

New England **Climate Adaptation** PROJECT



Case Study **Wells, Maine**

PRODUCED BY:

Massachusetts Institute of Technology Science Impact Collaborative
Consensus Building Institute
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The Massachusetts Institute of Technology Science Impact Collaborative (MIT SIC) is a research group focused on developing and testing new ways of harmonizing science, politics and public policy in the management of natural resources and resolution of environmental disputes. MIT SIC's tools and approaches include collaborative adaptive management, joint fact-finding, scenario planning, collaborative decision-making and multi-stakeholder engagement, and the use of role-play simulation exercises.

MIT SIC was established in 2003 with initial support from the United States Geological Survey. Today, the research group has numerous partners and supporters, ranging from the U.S. National Estuarine Research Reserve System to the Dutch research organization TNO. By engaging in community-based action research projects, MIT SIC researchers—including doctoral students, masters students, and faculty from the MIT Department of Urban Studies and Planning—train emerging environmental professionals while simultaneously testing the latest environmental planning methods and providing assistance to communities and policy-makers who seek our help.

Visit the MIT Science Impact Collaborative website for more information: <http://scienceimpact.mit.edu>

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The Consensus Building Institute (CBI) is a not-for-profit organization founded in 1993 by leading practitioners and theory builders in the fields of negotiation and dispute resolution. CBI's experts bring decades of experience brokering agreements and building collaboration in complex, high-stakes environments — and possess the deep understanding required to tackle negotiation and collaboration challenges in our practice areas. CBI's Founder, Managing Directors, and many of our Board members are affiliated with the Program on Negotiation at Harvard Law School and the MIT-Harvard Public Disputes Program.

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About the Wells National Estuarine Research Reserve

The National Estuarine Research Reserve System (NERRS) is a network of 28 areas representing different biogeographic regions of the United States that are protected for long-term research, water-quality monitoring, education and coastal stewardship. The reserve system is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states. Reserve staff work with local communities and regional groups to address natural resource management issues, such as non-point source pollution, habitat restoration and invasive species. Through integrated research and education, the reserves help communities develop strategies to deal successfully with these coastal resource issues. Reserves provide adult audiences with training on estuarine issues of concern in their local communities. They offer field classes for K-12 students and support teachers through professional development programs in marine education. Reserves also provide long-term water quality monitoring as well as opportunities for both scientists and graduate students to conduct research in a "living laboratory."

The Wells National Estuarine Research Reserve works to expand knowledge about coasts and estuaries, engage people in environmental learning, and involve communities in conserving natural resources, all with a goal of protecting and restoring coastal ecosystems around the Gulf of Maine. The Wells Reserve protects 2,250 acres of salt marsh, freshwater wetland, beach, dune, forest, and field.

Visit the Wells Reserve website for more information:

<http://www.wellsreserve.org/>

Table of Contents

Acknowledgements	2
Executive Summary	6
Introduction and Overview of NECAP	9
Situation Assessment	10
NECAP Workshops in Wells	16
Key Findings	21
Enriched perspective	21
Local-level responsibility and action	22
Incorporating climate change planning into everyday decision-making	24
Perceived barriers to action	26
Suggested pathways forward	29
Conclusion	31
Project Staff and Partners	33

Executive Summary

This report summarizes findings from the New England Climate Adaptation Project's (NECAP) work in Wells, Maine, from fall 2012 through spring 2014. The project aimed to increase public awareness about climate change risks and adaptation opportunities in Wells and build support for local efforts to address the challenge of adaptation. NECAP workshops engaged a diverse set of local residents to test whether role-play simulations tailored to the town's particular setting could be effective as a public education tool for learning about climate change risks, adaptation, and decision-making.

Prior to writing the simulation and running the workshops, project staff assessed the range of climate change risks facing the town and interviewed key stakeholders to determine current perceptions about these risks and the potential for adaptation. These findings were complemented by a public poll of 100 randomly selected Wells residents to establish baseline opinions about local climate change risk and adaptation.

Key Takeaways from the Summary Risk Assessment Include:

- Wells can expect temperature increases, increased precipitation, more extreme precipitation, and rising sea levels as a result of climate change. Wells is likely to experience more days of extreme heat and fewer days of extreme cold.
- Projections indicate that Wells will face increased coastal and riverine flooding from intense precipitation events, coastal storm surges, and sea level rise. More than 1,900 parcels of land will be at moderate to high risk of flooding over the long term in Wells.
- Additional risks to Wells include a higher likelihood of heat waves and more frequent extreme heat events.
- Changes in temperature and salinity in marine waters could lead to a decline in the health of the area's marine habitats.
- Degradation of regional beaches, coastal wetlands, and other natural areas resulting from sea level rise and changes to ocean composition would threaten the town's tourism industry.
- Town residents, public infrastructure, and private properties could all face significant risks from severe storms and flooding.

Key Takeaways from the Stakeholder Assessment and Public Poll Include:

- Interviewed stakeholders identified beach erosion, damage to coastal property from sea level rise, and increasing storm intensity as the most concerning climate change threats.
- Stakeholders felt that climate change could negatively affect coastal tourism in Wells, lead to infrastructure damage, and generally harm the fiscal and economic health of the town.

- When asked about adaptation options, stakeholders expressed the most concern about managing flood risks and suggested flood-proofing regulations, protecting critical infrastructure, and building sea walls as potential solutions.
- The most common obstacle cited by stakeholders to moving forward with adaptation efforts was a lack of knowledge about or belief in climate change among Wells residents. However, public poll findings indicate residents have a much higher level of concern about climate change than stakeholders assumed.
- Stakeholders felt that many adaptation options appeared costly or challenging to implement.
- The poll illuminated a lack of public confidence about the government's ability to respond successfully to climate change risks, and interest in public participation in local decision-making about climate change.

Key Takeaways from the Workshops

The Summary Risk Assessment and Stakeholder Assessment provided the basis for the role-play simulation NECAP staff created specifically for Wells. At the workshops, participants were invited to assume a role representing key interests of residents in a fictitious town very similar to Wells. Their task was to try to reach a consensus on what adaptation policies they would recommend to town leaders. In fall 2013, project staff ran eight workshops in Wells and surrounding communities, collecting data to gauge the effectiveness of the intervention. The workshops and subsequent data analysis revealed five key findings from the role-play simulation workshops:



Image 1. View of the Wells waterfront; credit: Erica Simmons

- 1. Enriched perspective:** The role-play simulations increased participants' empathy for other viewpoints and made it easier to have difficult conversations about climate change.
- 2. Local-level responsibility and action:** The workshops led to higher levels of local concern about climate change for participants, including a sense of local responsibility and public interest in planning and pursuing adaptation solutions.
- 3. Incorporating climate change planning into everyday decision-making:** The majority of workshop participants felt that decisions about climate adaptation should be incorporated into the daily work of local government. While a confidence gap exists between the actions residents think the government should take and what they believe it will actually do, the workshops did increase confidence in the government's ability to address the problem.

- 4. Perceived barriers to action:** The three major barriers to town action on climate change risks were, in rank order, 1. The difficulty of reaching agreement among so many stakeholders; 2. The lack of public interest or concern about climate change in Wells; and 3. The cost of adaptation measures.
- 5. Suggested pathways forward:** Workshop participants said public participation and education are key to moving forward with adaptation planning. Many participants also recommended specific policies or investments, particularly those highlighted in the simulation.

These findings provide insight into Wells residents' opinions regarding the management of climate change risks and adaptation options at the local scale. They also indicate that role-play workshops can have a positive impact in affecting public attitudes and starting conversations about climate change risk and adaptation. Follow-up interviews showed that Wells participants want to see more action and public engagement in their town, demonstrating that these workshops can help to build support and momentum for adaptation planning.

Introduction and Overview of NECAP

The New England Climate Adaptation Project (NECAP) recognizes the serious threats that climate change poses to coastal communities, including an increased risk of intensified storms and flooding, sea level rise, saltwater intrusion into marshes and farmland, coastal erosion, and destruction of infrastructure and coastal properties. To help communities assess and decrease their vulnerability to climate change, the project engaged four coastal New England cities and towns in public climate adaptation workshops: Wells, Maine; Dover, New Hampshire; Barnstable, Massachusetts; and Cranston, Rhode Island. At the workshops, residents were invited to participate in role-play simulations tailored to their community. These games put residents into different roles representing various local constituencies and challenged them to reach agreement about potential adaptation policy options for a fictitious town. The goal was to test this hands-on approach to public education about climate change adaptation and collective decision-making to solve challenging public problems. The project sought to investigate current perceptions about barriers to and solutions for climate change risk management and to test whether widespread use of such role-play simulations can help move a town toward proactive adaptation planning.

NECAP is a collaborative research partnership between the MIT Science Impact Collaborative (MIT SIC), the National Estuarine Research Reserve System (NERRS), the four New England coastal towns mentioned above, and the Consensus Building Institute (CBI). At the project outset, NERRS staff identified potential partner towns to serve as sites. The NERRS partner in Maine, the Wells Reserve at Laudholm, expressed interest in building a stronger relationship with the Town of Wells on climate change adaptation. They saw Wells as a good partner for the project because it is a small coastal town close to the Wells Reserve, and it was in the beginning stages of planning for climate change risk and adaptation. Town leaders agreed the project would be valuable and committed to participate.

The project officially launched in August 2012. During the first year, climate scientists at the University of New Hampshire produced downscaled climate change projections for Wells and the three other project sites. These projections provided the best possible scientific estimate of what the future climate will be like in each partner town. Projections were produced for temperature, precipitation, sea level rise, and a number of other key climate indicators, including extreme precipitation and extreme temperature events. NECAP staff worked with technical climate change experts and municipal partners to translate these climate projections into a Summary Risk Assessment for each site. Each Summary Risk Assessment broadly explains how projected climate changes could affect the municipality, providing a broad-brush evaluation of key local risks and potential adaptation options.



Image 2. NECAP towns; credit: NECAP staff

NECAP staff simultaneously conducted a Stakeholder Assessment for each community. This involved interviewing 15 to 20 key stakeholders at each site to gather their views about climate change risks and adaptation options. Wells' interviewees included local, regional, and state government officials; business owners; environmental organization representatives; science and engineering professionals; educators; and property owners. During the interview process, stakeholders were shown the climate change projections for their town and were asked to react to these forecasts. Findings from the stakeholder interviews were then used to write a Stakeholder Assessment document, which interviewees reviewed for accuracy and completeness. The Stakeholder Assessment was then shared with project partners and other officials in each municipality to inform their planning and public engagement strategies going forward.

Based on the stakeholder and risk assessment findings, MIT project staff wrote a role-play game tailored to each test site. In Wells, the role-play was for the fictitious town of Launton, which was given a geography and population very similar to Wells as well as the same vulnerabilities and climate change risks. The role-play was designed to model for community stakeholders a collective approach to local policy-making on climate change risks. The Launton game illustrated an array of no-regrets policy options that could help increase Wells' resiliency to climate change.

Before running the NECAP role-play simulation workshops in Wells, NECAP staff commissioned an independent firm to poll 100 randomly selected Wells residents via landline. This poll, conducted in May 2013, established baseline opinions about climate change risk and adaptation among residents in Wells.

Between June and December 2013, NECAP staff ran eight workshops in the Wells area and engaged 115 participants in the role-play simulations and follow-up debriefings. At the workshops, all participants began by filling out surveys to establish their baseline opinions on climate change risk and adaptation. They then completed a second survey at the end of the workshop to establish whether the experience had affected their views. Approximately four to six weeks after the workshop, NECAP staff conducted in-depth follow-up interviews with 29 participants to determine the longer-term effects of the workshop, if any.

Key findings from the Wells Summary Risk Assessment, Stakeholder Assessment, and initial public poll are discussed below in the Situation Assessment section. The Situation Assessment is followed by an overview of the methodology used to develop and run the climate change adaptation workshops in Wells. The case study concludes with a detailed discussion of key findings from the workshops.

Situation Assessment

Wells is a town of 10,000 year-round residents on the southern coast of Maine near the New Hampshire border. Tourism is a major business in this town, with area beaches swelling the town's population to 40,000 in the summer months. Other natural resources include an ecologically diverse estuary and two federal nature preserves, the Wells National Estuarine Research Reserve

and the Rachel Carson National Wildlife Refuge. The town's barrier beaches and estuary give it a unique ecological setting.

Wells is one of the fastest growing communities in Maine. Development in the town's 60 square miles is concentrated along the coastline and inland along Route 1. The estuary provides a natural separation between the higher density coastal development and some of the lower density inland development. In addition to tourism, major industries include commerce, resource extraction, and commercial fishing. In 2010, the median household income in Wells was \$62,896, with 3.2 percent of families and 5.3 percent of individuals living below the poverty line of \$23,850 for a family of four and \$11,670 for individuals. The racial makeup of the town is predominantly White, accounting for 99 percent of the population. There are several active neighborhood associations, but these are concentrated in the coastal neighborhoods and their work is affected by the seasonality of many of the residents. Although a substantial proportion of Wells' year-round population lives inland, there appears to be less neighborhood organization in those areas.

The Town of Wells is governed by an elected board of selectmen that appoints a town manager. The town manager, town engineer, and code enforcement officer collaborated with project staff on the project. Prior to participating in NECAP, Wells had engaged in preliminary planning activities to reduce the town's vulnerability to climate change

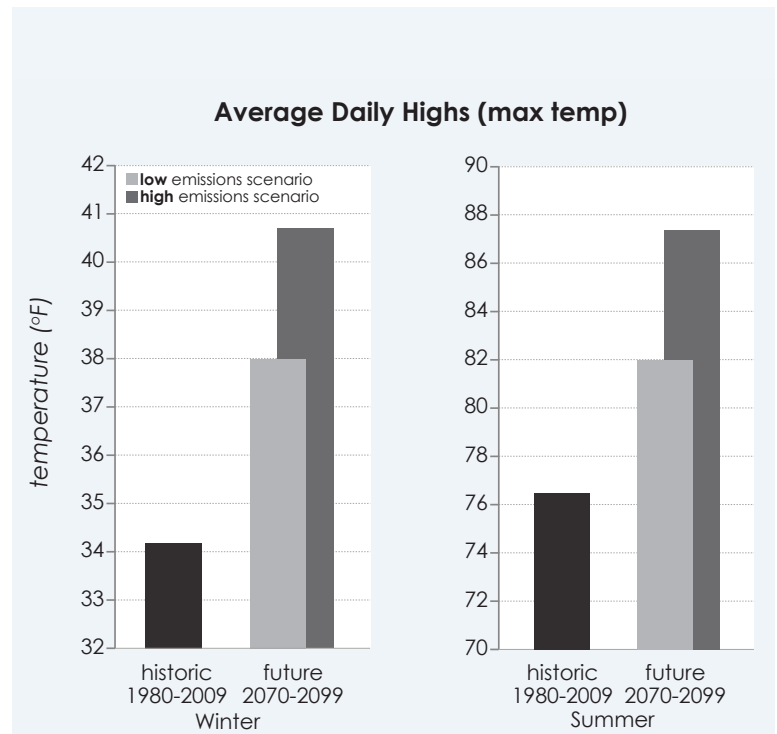


Figure 1. Projected average daily high seasonal temperatures

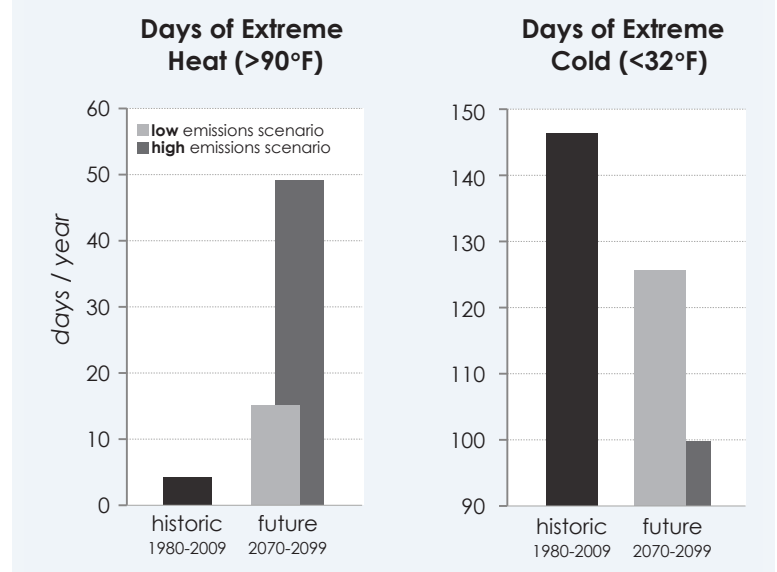


Figure 2. Projected days of extreme heat and cold

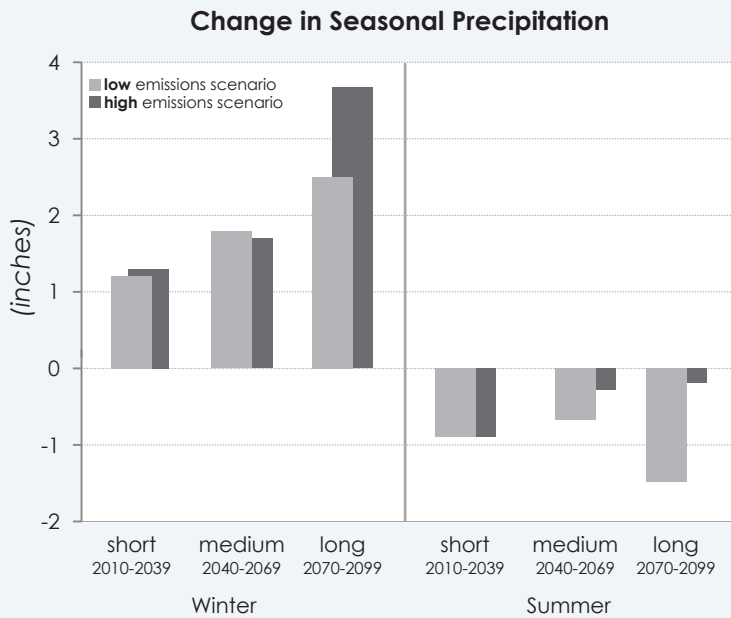


Figure 3. Projected seasonal precipitation changes

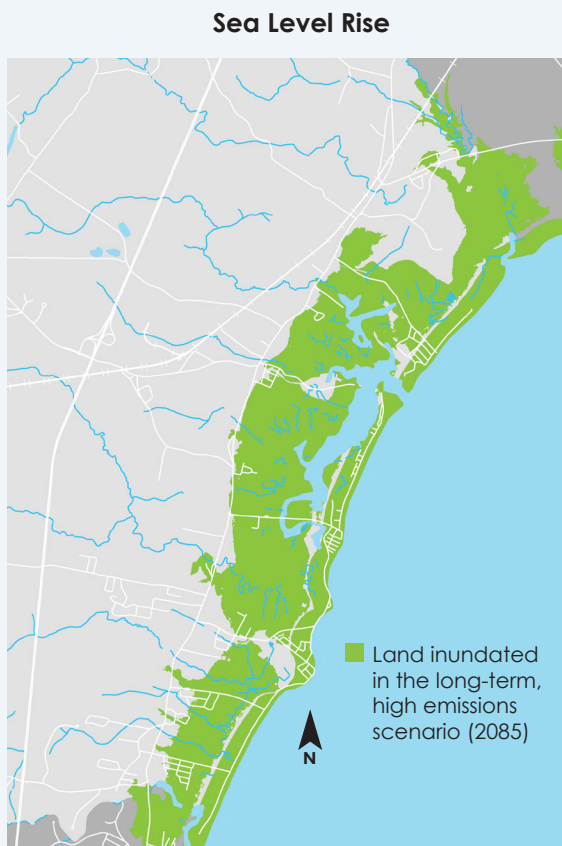


Figure 4. Future predicted sea level rise in Wells

impacts and to raise public awareness. For example, the 2013 Wells Harbor Management Plan calls for considering sea level rise projections when siting and designing harbor infrastructure. Following severe storms, the town's Highway Department has reviewed its infrastructure design standards and emergency officials have shared lessons learned from response efforts. Under different leadership in the past, however, Wells had declined to participate in regional efforts to plan for climate change risks led by the Southern Maine Regional Planning Commission and the Maine Geological Survey. In participating in NECAP, Wells leaders were particularly interested in getting technical data about the potential risks facing the town and in learning how to incorporate adaptation planning into their next Comprehensive Plan update in 2015.

The Summary Risk Assessment for Wells, available in full at necap.mit.edu, outlines likely future climatic conditions projected for Wells, in addition to major risks and vulnerabilities. The risk assessment produced projections for a "better case" low emissions scenario and a "worse case" high emissions scenario across a short-, medium-, and long-term time frame. These scenarios were contrasted to a historic baseline from data collected between 1980 and 2009.

According to the climate projections, Wells can expect temperature increases, increased precipitation, more extreme precipitation events, and rising sea levels as a result of climate change. Wells is likely to experience more days of extreme heat and less extreme cold. In

the long run, between 2070 and 2099, average temperatures in Wells are expected to increase between 3.8 and 8.5 degrees Fahrenheit (see Figure 1). Days of extreme heat above 90 degrees are projected to increase from the historic baseline of four days per year to between 15 and 49 days a year (see Figure 2). Wells can also expect increased precipitation and more extreme precipitation events, particularly during the winter months (see Figure 3). In the long-term, high emissions scenario, Wells would see a 50 percent increase in the number of events per year in which two inches of rain falls in 48 hours. By the end of the century, sea level rise in Wells is expected to increase by 2 feet in a low-emissions scenario and to nearly 5 feet under a high emissions scenario from the historic baseline.

These projections indicate that Wells faces increased coastal and riverine flooding from intense precipitation events, coastal storm surges, and sea level rise. Under the long-term, high emissions scenario, coastal flooding would far exceed the bounds of the estuary that currently separates part of the town from the ocean. More than 1,900 parcels of land will be at moderate to high risk of flooding over the long term in Wells (see Figure 4). Due to dense development along Wells' barrier islands, coastal areas such as Wells Beach, Moody Beach, Drakes Island, and Wells Harbor are particularly vulnerable to damage from future tidal and surge flooding. Stormwater runoff and related riverine flooding also pose threats to developed areas further inland. Sea level rise will likely submerge beaches and marshlands that currently provide the town with natural defensive barriers.

Additional risks to Wells include a higher likelihood of heat waves due to increasing temperatures and more frequent extreme heat events, which—particularly when paired with projected decreases in summertime rainfall—may also increase the risk of drought. Changes in temperature and salinity in marine waters could damage the area's marine habitats. Degradation of regional



Image 3. Wells coastline during a storm; credit: Wells Reserve at Laudholm

beaches, coastal wetlands, and other natural areas would also threaten the tourism industry in Wells.

Stakeholder Assessment interviews conducted with 15 Wells residents from a variety of stakeholder groups echoed the concerns identified in the Summary Risk Assessment. Every interviewed stakeholder identified beach erosion and damage to coastal property as concerning climate change threats. Stakeholders also felt that climate change would negatively affect tourism, lead to infrastructure damage, and generally harm the fiscal and economic health of the town. Another possible threat stakeholders identified was the impact on the health of the town's estuaries from increased saltwater intrusion and changing temperatures. In all cases, the stakeholders most concerned were those responsible for public services that have been affected by recent weather events, business and property owners who have suffered climate-related effects, and those who work in the environmental services industry.

How concerned are you about the possible impacts a changing climate might have on your town?

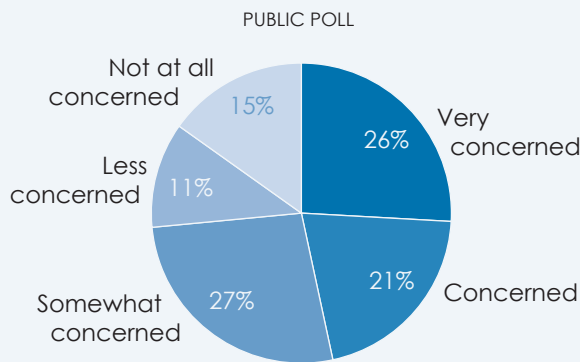


Figure 5. Frequency of climate change consideration

Do you ever think about whether a change in the climate could affect your community?

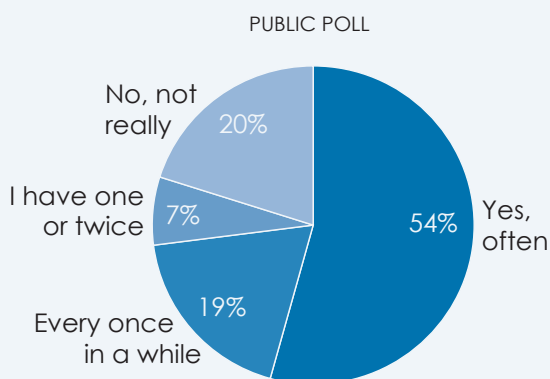


Figure 6. Level of climate change concern

The most common obstacle to moving forward with adaptation efforts cited by interviewed stakeholders was a lack of knowledge about or belief in climate change among Wells residents. The majority of interviewees said they thought up to half of Wells residents did not believe that climate change was taking place. Interviewees said this stance makes it challenging to build political support for adaptation, and they identified a strong need for more public education about climate change risks. A second commonly cited obstacle was financial constraints, with many adaptation options appearing costly to stakeholders or challenging to implement due to state and federal regulatory constraints. Maine has a strong property rights culture that could make adaptation solutions focused on restricting land use or coastal development difficult. Stakeholders cited government agencies from all levels—local, regional, state, and national—as having a role to play in adaptation. They also felt it is important that residents take personal responsibility for climate preparedness.

The independent public poll of 100 Wells

community members conducted prior to the project's launch provides a clearer picture of town residents' actual views about climate change risks, barriers, and solutions.¹ While stakeholders expressed concern that the majority of Wells residents were apathetic about climate change, 54 percent of poll respondents reported "often" thinking about how climate change could affect their community; another 19 percent said that they think about this subject "every once in a while." While 20 percent of respondents reported not thinking about climate change, this figure is substantially lower than stakeholder estimates (see Figure 5). Similarly, close to 75 percent of respondents said that they were "somewhat" to "very" concerned about the impacts a changing climate might have on their community (see Figure 6).

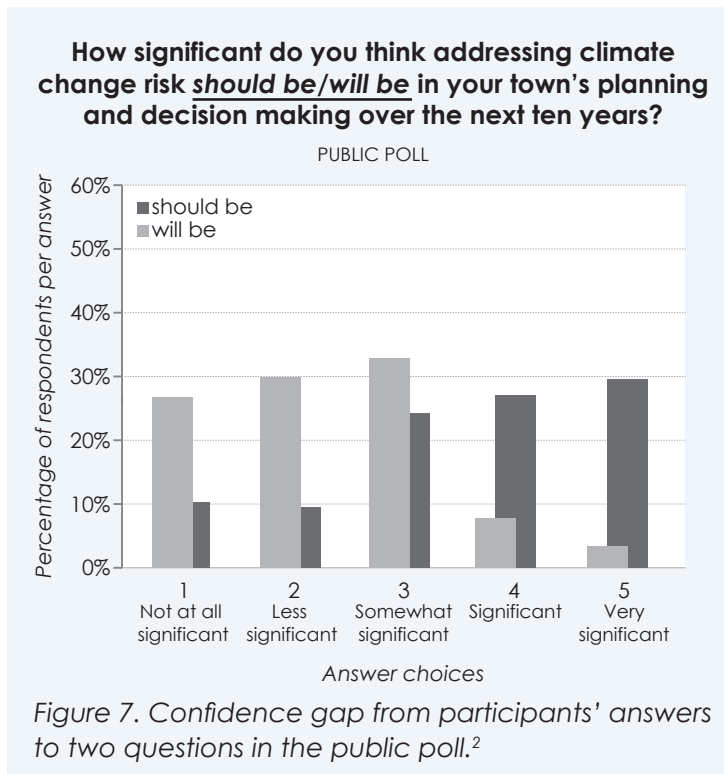
In line with the findings from the stakeholder assessment, the climate-related concern that typically topped the list among poll respondents was increased flooding (33 percent), followed by more severe storms (20 percent), and ecosystem impacts (14 percent). Only 9 percent of respondents felt that there would be "no significant impacts" from climate change. When asked how "risky" they think climate change is, 58 percent of respondents said "very high" or "high." Another 25 percent felt that climate change was "moderately" risky. However, when asked if decision-makers should take scientific projections about what the climate might be like in 50 years into account when making everyday decisions today, 36 percent of respondents either disagreed or had no opinion. In contrast, over 45 percent of respondents strongly agreed that decision-makers should take scientific projections about the climate in 50 years into account in their everyday decision-making.

Importantly, the poll illuminated a gap between the public's expectations of local government action on climate change and their confidence in the government's ability to respond successfully. Eighty-one percent of participants said that climate change risks *should be* somewhat to very significant in town decision-making. Yet, only 44 percent of participants expected that *will actually be* the case in their town over the next decade, in contrast to 11 percent who said they thought addressing climate change risks will play a significant or very significant role in government decisions (see Figure 7). While the poll does not explain this gap, the financial, regulatory, and political barriers identified by stakeholders might contribute to the disparity.

When asked if residents, local groups, and businesses should be involved in making decisions about how to respond to climate risks, more than 91 percent of poll respondents said yes. This high response shows an interest in public participation in local decision-making about climate change.

Poll respondents were split nearly evenly between men and women. Ninety-four percent reported being year-round residents of Wells, a number that may reflect the higher likelihood of year-round residents having landline phones. Eighty-two percent of poll respondents had lived in the community for 10 years or more and 62 percent were 50 years or older. Fifty-two percent identified themselves as political independents, while 18 percent were self-identified as liberal and 20 percent as conservative. Seventy-seven percent of poll participants were unaffiliated with any

¹ A sample size of 100 people is commonly used for broad-brush public opinion polls and provides for a 10% margin of error, regardless of the population size.



local or national environmental organization. In terms of highest level of educational attainment, 54 percent were high school graduates, 14 percent had bachelor's degrees, and 23 percent had graduate degrees. Poll results were weighted to account for age and gender differences between the poll population and U.S. Census data for Wells.

In addition to gauging concern about climate change via the public poll and stakeholder interviews, project staff also asked stakeholders about adaptation options for responding to climate change risk. Interviewed stakeholders expressed the most concern about managing flood risks and suggested flood-proofing regulations, protecting critical infrastructure, and building sea walls as potential solutions. Similarly, the Wells Summary Risk Assessment highlights

several other ways of reducing flooding risks in and around Wells, including voluntary buy-back programs for at-risk properties, protecting and restoring sand dunes, and incentivizing development in less flood-prone areas. The town could also shore up critical infrastructure by raising and fortifying emergency routes, expanding stormwater culverts, and addressing stormwater runoff.

Several other adaptation options arose in multiple interviews. Increasing awareness of climate change risk through public education was a major adaptation step identified by stakeholders. The interviewees also discussed the need to manage town growth and preserve open space. Stakeholders suggested collaborating with other municipal governments in the region and linking adaptation efforts to town projects and policies to increase their effectiveness. Several individuals thought that adapting town policies incrementally was the best way to proceed. Many of these adaptation options formed the basis of the policy choices presented to workshop participants during the role-play simulations.

NECAP Workshops in Wells

This section describes the climate adaptation workshop structure and delivery in Wells. After conducting the Stakeholder Assessment and Summary Risk Assessment, project staff wrote a

² In response to the first of these two poll questions (dark grey bars in Figure 7), a high number of respondents thought that addressing climate change risk **should be significant** in their town's planning, but in answering the second of these questions (light grey bars), a high number of respondents thought that addressing climate change risks **will not be significant** in their town's actual planning.

tailored role-play simulation for the town. Over the course of seven months, between June and December 2013, NECAP staff ran six workshops in Wells and two in the neighboring communities of Kennebunkport and Biddeford. In total, 115 participants attended the workshops. Group size tended to be small, with an average of 14 people attending each event, resulting in about two tables of game play at each workshop.



Image 4. Wells workshop participants prepare for the role-play simulation; credit: Julie Curti

The workshops lasted approximately two and a half hours. During the first 30 minutes, 15 minutes were designated for people to check in and the next 15 minutes for providing an all-group overview of the NECAP project and an introductory description of the Wells simulation. Participants were then given half an hour to read their game materials. The role-play portion of the workshop ran for one hour and the final 30 minutes were devoted to an all-group debriefing. This involved discussing participants' role-play experience and examining how to apply the lessons learned in their own communities.

The role-play simulation created for Wells is based on the findings of the Summary Risk Assessment and Stakeholder Assessment, reflecting the main climate threats facing the town as well as the political dynamics of Wells. However, to provide a safe space for participants to engage, staff intentionally developed the scenario for a fictitious town called Launton. Like Wells, Launton is a small coastal town in New England, which is home to 10,000 year-round residents and 30,000 people during the summer months. The coastal areas of the town are largely developed, and tourism drives much of the economy. In recent years, Launton has experienced increased frequency and severity of coastal storms. The town faces flooding and related damage every time there is a storm surge on the coast. Town residents are concerned about the high cost of rebuilding after every storm, and coastal residents are particularly worried about high property tax rates and the rising cost of flood insurance.

In response to these public concerns, Launton's town government is developing a climate adaptation strategy that will be built into its updated Comprehensive Plan. The town has asked a group of stakeholder representatives to serve on its Coastal Resiliency Task Force to help inform the adaptation strategy. The role-play scenario convenes the group of six representatives from the civic, government, and business sectors for their third and final meeting, which will be guided by a professional facilitator. The scenario establishes that the task force has already come up with six potential policy proposals that could reduce future risks and costs associated with severe storms. All these strategies relate to reducing coastal development risks. Adaptation strategies put forward to reduce risks to existing coastal development include building new sea walls, expanding the flood-proofing ordinance to include buildings in the 500-year floodplain, and launching a buy-back program to purchase at-risk properties. Strategies for reducing risks to future coastal development include upgrading coastal infrastructure, incentivizing inland development, and incentivizing inland development in conjunction with a conservation plan.

During the hour-long role-play simulation, participants were asked to assume different roles in the town and come up with a set of ideas to include in the new Comprehensive Plan that at least five of the six participants can support. Each participant in the workshop received a set of background instructions that included the information about Launton described above, a short description of each representative at the table, a chart outlining the likely benefits and costs of each policy option, a map of the town, a glossary of climate adaptation terms, and a brief risk assessment prepared by a local university. The risk assessment shows the potential impacts of climate change on the town in terms of increased precipitation events and sea level rise in the short, medium, and long run. In addition, each workshop participant received a set of confidential instructions specific to the role he or she was assigned. These roles included representatives from a neighborhood association, the chamber of commerce, and a local land trust; a town councilor; the town planner; the town emergency management director; and a professional facilitator. Each set of confidential instructions was broadly based on the findings of the stakeholder interviews conducted in the winter of 2012–2013, although many roles combine the interests and perspectives of multiple real-world stakeholder groups.

NECAP staff used a multifaceted outreach strategy to attract town residents to the workshops. By intent, the participants in the first two workshops were primarily people interviewed for the Stakeholder Assessment, town employees, and Wells Reserve at Laudholm staff. Building on their recommendations for whom to engage in future workshops, staff generated an email list of potential participants that they continued to expand throughout the fall of 2013. Project staff also relied on civic organizations, places of worship, political organizations, educational institutions, and business associations as channels to attract community members to participate. Leaders of these organizations were asked to announce workshop opportunities to their memberships. In addition, Wells Reserve at Laudholm partners placed advertisements in local publications and announced the workshop via their email list and Facebook page. Project staff posted fliers at town businesses and institutions and asked participants to share their workshops experiences with family members, friends, and colleagues.

Despite these efforts, recruiting sufficient participants for the Wells workshops proved challenging. Once the summer ends, Wells' population returns to just under 10,000 people, leaving a relatively small population from which to draw. Additionally, the main method of outreach, email, did not seem to be the most effective way to reach Wells residents. When participants were later asked how they heard about the workshops, only 33 percent said an email announcement led them to attend. The team also learned that the phrase "climate change" in the materials turned off some residents, so they changed their messaging to focus on recent severe storms in Wells. The use of the word "game" also seemed to dissuade some people from attending, so staff started using phrases such as "role-play simulation" and "take on a decision-making role." These adjustments in the outreach strategy led to some improvement in attendance. Less effort was required to generate RSVPs for later workshops.

NECAP staff administered surveys to all workshop participants before and after each event (referred to as the "pre-surveys" and the "post-surveys," respectively), and collected complete sur-

	PUBLIC POLL		WORKSHOP SURVEYS	
AGE	COUNT	PERCENTAGE	COUNT	PERCENTAGE
29 & Under	13	13.7%	27	26.2%
30-39	6	6.3%	9	8.7%
40-49	17	17.9%	14	13.6%
50-59	23	24.0%	13	12.6%
60+	36	37.9%	40	38.8%
LENGTH OF RESIDENCE				
Less than 1 year	0	0%	24	23.3%
1-3 years	0	0%	11	10.7%
3-10 years	16	17.2%	13	12.6%
10-20 years	23	24.2%	21	20.4%
20+ years	54	56.8%	30	29.1%
TYPE OF RESIDENCE				
Year-round	89	94.7%	72	48.0%
Summer	3	3.2%	12	8.0%
Autumn	0	0%	18	12.0%
Winter	0	0%	15	10.0%
Spring	0	0%	19	12.7%
Holidays only	0	0%	1	0.7%
I am here sporadically	1	1.1%	5	3.3%
Other	1	1.1%	8	5.3%
POLITICS				
Conservative	19	20.2%	23	22.1%
Liberal	17	18.1%	49	47.1%
Independent	49	52.1%	30	28.8%
Other	9	9.6%	2	1.9%
ENVIRONMENTAL GROUP MEMBERSHIP				
No	72	76.6%	59	57.8%
National group	6	6.4%	22	21.6%
Local group	12	12.8%	12	11.8%
Yes, other	4	4.3%	9	8.8%
EDUCATION				
High school graduate (or equivalent)	51	54.3%	27	25.5%
Bachelor's degree (BA, BS, AB, etc)	13	13.8%	31	29.2%
Graduate degree (JD, MA, MSc, PhD)	21	22.3%	43	40.6%
Other	9	9.6%	5	4.7%

Figure 8. Comparison of public poll and workshop participant demographics

vey data from 110 workshop participants. The surveys sought to measure participants' concerns about climate change risk as well as their opinions about barriers to adaptation and possible solutions. Many of the same questions appeared in both the pre- and post-surveys so it would be possible to measure any change that might have been caused by participation in the workshops. Each workshop ended with a debriefing, which sought to capture people's impressions about the workshop and the prospect of managing the risks associated with climate change. The staff also conducted 29 in-depth follow-up interviews with participants about four to six weeks after each workshop. In these interviews, they probed more deeply into what participants recalled and what, if anything, they took away from the workshops.

After the final Wells workshop in December 2013, MIT staff analyzed the data. Survey results were coded for anonymity and entered into a database. They tallied statistically significant shifts between the pre- and post-survey results. Graduate student staff also compared workshop survey data to town polling data conducted at the start of the project to look for any major similarities or differences in the views of those who attended the workshops as compared to the views of residents in general. Every qualitative interview was transcribed and reviewed for key themes and takeaways. Debriefing notes were similarly organized and analyzed.

Of the attendees at the eight Wells-area workshops, participants were split nearly evenly between men and women. Older residents, here defined as 50 years and up in age, made up just over half of attendees. Forty-seven percent of participants self-identified politically as liberal, 22 percent as conservative, and 29 percent as independent. Nearly half of the participants had lived in Wells for 10 years or more, while another quarter reported living in the town for one year or less. Year-round residents made up almost half of the workshop attendees. Over 70 percent of the participants had a bachelor's and/or graduate degree, indicating a highly educated workshop population. Forty-two percent of participants reported belonging to a local or national level environmental organization (see Figure 8).

The Wells workshop population looks slightly different than the population in the town-wide poll conducted prior to the NECAP intervention. The workshop population trended toward those who are concerned about climate change more than the general town population. This is not surprising given that participation in the workshops was voluntary and self-selecting. More workshop participants also reported affiliations with local or national environmental organizations and identified politically as liberal than the public poll population. Attendees had higher educational levels than those in the public poll, and more of the workshop participants were part-time residents of Wells than those surveyed town-wide.

The purpose of the intervention was not simply to educate people about climate change risks, but also to model a way in which town-wide decisions about local adaptation planning could be made collaboratively, even though people have very different values and interests. Hence, while the workshop population differs somewhat from the town at large in terms of attitudes about climate change risks and adaptation, that did not interfere with meeting the project's objectives. Indeed, the people who attended the workshops are probably more likely than Wells residents in general to try to influence local political decisions; thus, engaging them—rather than

a perfectly representative sample of Wells residents—is likely to have a greater effect on adaptation action in the town.

Key Findings

The analysis of the Wells data was guided by two overarching research questions. The first was, “What are the major impacts or effects of the role-play workshop on participants?” This question sought to identify in what ways people changed their thinking as a result of participating in the workshops. The second was, “What did we learn about the attitudes of Wells residents regarding the management of climate change risks and the possibilities of climate adaptation?” This question sought to provide a snapshot of the level of public “readiness” and “willingness” to engage in adaptation planning.

The major findings from the Wells workshops fall into five categories—enriched perspective; local-level responsibility and action; incorporating climate change into everyday decision-making; barriers to action; and suggested pathways forward. These are detailed in the sections that follow.

Enriched Perspective

One of the major benefits reported by Wells workshop participants was that the role-play simulation helped them think about climate change through the eyes of others. In the workshop debriefs, surveys, and follow-up interviews, participants discussed the benefits of perspective-taking, including increased empathy, better understanding of different people’s stances, and increased ease with difficult conversations. These findings indicate that climate adaptation-themed role-play simulations can help people appreciate opinions different from their own, and increase their sense of optimism about reaching agreement on adaptation policy in a way that takes account of diverse stakeholder perspectives.

“[It was] good to have this chance to really delve into the motivations behind a very difficult viewpoint and try to understand it.”

“[It was] interesting to have to assume a role in conflict with my own standpoint.”

“Role playing does expand ones’ empathy and understanding - useful.”

“Role-playing allowed people to laugh about an otherwise serious topic - by lightening the mood, there seemed like there was a more inclusive discussion of different points of view.”

Figure 9. Sample comments from the workshop surveys

Encouraging participants to think about climate change from different perspectives was intentional to the game design. The six roles at the table were meant to represent the diversity of perspectives on climate change adaptation found in the Stakeholder Assessment interviews. As one participant noted, “Some of us were put into positions where we didn’t agree with the goals we were given, so it forced you to look at the issue from the other side, and that was challenging.” Whenever possible, project staff assigned workshop participants to roles different from the ones they play in their everyday lives.

Workshop data show that participants found enriched perspective to be one of the biggest benefits of the workshop. The post-workshop survey included two write-in questions asking participants about what they learned. Thirty-five percent offered optional comments about the perspective they had gained, often remarking that the role-play showed them the importance of understanding or seeing other people’s viewpoints. The theme also came up in the debriefings at the end of six of the eight workshops and in follow-up interviews when asked, “What did you think of the role-play?” and “Would you recommend role-play simulations to help communities learn?” From these qualitative data, it seems that one of the key takeaways for workshop participants was enriched perspective.

Some quotes from respondents illustrate this point. One person indicated that the role-play made her think about the challenges facing an emergency manager: “It expanded my view of the whole issue—I was the emergency management director, and I didn’t realize the role that person played in the town. It opened up my eyes to a broader viewpoint.” Another gained concern for the difficulties facing coastal homeowners: “Putting myself as a resident of a home, I understand more why people would be unwilling to let go of their family house.” Since workshop participants were obliged to articulate the views of their assigned characters during the simulation, the role-play helped them understand the motivations behind the views other people in town have about adaptation.

The role-play also made challenging conversations about climate change risk and adaptation easier for some participants. Since the exact level of risk towns face is unknown, and some adaptation options are controversial, discussing climate change adaptation can be difficult. One participant wrote, “Role-playing allowed people to laugh about an otherwise serious topic—by lightening the mood, there seemed like there was a more inclusive discussion of different points.” For other attendees, the role-play increased their level of empathy for others at the table. During one debriefing, a participant said: “This is our community, and we all live here and have the same needs. There was a lot of empathy at our table.” These two reported benefits of role-playing—increasing empathy and making it easier to have difficult conversations about adaptation—suggest that simulations can help bring together those with diverse opinions and perspectives and enhance their sense of optimism about taking collective action.

Local Level Responsibility and Action

The data shows a second predominant finding: The workshops helped people think about climate change from a local perspective, often for the first time. After participating, residents

showed an increased level of concern about climate change and assigned increased responsibility to actors at the local level. They reported feeling that climate adaptation decisions should be made with broad public participation at the local level and concluded that pursuing local-level adaptation solutions is important. This shift in viewpoint among workshop participants is important to enhancing the readiness to take action in Wells.

Local-level climate change risk and adaptation were topics that arose in three-fourths of the Wells follow-up interviews. Several interviewees said one of their major takeaways from the experience was realizing the need for local action. As one woman noted, "It's a global issue, but the workshop really helped bring it down to a local level where I felt an impact and a concern on a personal level. And I think that was one of the biggest values I got out of it." Participation in the workshop seemed to help residents think specifically about the consequences for the Town of Wells. Another participant said, "It literally brought it home. For me, it made me think... 'Hey, we are going to be under water.'" This qualitative data tracks well with survey responses. An analysis of before and after responses to the question "How concerned are you about the possible impacts a changing climate might have on your town?" shows a statistically significant increase in concern among participants after the workshops. Many participants explained that they hadn't realized the direct impact climate change could have on Wells; the workshop provided a local perspective they hadn't considered before.



Image 5. The road to the Wells coastline; credit: Erica Simmons

People also said the workshop reshaped their views on the need for local-level public participation in adaptation planning. Many interviewees said that the workshop helped them to see that everyone in the town should be involved and play a part in adaptation planning. As one interviewee said, "[Before the workshop] I really thought it was up to the town agencies. And then, after the fact, I realized that it was really the people, because [the agencies] need feedback from the public." This trend is reflected in participant responses to the survey question "If the climate is changing, who do you think should be responsible for preparing for the possible impacts this might have on your community?" Before and after results showed a statistically significant shift toward identifying local-level actors, including neighborhoods and businesses, as responsible. Additionally, in the post-workshop survey, 93 percent of respondents reported feeling that it was "important" or "very important" for residents, local groups, and businesses to be involved in deciding how to respond to climate change risks. Many interviewees continued to assign significant responsibility to town agencies and government, but they explained that the workshop had made them think that more general public participation in decision-making was

also needed. Workshop findings show that an increased awareness and concern for the effects of climate change on Wells correlated with a shift toward an increased interest in public involvement in adaptation planning.

One outgrowth of thinking about climate change at the local level was that an overwhelming majority of workshop participants interviewed came to believe that local-level solutions would be needed. One interviewee remarked, “After that discussion, I realized really that a lot of it was local . . . that is probably where I changed my mind the most, where I realized it can’t be just be top-down, but it has to be both ways—be bottom-up as well.” Overwhelmingly, interviewees expressed that the local level was where solutions needed to come from. Another participant shared, “It’s going to be up to the communities to step up and do something at the local level.” In the post-workshop survey, 88 percent of respondents said that addressing climate change risk should play a “significant” or “very significant” part in the town’s planning over the next 10 years. Several interviewees cautioned, though, that local-level solutions should not be considered in isolation. One municipal employee said, “When you look at it solely through the municipal lens, your view stops at your town boundaries. You can have downstream effects.” This matches concerns project staff heard in some interviews for the Stakeholder Assessment, which centered on the need for better regional communication and resource sharing for adaptation. That said, climate change is often presented as a national or international problem. The role-play helped convey the reality that this global issue will have considerable local effects.

Incorporating Climate Change into Everyday Decision-Making

A related finding from the workshops is that a majority of participants felt that planning decisions for climate adaptation should be integrated into the daily work of local government. Participants suggested that coastal towns face particular risks and uncertainty that warrant early action and that incremental planning or no-regrets actions – ones with benefits in addition to adaptation – can and should be included in local comprehensive plans. In contrast, no interviewees suggested waiting to take action.

Workshop participants’ pre- and post-survey responses indicated a strong interest in incorporating climate change considerations into everyday planning. To the question “What do you think local decision-makers should do now to address climate change, if anything?” 72 percent answered, “Change the way they make everyday planning and infrastructure decisions” on the pre-survey, and 74 percent gave that answer on the post-survey. The theme of mainstreaming climate adaptation planning arose in three of the workshop debriefings as well. One long-term Wells resident noted: “It made me think a lot more about the complexity of having to prepare—not just that we have to build some levees or some dikes, but something that’s going to affect every part of the town system and structure.” Similarly, more than one-third of respondents in the qualitative interviews indicated that they would like government to be more proactive about planning for climate change and incorporating adaptation considerations into everyday planning.

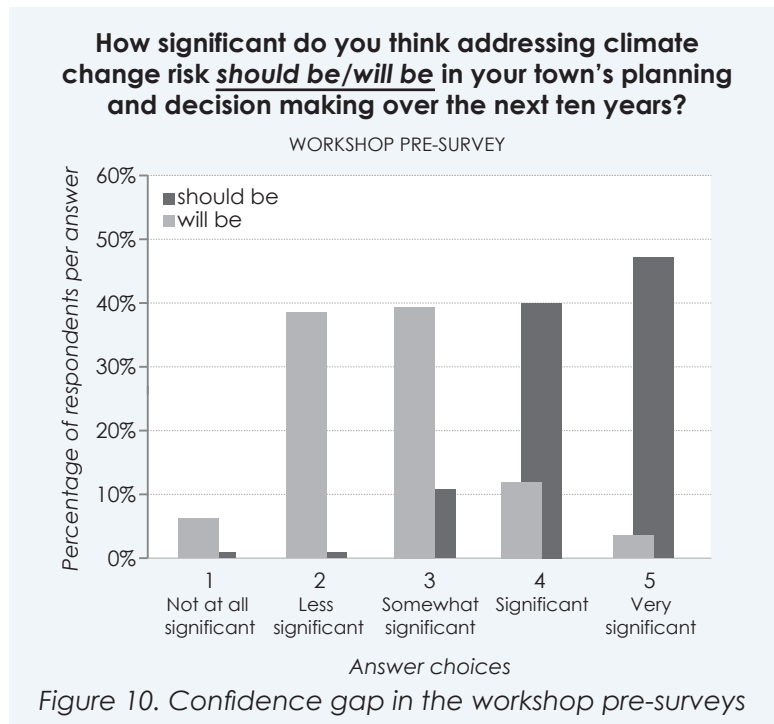
Participants emphasized that mainstreaming was important because of the particular risks facing coastal towns. In the words of one participant, “Coastal towns have more at stake than

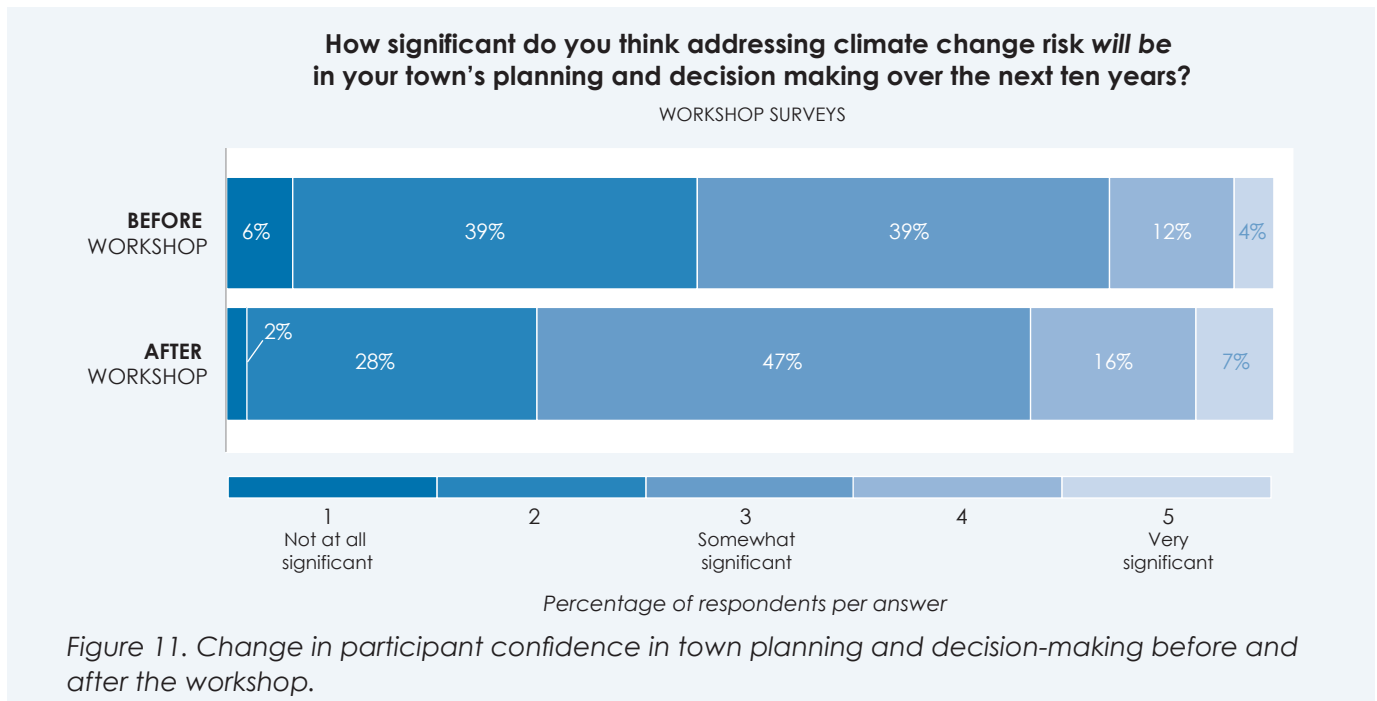
inland towns. So for that reason, the coastal towns should have more programs in place to deal with what's inherent with their particular risks." Several interviewees pointed out that while there was uncertainty about the risks the town faced, preparing for climate change risks could be a win-win situation. As one local public employee noted, "It's good to prepare either way—if it's happening, then preparation is good; if it's not, then you're prepared anyway." These responses indicate that Wells could consider no-regrets options while planning for climate change—that is, actions that both reduce the risks associated with climate change and accomplish other important goals at the same time.

Several participants felt that the high level of risk facing Wells could be best addressed by taking incremental steps. During a game debriefing, one participant shared: "Incremental approaches are necessary. We tend to think 'all or nothing,' but the idea is how to do mitigation and planning along with all the other concerns that are not on the top shelf." The workshop debriefings and follow-up interviews suggested that many town residents want Wells to change its approach to planning. One long-term resident wants the town to think more creatively about solutions to climate change risks: "I often think there is a third way out: We are locked into A and B, but if we peel things back we might see C." The Stakeholder Assessment interviews with town officials indicated that town leaders are open to taking an incremental approach to adaptation decision-making.

While workshop participants expressed interest in incorporating climate change risk into everyday planning, both the Wells public poll and the workshop surveys revealed what might be considered a "confidence gap" in people's impressions about the town's readiness to take action. People want their local government to plan for climate change risks, but they doubt its abilities. Some participants suggested that Wells has a culture of approaching planning in a piecemeal fashion; many also said that residents are apathetic about climate change.

The confidence gap was evident in the different responses given to public poll and workshop survey questions. To the question, "How significant do you think addressing climate change risk *should be* in your town's planning and decision-making over the next 10 years?" 87 percent of workshop participants answered "significant" to "very significant" on the post-survey. In contrast, when asked "How significant do you think climate change *will actually be* in your town's planning and decision-making over the next 10 years?" only 16 percent of respondents answered "significant" to "very significant" (see Figure 10). This gap also appeared in the public poll: 56





percent of respondents answered “significant” to “very significant” to the first question and only 11 percent gave those answers for the second.

The qualitative interviews help elucidate some of the barriers to greater confidence in town government. Four participants indicated they did not trust local officials to know what to do about climate change risk. One man said, “I’m pretty sure they don’t tackle issues in that context. They’re way down in what can we do about this particular bridge and land-use planning in the low level.” Several participants also commented that citizen apathy and the town’s culture prevent everyday planning decisions from taking adaptation into account.

Importantly, the workshops did lead to an increase in confidence that Wells will respond to climate change. In response to the question, “How confident are you that your town will be able to respond to climate risk,” there was a statistically significant shift in the post-survey toward more confidence in town government (see Figure 11). This was particularly significant among workshop participants with less formal education. The results indicate that residents want to see Wells take action on climate change adaptation planning and that the workshops provided one avenue toward increasing public confidence in the town’s ability to do so. Interviews and survey data did not elucidate the exact reasons for the increase in confidence in town government, but a small number of interviewees did report feeling increased optimism as a result of the workshops. Several of the “suggested pathways forward” highlighted below were linked to participating in the workshop and may also tie to an increased confidence in local government.

Perceived Barriers to Action

The Wells workshops provided a snapshot of what residents in Wells perceive to be barriers and

challenges to responding to climate change risk. The main challenges identified by participants via the workshop follow-up interviews, in rank order, include: 1. Challenges associated with reaching agreement among so many stakeholders; 2. Lack of public interest or concern about climate change in Wells; and 3. Budget limitations. These also coincide with findings from the Wells Stakeholder Assessment. Pre- and post-survey data from the workshops similarly shows that people felt the biggest challenges in Wells were financial limitations and lack of agreement on what to do. The cohesion among these different data sources in identifying key challenges to action on adaptation indicate that these are barriers the town should seriously consider addressing.

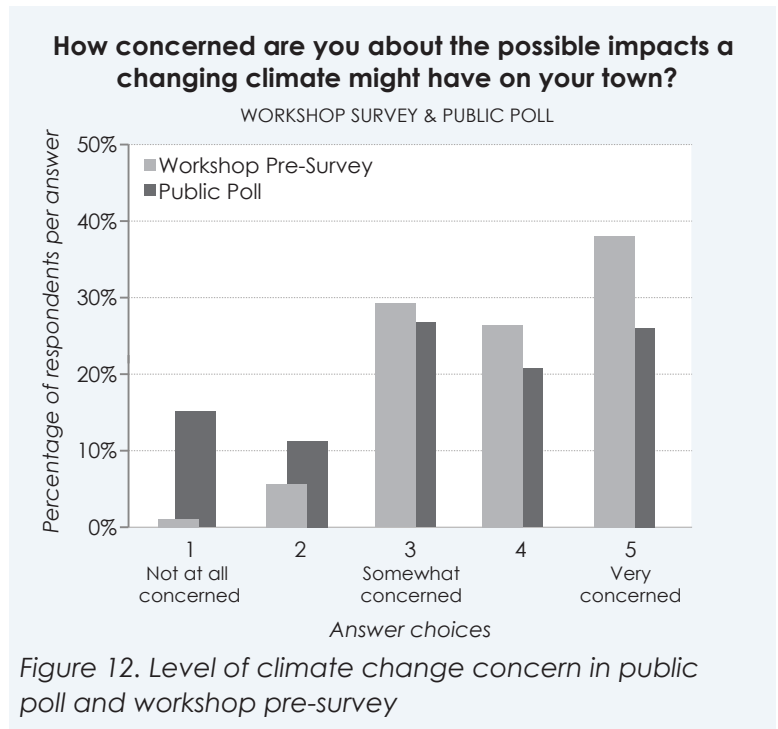
Over three-fourths of interviewees reported that the workshop made them think differently about the challenges and barriers their community faces in trying to prepare for climate change. One of the major observations reported in the qualitative surveys conducted after the role-play simulation was that it was difficult to get people with differing opinions to agree on issues. The same sentiment cropped up in the interviews. One post-survey question asked, "If the climate is changing, what is most likely to prevent your community from taking action?" Thirty percent of respondents answered, "lack of agreement about what to do." One student participant highlighted the challenge of reaching agreement among so many different interests and stakeholders: "That's probably my biggest takeaway from the workshop. It's just not as simple; nothing's ever simple." Interestingly, all 18 tables of people who played the game over the course of eight workshops did reach agreement about what to do in the role-play scenario—although they came up with very different solutions. Despite that success, participants said that reaching agreement in a real-world context would be one of the biggest challenges to moving forward with adaptation planning.



Image 6. Workshop participants at the Wells Reserve at Laudholm; credit: NECAP staff

The second biggest perceived challenge to climate adaptation in Wells identified by the post-survey was budget limitations. Twenty-nine percent of respondents identified "lack of funding or financial resources" as a major barrier to town action. The theme arose as a challenge to adaptation in the majority of workshop debriefings, as well as in several follow-up interviews and post-survey written comments. Respondents saw climate adaptation solutions as expensive, both within the Launton role-play game and when talking about the actual challenges facing Wells. One interviewee said, "Money in Maine is very hard to find to do any sort of planning." Another participant noted during a debriefing that the town reaps significant tax benefits from

coastal properties, making it hard to disincentivize building there: “The biggest problem we kept coming back to is money. Who is going to pay for this? . . . Structures are being built along the beach that would never be allowed in the past. The town wants tax money.” Several interviewees commented that the role-play itself needed more clarity about the cost of different adaptation options and the available budget. Too much of the funding seemed to come from sources that were outside the town with no context about how easy they would be to obtain. As one participant noted, “The easy solution is to just say government will buy up the properties and get rid of the risk that way, but the reality is that it would take so many tens of millions of dollars to do that that it’s really not a realistic solution.”



Finally, workshop participants cited a lack of public awareness or concern about climate change as a barrier. Thirteen percent of workshop participants chose “lack of public support” as a barrier to adaptation planning in their post-survey responses. One local teacher stated, “I don’t think the average citizen thinks about [climate change] much at all. And we’re talking about something that could have tremendous financial and physical impact on our town.” Participants at several workshops felt it would take a major catastrophic event to spur action. In the debriefing after one game, a participant said, “Big storms lead to action like buy-back or changing infrastructure. People on the coast are against change and like living on the coast.” Similar sentiments about the apathy of Wells residents toward climate change also arose during the Stakeholder Assessment interviews. When asked what it would take to overcome obstacles to climate change adaptation in Wells, many stakeholders said it would take a catastrophic storm, reflecting pessimism about the town’s ability to build political consensus for action before it faces a compelling need.

Yet, the full story about citizen concern regarding climate risks appears more complicated than the one told by workshop participants or stakeholder interviewees. In the poll of Wells residents prior to the intervention, 74 percent of respondents shared that they were “somewhat” to “very” concerned about the possible impacts a changing climate might have on their community (see Figure 12). Similarly, 81 percent said that addressing climate change risk should be somewhat to very significant in the town’s planning and decision-making over the next 10 years. While con-

cern about climate change risks may not translate directly into support for adaptation planning, there seems to be more support for action in Wells than workshop participants imagine.

Suggested Pathways Forward

Pathways forward suggested by workshop participants via quantitative and qualitative data fell into two categories: process-based solutions and policy ideas. Participants generally expressed a strong interest in undertaking a collaborative problem-solving process in Wells, an idea that for some came from participating in the workshop. People reported that public participation, while challenging, is important to finding and implementing successful solutions. A second commonly suggested process solution was to educate the public about climate change risks and adaptation options. Finally, some participants suggested pursuing specific policy ideas, most of which mirrored solutions discussed in the workshop such as buy-back programs or reinforcing coastal infrastructure.

The large majority of interviewees pointed to public participation as very important to climate adaptation planning. The workshop post-survey asked participants, "How important is it that residents, local groups, and businesses be involved in deciding how to respond to climate change risks?" to which 93 percent of respondents answered "important" or "very important." The public poll of Wells residents also showed high levels of interest in public participation, with 75 percent of respondents answering "important" or "very important" to the question. In response to the interview question, "After the workshop, who do you think should be directly involved in preparing for climate change?" more than half of respondents answered either "citizens" or "everyone." When asked more specifically about what solutions they would recommend to a town manager tackling climate adaptation planning, one-third of interviewees responded that the town should start a discussion or collaborative process with citizens. Similarly, 19 participants submitted written comments about collaborative decision-making and/or public participation via the post-survey.

While the majority of interviewees supported public participation, some also noted that public participation can be challenging. One-third of the interviewees saw reaching agreement or incorporating disparate views as a challenge to adaptation planning. A few of the municipal and public employees who were interviewed after the workshop expressed less interest in working with the public in the adaptation planning process, reflecting on past experiences with public engagement as both difficult and time-consuming. Yet, not incorporating public participation in adaptation planning has its own challenges. As one long-term resident suggested, "I think when people are brought in early in the process, they have ownership in it; otherwise they will think that something is going to be imposed on them." These responses suggest that Wells should consider a collaborative public process for its adaptation planning but ensure that any solution is carefully structured to incorporate multiple viewpoints and to provide a viable path toward consensus.

Many interviewees said the workshop had influenced their views of public participation. One participant said, "The workshop made me more aware of the fact that all citizens . . . should be taking a look at what's going on and taking a role in it." Another credited the workshop for making her think about a collaborative process as a pathway forward: "Even though I think of my-



Image 7. Workshop participants discuss adaptation options for a town like Wells; credit: Alexandros Sarris

self as knowledgeable about the basics of climate change, I hadn't really considered the process of actual decision-making in communities and figuring out what to do." Related to the theme of public participation, several interviewees reported that the workshop had made them feel more optimistic that citizens could have an impact on climate change decision-making. As Wells moves forward with adaptation planning, these findings show that incorporating meaningful citizen participation in the process will be important to success.

A second suggested pathway forward was to focus on more public education about climate change risk and adaptation opportunities. This subject often arose in the workshop debriefings, follow-up interviews, and in the qualitative survey responses. In the interviews, more than a third of participants talked about the need to communicate and share information with the public about climate change adaptation. When asked about effective approaches, nearly two-thirds stated that role-play was an effective tool for learning about climate change adaptation. Similarly, in one workshop debrief, a participant said, "This approach gets people to think, 'This is my town. We better get together to solve what we can while we can.'" Participants also shared that the workshops were a conversation-starter, with almost every interviewee pointing out that they talked about the workshop afterwards. As one participant shared in a workshop debrief, "I am thinking about the town of Porter, Maine. My wife sits on the council and they have never talked about climate change. I think I will go home and say, 'Hey, have you thought about this and talked about it?'" These findings indicate a strong belief that more education about climate change is needed and that the NECAP workshops were an effective approach.

The theme of public education about climate change also came up as a theme in the Wells Stakeholder Assessment. Several respondents focused on the importance of engaging younger people, either with the view that they would become involved when they get older or that they would influence the adults in their lives. In the words of one participant, "We need to start with the people in this building, high school students. We need to be more interactive with them and show them what climate change effects will look like. Start at a young age with education." Respondents did not typically provide specific adult education ideas in their responses; they mainly spoke about increasing communication and "getting the information out." Since the findings indicate people in Wells are already concerned about climate change, education and engagement around climate change adaptation should focus on pathways forward rather than just on climate change risks.

Some interviewees said they now have more ideas about what to do in terms of climate

change adaptation and reported that they think about these issues more frequently since attending the workshop. When asked what solutions they would recommend to the town, several policy options from the workshop came up in about one-third of responses. These ranged from putting a moratorium on coastal development and starting a buy-back program to reinforcing coastal infrastructure and shoring up emergency plans. The scope of responses suggests that some people took away more about the decision-making process while others focused more on specific policy or program options. Notably, a majority of interviewees expressed strong interest in knowing what the town intended to do next in terms of adaptation planning.



Image 8. View of the Wells beach; credit: Erica Simmons

Conclusion

These findings provide insight into Wells residents' opinions regarding the management of climate change risks and adaptation options at the local level. They also highlight how role-play workshops can have a positive impact on public attitudes and start conversations about climate change risk and adaptation.

For Wells leaders and residents, this research shows that more people in the town are concerned about climate change risks than many imagined. Additionally, many Wells residents want the town to incorporate climate change considerations into the daily work of government. This high level of concern, however, is coupled with a confidence gap between what town residents think the town government should do and what they think it will do. This gap appeared both in the public opinion poll and in the workshop surveys. Workshop participants also saw financial costs and lack of agreement about the best way to adapt to climate change risks as the main barriers to moving forward. The majority of poll respondents and workshop participants support a public participation process that will address climate change risks. Many also expressed a desire for more public education about climate change.

These workshop findings demonstrate that role-play simulations can address many of the concerns raised by Wells residents. The survey data and follow-up interviews show that tailored role-play simulations increased citizen concern about climate change risks and bolstered understanding of and support for local-level approaches to adaptation. They also narrowed the confidence gap between what people hoped their government would do and what they thought

would actually be done. The workshops increased empathy for other people's perspectives about climate change, helping to pave the way for residents to begin the difficult conversations necessary to spur local action. They also increased interest in public participation and collective decision-making about adaptation.

These results show that role-play simulations can be an effective tool for other coastal towns facing increasing risks from climate change that wish to engage more citizens and improve confidence in their municipality's ability to adapt. While adaptation planning will take time and require challenging decision-making, workshops like the ones organized by this project can start conversations about adaptation and build momentum for adaptation efforts in towns similar to Wells.

Although the confidence gap narrowed following the workshops, Wells participants still indicated that they felt their town faced numerous adaptation planning barriers. Wells leaders should consider addressing some of the concerns raised, including the potentially high financial costs of adaptation and the difficulties of finding agreement among conflicting opinions about what to do. The town can take steps to begin incorporating adaptation planning into everyday planning decisions, look for ways to engage the public in decision-making, and dialogue with regional partners and state and federal government about pathways forward. Wells leaders can also capitalize on the relatively high levels of concern about climate change in their town and on the increased interest in adaptation planning generated by these workshops to increase the town's preparedness and resilience to climate change risks.

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