

Technical Report (Draft 4/23/2009)

Climate Variability and Coastal Community Resilience: Developing and Testing a National Model of State-based Outreach*



Photo: S. M. Dickson

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Climate Variability and Coastal Community Resilience: Developing and Testing a National Model of State-based Outreach

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INTRODUCTION

The Maine Sea Grant College Program, in partnership with the Oregon Sea Grant College Program, is involved in a two-year NOAA-funded project: 1) to explore how climate variability and coastal hazards may be affecting our coastal regions and how these relate to coastal development in the two states; 2) to encourage and facilitate collaboration among and between decision makers and coastal property owners to determine and implement appropriate responses to climate variability on short and longer timescales; 3) to discover the barriers that targeted audiences in the states have to taking action to either prepare for or mitigate the effects of climate variability; 4) and to develop educational and informational materials and strategies concerning these issues. The ultimate goal of the project is to move behavior toward decisive action that results in coastal communities that are more resilient to climate variability at all scales.

In Maine, two groups are targeted with these strategies and materials: coastal property owners (CPOs); and municipal elected and appointed officials, including local and regional planning agency personnel. For the purposes of this report, “coastal hazards” include shoreline erosion, sea-level rise, higher tides, increased storm severity, and coastal flooding. **This technical report will cover only the Maine component of the project.**

RATIONALE

Maine Sea Grant has been working with the Maine Coastal Program at the State Planning Office to develop a program aimed at uncovering the barriers and benefits (McKenzie-Mohr 1999) that coastal property owners and town officials associate with implementing coastal erosion hazard mitigation strategies. The primary focus area for this project is the southern coastal region (Casco Bay to the New Hampshire border) that is home to the vast majority of the state’s sand beaches and, secondarily, the midcoast region where there are numerous bluffs and landslides have historically occurred (Maine Geological Survey 1996)

When imagining the Maine waterfront, the rocky coast comes to mind and, indeed, sand beaches are a rare and highly valued resource to the state, covering only about 35 miles of Maine’s 5300-mile long coastline (Maine Coastal Program 2006). But sand beaches are a major economic driver in the state, exhibiting some of the most intensely developed and visited areas in Maine. Sand beaches are also the state’s coastal ecosystem most threatened by the effects of climate change. All of Maine’s sand beaches are eroding, and sea-level rise predictions in the range of two feet (as adopted for planning purposes by the State) would result in shoreline retreat of approximately 600 feet along sand beaches (Maine State Planning Office and U.S. EPA 1995).

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Private ownership of the coast brings an added dimension to the complexity of coastal resource management. Most of Maine's shoreline is privately owned, and unlike most other coastal states, a private landowner may own the intertidal zone, the land area between mean high and mean low tide lines.

Maine's coastal development regulations for sand dune systems, established in 1983 (Coastal Sand Dune Rules—<http://www.maine.gov/sos/cec/rules/06/096/096c355.doc>) have earned the state national recognition for its exemplary approach to planning for climate change and associated sea-level rise and coastal erosion. These rules state that “in order to protect valuable coastal sand dune systems, the Department of Environmental Protection will evaluate proposed developments with considerations given to future sea-level rise (anticipated at approximately two feet in the next 100 years) and will impose restrictions on the “density and location of development and on the size of structures” (Maine Department of Environmental Protection 2006). These restrictions include prohibition on new seawalls and a limit of a single rebuild for structures within the “velocity zone,” damaged in a coastal storm, by greater than 50 percent of the building's value. Strategies promoted by the rules include removing existing seawalls and restoring dunes, and elevating or relocating structures landward.

In addition to sound regulations, however, implementation of numerous strategies at various levels of government and by private property owners are needed to achieve mitigation of coastal hazards. Data that tracks the use of erosion hazard mitigation strategies is not available, and on-the-ground examples of “soft” alternatives to hardened shorelines in Maine are few.

Indeed, the need to focus erosion hazard educational outreach on municipal elected and appointed officials (including local and regional planning agencies), coastal property owners, and Maine state and county agencies has been identified for over a decade. The 1995 report produced by the Maine State Planning Office, *Anticipatory Planning for Sea-Level Rise Along the Coast of Maine*, targets these groups for education on “the hazards of coastal erosion and inundation, possible impacts of accelerated sea-level rise, the costs of engineered ‘solutions,’ and the benefits of the soft coasts as resilient natural systems.”

METHODOLOGY

Working with the Center for Research and Evaluation (CRE) at the University of Maine, the project team (authors of this report) developed both a needs assessment and an evaluation of the two target audiences (coastal property owners and municipal officials) to answer the following questions:

- Prior to the design and implementation of Sea Grant's educational program, what level of knowledge of climate variability, coastal hazards, and coastal development characterizes each of the two target groups?
- Prior to the design and implementation of Sea Grant's educational program, what beliefs and perceptions related to climate variability, coastal hazards, and coastal development characterize each of the target groups?

- Do the target groups levels of knowledge and perceptions about climate variability, coastal hazards, and coastal development change subsequent to the implementation of Sea Grant’s educational program?
- Does the behavior of the target groups change subsequent to the implementation of Sea Grant’s educational program (e.g., Are they using or willing to become involved in erosion hazard mitigation strategies?)

The methodology involved a three-pronged approach. The needs assessment (pre-test) determined the message to be delivered in the educational outreach materials, as well as the format for the materials. Secondly, through the outreach plan, scenarios were provided for ways extension staff could deliver the informational materials to the targeted audiences. Finally, the evaluation (post-test), which will be conducted in June 2009, will determine the effectiveness of the outreach activities in affecting the audiences’ beliefs and opinions and will determine, ultimately, their change in behavior—although this last goal is beyond the scope of this two-year project, which ends in August 2009.

Needs Assessment: Focus Groups

The project team worked with CRE staff to identify key issues and formulate the presentation of these issues as discussion topics/questions for the six focus groups that targeted 11 coastal communities in the southern and midcoast regions of the state. Three of the groups consisted only of coastal property owners; two of these groups were held in the southern region of the state and one in the midcoast area. The three groups were divided as follows:

1. Kittery, York, Wells (southern)
2. Kennebunk, Biddeford, Saco, Scarborough (southern)
3. Rockland, Lincolnville, Camden, Rockport (midcoast)

Of the remaining three focus groups, one consisted only of town officials, and the other two were mixed, including property owners, municipal officials, and some recreational users of the coast (an approach recommended by CRE). To obtain names of coastal property owners to invite to the groups, town managers in each of the 11 communities were contacted by letter, phone, and e-mail and asked to supply names of residents who fit the following categories:

Commercial coastal property owners (business where a waterfront location is beneficial to their business, but not required for their business)

- Restaurant owner
- Retail business owner
- Lodging owner

Residential coastal property owners

- Primary home, long time, year-round resident, working or retiree
- Primary home, newcomer, year-round resident, working or retiree
- Second home, seasonal resident
- Vacation/income property seasonal resident

- Owner of one of the most valuable coastal properties in town
- Coastal property owner of a lesser-valued property

Most managers (or town tax assessors) supplied a list of coastal property owner names. The goal was to have 10-12 participants per group.

For the CPO (coastal property owner)- only focus groups, invitation letters were sent to CPOs asking them to RSVP to confirm their participation. To obtain the optimal number of participants for each group, the project team made phone calls to those invited. The three groups were held at the following dates and venues:

1. Kittery, York, Wells- Monday, September 17, 2007—York Harbor Inn (York)
2. Kennebunk, Biddeford, Saco, Scarborough- Tuesday, September 18, 2007— (Wormwoods Restaurant, Saco)
3. Rockland, Lincolnville, Camden/Rockport- Monday, September 24, 2007—Tavern on the Falls (Camden)

CRE staff compiled a summary of the information provided by participants in the three CPO focus groups, which can be found in the “Results” section of this report.

The focus group specifically for town officials was held in the southern region of the state and, of the other two groups (which included town officials, as well as coastal property owners and recreational users of the coast), one was held in the south and the other in the midcoast area. Staff at the Maine Coastal Program compiled a list of names of all town officials in the 11 targeted communities (from the Maine Municipal Directory) and names of recreational users were obtained from several lists maintained by beach recreational and coastal interest groups, and from the database of participants at the biannual Maine Beaches Conference. Invitation letters were sent to prospective participants and followed up with phone calls as with the previous groups. The following groups were held:

1. Mixed group southern- Monday, November 5, 2007—York Harbor Inn (York)
2. Town officials- November 6, 2007—Wormwood’s Restaurant (Saco)
3. Mixed group midcoast - Tuesday, November 13, 2007—Tavern on the Falls (Camden)

For a summary of major issues from town official focus groups, see “Results” section of this report. The URL of the comprehensive 133-page summary report from all six focus groups is also included in the “Results” section.

Needs Assessment: Surveys

CRE staff consulted with the project team and, using data obtained from the focus groups, constructed two surveys that were used to collect data from expanded samples of each of the two target groups—coastal property owners and town officials. Survey data were used to validate and provide a quantitative dimension to focus group data.

Objectives of Survey

1. Determine target audience knowledge about climate variability and climate change.
2. Determine target audience beliefs and perceptions about climate variability and change.
3. Determine audiences' current barriers to action.

During January and February 2008, the project team met with CRE staff to develop a mail survey for coastal property owners. For the mailing list, CRE staff obtained names of CPOs (residents east of Route 1) from the 11 towns targeted in the study. The survey was sent out to 6,967 coastal property owners and 548 responses were received.

From April through June 2008, the project team worked with CRE to develop another survey targeting elected and appointed town officials, which was sent out to 250 officials in the 11 targeted towns. From this pool, 55 completed surveys were received. At the end of both surveys, participants were asked to provide their names and addresses if they wanted to be entered in a drawing for an L.L. Bean gift certificate, and would be willing to participate in an educational program in the coming year, about the issues raised in the survey. From the CPO survey, 238 provided their names and from the town official survey, 34 provided names. These individuals will be invited to participate in an educational program in June 2009 where a post-test (survey) will be administered to participants to evaluate the effectiveness of the program and materials presented. Information about the post-test is included in the "Evaluation/Discussion" section of this report.

CRE staff compiled the data and a report entitled, "Climate Variability and Coastal Community Resilience: Results of Coastal Property Owner and Public Official Surveys," was produced; the summary of this may be found in the "Results" section of this report. The URL for the complete report is also included in the "Results" section.

In addition, CRE produced a synthesis document, comparing the information obtained from the focus groups to the data in the survey analyses. The URL to this comparative analysis may be found in the "Results" section of this report. The project team used all of these reports to find common themes and develop messages that have informed the content, as well as the design (format), of their educational materials and strategies. This is discussed in the "Outreach" section of this report.

To further validate the focus group and survey results and to obtain input on their outreach strategies and materials, the project team assembled two advisory groups: a stakeholder advisory committee and a technical advisory committee. Both committees were provided with background information on the project, including the comparative summary report mentioned above.

Stakeholder Advisory Committee Input

In fall 2008, the Maine project team met with their stakeholder advisory committee, comprised of a coastal property owner, representatives of municipalities (town manager and code enforcement officer), and a regional planner. Before this meeting, the project team used the themes expressed in the focus groups and surveys and drafted a “Themes Translated into Messages” document (found in “Outreach” section of this report) for the committee’s review.

The purposes of the stakeholder advisory meeting were:

- * To share with the stakeholder committee a summary of the findings from the focus groups and surveys and, with their help, to identify any gaps in or issues with the findings.
- * With the help of the stakeholder committee, to translate the themes from the research findings into action-oriented messages that would be compelling to coastal property owners and municipal officials.
- * To identify the most effective tools, venues, and partners for communicating these messages among those groups. The committee was asked to consider the following questions:

- What does the data tell us about our two targeted audiences (coastal property owners and municipal officials)
- What do you think about the data? Are these findings consistent with your experience?
- Have we missed any important themes? Are we misinterpreting any of the themes?
- How do we translate these themes into messages compelling to coastal property owners? To municipal officials?
- What should we focus on? What should we avoid?
- What tools do you think we should use (besides DVD) to reach coastal property owners? To reach municipal officials?
- What venues and partners would be most effective in helping us to disseminate these tools?

Following are themes raised at this meeting:

Themes

For coastal property owners:

- Information on hazard mitigation strategies is available but it needs to be presented on a “cost basis” to encourage owners to “open up their wallets” in a way that would benefit themselves and their neighbors. They recommended a Web site with costs, statistics, diagrams, examples, and photos of “how to.”
- When disaster hits, information should be ready to disseminate. “People learn when they’re ready to learn.”
- Architects (and other building professionals) in Maine don’t seem to be well informed of coastal construction techniques. This is problematic for property owners because they “rely on the guy on the phone who is giving information on how much it will cost to build a house. They should know the details and construction methods.”

- Municipal officials are trusted and not regarded as barriers to property owners' activities, as federal and state officials often are. One committee member said, "The code enforcement officer pointed me in the right direction."
- The conflicts between federal, state, and local regulations combine to discourage owners from being proactive. One said, "Get in compliance to then confront the hazard mitigation." Expediting the permitting process if they follow certain principles would be an incentive.

For municipalities:

- It will be important to rethink incentives and disincentives. In the current regulatory environment, towns are only ready to take action when it comes time to do some type of regulatory compliance.

Approaches

- Training seminars (for architects, code enforcement officers); also include where not to build
- Web site for mitigation techniques and costs (different sections for CPOs and architects)
- Post information on Web site and send out e-mail alert
- Save Our Shores (SOS) Maine meetings
- *Portland Magazine; Maine Boats, Homes & Harbors; Maine Home & Design; Coastal Living, etc.*
- Feature articles in newspapers (*York County Coast Star, Free Press, Village Soup, etc.*)
- Online newsletter; send e-mail with link to it
- State fire marshal's office to piggyback on existing CEO training/information sessions
- Distribute information at regulatory compliance programs (for town officials)
- Trade journals for architects, builders
- Building "information trees"
- Maine Beaches Conference

Technical Advisory Committee Input

The project team met with their technical advisory committee in February 2009. Three of the committee members are on the faculty at the University of Maine (one is the Maine State Climatologist, one in the Department of Earth Sciences, and the last in the Department of Communication and Journalism) and the other member is a marine geologist with Maine Geological Survey.

The purposes of this meeting were:

- * To share with the technical advisory committee a summary of the findings from the focus groups, surveys, and stakeholder meeting.
- * With the help of the technical advisory committee, to identify any gaps in or issues with the findings and to further refine the action-oriented messages that would be compelling to coastal property owners and municipal officials.
- * To prioritize the most effective approaches for communicating these messages among those groups.

They were asked to consider the following questions:

- What do you think about the data? Are these findings consistent with your experience?
- Have we missed any important themes? Are we misinterpreting any of the themes?
- How should these messages be refined to ensure that they are compelling to the audiences?

Members of this committee presented the following suggestions, themes, and messages:

Suggestions:

- Point-of-sale of real estate identified as window to deliver information (associated risk, etc.) to property owners. Landowners are familiar with flood maps, but not with inundation/hazard mapping.
- Critical to publish survey results in peer-reviewed journal, to give it credibility.
- Need identified for information on the costs, effectiveness, etc. for different treatments/erosion control measures. Need to provide costs of inaction.
- There are selective options available. Beach scoring system only done for bigger dune and beach nourishment. Could expand this to include other options based on local conditions. Dunes on top of or behind seawalls. "Engineering" includes 5,000+ options. There are cases where people have *not* rebuilt. Produce table or flow chart/decision tree for property owners.
- Need to incorporate long-range climate planning into municipal and state planning (e.g., engineering standards).
- Need consistent/integrated message for multi-media campaign ("Maine's Changing Coast"). Emotional message is about future generations.
- How do we deal with change due to natural coastal processes, and change due to changing climate, and public perceptions of both? Using current examples to demonstrate unknown future.
- Use natural events as examples. "These are lessons learned and are examples of things you'll be dealing with more often." For example, Patriot's Day storm may be happening every year. Difference between 10-year and 100-year storm in southern Maine is only 12 inches. Also 1987 flooding on Kennebec River, people cancelled their flood insurance because they thought it would never happen again.
 - Other examples: Camp Ellis—sometimes response makes things worse.
 - Morse River, Popham Beach—left alone, landscape will shift.
 - Sherman Marsh – dams, culverts washing out.

Themes:

- **UPS= Urgency** (time is now to take action for future security—the need); **Partnership** (work with your neighbors and your towns); the **Solution**. Federal and state agencies are partners, but the actions they take will not benefit all individual properties.
- Individual actions must be coordinated for the good of many; piecemeal approach is not going to work, because individual actions to protect your property can harm your neighbor's properties. If everyone acts on the greater good, the entire beach system can benefit and in turn will benefit all individual owners. Keeping system intact also protects it against next storm.

- Maine is ahead of the curve. We have forward thinking laws. If people understood that the state of Maine has been forward-looking, has put a lot of thought into long-term planning, they may want to "be part of" that solution. Need to convince people to take action, make them feel comfortable about adopting solutions, that specific actions are right for *them*.
- Another issue is "psychological distance" – need to perceive problem as LOCAL: trust municipal officials, concerned about neighbors, keeping property in family. People need to see local, social, near-term connections. Use local, peer examples.
- Messaging is hard, because there is no unified solution. The more people are aware of inundation scenarios, the more they will demand change in state policy. We need to simplify based on audiences: officials need to start creating a strategy for infrastructure and natural systems; property owners need information about their options and how to get help.
- Can't use "change" as a theme because too overused now. "Adaptation" theme is being used nationally.
- Use radio ads? (people talking about sea-level rise; seasonal messages, e.g., bluffs in spring-landslides; beaches in winter-storms).

Messages:

- Concerned about climate change and how it will impact your coastal property? To find out more...you can act locally and with your community...it takes a community to build resilience and adapt to climate change.
- Things are not going to be the way they have been; there are things we can do, but they may cost money, and there are going to be difficult decisions to make. But we cannot wait; it is time to partner up for solutions.

The committee was then presented with the draft outreach plan (found in the “Results” section of this report), which related identified barriers/benefits and messages to effective outreach approaches, and they were asked to help prioritize activities. The input from the two advisory committees, the synthesis document (comparing the information received from the focus groups to survey results), and the individual focus group and survey reports provided valuable guidance when the project team developed their final outreach plan for coastal property owners and municipal officials.

OUTREACH

In developing the project proposal, partners agreed that the long-term goal of the public outreach effort would be to have communities that are resilient in the face of climate change impacts; the short-term goal would be to prepare communities and individual decision-makers to plan for climate change impacts.

Outreach on climate variability is more complex than that on other topics, partly due to the episodic nature of short-term climate variability, the relatively gradual nature of climate warming impacts, and a tendency to inertia or resistance on the part of individuals who may be affected (Climate Impacts Group 2007). A key element of this project’s outreach approach was to identify and address the barriers to constructive action faced by the target audiences. The focus groups and surveys, covered in the “Methodology” section of this report, were used for this purpose.

Themes Translated into Messages

Before the project team met with their two advisory committees, they gleaned the following themes from the focus group feedback and survey data and translated these themes into messages to guide the outreach discussion in the two meetings:

Coastal Property Owners

1. **Knowledge Theme:** Many participating coastal property owners (CPOs) have owned their properties for long periods of time, would plan to rebuild and to pass the property on to family. But they do not regard themselves as well informed on the effects of climate change in Maine, the effectiveness of various mitigation alternatives, or related federal, state or local regulations.

Message: There is accurate, concise information on climate change effects, mitigation strategies and coastal regulations that is readily available to coastal property owners to help inform their decision-making on their properties.

2. **Actions Theme:** CPOs believe they need to take action in anticipation of the effects of climate change on their property and many believe that “soft alternatives” are more effective than “hard alternatives.” But the largest majority of CPOs do not know anything of the effectiveness of hard or soft alternatives.

Message: Coastal property owners seek demonstration projects and/or models of soft and hard alternatives applied in Maine coastal communities to clarify their effectiveness.

3. **Barriers to Action Theme:** CPOs think climate change is having an impact on the coast (and their property) and will continue to do so, and they would like to do something to mitigate the effects. However, the obvious solutions (relocate, move up, or move back) are too expensive.

Message: There are affordable measures CPOs can take now to help protect their property and house (plant native dune grass and plants, build a berm in front of the house, etc.) and resources that can be brought to bear for more expensive alternatives.

4. **Motivations for Action Theme:** Grants, actions taken by peers, and leadership from the Town are most motivating to coastal property owners considering mitigation options.

Message: Towns and coastal property owner groups need to be partners in efforts to address climate change effects.

5. **Conflict with Government Theme:** Coastal property owners see government (primarily federal and state) as a barrier to protecting their properties and infringing on private property rights.

Message: Federal and state regulatory agencies need to be partners in efforts to address climate change effects.

6. **Sources of Information Theme:** Coastal property owners prefer to receive information from newspaper, television, Internet, property owner groups, and realtors.

Message: Target these sources in outreach to coastal property owners.

Public/Town Officials

1. **Knowledge Theme:** Public/Town officials believe they are responsible to take action, but feel they lack the resources and knowledge to apply this information to their jobs. In particular they identified the need for convincing climate change impact evidence, erosion mitigation strategies, and emergency management and mitigation planning.

Message: There is accurate, concise information on climate change effects and mitigation strategies that are readily available to public/town officials to help inform their planning efforts and there are state and federal resources available to assist.

2. **Actions Theme:** Public/town officials and coastal property owners agree that there is a need for improved government action in response to coastal storms, but disagree as to the right solutions.

Message: Towns and coastal property owner groups need to be partners in efforts to address climate change effects.

3. **Barriers and Motivations Theme:** Public/town officials are very busy, have limited financial resources, and do not hear a sense of urgency to take action from those who assign or influence their work.

Message: There are state and federal resources available to assist towns in implementing mitigation strategies and there is compelling information that towns need to prepare for (or adapt to) the effects of climate change now.

4. **Sources of Information Theme:** Public/town officials prefer to receive information from newspaper and television primarily, with technical journals, government documents, and agency Web sites as secondary sources. Their preferred distribution method is direct mail.

Message: Target these sources and methods in outreach to public/municipal officials.

OUTREACH PLAN

The project team developed a draft outreach plan that was presented to their technical advisory committee in winter 2009. One suggested strategy in this plan (and also included in the original proposal to NOAA) was to produce a DVD. Due to the time necessary to produce a DVD program, and the two-year timeframe of the project, video footage and interviews of CPOs and municipal officials were shot in the summers of 2007 and 2008. The Oregon project principal investigator was the producer of the DVD. Working with the project team, Maine Sea Grant's science writer researched the topic, which included a review of journal articles and other pertinent literature, as well as information obtained through the focus groups and surveys (see "Themes Translated into Messages" above), to write a rough draft of the script. Since interviews formed the basis of the program, she wrote suggested text for interviewees, as well as narration to provide background and a context for the dialogue. Project partners in Maine and Oregon developed the draft shooting script.

The Maine project team developed shooting plans and coordinated and scheduled videotape interviews of members of the target audiences. Over 11 hours of interviews

were recorded in summer 2008. Potential background footage also was shot in summer 2007.

The Oregon project team edited the video footage, redrafted the narration to integrate with the interviews, and produced five draft segments. The Maine project team, the technical advisory committee, and some stakeholder advisory members reviewed and provided input on the draft DVD segments in winter 2009. After incorporating suggestions from the reviewers and many revisions, the program is now in its final draft form and is scheduled to be completed in May 2009.

Other priority outreach activities (to be completed by September 2009) are:

- Producing a technical report
- Conducting educational workshops with members of the target audiences who participated in the pre-survey
- Administering the post-test to participants in the workshops
- Developing a brochure/ guide to using the DVD
- Producing/distributing a press release about DVD
- Presenting focus groups and survey findings to state regulatory agencies and CPO organizations; distribute reports/summaries of findings to agencies and CPO groups

The URL for the complete outreach plan is in the “Results” section of this report.

RESULTS

Focus Groups: Coastal Property Owners Results

Issues discussed by coastal property owners in the focus groups (provided by Center for Research and Evaluation, University of Maine).

Property owners focused on six major themes:

- 1) **Attitudes** towards sea-level rise and climate change.
- 2) **Personal behaviors** of property owners, including shoreline protection strategies, construction siting, vegetation control / management, and construction methods.
- 3) **Changes** to the shoreline over time, including significant erosion.
- 4) **Communication** with DEP, Army Corps of Engineers, Maine Geological Survey, local officials, and the Federal Emergency Management Agency.
- 5) **Action** and **inaction** of public agencies and government.
- 6) **Private property rights** and the limits of those rights.
- 7) **Educational preferences** of property owners, including the type of information they liked to receive, where they preferred to get this information, and which sources of information they trusted most.
- 8) **Comments specific to Sea Grant** and how Sea Grant might think about creating its educational materials
- 9) **Comments specific to other agencies**

Sea-level Rise and Climate Change Attitudes:

In general, participants had relatively little knowledge of the issues surrounding climate change and sea level rise. While participants in all three groups commented on the change in sea level, all participants seemed unsure how they might logically react to these changes. All groups agreed that both sea level and storm surges were reaching higher and higher levels than they remembered in the past. More than one participant wondered if it was primarily due to increased sea level, land subsidence, or both. Despite a keen awareness that storm surges were more severe, and tides seemed to be higher, these groups were at a loss as to what they could really do about these issues – although several participants talked about specific measures they had taken to counter these erosional forces.

Personal Behaviors of Property Owners:

In all three groups, individuals expressed their concern for protecting their properties. Several of the participants described the steps they had taken to protect their shoreline and/or the structures on their properties. These measures included:

Changes to shoreline to try to limit erosion:

- Placing riprap following the Patriot's day storm. This suggestion was followed by the comment: "You have to get the really big boulders. Those are the ones that work."
- Owner had cut large tree trunks and embedded them in the bank to control erosion (this was eventually washed away in a large storm, but the owner felt the measure was "successful" until this large weather event.)
- Owner had planted beach grass following the Patriot's day storm. This was successful, however; when this owner then tried to add sand to the beach a few months later, the application was denied by the DEP because it would cover the beach grass the owner had just planted.
- Owner had done a major reconstruction on the embankment of his property. This included the placement of rip rap, reinforcing soils, interlocking blocks, landscaping fabrics, trenches, and other strategies.
- Owner had sand trucked in to replenish front dune.
- Owner had rebuilt seawall, or had increased height of seawall.
- Owner had extensively trenched and drained embankment.
- Owner had dug 20'-deep trench and filled with 30' of riprap.
- Owner had planted trees along embankment.
- Owner had allowed lawn to revert to wild growth.
- Owner had diverted upland runoff to minimize erosion from major rainfalls.

Changes to structures:

- Owner:
 - Sunk piers into soil
 - Used 2 X 10 front walls
 - Installed blowout walls in rear of house
 - Anchored roof and porch using hurricane ties
 - Used hurricane rated shingles
 - Relocated all utilities to 12 feet above average high water mark

- Elevated house 12 feet above grade
- Created blowout panels to allow wind to travel under house
- Owner moved house back from water, elevated, and reinforced structure.

Other changes to shoreline / structures reported by participants that *other owners* engaged in:

- Filling in shoreline erosion using fill from construction excavation
- Cutting trees that blocked view of water. When that owner was informed by the DEP that they would be billed 50\$ for each tree, they made arrangements to have the remainder of the trees cut down and paid the fine.
- Cutting embankment to permit walkways and stairways.

Changes to the shoreline & tides:

- Several owners noted rocks that were previously visible at high tide were now almost completely covered by the water.
- Several individuals reported seeing large sections of the embankment slide into the ocean. One participant saw his neighbor's entire lot slide into the ocean.
- Several participants reported the erosion of a substantial portion of the frontal dunes in both York and Camp Ellis.
- Several participants noted significant retreat of bluffs in Rockland group.
- Two participants reported seeing "several" houses lost into the ocean at Camp Ellis.
- One participant witnessed the slide of his neighbor's home into the ocean in Rockland.
- Several Rockland participants noted the erosional effect of upland runoff on their properties.
- All participants witnessed what they considered to be higher tides and higher storm surges.

Communication between CPOs and public agencies / government:

This issue was discussed for longer and in more detail than any of the other concerns addressed in these focus groups. In general, CPOs were frustrated in their dealings with local, state, and federal agencies. In several cases, owners received differing (and conflicting) instructions from different agencies. They also were unsure of the exact chain of command when dealing with these groups. For one resident, it was unclear what authority the town had versus the DEP versus the Army Corps of Engineers. For another participant, an issue brought before the same agency was decided in two different ways. A significant majority of the participants expressed an unfavorable view of Maine DEP, FEMA, and the Army Corps of Engineers. The attitudes of CPOs towards local officials were more mixed. In some cases, individuals expressed camaraderie with local officials while others were simply frustrated. The following are a sample of the issues raised by owners with respect to communication.

- For one resident, the town's sea wall is in disrepair. In turn, this threatens the person's home. Attempts to get a response from the town have not answered. This owner reports they are now faced with the dilemma of illegally

constructing a structure to protect their home, or be threatened with the destruction of their property in a future severe weather event.

- Another resident is a member of a local planning commission whose mission is to create and implement a beach management plan. This individual remains frustrated because there is no representation from one of the local towns to this group.
- Several owners reported an arduous process to get permits from DEP to make changes to their property. One such example was shared in the previous section where the owner had planted vegetation, only to be told that it couldn't be covered up with more sand. Had this person done nothing, the deposition of the sand would have been permitted.
- Another owner reported it was far easier to complete whatever work was required and then file for the permits after the fact.
- One owner was allowed to complete a project by the town, and was then denied approval by the state DEP.
- Another owner reported petitioning the local government to enact the recommendations of the Maine Geologic Survey to slow the rate of erosion. These petitions had not been successful.
- Another owner talked about the installation of a wheelchair ramp right through the middle of a dune. They commented "they [DEP] lose a lot of credibility when they tell you that you can't move some stuff. They tell us that we have to protect the dune, and yet when they put a handicap ramp right through the middle of the dune, the first storm already damaged it; the next storm will get rid of the dune because they cut a hole right in the middle of it."

Action and Inaction of public agencies and government:

Several participants expressed frustration with the actions (and inactions) of agencies and government. While this issue is tied closely with the "communication" issue, several participants noted specific instances where local governments and agencies were aware of problems but did not deal with them in a timely manner, if at all. This issue tended to be coupled with the communication issue above, but usually involved specific events where public entities failed to act or acted inappropriately.

- And what was it, '96?—when we lost two houses. It was then the city basically said we're going to find out what's going on. They hired an engineering firm to come in and survey the entire area. Did quite extensive samples of it, I mean they even did get some hand burns even trying to get there because some of it is very steep. There is a tremendous amount of marine clay. They've zoned what was bad, what was good, what needs to be done, what should be done. About how much it would cost to fix in some areas. Some areas were coded red, which meant they needed immediate attention, and some were orange. With that study, there were pages of conclusions and lots of recommendations and this is what you have to do. And with 11 years, the city of Rockland has done absolutely nothing with those recommendations
- FEMA requested that they use copper sheathing to put on the turn down here. And actually appropriated some money to do it. I mean they showed up with

the check, and as a matter of fact they did that a couple of years ago. But the city of Saco was not going to be able to do that. Simple reason the DEP would not allow them to do it.

- Last year we went to the board of selectmen and the newspaper people came in and there were several articles throughout the summer about our concerns about the seawall eroding to the point that it's no longer going to protect our properties, and you know they are telling us unless it's destroyed beyond 50 % you can't rebuild (a house) so of course we are very concerned about that issue. They're not doing our part but we're doing our part building our own little seawalls but we can't do anything to the town seawall. Well not only that, we took the newspaper man down at low tide; you can look at the rocks up against the sea wall and see daylight under the road, and you see a truck coming through there and you know worst case scenario, a school bus could actually cave in. Well during the storm, actually the area that we talked about did sink, it was washed away and you couldn't really see it that well but it's about 4ft. So that's our concern as the seawall is eroding, chipping away. They have all the little cones all over so people don't step into the holes that have been created by the recent storm, and they also have concrete blocks. I guess they have the road closed for some time, so that's been our concern, the seawall issue. In the year 2000, I have letters where the selectmen said "yes they're going to come in and rebuild this wall." That's not happened, it's still eroding and chipping away and falling apart before our very eyes and we have no recourse, nothing. You know a lot of the people that are owners of the beach do not live there. So as far as the selectmen are concerned, well "they aren't voters we don't have to worry about them you know that kind of thing," but we generate probably more taxes in Maine than any other parts. They keep forgetting that, if they lose us they're losing a lot of income plus the access to a lot of beautiful beaches that we have.
- The government tends to be very reactive rather than proactive, and so if they could switch their gears and help property owners become proactive to protect their property before anything happened, and allow permits for things to let people protect themselves before there was devastation, and it is very difficult to get permits ahead of time, much easier after the fact because there was one permit I'd been working on for 4 years—and after the Patriot's storm I wasn't damaged at that particular building—after the Patriot's Day storm, it went sailing through, because they were approving everything at that point; they were just putting on a yes stamp, and it was easier to get a permit afterwards, but had they been active, we would have had it all done ahead of time. And so rather than be reactive, they should be more proactive.

Personal property rights:

Another area of significant discussion was personal property rights. Members of these groups felt almost universally that their rights as property owners were being usurped by the state and federal government. Although owners understood the rules and

regulations, they did not agree with the restrictiveness of these limitations. Owners also shared a common sentiment that they were bearing a disproportional amount of the tax burden, yet were not allowed to protect that highly valued, highly taxed property.

Following are several of the issues shared by members of these groups:

- One owner reported the taking of a neighbor's property by the town when the land was eroded to the point that a structure was no longer viable on that lot. This person attempted to seek compensation from the town for the taking of that property, and was only paid \$10,000 for the lot several years later.
- Another owner commented, "75% of the taxes in the town of Wells are collected east of Route 1. That's less than a quarter of the land area in the town, and when you consider most of it is protected salt marsh, it's less than 10% of the land."
- One owner said: "First off, I don't think they are obligated to buy out anybody, nor to contribute to anybody's repair of private property. But the other part of it, if a state or federal program, structure, or regulation or rule, hinders or contributes to the destruction of your private property then they should reimburse you for that, or if your house goes out to sea and they didn't allow you to protect it then they should be liable for the market value of that house."
- "The road was washed out in front of those homes and it is preventing them from taking any measures to protect their property. Which is the real issue at heart. I mean you and everybody else ought to have a right to protect your property. And in this case the state seems to be subverting that. I have a real issue with that."
- "Well one of the things that happens with the public's responsibility if you take our issue in Rockland, is if we have another landslide that gets more significantly into the streets, the water, or the sewer and the electric will all be affected. I mean your whole infrastructure on that end of town has collapsed. Then whose responsibility is it? So it really makes good sense for everyone to try to fix the problem because we're just kind of buffering the public utilities, if you will, and in some cases it's only a few hundred feet."

Educational preferences:

Participants reported a variety of sources of information about sea-level rise, climate change, mitigation strategies, construction techniques, and other issues related to their waterfront properties. These participants received a good deal of their information from the Internet. Several stated they would "Google" terms they were interested in. Others got most of their information from television. To a lesser degree, they got information from the newspaper. Only a few participants sought out information in scientific journals or through official government channels. Age did not appear to be associated with the mode of communication sought by participants; however, it was clear they used a number of channels to gather information.

When asked what sources of information they trusted most and least, the participants gave differing responses, but the group suggested they were wary of most sources of information. They specifically mentioned being unsure of the data from the University of Maine. When queried further, several participants felt Joe Kelly had an

“agenda” and that his conclusions were not entirely unbiased. Others mentioned the DEP, MGS, and Army Corps as also having an “agenda.” When pressed what this agenda might be, these participants felt the state and federal agencies were pushing a policy of abandonment (in other words, let erosion happen unchecked and force people to abandon their properties.)

One group spoke very favorably of Sea Grant, and the Maine Beaches Conference, where they said they had learned much from the speakers.

In sum, participants did not have a single favored source of information, and they did not universally trust the information provided by local, state, or federal agencies.

Specific sources of media information included:

- Local news broadcasts
- Local newspapers
- *National Geographic*
- *Time* magazine
- NPR
- Google
- *An Inconvenient Truth*

When asked whom they would ask specific questions (such as what they could/could not do with their property) participants listed the following individuals:

- Realtors
- Code enforcement officers
- Local planning board members
- Maine DEP
- Army Corps of Engineering
- Local land trusts

Comments specific to Sea Grant/University of Maine:

- I don’t think that most of us would think today to go to the University of Maine as a source of information or leadership or guidance or anything on these issues. Because we certainly don’t know of it as a voice of authority.
- I think maybe involving the contractors that are out there, that are doing business in the area, if they start getting more info about construction techniques, for buildings that are really susceptible to the front line of the storms, it’s not just water that we’re dealing with, it’s storms and wind—and I think that would help. You know when you’re a homeowner and you don’t know much, if you go to this contractor and you’re going to put up a building, change a building, maybe they are the ones to suggest, “Well you really don’t want 2x4 walls here; you should put in something stronger.”
- Well, that’s the hard part though, because with all the university reports? I’m not going to read all of them, so I’m waiting for the news blurb, or somebody else who has read three of them to synthesize them for me. You know there’s that “think

global, act local” so until there’s some act local aspect to it, it’s really hard for me to connect to that think global thing, other than that miniature byline at all.

Comments specific to other agencies:

- I don’t think it would need to be the property owners that need to compromise; maybe it’s the state DEP (Department of Environmental Protection) that needs to compromise.
- They need to regionalize their thought processes and be more specific instead of painting everything with the same brush.
- DEP is too strong.
- The problem that I see (and my experience with this problem is probably 50 years), it’s taken more than 50 years to get the federal government to admit that they caused a problem, and that whole problem is one were dealing with and one we’re working with, its not the point of comment. The point is, the attitude was, if I let you stew long enough you won’t be able to keep it going. I mean and going and going, and I’m not telling anybody around here anything new when I say we’ve been working on this problem for 50 years. You can find anybody who walks around the streets here, and you can say what do you think is going to happen with this project they’re talking about building the breakwaters, out here in front of Camp Ellis. And they say, I’ll be dead before it happens. And they’re young; they’re not old. The problem is permuted on the state level, and it’s echoed on the federal level, and that is they don’t want to help you. They’re there to put the rules up and force the rules, don’t ask me to help you; I don’t want to help you. You’re on your own. And it’s a concerted effort. There are actually people who seem to think that endorsing a conservative or a conservation position, is one that is somehow a little more worthy in these green times. But when you take a look at what we had to do to prove to the Army Core of Engineers that it was their problem, or their jetty that was causing the erosion problem, it took more than 50 years and more than 6 million dollars. What chance do we have when you look at global warming, which has an indeterminate cause and an indeterminate effect?
- I was on the commission at that point working on that; I have been working with the Army Core of Engineers since the beginning of this project as a member of the regional team, and my education has come from the beaches conferences; as a matter of fact, I was a presenter there a couple of years. And from working with the core of engineers, their coastal engineers, the State of Maine, Maine Geological Survey, I have found both organizations to be technically very good, and very willing to talk and discuss what’s going on. And as long as we’re talking science, things are good. When we get out of science, then it seems to be whatever the prevailing bureaucratic wind is. That is a problem of that type of work. They work for the government so whoever’s running the department really gets a tremendous amount of say as far as what goes on.
- Peter Slovinsky is just fabulous; they (Maine Geological Survey) are great. The head of their department is Bob Marvinney. He chairs at the regional commission that I have been working on; he is very good as well. Again, as long as we’re talking about the science they’re great. The core of engineers, there are a half a dozen people that I have worked with in various forms and shapes of things; they are terrific. The

contractors that they brought in to work on the problems, you can get a side bar with them that are valuable ammunition, because they go to the heart of the matter and you can get opinions and suggestions from them that you don't get from the government. Clearly there's a lot of politics in what's going on, that's why it's taken us more than 50 years to get this done. The #1 solution to the problem for a very long time here was, we'll just buy the property and you guys move somewhere else.

- I've gotten to a point where I don't trust the University of Maine professors at all, and so I've read another geologist that has worked for us at different times on different things, and we've become a member of the American Shore Association, it's a national organization; there're a lot of journals that I read through, plus talking to people who do a lot of restoration work and they seem to know a lot about the currents and the tides. Every area of the coast is so different, even along the Maine coast, you know what's happening in one area is entirely different than what's happening in another.
- Most of the sand from Wells Beach ends up in the harbor, and then when you take it out, what I've found is that the sand redistributes itself, the sand never stays still. Our southern properties become more protected and our northern properties become more protected until the sand once again gets into Wells harbor. Whenever you affect the flow of water, there are going to be effects outside of that. And to get the state to admit that what they have done is actually wrong is very difficult, because they've got lawsuits and it's an ego thing.

Focus Groups: Town Officials Results

Summary of major issues from focus groups (provided by Center for Research and Evaluation, University of Maine)

Information needed by town officials:

Erosion mitigation issues:

- Strategies for getting funding to do beach restoration / conservation
- Information about the relative impact of different strategies for local town officials
 - Dredging
 - Barrier construction
 - Beach grass / vegetation planting
- Strategies to address the differences in how local governments handle problems versus the ways the state and federal agencies handle these same issues
- Strategies to educate homeowners and builder as to what kinds of construction are likely to be effective and resilient and what kinds are likely to fail

Climate change issues:

- Clear and convincing evidence about the impact of climate change on these issues that addresses some of the current critics of the concept of global warming

Planning issues:

- Information about ways to address issues where houses and other structures (including infrastructure) are in areas prone to flooding and erosion

- Strategies to get local officials to start thinking in a “big picture” that is – to make sure they are thinking beyond the one year timeframe
- Addressing the need for building codes that are based on the future demands on a property, not just the current demands
- Suggestions for a common set of elevation maps to do local planning – some municipalities are using the 100-year floodplain maps, which can be highly inaccurate
- Information to help towns better plan their infrastructure to meet the changing environment of the future
- Strategies to deal with rampant development – Wells had over 400 cottages go into a single development
- More information about the need for emergency evacuation routes and emergency preparedness

Town management issues:

- How to strike a balance between individual property rights and the need to plan for the future in a way that is sustainable
- Inability of local governments to purchase land for the fair market value
- How to address equity issues in towns where some properties, by virtue of their location near the shore, are worth much more than inland properties; as a result the coastal owners are paying a far greater share the taxes than those living further from the water.
- Strategies to get people (the townspeople) to take the future challenges of sea level rise seriously
- Ways to deal with property owners who are primarily interested in the value of their place as well as the investment potential of it, and those people not wanting to see that investment infringed upon because of local, state or federal regulations.
- How to build trust between residents and local officials (state officials too)
- How to get a read on the local values and how to work on shifting those values to place a higher priority on things like a better environment
- Helping residents to understand that the coast of Maine is not a fixed thing – that it is constantly shifting and changing
- Ways to discuss that taxes paid do not equal services received

Information needed by property owners (according to town officials):

- A single clearinghouse for information about:
 - Building codes & regulations
 - Beach nourishment / protection strategies
 - Projected changes in the coastline over time
 - Most and least effective strategies for controlling erosion
- Streamline the process of gathering information for homeowners
- Streamline the process of applying for permits so that a homeowner or contractor can do “one stop shopping”

Suggestions for Sea Grant materials:

- Provide information about the economic impact of Maine’s beaches as a strategy to influence lawmakers, as well as others.
- Suggestions for whom should be communicated with:
 - Realtors
 - Developers
 - Builders/contractors
 - City managers
 - Planning board / board of appeals
 - Conservation commissions
- Focus on young people (children)
- Develop materials that are credible and pragmatic

Survey Results

Coastal Property Owners

A total of 6,967 surveys were sent to homeowners in the 11 selected towns. A sample of residents east of Route 1 was invited to participate in the survey if they owned, as opposed to rented, the property. **Five hundred forty-eight homeowners** responded to the survey, resulting in an overall response rate of 7.9%. The response rate by town varied from 4.7% to 9.4%.

Town Officials

A total of 236 surveys were sent to public officials in the 11 selected towns. Elected and appointed municipal officials, municipal staff, and county officials who had the potential to be involved with climate change, were invited to participate in the survey. **Fifty-five public officials** responded to the survey, resulting in an overall return rate of 23.3%. Return rate by town varied greatly from 42.9% (York) to 5.3% (Kennebunk).

SUMMARY OF COASTAL PROPERTY OWNER AND TOWN OFFICIAL SURVEYS (taken from “Climate Variability and Coastal Community Resilience: Results of Coastal Property Owner and Public Official Surveys,” produced by the Center for Research and Evaluation, College of Education and Human Development, University of Maine, August 2008.)

With the response rate for the **coastal property owners** being lower than one would have hoped for at 7.9%, it is important to note that many of the survey recipients simply may not have viewed themselves as “coastal property owners” and disregarded the survey. The property owners who did respond appear to fit the demographics one would associate with coastal property owners. More than half of the respondents had a household income above \$75,000 (59.8%) and/or owned their property more than ten years (55.3%). Half of the respondents (49.4%) indicated they held a graduate degree, while nearly three-quarters (72.9%) were over the age of 50.

A very large majority of property owners were concerned about the reported changes and variability in the Earth’s climate. They felt that the government and individuals should take immediate steps to reduce the apparent causes of global climate change. They also felt that the government and individuals should prepare for the effects of

climate change that are predicted to occur. Nearly one-third indicated though that they were not “well-informed” about the expected effects of global climate change in Maine.

Of coastal erosion, sea-level rise, flooding and increased high tides, respondents viewed coastal erosion as the most problematic for shorelines closest to them. When looking at the subset of respondents who had shoreline or waterfront property, one-third indicated natural forces had affected their property adversely. Erosion appeared to be the most common cause of damage to their personal property.

Almost two-thirds of property owners felt the town should create a plan to deal with coastal natural forces. When asked what measures they had already taken to protect their property, the highest percentage stated they had already become familiar with floodplain maps and other information that describes their property. Over 60% indicated they would not be willing to move their structures further away from the shore. A low interest loan did not appear to be a motivator to take action against damage for many of the respondents. Conversely, nearly half of the respondents indicated they would be very motivated if a grant was available to them. Over two-thirds indicated they would rebuild on their property with storm resistant strategies if their property were severely damaged due to natural forces. Many others simply stated they did not know what they would do.

Nearly half of the coastal property owners indicated they trusted the information colleges/universities supplied about coastal erosion, sea-level rise, flooding and high tides. They also trusted information provided by environmental organizations. About half preferred to receive their information through newspapers.

With an overall return rate of 23% for the **public official survey**, the rate varied greatly among the 11 towns. Of those responding, 80% were male, had at least a Bachelor’s degree (70%), and had been in their current job for less than six years (52.6%). One-fifth of the respondents indicated they were planning board members.

The information gathered from the public official survey falls within three separate categories: 1) respondents’ level of concern and responsibility regarding climate change, 2) respondents’ knowledge of the subject, and 3) resources used and needed to gain information. It was clear that the respondents were very concerned about the issue of climate change and its effects. Seventy-two percent of respondents indicated that climate change will require action from them in the next year or two. The majority of respondents (85.4%) felt that the *causes* of climate change are issues that need to be dealt with immediately. Additionally, nearly 90% of municipal officials indicated their municipalities need to prepare for the *effects* of changes in the earth’s climate that are predicted to occur.

Not only were the public officials concerned about climate change and its effects, they also felt a responsibility to take action. Even though approximately half of the respondents indicated they already have a full load at work and can’t add another activity, over four-fifths of respondents indicated they would be willing to take action in their work if they had compelling information about anticipated risks (83.6%) and if there was adequate funding (81.5%).

Municipal officials indicated there is a need for information and/or training surrounding the issues involved with climate change. More than 80% of all respondents indicated there is either a moderate or high need within the next two years for: information to better understand or predict the effects of climate change on coastal communities (88.8%); assistance with assessing the vulnerable of their own municipality

(87.0%); planning assistance to adapt to the anticipated effects of climate change (81.5%); funding to assess vulnerability, develop adaptation plans or to implement adaptation measures (83.4%); and credible informational materials to provide to the public (90.5%). When asked to indicate the level of importance for gaining information or training surrounding specific topics, over half of the respondents indicated it was *very important* in the areas of: effects of sea-level rise on shoreline armoring (56.4%), sea-level rise predictions (50.9%) and effects on community infrastructure (50.9%).

Respondents were much more likely to receive information about climate change from non-scientific/technical sources than they were from scientific/technical ones. The most frequently used source of non-scientific/technical information for municipal officials was the newspaper followed closely by TV news. As for scientific/technical sources, respondents indicated they most frequently used the National Weather Service or the National Oceanic and Atmospheric Administration. When asked how they would prefer to receive information, the majority (86.8%) indicated they were “likely to” or would “definitely” use printed material mailed to them.

SYNOPSIS OF COASTAL PROPERTY OWNER SURVEY THEMES (compiled by Kristen Grant, Maine Sea Grant/University of Maine Cooperative Extension)

Total respondents N = 548

Respondent profile

- 58% male
- 43% age 51 – 65
- 41% income >\$100K annually
- 49% masters degree

Well-educated, high earner, older men

Property background

- 64% primary residence
- 32% waterfront
- 35% owned more 20 years
- 31% plan pass on to family

Long-term perspective

Perceptions of climate variability

- ~85% strongly agreed (SA) or agreed (A) that they are personally concerned about changes to Earth’s climate, potential impacts to Maine coast, and it is important for governments and individuals to *prepare for the effects* of climate change; fewer strongly agreed, by approximately 10%, with these statements than statements indicating a need to reduce the apparent causes.
- Yet ~20% – 30% indicate erosion, sea-level rise, flooding, and increased high tides are not a problem on nearest shoreline.
- Of the group indicating it is not problem - ~74% indicate it will not be a problem within 10 years and ~70% indicate that their nearest shoreline has not yet been affected by the above.

- Of shoreline property owners answering, 1/3 indicate there are adverse effects from climate change, sea-level rise, and erosion.

Climate change is a problem, but I don't see it myself right now, and don't expect to in 10 years.

Actions

- Measures that should be taken:
42%-51% said they did not know anything of the effectiveness of these hard or soft alternatives; 64% were familiar with floodplain maps.

Hard alternatives:

- 30% new seawalls built
- 36% seawalls reinforced
- Seawalls not seen as effective strategy

Soft alternatives:

- 41% dunes replenished (25% = not effective at all)
- 42% homes elevated
- 42% move back (28% = very effective)
- 30% beach re-nourished
- 51% stronger shoreland zoning

Management:

- 65% realtors' disclosure
- 64% town planning

Preference for management solutions; soft alternatives before hard.

- Measures that have been taken/would be willing to take
 30% restore native vegetation
 14% willing to move up, back
 61% do not know if their beach has been replenished.

Very low willingness to significantly invest their own money in structural mitigation measures.

Barriers to taking action

- Laws and rules do not allow it = 19.7%
- Engineering solutions to control nature do not work = 24.2%
- Costs are too high = 29%
- Do not have the information I need to make a decision = 27.4%
- Do not own enough land = 23.1%
- Other = 23.1%

“Cost is too high” = highest percentage of respondents (29.1%), followed closely by “do not have the information I need...” (27.4%). Of the 27 responses provided for “other,” nine alluded to laws or zoning issues.

Motivations for action

- 47% not motivated at all by low interest loan; 47% highly motivated by grant
- 50% motivated or very motivated if neighbors take action; 50% unmotivated

by same

- 67% motivated or very motivated if town leads; 33% unmotivated by same

Municipal leadership is key.

Evaluating risks

- 60.3% indicated they had evaluated the risks before buying property; 95.3% indicated the information they received was accurate; 40.4% received their information from their town office; from realtors and adjacent neighbors ~25%. Other common sources to be personal knowledge of the area.

Local information sources are most common when evaluating risks.

If severely damaged, what to do

- 78.9% indicated they would rebuild same structure or using storm-resistant strategies; only 8% would sell.
- 12.5% indicate other, many stating they were unsure of what they would do.

Reinforcing long-term perspective: owners rebuild at site with storm-resistant techniques.

Regulations

- 42% have only basic understanding of rules/regulations pertaining to their property; 33% have strong understanding

Need improved understanding of related federal, state, and local regulations.

Most trusted information source

- Colleges/universities 46% (contradicts focus group findings)
- Environmental organizations 43%
- Maine Sea Grant/Cooperative Extension 25%
- State agencies 25%
- Federal agencies 17%
- Local official 17%
- Property owners' associations 11%
- Other 7%

How they prefer to receive information

- Newspapers 50%
- Television news 42%
- Web sites 39.5%
- Pamphlets/flyers 36%
- E-mail 30%
- Informational meetings 21%
- Other 5%

CPO Focus Group Themes

Attitudes towards sea-level rise, climate change: Relatively little knowledge of science of climate variability.

Personal behaviors: Concern for protecting their properties; have used various hard and soft alternatives to limit erosion.

Shoreline change: Most observed dramatic changes, including higher tides, higher storm surges, and loss of property and even structures to erosion.

Agency communication: discussed longer, in more detail than any other topic. Frustrated dealing with local, state, and federal agencies. Some received differing (and conflicting) instructions from different agencies. They are unsure of chain of command.

Government action & inaction: Frustration; noted specific instances where local governments and agencies were aware of problems but did not deal with them in a timely manner, if at all. Involved specific events where public entities failed to act or acted inappropriately.

Private property rights: Felt almost universally rights as property owners being are being usurped by state/ feds. Although owners understood the rules and regulations, they did not agree with restrictiveness of limitations. Felt they were bearing a disproportional amount of the tax burden.

Educational preferences: Information sought from Internet, television, newspapers. Do not universally trust information from local, state, federal government or university. Ask for information from realtors and code enforcement officials.

Insights for Sea Grant: Will not seek out university research; wait for news blurb, overview/synthesis, some university researchers are perceived of as biased and will not be trusted as spokespeople on these issues.

Insights for agencies: Need better coordination between departments, levels of government to create consistency; need more cooperative, adaptive approach to working with coastal property owners.

Municipal Official Focus Group Themes

Public officials information needs:

- Convincing climate change impact evidence: clear and convincing evidence about the impact of climate change on these issues that address some of the current critics of the concept of global warming
- Erosion mitigation strategies: funding for implementation; impacts of various strategies, BMPs, approaches used by various agencies
- Emergency preparation and municipal planning: information, maps, data on flood prone areas, upgrading building codes for future climate change, etc.

- Management strategies: Balancing individual property rights and the public good for sustainability; tax equity issues; lack of funding for buy outs

Coastal property owner information needs:

- A clearinghouse for information on best management practices (BMPs) and permitting

Insights for Sea Grant: Need information on economic impact of beaches; also need for educational outreach to realtors, developers, and builders.

SURVEY AND FOCUS GROUP RESULTS COMPILED

(Adapted from PowerPoint presentation by Kathleen Leyden, Maine Coastal Program, to Stakeholder Advisory Committee, November 12, 2008)

Coastal Property Owners—Attitudes and Values

- Mid- to long-term ownership of primary residences – desire to keep property in the family.
- Personally concerned about climate change and impacts in ME; government and individuals should prepare for effects (85%).
- Mixed results re: acknowledgement of effects already experienced in Maine, with recognition highest among waterfront property owners.

Motivated audience, already thinking about long term, folks not on immediate shoreline need more information.

Coastal Property Owners—Actions

- If damaged, would rebuild using storm-resistant methods (68%).
- Slight preference for “soft” vs. “hard” alternatives”, but unsure of effectiveness of either. 20% say engineering solutions don’t work.
- Regulatory and town planning responses favored over individual action (64% town planning; 65% realtors disclosure; 51% shoreland zoning, 50% land acquisition of vacant property).
- Beach nourishment was least favored option.

Conduct and publicize demonstration projects and/or models of soft and hard alternatives applied in Maine coastal communities and clarify their effectiveness.

Coastal Property Owners—Barriers to Action

- Costs – structural measures; move up, move back are too expensive, not enough land.
- Lack of information—effects of climate change in Maine, the effectiveness of various mitigation alternatives, federal, state or local regulations.
- Government—government (primarily federal and state) is a barrier to protecting property and infringes on private property rights.

Focus on affordable measures; provide examples of actual costs, publicize resources that can help with more expensive alternatives.

Coastal Property Owners—Motivators

- Motivators
 - Grants (47%)
 - Actions taken by peers (50%)
 - Leadership from town government (67%)

Towns and coastal property owner groups need to be partners in efforts to address climate change effects.

Coastal Property Owners—Information Sources & Delivery

- Information sources
 - Environmental organizations, property owner groups, town office/code officers realtors (Colleges and universities?)
 - High level of familiarity with flood maps
 - Evaluation of “risks” before purchase is common (60.3%).
- Information delivery
 - Newspaper, television, Internet, pamphlets, meetings

Public Officials—Attitudes

- Attitudes
 - Prepared to devote time/resources to issue (56%).
 - Willing to take action in my work, if I had compelling information about anticipated risks in the future (83%).
 - Requires action from me in 2009/2010 (72%).
 - Important for my generation of decision-makers (74%).
 - Other US communities are addressing climate change (54%).

These folks are ready to act--credible information will help them do so!

Public Officials—Barriers to Action

- Barriers to Action
 - Not enough information (64%)
 - Full plate of activities (53%)
 - New funding needed (82%)
 - Those who assign/influence my work not communicating a sense of urgency (52%)
 - Lack of unified property owner/government opinions on solutions

Provide highly relevant information in a way that is easy for busy people. Focus on options that are broadly supported.

Public Officials—Information

- Information Needs
 - Convincing climate change impact evidence.

- Erosion mitigation strategies; funding, impacts, BMPs.
- Planning—data/information/maps; building codes.
- Emergency preparedness.

These folks “know what they don’t know” and have very specific information needs. Provide accurate, concise information on climate change effects, and mitigation strategies.

Public Officials—Information Sources & Delivery

Primary Sources:

- Newspaper and television
- Secondary sources
- Technical journals, government documents, and agency Web sites
- Direct mail (i.e. hard copy, comes to them)

URLs for Reports:

September, October, & November (2007) Focus Groups Final Report

http://www.seagrant.umaine.edu/program/SARPdocs/09SGFinalReportFocusGroups4_2_08.pdf

Fall 2007 Focus Groups & Spring 2008 Surveys Comparative Analysis

<http://www.seagrant.umaine.edu/program/SARPdocs/09SGComparativeReport082908.pdf>

Outreach Plan (2009)

<http://www.seagrant.umaine.edu/program/SARPdocs/09OutreachPlanV7SARP.doc>

EVALUATION/DISCUSSION

The evaluation of the project will take place at the two regional educational workshops scheduled for June 2009. One workshop will be held in the southern region of the state (Kennebunk) and the other in the midcoast area (Rockland). All participants in the two surveys who provided names and addresses will be invited to attend one of the workshops. Our goal is to attract a total of at least 50 coastal property owners and 20 town officials.

The DVD will be shown to participants in the workshops and then a facilitated discussion will follow. At the end of the session, participants will be given a post-test, which will consist of a subset of questions taken from the original pre-test survey.

Session objective (what will participants learn or do?):

- After viewing the DVD “Building a Resilient Coast: Maine Confronts Climate Change” and participating in the following discussion, XX% of participants taking the post-test will indicate an increase in knowledge of topic areas identified in the pre-test.
- After viewing the DVD “Building a Resilient Coast: Maine Confronts Climate Change” and participating in the following discussion, XX% of participants taking the post-test will be able to identify a hazard mitigation action they can take on their property or in their work.

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