA. |

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| <b>Need</b> | Improved predictions for spatial extent of coastal wetlands   |
| Description | Examine Wetlands Protection Act rules will have to be revised to address predicted changes in spatial extent of coastal wetlands                                |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Improved regional approaches to water planning through regulations, training, capacity, communication and outreach             |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance                |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science<br>- Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Maine Coastal Program. 2012. Maine Coastal Plan: Assessment and Strategy under Section 309 of the Coastal Zone Management Act. |

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| <b>Need</b> | Improved seasonal weather forecasts and day-to-day weather forecasts for agricultural sector |
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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul> |
| Focus Area | - Climate Impacts on Water Resources  |
| Discipline | <ul style="list-style-type: none"> <li>- Physical Science</li> <li>- Ecological and Biological</li> </ul>   |
| Sector     | - Managed Ecosystems  |
| Region     | - Regional Or State -- South East   |
| Source     | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011.  |

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|-------------|---|
| <b>Need</b> | <b>Improved short-term and seasonal forecasts at local levels</b>   |
| Description | Improved short-term and seasonal forecasts at local levels, including downscaled impact models  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul> |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>                                     |
| Region      | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic -- Central -</li> <li>- Great Lakes -- South East</li> </ul>  |

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| <b>Need</b> | <b>Improved understanding of climate impacts on water table levels and implications for septic systems</b> |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |



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| Source | Massachusetts Climate Change Adaptation Report. September 2011. |
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| <b>Need</b> | Improved understanding of impacts of reduced summer flows on large rivers and ground water tables to address water demands   |
| Description | Improved understanding of impacts of reduced summer flows on large rivers and ground water tables to address water demands; reduced water tables could lead to conflicts among users.  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul> |
| Priority    | - High   |
| Focus Area  | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.   |

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| <b>Need</b> | Improved understanding of regional and local climate impacts on coastal habitats and species including coral, marine fisheries, endangered species and marine mammal protection act (MMPA) species, candidate species, and species of concern                      |
| Type        | <ul style="list-style-type: none"> <li>- DATA: Indicator Based Research</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul>  |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region      | - Regional Or State  |
| Source      | Eastern Region Gaps, Needs and Assets Document. Updated in May 2010.   |

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|-------------|---|
| Description | Improved understanding of regional and local climate impacts on coastal habitats, including improved data on phenology and impacts of drought |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate                                    |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source      | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010.  |

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| <b>Need</b> | Improved understanding of the sources and effects of cumulative impacts and stress on the marine environment   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | Commonwealth of Massachusetts. Executive Office of Energy and Environmental Affairs. Office of Coastal Zone Management. 2010. Section 309 Assessment and Five-Year Strategy for CZM Program Enhancement (FY2011-2015). |

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| <b>Need</b> | Improved understanding of water budgets and water resource demands in a changing climate, including updated precipitation data |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies   |
| Priority    | - High   |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East                                 |

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| Source | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010. |
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| <b>Need</b> | In-depth geomorphic assessment to identify vulnerable river reaches and monitor rivers for disconnection from floodplains |
| Type        | - DATA: In situ Observations<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                                      |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Inclusion of ice sheet dynamics and ocean-ice shelf interactions in global climate models for more accurate projections of global sea level rise |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source      | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010.   |

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| <b>Need</b> | Increase the capacity of essential partners in NOAA's habitat conservation efforts at regional, state and local levels to use and respond to impacts of climate change on riverine, coastal and marine habitats |
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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> </ul> |
| Priority   | - High  |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>  |
| Sector     | <ul style="list-style-type: none"> <li>- Natural Ecosystems</li> <li>- Biota</li> <li>- Social and Cultural Resources</li> <li>- Cross Disciplinary</li> </ul>  |
| Region     | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State</li> <li>- Local/City</li> </ul>   |
| Source     | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010.   |

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| <b>Need</b> | Increased coordination between state and local, state and federal governments – interstate collaboration  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> <li>- PRODUCTS: Other</li> </ul> |
| Priority    | - High  |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>    |

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| Discipline | - Climate Society Interactions   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region     | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Great Lakes -- South East          |
| Source     | NOAA Eastern Region Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated in May 2010. |

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| <b>Need</b> | increased geologic mapping and groundwater resource assessments to provide an inventory of the resource available and the consequences of developing it. |
| Description | Most areas of Nova Scotia currently do not have comprehensive groundwater management plans and would benefit from increased mapping and inventories.     |
| Discipline  | - Physical Science<br>- Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Source      | Vulnerability of Nova Scotia's Coastal Groundwater Supplies to Climate Change<br>May 2012  |

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| <b>Need</b> | Increased knowledge sharing to facilitate information development and dissemination  |
| Type        | - PRODUCTS: Engagement   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Region      | - Regional Or State -- Mid-Atlantic -- Great Lakes   |
| Source      | Gregg, R. M., K. M. Feifel, J. M. Kershner, and J. L. Hitt. 2012. The State of Climate Change Adaptation in the Great Lakes Region. EcoAdapt, Bainbridge Island, WA. |

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| <b>Need</b> | Increased marine habitat assessment is necessary in order to accurately forecast biological response to climate change     |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- DATA: Indicator Based Research<br>- PRODUCTS: Plans, Assessments, Studies |
| Priority    | - High   |

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| Focus Area    | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Sector        | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region        | - Regional Or State -- New England   |
| Source        | Massachusetts Ocean Management Plan. Volume 1., 2009.; Report of the National Marine Fisheries service Habitat Assessment Improvement Plan Team, 2010.   |
| Lead Agencies | NOAA NMFS  |

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| <b>Need</b> | Increased saltwater intrusion monitoring   |
| Type        | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Data Stewardship and Provisions</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> </ul> |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> <li>- Economic Resources</li> </ul>   |
| Region      | - Regional Or State -- South East  |
| Source      | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011.                   |

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| <b>Need</b> | Increased tide gauge network to monitor tidal resources and local sea level rise                                  |
| Type        | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Observing Systems</li> </ul> |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Sector      | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> </ul>                  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| Type       | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area | - Climate Impacts on Water Resources  |
| Discipline | - Physical Science  |
| Sector     | - Public Health and Safety  |
| Region     | - Regional Or State -- Mid-Atlantic   |
| Source     | Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase II: Building Societal, Economic, and Ecological Resilience. Report for Maryland Commission on Climate Change. |

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| <b>Need</b> | Indicators and indices to gauge the severity of impacts drought induced saltwater intrusion has on coastal systems                                 |
| Type        | - DATA: In situ Observations<br>- DATA: Indicator Based Research   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate |
| Sector      | - Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- South East  |
| Source      | National Drought Information System (NIDIS) Carolinas Drough Pilot Project Scoping Workshop. July/August 2012. Meeting notes.                      |

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| <b>Need</b> | Indicators that are representative of specific geographic ranges, behaviors, or population characteristics of certain species, including plants, birds, mammals, and insects, that are known to be sensitive to sea-level rise and other climatic changes |
| Type        | - DATA: Indicator Based Research  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Ecological and Biological   |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group.  |

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| Type       | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Observing Systems</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>     |
| Discipline | <ul style="list-style-type: none"> <li>- Ecological and Biological</li> <li>- Chemical</li> </ul>  |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Biota</li> </ul>  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source     | NMFS. 2012. River Herring Climate Change Workshop Report. Report to the National Marine Fisheries Service, Northeast Regional Office. December 27, 2012, 60pp.     |

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| Need        | Information about river herring sensitivity to climate change variables and projecting these into the future   |
| Description | Variables include water chemistry and habitat criteria for river herring, water quality (including temperature, pH, salinity, contaminants, etc.) and match it up to spawning habitat and early life stage development; well-coordinated fishery independent survey network in juvenile habitats |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul>                         |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>   |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Biota</li> </ul>  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source      | NMFS. 2012. River Herring Climate Change Workshop Report. Report to the National Marine Fisheries Service, Northeast Regional Office. December 27, 2012, 60pp.   |

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| Need | Information on potential impacts of climate change on river herring by region including information of species, life stage, indicators, potential impacts, and available data/relevant references |
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| Type       | - DATA: In situ Observations<br>- DATA: Data Stewardship and Provisions<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area | - Sustainability of Marine Ecosystems<br>- Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats                 |
| Discipline | - Ecological and Biological  |
| Sector     | - Managed Ecosystems   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source     | NMFS. 2012. River Herring Climate Change Workshop Report. Report to the National Marine Fisheries Service, Northeast Regional Office. December 27, 2012, 60pp. |

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| <b>Need</b> | Initiatives to educate public about limiting the spread of vector-born disease   |
| Description | Initiatives to educate public about reducing vector born diseases, for instance preventing standing water to reduce mosquito breeding habitats |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education<br>- PRODUCTS: Training and Capacity Building  |
| Priority    | - High   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Initiatives to remove invasive species from large unfragmented forest blocks on state land            |
| Description | Collaborate with community non-profits on conservation efforts, including removal of invasive species |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education   |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Climate Society Interactions  |

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| Sector | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul> |
| Region | - Regional Or State -- New England  |
| Source | Massachusetts Climate Change Adaptation Report. September 2011.   |

|             |   |
|-------------|---|
| Need        | Integrate environmental and health initiatives so that they address both human and ecosystem health   |
| Description | Integrate environmental and health initiatives so that they address both human and ecosystem health   |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Education</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Natural Ecosystems</li> <li>- Social and Cultural Resources</li> <li>- Cross Disciplinary</li> </ul>   |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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|------------|--|
| Need       | Integration of sea-level rise projections and scenarios into digital/spatial database  |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> </ul>       |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline | - Physical Science   |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- Mid-Atlantic  |
| Source     | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |

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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul> |
| Priority   | - High  |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>  |
| Discipline | - Climate Society Interactions  |
| Sector     | - Infrastructure  |
| Region     | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic -- Central -</li> <li>- Great Lakes -- South East</li> </ul>  |
| Source     | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press.  |

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| <b>Need</b> | Inventory of infrastructure potentially impacted by sea level rise, including the identification of public and private systems and facilities and threatened historical structures                             |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Priority    | - High   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |

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| <b>Need</b> | Investigate benefits to broader use of integrated pest management  |
| Description | Conduct research and investigate use of pest controls for changing conditions. Integrated pest management, and the use of herbicides, fungicides, and insecticides will likely be needed to address pests not presently common in Massachusetts. Research by educational institutions and trade groups on organic strategies, as well as training in new pest controls may be needed to improve familiarity of best practices and alternative solutions to emerging pests. |
| Type        | <ul style="list-style-type: none"> <li>- DATA: Other</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul>   |

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|------------|---|
| Focus Area | - Climate Impacts on Water Resources                            |
| Discipline | - Ecological and Biological                                     |
| Sector     | - Managed Ecosystems  |
| Region     | - Regional Or State -- New England                              |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Landslides maps to predict mudslides in the case of severe storms  |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- South East  |
| Source      | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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|-------------|---|
| <b>Need</b> | LiDAR data for revision of FEMA maps and in-depth modeling of geomorphic/vegetation changes due to sea level rise |
| Type        | - DATA: Data Stewardship and Provisions<br>- PRODUCTS: Maps (Imagery, geo-referenced data)                        |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science  |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Governor's Commission on Climate Change (Virginia). Final Report: A Climate Change Action Plan. December 2008.    |

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| <b>Need</b> | LiDAR data to conduct vulnerability assessment in these areas: sea level rise and coastal flooding, habitat types, socio-economic vulnerability to sea level rise, existing infrastructure  |
| Description | LiDAR data to conduct vulnerability assessment in these areas: sea level rise and coastal flooding, habitat types, socio-economic vulnerability to sea level rise, existing infrastructure. |

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| Type       | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments   |
| Priority   | - High  |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline | - Physical Science  |
| Sector     | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems<br>- Biota   |
| Region     | - Regional Or State -- Mid-Atlantic   |
| Source     | Governor's Commission on Climate Change (Virginia). Final Report: A Climate Change Action Plan. December, 2008.   |

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| <b>Need</b> | LiDAR to identify important wetlands and ensure that a variety of wetland types are represented in land protection planning   |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments<br>- DATA: Depth and Elevation Data<br>- DATA: Data Stewardship and Provisions                  |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Local climate-change predictions |
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| Description   | From page 22 of the report:<br>We need local climate-change predictions. As well, we need better measurements of past and present-day conditions. Better information on waves and water levels is important. Currently, only a handful of permanent water-level gauging stations are operating in Atlantic Canada. For example, there is just one permanent gauge in Prince Edward Island (at Charlottetown). Measuring storm surge and extreme water levels along the north, east, and west shores of the island must rely on gauges located hundreds of kilometres away. Data on offshore wave conditions is even sparser. Computer models and remote sensing data are making great strides in improving our predicting water levels and understanding our nearshore waters. But there is still a need for reliable, long-term measurements. |
| Sector        | - Infrastructure<br>- Natural Ecosystems   |
| Source        | see report information above   |
| Lead Agencies | Atlantic Canada Adaptation Solutions Association   |
| Contacts      | Mike Davies, Ph.D. (report author), <a href="http://www.coldwater-consulting.com">www.coldwater-consulting.com</a>   |

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| Need       | Localized flooding and sea level rise information to build up coastal roads in preparation for storms, and prepare community for road closures                 |
| Type       | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Regulatory/ Policy Guidance   |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline | - Physical Science<br>- Climate Society Interactions   |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- South East  |
| Source     | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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|-------------|---|
| Need        | Management for private forests to address increase pest pressure, fragmentation as well as stressors associated with climate change |
| Description | Management for private forests to address increase pest pressure, fragmentation as well as stressors associated with climate change |

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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Education</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> </ul> |
| Focus Area | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline | <ul style="list-style-type: none"> <li>- Ecological and Biological</li> <li>- Climate Society Interactions</li> </ul>  |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Biota</li> <li>- Economic Resources</li> </ul>  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.   |

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|-------------|---|
| <b>Need</b> | Map of new infrastructure and development outside of future floodplans considering sea level rise, erosion of barrier islands and coast lines, and wetland inundation |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> </ul>                                  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.    |

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| <b>Need</b> | Mapping benthic habitats   |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Physical Science   |
| Sector      | - Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | Maine Coastal Program. 2012. Maine Coastal Plan: Assessment and Strategy under Section 309 of the Coastal Zone Management Act. |

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| Type       | - PRODUCTS: Maps (Imagery, geo-referenced data)                                      |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- New England   |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011.                      |

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|-------------|---|
| <b>Need</b> | Mapping of coastal areas to determine areas well suited for coastal protection  |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.  |

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|-------------|---|
| <b>Need</b> | Mapping of location and elevation of public and private infrastructure, including value and condition     |
| Type        | - DATA: Depth and Elevation Data<br>- PRODUCTS: Maps (Imagery, geo-referenced data)                       |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                      |
| Discipline  | - Physical Science  |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Social and Cultural Resources<br>- Economic Resources |
| Region      | - Regional Or State -- New England  |
| Source      | Facing Our Future: Adapting to Connecticut's Changing Climate. March, 2009.                               |

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| <b>Need</b> | Mapping of shifts in habitat uses and species distributions (including prey species) to document climate impacts |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)  |



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| Priority   | - High   |
| Focus Area | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline | - Ecological and Biological  |
| Sector     | - Natural Ecosystems<br>- Biota  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source     | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010.   |

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|-------------|---|
| <b>Need</b> | Mapping sea level rise inundation zones   |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)   |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Rhode Island Coastal Resources Management Council. 2010. Program Assessment and Strategy for Enhancement Performed Pursuant to Section 309 of the Coastal Zone Management Act of 1972 as Amended. |

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|-------------|--|
| <b>Need</b> | Mapping that combines NOAA weather predictions and agricultural knowledge to assist with crop relocation   |
| Description | Support and plans for crop relocation projects, using mapping that combines NOAA weather predictions and agricultural knowledge                                |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- South East  |
| Source      | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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| <b>Need</b> | Maps of barrier island land area change  |
| Description | Increased understanding of storm impact on barrier islands, including maps of land area change   |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Natural Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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|-------------|--|
| <b>Need</b> | Maps of flood and storm surge heights, with extent of areas inundated compounded by impervious surface run off                                 |
| Description | Maps of flood and storm surge heights, with extent of areas inundated compounded by impervious surface run off (similar to existing FEMA maps) |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate                                     |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | State of New Jersey. 2008. Draft: Global Warming Response Act Recommendation Report.   |

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| <b>Need</b> | Maps of the effects of changes in oceanographic conditions on protected marine species, including candidate species and species of concern, and their prey |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Priority    | - High   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats   |

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| Discipline | - Physical Science<br>- Ecological and Biological                                    |
| Sector     | - Natural Ecosystems<br>- Biota  |
| Region     | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- South East       |
| Source     | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010. |

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|-------------|---|
| <b>Need</b> | Maps of where public drinking water supply systems, waste water treatment facilities, and locations where public linear infrastructure such as roads or sewer systems intersect surface waters; include vulnerability to flooding |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.  |

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| <b>Need</b> | Marine ocean acidification threshold information   |
| Type        | - DATA: Observing Systems<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |

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| Source | Partnership for Observation of the Global Oceans. 2010. Speed Installation of System to Monitor Vital Signs of Global Ocean, Scientists Urge. |
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| <b>Need</b> | Modeling and inundation analyses for storm surge from extra-tropical storms  |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Maine Coastal Program. 2012. Maine Coastal Plan: Assessment and Strategy under Section 309 of the Coastal Zone Management Act. |

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| <b>Need</b> | Modeling support for sea level rise and products to make the data and model results available to all stakeholders and users                                |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- South East  |
| Source      | Mitchum, G. 2011. Sea Level Changes in the Southeastern United States: Past, Present, and Future. Florida Climate Institute. Southeast Climate Consortium. |

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| <b>Need</b> | Models of aquifers and groundwater flows in the coastal zone to inventory the vulnerability of water systems   |
| Description | Models of aquifers and groundwater flows in the coastal zone to inventory the vulnerability of public/private water systems to saltwater due to progressive sea level rise |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)            |

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| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources |
| Sector     | - Public Health and Safety<br>- Infrastructure   |
| Region     | - Regional Or State -- New England   |
| Source     | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.                         |

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|-------------|--|
| <b>Need</b> | Monitor health hazards and events (i.e. air quality monitoring, number of heat related illnesses and deaths)   |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- PRODUCTS: Engagement<br>- PRODUCTS: Viewers and Web-based Tools                                     |
| Priority    | - High   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Monitor the impacts of storms and hurricanes on water-borne diseases   |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- DATA: Data Stewardship and Provisions<br>- PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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|-------------|---|
| <b>Need</b> | Monitoring and evaluation are needed to identify climate-driven changes |
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| Type       | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Viewers and Web-based Tools   |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats                |
| Discipline | - Physical Science<br>- Ecological and Biological  |
| Source     | Gregg, R. M., K. M. Feifel, J. M. Kershner, and J. L. Hitt. 2012. The State of Climate Change Adaptation in the Great Lakes Region. EcoAdapt, Bainbridge Island, WA. |

|             |   |
|-------------|---|
| <b>Need</b> | Monitoring and farmer education programs to encourage identification and reporting of agricultural pests  |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Managed Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Monitoring and identification of pollution-induced eutrophication that facilitates algal blooms        |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Priority    | - High   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Natural Ecosystems<br>- Biota<br>- Social and Cultural Resources<br>- Recreation and Tourism         |

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| Region | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source | Partnership for Observation of the Global Oceans. 2010. Speed Installation of System to Monitor Vital Signs of Global Ocean, Scientists Urge. |

|             |   |
|-------------|---|
| <b>Need</b> | Monitoring of coastal and marine habitat ecosystem response to climate change   |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems   |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source      | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

|             |   |
|-------------|---|
| <b>Need</b> | Monitoring of coastal and marine habitat ecosystem response to climate change                       |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems   |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise) |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- South East                      |

|        |   |
|--------|---|
| Source | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |
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| <b>Need</b> | Monitoring strategy for key marine indicators, including invasive species  |
| Type        | - DATA: Indicator Based Research<br>- PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building   |
| Priority    | - High   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.   |

|             |  |
|-------------|--|
| <b>Need</b> | Monitoring to detect environmental responses to climate change and prioritize inland habitat or watersheds to protect or restore |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Engagement                            |
| Priority    | - High   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats                           |
| Discipline  | - Ecological and Biological  |
| Sector      | - Natural Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future. March 2009. |

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| <b>Need</b> | Monitoring transportation infrastructure conditions, particularly the impacts of weather and climate extremes |
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| Type       | - DATA: Observing Systems<br>- PRODUCTS: Viewers and Web-based Tools   |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Infrastructure   |
| Region     | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source     | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press. |

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| <b>Need</b> | More information on river herring at the extremes of the range to see the most acute climate change effect (e.g., on blueback herring in the St. Johns River, alewife in North Carolina) |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source      | NMFS. 2012. River Herring Climate Change Workshop Report. Report to the National Marine Fisheries Service, Northeast Regional Office. December 27, 2012, 60pp.                           |

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| <b>Need</b> | Municipal resources and tools for climate adaptation planning when faced with limited budgets and staffing  |
| Description | Leaders in the region recognize the need to be proactive in adapting... but do not yet have the resources and tools they require to do so successfully...Many said they needed help making adaptation a priority in their communities at a time of constrained human and financial resources. |
| Type        | - PRODUCTS: Engagement  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate  |

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| Discipline    | - Climate Society Interactions  |
| Sector        | - Public Health and Safety<br>- Infrastructure<br>- Social and Cultural Resources<br>- Economic Resources<br>- Cross Disciplinary |
| Region        | - Regional Or State -- New England  |
| Source        | Preparing for the Changing Climate: A Northeast-focused Needs Assessment (Clean Air-Cool Planet, 2011)                            |
| Lead Agencies | Clean Air-Cool Planet   |

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| Need          | Municipalities in New Brunswick need funding, expertise, information and cooperation to increase their capacity for climate change adaptation   |
| Description   | From the study:<br>"Many municipalities are small and have limited staff who have no expertise in (or even basic knowledge of) environmental and climate change matters. Municipalities feel that they need information and often do not have the finances, time or human resources to collect it themselves. They also need proof that climate change is actually occurring locally, and information and an increased awareness on how exactly climate change trends will affect ... their communities. Furthermore, this information needs to be consistently available over the long-term... Municipalities would benefit from toolkits and tangible examples of climate change adaptation planning. These could include recommended actions in the forms of specific models of bylaws, legislations, policies, and guidelines for design standards, for example." |
| Type          | - PRODUCTS: Plans, Assessments, Studies   |
| Discipline    | - Climate Society Interactions  |
| Sector        | - Public Health and Safety<br>- Infrastructure<br>- Social and Cultural Resources<br>- Economic Resources<br>- Cross Disciplinary   |
| Source        | Capacity for Climate Change Adaptation in New Brunswick Municipalities (2010)   |
| Lead Agencies | Mount Allison University Rural and Small Town Programme   |
| Contacts      | Stephanie Miller and Gwen Zwicker   |

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| Need | National system for inventorying natural areas that includes their carbon sink capacity (and calculates the CO2 emissions that would result from their conversion).<br>Uniform national (Canadian) calculator to help assign dollar values to natural features. |
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| Description   | <p>From a conference call with municipalities on the topic of land use/land conversion and its impact on municipal greenhouse gas emissions:</p> <p>Participants voiced the need for a systematic, nationwide approach/system to compile inventories of natural areas that include a GHG count (carbon sink capacity), and provide a uniform means by which to calculate potential CO2 emissions from conversion of these natural areas. Since it may take time to develop these inventories and conversion measures, participants recommended that a uniform nationwide calculator should be developed that could assign a dollar value to natural features. Participants expressed a need for Canada to emphasize land use/conservation as a critical means of emissions reductions/carbon stabilization and provide better means of measuring cost/benefits of preservation vs. infrastructure investment (e.g., is money better spent preserving/reconstructing wetlands or retrofitting a building). They felt that Canada needs broader public recognition of the value natural lands provide both for carbon storage (emissions reductions/mitigation) and for adaptation (flood control; reducing heat island effect; tempering winds and extreme weather; reducing drought, erosion, and desertification).</p> |
| Discipline    | - Ecological and Biological   |
| Sector        | <ul style="list-style-type: none"> <li>- Natural Ecosystems</li> <li>- Economic Resources</li> <li>- Cross Disciplinary</li> </ul>  |
| Source        | July 2013 Land Use Discussion hosted by FCM's Partners for Climate Protection   |
| Lead Agencies | Federation of Canadian Municipalities/Partners for Climate Protection   |
| Contacts      | Devin Causley, pcp@fcm.ca   |

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| Need        | <p>Need modelling for what level of storm severity will cause overtopping of dykes</p> <p>Assess potential for salt marsh restoration as an adaptive strategy to buffer storm surge</p> <p>Define regionally relevant best practices to reduce flood risk/impact</p>   |
| Description | <p>Additional needs identified in the report:</p> <ul style="list-style-type: none"> <li>- The flat water model used leaves open the question of how long/intense a storm has to be to overtop the dykes</li> <li>- need for strong coordination between RCMP, CN rail, Department of Transportation, and utilities in terms of emergency response if waters do flow over the dykes</li> <li>- need further study of how Hsaline intrusion affect freshwater wetlands and impact biodiversity</li> </ul> |
| Type        | - PRODUCTS: Training and Capacity Building   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> </ul>   |

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| Source        | Coastal Dykelands in the Tantramar Area: Impacts of Climate Change on Dyke Erosion and Flood Risk (October 2012)         |
| Lead Agencies | Atlantic Climate Adaptation Solutions Association<br>New Brunswick Department of Environment--Climate Change Secretariat |
| Contacts      | env-info@gnb.ca  |

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| <b>Need</b>   | Need more information on adaptive actions taken by communities in the Gulf of Maine region; climate impacts specific to the region; and socio-economic data on the costs of ecosystem disruptions and major storm/weather events.   |
| Description   | The State of the Gulf of Maine Report's theme papers on climate change (2010) cite gaps in climate-related information on adaptive actions that communities are taking; regional impacts of climate change; and socio-economic data about the costs associated with extreme weather events and potential diminishment of productive ecosystems. |
| Type          | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Education  |
| Focus Area    | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline    | - Ecological and Biological<br>- Climate Society Interactions   |
| Sector        | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems<br>- Biota<br>- Social and Cultural Resources<br>- Economic Resources  |
| Source        | State of the Gulf of Maine Report<br>Theme Papers on Climate Change Impacts (2010)  |
| Lead Agencies | Gulf of Maine Council on the Marine Environment   |
| Contacts      | Heather Breeze<br>Heather.Breeze@dfo-mpo.gc.ca  |

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| <b>Need</b> | New design that lessens stormwater and wastewater nutrient effects on ecosystems      |
| Type        | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Training and Capacity Building |
| Focus Area  | - Climate Impacts on Water Resources  |
| Discipline  | - Physical Science<br>- Ecological and Biological                                     |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |

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| Source | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009. |
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| <b>Need</b> | Northeast regional and sub-regional Coastal and Marine Spatial Planning   |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> </ul> |
| Focus Area  | - Sustainability of Marine Ecosystems   |
| Discipline  | - Climate Society Interactions  |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> </ul>  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | Connecticut Department of Environmental Protection. Office of Long Island Sound Programs. 2010. Updated Assessment and Strategy of the Connecticut Coastal Management Program.                          |

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| <b>Need</b> | Ocean acidification observations and research  |
| Type        | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Observing Systems</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul> |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Ecological and Biological  |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source      | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010.   |

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| <b>Need</b> | Ocean Tracking Network to monitor ocean acidification and migration patterns |
| Type        | - DATA: Observing Systems  |

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| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Discipline | - Ecological and Biological  |
| Sector     | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region     | <ul style="list-style-type: none"> <li>- International</li> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic -- South East</li> </ul>  |
| Source     | Partnership for Observation of the Global Oceans. 2010. Speed Installation of System to Monitor Vital Signs of Global Ocean, Scientists Urge.  |

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| Need       | On-line Coastal Atlas that facilitates access to best available information on renewable ocean energy- related siting issues   |
| Type       | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline | - Physical Science   |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- New England   |
| Source     | Maine Coastal Program. 2012. Maine Coastal Plan: Assessment and Strategy under Section 309 of the Coastal Zone Management Act. |

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| Need       | Outreach and education about climate related hazards, natural disasters, and emergency response protocol   |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Education</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>   |
| Sector     | - Public Health and Safety   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic   |

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| Source | New Hampshire Climate Action Plan, People & Nature Adapting to Climate Change: Charting Maine's Course, Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations |
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| <b>Need</b> | Outreach and education about water conservation practices          |
| Description | Conduct outreach and education about water conservation practices. |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education                    |
| Focus Area  | - Climate Impacts on Water Resources                               |
| Discipline  | - Climate Society Interactions                                     |
| Sector      | - Public Health and Safety<br>- Infrastructure                     |
| Region      | - Regional Or State -- New England                                 |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.    |

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| <b>Need</b> | Outreach and education programs for populations most vulnerable to climate related health hazards  |
| Description | Outreach and education programs for populations most vulnerable to climate related health hazards  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education  |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | Rhode Island Climate Commission Progress Report 2012. Adapting to Climate Change in the Ocean State: A Starting Point, Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations. 2010. |

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| <b>Need</b> | outreach material on adaptation and planning for the general public, providing landowners and communities with examples of climate change best practices and with comparative cost-benefit analyses of adaptive changes |
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| Description   | Other needs identified at this meeting include:<br>- create a list of indicator species to monitor how climate change is affecting GOM marine life;<br>- foster the sharing and coordination of data and modelling experiences, and help compile standardized and consistent land-based datasets such as LIDAR;<br>- support development of high-resolution maps (at 5 km) in conjunction with federal, provincial, state, municipal, and private entities; |
| Discipline    | - Ecological and Biological<br>- Climate Society Interactions   |
| Sector        | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region        | - Regional Or State -- New England  |
| Source        | Needs identified at a binational meeting in Orono, Maine in September 2013  |
| Lead Agencies | Gulf of Maine Council on the Marine Environment Climate Network   |

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| <b>Need</b> | Outreach materials on flood adaptation measures for facilities with hazardous materials  |
| Description | Encourage local government agencies that oversee the operation or building of industrial facilities with hazardous waste and hazardous materials in areas prone to flooding to develop outreach materials on flood adaptation measures |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Regulatory/ Policy Guidance   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Outreach on effective coastal hazards planning to make public aware of existing resources and info         |
| Type        | - PRODUCTS: Engagement   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate |



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| Discipline | - Climate Society Interactions   |
| Sector     | - Public Health and Safety   |
| Region     | - Regional Or State -- New England   |
| Source     | Connecticut Department of Environmental Protection. Office of Long Island Sound Programs. 2010. Updated Assessment and Strategy of the Connecticut Coastal Management Program. |

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| <b>Need</b> | Outreach to coastal managers: inform about StormSmart Coasts web site as a tool to communicate with other CMPs on what they are doing and how they are engaging communities in adaption planning |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building   |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | New Hampshire Department of Environmental Services. 2010. Coastal Zone Management Act Section 309 Enhancement Grants Program Assessment and Strategy. R-WD-10-25.                                |

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| <b>Need</b> | Outreach to facilitate public dialogue about benefits, costs, and risks associated with protecting existing coastal development |
| Type        | - PRODUCTS: Engagement  |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety<br>- Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Partnership with existing federal agriculture programs to facilitate outreach and technical assistance programs at the state or county level  |
| Description | Provide technical assistance and outreach in partnership with existing federal programs (such as U.S. Department of Agriculture's Natural Resources Conservation Service) that deliver programs at the state or county level. |

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| Type       | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building                 |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate |
| Discipline | - Climate Society Interactions   |
| Sector     | - Managed Ecosystems   |
| Source     | Massachusetts Climate Change Adaptation Report.<br>September 2011.                   |

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| <b>Need</b> | Partnerships between industry and government to facilitate technical assistance to businesses that are adapting to climate change |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Regulatory/ Policy Guidance   |
| Priority    | - High  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report.<br>September 2011.  |

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| <b>Need</b> | Pest monitoring education programs for farmers  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education<br>- PRODUCTS: Training and Capacity Building |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate          |
| Discipline  | - Ecological and Biological<br>- Climate Society Interactions                                 |
| Sector      | - Managed Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report.<br>September 2011.                            |

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| <b>Need</b> | Policies that encourage the use of energy efficient cooling methods such as shading buildings and windows, and use of highly reflective roof paints to reduce building temperature and energy usage |
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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- Mid-Atlantic  |
| Source     | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report.                                   |

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| Need       | Policy and guidance on the use of living shoreline techniques to address coastal erosion and cumulative effects of shoreline hardening   |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Infrastructure   |
| Region     | - Regional Or State -- New England   |
| Source     | Rhode Island Coastal Resources Management Council. 2010. Program Assessment and Strategy for Enhancement Performed Pursuant to Section 309 of the Coastal Zone Management Act of 1972 as Amended.  |

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| Need       | Policy engagement and communication about trade-offs between transportation infrastructure robustness versus economic costs of failure       |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> </ul>                 |
| Focus Area | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul> |
| Discipline | - Climate Society Interactions   |
| Sector     | - Infrastructure   |

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| Region | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press. |

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| <b>Need</b> | Policy strategies (such as rolling easements) that protect coastal wetlands by prohibiting seawall construction, while still allowing for development              |
| Type        | - PRODUCTS: Regulatory/ Policy Guidance  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Policy that targets coastal and floodplain properties for residents and structures needing to relocate due to risk of inundation |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate                       |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Rhode Island Climate Commission Progress Report 2012. Adapting to Climate Change in the Ocean State: A Starting Point.           |

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| <b>Need</b> | Policy to reduce agricultural, urban, and stormwater runoff   |
| Description | Seek to implement and enforce legal and design standards to reduce agricultural, urban, and stormwater runoff |

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| Type       | - PRODUCTS: Regulatory/ Policy Guidance                                |
| Focus Area | - Climate Impacts on Water Resources                                   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems |
| Region     | - Regional Or State -- New England                                     |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011.        |

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| <b>Need</b> | Policy toolkits to help build resilient regional water systems   |
| Description | Policy toolkits that help build resilient regional water systems using tools such as treaties, risk sharing mechanisms, and regional planning approaches           |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Policy tools that help provide disincentives to building or remaining in high risk areas                   |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance                      |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Predictions for changes to freezing periods to inform logging industry |
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| Description | Information on freezing periods for loggers; soil must be hard for heavy machinery to operate without causing damage                 |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)   |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| <b>Need</b> | Predictions of harmful algal blooms and marine pathogens  |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)       |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise) |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.                                     |

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| <b>Need</b> | Predictions to help identify new agricultural market opportunities and guide new crop development  |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.   |

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| Description | Predictive data on weather extremes to adapt culvert management; adaptations might include changing requirements for culvert size, implementing design for increased scour, and increased inspection of culverts. |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)   |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.  |

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| <b>Need</b> | Predictive mapping and modeling to identify location of future habitats                        |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Priority    | - High   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate           |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East |
| Source      | Multiple   |

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|-------------|--|
| <b>Need</b> | Predictive models for red tide (phytoplankton blooms)  |
| Type        | - PRODUCTS: Hindcasts (climatologies, models)<br>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Plans, Assessments, Studies |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Physical Science   |

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| Sector | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source | Partnership for Observation of the Global Oceans. 2010. Speed Installation of System to Monitor Vital Signs of Global Ocean, Scientists Urge. |

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|------------|---|
| Need       | Probabilistic investment analyses and design approaches that apply techniques for trading off the costs of making transportation infrastructure more robust against the economic costs of failure |
| Type       | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline | - Climate Society Interactions  |
| Sector     | - Infrastructure  |
| Region     | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East  |
| Source     | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press.      |

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| Need       | Probability forecasts of moisture, to aid with thresholds of fungus-resistant crop   |
| Type       | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)   |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline | - Physical Science   |
| Sector     | - Managed Ecosystems   |
| Region     | - Regional Or State -- South East  |
| Source     | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |



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| Type       | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building |
| Discipline | - Climate Society Interactions                                       |
| Sector     | - Managed Ecosystems   |
| Region     | - Regional Or State -- New England                                   |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011.      |

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| <b>Need</b> | Projections of increased water demand to establish new thresholds and guidelines   |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)  |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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|-------------|---|
| <b>Need</b> | Projects/maps to help identify vulnerable coastal infrastructure and ecosystems: shoreline, coastal wetlands, transportation (streets, bridges and causeways) and energy infrastructure     |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data)<br>- PRODUCTS: Plans, Assessments, Studies |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science<br>- Climate Society Interactions  |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | State of New Jersey. 2008. Draft: Global Warming Response Act Recommendation Report.  |

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|-------------|---|
| Description | Promote 'citizen science', the involvement of citizens to monitor ecological shifts in time and space (i.e. feederwatch: survey to predict bird distributions)  |
| Type        | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Observing Systems</li> <li>- DATA: Surveys and Preliminary Assessments</li> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Education</li> </ul> |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats   |
| Sector      | <ul style="list-style-type: none"> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.  |

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|-------------|---|
| <b>Need</b> | Promote fire suppression practices in response to increased fire risk.  |
| Description | Promote fire suppression practices in response to increased fire risk.  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> </ul> |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Economic Resources</li> </ul>  |
| Region      | - Regional Or State -- New England  |
| Source      | New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future. March 2009.  |

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| <b>Need</b> | Promote sustainable land use planning and development to avoid habitat fragmentation  |
| Description | Promote sustainable land use planning and development to avoid habitat fragmentation.   |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Education</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats   |

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| Sector | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region | - Regional Or State -- New England   |
| Source | New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future. March 2009. |

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| <b>Need</b> | Promote workforce development to train public health staff to respond to climate change related health threats |
| Description | Promote workforce development to train public health staff to respond to climate change related health threats |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                           |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Provide foresters with strategies, technical assistance, skills, and support services related to maintaining forest viability in the face of climate change induced disturbance   |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools<br>- PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| Type       | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Other |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Infrastructure<br>- Managed Ecosystems   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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|---------------|---|
| <b>Need</b>   | public awareness of climate change risks/impacts, potential mitigation actions, integration of climate vulnerability information into planning, improved forecasting  |
| Description   | The Conference of New England Governors and Eastern Canadian Premiers (NEG-ECP) in its 2013 Regional Climate Change Action Plan: Strategic Overview cites the need to <ul style="list-style-type: none"> <li>• enhance understanding of regional climate-related change and its impacts;</li> <li>• share information on effective policies and practices (particularly those that involve multi-jurisdictional collaboration);</li> <li>• work cooperatively with the research community to better understand forecasting and appropriate macro-level adaptation measures;</li> <li>• ensure that climate risk/vulnerability/adaptation information is integrated into planning and sectoral decision-making; and</li> <li>• continue to inform the public about climate risks and impacts, mitigation actions, and preparedness.</li> </ul> |
| Discipline    | - Climate Society Interactions  |
| Sector        | - Public Health and Safety<br>- Infrastructure<br>- Social and Cultural Resources<br>- Economic Resources<br>- Cross Disciplinary   |
| Region        | - Regional Or State -- New England  |
| Source        | The Conference of New England Governors and Eastern Canadian Premiers (NEG-ECP) 2013 Regional Climate Change Action Plan: Strategic Overview  |
| Lead Agencies | Conference of New England Governors and Eastern Canadian Premiers   |

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| <b>Need</b> | Public outreach to educate about water management importance and strategies |
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| Type       | - PRODUCTS: Engagement<br>- PRODUCTS: Education  |
| Focus Area | - Climate Impacts on Water Resources   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Public Health and Safety<br>- Infrastructure   |
| Region     | - Regional Or State -- South East  |
| Source     | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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| <b>Need</b> | Publicly available monitoring and data about climate and health indicators such as airborne pollen and mold  |
| Type        | - DATA: In situ Observations<br>- PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Ecological and Biological  |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | R&D/implementation of sensors and other “smart” technologies to monitor transportation infrastructure   |
| Description | R&D for sensors and other “smart” technologies would enable infrastructure providers to receive advance warning of potential failure due to water levels and currents, wave action, winds, and temperatures exceeding what the infrastructure was designed to withstand |
| Type        | - DATA: Observing Systems   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East  |

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| Source | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation. Washington, DC: The National Academies Press. |
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| <b>Need</b> | Refined benthic and demersal resource data on species location in reference to coastal armoring                        |
| Type        | - DATA: In situ Observations<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)                    |
| Discipline  | - Ecological and Biological  |
| Sector      | - Infrastructure<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | The Commonwealth of Massachusetts. 2009. Management and Administration. Massachusetts Ocean Management Plan. Volume 1. |

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| <b>Need</b> | Refined modeling and mapping of the variations of sea level rise impacts (inundation, flooding, storm surge)   |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data) |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Governor's Commission on Climate Change (Virginia). Final Report: A Climate Change Action Plan. December 2008.   |

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| Description | Current conditions need to be put into a historical context and observations need to be incorporated into regional modeling to support hindcasts, nowcasts, and forecasts of climate conditions in the region.   |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul>   |
| Priority    | - High   |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Discipline  | - Physical Science   |
| Sector      | - Natural Ecosystems   |
| Region      | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic</li> </ul>   |
| Source      | Northeast Regional Association of Coastal and Ocean Observing Systems (NERACOOS)   |

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| Need       | Regional precipitation data and projections to predict freshwater inputs into bays and estuaries   |
| Type       | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> <li>- PRODUCTS: Viewers and Web-based Tools</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>                   |
| Discipline | - Physical Science   |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> </ul>   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source     | Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes.    |

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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul> |
| Priority   | - High   |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>   |
| Sector     | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region     | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State -- New England -- Mid-Atlantic</li> <li>- Local/City</li> </ul>   |
| Source     | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010.  |

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| <b>Need</b> | Regionalization efforts among local boards of health   |
| Description | Facilitate and enhance regionalization efforts among local boards of health  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Training and Capacity Building</li> </ul>                 |
| Focus Area  | <ul style="list-style-type: none"> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul> |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Relative and absolute humidity data to determine HVAC needs for industrial applications |
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| Type       | - DATA: In situ Observations<br>- DATA: Data Stewardship and Provisions   |
| Focus Area | - Climate Impacts on Water Resources  |
| Discipline | - Physical Science  |
| Sector     | - Infrastructure  |
| Region     | - Regional Or State -- South East   |
| Source     | Dow, K. 2012. Climate Information Needs in the Southeast: Analysis of Requests. CISA Research Report 2012-02. Columbia, SC: Carolinas Integrated Sciences & Assessments (CISA). |

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|-------------|---|
| <b>Need</b> | Research and development of road building materials that can withstand high temperatures without buckling, and mechanisms for sharing new knowledge |
| Type        | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building                                     |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety<br>- Infrastructure  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East  |
| Source      | National Research Council. 2008. Transportation Research Board Special Report 290: Potential Impacts of Climate Change on U.S. Transportation.      |

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| <b>Need</b> | Research and improved projections for local scale ocean stratification and its impact on production  |
| Type        | - DATA: In situ Observations<br>- DATA: Satellite Remote Observations<br>- PRODUCTS: Plans, Assessments, Studies                                       |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |

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| Region | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source | Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes. |

|             |  |
|-------------|--|
| Need        | Research and observations are needed to anticipate and track how habitats respond to changes in climate  |
| Description | Research and observations are needed to anticipate and track how habitats respond to changes in climate  |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> </ul>   |
| Focus Area  | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Discipline  | - Ecological and Biological  |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source      | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010.  |

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| Need       | Research and observations to help design and evaluate marine habitat protection and restoration efforts to promote resilience and adaptation to climate change   |
| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Plans, Assessments, Studies</li> <li>- PRODUCTS: Other</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Coasts and Climate Resilience (including sea-level rise)</li> </ul>  |

|            |   |
|------------|---|
| Discipline | - Physical Science<br>- Ecological and Biological   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source     | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

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| <b>Need</b> | Research equitable water pricing programs to implement greater water conservation  |
| Type        | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Training and Capacity Building  |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Research focused on bridges in the context of possible increased stream instability due to different sediment transport loads, overtopping, and weir flow damage to bridge approach roadways |
| Description | Research focused on bridges in the context of possible increased stream instability due to different sediment transport loads, overtopping, and weir flow damage to bridge approach roadways |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.   |

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| Type       | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area | - Climate Impacts on Water Resources   |
| Discipline | - Ecological and Biological  |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region     | - Regional Or State -- Mid-Atlantic -- Great Lakes   |
| Source     | Gregg, R. M., K. M. Feifel, J. M. Kershner, and J. L. Hitt. 2012. The State of Climate Change Adaptation in the Great Lakes Region. EcoAdapt, Bainbridge Island, WA. |

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| <b>Need</b> | Research into feasibility of alternative power generation, specifically focused on resilience to climate impacts   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Economic Resources   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Research into impact of hydrological changes on non-point source pollution and storm water runoff  |
| Description | Research into impact of hydrological changes on non-point source pollution and storm water runoff  |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Plans, Assessments, Studies |
| Priority    | - High   |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |

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|--------|---|
| Source | Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations. 2010. |
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| <b>Need</b> | Research into local impacts of climate on health demands and the capacity of providers   |
| Description | Assess the capacity of providers to address anticipated increased patient volumes and changing health demands, including capacity to address heat waves and anomalous winter weather events. |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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|-------------|---|
| <b>Need</b> | Research into opportunities to coordinate water treatment and energy generation   |
| Description | Explore opportunities to coordinate water treatment and energy generation, for example locating power plants adjacent to wastewater treatment facilities could partially displace freshwater needs for cooling purposes |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Research into spatial and temporal distribution and habitat needs of marine animals and plants                         |
| Description | Develop a better understanding of the spatial and temporal distribution and habitat needs of marine animals and plants |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Priority    | - High   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats                 |
| Discipline  | - Ecological and Biological  |

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| Sector | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota         |
| Region | - Regional Or State -- New England                              |
| Source | Massachusetts Climate Change Adaptation Report. September 2011. |

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| Need       | Research into specific economic impacts of drought on coastal resources  |
| Type       | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate |
| Discipline | - Physical Science   |
| Sector     | - Infrastructure<br>- Managed Ecosystems<br>- Natural Ecosystems<br>- Biota<br>- Economic Resources  |
| Region     | - Regional Or State -- South East  |
| Source     | National Drought Information System (NIDIS) Carolinas Drought Pilot Project Scoping Workshop. July/August 2012. Meeting notes.                     |

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| Need       | Research into specific economic impacts of drought on healthcare costs   |
| Type       | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline | - Climate Society Interactions   |
| Sector     | - Public Health and Safety<br>- Economic Resources   |
| Region     | - Regional Or State -- South East  |
| Source     | National Drought Information System (NIDIS) Carolinas Drought Pilot Project Scoping Workshop. July/August 2012. Meeting notes. |

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| Need | Research into technology (water re-use systems, desalination, irrigation efficiency) to improve storage and reuse practices of storm water |
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| Description | Research into technology: water re-use systems, desalination, irrigation efficiency to improve storage and reuse practices of storm water Research and development |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Rhode Island Climate Commission Progress Report 2012. Adapting to Climate Change in the Ocean State: A Starting Point.   |

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| <b>Need</b> | Research into the capacity of streams and rivers to assimilate effluent from wastewater treatment plants experiencing increasing water temperatures                |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Research into the effects of shifting pH on aquaculture and shellfish fisheries |
| Description | Research into the effects of shifting pH on aquaculture and shellfish fisheries |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Changes in Extremes of Weather and Climate                                    |
| Discipline  | - Physical Science<br>- Ecological and Biological                               |
| Sector      | - Managed Ecosystems<br>- Economic Resources                                    |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.                 |

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| <b>Need</b> | Research into the impacts of climate change on genetics of fishery stocks and other marine species |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |

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| Focus Area | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline | - Ecological and Biological   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source     | Understanding Climate Impacts on Fish Stocks of the Northeast Large Marine Ecosystem: Key Research Needs and Future Directions. Providence, RI; July 23, 2013. Meeting Notes. |

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| <b>Need</b> | Research into the impacts of climate change on the agricultural economy, food prices, and food security                              |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Managed Ecosystems<br>- Economic Resources   |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East                         |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| <b>Need</b> | Research into the potential effects of shifting climate patterns on offshore wind structures such as turbines and drilling platforms |
| Description | Research into the potential effects of shifting climate patterns on offshore wind structures such as turbines and drilling platforms |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate                           |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Economic Resources   |



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| Region | - Regional Or State -- New England                              |
| Source | Massachusetts Climate Change Adaptation Report. September 2011. |

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| Need       | Research into the role of groundwater in coastal systems, particularly focused on depth, discharge rates, and combined impacts of nutrients, contaminants, etc |
| Type       | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate             |
| Discipline | - Physical Science   |
| Sector     | - Infrastructure<br>- Natural Ecosystems   |
| Region     | - Regional Or State -- South East  |
| Source     | National Drought Information System (NIDIS) Carolinas Drough Pilot Project Scoping Workshop. July/August 2012. Meeting notes.                                  |

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| Need       | Research into whether or not the life spans of buildings are in line with anticipated climate changes (i.e., a 50-year building will not be located in an area where flooding is projected in 30 years' time) |
| Type       | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline | - Climate Society Interactions  |
| Sector     | - Infrastructure  |
| Region     | - Regional Or State -- New England  |
| Source     | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| Need        | Research is needed on Great Lakes biogeochemical cycles and how they will interact with climate change   |
| Description | Geologic conditions surrounding the Great Lakes create different chemistry than oceans or other freshwater environments; as a result, there is a strong need for research about Great Lakes' biogeochemical cycles, and how they will interact with climate change |

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| Type       | - DATA: In situ Observations<br>- DATA: Data Stewardship and Provisions  |
| Focus Area | - Climate Impacts on Water Resources   |
| Discipline | - Physical Science<br>- Chemical   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems   |
| Region     | - Regional Or State -- Mid-Atlantic -- Great Lakes   |
| Source     | Gregg, R. M., K. M. Feifel, J. M. Kershner, and J. L. Hitt. 2012. The State of Climate Change Adaptation in the Great Lakes Region. EcoAdapt, Bainbridge Island, WA. |

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| <b>Need</b> | Research is needed on when, where and how habitats and ecosystems may undergo rapid, significant changes or ecological tipping points, and possible management strategies to avoid these outcomes                    |
| Description | Special focus is needed on when, where and how habitats and ecosystems may undergo rapid, significant changes or ecological tipping points, and possible management strategies to avoid these outcomes               |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Plans, Assessments, Studies           |
| Priority    | - High   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source      | NOAA Office of Habitat Conservation. 2010. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate.                                     |

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|-------------|---|
| Description | Facilitate research on crop adaptation and diversity with a specific focus on hybrid crops better able to withstand new pests |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Ecological and Biological   |
| Sector      | - Public Health and Safety<br>- Managed Ecosystems<br>- Economic Resources  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Research on disease resistant shellfish strains  |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.             |

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| <b>Need</b> | Research on the economic impacts of coastal hazards (including sea level rise) on resource-based trades and industries   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Climate Society Interactions   |
| Sector      | - Economic Resources   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |

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| Type       | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline | - Physical Science<br>- Ecological and Biological  |
| Sector     | - Natural Ecosystems<br>- Biota  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source     | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010.   |

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| <b>Need</b> | Research policy options for nourishment of private beaches   |
| Description | Examine issuing a state policy regarding the mining of sediment from the seafloor to guide the use of sand and gravel resources from Massachusetts' tidelands, especially for nourishment of private beaches |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Natural Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Research to identify major crops and livestock affected by climate change to develop mitigating practices  |
| Description | Assess vulnerable crops. Identify major crops and livestock likely to be affected by climate change, and practices that may mitigate these effects |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Ecological and Biological<br>- Climate Society Interactions  |
| Sector      | - Managed Ecosystems   |
| Region      | - Regional Or State -- New England   |

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| Source | Massachusetts Climate Change Adaptation Report. September 2011. |
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| Need        | Research, educate, and develop incentives to encourage forestry practices that foster regeneration of vulnerable species (such as northern hardwoods) to perpetuate their benefits   |
| Description | Research, educate, and develop incentives to encourage forestry practices that foster regeneration of vulnerable species (such as northern hardwoods) to perpetuate their benefits   |
| Type        | <ul style="list-style-type: none"> <li>- DATA: Surveys and Preliminary Assessments</li> <li>- PRODUCTS: Engagement</li> <li>- PRODUCTS: Education</li> <li>- PRODUCTS: Training and Capacity Building</li> <li>- PRODUCTS: Management Guidance (i.e. structured decision making)</li> <li>- PRODUCTS: Regulatory/ Policy Guidance</li> </ul> |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Sector      | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| Need       | Restoration and wetland adaptation strategies in response to sea level rise   |
| Type       | - PRODUCTS: Training and Capacity Building  |
| Focus Area | <ul style="list-style-type: none"> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Changes in Extremes of Weather and Climate</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Discipline | <ul style="list-style-type: none"> <li>- Physical Science</li> <li>- Climate Society Interactions</li> </ul>  |
| Sector     | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> </ul>  |
| Region     | - Regional Or State -- Mid-Atlantic   |
| Source     | Source New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015.   |

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| Type       | - DATA: In situ Observations  |
| Focus Area | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline | - Ecological and Biological   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source     | Osgood, K.E. (Ed). 2008. Climate Impacts on U.S. Living Marine Resources: National Marine Fisheries Service Concerns, Activities and Needs. NOAA Technical Memorandum NMFS-F/SPO-89 |

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| <b>Need</b> | Risk alert system for potential homebuyers   |
| Type        | - PRODUCTS: Engagement   |
| Priority    | - High   |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East |
| Source      | Multiple   |

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| <b>Need</b> | Risk and vulnerability assessments that incorporate sea level rise                                  |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science<br>- Climate Society Interactions  |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East                                    |
| Source      | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010. (Unpublished). |

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| <b>Need</b> | Risk assessment addressing habitat loss and degradation |
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| Description | Evaluate risks of habitat loss and degradation; implement appropriate solutions to maintain terrestrial and aquatic ecosystem connectivity.  |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- New England   |
| Source      | The Impacts of Climate Change on Connecticut Agriculture, Infrastructure, Natural Resources and Public Health, People & Nature Adapting to Climate Change: Charting Maine's Course, The New Hampshire Climate Action Plan: |

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| <b>Need</b> | Risk-based methods to evaluate service life of infrastructure assets against adverse climate change |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.                                     |

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| <b>Need</b> | Risk/vulnerability assessments of erosion and storm surge with sea level rise scenarios  |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Commonwealth of Massachusetts. Executive Office of Energy and Environmental Affairs. Office of Coastal Zone Management. 2010. Section 309 Assessment and Five-Year Strategy for CZM Program Enhancement (FY2011-2015). |

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| <b>Need</b> | Robust, multidisciplinary network to share daptation science, tools, data, and expertise among federal agencies and with state, local and tribal governments. |
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| Type       | - PRODUCTS: Engagement   |
| Focus Area | - Changes in Extremes of Weather and Climate   |
| Sector     | - Infrastructure<br>- Natural Ecosystems   |
| Region     | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East |
| Source     | The Nature Conservancy. Public Comments: 2012 U.S. DOT Climate Adaptation Plan.                              |

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| <b>Need</b> | Routine mechanisms for coastal and marine sectors to stay current on best available scientific information, i.e. through the NOAA Climate Portal, webinars, training workshops, etc.  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats                                |
| Discipline  | - Physical Science  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source      | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

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| <b>Need</b> | Satellite altimetry to measure sea level rise and ice melts, local tidal gauges to measure relative sea level change at the local scale   |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)   |



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| Discipline | - Physical Science   |
| Sector     | - Infrastructure<br>- Natural Ecosystems   |
| Region     | - Regional Or State -- South East  |
| Source     | Mitchum, G. 2011. Sea Level Changes in the Southeastern United States: Past, Present, and Future. Florida Climate Institute. Southeast Climate Consortium. |

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| <b>Need</b> | Scientific and technological research to identify novel means to reduce air pollution |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.                       |

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| <b>Need</b> | Scientific guidance for habitat managers on how best to apply climate projections   |
| Description | Habitat managers need help from NOAA climate scientists on how best to apply climate projections, and under what conditions   |
| Type        | - DATA: Data Stewardship and Provisions<br>- PRODUCTS: Other<br>- PRODUCTS: Training and Capacity Building  |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East  |
| Source      | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

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| <b>Need</b> | Sea level rise maps specific to waste water systems (private septic and public systems) |
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| Type       | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources   |
| Discipline | - Physical Science   |
| Sector     | - Public Health and Safety<br>- Infrastructure   |
| Region     | - Regional Or State -- South East  |
| Source     | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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| <b>Need</b> | Sea surface and water column profiles of these parameters are necessary and measurements are needed on spatial and temporal scales that capture the variability experienced by organisms |
| Type        | - DATA: In situ Observations   |
| Focus Area  | - Sustainability of Marine Ecosystems  |
| Discipline  | - Physical Science   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East   |
| Source      | Osgood, K.E. (Ed). 2008. Climate Impacts on U.S. Living Marine Resources: National Marine Fisheries Service Concerns, Activities and Needs. NOAA Technical Memorandum NMFS-F/SPO-89      |

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| <b>Need</b> | Sea surface, water column and bottom temperature data  |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science   |
| Sector      | - Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | The Commonwealth of Massachusetts. 2009. Management and Administration. Massachusetts Ocean Management Plan. Volume 1.                                 |

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|-------------|---|
| <b>Need</b> | Sensors for tracking ocean acidification  |
| Description | Sensors for tracking ocean acidification  |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source      | Partnership for Observation of the Global Oceans. 2010. Speed Installation of System to Monitor Vital Signs of Global Ocean, Scientists Urge. |

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| <b>Need</b> | Shoreline management planning  |
| Description | Will involve "assessing underlying geology and morphology, historic and recent shoreline change, as well as mapping of existing structures and current shore conditions, assessing existing marine resources, analyzing general wave climate, analyzing storm surge and sea level rise, and developing site-specific shore management strategies." |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Geological   |
| Sector      | - Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Virginia Coastal Management Office. 2011. Section 309 Needs Assessment & Strategy.   |

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| <b>Need</b> | Short & long term weather forecasts & probabilities, with an emphasis on flash events that consider effects on livestock |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                                     |

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| Discipline | - Physical Science   |
| Sector     | - Managed Ecosystems   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| <b>Need</b>   | Specific agency-level plans generated by DOT for communication and integration of efforts among the modal administrations and to state and metropolitan partners |
| Type          | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area    | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline    | - Climate Society Interactions   |
| Sector        | - Infrastructure   |
| Region        | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East   |
| Source        | Georgetown Climate Center. Public Comments: 2012 U.S. DOT Climate Adaptation Plan.   |
| Lead Agencies | DOT  |

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| <b>Need</b> | State-wide sea-level rise inundation and storm surge modeling at a scale appropriate for both state and local planning   |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data)   |
| Priority    | - High   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |

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| <b>Need</b> | Statewide Adaptation Plan addressing coastal hazards under various climate change and sea level rise scenarios |
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| Type       | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area | - Coasts and Climate Resilience (including sea-level rise)   |
| Sector     | - Public Health and Safety<br>- Infrastructure   |
| Region     | - Regional Or State -- Mid-Atlantic  |
| Source     | New Jersey Coastal Management Office. 2011. New Jersey Section 309 Coastal Programs Assessment and Strategy for 2011-2015. |

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| <b>Need</b> | Statewide database inventory of natural systems and resources  |
| Type        | - PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological<br>- Climate Society Interactions  |
| Sector      | - Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future. |

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| <b>Need</b> | Stronger federal, state, local, and regional observation systems to improve the detection of biological, physical, and chemical responses to climate change and sea level rise                                      |
| Type        | - DATA: In situ Observations<br>- DATA: Satellite Remote Observations<br>- DATA: Observing Systems<br>- DATA: Data Stewardship and Provisions   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science<br>- Ecological and Biological<br>- Chemical   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- Mid-Atlantic   |

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| Source | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group. |
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| <b>Need</b> | Studies on specific impacts of climate change on food supplies, food quality, food availability, and disease transmission   |
| Description | Identify and understand specific impacts of climate change on food supplies, food quality, and disease transmission to develop appropriate policies and regulations |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | Massachusetts Climate Change Adaptation Report, Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase II                            |

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| <b>Need</b> | Studies that evaluate impacts of weather extreme predictions on transportation infrastructure design and materials                   |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| <b>Need</b> | Studies to identify coastal areas for suitable sand and gravel nourishment   |
| Description | Identify coastal areas for suitable sand and gravel nourishment. Includes investigating appropriate potential borrow areas, identifying sediment quantities and examining sediment characteristics |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- DATA: Depth and Elevation Data<br>- PRODUCTS: Plans, Assessments, Studies   |

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| Focus Area | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline | - Physical Science<br>- Geological  |
| Sector     | - Infrastructure<br>- Natural Ecosystems  |
| Region     | - Regional Or State -- New England  |
| Source     | The Commonwealth of Massachusetts. 2009. Management and Administration. Massachusetts Ocean Management Plan. Volume 1.  |

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| <b>Need</b> | <b>Study on risks to affordability and availability of insurance</b>   |
| Description | Study on climate change risks to availability and affordability of insurance, including identifying data gaps, insurance structures to encourage early adaption, and assessment for managing risks and uncertainty |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Economic Resources   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Maryland Commission on Climate Change. 2008. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase I: Sea-level Rise and Coastal Storms. Adaptation and Response Working Group.     |

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| <b>Need</b> | <b>Support stormwater, land use and flood management to prioritize natural function and minimize hazards to existing structures</b>                        |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |

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| Sector | - Public Health and Safety<br>- Infrastructure   |
| Region | - Regional Or State -- Mid-Atlantic  |
| Source | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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|-------------|---|
| <b>Need</b> | Systems to measure and monitor climate-related health effects and identify those populations which may be most vulnerable |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Regulatory/ Policy Guidance   |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England  |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.  |

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| <b>Need</b> | Targeted education efforts for planners, and for specific groups or communities more likely to be vulnerable to public health impacts   |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase II: Building Societal, Economic, and Ecological Resilience. Report for Maryland Commission on Climate Change. |

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| <b>Need</b> | Targeted process studies are required to understand the mechanisms controlling the responses of living marine resources to climate |
| Type        | - DATA: In situ Observations<br>- DATA: Other<br>- PRODUCTS: Plans, Assessments, Studies   |



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| Focus Area | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate   |
| Discipline | - Ecological and Biological   |
| Sector     | - Managed Ecosystems  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source     | Osgood, K.E. (Ed). 2008. Climate Impacts on U.S. Living Marine Resources: National Marine Fisheries Service Concerns, Activities and Needs. NOAA Technical Memorandum NMFS-F/SPO-89 |

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|-------------|---|
| <b>Need</b> | Technical and financial support for farmers transitioning to new crops and infrastructure                           |
| Description | Policies that provide technical and financial support to farmers for transitioning to new crops and infrastructure. |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance<br>- PRODUCTS: Other          |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                                |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Managed Ecosystems<br>- Economic Resources  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Technical assistance to aid in the implementation of Low Impact Development (LID) site design and stormwater management regulations |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance                     |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Temperature and precipitation thresholds for increased wildlife mortality   |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Ecological and Biological   |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.                  |

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| <b>Need</b> | Thresholds for building material in areas of material strength, resistance to heat, cold and acidity |
| Type        | - DATA: Surveys and Preliminary Assessments  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                 |
| Sector      | - Infrastructure   |

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|-------------|---|
| <b>Need</b> | Tide-coordinated NOAA LIDAR Coastal Surveys (mid-tide to low-tide)(shoreline; topo)   |
| Type        | - DATA: Observing Systems<br>- DATA: Depth and Elevation Data<br>- DATA: Data Stewardship and Provisions  |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England  |
| Source      | Rhode Island Coastal Resources Management Council. 2010. Program Assessment and Strategy for Enhancement Performed Pursuant to Section 309 of the Coastal Zone Management Act of 1972 as Amended. |

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|-------------|---|
| <b>Need</b> | Time series of pH for the Gulf of Maine |
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| Description | No data exist on acidification in nearshore or ocean ecosystems for the Gulf of Maine                      |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- PRODUCTS: Plans, Assessments, Studies       |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)        |
| Discipline  | - Physical Science<br>- Chemical   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | Nye, J. 2010. Climate Change and its Effects on Ecosystems Habitats and Biota. State of the Gulf of Maine. |

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| <b>Need</b> | Time series to detect changes in timing of ecological events occurring in the Gulf of Maine  |
| Type        | - DATA: In situ Observations<br>- DATA: Observing Systems<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England   |
| Source      | Nye, J. 2010. Climate Change and its Effects on Ecosystems Habitats and Biota. State of the Gulf of Maine.   |

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|-------------|---|
| <b>Need</b> | Tool for archiving and disseminating data related to forest hazards |
| Type        | - PRODUCTS: Viewers and Web-based Tools                             |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats       |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems                        |
| Region      | - Regional Or State -- Mid-Atlantic                                 |

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| Source | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |
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| <b>Need</b> | Tool that archives and makes data about health hazards widely available   |
| Description | Archive and make data about health hazards widely available(i.e. air quality monitoring, number of heat related illnesses and deaths).  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Viewers and Web-based Tools   |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State   |
| Source      | ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report., Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase II: Building Societal, Economic, and Ecological Resilience |

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| <b>Need</b> | Toolkit or guidance to understand existing policy strengths and limitations for integrating adaptation strategies for sea level rise |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | Governor's Commission on Climate Change (Virginia). Final Report: A Climate Change Action Plan. December 2008.                       |

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| <b>Need</b> | Toolkit to implement strategies for siting development outside of vulnerable resource areas                                |
| Description | Analyze strategies for siting new development and redevelopment outside of projected vulnerable and future resource areas. |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                                       |
| Discipline  | - Climate Society Interactions   |

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| Sector | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems |
| Region | - Regional Or State -- New England                                     |
| Source | Massachusetts Climate Change Adaptation Report                         |

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| <b>Need</b> | Tools and models that combine climate (i.e. maps of temp ranges) and biology data to create migrating species maps                               |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data) |
| Priority    | - High   |
| Focus Area  | - Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological  |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.             |

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| <b>Need</b> | Tools and technical assistance for private owners to prepare infrastructure for impacts                         |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate      |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure  |
| Region      | - National<br>- Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East    |
| Source      | Multiple  |

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| Type       | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools   |
| Priority   | - High  |
| Focus Area | - Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline | - Physical Science<br>- Ecological and Biological   |
| Sector     | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source     | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

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| <b>Need</b> | Tools that incorporate near-real-time data, including meteorological & snow pack data, water quality data, stream flow data, and reservoir status data   |
| Description | Tools that incorporate near-real-time data, including meteorological & snow pack data, water quality data, stream flow data, and reservoir status data   |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Viewers and Web-based Tools |
| Focus Area  | - Climate Impacts on Water Resources   |
| Discipline  | - Physical Science   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England -- Mid-Atlantic   |
| Source      | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes.  |

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| <b>Need</b> | Tools that track long term temperature shifts geographically to assist agricultural adaptation |
| Type        | - PRODUCTS: Viewers and Web-based Tools  |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |

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| Sector | - Managed Ecosystems   |
| Region | - Regional Or State -- South East  |
| Source | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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| <b>Need</b> | Tools to help develop long-term infrastructure sustainability plans  |
| Description | Use adaptive management techniques to develop long-term infrastructure sustainability plans. Develop long-term solutions that include decentralized resources and regional approaches. Some solutions may involve centralized or decentralized physical assets |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Tools to incorporate climate data into farm insurance policies   |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools<br>- PRODUCTS: Management Guidance (i.e. structured decision making)     |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science<br>- Climate Society Interactions   |
| Sector      | - Infrastructure<br>- Managed Ecosystems<br>- Economic Resources   |
| Region      | - Regional Or State -- South East  |
| Source      | Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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| <b>Need</b> | Tools to monitor, analyze and manage runoff from farms with livestock                 |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance |

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| Focus Area | - Climate Impacts on Water Resources   |
| Discipline | - Physical Science   |
| Sector     | - Infrastructure<br>- Managed Ecosystems   |
| Region     | - Regional Or State -- New England -- Mid-Atlantic   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| <b>Need</b> | Tools to redefine flood zones and incorporate flood projections for building permitting, including new policy  |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools  |
| Priority    | - High   |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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| <b>Need</b> | Tools, models, indicators to research, monitor, and measure drought   |
| Type        | - PRODUCTS: Viewers and Web-based Tools   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- South East   |
| Source      | National Drought Information System (NIDIS) Carolinas Drought Pilot Project Scoping Workshop. July/August 2012. Meeting notes.                        |

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| <b>Need</b> | Track and forecast large-scale and local-scale climate forcing within the Northeast region to make observations on boundary forcing as well as key internal climate-system parameters |
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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Hindcasts (climatologies, models)</li> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul> |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>  |
| Discipline | <ul style="list-style-type: none"> <li>- Physical Science</li> </ul>   |
| Sector     | <ul style="list-style-type: none"> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Region     | <ul style="list-style-type: none"> <li>- Regional Or State -- New England</li> </ul>   |
| Source     | Northeast Regional Association of Coastal and Ocean Observing Systems (NERACOOS). Northeast Regional Build Out Plan. September 2011.   |

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| Need       | Track endangered sea turtles, seabirds, major avifauna and bat migratory pathways, benthic communities of flora and fauna, certain pelagic fish, and areas of high trophic support |
| Type       | <ul style="list-style-type: none"> <li>- DATA: In situ Observations</li> <li>- DATA: Surveys and Preliminary Assessments</li> </ul>  |
| Focus Area | <ul style="list-style-type: none"> <li>- Sustainability of Marine Ecosystems</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul>                     |
| Discipline | <ul style="list-style-type: none"> <li>- Ecological and Biological</li> </ul>  |
| Sector     | <ul style="list-style-type: none"> <li>- Managed Ecosystems</li> <li>- Natural Ecosystems</li> <li>- Biota</li> </ul>  |
| Source     | Massachusetts Climate Change Adaptation Report, September 2011.  |

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| Need       | Tracking of mitigation efforts for permitted tidal wetlands losses  |
| Type       | <ul style="list-style-type: none"> <li>- DATA: Surveys and Preliminary Assessments</li> <li>- DATA: Data Stewardship and Provisions</li> <li>- PRODUCTS: Training and Capacity Building</li> </ul>                                |
| Focus Area | <ul style="list-style-type: none"> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Conservation/ Restoration of Sensitive Species and Habitats</li> </ul> |
| Discipline | <ul style="list-style-type: none"> <li>- Physical Science</li> <li>- Climate Society Interactions</li> </ul>  |

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| Sector | - Managed Ecosystems<br>- Natural Ecosystems                                       |
| Region | - Regional Or State -- Mid-Atlantic  |
| Source | Virginia Coastal Management Office. 2011. Section 309 Needs Assessment & Strategy. |

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| <b>Need</b> | Training and support to identify scientific information for use in habitat conservation planning and management   |
| Description | Assistance to identify and provide the best available model projections and other scientific information for the use in habitat conservation recommendation, planning and management decisions. |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Management Guidance (i.e. structured decision making)<br>- PRODUCTS: Regulatory/ Policy Guidance                                      |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats                            |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Infrastructure<br>- Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - International<br>- National<br>- Regional Or State  |
| Source      | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010.           |

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| <b>Need</b> | Training for coastal managers on inundation including mapping and shoreline delineations  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Management Guidance (i.e. structured decision making) |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)  |
| Discipline  | - Physical Science  |

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| Sector | - Public Health and Safety<br>- Natural Ecosystems<br>- Biota        |
| Region | - Regional Or State -- New England                                   |
| Source | Eastern Region Gaps, Needs and Assets Document. Updated in May 2010. |

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|-------------|---|
| <b>Need</b> | Training in climate adaptation strategies for water supply and wastewater treatment facilities                  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                            |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety<br>- Infrastructure  |
| Region      | - Regional Or State -- Mid-Atlantic   |
| Source      | Pennsylvania Climate Adaptation Planning Report: Risks and Practical Recommendations. 2010.                     |

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| <b>Need</b> | Trainings, guides and/or toolkits could be developed collaboratively among climate and habitat conservation experts for use in fulfilling NOAA's habitat conservation mission  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance  |
| Priority    | - High   |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota  |

|        |   |
|--------|---|
| Region | - National<br>- Regional Or State -- Mid-Atlantic -- Central -- Great Lakes -- South East   |
| Source | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

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| <b>Need</b> | Translation of climate change science and adaptation information for both practitioners and laypeople  |
| Type        | - PRODUCTS: Engagement<br>- PRODUCTS: Education<br>- PRODUCTS: Training and Capacity Building  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                   |
| Discipline  | - Climate Society Interactions   |
| Region      | - Regional Or State -- Mid-Atlantic -- Great Lakes   |
| Source      | Gregg, R. M., K. M. Feifel, J. M. Kershner, and J. L. Hitt. 2012. The State of Climate Change Adaptation in the Great Lakes Region. EcoAdapt, Bainbridge Island, WA. |

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| <b>Need</b> | Transportation related inventory and assessment tools   |
| Description | Develop and distribute transportation related inventory and assessment tools; create a common repository for the information, and provide technical assistance to local entities for modifying existing road structures |
| Type        | - PRODUCTS: Viewers and Web-based Tools   |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Climate Society Interactions  |
| Sector      | - Public Health and Safety<br>- Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | People & Nature Adapting to Climate Change: Charting Maine's Course. 2009.  |

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| <b>Need</b> | Update 25, 50 and 100-year storm specifications, as well as flood plain and coastal area management designations |
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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> </ul> |
| Priority   | - High   |
| Focus Area | <ul style="list-style-type: none"> <li>- Coasts and Climate Resilience (including sea-level rise)</li> <li>- Climate Impacts on Water Resources</li> <li>- Changes in Extremes of Weather and Climate</li> </ul>   |
| Discipline | - Physical Science   |
| Sector     | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> </ul>   |
| Region     | - Regional Or State -- New England   |
| Source     | Facing Our Future: Adapting to Connecticut's Changing Climate. March, 2009.  |

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| <b>Need</b> | Update Maine's coastal Marine Geologic Environments layers   |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)   |
| Discipline  | - Physical Science   |
| Sector      | <ul style="list-style-type: none"> <li>- Infrastructure</li> <li>- Natural Ecosystems</li> </ul>                               |
| Region      | - Regional Or State -- New England   |
| Source      | Maine Coastal Program. 2012. Maine Coastal Plan: Assessment and Strategy under Section 309 of the Coastal Zone Management Act. |

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| <b>Need</b> | Updated flood records using statistical analysis of recorded floods in 10-15 year intervals   |
| Type        | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Maps (Imagery, geo-referenced data)</li> </ul> |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | <ul style="list-style-type: none"> <li>- Public Health and Safety</li> <li>- Infrastructure</li> </ul>  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |

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| Source | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |
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| <b>Need</b> | Updated floodplain maps   |
| Description | States need to updated floodplain maps to plan for climate impacts.   |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)   |
| Priority    | - High  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Infrastructure<br>- Managed Ecosystems<br>- Natural Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic  |
| Source      | Virginia Governor's Commission on Climate Change. 2008. Final Report: A Climate Change Action Plan. , (and other state plans)                                       |

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| <b>Need</b> | Updated freshwater flood maps, sea level rise maps, and 100 year flood maps   |
| Description | Updated flood and sea level rise maps are necessary to determine risk factors for engineering assessments   |
| Type        | - PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)<br>- PRODUCTS: Maps (Imagery, geo-referenced data)  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science  |
| Sector      | - Infrastructure  |
| Region      | - Regional Or State -- New England -- South East  |
| Source      | Facing Our Future: Adapting to Connecticut's Changing Climate. March, 2009., Sensitivities to Weather and Climate in North Carolina, Southeast Regional Climate Center (SERCC) Interview of Ryan Boyles, NC State Climatologist. June 2011. |

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| <b>Need</b> | Updated peak flood flow frequency regional regression equations to produce more accurate flood level predictions |
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| Type       | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling) |
| Priority   | - High  |
| Focus Area | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline | - Physical Science  |
| Sector     | - Infrastructure  |
| Region     | - Regional Or State -- New England -- Mid-Atlantic  |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes.                            |

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| <b>Need</b> | Urban heat research  |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. New York State Energy Research and Development Authority (NYSERDA). 2011. |

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| <b>Need</b> | Vector-born infectious disease forecasts and maps of at risk areas  |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Maps (Imagery, geo-referenced data)                       |
| Focus Area  | - Changes in Extremes of Weather and Climate  |
| Discipline  | - Ecological and Biological<br>- Climate Society Interactions   |
| Sector      | - Public Health and Safety  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East  |
| Source      | U.S. Global Change Research Program. National Climate Assessment Health Sector Workshop. Charleston, S.C. February 2012. Meeting notes. |

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| <b>Need</b> | Vulnerability assessment for all critical public facilities (hospitals, schools)  |
| Description | Investigate the vulnerability of all critical public facilities (hospitals, schools)  |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate  |
| Discipline  | - Physical Science<br>- Climate Society Interactions  |
| Sector      | - Public Health and Safety<br>- Infrastructure  |
| Region      | - Regional Or State -- New England  |
| Source      | Preliminary Assessment of Rhode Island's Vulnerability to Climate Change and its Options for Adaptation Action. February 2010., Massachusetts Climate Change Adaptation Report. September 2011. |

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| <b>Need</b> | Vulnerability assessment for forest types most vulnerable to climate change   |
| Description | Assess vulnerable species. Identify forest types most vulnerable to climate change, and practices that may mitigate these effects.                    |
| Type        | - PRODUCTS: Plans, Assessments, Studies   |
| Priority    | - High  |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate<br>- Conservation/ Restoration of Sensitive Species and Habitats |
| Discipline  | - Physical Science<br>- Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - Regional Or State -- New England  |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.   |

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| <b>Need</b> | Vulnerability assessment for species, habitats, and ecosystems at multiple scales (national, regional, and watershed) |
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| Description | Assessments of the vulnerability of species, habitats, and ecosystems are required for adaptation planning and action at multiple scales (national, regional, and watershed).         |
| Type        | - PRODUCTS: Plans, Assessments, Studies<br>- PRODUCTS: Other  |
| Priority    | - High  |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Conservation/ Restoration of Sensitive Species and Habitats  |
| Discipline  | - Ecological and Biological   |
| Sector      | - Managed Ecosystems<br>- Natural Ecosystems<br>- Biota   |
| Region      | - National<br>- Regional Or State<br>- Local/City   |
| Source      | NOAA Office of Habitat Conservation. Priority Climate-Related Science, Product and Engagement Needs For Conservation of Marine and Coastal Habitats in a Changing Climate. June 2010. |

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| <b>Need</b> | Vulnerability assessment related to occupational health and safety regulations to protect outdoor workers, particularly for vulnerable populations |
| Type        | - DATA: Surveys and Preliminary Assessments<br>- PRODUCTS: Plans, Assessments, Studies   |
| Focus Area  | - Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety   |
| Region      | - Regional Or State -- New England   |
| Source      | Massachusetts Climate Change Adaptation Report. September 2011.  |

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| <b>Need</b> | Vulnerability assessments and initiatives targeting small farms and their capacity to adapt to climate change |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Regulatory/ Policy Guidance                         |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate                          |
| Discipline  | - Physical Science<br>- Ecological and Biological   |

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| Sector | - Managed Ecosystems<br>- Economic Resources   |
| Region | - Regional Or State -- New England -- Mid-Atlantic -- Central -<br>- Great Lakes -- South East                                       |
| Source | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, N.Y. August 2011. Meeting notes. |

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| <b>Need</b> | Vulnerability assessments related to drought induced saltwater intrusion into coastal lands  |
| Description | Vulnerability assessment with respect drought induced saltwater intrusion into coastal lands; potential subjects include public health and safety, ecology, and infrastructure |
| Type        | - PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems   |
| Region      | - Regional Or State -- South East  |
| Source      | National Drought Information System (NIDIS) Carolinas Drough Pilot Project Scoping Workshop. July/August 2012. Meeting notes.  |

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| <b>Need</b> | vulnerability maps comparing scenarios of future climate changes with other data  |
| Description | vulnerability maps comparing scenarios of future climate changes, such as changes in temperature, vegetation patterns, or hydrology, with contemporary layers, such as the locations of priority habitats, focal species distributions, or current land use practices |
| Type        | - PRODUCTS: Maps (Imagery, geo-referenced data)<br>- PRODUCTS: Plans, Assessments, Studies  |
| Focus Area  | - Coasts and Climate Resilience (including sea-level rise)<br>- Conservation/ Restoration of Sensitive Species and Habitats   |
| Discipline  | - Ecological and Biological<br>- Climate Society Interactions   |
| Sector      | - Public Health and Safety<br>- Infrastructure<br>- Natural Ecosystems<br>- Biota   |

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| Region | - Regional Or State -- Mid-Atlantic -- Great Lakes   |
| Source | Gregg, R. M., K. M. Feifel, J. M. Kershner, and J. L. Hitt. 2012. The State of Climate Change Adaptation in the Great Lakes Region. EcoAdapt, Bainbridge Island, WA. |

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| <b>Need</b> | Water management tools that integrate planning with saltwater intrusion risks, temperature changes, and water availability changes                                 |
| Type        | - PRODUCTS: Training and Capacity Building<br>- PRODUCTS: Viewers and Web-based Tools<br>- PRODUCTS: Regulatory/ Policy Guidance                                   |
| Focus Area  | - Climate Impacts on Water Resources<br>- Changes in Extremes of Weather and Climate   |
| Discipline  | - Physical Science   |
| Sector      | - Public Health and Safety<br>- Infrastructure   |
| Region      | - Regional Or State -- Mid-Atlantic  |
| Source      | New York State Energy Research and Development Authority (NYSERDA). 2011. ClimAID: Integrated Assessment for Effective Climate Change Adaptation Technical Report. |

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|-------------|---|
| <b>Need</b> | Wetland inundation maps and models  |
| Type        | - PRODUCTS: Forecasts and outlooks (monthly to annual, models)<br>- PRODUCTS: Maps (Imagery, geo-referenced data) |
| Focus Area  | - Sustainability of Marine Ecosystems<br>- Changes in Extremes of Weather and Climate                             |
| Discipline  | - Physical Science  |
| Sector      | - Natural Ecosystems  |
| Region      | - Regional Or State -- New England -- Mid-Atlantic -- South East  |
| Source      | NOAA Climate Team. Eastern Region Gaps, Needs and Assets Document. Updated May 2010.                              |

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| <b>Need</b> | Wind speed prediction to guide development and testing of building materials for transportation infrastructure   |
| Description | Material strength, testing and design factors will all need to be adjusted based on local wind speed predictions |

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| Type       | <ul style="list-style-type: none"> <li>- PRODUCTS: Forecasts and outlooks (monthly to annual, models)</li> <li>- PRODUCTS: Projections (intra-annual to multi-decadal, including SLR and model down-scaling)</li> </ul> |
| Focus Area | - Changes in Extremes of Weather and Climate  |
| Discipline | - Physical Science  |
| Sector     | - Infrastructure  |
| Region     | <ul style="list-style-type: none"> <li>- National</li> <li>- Regional Or State</li> </ul>   |
| Source     | NOAA and Northeast Regional Climate Center (NRCC) Inland Impacts of Climate Change Meeting. Ithaca, NY. August 2011. Meeting notes.   |