Preparing for the Changing Climate

A Northeast-Focused Needs Assessment

CLEAN AIR COOL PLANET

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Needless to say, a wide array of experiences are represented in the report and no specific observations should be attributed to any specific interviewees.

About Clean Air-Cool Planet

For more than a decade, Clean Air-Cool Planet (CA-CP) has worked to solve the global warming problem through civic engagement, education and effective policy. CA-CP has a successful track record of helping communities, corporations and campuses large and small to innovate, problem-solve, and improve their bottom lines—while building a bi-partisan base of support for national climate and energy solutions. For more information, visit www.cleanair-coolplanet.org.

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Executive Summary

In the Northeast, the impacts of a changing climate are clearly evident and well-documented. Leaders in the region recognize the need to be proactive in adapting to such changes, but do not yet have the resources and tools they require to do so successfully. This report presents a snapshot of the needs of local, regional and state governments in undertaking such climate preparedness efforts. The goal is to target assistance effectively, and to help our partners in this effort—policy-makers, NGOs and others—do the same.

The research was conducted in 2010 and early 2011 and involved extensive individual interviews as well as an online survey distributed to more than 200 communities. The responses, which were well distributed throughout the region, indicate the following:

Northeast communities are concerned about climate change impacts.

- Over half who responded are already doing some form of climate preparedness planning.
- Another third are concerned, but are unsure what steps to take or lack capacity.
- Sea-level rise, increased precipitation, floodplain changes, and public welfare and health are the impacts of greatest concern.

In order to progress, they need technical, communications, and financial assistance.

- The technical need most often ranked as a top priority (by 35 percent of respondents) is help with infrastructure vulnerability assessments.
- Other technical needs ranked as the most important include updated floodplain maps (19%) local climate/scientific data (15%) and help with creating adaptation plans (15%).
- "Convincing the public that climate change is happening" is the education and outreach need most often ranked as primary (21%), followed closely by "lack of national leadership and education awareness campaign" (19%).
- Many said they needed help making adaptation action a priority in their communities at a time of constrained human and financial resources.
- Communities need financial assistance and additional staff capacity: 77 percent noted that they do not have the resources to integrate climate preparedness across their departments, although they would like to.

Increased coordination, collaboration and resource sharing is a high priority.

- Representatives from government at every level identified a need to work across disciplines, agencies and organizations on this issue.
- Projects undertaken at a regional level—in a watershed or within the jurisdiction of a regional planning commission, for instance—are beginning to deliver tangible results and are benefiting from economies of scale.
- Climate adaptation-focused networks are rapidly developing within and between Northeast states. Their aim is to connect data "providers" with "consumers," avoiding duplication of efforts and conducting knowledge transfer
- Partnerships with NGOs, universities and/or the private sector have been vital to the progress of many existing community climate preparedness efforts.

1. INTRODUCTION

CLIMATE PREPAREDNESS IN THE NORTHEAST

In the Northeast, the impacts of a changing climate are clearly evident and well documented. The United States Global Change Research Program has catalogued a list of observed changes in the region, which include a rise in average annual temperatures; an increase in extremely hot days; stronger storms and a number of changes in overall precipitation patterns; and increased sea levels—among others (US Global Change Research Program, 2009). As some of the most densely populated areas of the country, the Northeast's communities are subject to significant risks and challenges from such changes; risks to infrastructure, public health, natural resources, industry and overall quality of life.

Annual storm losses in the U.S. have increased six-fold since the 1940s and the New England region has seen more than a 50% increase in federally declared storms during the last two decades. In New Hampshire alone, the costs associated with declared storm damages have increased nearly 15-fold and the state has suffered through four "100-year floods" in the last decade. Two Nor'easters within two weeks in March 2010 brought massive flooding and wind damage to much of the Northeast, smashing rainfall records from New Jersey to Massachusetts and leaving more than 500,000 people without power for days. In all areas, vital services like energy and electricity, telecommunications, and water and sewer are increasingly threatened or undermined by severe weather events.

As these threats become more evident, so does the need to be proactive in protecting communities. The Northeast is home to some of the nation's leaders with regards to climate preparedness. For example, New York City has focused on preparing for climate change since 2008, when Mayor Bloomberg launched the Climate Change Adaptation Task Force and the New York City Panel on Climate Change (NYPCC) with the goal of developing strategies to secure the City's infrastructure from climate change effects (City of New York, 2008). In Boston in 2007, an executive order from Mayor Menino tasked that city's offices and departments with assessing their vulnerabilities to climate change impacts and incorporating climate impact projections into the planning and operations for which they are responsible. One result: the Boston Redevelopment Authority now requires that any new proposal for a project sited on the coast needs to include a description of how it will address projected sea level rises (City of Boston, 2011). Also in 2007, the City of Keene, New Hampshire, began serving as a pilot community for the ICLEI–Local Governments for Sustainability "Climate Resilient Communities" program, helping to develop an important suite of tools to be shared with others.

It is not only municipalities that are tackling climate preparedness; at the state level, Maine, New Hampshire, Massachusetts, Connecticut and New York all have adaptation plans in progress or completed, while Vermont has a state climate action plan that recommends the creation of an adaptation plan. Regional organizations, such as watershed or resource protection groups and regional planning commissions, are also increasingly working to facilitate climate preparedness efforts that cross municipal boundaries. One recent project in New Hampshire, undertaken by the Lake Sunapee Protective Association in partnership with Antioch University New England and Syntech International, with funding from the National Atmospheric and Oceanic Administration, focused on evaluating culvert sizes across the Lake Sunapee watershed and

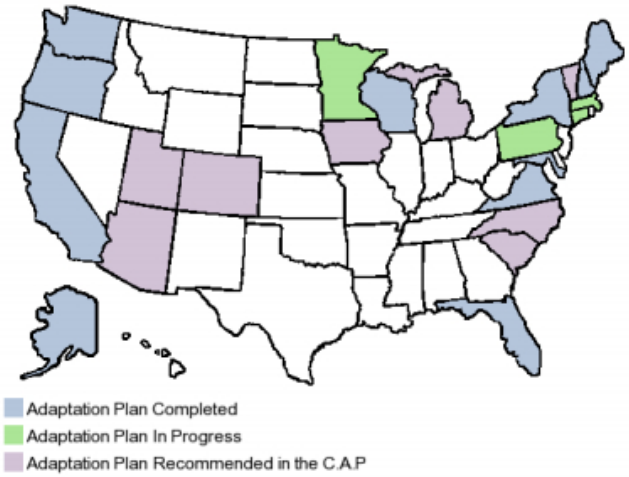

Figure 1.1 State Adaptation Plan Map (Pew Center for Climate Change, 2011)

targeting those that needed to be upgraded to prevent erosion and flood damage associated with more or heavier storms. Other examples: The Southern Maine Regional Planning Commission has supported joint preparedness planning efforts for several coastal towns in southern Maine (see page 31); New Hampshire's Coastal Adaptation Workgroup has convened seacoast-area towns in New Hampshire for climate preparedness work with support from the relevant regional planning commissions there; and regional planning agencies in Massachusetts are helping local communities incorporate climate impact projections into their Hazard Mitigation Plans.

ASSESSING NEEDS AND BARRIERS

The preceding are just a few examples of the climate preparedness work underway throughout the Northeast; many communities are poised to follow. However, as local, regional and state governments begin to tackle this challenge, they often find that they do not have all of the necessary resources to be effective. This report captures Clean Air-Cool Planet's efforts to better understand those needs. Specifically, the intent is to provide a snapshot of the barriers and resource gaps that must be addressed in order for local, regional and state governments to effectively plan for and implement climate preparedness strategies.

In the autumn of 2010, Clean Air-Cool Planet's staff conducted a series of interviews with representatives from the states of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York and New Jersey. Most of those interviewed work in state or local government or are focused on providing resources on a statewide basis. The goal of these conversations was to get an overview of climate preparedness in the Northeast. A list of the questions asked can be found in Appendix A.

The information from these interviews was used to guide the next step in the research process; a twenty-question survey was created and distributed online in January and February of 2011 and sent to over 200 local, regional and state level government officials. The survey sought to uncover the degree to which such officials were already focused on the need for climate change preparation, and asked respondents to identify and prioritize—through a series of both multiple choice and open-ended questions—the resources they needed to move forward on such work. For a complete copy of the survey and a summary of the responses, see Appendix B.

In total, 51 complete survey responses were received (only surveys that were fully completed were included in the analysis), 48 of which were from representatives of local, regional or state agencies. The responses were well distributed throughout the Northeast, with state-level responses from six of the eight states, regional agency responses from four

About Clean Air – Cool Planet's Climate Preparedness Work

For more then a decade Clean Air-Cool Planet (CA-CP) has worked to solve the global warming problem. While that has always meant focusing on ways to mitigate climate change, CA-CP has also long recognized the need to prepare for the impacts of such change that have become unavoidable. As early as 2003, we began work on a project focused on the horticultural aspects of "adaptation." In 2006 we helped to organize, with the Town of Guilford, Connecticut, a day-long symposium on sea-level rise. And in 2009, CA-CP launched the "Hip Boot Tour," an outreach campaign that brought the latest science, local impacts—demonstrated visually with high-resolution maps—and policy solutions to eight vulnerable cities up and down the eastern seaboard.

In early 2010, with support from the Rockefeller Foundation, we began a series of interviews and focus groups aimed at determining roadblocks to communicating with the public about the need to prepare for climate impacts—which, among other things, helped to determine that talking about "climate preparedness" is more meaningful and compelling than promoting "adaptation" to climate change.

Building on these successful initiatives and partnerships, and with generous support from the Kresge Foundation, CA-CP is now working to develop a strong Northeast network of adaptation practitioners—planners and resource managers; business officers; building professionals; local, state and federal policy-makers; researchers; and many others—and to provide two-way access to resources and information among these key groups. Because the challenges of climate preparedness in the Northeast can only be met through effective, informed, coordinated collaboration, facilitating such collaboration is and will continue to be at the core of CA-CP's climate preparedness work. For more information, visit www.cleanair-coolplanet.org/climate_preparedness/.

states and multiple local government responses from all eight states. The survey was closed after approximately four weeks and the responses were analyzed via each of the three levels of governments. Clean Air –Cool Planet's experiences helping various partners on climate preparedness work over the past 12 to 18 months reinforce the results of the survey.

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City of Boston, 2011. "A Climate of Progress: City of Boston Climate Action Plan Update 2011," available at http://www.cityofboston.gov/Images_Documents/A%20Climate%20of%20Progress%20-%20CAP%20Update%202011_tcm3-25020.pdf

Pew Center on Global Climate Change, 2011. "State Adaptation Plans" available at http://www.pewclimate.org/what_s_being_done/in_the_states/adaptation_map.cfm

2. STATE GOVERNMENT

OVERVIEW

Eight responses were collected from state agencies in New York, Maine, New Jersey (2), New Hampshire, Rhode Island (2) and Connecticut. Of these, six indicated that the environmental protection/ conservation departments were the most involved with climate preparedness work within the state government.

The states that responded appear to be most concerned with sea level rise, increased levels of precipitation, and shoreline and fluvial erosion (listed in order of priority of concern). The resulting impacts on infrastructure and public health and welfare are also of top concern.

All of the states have experienced significant damage from severe weather in the past ten years. For example, a "500-year" storm in March of 2010 completely inundated two large municipal wastewater treatment facilities in Rhode Island. The same storm caused significant damage to roads, bridges, personal property and other infrastructure in Connecticut.

Five of the respondents (NY, ME, NH, RI and CT) are in the process of creating an adaptation, climate preparedness or other type of plan that includes addressing the likely impacts of climate change. New Jersey indicated they are aware of what needs to be done and are beginning to move forward.

All six states ranked technical assistance and education and outreach assistance as either vital or important. All but one ranked financial assistance as vital or important. The most frequently-cited top technical need was LiDAR (Light Detection and Ranging) information or other high-resolution digital elevation model (DEM) data. This information is in fact becoming more and more available and one respondent pointed out that "sea level rise predictions are fairly common and relatively easy to work with… [T]here is a greater need for reliable predictions of anticipated precipitation levels."

Education and outreach is a major area of concern. State officials desire coordinated support from their political leaders at the local, state and federal levels.

The primary issues cited as preventing action are shifting policy priorities and lack of funding. The state and local budgetary crisis is a huge limiting factor.

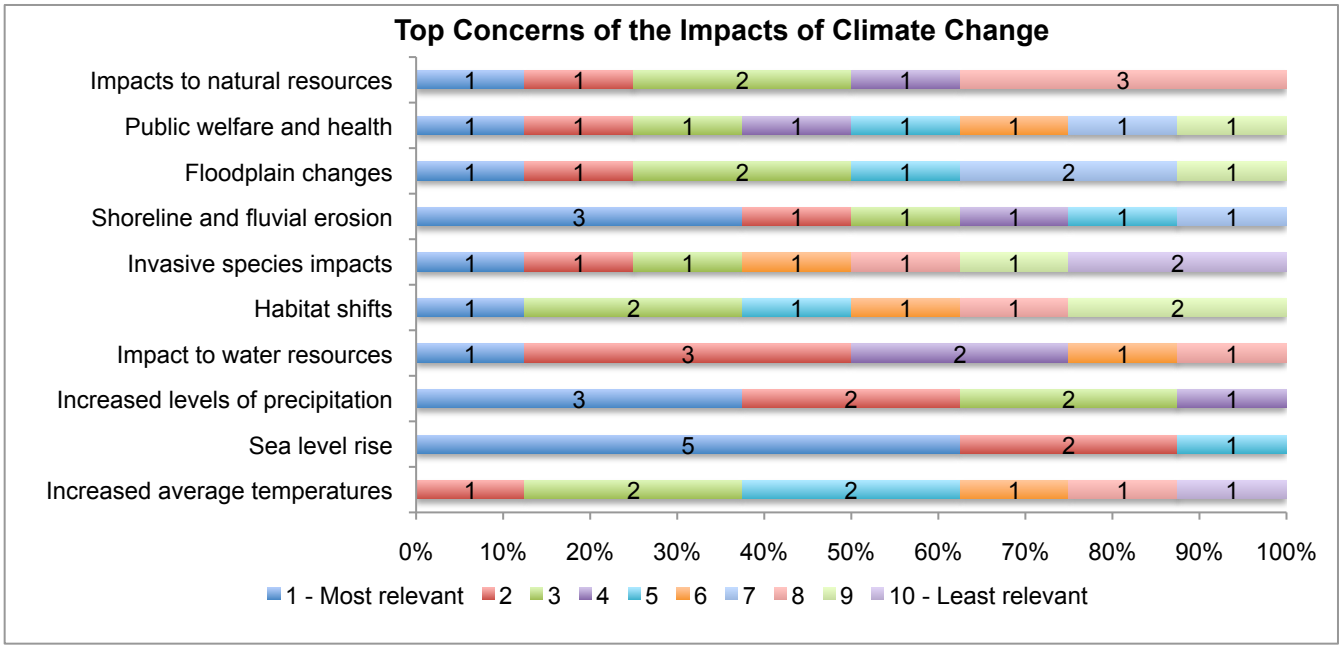

Table 2.1 Rankings state level concerns of climate change impacts, based on survey results in NY, ME, NH, RI, CT and NJ. Winter, 2011.

NEW YORK

The state of New York has been working vigorously to prepare for the impacts of climate change. The Office of Climate Change, within the New York State Department of Environmental Conservation, has been leading the effort on the state level. New York City has been coordinating its own efforts, as have many colleges and universities throughout the state. All of this work is important, yet remains somewhat piecemeal. Many reports have been published but there appears to be significant overlap.

Current Work

The Office of Climate Change is responsible for developing "programs and policies that mitigate greenhouse gas (GHG) emissions and help New York communities and individuals adapt when changes in our climate cannot be avoided." (NYSDEC, n.d.) In September of 2010, the Office of Climate Change stated it would soon have three new reports:

1- A State Climate Action Plan – an interim draft report was released in November 2010 and a final report is due during the second quarter of 2011;
2- Clim-AID, an academic report that will identify critical vulnerabilities, climate risks, and adaptation strategies specific to New York State for a range of key sectors: agriculture, coastal zones, ecosystems, energy, infrastructure, public health, and water resources. For each sector, the economic costs and benefits of impacts and adaptation strategies also will be assessed (NYSERDA, 2010); and
3- A vulnerability report draft will be issued with the final report of the State Climate Action Plan in 2011. This will provide critical background information for the climate action plan.

The NYSDEC is also utilizing information from New York City to inform their state efforts. The New York Sea Level Rise Task Force submitted a plan for adaptation on December 31st 2010.

The Office of Climate Change also has a state-local partnership called Climate Smart Communities, with over 90 New York communities already pledged to become "climate smart." (NYSDEC, 2011)

Impacts

New York State's government-level response to our survey listed sea level rise, invasive species, shoreline and fluvial erosion and floodplain changes as the top relevant impacts. Increased levels of precipitation, impact to water resources and impact to natural resources were listed next, and increased average temperatures, habitat shifts and public welfare and health followed. Sea level rise is the top concern "because of the current vulnerability of property and public infrastructure, natural resources and human communities in the coastal zone."

Technical Assistance Needs

Technical assistance needs were ranked as "vital" for climate preparedness work. The top technical assistance needs indicated were "updated floodplain maps" and "infrastructure vulnerability assessments." "Creating adaptation plans," "hazard mitigation

Table 2.2 New York State's adaptation planning documents. Winter, 2011.

Report/Program	Creator	Date Published	Online Link
NY State Climate Action Plan Interim Report	Climate Action Council	November 9, 2010	http://nyclimatechange.us/InterimReport.cfm
Clim-AID – Responding to Climate Change in NY State	NY State Energy Research and Development Authority (NYSERDA)	Draft-2010	http://www.nyserda.org/programs/environment/emep/clim-aid-synthesis-draft.pdf
NY State Sea Level Rise Task Force: Report to the Legislature	NY State Sea Level Rise Task Force	December 31, 2010	http://www.dec.ny.gov/docs/administration_pdf/slrtffinalrep.pdf

planning," "emergency management planning," and "climate adaptation master planning" were second. The response for the top technical need in the survey was elaborated upon:

> *"High-resolution LiDAR information is needed for effective vulnerability assessments and adaptation planning in the coastal zone and riverine floodplains."*

Some counties have LiDAR and are processing the data to different resolutions. New York State has contracted with USGS to have LiDAR mapping done for some coastal counties including up the Hudson; the state has provided matching funds and the NYSDEC and the Office of Emergency Management will use their GIS capabilities to process the data.

Education and Outreach Assistance Needs

Education and Outreach assistance needs were identified as "important" in the New York survey response. The top education needs indicated were "convincing the public that climate change is happening," "getting local authorities to take action," and "lack of national leadership." Listed second were "having a clear message for the public," and "addressing and explaining uncertainties of climate change." "Staff education" and "coordinating staff across departments" are less of a priority. Again, further elaboration was provided:

> *"Encouraging local leaders of the need for, and benefits of, adaptation planning, and providing them with information and decision-support tools is critical. Local leaders are important because local governments have most control over land-use planning and emergency response. They are also most likely to be important decision leaders."*

Financial Assistance Needs

The survey reported that financial assistance was "unnecessary" to New York's climate adaptation work. If funding were available, it would be used to hire a consultant to provide research or technical assistance.

MAINE

Attention to climate preparedness in Maine has been present at the state level, with heavy involvement from Maine Sea Grant at the University of Maine – Orono. However, there is concern that shifts in policy positions will negatively influence climate change adaptation efforts.

The Director of Maine Sea Grant was interviewed, and staff from the Department of Environmental Protection (DEP), which in 2009 was given the statutory responsibility to lead state efforts in climate change, responded to the survey.

Current Work

In April 2009, the Maine State Legislature charged the DEP with establishing and convening a stakeholder group to evaluate the options and actions available to Maine's people and businesses to prepare for and adapt to the most likely impacts of climate change. A final report titled *People and Nature Adapting to A Changing Climate: Charting Maine's Course* was published in February 2010. (Maine DEP, 2010)

Maine Geological Survey and Maine Coastal Program have partnered with the University of Maine's Sea Grant program to create an award-winning five-part documentary titled, *Building a Resilient Coast: Maine Confronts Climate Change*. (Maine Sea Grant, n.d.) It is available on Maine Sea Grant's website.

Adaptation work in Maine is being assisted by regional, federal, and state agencies including the Environmental Protection Agency (EPA) and National Oceanic and Atmospheric Administration (NOAA), as well as non-profits such as New England Interstate Water Pollution Control Commission (NEIWPCC), Northeast States for Coordinated Air Use Management (NESCAUM), The Nature Conservancy (TNC) and Manomet Center for Conservation Sciences.

The Southern Maine Regional Planning Commission has also been working with state agencies on adaptation. They have taken the lead on the Coastal Hazard Resiliency Tools Project, which is a collaborative effort between state agencies (Maine Coastal Program, Department of Conservation – Geological Survey) and municipalities (Scarborough, Old Orchard Beach, City of Saco, and City of Biddeford). For more information on this effort, see page 31.

Impacts

In Maine, "increased levels of precipitation" was identified as the top relevant impact. The ranking goes as follows:

1- Increased levels of precipitation
2- Sea level rise
3- Impacts to natural resources
4- Impact to water resources
5- Shoreline and fluvial erosion
6- Public welfare and health
7- Floodplain changes
8- Increased average temperatures
9- Habitat shifts
10- Invasive species impacts

This ranking was further explained with the following comment:

> *"Increased/changing precipitation regimen will have an impact on all aspects of Maine's environment, and, combined with sea level rise and storm surge (which you don't list), creates the most potential for vulnerability effects in both human and natural systems."*

Technical Assistance Needs

Top technical assistance need was identified as "LiDAR for inland watersheds, rivers, and floodplains." All others were ranked as of equal (secondary) importance.

Education and Outreach Assistance Needs

"National leadership" was indicated as the priority education need.

Maine officials are beginning to compile available tools and resources to serve local municipalities and organizations. Based on what they have heard, this is a primary need for education and outreach.

Financial Assistance Needs

The survey indicated that financial assistance, if made available to the state government, would be used to complete the state adaptation plan.

NEW JERSEY

New Jersey had two respondents from the State: the Department of Environmental Protection (DEP) and the Office Planning Advocacy. Information was also gathered from an interview with the State Office of Planning and Sustainable Communities.

Similar to New York, New Jersey has various climate preparedness efforts underway in different state departments, creating "silos" of adaptation action. An interdisciplinary task force has been created within DEP to reduce this "silo" effect and increase coordination.

The survey results indicated that the lack of an explicit mandate that prioritizes climate preparedness makes it less of a priority. The DEP also lacks the funding to do climate preparedness work.

Current Work

The DEP is the agency most involved with adaption work in the state. The survey response indicated:

> *"Many sections of the Department of Environmental Protection are developing vulnerability assessments and tools for identifying vulnerabilities. For adaptive initiatives happening outside the Department, staff is involved in reviewing materials and supporting the science."*

Both departments responded similarly to the question regarding what stage of adaptation planning the state is in. The Office of Planning Advocacy selected the option, "Know what needs to be done but don't have the capacity or resources to act" but clarified in the comments section saying,

> *"I would modify my answer to say 'Know something should be done, but don't have the authority, power, organizations, capacity or resources to act.'"*

The DEP selected "Other" and wrote in,

> *"Know some of what needs to be done, and are moving in some areas. NJ has a patchwork of initiatives without an overarching plan at the moment."*

Within the DEP, the division working frequently with local communities is the Office of Planning and Sustainable Communities. Sustainable Jersey "is a certification and incentive program for municipalities in New Jersey that want to go green, save money, and take steps to sustain their quality of life over the long term." (NJ DEP, 2010) Currently the program is focused on climate change mitigation, however tools are being developed for municipalities to become climate resilient communities.

North Jersey Transportation Planning Authority (NJTPA) has funding from the Federal Highway Administration (FHWA) to assess the vulnerability of transportation infrastructure in New Jersey. The FHWA currently has a conceptual model to address

NJ Relevant Impacts		
Rank	DEP	Planning Advocacy
1	Sea level rise	Sea level rise, shoreline and fluvial erosion
2	Increased average temperature	Increased levels of precipitation; Impact to water resources; Invasive species Impacts; Floodplain changes; and Public welfare and health
3	Increased levels of precipitation	Increased average temperature, Habitat shifts, Impacts to natural resources
4	Impact to water resources	
5	Public welfare	
6	Habitat shifts	
7	Shoreline and fluvial erosion	
8	Impacts to natural resources	
9	Floodplain changes	
10	Invasive species impacts	

Table 2.3 New Jersey Department of Environmental Protection and the Office of Planning Advocacy ranking of the most relevant impacts of climate change. Winter, 2011.

transportation infrastructure and part of New Jersey's transportation network was selected as a FHWA pilot.

Impacts

Sea level rise was ranked as a top concern by both state departments. The Office of Planning Advocacy also identified shoreline and fluvial erosion as a number one impact. The DEP pointed out that,

> *"New Jersey is so diverse that these rankings could be looked at differently depending on which area of the state you are dealing with. Coastal and riverine communities are most concerned with SLR and flooding. Urban communities have heat island effect issues. All communities should be concerned with water and public health issues."*

Ultimately sea level rise was selected due to the "amount of coastal and bay areas we have in the state, and the impact of SLR and storm surge on those areas." The Office of Planning Advocacy reiterated this point by saying,

> *"Our environmental policies aim to protect all environmental resources in the state, so it is hard to choose. Being coastal and a state in which tourism is a major industry, those issues do rise to the fore."*

NJ Technical Assistance Needs		
Rank	DEP	Planning Advocacy
1	Climate adaptation master planning	Other- Organizational Models - We don't even have proper system set up to do the work effectively. The combination of silos (OEM's at State Police are a joke) and total gaps (state climatologist does not a weather strategy make) need critiqued and given alternatives.
2	Climate impact assessments	Climate adaptation master planning, climate impact assessments
3	No answer	Local climate science/data
4	Infrastructure vulnerability assessment	Meeting facilitation
5	Hazard mitigation planning	No answer
6	Emergency management planning	Hazard mitigation planning
7	Updated floodplain maps	Creating adaptation plans
8	Creating adaptation plans	Infrastructure vulnerability assessments
9	Local climate science/data	Updated floodplain maps
10	Climate adaptation master planning	

Table 2.4 New Jersey Department of Environmental Protection and the Office of Planning Advocacy ranking of technical assistance needs. Winter, 2011.

Technical Assistance Needs

Both the DEP and the Office of Planning Advocacy indicated that technical assistance is 'important' to their adaptation work. They also agreed that New Jersey needs a coordinated adaptation effort at the state level. The DEP stated,

> *"New Jersey needs a coordinated adaptation planning process that takes all the moving pieces of the puzzle and pulls them together and identifies planning gaps that need to be addressed."*

NJ Education/outreach Assistance Needs		
Rank	DEP	Planning Advocacy
1	Coordinating staff across departments	Other – Federal systems which requires/rewards climate protective systems at state level. Builds capacity
2	Lack of national leadership	Coordinating staff across departments
3	Having a clear message for the public	Having a clear message for the public
4	Convincing public that climate change is happening	Getting local authorities to take action
5	Addressing and explaining uncertainties of climate change	Convincing public that climate change is happening
6	Staff education	Addressing and explaining uncertainties of climate change
7	Getting local authorities to take action	Lack of national leadership
8	Coordinating staff across departments	Staff education

Table 2.5 New Jersey Department of Environmental Protection and the Office of Planning Advocacy ranking of their education and outreach assistance needs. Winter, 2011.

The Office of Planning Advocacy expressed the need for an organizational model for adaptation in order to break down silos between state departments.

Education and Outreach Assistance Needs

State coordination is also needed with respect to education and outreach. The DEP explained that,

> *"Without a coordinated directive in all state agencies to move forward and incorporate climate impacts into their initiatives and begin to address its affects, the planning effort will not success. Too many things are impacted for one agency to move alone."*

The DEP said education and outreach assistance is vital to their climate adaptation work.

The Office of Planning Advocacy believes education and outreach support is "important" and added that they need, "Federal systems which requires/rewards climate protective systems at state level [to] build capacity."

Financial Assistance Needs

The DEP and Office of Planning Advocacy said financial assistance was "important" to their adaptation work. The DEP indicated it would use financial assistance to "hire an intern," "hire a full time employee for more general sustainability/climate work" or "hire a consultant to provide research or technical assistance." The Office of Planning Advocacy again reiterated the need for coordination. It needs "a tech guidance report on how to integrate into state planning systems."

The DEP said,

> *"Financial resources would help to move the effort forward, but I wouldn't say it's more important than the technical assistance."*

NEW HAMPSHIRE

New Hampshire is embarking on a highly organized, sector-based approach to addressing climate change adaptation. Their primary hurdle with this approach is be able to get funding so each agency can move forward with the work they know they need to do. In particular, there is a need for funding for LiDAR.

Information for our report came from a survey response and an interview with staff from The New Hampshire Department of Environmental Services.

Current Work

New Hampshire is working on convening sector-based adaptation initiatives. There are three sub groups: coastal, public heath and wildlife. Strategic plans are being developed for each subgroup. According to the survey respondent, "At the state level we are working with communities to address the potential impacts they may be facing. We are also working in-house to look at our policies and how they support or detract from climate change (both mitigation and adaptation)."

In 2001, a report titled A Preliminary Assessment of Tidal Flooding along the New Hampshire Coast was released by the New Hampshire Coastal Program (NHCP) and the New Hampshire Office of Emergency Management (OEM). More recently in 2009, a report came out of the Rockingham Planning Commission titled, Adaptation Strategies to Protect Areas of Increased Risk From Coastal Flooding Due to Climate Change. (NH DES, 2008)

The DES has five fact sheets published online about the impacts of climate change on New Hampshire. There is one general sheet and then four sector-based sheets describing the impacts on skiing, fall foliage and maple sugar industries, cold-water fishing, and the forest and timber industries.

Impacts

The ranking of the most relevant impacts of climate change to New Hampshire was as follows:

1- Increased levels of precipitation
2- Impact to water resources
3- Floodplain changes
4- Shoreline and fluvial erosion
5- Sea level rise
6- Increased average temperature
7- Public welfare and health
8- Impacts to natural resources
9- Habitat shifts and invasive species impacts

Technical Assistance Needs

Technical assistance was ranked as "vital." The top technical assistance need was specifically identified as:

> *"Funding to obtain local data … [to] help communities know what they need to plan and prepare for."*

Also ranked as priorities were updated floodplain maps and infrastructure vulnerability assessments.

Education and Outreach Assistance Needs

Again an emphasis for local data was indicated and it was ranked as "vital." This was elaborated upon:

> *"Local data…. again to base planning and preparation on so people have a clear understanding of what to expect and how it will impact them. Economic data are included in this."*

"Outreach and clear messaging to the public" was to the next priority, with things like "local coordination across department," "staff training" and "national leadership" all coming further down the list.

Financial Assistance Needs

Financial assistance was identified as vital for New Hampshire's adaptation work. The survey results indicated that:

> *"Financial assistance can help gather technical information which will then be communicated to decision makers and the public."*

Funding would most likely be used 'To hire a full time employee for more general sustainability/ climate work" or "to utilize data gathered from LiDAR to make maps for communities."

An additional comment was left on this section saying, "not necessarily to hire more people but funding to help pay for salaries of existing staff working on these issues."

RHODE ISLAND

The Rhode Island Division of Planning and the Rhode Island Coastal Resources Management Council (CRMC) are the two state agencies working on climate change adaptation and both responded to the survey. An interview was also conducted with a staff member of the Rhode Island Coastal Zone Management Agency.

Current Work

Interestingly, the Rhode Island Division of Planning's Statewide Planning Program indicated that the Department of Environmental Management is doing most of climate adaptation work and the CRMC, which is a division of Rhode Island's Department of Environmental Management, said that the State Planning Department was doing most of the adaptation work.

The state already has some LiDAR and high-resolution digital elevation models (DEMs) currently being created to show different sea level rise and storm surge scenarios.

The CRMC has created a public working draft of a proposed amendment to CRMC's sea level rise policy. The policy sets new regulations mandating that all new construction in a FEMA Coastal A Zone must meet V Zone requirements. There are additional new requirements for substantially improved structures in these coastal zones. All residential and non-water dependent uses located on undeveloped barrier beaches that are physically destroyed more than 50 percent by a storm are prohibited from being rebuilt. (RI CRMC, n.d.)

Impacts

While the rankings ended up being slightly different, the responses were similar between the two agencies (See Table 2.5). The Planning Program

said its top concerns were:

> *"Public health safety and welfare relative to sea level rise, floodplain changes and increased erosion given the states extensive shoreline and prevalence of critical transportation, sanitary and other public infrastructure within these locales."*

The CRMC said,

> *"Being a coastal zone management agency, we are interested in most of the above options. Sea level rise and erosion will impact the built environment, which in turn jeopardizes public safety. We are also very concerned about impacts to natural resources, particularly salt marsh and other coastal habitat shifts."*

Technical Assistance Needs

The Planning Program indicated technical assistance as "important" and listed "updated floodplain maps" as the top technical need. CRMC indicated it as "vital" and listed "infrastructure vulnerability assessments" as the top need. "Meeting facilitation" was ranked last by both departments. The Planning Program said,

> *"Sea level rise predictions are fairly common and relatively easy to work with. Given this I feel there is a greater need for reliable predictions of anticipated precipitation levels."*

The CRMC reiterated that they

> *"need technical work such as creating high resolution DEMs from LiDAR data, analysis on flooding impacts, etc."*

Education and Outreach Assistance Needs

The Planning Program's top education and outreach need was registered as convincing the public that climate change is happening because,

> *"The public must be educated on the reality and pending impacts. Without public buy in, the political support for adaptation will not be there."*

They consider this "vital."

The CRMC said "coordinating staff across departments" is their top education and outreach need. In general, education and outreach assistance is "important" to their adaptation work.

RI Relevant Impacts		
Rank	Planning	CRMC
1	Public welfare and health	Sea level rise
2	Sea level rise	Shoreline and fluvial erosion
3	Shoreline and fluvial erosion and floodplain changes	Increased level of precipitation
4	Increased levels of precipitation	Impacts to natural resources
5	Increased average temperatures	Habitat shifts
6	Impact to water resources	Invasive species impacts
7	No answer	Floodplain changes
8	Habitat shifts, invasive species impacts and impacts to natural resources	Impacts to water resources
9		Public welfare and health

Table 2.6 Rhode Island's Division of Planning and the Rhode Island Coastal Resources Management Council ranking of the most relevant climate change impacts. Winter, 2011.

RI Technical Assistance Needs		
Rank	Planning	CRMC
1	Updated floodplain maps	Infrastructure vulnerability assessments
2	Infrastructure vulnerability assessments	Climate adaptation master planning
3	Climate impact assessment	Creating adaptation plans
4	Creating adaptation plans	Climate impact assessments
5	Emergency management planning	Local Climate Science/Data
6	Hazard mitigation planning	Updated floodplain maps
7	Climate adaptation master planning	Hazard Mitigation planning
8	No Answer	Emergency management planning
9	Local climate science/data	Meeting facilitation
10	Meeting facilitation	

Table 2.7 Rhode Island's Division of Planning and the Rhode Island Coastal Resources Management Council ranking of the technical assistance needs. Winter, 2011.

Financial Assistance Needs

Financial assistance was listed as "vital" for both departments to carry out their adaptation work. The Planning Program would likely use financial assistance "to hire a full-time employee just for climate preparedness work." The CRMC would use it "to hire a consultant to provide research or technical assistance."

Both state programs also listed financial limitations as the one thing that is getting them "stuck" in terms of their adaptation work. The Planning Program said,

> *"State and Local budgetary crises limit funding for advancing the work. 100% federal or other funding sources are needed."*

The CRMC said the work "will be very expensive [and] needs must be prioritized."

CONNECTICUT

The survey was responded to by Connecticut's Office of Long Island Sound Program (OLISP), which is part of the State's Department of Environmental Protection (DEP). The OLISP is very involved with climate preparedness efforts. An interview with a staff member of the OLISP was conducted as well.

Current Work

The Governor's Steering Committee on Climate Change formed an Adaptation Subcommittee in 2008 to assess climate impacts on Connecticut and develop statewide adaptation strategies.

With support from the EPA's Climate Ready Estuaries program, ICLEI – Local Governments for Sustainability, the OLISP facilitated a three-part workshop series in 2010, designed to help engage representatives from federal, state, and municipal governments in climate adaptation efforts and to begin defining strategies for maximizing resilience to coastal impacts throughout Connecticut and the Northeast.

The DEP has developed a series of initial climate adaptation fact sheets, *Facing Our Future*, that detail current observations and provide some cursory recommendations for alternative approaches to foster adaptation at the local and regional levels. These fact sheets address overlapping categories: biodiversity and habitat, fisheries, forestry, infrastructure, natural coastal shoreline environment, outdoor recreation,

RI Education/Outreach Assistance Needs		
Rank	Planning	CRMC
1	Convincing public that climate change is happening	Coordinating staff across departments
2	Having a clear message for the public	Having a clear message for public
3	Staff education	Getting local authorities to take action
4	Coordinating staff across departments	Staff education
5	Getting local authorities to take action	Convincing public that climate change is happening
6	Lack of national leadership	Addressing and explaining uncertainties of climate change
7	Addressing and explaining uncertainties of climate change	Lack of national leadership

Table 2.8 Rhode Island's Division of Planning and the Rhode Island Coastal Resources Management Council (CRMC) ranking of the top educational and outreach needs. Winter, 2011.

water resources, and wildlife. (CT Climate Change, 2011)

The CT DEP is also a partner in The Sentinel Monitoring for Climate Change in Long Island Sound Program. It is a multidisciplinary scientific approach to provide early warning of climate change impacts to Long Island Sound ecosystems, species and processes to facilitate appropriate and timely management decisions and adaptation responses. Other partners include EPA Long Island Sound Office, National Oceanic and Atmospheric Administration, New York Department of Environmental Conservation, New York Sea Grant and Connecticut Sea Grant. (Long Island Sound Study, 2011)

The OLISP is coordinating federal, state and local government efforts around climate change adaptation. The OLISP partnered with ICLEI to develop an Adaptation Resource Toolkit (ART), which will be a one-stop-shop for climate preparedness needs. They launched Connecticut Climate Network (a municipal outreach program), and are joining the StormSmartCoasts Network. Connecticut is also working on finalizing CHAMP, a website that will include inundation scenarios and resiliency

information.

Impacts

The top relevant impacts of climate change to Connecticut were listed as "sea level rise," "increased levels of precipitation," "impact to water resources," "habitat shifts," "shoreline and fluvial erosion," and "impacts to natural resources." The rest of the ranking went as follows:

2- Invasive species impacts
3- Public welfare and health
4- Floodplain changes, increased average temperatures

OLISP explained that since their office is responsible for permitting coastal structures and protecting resources in Long Island Sound,

> *"Sea level rise and impacts to natural resources are key. Increased severity of storm events, which is not on your list, and sea level rise are probably tied because of their impacts to coastal communities, human and natural, and the human response has been to harden the shore which destroys the resources and threatens safety."*

Technical Assistance Needs

The top technical needs for Connecticut are coordination efforts and "more outreach to towns that are ready to start the dialogue, hopefully leading to actions." This need is "important" for their work. "Infrastructure vulnerability assessment" and "creating adaptation plans" were also noted as priorities for technical assistance, whereas "emergency management planning" was ranked very low.

Education and Outreach Assistance Needs

The top education and outreach need indicated in Connecticut was "working on getting local authorities to take action." Also of high priority: "Having a clear message for the public," "convincing public that climate change is happening," and "lack of national leadership." Assistance with education and outreach of this kind was ranked as "vital" to their work.

Financial Assistance Needs

The State of Connecticut would likely use additional funding for more workshops and outreach and financial support is "important" for this. Connecticut was able to take Groton's adaptation process "on the road" as an example for other communities. This "Road Show of Groton" provided workshops that helped towns start or continue their own adaptation efforts; however, the state needs additional money to fund more of these workshops.

Policy shifts have also created uncertainty as to whether or not the climate programs will continue. The survey response noted that,

> *"No one wants to spend money now because of the huge deficit but we need leadership and commitment at the top to continue with the positive momentum we have started."*

MASSACHUSETTS

Massachusetts' adaptation work began with the passing of the Global Warming Solutions Act in 2008. Since then, the Executive Office of Energy and Environmental Affairs has taken the lead on adaptation work on the state level. Their work has been supported by the Massachusetts Office of Coastal Zone Management and non-profits such as the Manomet Center for Conservation Sciences.

Although we did not receive a survey response from a state level agency in Massachusetts, we did conduct interviews with a staff member from the Executive Office of Energy and Environment and a former NOAA fellow that worked on the State's StormSmart Coast Program.

Current Work

In May 2009 the Secretary of the Executive Office of Energy and Environmental Affairs named the Climate Change Adaptation Advisory Committee. This Committee was created under the Global Warming Solutions Act of 2008 to advise the Executive Office of Energy and Environmental Affairs to study and make recommendations on strategies for adapting to climate change. The Advisory Committee's report to the Legislature is currently under development. (MassDEP, n.d.) Legislative deadline for the report is December 31, 2010, however as of June, 2011, the report was still in the final stages of review and not yet available to the public.

The Manomet Center for Conservation Sciences has received a grant from the Wildlife Conservation Society to develop tools that will incorporate potential

impacts from climate change into the State Wildlife Action Plan (SWAP). The State Wildlife Action Plan identifies habitats and species with the greatest need for conservation. The Manomet project and the SWAP create a comprehensive set of variables that describe vulnerabilities to climate change. (MA Department of Fish and Game, n.d.)

The Massachusetts Office of Coastal Zone Management (CZM) has developed the StormSmart Coasts program, which is designed to help coastal communities address the challenges arising from storms, floods, sea level rise, and climate change, and provides a menu of tools for successful coastal floodplain management. Five pilot projects were launched in 2009 and CZM is now accepting proposals from communities for a second round of pilot projects for 2011-2013.

The CZM has also recently launched MORIS (Massachusetts Ocean Resource Information System), which is an online mapping tool that can be used to search and display spatial data pertaining to the Massachusetts coastline. However, sea level rise scenarios are not currently a part of this tool. (MA Office of Coastal Zone Management, n.d.)

Impacts

Without the survey being completed, we are unable to report what Commonwealth officials believe to be the most threatening impacts of climate change. However, with the upcoming completion of the Advisory Committee's report to the Legislature, this information should become clear in the near future.

Based on the information collected from other states, we might hypothesize that because Massachusetts has significant coastal development the state is concerned with coastal issues such as sea level rise and erosion. From the City of Boston's education, health care and financial centers to the tourism revenue from the Cape and the Islands, the Commonwealth is heavily invested in its coasts.

Changes in precipitation would affect Boston's suburbs, many of which rely on their own water supplies. The western part of Massachusetts might be most concerned with impacts on natural resources because such resources attract large numbers of tourist each year.

Technical Assistance Needs

Massachusetts has recently funded LiDAR mapping for coastal communities, but additional resources are needed for inland communities, especially regarding river flooding. The Commonwealth is also in need of modeling capacity. They have the data, but need assistance with creating the models. Other data needs that were mentioned included:

- Better groundwater monitoring, especially near the coast
- Updated rainfall "return" information
- Updated 100-year flood mapping
- Information on tidal surges

The state also identified the need for assistance with vulnerability analysis on specific areas such as subway systems and airports.

Education and Outreach Assistance Needs

The Executive Office of Energy and Environmental Affairs has found that municipal education and outreach efforts have been most effective when climate preparedness is discussed in terms of hazard mitigation. One exception is the City of Boston, which is already onboard and explicitly supportive of adaptation.

Based on the high response rate from regional planning agencies and municipalities from within the Commonwealth, it is clear that education and outreach has been at least moderately successful in Massachusetts.

One specific need that was mentioned was more information for communities to convince them of the value of adopting adaptation-oriented policies and new requirements. In other words, the local officials need the evidence to justify taking action.

Financial Assistance Needs

Lack of funding is a huge obstacle for adaptation planning in Massachusetts. The state's Climate Change Adaptation Advisory's subcommittees are completely made up of volunteers from other governmental agencies, nongovernmental organizations and academia. Funding is needed to create the models from the LiDAR data.

The state also recognizes that financial limitations at the local level often prohibit adaptation work from even getting started. Most of the efforts have been on mitigation, and only where there is a clear short-term return on investment.

VERMONT

Unfortunately, we received no response or feedback from anyone within Vermont state government. However, the state is doing a considerable amount of adaptation work. The state's Climate Change team, which is part of the Vermont Agency of Natural Resources (ANR) has a website dedicated to their adaptation work: http://www.anr.state.vt.us/anr/climatechange/Adaptation.html.

The website explains the causes of climate change and some of the impacts that are already in evidence in Vermont. The state is working on a set of Adaptation White Papers that will provide "a brief overview of the challenges facing the different sectors of Vermont, what programs are already in place to address those challenges, and what steps need to be taken next to continue adapting to the impacts of climate change. The paper is still in draft form, however portions of it are available to download in PDF format. (VT Agency of Natural Resources, 2010)

The work began with the creation of The Climate Cabinet, which was established via executive order #05-11, signed on May 17th, 2011 by Governor Shumlin. The Climate Cabinet is comprised of senior government officials including Secretaries of Administration, Agriculture Food and Markets, Commerce and Community Development, and Transportation; the Commissioners of the Departments of Economic, Housing and Community Development, of the Department of Buildings and General Services and the Department of Public Service. The ANR is the lead agency of the effort and the Secretary of the ANR is the cabinet chair. (VT Agency of Natural Resources, 2010)

Part of the Climate Cabinet's mission is to implement climate change adaptation efforts across all state agencies and departments.

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3. REGIONAL PLANNING COMMISSIONS

WHO RESPONDED

Six regional entities responded to the survey. All but one were regional planning commissions (RPCs), the exception being the Ocean County, NJ, Parks and Recreation department. Two-thirds of the regional respondents were from coastal regions. Figure 3.1 identifies the regional governments that responded.

REGIONAL CLIMATE PREPAREDNESS

Regional climate preparedness work is primarily being supported by state programs. From the section on local governments, we learned that RPCs are providing most of the assistance to local governments. Most of the work is done through planning departments; however some work is being done by environmental, emergency management and transportation departments.

Half of the RPCs responding have not yet started adaptation planning. However two are in the process of creating an adaptation plan and one is incorporating climate adaptation into a hazard mitigation plan.

IMPACTS OF CLIMATE CHANGE

According to our survey, regional entities are most concerned with "increased levels of precipitation;" this was the number one or number two concern for

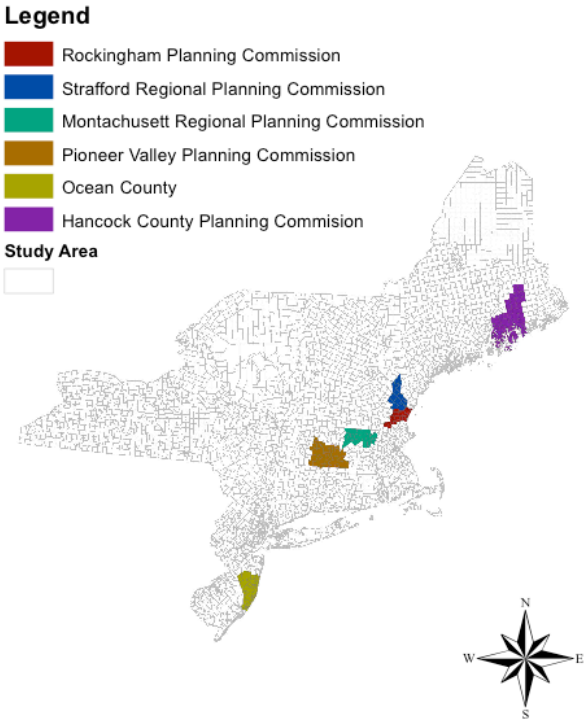


Figure 3.1 Map of survey responses from regional planning commissions and county governments. Winter, 2011.

Stage of Adaptation Planning	#
Have considered it, know something must be done, but not sure what the first step is	1
Know what needs to be done but don't have the capacity or resources to act	2
In the process of creating or updating a hazard mitigation plan to include the likely impacts of climate change an adaptation plan	1
In the process of creating an adaptation/climate preparedness or other type of plan that includes addressing the likely impacts of climate change	2

Table 3.1 Stage of regional planning commissions and county governments adaptation planning efforts. Winter, 2011.

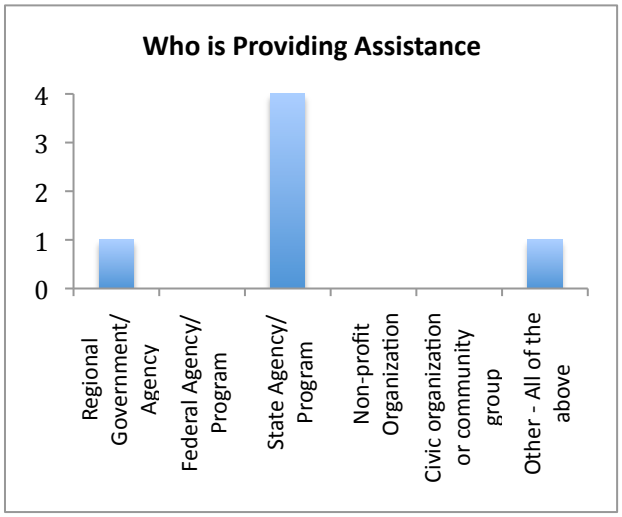


Table 3.2 Who is assisting regional planning commissions and county governments with their adaptation planning. Winter, 2011.

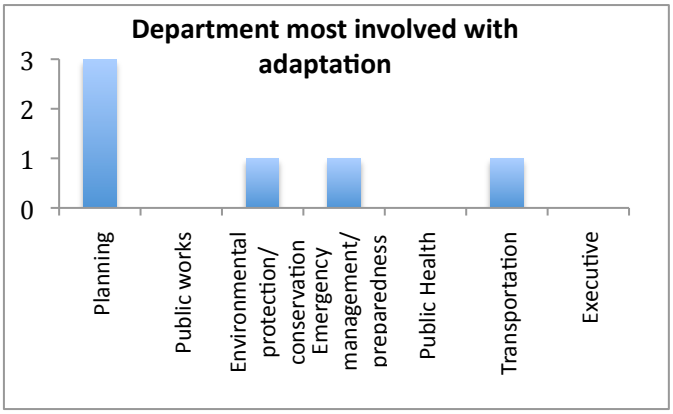


Table 3.3 Department most involved with adaptation efforts within regional planning commissions and county governments. Winter, 2011.

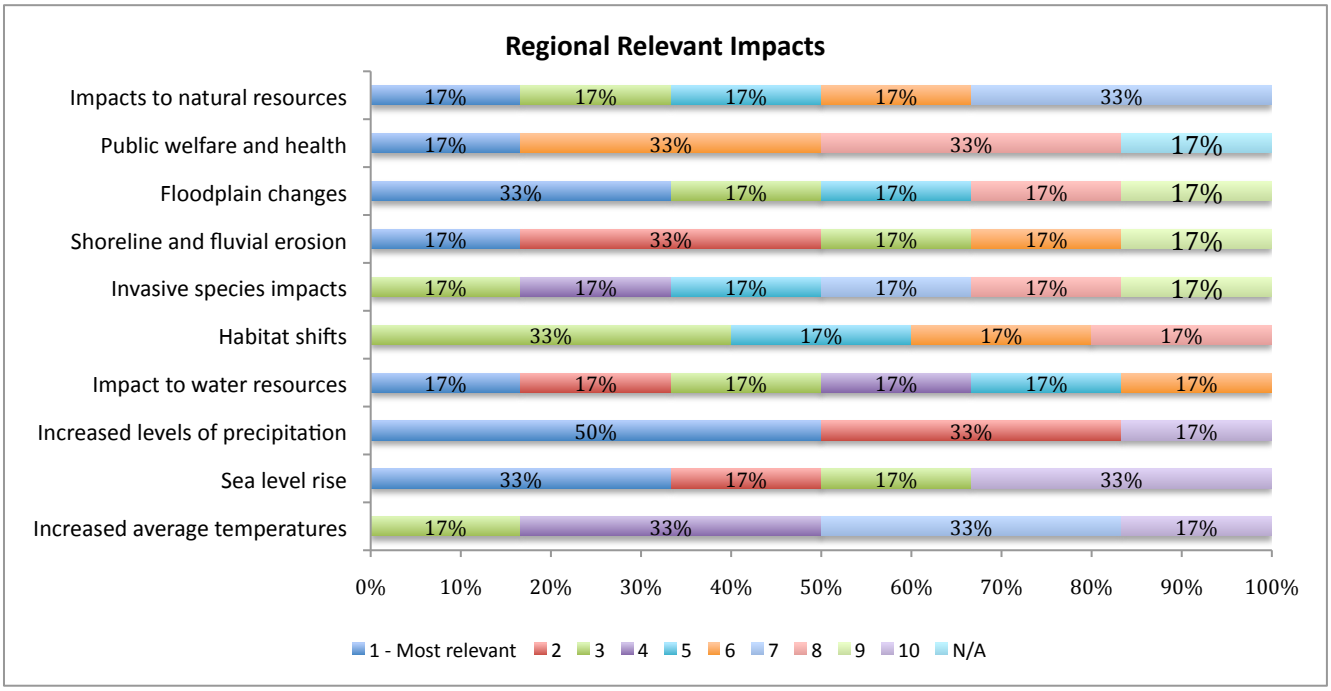


Table 3.4 The top concerns of impacts from climate change, identified through the surveying of regional planning commissions and county governments. Winter, 2011.

five of the six respondents. Floodplain changes and sea level rise were also a top concern for many.

The comments received in relation to this question clarify that issues around flooding are of the most concern. The RPCs serving coastal regions worry about sea level rise since the coastlines are the major drivers in their regional economies. There is also concern about losing waterfront parks. Increased levels of precipitation are a top concern because as one respondent noted,

"This one factor affects many sectors of health/safety, transportation infrastructure, natural resources and land use"

RESOURCE NEEDS

All six respondents indicated that financial assistance was vital to their climate preparedness work. Two said technical assistance was vital and one said education and outreach assistance was vital.

Technical Needs

The technical needs of regional governments, based

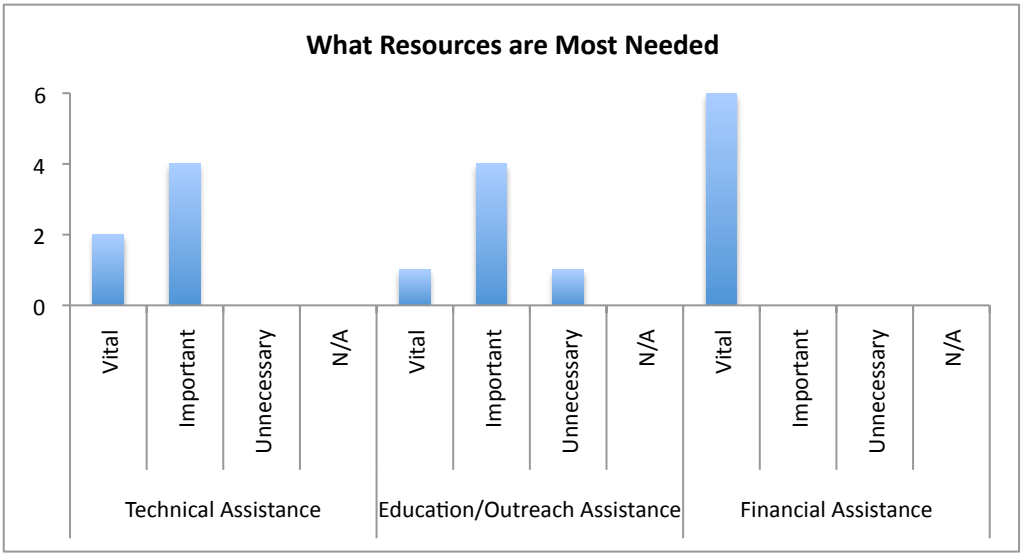


Table 3.5 Regional Planning Commission's and County Governments top resource needs. Winter, 2011.

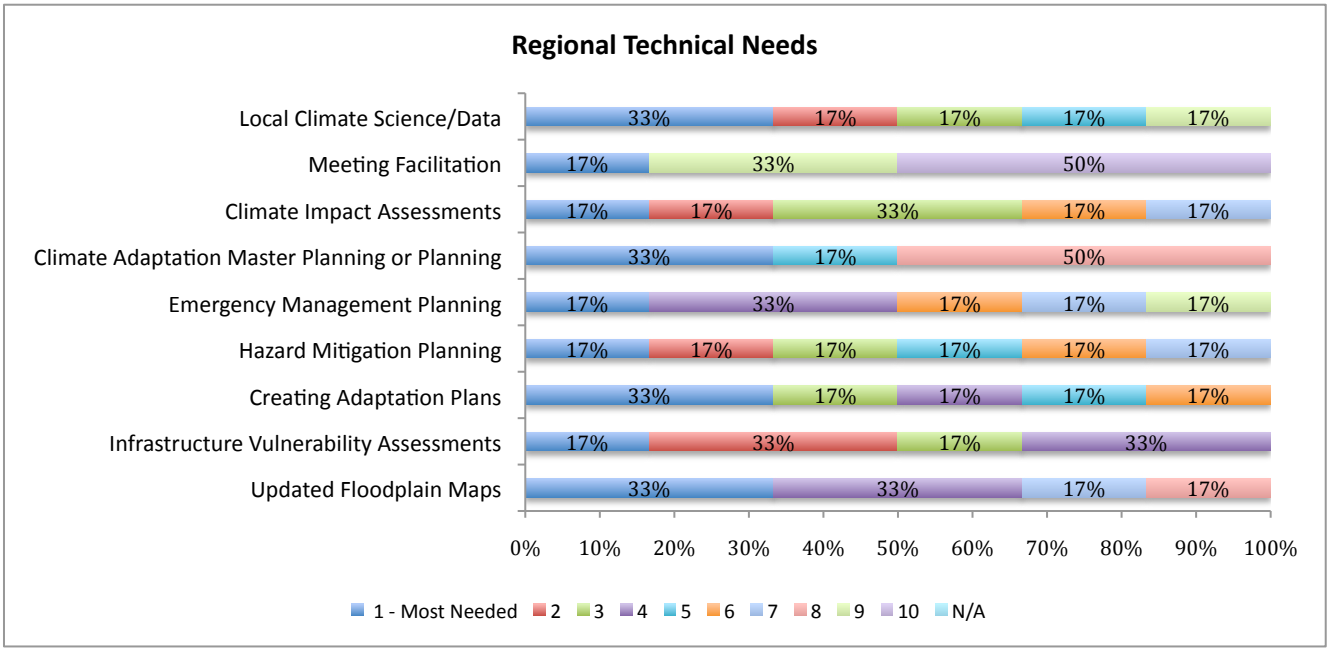


Table 3.6 Regional Planning Commission's and County Governments top technical needs. Winter, 2011.

on this survey, are broad. "Updated floodplain maps," "creating adaptation plans," "climate adaptation master planning" and "local climate science/data" were listed as the top need eight times collectively (some respondents had more than one 'top' concern).

In the comments section, respondents mentioned the following items as their single most needed technical assistance:

- Local infrastructure impacts modeling
- Local data
- Mitigation planning and implementation
- Funding for shoreline protection
- Funding/staff for implementation
- Examples or assistance with creating a regional adaptation plan

Education and Outreach Needs

Based on the ranking question in the survey, regional entities are most in need of "having a clear message for the public" and "coordination of staff across departments" (based on number one and number two needs combined). A respondent made the point that "we need to stop using the words 'climate change'" and that "frequency of major storms events

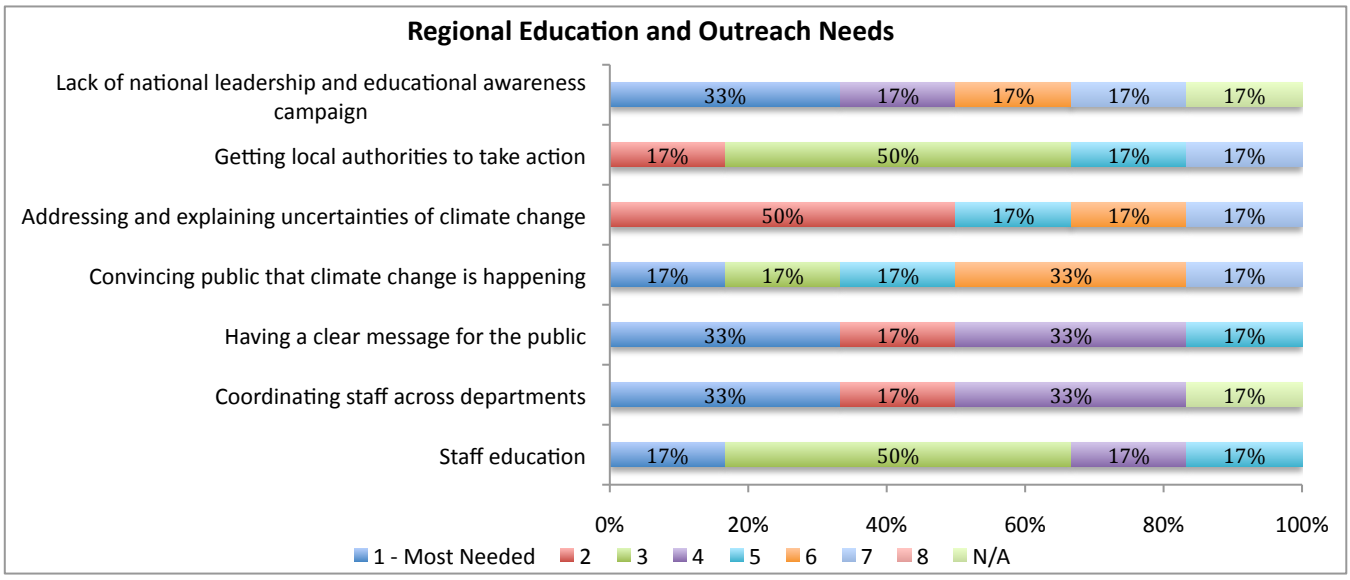


Table 3.7 Regional Planning Commission's and County Governments top education and outreach needs. Winter, 2011.

is a clearer motivation moving forward." In the comments section the respondents indicated the need for better data to create brochures and other materials to educate their communities. One respondent said, "this is a priority since towns are not presently being informed about these issues." Two respondents mentioned educating communities as a top priority. Another educational and outreach need was staff education to write a climate adaptation plan for the region. The lack of national leadership was also mentioned as a hindrance to climate preparedness work on the regional level.

Financial Needs

Two of the six respondents indicated their agencies would use financial assistance, if it were available, to hire a full-time employee to do general sustainability and climate work. The other was to pay current staff salaries to do this work. The respondent who selected "To train current staff" pointed out that they need more data in order to work on this issue and that they "need a source of funds against which we can bill our time." None indicated funding would be used for the hiring of a full-time employee just for climate preparedness work or to hire a part-time employee.

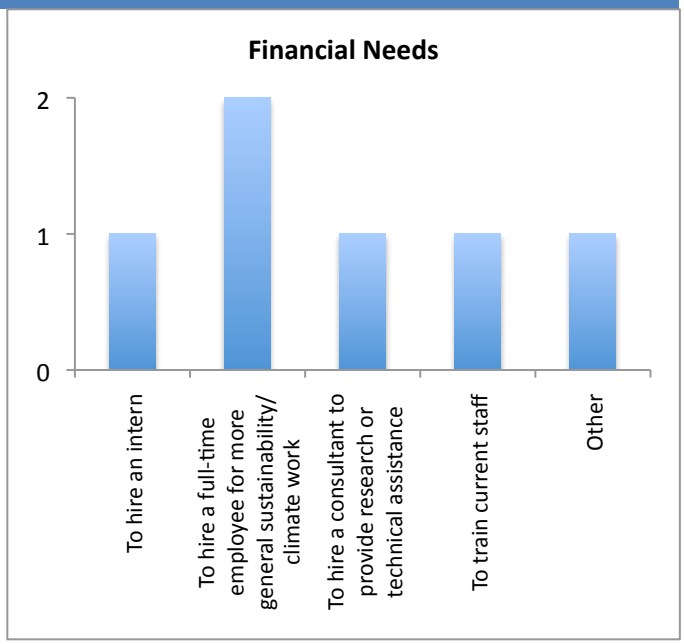


Table 3.8 Regional Planning Commission's and County Governments top financial needs. Winter, 2011.

4. LOCAL GOVERNMENT

WHO RESPONDED

Two-thirds of complete responses came from local governments, the majority of which were from planning department staff. Most of the respondents identified their communities as coastal and suburban, with populations between 20,000 – 50,000. We received 17 responses from Massachusetts, seven from Connecticut, three from New Hampshire, three from New Jersey, two from Rhode Island and two from New York.

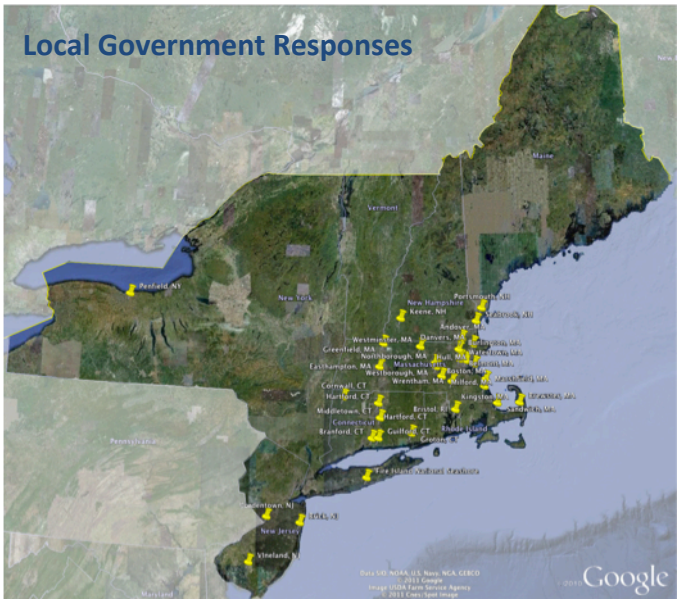


Figure 4.1 Map of survey responses from local governments. Winter, 2011.

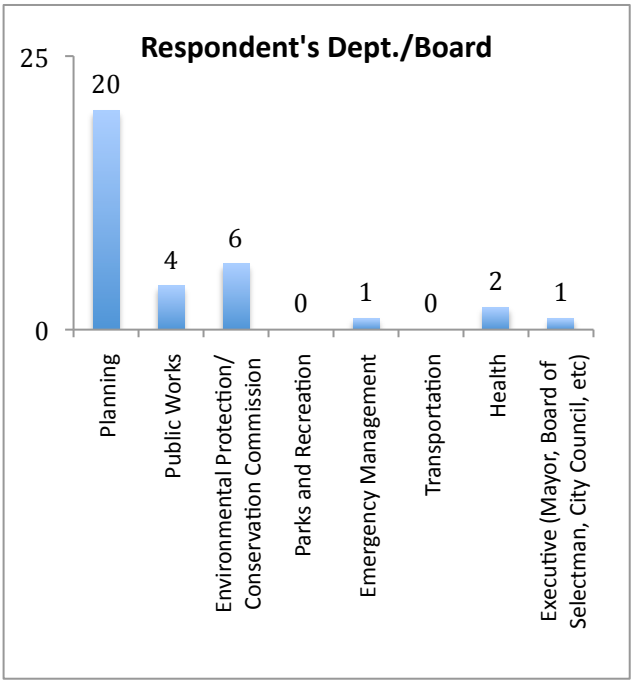


Table 4.1 The department or board that the survey respondent is from. Winter, 2011.

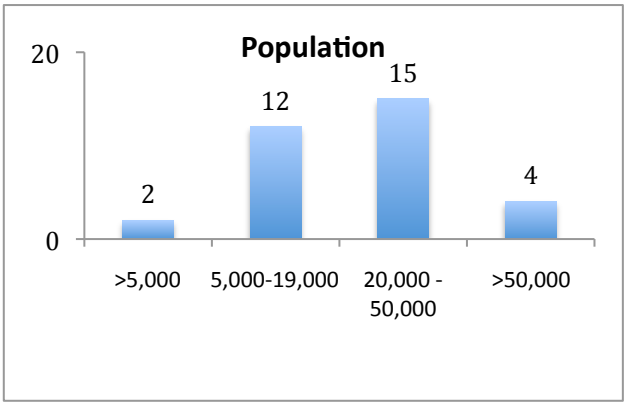


Table 4.3 Population of survey response communities. Winter, 2011

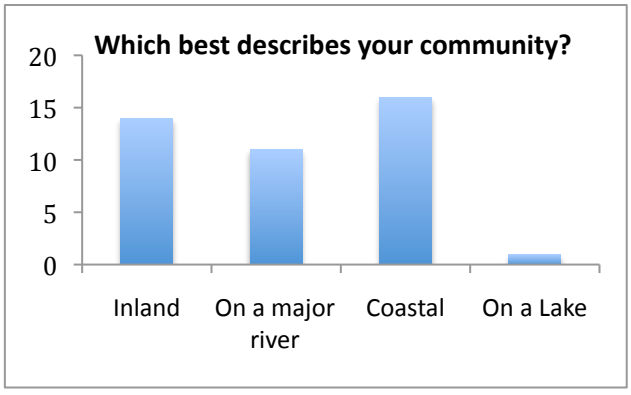


Table 4.2 Geological descriptions of survey response communities. Winter, 2011

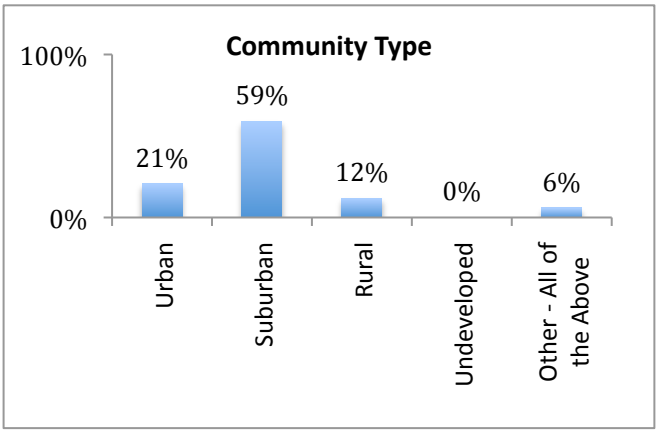


Table 4.4 Community type breakdown of survey responses. Winter, 2011

LOCAL CLIMATE PREPAREDNESS

Most of the respondents indicated that their communities are currently engaged in some form of climate preparedness planning and most of this work is being done by planning departments. Two-thirds of the respondents indicated that their communities had experienced significant damage from severe weather in the past ten years. Most noted that they are receiving assistance from regional planning commissions and county governments.

IMPACTS OF CLIMATE CHANGE

Table 4.8 shows that "sea level rise" (26%) and "public

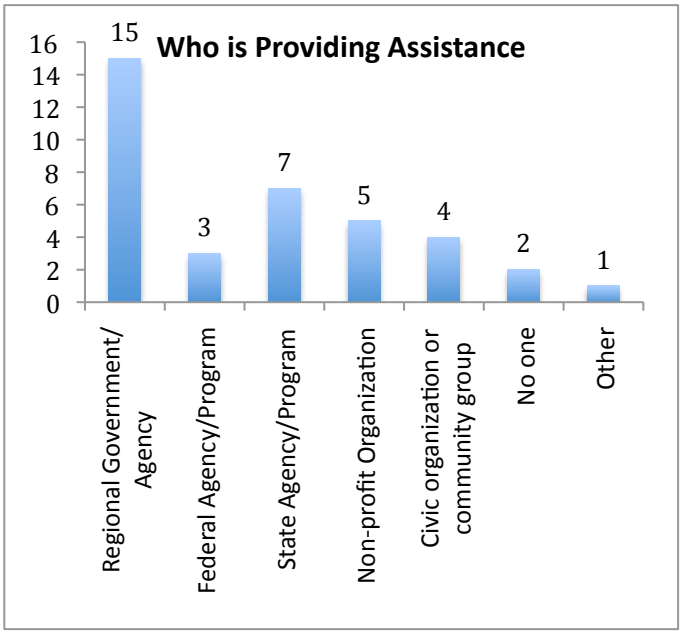


Table 4.5 Who is assisting local governments with their climate preparedness work. Winter, 2011

Stage of Adaptation Planning	#
Haven't thought about it at all	2
Have considered it but not sure if it needs to be addressed	3
Have considered it, know something must be done, but not sure what the first step is	6
Know what needs to be done but don't have the capacity or resources to act	4
In the process of creating or updating a hazard mitigation plan to include the likely impacts of climate change an adaptation plan	0
In the process of creating an adaptation/climate preparedness or other type of plan that includes addressing the likely impacts of climate change	6
We have a plan that addresses the likely impacts of climate change complete	1
Implementing climate preparedness plan or implementing the aspects of climate preparedness plan or implementing the aspects of climate preparedness in our Hazard Mitigation plan	3
Incorporating climate preparedness into all departments	1
Incorporating climate preparedness into hazard mitigation plan or emergency planning	3
Incorporating climate preparedness into master plan	1
Incorporating climate preparedness into Zoning Ordinances	1
Incorporate climate preparedness in development practices/polices	2

Table 4.6 Stage of climate preparedness work among local governments. Winter, 2011

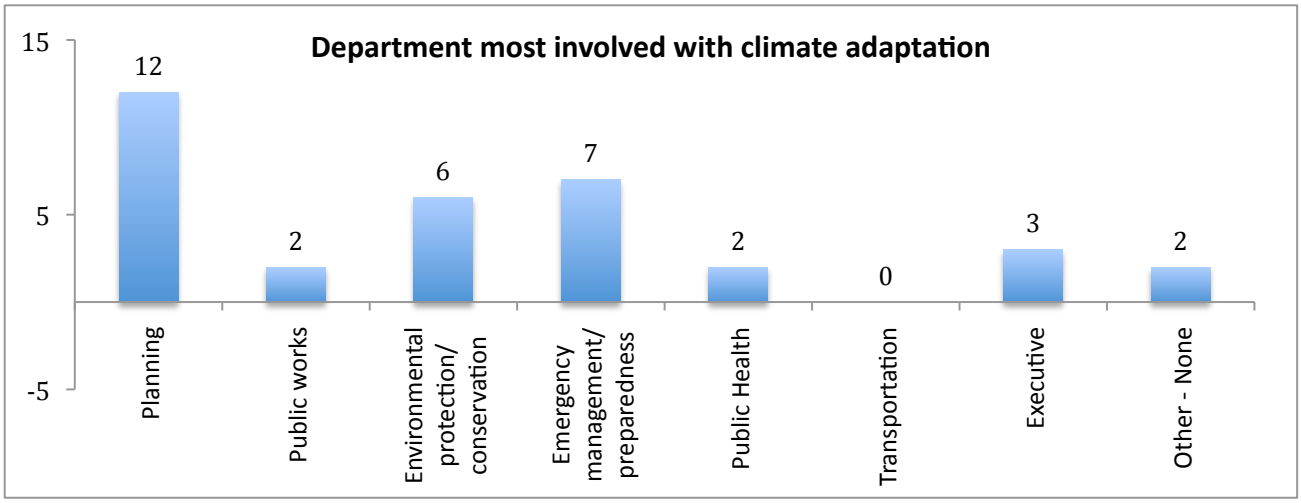


Table 4.7 Department most involved with climate preparedness work within local governments. Winter, 2011

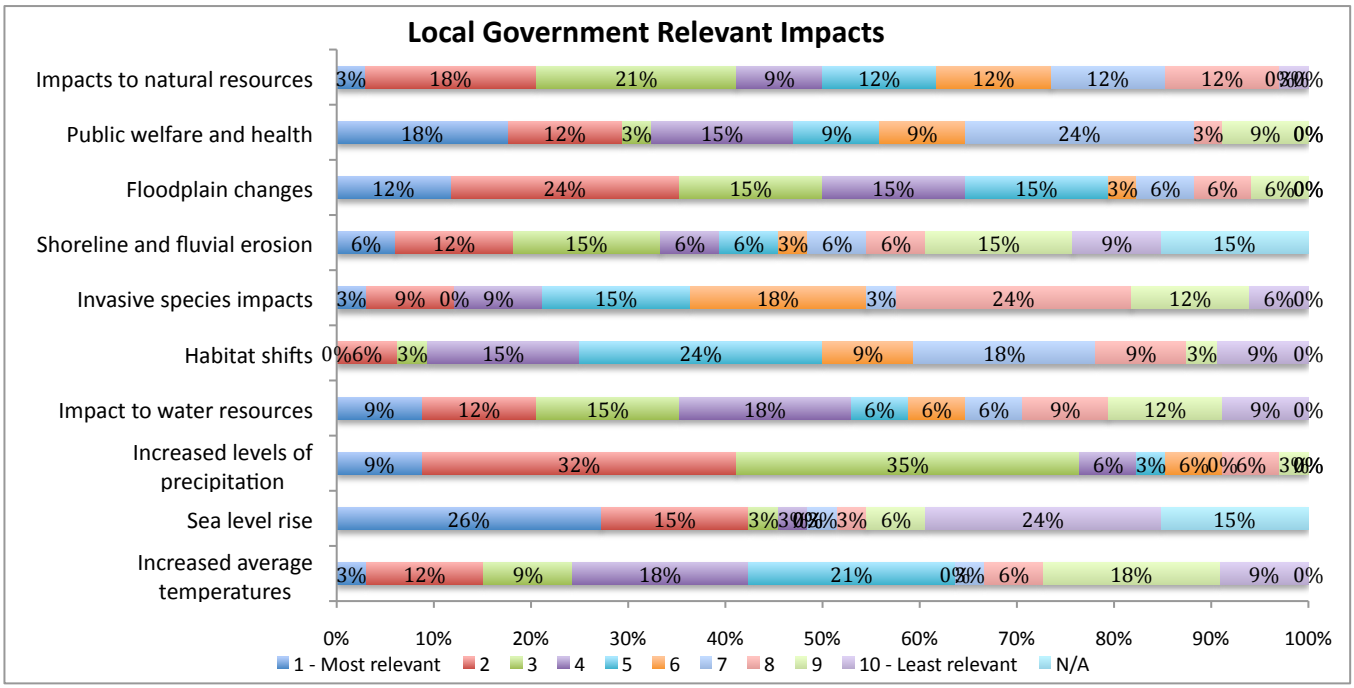


Table 4.8 The top concerns of impacts from climate change, identified through the surveying of local governments. Winter, 2011.

welfare and health" (18%) were most frequently ranked as the most relevant impact to local governments and their communities. Sea level rise was also rated "least relevant" for 24 percent of the respondents. When looking at the top two impacts, for coastal communities, "sea level rise" was again the most common response (26%), followed closely by "increased levels of precipitation," "public welfare and health" and "impacts to natural resources. Increased levels precipitation was a top three concern for 76 percent of the local government respondents. Coastal communities appear to be less concerned about "increased average temperatures." "Invasive species impacts" and "habitat shifts" were ranked low across the board, especially for coastal communities. The follow-up question, which gave respondents the

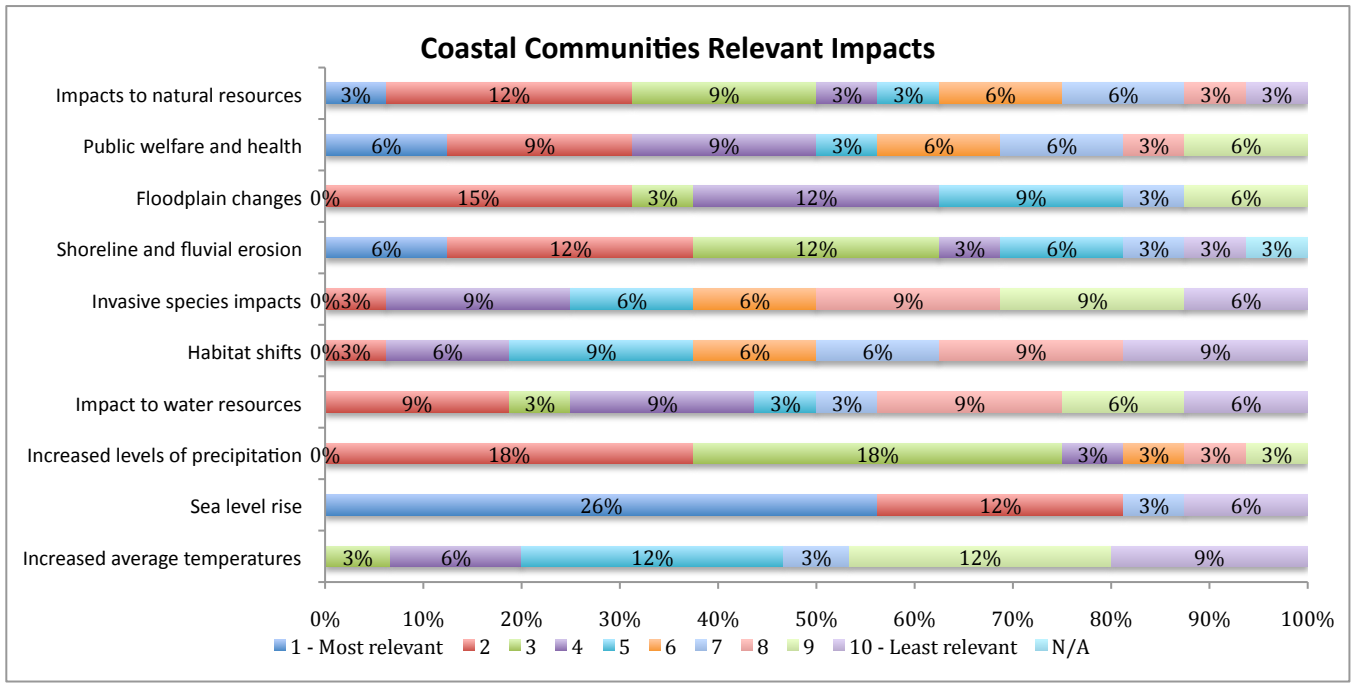


Table 4.9 The top concerns of impacts from climate change on coastal communities, identified through the surveying of local governments. Winter, 2011.

opportunity to identify and explain their top concerns, showed that local government officials are most concerned with how their infrastructure and the general public will be impacted. For coastal towns, this means sea level rise and erosion will be the most impactful. One local official responded saying,

> *"Significant sea level rise will dramatically affect existing public & private infrastructure, floodplains, natural resources, habitats, etc."*

Inland communities are, not surprisingly, less concerned with rising sea levels; their top concern was increased precipitation. An inland community respondent said,

> *"Actually, we're concerned with nearly all of them. The one that has the most importance is changes in the amount and type of precipitation. We seem to be experiencing that the most at the moment."*

Concern about the likely effects of climate impacts on infrastructure was a consistent theme.

RESOURCE NEEDS

In terms of resource needs, it comes as no surprise that half of the local governments indicated that financial assistances is vital for their climate preparedness work. Only one response indicated financial assistance was unnecessary. Technical assistance was second, with 44 percent indicating it as being vital. Education and outreach was ranked as important for most respondents.

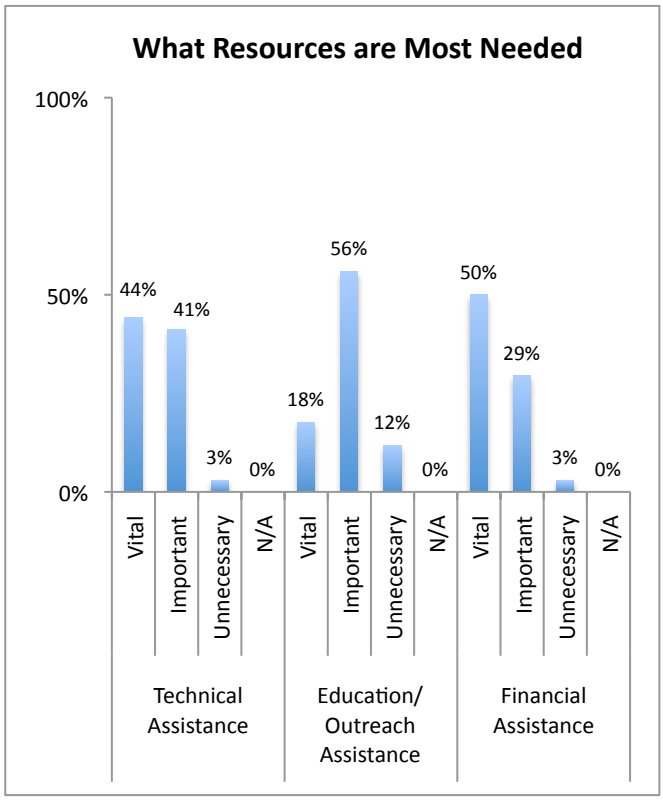


Table 4.10 Local governments resource needs. Winter, 2011.

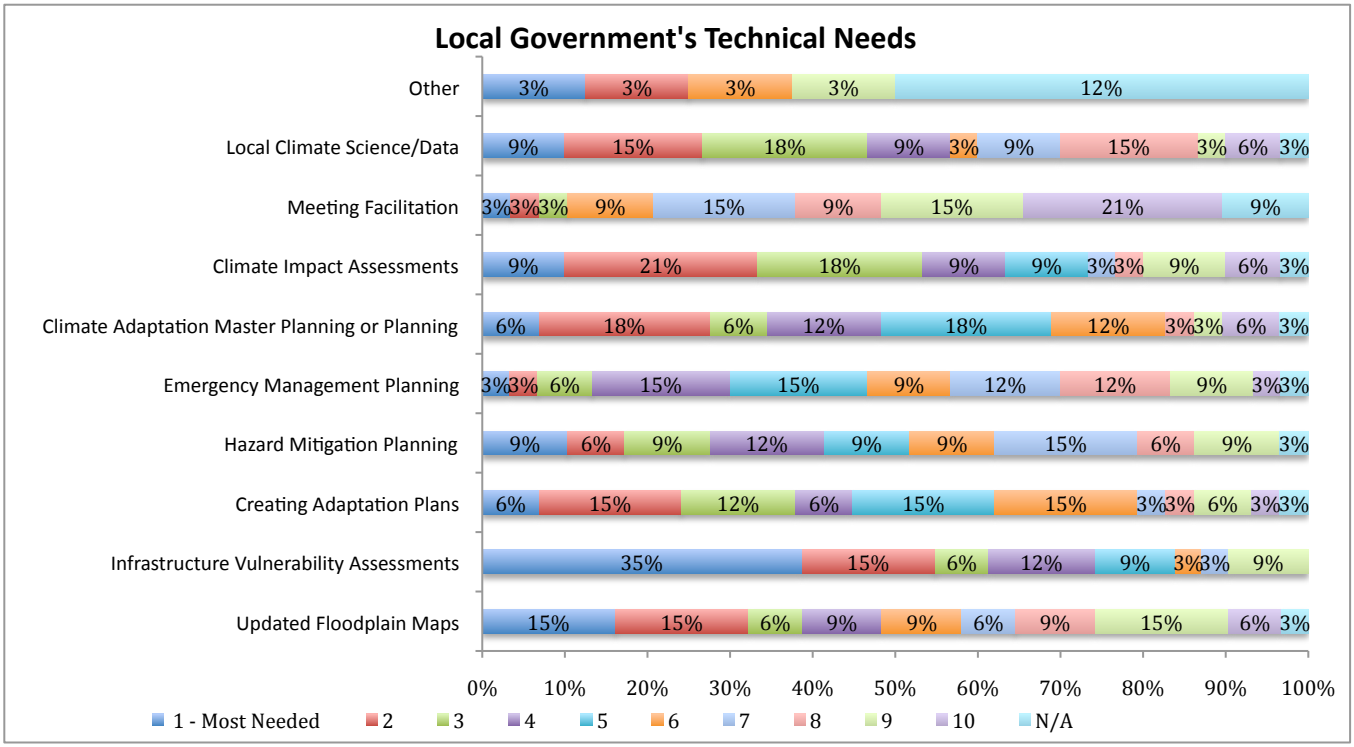


Table 4.11 Local government technical needs ranking. Winter, 2011.

Technical Needs

Responses to the question regarding technical needs reinforced the clear concern for infrastructure. "Infrastructure vulnerability assessments" were the top technical need for 35 percent of the respondents; it was in the top three for 56 percent. "Comprehensive climate impact assessments" were in the top three for 48 percent. The need for "local climate science/data" was ranked in the top three for 42 percent. "Updated floodplain maps" were also a top priority for many communities; it was the number one need for 15 percent.

The follow-up questions indicate that impact assessments are needed to give "a place to start planning and looking for funding" and to assess "infrastructure, floodplains, [and] natural resources." The most pressing local climate data needs are maps that project sea level rise at different time scales at the local level. According to one respondent,

> *"Updated inundation mapping showing sea level rise scenarios/impacts are most important to help plan for future infrastructure priorities."*

Local governments are concerned with protecting their people and the critical infrastructure that enables their communities to function. They require assistance in understanding how people and the built environment are and will be affected by climate change impacts.

Education and Outreach Needs

Education and outreach needs seem to be highly variable, in keeping with variation in local governments. Is local leadership supportive of climate preparedness efforts? Is the community behind these efforts or do they need convincing? Twenty-one percent said "convincing public that climate change is happening" is their top need. In the open-ended follow-up questions, many elaborated on their need for information that explains the impacts of climate change in order to convince the public and/or leadership that action is needed. One respondent said their community's top education and outreach need is,

> *"Determining and making known likely local impacts of climate change to officials and public."*

Another said,

> *"Education for the local boards and commissions on the real need to address this issue."*

And finally, another said,

> *"Getting staff to better understand the impacts of climate change so that the park can better position its priorities for the near future."*

It seems clear that the education and outreach needs of local governments are broad. Essentially, communities need all of the items listed, from national leadership to local education.

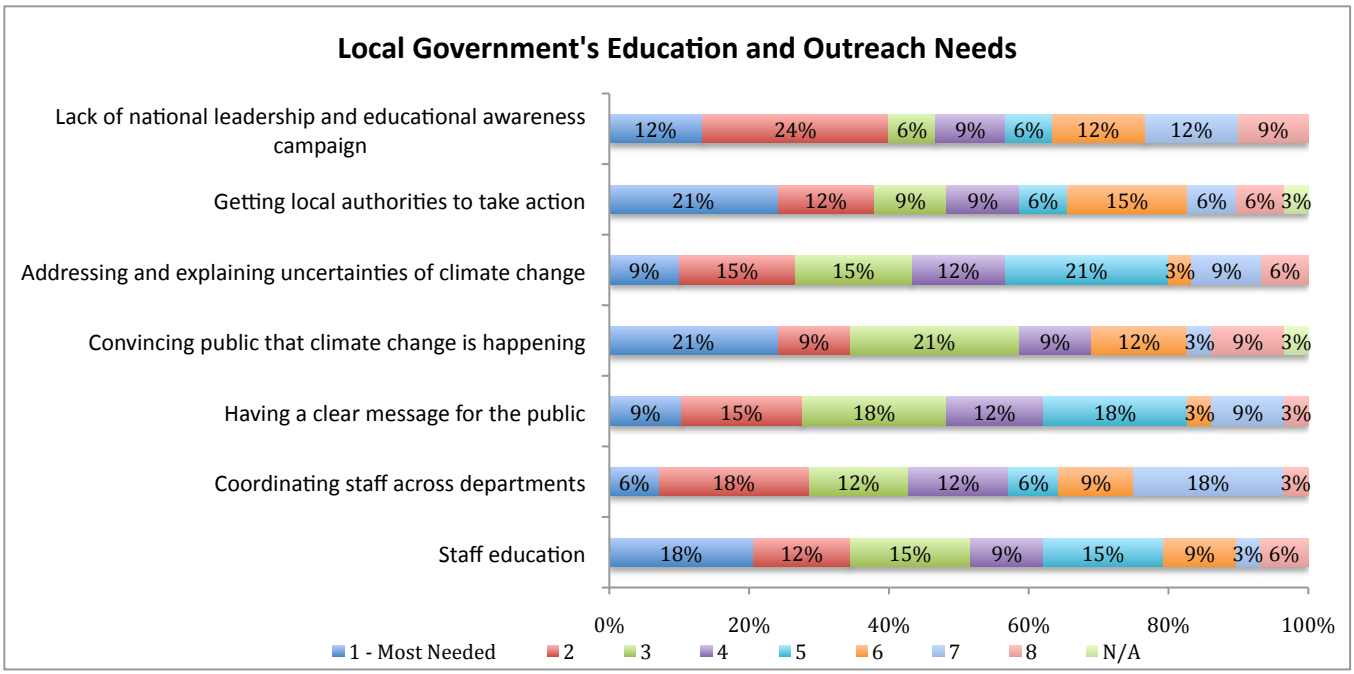


Table 4.12 Local government education and outreach needs ranking Winter, 2011.

Financial Needs

Throughout the survey, many respondents used the comments section of questions to explain that they need serious financial assistance to carry out climate preparedness work. As one community put it, "everything is in place, we need funding and staff." Having the personnel and funding to carry out this work is essential. One community said, in response to the technical needs question, that they need "a champion to promote and carry the task forward and to physically do the work." Forty-seven percent said they would use funding to hire a consultant to provide research or technical assistance. Municipal staff generally are already too busy working on various day-to-day tasks with limited budgets and do not have the time to take on climate preparedness. As another technical needs questions response put it,

> *"With the present state of the economy the local staff is overly short-handed. While there is a desire to address planning, the day-to-day need for maintenance and management take priority over planning initiatives."*

This explains why many communities we surveyed said they would prefer to hire an outside consultant or a full time employee for more general sustainability/climate work (21 percent).

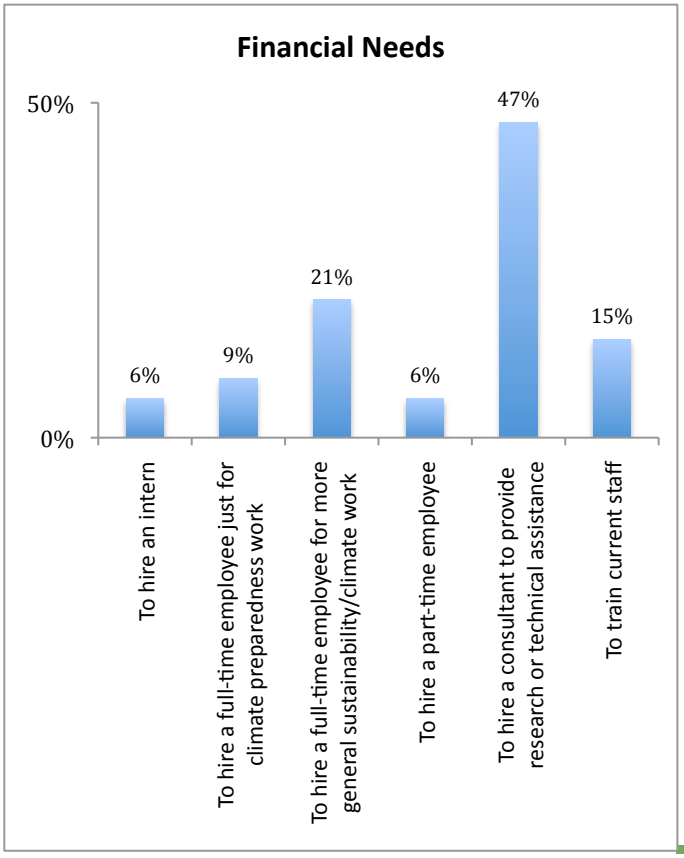


Table 4.13 Local government financial needs ranking. Winter, 2011.

5. CONCLUSION

This needs assessment reached out to more than 200 communities from Maine to New Jersey, and received complete responses from 34 local governments, 6 regional governments, and 8 state agencies. While it cannot be considered a comprehensive assessment, it does provide ample data from which to draw general conclusions about adaptation work in the Northeast.

WHAT ARE THE NEEDS?

Communities in the Northeast are concerned about preparing for climate change impacts; over half who responded are already doing some form of adaptation planning, and another third are concerned but unsure what steps to take or lacking capacity.

The climate impacts communities are most focused on include sea-level rise, increased precipitation and floodplain changes, as well as threats to public welfare and health.

Technical assistance of various kinds is needed. The top priority is help with infrastructure vulnerability assessments—35 percent of the local respondents identified that as their top technical need. Other high- priority technical needs included help with overall climate impact assessments, local climate science data and updated floodplain maps. The most pressing local climate data needs are for maps that project sea level-rise at the local level at different time scales.

Communities also need help with education and outreach. Twenty-one percent said that convincing the local public that climate change is happening is their top need. Many said that they needed help making adaptation action a priority at a time of constrained human and financial resources.

Finally, communities need financial assistance and staff capacity. 77 percent of the respondents said they needed assistance to hire or contract with a full-time person to lead their climate preparedness efforts.

In addition to technical, education and outreach and financial needs, it appears that local governments would benefit from a champion to push for climate preparedness work. This need was expressed by many in some of the open-ended survey questions.

Many governments do not have staff or time to add climate preparedness to their agendas as a separate domain of work. As a result, governments are attempting to either incorporate adaptation into operations across all of their departments and planning, or they are looking to hire a consultant who will do distinct aspects adaptation planning such as a vulnerability assessment, for them. Many suggest the first option is preferred, because it saves money and allows the people who know the community best to conduct the work; makes it more likely that such efforts will be integrated into "business as usual" and sustained; and avoids the creation of another plan that requires implementation and potentially will collect dust on a shelf somewhere. This approach simply involves putting a 'climate lens' across all departments and projects. Boston is one example of a community that is taking such an approach; each city agency or department has been asked to set and work toward meeting climate mitigation goals and to incorporate data about climate change impacts into all the planning or projects that they undertake.

The downside to that integrated approach is that it requires moving multiple staff through a learning curve; with budgets tight and personnel stretched thin, it can be more feasible in the short term to bring in outside expertise for specific tasks, such as evaluating coastal infrastructure vulnerability.

Ultimately, communities must decide what approach is best for them. Most importantly, they must get started. This assessment identified some existing and/or soon-to-be available tools and resources that are well-suited to meet the needs of adaptation "practitioners." Various federal and state agencies, nonprofits and universities are all work on developing such resources and tools.

REGIONAL AND STATE SUCCESS STORIES

This assessment has found that state and regional level initiatives are often able to best optimize effective use of resources, and we are beginning to see many more such efforts under development. With limited government budgets, it is inefficient for each town or municipality to attempt to generate their own data on

the local impacts of climate change. Once the impacts of climate change are modeled and understood at a regional scale, local governments can apply the information to their towns and evaluate how their infrastructure and services will be impacted. State and regional budgets may be tight as well; however, investment in tools and resources and access to federal data and resources at such scales can serve multiple towns and it is a more efficient way of utilizing funding and personnel.

This is not to say that climate preparedness planning should be a top-down effort. While the tools and resources often need to come from above, local knowledge of priorities, political climate, infrastructure and community vulnerabilities will ultimately be key to effective climate preparedness strategies.

Online Mapping and Visualization Tools

Connecticut and Massachusetts have already begun to develop and provide hands-on resources designed to meet some of the technical needs identified as important in this assessment. For example, The Nature Conservancy's Coastal Resilience project provides communities, planners, businesses, and officials along Long Island Sound easy access to information on projected changes in sea level and coastal storm impacts in order to assist in coastal planning and management decisions. The project includes a scenario-based mapping tool that is open-access and available via the web. (TNC, 2011)

The State of Connecticut is working with ICLEI – Local Governments for Sustainability on an Adaptation Resources Toolkit (ART), which uses the adaptation planning experience of Groton, Connecticut to help provide the necessary resources for other communities in the state. Connecticut Department of Environmental Protection has also developed the Connecticut Coastal Hazards Portal and Visualization Tool for its coastal communities. The site is "a centralized source of information for the municipal officials, coastal property owners, state coastal managers, and the general public." (CT DEP et. al, 2009) The website offers coastal hazards management information as well as a tool that shows what coastal flooding and sea level rise look like on a map of the state's coast.

Massachusetts also provides resources for coastal communities. Its StormSmart Coasts program is designed to help coastal communities address the challenges arising from storms, floods, sea level rise, and climate change. It also provides a menu of tools for successful coastal floodplain management. This website is a great hub for information on coastal planning in Massachusetts, but it does not offer any mapping tools.

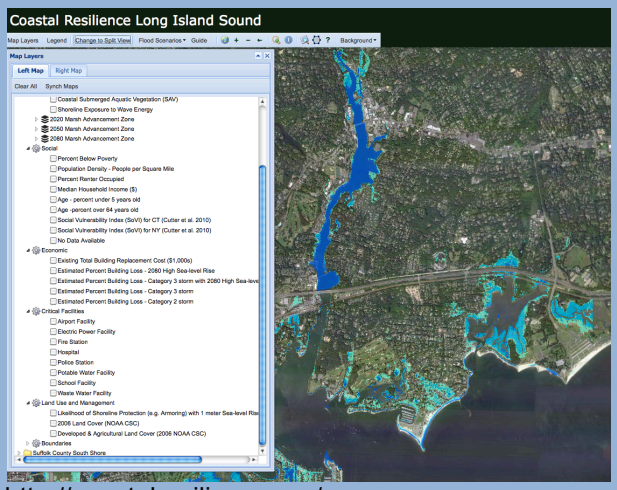
Massachusetts did recently develop its own coastal online mapping tool called Massachusetts Ocean Resource Information System, or MORIS. The tool can be used to search and display spatial data

The Nature Conservancy's Coastal Resilience Website and Tool

The Nature Conservancy
Protecting nature. Preserving life.™

The aim of this website and tool is to provide coastal communities with a decision support platform for their planning, zoning, acquisition and permitting decisions in response to coastal change. The tool provides a wealth of geospatial information for exiting risk and future growth strategies. It includes locally relevant, down-scaled projections of sea level rise with or without storm surges. Additional layer include marsh advancement zones, social vulnerability and other population census data, critical infrastructure, land cover data, and estimates of percent building loss and replacement cost under various sea level rise and/or storm scenarios.

The image below shows the various layers that can be viewed in relation to selected scenarios. The various shades of blue indicate different mapping confidences of inundation under selected scenarios. The website also supports the US Virgin Islands and the Gulf of Mexico



http://coastalresilience.org/

pertaining to the Massachusetts coastal zone. Much like TNC's tool, MORIS uses an interactive map to display various information such as tide gauge station, marine protected areas, bathymetry, marine life, and historical coastlines. It also displays census data, much like the TNC tool. However this tool does not visualize sea level rise projections. (MA Office of Coastal Zone Management, n.d.)

One benefit of MORIS is that it allows the user to easily export the maps and data. The data can be exported to ESRI shapefiles or Google Earth KMZ files—something that Connecticut's mapping tools cannot do. Being able to take this data into a powerful program like ArcGIS is essential for enabling planners to work with the data.

These types of open-access, web-based tools put vast amounts of information in the hands of communities; and not just the municipal officials, but the citizens as well. In the case of TNC's Coastal Resilience tool, anyone can now see and explore the future of their coastline. This creates a powerful education and outreach tool for the community. City officials and residents alike can use these types of tools to see how their community or property will be impacted by climate change. Then they can take the necessary steps to plan and prepare.

Regional Planning Commissions

It is clear that at least some regional planning commissions (RPCs) in the Northeast are beginning to work on climate preparedness. They are assisting local governments with adaptation work and considering the impacts of climate change at the regional level.

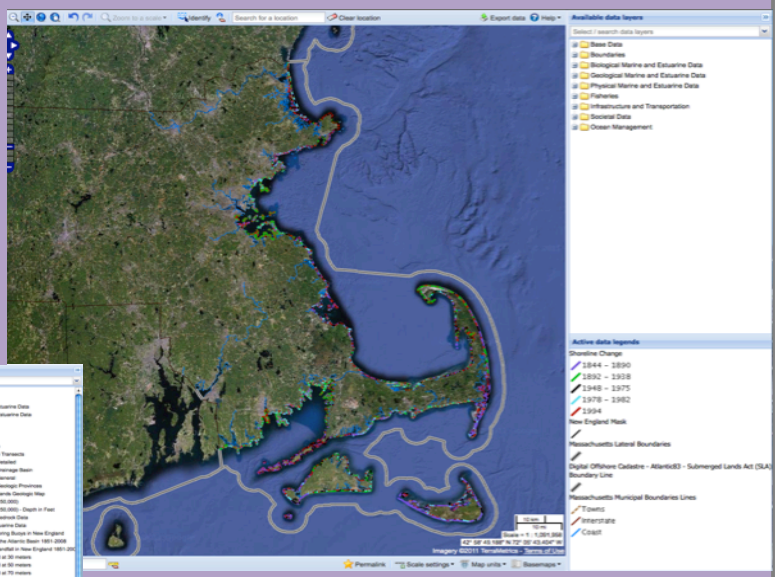
There are, nationally, fewer well-known models and less available research about climate preparedness planning at the regional level than at the local level. There are a few examples in the western and southern parts of the U.S. (Miami-Dade County and King County, WA are a few prominent ones); however county government and regional planning agencies in the Northeast function much differently so it is difficult to compare or use such examples as models.

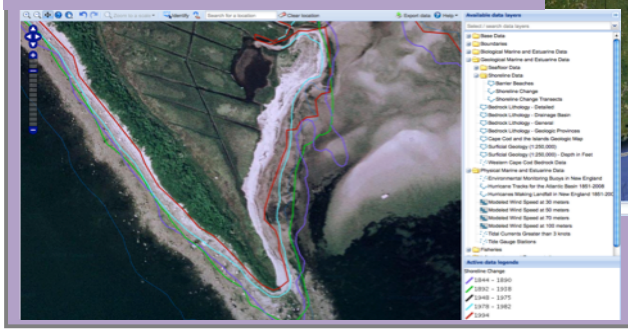
Local governments, especially in smaller communities, are already accustomed to going to their RPC for technical assistance with planning. This relationship might naturally expand to include climate preparedness planning, since regional agencies tend to have technical expertise on staff that would lend itself to such work.

One such example is in Massachusetts, where local governments are encouraged to create Hazard Mitigation Plans that account for the future impacts of climate change. By creating such plans, they become eligible for post-disaster recovery funds. Many RPCs in Massachusetts are already being called

MORIS

Users can search, display and download spatial data related to the Massachusetts coastal zone. These images show the shoreline change layer. The red line is the coastline in 1994 and the purple line shows where the coast used to be between 1844 and 1890. Sea level rise projections are not yet available with this tool.





http://www.mass.gov/czm/mapping/index.htm

Southern Maine Regional Planning Commission – Sea Level Adaptation Working Group for Saco Bay

In early 2009, the Town and City Mangers of Saco, Scarborough, Old Orchard Beach, and Biddeford, ME decided to created a Saco Bay Sea Level Adaptation Working Group (SLAWG) to develop and implement regional climate change adaptation strategies to respond to rising sea levels and become more resilient to coastal. The Southern Maine Regional Planning Commission (SMRPC) received a grant from the Maine State Planning Office (SPO) in 2009 and facilitated the creation of a Steering Committee for SLAWG. The Steering Committee worked with SMRPC and the Main Geological Survey (MGS) to create a detailed action plan for SLAWG and an interlocal agreement for council consideration, containing its structure, by laws, and duties. All four communities ratified the interlocal agreement by November 2010. A Regional Vulnerability Assessment for the region was created and a draft version was submitted to municipal councils for approval.

SMRP is also working with MGS, the Maine Coastal Program and the above-mentioned towns on a project called the Coastal Hazard Resiliency Tools Project. The goal of this project is to work on data development, outreach and education, and create partnerships.

More Information is available online at

http://www.smrpc.org/Sea Level Adaptation/Sea Level Adaptation Working Group Page.htm

upon to assist in creating these plans for their local communities.

However, we have learned from this survey that RPCs feel they need much more and better data to support their local governments effectively in such tasks. This will likely need to be provided by federal agencies and/or academic researchers. While having a staff person dedicated to sustainability work generally and/or climate change adaptation specifically would enable RPCs to develop and sustain deep knowledge of the impacts of climate change in their region that they could then share at the local level, it is not clear that such capacity will be available anytime soon.

Whether or not it proves feasible to have dedicated staff for such work, it is certainly the case that some of the state-level tools and resources mentioned in the previous section could be used by regional planning agencies to help create adaptation plans for their regions. RPCs can also help connect local governments to the many resources and tools available at the state and federal levels.

In addition to providing or connecting local governments with technical resources, regional planning commissions clearly have an important role to play in facilitating cooperation between local governments. The call-out box on page 31 highlights the facilitation work of the Southern Maine Regional Planning Commission (SMRPC). Indeed, the SMRPC has emerged as great model in the Northeast for collaborative regional climate preparedness planning.

OBSERVATIONS FOR MOVING FORWARD

With such a wide array of technical assistance, education and outreach, and financial support needed in order to prepare the Northeast for climate change, governments at all levels clearly have their work cut out for them. The federal government provides a substantial and increasing number of tools for climate preparedness, especially the EPA and through NOAA's Coastal Services Center. However, the need for additional resources is still clearly very great.

Beyond the needs for technical expertise and the obvious question of funding, one "missing piece" cited by a number of communities emerged rather prominently: the need for a comprehensive education and outreach campaign that would emphasize the necessity of climate preparedness at the state and local level, and offer some degree of "standardization" mandating that climate preparedness be addressed. Convincing residents and even some local elected officials of the need to prioritize climate preparedness remains an uphill battle according to many of those who responded to our survey; there was a clear theme indicating desire for a federally orchestrated campaign

to help address these problems.

State agencies must utilize the available federal resources, and help make these resources available to their communities as well. State efforts often begin with an executive order mandating that climate adaptation be addressed. This appears to be critical for ensuring an organized approach is taken and that efforts are not duplicated. States can also work with their regional governments to support and facilitate climate preparedness planning. This has proven to be an effective way of distributing data and resources from the state and federal levels to the local level.

Partnerships between governments, NGOs, universities, and/or businesses are also useful for getting data and other resources to those that need them. Successful examples of and models for such partnerships abound: universities including Antioch New England, Columbia, Cornell, Rutgers, the University of Massachusetts, University of Maine, and University of New Hampshire, and nonprofits like Manomet Center for Conservation Sciences, ICLEI-Local Governments for Sustainability, The Nature Conservancy and Clean Air-Cool Planet are just a few examples of those working directly with municipal, regional or state agencies to support their adaptation efforts.

Many local governments are eager prepare their communities for the impacts of climate change. However, even when the necessary data and technical tools are made available, municipalities often find themselves short of staff-power to execute the work. This is a barrier that can to some degree also be addressed through strategic partnerships in the public and private sectors—but only to a point. As government budgets continue to shrink, engaging in climate preparedness efforts at the regional scale becomes ever more imperative. Regional cooperation and the sharing of resources will maximize results while conserving funding.

Resources

CT Department of Environmental Protection (CT DEP), University of Connecticut and NOAA Coastal Service Center, 2009. Connecticut Coastal Hazards Portal and Visualization Tool. http://coastalhazards.uconn.edu/map_info_page.html

MA Office of Coastal Zone Management, n.d. Massachusetts Ocean Resource Information System: CZM's Online Mapping Tool. http://www.mass.gov/czm/mapping/index.htm

The Nature Conservancy (TNC), 2011. Coastal Resilience. http://coastalresilience.org/

APPENDIX A – INTERVIEW QUESTIONS

1. What resources are you currently using to help your adaptation work move forward?
2. What specific data is necessary for you to move forward with adaptation planning?
3. What are the bureaucratic barriers you are facing dealing with adaptation?
4. What resources do you need in order to move forward with adaptation work? (Federal, state, other?)
5. What other needs do you have?
6. Are there any other questions we should be asking?
7. What successes/difficulties have you had in discussing adaptation within your organization and with the public?

Final Questions:

1. Who else should we be talking to in your state that is working on adaptation?

2. What one thing would be most helpful?

3. What other workshops/events are occurring in your state on adaptation? Networks in your area? Sharing opportunities?

APPENDIX B – SURVEY QUESTIONS AND RESULTS

Constant Contact Survey Results

Survey Name: Northeast Climate Preparedness Needs Assessment Survey

Response Status: Completed

Filter: None

3/31/2011 2:50 PM EDT

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* Are you completing this survey on behalf of a local, regional or state government/agency?

Answer	0% 100%	Number of Response(s)	Response Ratio
Local		34	66.6 %
Regional		6	11.7 %
State		8	15.6 %
Other		3	5.8 %
No Response(s)		0	0.0 %
	Totals	**51**	**100%**

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*

Government/Agency Name

51 Response(s)

*

Department or Board

Answer	0% 100%	Number of Response(s)	Response Ratio
Planning		25	49.0 %
Public Works		4	7.8 %
Environmental Protection/Conservation Commission		9	17.6 %
Parks and Recreation		1	1.9 %
Emergency Management		1	1.9 %
Transportation		0	0.0 %
Health		2	3.9 %
Executive (Mayor, Board of Selectman, City Council, etc)		1	1.9 %
Other		8	15.6 %
No Response(s)		0	0.0 %
	Totals	**51**	**100%**

If you represent a town or city, what is its approximate population?

Answer	0% 100%	Number of Response(s)	Response Ratio
>5,000		2	3.9 %
5,000-19,000		12	23.5 %
20,000 - 50,000		15	29.4 %
>50,000		7	13.7 %
No Response(s)		15	29.4 %
	Totals	**51**	**100%**

Is your community, or the communities you serve, primarily urban, suburban, rural or undeveloped?

Answer	0% 100%	Number of Response(s)	Response Ratio
Urban		8	15.6 %
Suburban		21	41.1 %
Rural		6	11.7 %
Undeveloped		0	0.0 %
N/A - I work for a state government		8	15.6 %
Other		6	11.7 %
No Response(s)		2	3.9 %
	Totals	**51**	**100%**

* Which best describes your community or the communities you serve? Select all that apply.

Answer	0% 100%	Number of Response(s)	Response Ratio
Inland		20	39.2 %
On a major river		15	29.4 %
Coastal		25	49.0 %
Other		7	13.7 %
	Totals	**51**	**100%**

What department within your government is most involved with climate change adaptation? Please explain this involvement in the comments section.

Answer	0% 100%	Number of Response(s)	Response Ratio
Planning		16	31.3 %
Public works		2	3.9 %
Environmental protection/conservation		14	27.4 %
Emergency management/preparedness		8	15.6 %
Public Health		2	3.9 %
Transportation		1	1.9 %
Executive		3	5.8 %
Other		5	9.8 %
No Response(s)		0	0.0 %
	Totals	**51**	**100%**

Rank the following potential impacts of climate change in terms of how relevant or impactful they are likely to be to your community; one being the most relevant.Please do not assign more than one item to a number. For example, there should only be one item ranked as "1 - Most relevant."

1 = 1 - Most relevant, 2 = 2, 3 = 3, 4 = 4, 5 = 5, 6 = 6, 7 = 7, 8 = 8, 9 = 9, 10 = 10 - Least relevant, 11 = N/A

Answer	1	2	3	4	5	6	7	8	9	10	11	Number of Response(s)	Rating Score*
Increased average temperatures												50	5.5
Sea level rise												50	4.9
Increased levels of precipitation												51	3.0
Impact to water resources												51	4.8
Habitat shifts												48	5.9
Invasive species impacts												50	6.3
Shoreline and fluvial erosion												50	5.6
Floodplain changes												51	4.1
Public welfare and health												51	4.9
Impacts to natural resources												51	4.8

*The Rating Score is the weighted average calculated by dividing the sum of all weighted ratings by the number of total responses.

Of the options given in question 8, what is your top concern regarding the impacts of climate change and why?

46 Response(s)

Has your community experience significant damage from severe weather in the past 10 years? For example, infrastructure, insurance claims, erosion or loss of life? If yes, please give details such as dates and damages in dollar amounts and any key loss of infrastructure.

Answer	0% 100%	Number of Response(s)	Response Ratio
Yes		38	74.5 %
No		11	21.5 %
No Response(s)		2	3.9 %
	Totals	**51**	**100%**

What stage best describes where your government is in terms of adaptation planning or incorporating climate preparedness into your overall planning efforts? We define adaptation planning as planning for possible increases in the frequency of extreme weather and flooding events, or other potentialimpacts of climate change, including but not limited to sea-level rise and more frequent storm surges.

Answer	0% 100%	Number of Response(s)	Response Ratio
Haven't thought about it at all		3	5.8 %
Have considered it but not sure if it needs to be addressed		3	5.8 %
Have considered it, know something must be done, but not sure what the first step is		7	13.7 %
Know what needs to be done but don't have the capacity or resources to act		7	13.7 %
In the process of creating or updating a hazard mitigation plan to include the likely impacts of climate change an adaptation plan		1	1.9 %
In the process of creating an adaptation/climate preparedness or other type of plan that includes addressing the likely impacts of climate change		14	27.4 %
We have a plan that addresses the likely impacts of climate change complete		1	1.9 %
Implementing climate preparedness plan or implementing the aspects of climate preparedness plan or implementing the aspects of climate preparedness in our Hazard Mitigation plan		3	5.8 %
Incorporating climate preparedness into all departments		1	1.9 %
Incorporating climate preparedness into hazard mitigation plan or emergency planning		3	5.8 %
Incorporating climate preparedness into master plan		1	1.9 %
Incorporating climate preparedness into Zoning Ordinances		1	1.9 %
Incorporate climate preparedness in development practices/polices		3	5.8 %
Other		3	5.8 %
No Response(s)		0	0.0 %
	Totals	**51**	**100%**

Who, if anyone, is directly assisting you with your adaptation work? Please provide the names of organizations/agencies and their adaptation programs that you are working with in the comment section below.Check all that apply.

Answer	0% 100%	Number of Response(s)	Response Ratio
Regional Government/Agency		21	46.6 %
Federal Agency/Program		10	22.2 %
State Agency/Program		21	46.6 %
Non-profit Organization		13	28.8 %
Civic organization or community group		7	15.5 %
Other		15	33.3 %
	Totals	**45**	**100%**

TextBlock:

The following section will ask about specific technical, educational/outreach and financial assistance needs. Technical assistance includes things such as mapping, data and science, assessments, planning assistance, and meeting facilitation. Education and outreach includes understanding basic climate science and understanding the local impacts of a changing climate. Financial assistance could be for your organization or related governmental organization. It could be for town officials/staff or for the public

Rank the following technical assistance needs, 1 being the most needed to further your adaptation work. Please do not assign more than one item to a number.

1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5, 6 = 6, 7 = 7, 8 = 8, 9 = 9, 10 = 10, 11 = N/A

Answer	1 2 3 4 5 6 7 8 9 10 11	Number of Response(s)	Rating Score*
Updated Floodplain Maps		46	5.2
Infrastructure Vulnerability Assessments		47	3.0
Creating Adaptation Plans		45	4.4
Hazard Mitigation Planning		45	5.0
Emergency Management Planning		46	6.0
Climate Adaptation Master Planning or Planning		45	4.5
Climate Impact Assessments		46	4.1
Meeting Facilitation		43	7.6
Local Climate Science/Data		46	4.6
Other (write in comment space)		13	7.2

*The Rating Score is the weighted average calculated by dividing the sum of all weighted ratings by the number of total responses.

What is your single, most needed technical assistance and why?

43 Response(s)

Rank the following education and outreach needs; 1 being the most needed to further your adaptation work.Please do not assign more than one item to a number.

1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5, 6 = 6, 7 = 7, 8 = 8, 9 = N/A

Answer	1 2 3 4 5 6 7 8 9	Number of Response(s)	Rating Score*
Staff education		45	4.0
Coordinating staff across departments		44	3.9
Having a clear message for the public		45	3.6
Convincing public that climate change is happening		45	3.8
Addressing and explaining uncertainties of climate change		46	4.2
Getting local authorities to take action		45	3.8
Lack of national leadership and educational awareness campaign		47	4.1
Other (write in comment space)		9	7.9

*The Rating Score is the weighted average calculated by dividing the sum of all weighted ratings by the number of total responses.

What is your single, most needed education and outreach assistance and why?

35 Response(s)

If you require financial assistance for climate preparedness work, please indicate what that money would be used for. Please explain your response in further detail in the comment section.Check all that apply.

Answer	0% 100%	Number of Response(s)	Response Ratio
To hire an intern		4	8.8 %
To hire a full-time employee just for climate preparedness work		6	13.3 %
To hire a full-time employee for more general sustainability/climate work		10	22.2 %
To hire a part-time employee		2	4.4 %
To hire a consultant to provide research or technical assistance		20	44.4 %
To train current staff		6	13.3 %
Other		9	20.0 %
	Totals	**45**	**100%**

Please tell us how it important it is to the success of your climate preparedness efforts that the following resources be made more available. If you rate more than one item as "vital" or "important" please use the comment box to rank each item in order of importance, most to least.

1 = Vital, 2 = Important, 3 = Unnecessary, 4 = N/A

Answer	1 2 3 4	Number of Response(s)	Rating Score*
Technical Assistance		46	1.6
Education/Outreach Assistance		45	1.9
Financial Assistance		44	1.5

*The Rating Score is the weighted average calculated by dividing the sum of all weighted ratings by the number of total responses.

Do you feel that your government is "stuck" at some level of addressing climate change adaptation? If so, please describe why that is and what ONE thing would be most useful in moving adaptation work forward.

35 Response(s)

Anything else we should know about your adaptation work or needs?

7 Response(s)