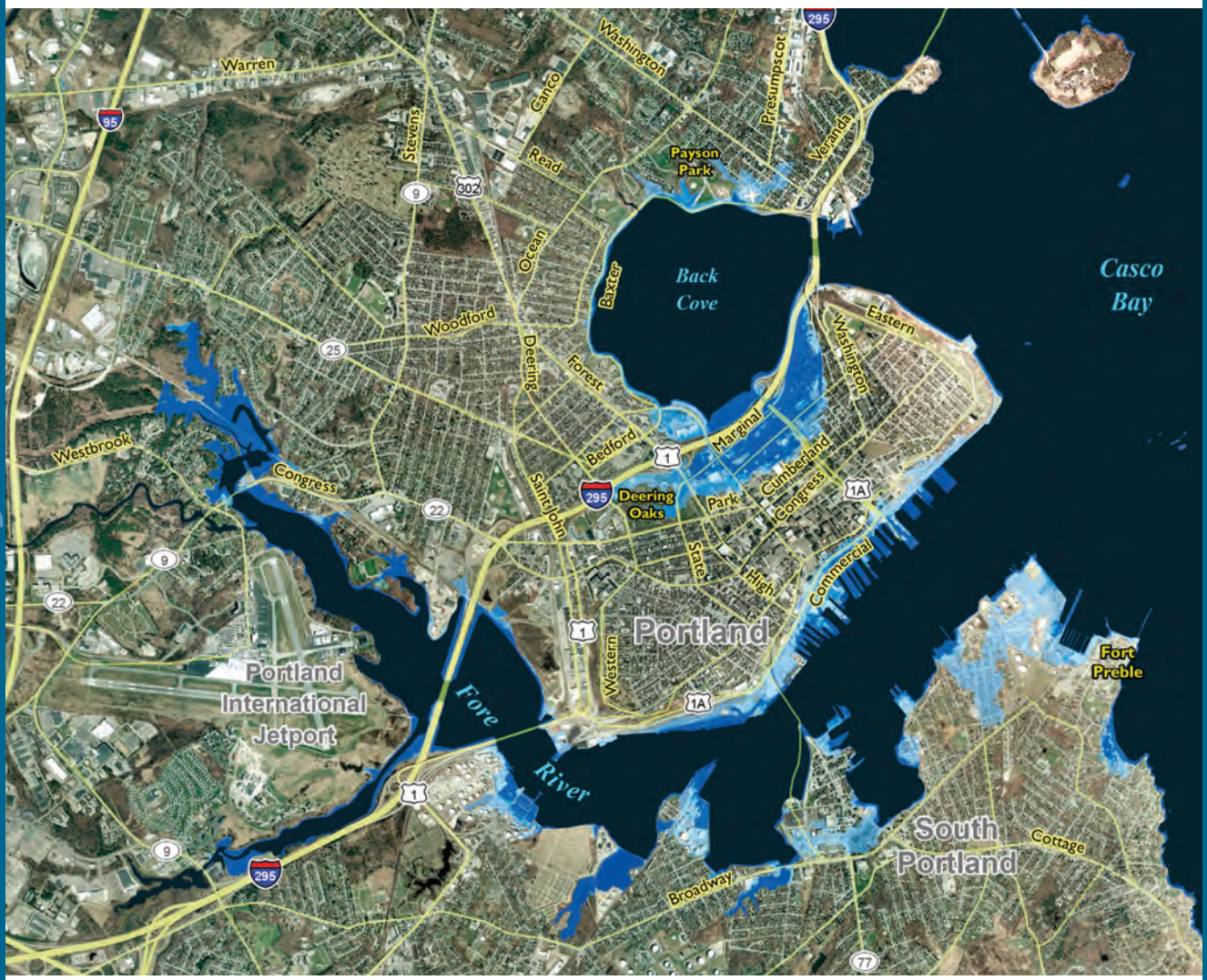
A ULI Advisory Services Panel Report

Waterfronts of Portland and South Portland Maine

May 11–16, 2014



Urban Land Institute

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Waterfronts of Portland and South Portland Maine

Regional Strategies for Creating Resilient Waterfronts

May 11–16, 2014

Urban Land Institute

About the Urban Land Institute

THE MISSION OF THE URBAN LAND INSTITUTE is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. ULI is committed to

- Bringing together leaders from across the fields of real estate and land use policy to exchange best practices and serve community needs;
- Fostering collaboration within and beyond ULI's membership through mentoring, dialogue, and problem solving;
- Exploring issues of urbanization, conservation, regeneration, land use, capital formation, and sustainable development;
- Advancing land use policies and design practices that respect the uniqueness of both built and natural environments;
- Sharing knowledge through education, applied research, publishing, and electronic media; and
- Sustaining a diverse global network of local practice and advisory efforts that address current and future challenges.

Established in 1936, the Institute today has more than 32,000 members worldwide, representing the entire spectrum of the land use and development disciplines. Professionals represented include developers, builders, property owners, investors, architects, public officials, planners, real estate brokers, appraisers, attorneys, engineers, financiers, academics, students, and librarians.

ULI relies heavily on the experience of its members. It is through member involvement and information resources that ULI has been able to set standards of excellence in development practice. The Institute has long been recognized as one of the world's most respected and widely quoted sources of objective information on urban planning, growth, and development.

Cover photo: Clean Air Cool Planet.

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About ULI Advisory Services

THE GOAL OF ULI'S ADVISORY SERVICES program is to bring the finest expertise in the real estate field to bear on complex land use planning and development projects, programs, and policies. Since 1947, this program has assembled well over 400 ULI-member teams to help sponsors find creative, practical solutions for issues such as downtown redevelopment, land management strategies, evaluation of development potential, growth management, community revitalization, brownfield redevelopment, military base reuse, provision of low-cost and affordable housing, and asset management strategies, among other matters. A wide variety of public, private, and nonprofit organizations have contracted for ULI's advisory services.

Each panel team is composed of highly qualified professionals who volunteer their time to ULI. They are chosen for their knowledge of the panel topic and screened to ensure their objectivity. ULI's interdisciplinary panel teams provide a holistic look at development problems. A respected ULI member who has previous panel experience chairs each panel.

The agenda for a five-day panel assignment is intensive. It includes an in-depth briefing day composed of a tour of the site and meetings with sponsor representatives; a day of hour-long interviews of typically 50 to 75 key community representatives; and two days of formulating recommendations. Long nights of discussion precede the panel's conclusions. On the final day on site, the panel makes an oral presentation of its findings and conclusions to the sponsor. A written report is prepared and published.

Because the sponsoring entities are responsible for significant preparation before the panel's visit, including sending extensive briefing materials to each member and arranging for the panel to meet with key local community members and stakeholders in the project under consideration, participants in ULI's five-day panel assignments are able to make accurate assessments of a sponsor's issues and to provide recommendations in a compressed amount of time.

A major strength of the program is ULI's unique ability to draw on the knowledge and expertise of its members, including land developers and owners, public officials, academics, representatives of financial institutions, and others. In fulfillment of the mission of the Urban Land Institute, this Advisory Services panel report is intended to provide objective advice that will promote the responsible use of land to enhance the environment.

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About Urban Resilience Panels

WITH A NUMBER OF EXTREME and damaging weather-related events in recent memory, cities around the world are thinking about how to become more resilient in the face of these challenges. Resilience has taken on many meanings in different contexts. The Urban Land Institute has joined a number of partner industries to create a shared definition of resilience: the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events. Implied in this definition is the ability not just to recover and bounce back, but also to bounce forward and thrive.

ULI, with generous funding support from the Kresge Foundation, has undertaken a series of panels to assess how cities can better prepare for changes deriving from global climate change. These changes range from rising sea levels, to warmer water and air temperatures, to more extreme weather events such as rainstorms and hurricanes.

The objective is for such panels to offer advice and guidance to communities that will assist their formulation of plans and policies and that will, in turn, create stronger responses to and recoveries from such events.

Indeed, this panel effort is focused on not just recovery in the sense of rebuilding what existed before, but also in looking forward to rebuilding and developing in the normal cycle in a way that reduces or eliminates the risks from such natural events.

Portland and South Portland were selected for this, the first ULI panel to focus on resilience. As coastal cities that have historically experienced the consequences of natural events, and as cities dependent on the water as an economic and social resource, this choice of venue seems most appropriate. Fittingly, the motto of Portland is *Resurgum*, meaning "I shall rise again," and the motto of South Portland is "Forward." These mottos speak to the intent of this panel report—to assist these communities in rising again from the consequences of these adverse events and, most important, to move forward in formulating plans and policies that will mitigate the consequences of future natural events before they occur.

Acknowledgments

THE URBAN LAND INSTITUTE WISHES to thank the cities of Portland and South Portland, Maine, for collaborating to sponsor this panel. Sincere gratitude also goes to the Kresge Foundation, whose generous support of ULI's Urban Resilience Program has made these panels possible.

The panel would also like to thank the more than 50 stakeholders from the Greater Portland area who graciously provided their perspectives during the interview process. This group of interviewees included industry representatives, elected officials, local business owners, members of the historic preservation community and municipal staff. Community input is a critical component of the panel process and their views have greatly informed this report.

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Background and the Panel's Assignment

IN MANY WAYS, THE CITIES of Portland and South Portland embody the archetype of the quaint New England seaport community. The history of the region goes back to some of the first English colonists who arrived on the continent. The two cities straddle the mouth of the Fore River as it flows into Casco Bay. Maritime life and industry are a critical part of the region's identity and tourism industry, as is evident by a stroll down Portland's Commercial Street. But the port also plays a key infrastructural role, with a growing container-shipping business and as one of the eastern seaboard's largest energy ports.

Although the Greater Portland region retains its small-town New England charm, it is also the urban hub for all of Maine. Portland (population 66,000) and South Portland (population 25,000) anchor a region that is home to a half-million people, representing half the state's population and two-thirds of the state's economic activity. The cities are 115 miles north of Boston on the Interstate 95 corridor.

A computer model of land at risk from flooding with sea-level rise.

Study Area

The waterfront in Portland and South Portland varies dramatically between the two cities. In Portland, the working waterfront combines many active finger piers with lobstering and fishing operations in full swing, as well as a few residential land uses, restaurants, and nonmarine businesses. The water's edge in Portland is largely dedicated to support for commercial vessels. On the east end of the waterfront is a cruise ship terminal, and the west end gives way to the container-shipping terminal and more industrial uses. Commercial Street separates the waterfront from the city proper, and while the waterfront sees bustling pedestrian activity, the majority of business and commercial activity happens several blocks uphill, away from the water's edge. South Portland, in contrast, has little to no commercial tourist or pedestrian activity on

Regional map.

the waterfront, but rather a diverse array of other uses. Vessel berthing along the South Portland waterfront is interspersed between petroleum terminals for crude and refined-product tankers and barges. Southern Maine Community College is located at the easterly point of the city, near the Bug Light lighthouse and a public park. The Coast Guard maintains an active facility, and there is a wastewater treatment plant. Perhaps the most visible elements of the South Portland waterfront are the many petroleum storage tanks that line the shores, often directly adjacent to single-family homes.

The Panel's Assignment

The cities of Portland and South Portland asked the panel to recommend strategies to address risks from climate change. Specifically, the risks caused by sea-level rise and storm surge were of most concern because of the waterfront's importance. The panel focused on building resilience to these risks in the context of historic preservation, economic development, land use planning, risk mitigation, and design strategies.

Summary of Recommendations

The panel's recommendations fall broadly into three categories: (a) economic diversity, (b) planning and development, and (c) leadership and governance. Although the initial discussions of resilience to climate change risks focused on building and infrastructure design, economic issues quickly asserted themselves as posing an important unanticipated risk to the community. The region has already begun to consider risks of climate change in planning for its waterfront and has already taken steps to protect new development against future risks. The people of Portland and South Portland are no strangers to storms and flooding, and the working waterfront is in a constant state of repair and rebuilding, as required by the aging infrastructure.

Economic Diversity

The panel clearly recognizes the value of the working waterfront to the community and commends the cities for their strong efforts to protect this character-defining image. In this context, the panel felt viewing the waterfront not just as a historic preservation project but as a resource that evolves over time was important. By redefining a working waterfront, not only can the community honor and elevate the past, but it can also integrate it with the present and accommodate a sustainable future. Perhaps more important than the economic activity generated by industries on the working waterfront is the tourism it brings. The panel recognized this industry to be at serious potential risk from climate change. As oceans warm and acidify, fish populations respond in ways that may threaten the viability of the working waterfront, which in turn threatens the iconic image that visitors come to see as well as the great food they expect at Portland's numerous restaurants. Diversifying the local economy therefore becomes an essential way to address this risk to a sustainable working waterfront.

Planning and Development

Local officials have endeavored to limit nonmarine uses along the waterfront to protect its working character. However, upgrades to the infrastructure along the waterfront are needed today and may only become more pressing with increasing sea levels and storm surges. Although the city of Portland currently has regulatory and financing structures in place for infrastructure improvements, the needs of aging piers may demand additional resources in the future. The panel recommends that the cities find a creative way to leverage mixed-use development near the waterfront, which could generate funds to pay for needed infrastructure improvements and provide more of a year-round base to support downtown businesses.

Leadership and Governance

The panel is impressed by the amount of investigation, planning, and analysis that has already been done by Portland and South Portland related to climate change. Lacking strong leadership on these issues at the state and federal levels, the local governments, educational institutions, and design community have taken leadership roles in how to address risks caused by climate change and how to respond to those risks. Though the panel was struck by

The Bug Light on the South Portland waterfront.

the community's eagerness to learn about climate change and recognizes the importance of educating the community, a clear community consensus does not exist about the politics of climate change. Although that disagreement may be unlikely to change in the near future, community agreement about the decision-making process to address risk should be possible. To this end, the panel recommends the formation of two groups. These groups may need to be created anew or they may fit within existing structures in the community. The first is a Risk Data Group.

Many of the early questions to the panel focused on getting accurate data on sea-level rise projections or flood risk. In reality, the right amount of sea-level rise a community plans for will depend on the risks faced and the costs to address those risks—a task outside the scope of a weeklong panel. Furthermore, risks and projections change over time as the latest data become available and the climate itself changes. The Risk Data Group would be tasked with aggregating the best available science on climate change projections for the region, thus allowing the community to agree on which data and projections they are using for planning purposes.

The second group would be a Resilience Working Group. This group would consider the waterfront as a whole—across jurisdictional boundaries. This group would involve the major stakeholders from the waterfront to use the information from the Risk Data Group and to determine specific risks faced by properties along the waterfront, which are likely to be the most vulnerable to sea-level rise and storm surge. An integrated approach to resilience is important with a shared resource such as the waterfront. Some strategies for mitigating flood and storm-surge risk can simply push the damages down the shore. In other cases, funding applications for mitigation and adaptation strategies can be strengthened and improved when they are completed as a joint effort.

Building Resilience through a More Diverse Economy

THE PANEL'S OBJECTIVE IN REVIEWING the economic position of the region is to provide context for consideration of public policies directed at mitigating and adapting to effects of climate change. The following sections discuss the existing major regional economies as well as the more specific local economies and propose ways to increase resilience through diversification of the economy.

Highlights of the Region's Economy

Maine's economy was long dominated by tourism, particularly vacation homes; limited manufacturing, especially ship building; and natural resources management: logging for timber and pulp along with coastal fishing. At the same time, the Greater Portland region grew into a center of banking, professional services, health care, and culture. Unlike much of Maine, the Portland region is active year-round because of its role as a regional business center. The excellent and intermodal access to Boston has also provided economic benefits, as local startups take advantage of that connection and mid-career professionals move to Portland while retaining their Boston-area affiliations. In addition, tourists are now more interested in staying downtown, resulting in a rush of new hotel development in the core over the past few years.

Tourism

In addition to being a service center to the state and southern New Hampshire, the Greater Portland region attracts about a quarter of all tourists to the state annually: 8.4 million of 29.8 million visitors. They come to disperse to second homes throughout the mountain and lake districts to the north and the dramatic shoreline extending to the northeast and Canada. They occupy a vibrant and diverse array of hotels and motels accessible from the interstate highways as well as on the waterfront and within the historic downtown. They come to enjoy the city's historic downtown business district on the peninsula, with a vibrant dining and nightlife district focused on the waterfront, and to take advantage of the unique shops in historic buildings. They also come to visit regional retailers, including the Maine Mall and the Freeport outlet district anchored by L.L.Bean's flagship complex.

Fishing Industry

The fishing industry is represented in the Portland region with both lobstering and ground-fishing support functions but should be seen in the context of a far greater array of these resources distributed among the many smaller harbors and bays that characterize the shores of Casco Bay and farther to the northeast on the Atlantic shoreline. The marine-related industry includes boat docking along with diverse supporting marine services and facilities such as bait, ice, fish processing, fueling operations, and boat maintenance. A highly visible component of the industry is the array of waterfront piers that extend into the harbor from Portland's Commerce Street. The anchor of the Portland ground-fishing industry is the Portland Fish Exchange at the municipal fish pier. Lobstering activity—harvesting, wholesaling, and retailing—is ubiquitous along the Portland waterfront and among the islands of Casco Bay.

Housing

The Portland region's housing market comprises three primary sectors: the homes of those who live in the Portland region year-round; second and vacation homes for households from near and far, mainly from the large northeast metropolitan areas of Boston, New York, and Philadelphia; and seasonal housing for workers attracted from their permanent residence elsewhere to jobs in the peak tourist season, especially in the hospitality and retail sectors.

As relayed to the panel in several interviews, the regional housing market has firmed up in the last several years

and is relatively tight today. Few housing starts have been made in the urban core, and new starts in the suburbs have not caught up with growing demand. This is especially the case with rental apartments where a shift from ownership to rental tenure among segments of the populace has driven rising rents.

Transportation System

The backbone of the Portland region's transportation system is the I-95 highway corridor, which divides into two branches just south of Portland and converges again just south of Augusta. The balance of the state's and the region's highway network is a web of primarily two-lane, undivided highways and roadways. Sections of the resulting system can be seriously constrained in selected locations both within the greater Portland region and beyond, especially during the peak summer and fall tourist seasons and during the daily commute across the bridge between the two cities.

Portland is linked to Boston by Amtrak passenger rail, which extends to its northern terminus at Brunswick to the northeast. Express bus service for the two-hour trip to Boston is likewise available hourly. The Metro system provides regional bus service with lines that extend radially from downtown Portland to suburban centers to the northeast, north, west, and southeast. South Portland's bus system connects across the Fore River to downtown Portland as well as to neighborhoods to the south and southwest. Overall this public transit system fails to provide the kind of service that will be required if the region seeks to lessen its dependence on automobile travel.

A unique, specialized component of the region's transportation system is the ferries that connect those who live on the numerous islands of Casco Bay to the jobs and resources of Portland's urban core as well as give access to the islands for those who provide services and supplies for both summer and year-round residents. The recently revived overnight ferry service between Nova Scotia and Portland via the *Nova Star* is an exciting component of the water transportation system.

BILL NEEDELMAN

Portland is a major regional transportation hub. Above, a ferry loads for the recently added service to Nova Scotia.

The Portland International Jetport is a municipally owned and operated regional commercial airport serving about 1.7 million passengers annually. Frequent flights to New York, Washington, D.C., and other major hubs contribute to Greater Portland's ability to compete as a business center, service center, and tourism destination.

Warehousing and Distribution

The Portland region is an important point of warehousing and distribution for various commodities and products, given its position at the gateway to the entire state of Maine and parts of southern New Hampshire and its regional airport and harbor capacities. Truck and limited rail/truck transfer occurs primarily in suburban business parks, and the Portland airport accommodates limited air cargo. Portland Harbor is an especially important component of this system. Refined petroleum products arrive there by ship to be distributed primarily by tanker trucks throughout New England. Crude oil arrives by tanker ships and is conveyed to Montreal by pipeline for refinement and distribution in Canada. Evidence of this important economic activity is made manifest by the several large tank farms distributed along the south shore of the Fore River, across from and just upstream from downtown Portland. Eimskip international shipping company has established a successful container-freight terminal on the Portland waterfront, bringing valuable global trade between North America and

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The Eimskip operations add container-shipping services to Portland's varied working waterfront economy.

northern Europe. Limited rail-freight transport arrives at the riverfront, and plans are underway to add ship-to-train in addition to ship-to-truck intermodal connections with the Eimskip operations. Bulk and break-bulk marine freight capacity with rail and highway connections exist on both sides of the Fore River, serving Maine's forest product and paper export needs, as well as the importing of coal, salt, and other bulk commodities.

Economic Insights

Within the immediate area that the panel focused on—Portland and South Portland—the major economic heart of these communities is the Portland Peninsula and the South Portland waterfront with their common orientation to the harbor and the Fore River. These community assets create a synergy that makes major contributions to the local and regional economies.

The Portland waterfront.

BILL NEEDELMAN

The Port as a Working Waterfront

A port is where the water's edge is a source of commerce. In this context, the port supports three main industries: (a) the fishing industry; (b) transatlantic shipping, storage, and distribution of petroleum products; and (c) ferry and limited cruise services. The economic activity in the port is also what indirectly supports the tourism industry and provides a catalyst for the second- and vacation-home market with its focus on homebuyers who desire views of the scenic waterfront.

Through these industries, the port becomes a place of commerce, not merely a scenic or recreational waterfront as other waterfront tourist cities have become. This working waterfront is a scarce resource that contributes to the entire economy (industrial, tourism, and residential). Its preservation has become a high-priority policy objective of the local governments. The panel believes both the cities of Portland and South Portland have shown an outstanding commitment to the marine-related industries and should continue to pursue this policy objective. However, preservation should coincide with economic vitality, which mandates that the effectiveness of these policies and practices be carefully monitored and assessed. City government should likewise continue to seek new and innovative marine-related uses that further increase the vitality of the waterfront.

Fishing Industry

The fishing industry is a vital part of the working waterfront. Despite its modest contribution to the local economy, the panel believes that retaining a fishing industry as a meaningful presence on the waterfront creates an aura of authenticity that tourists and residents appreciate. This fishing industry stimulates the tourism economy, filling restaurants and hotels and busy retail corridors. The lobster industry is a component of the fishing industry, and even with the vast supply of lobsters in the past few years, only 100 lobster vessels still operate in the core of the harbor. Although fresh lobsters account for a relatively small per-

centage (estimated at 10 percent to 20 percent) of lobsters caught in the harbor and consumed there, the prevalence of lobstering supplies and services along with restaurants serving whole lobsters contributes positively to the image of Portland and Maine more broadly. The lobstering and fishing industries generate many support jobs, including bait supply, lobster pounds, bait distribution, gear, sales, mechanics, and more. However, the majority of the lobsters caught locally are ultimately processed outside the region, sometimes shipped as far as Canada, and are used for other food and nonfood products. Although fewer than a dozen fish-processing facilities are located along the Portland waterfront, the industry's visible presence creates a brand that is vital to the local economy.

The long-term impacts are not yet clear, but warming and acidifying oceans are thought to affect local fish and lobster populations. The Gulf of Maine has seen an unprecedented boom in lobster catch in recent years, whereas the catch at Buzzards Bay and points farther south has dropped precipitously. Furthermore, the ocean changes have affected the predator/prey relationship, contributing to the green crab invasion that has affected the clam industry. The habitat changes have occurred mainly in the last decade, and fishery stocks can clearly change much more quickly than the local economy they support can adapt to such changes.

Major Employment Sectors, Portland Region

Sector	Number of jobs
Marine jobs	1,200
Health care	3,757
Accommodation and food services	3,103
Educational services	2,942
Finance and insurance	2,813
Professional, scientific, and technical services	2,653
Construction	1,453
Total regional jobs	**35,000**

Sources: www.city-data.com/work/work-Portland-Maine.html; marine jobs information from personal communication with city of Portland staff.

Marine Services

In addition to fishing, seafood processing, packaging, loading, and distribution, the waterfront is full of other marine-related industries. The current central waterfront zoning details the types of marine uses that are preserved on the waterfront, including activities such as boat building, boat repairs, boat storage, boat mooring, marinas, docks, and sail making, in addition to all the fishing-related industries described previously. These uses are both compatible with and supportive of the fishing industry, and they should continue to be encouraged and even incentivized along the waterfront. Current zoning requires 55 percent of marine uses in the ground floor of buildings on the piers but allows nonmarine uses on upper levels. This is intended to cross subsidize the marine uses. The panel believes this policy objective is desirable; however, continual monitoring of results in relation to evolving market conditions is important.

Another sector related to both the fishing industry and the marine industry is study, research, and education about the marine industry. The Gulf of Maine Research Institute has been operating on the waterfront for less than a decade, providing a working environment for scientific study and analysis of Maine coast fisheries and related community education. This highly beneficial use should be encouraged and leveraged to the benefit of the region's economy.

Petroleum Storage and Transshipment

South Portland has the largest oil port on the east coast. Several major companies use the waterfront for distribution and storage on which much of Maine and New England rely. Crude oil arrives by ship and is transported to Montreal to be refined and distributed in Canada. Refined petroleum products arrive by ship and are stored in tanks on the waterfront before distribution on tanker trucks throughout New England. Companies operating on waterfront property in the port rely on its continuous functioning. Likewise, the regional economy relies on the availability and efficient distribution of refined petroleum products. More than seven in ten Maine households use fuel oil as their primary energy source for home heating, a higher share than in any other state.

LIPOFSKY

Oil storage tanks line the South Portland waterfront, sometimes directly adjacent to single-family-home neighborhoods.

Arts and Culture

In 2013, 8.4 million tourists visited the Greater Portland region, with culture, arts, and restaurants stated as the main things that attracted them. Congress Street is filled with galleries, and Creative Portland encourages artists, artisans, and a creative class by displaying their art and products locally. A focus on the arts is becoming a visible part of the community identity. A major hotel chain that opened recently downtown committed to extensive use of local artists throughout its property—a rare but telling decision indicating the strength and growth of the local arts community.

Other Economies: "New Economy," Health Care, and Education

Reliance and dependence on marine-related industries such as petroleum and fishing are short sighted. The panel believes the two cities are moving in the direction of diversifying their economy with various other industries and should continue to do so. Policies that encourage and incentivize diverse industries would be highly recommended. Given the strong health care sector and the aging population (Maine has the highest average age of any state in the United States), a focus on related businesses should be encouraged. In addition, the higher education sector combined with the growing number of millennials and the development of co-working space would suggest a move toward focusing on high-tech, med-tech, and startup businesses. These business sectors should be encouraged to locate in the Greater Portland region.

LIPOFSKY

Although the fishing industry directly employs a relatively small number of workers, it leverages a much larger economic impact through tourism on the working waterfront.

Economic Responses to Climate Change Risks

Diversifying the economy is a strategy for resilience. Ocean warming, sea-level rise, and extreme storm risk put waterfront industries at risk, and overreliance on these industries is contrary to the objective of economic vitality. In pursuing this goal, the cities should consider using the following tools:

- Analyze industry and sector growth;
- Implement a marketing campaign to bring in new businesses; and
- Enact a tax incentive program for new industry.

Specific policies aimed at encouraging the arts and culture sector, as well as medical, higher education, technology, and innovation jobs will serve the region well for the longer term.

Incremental changes, including modifying structures and facilities on the water's edge to be more resilient to sea-level rise, should be pursued by both public and private interests. (See "Planning and Development Strategies for the Built Environment.")

In addition, providing resilient infrastructure allowing connection to freight rail will enable service to industrial properties on the western waterfront. This should include provisions to mitigate higher river levels in the future.

Risk Assessment

PORTLAND AND SOUTH PORTLAND have already begun to engage in aspects of assessing risks from climate-related events through multiple avenues. The cities collaborated to create the 2011 Slovinsky-Carver reports, which began to address the extent of inundation from storm surge with various sea-level rise scenarios. The 2011 Cumberland County Hazard Mitigation Plan (HMP), prepared by the Cumberland County Emergency Management Agency, identified the four highest risk events as flooding, severe winter storms, wildfire, and severe summer storms through a prioritization methodology. The cities were both involved in the recent Federal Emergency Management Agency (FEMA) Flood Map revision process of highly detailed and customized hydrological modelling that resulted in up-to-date flood mapping (based on historical weather data) and provided a fine-grained understanding of the depth of flooding for storm surge–related events at a parcel level. An initial assessment of flood vulnerability for properties on the region's waterfront has been performed using the COAST model. The Portland Society for Architecture convened the regional design industry with the larger community in a series of forums on climate change risk. The Department of Homeland Security is currently conducting a critical infrastructure assessment that is evaluating utilities, transportation, communications, and medical system vulnerabilities. Risk estimates by individual property owners, insurance companies, businesses, and investors happen regularly on an ad hoc basis at the detailed parcel level, and various other risk assessments have been done through the years beyond the few examples given here.

However, a comprehensive assessment of the region's exposure to climate-related risks has not been done. City policy makers, business leaders, and residents do not have a complete picture of the economic, social, and environmental risks that their homes, businesses, and the regional economy face today. Furthermore, increasing vulnerabilities in the face of sea-level rise, increased extreme weather events, and other changes to the climate exacerbate the confusion in the debate over how to create a more resilient community.

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Sea-level rise has averaged 1.8 millimeters per year over the last 100 years in Casco Bay, but the average over the last 20 years is 2.5 times higher at 4.5 millimeters per year.

Risk = Probability × Damage

The concept of risk has two components. The first is the likelihood of an event happening in a given period. The second is the damage the event will cause. The product of these two variables determines risk. Also called exposure, risk can be reduced primarily by minimizing the damage an event will cause (since the probability of natural hazards occurring is beyond the control of an individual or a community). However, reducing greenhouse gas emissions can lower the risk profile of future extreme weather events by slowing or stopping the increase in their severity or the increase in their probability.

Probability of the Occurrence of Catastrophic Events

Despite the desire for accuracy and certainty of future climate information to inform city policies and investment, probabilistic methods and predictive models are the best tools available. All types of future projections, and particu-

Risk and Probability: The 100-Year Storm Is Not *the* 100-Year Storm

Weather events such as storms and floods are frequently referred to in terms of their return period: "the 50-year flood," "the 100-year storm." However this designation is misleading, because the return period really refers to the event's expected probability in any year, not to how long it may take to return. Just as a lucky dice player might roll two sixes in a row, despite the 16 percent probability of rolling a six on each throw, so might an unlucky community face two 100-year storms within a 20-year period. The probability of such independent weather events is given by what is known as a binomial distribution. For example, the following table shows the results of the distribution for the probability of a certain number of 100-year storms (0.01 probability in any year) over a 100-year period:

Likelihood of a 100-year storm	
Number of storms in 100-year period	**Probability (%)**
0	36.6
1	37.0
2	18.5
3	6.1
4	1.5

As expected from the name, the most likely scenario, at 37.0 percent probability, is one 100-year storm in a 100-year period; however, almost as likely is seeing no such storms at all. Perhaps more alarming are the probabilities of seeing more than one such storm—roughly 26 percent chance of seeing two or more of these serious storms in a 100-year period.

If one looks at the probability of seeing the 100-year storm over any 20-year period, the results are also instructive:

Likelihood of a 100-year storm	
Number of storms in 20-year period	**Probability (%)**
0	81.8
1	16.5
2	1.6
3	0.1

Although 81.8 percent of the time one would not expect to see a 100-year storm, a 16.5 percent chance—almost one in six—exists that one of those storms would happen in any given 20-year period. In addition, do not forget the small but certainly not zero chance of seeing two of these storms in a given 20-year period.

Planning for risk of extreme weather events is challenging enough, but it must be based on an understanding of the actual risks and probabilities of occurrence—not confused by the shorthand language used to describe such events.

larly climate forecasting, include some level of uncertainty, yet decisions must be made and plans must proceed. Best available science provides sufficient ability to predict how frequently major storms will occur in the Portland region and to what extent sea-level rise will exacerbate the impact of extreme storms.

According to the Cumberland County HMP, between 1987 and 2010, FEMA disbursed resources to Cumberland County for 20 federally declared natural disasters, of which 17 were flood-related events. Thus, the cities of Portland and South Portland asked this panel primarily about resilience planning for this type of event, although impacts from high winds, winter storms, changing water temperature and quality, and wildfire did receive attention.

Although this panel was concerned with impacts from climate change, a raft of other types of catastrophic events deserve planning and preparation, such as major economic downturn, disease or pandemic flu, terrorism, or social unrest. The process of assessing risks and considering mitigation solutions can be extrapolated from the flood risk process to all other types of risk.

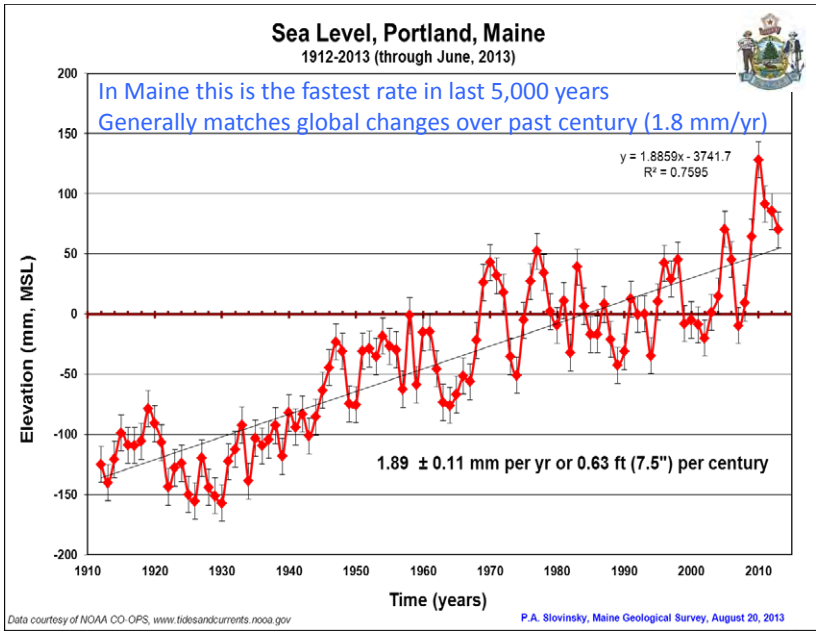
Recently, through the FEMA map revision process, a Flood Impact Study assessed historical records of storms and flooding, including the most recent data since the previous mapping process. This resulted in descriptions of storm events, wind speeds, wave heights, and resulting storm-surge levels with probabilities of annual occurrence of 10 percent (ten-year storm), 2 percent (50-year storm), 1 per-

cent (100-year storm), and 0.2 percent (500-year storm). This hydrological and historical climatic study produced detailed maps that show the extent and depth of flooding anticipated from each of these four probabilistic events.

The panel's only critique of this recent process is the suggestion to consider future prediction methods that may change the probabilities and extent of inundation. Two primary factors indicate the extent of inundation will be increasing over time: a modest rise in the average level of water in Casco Bay and the increasing frequency and intensity of coastal storms.

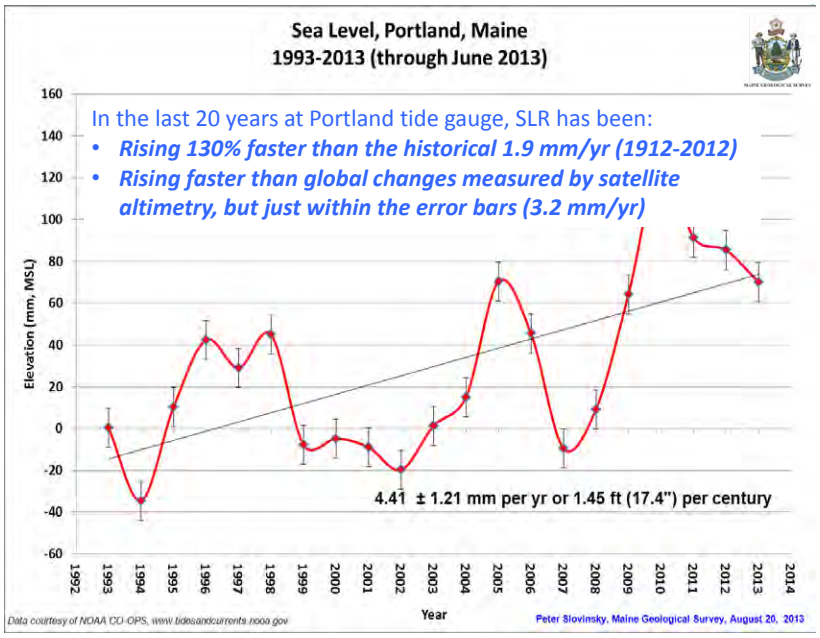
The National Oceanic and Atmospheric Administration (NOAA) tidal gauge data indicate a long-term trend of 1.8 millimeters per year (seven inches per century) though the data for the most recent 20 years indicate an annual average rise of 4.4 millimeters per year (17 inches per century). These data show the early signs of nonlinear increase in sea level, which is consistent with most climate models. An accelerating system such as this only increases the uncertainty as well as concern about future conditions. No absolute scientific recommendation can be made about which rate of increase should be set for future planning because risk appetite is different for every individual. But decisions must be made, and citywide policies must address some amount of sea-level rise for investments that have a 50- to 100-year planning horizon, such as infrastructure investment, urban planning, zoning, and many other public services. The panel recommends setting a level of sea-level rise that matches the public risk appetite while at the same time continuing to debate the issue as new information and best available science evolve.

Potentially more concerning, though supported by a smaller data set, is the factor of increasing frequency and intensity of extreme weather events such as nor'easters, tropical storms, and hurricanes. The anomalous disaster of Superstorm Sandy, which struck the New Jersey and New York region in 2012, is only one example of the increasing frequency and intensity of storms that are predicted to be seen in the Portland region. Sandy could have very well taken a path right through the Portland region, and Casco



Source: Slovinsky, Maine Geological Survey, August 20, 2013.

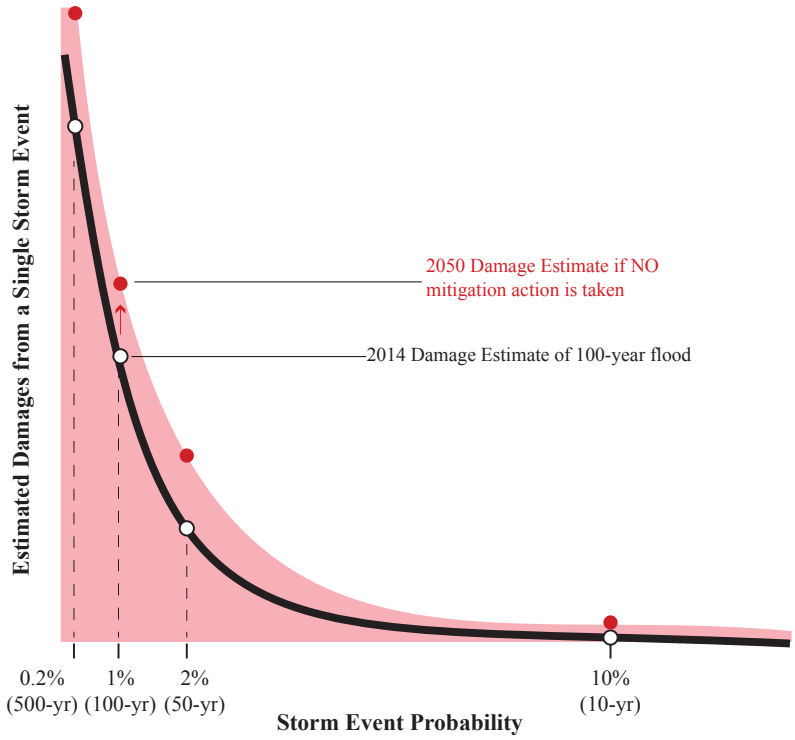
NOAA tidal gauge data in Casco Bay for the past 100 years.



Source: Slovinsky, Maine Geological Survey, August 20, 2013.

NOAA tidal gauge data in Casco Bay for the past 20 years.

Annual Estimated Damages to a Typical Property or Asset in the Floodplain



Example of typical risk curves for 2014 and 2050 with no mitigation.

Bay instead of New York Harbor might have experienced a storm surge a full three feet higher than any previously recorded water elevation. Other research, such as that which is ongoing at the University of Maine by Dr. Shaleen Jain, shows recent rainfall records from 1980 to 2010 place a nine-centimeter rain event at a 12-year return period compared to a 50-year return period from 1950 to 1980 data.

The impact of rising storm frequency and rising sea level creates an increased probability of flooding at any given flood height. Without any changes to physical features, higher flood levels cause more damage. Thus, a very quantifiable and direct impact of climate change is increasing annual expected damages (flood risk) of a given property in the floodplain.

Damage Estimation

The probability of a catastrophic event is only half the risk equation. If a major storm strikes Portland, but assets are protected and communities are prepared to respond, damages will be low and overall climate change risk will be low. If properties that once were out of the floodplain do not adapt and evolve to develop some level of flood protection, damages can be enormous. Within the limits of New York City, reported *insured* damages from Sandy were $18 billion, though actual direct damages were estimated at double or triple that amount.

In a comprehensive risk assessment a wide variety of types of damage are considered to capture a full view of the impacts of a catastrophic event. The direct impact of flooding and other extreme weather events is the most straightforward and quantifiable because they occur specifically to properties in the flood zone and they tend to be economic in nature, with the exception of loss of life.

But as any community that has experienced a major disaster knows, costs of a catastrophe stretch much further than the directly flooded properties themselves. In the event of a flood that reaches the height of Commercial Street, an employee of a retail store will be out of work until the business repairs the shop, restores inventory, and customers return to the neighborhood. Insurance coverage can take months to pay out, and many struggling businesses simply cannot come back after a major storm event, meaning employees have lost their jobs completely. Homeowners can rack up major debts from displacement (costs of relocating prior to returning home)

Direct Impacts from Flooding of Assets along the Portland Waterfront

Infrastructure	Commercial/ industrial	Residential
Asset damage (repair cost)	Building damages (repair cost)	Building damages (repair cost)
	Inventory loss	Personal property loss
	Loss of business revenue	Displacement costs
		Loss of life

Indirect Impacts from Flooding in the Greater Portland Region

Infrastructure	Commercial/ industrial	Residential
Costs from lost service	Loss of employee wages	Personal debt/ bankruptcy
	Job loss	Reduced home values
		Increased insurance rates

or from uninsured repair costs that can saddle them for years and even cause bankruptcy.

Finally, macroeconomic impacts of catastrophes are considered in a comprehensive risk assessment. Although less quantifiable, they can be even more significant to the long-term viability or vibrancy of a community than direct or indirect impacts. A city can build a reputation as a safe place to live or start a business after a serious storm strikes if infrastructure systems maintain services and the community adequately prepares. Some cities develop an image or a brand of resilience through their actions before, during, and after severe events. Others are known for being risky. Whole industries can be wiped out after disasters and never come back. These types of factors begin to put downward pressure on property values, which, in turn, reveals declines in tax revenues. These are just a few examples of the macroeconomic factors that the panel recommends the Portland region consider through the debate on how to deal with climate change risks.

Assets to Be Evaluated

Fortunately, the geography in the Portland region is favorable to flood risk because the bold coastline rises up quickly from the waterfront. This was likely a significant reason for the location of the town and the long and prosperous history of Portland and South Portland. Compared to many coastal communities along the eastern seaboard, relatively little land reclamation occurred over the years. But one can clearly see that those areas that have been filled are squarely in the 100-year floodplain today.

Typically, three broad categories of assets are assessed: waterfront infrastructure, waterfront commercial and industrial businesses, and waterfront residential communities. City-owned parks and buildings are also included, though Portland has very few assets in this category.

From a cursory view, the panel noted thousands of public and private parcels within the 100-year floodplain in the Portland region. Each parcel sees specific exposure as described by the direct damages, multiplied by the probability of all storm events in a given year. This product describes the annual expected damages for a given property. Then, adding the sum of all of the thousands of individual property costs to the citywide indirect damages estimate gives the citywide annual estimated damages value for a given year. Again, because of increased probability of storm events, sea-level rise tendencies, increases in waterfront property values, and other drivers, natural pressure causes the citywide annual expected damages to increase slightly every year.

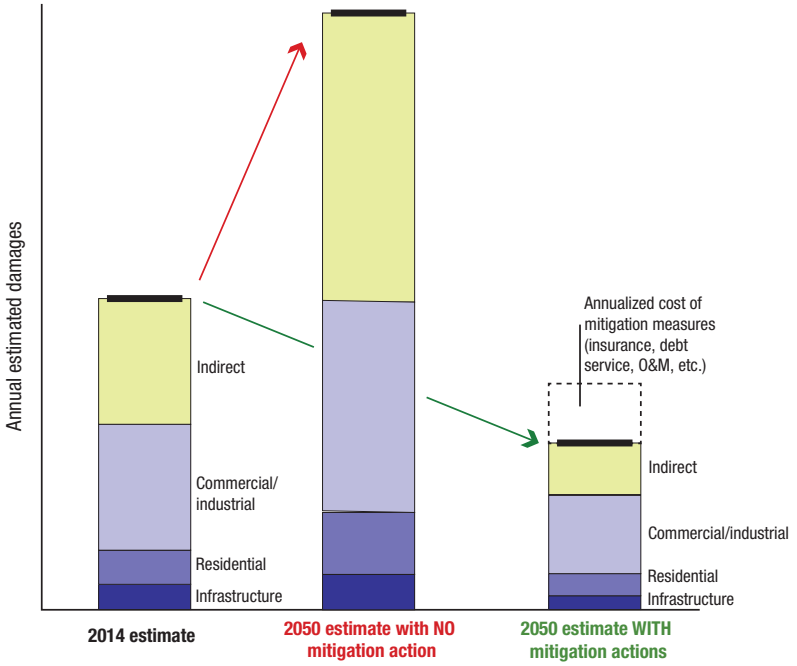
On a property-by-property basis, every asset has many strategies to reduce flood risk, such as building a wall around the property, raising the entire elevation of the property, deploying flood protection devices, and buying

Specific Assets in the 100-Year Floodplain in the Portland Region

Asset category	South Portland	Portland
Physical utility infrastructure	Electrical substation and small Peaker Power Plant in Mill Creek Wastewater treatment plant Sanitary pumping stations	Gas primary pumping station
Commercial/industrial	Oil storage and distribution facilities Marinas Portland pipeline	Waterfront businesses on piers Commercial Street retail Eimskip facility New rail line to Eimskip Back Cove businesses
Residential	Willard Beach neighborhood Mill Creek neighborhood Miscellaneous residential units	Condominiums on piers Back Cove neighborhood

Citywide Annual Estimated Damages

Expected damages with and without mitigation, 2014 and 2050.



flood insurance (see "Planning and Development Strategies for the Building Environment" and "Governance and Implementation" for full descriptions of physical mitigation strategies). Many community-scale infrastructural strategies also exist, such as long, linear levee walls, floodgates, deployable structures, and breakwaters. Such mitigation measures all have costs as well as benefits. But all properties and all cities have some subset of mitigation measures that are cost-effective risk reduction strategies. The process of identifying, prioritizing, funding, and implementing mitigation measures is the hard work of climate change adaptation and building resilience.

How to Use Risk Assessment Information

The results of a comprehensive risk assessment tell a story about a city's relative vulnerabilities in a quantifiable manner. They provide motivation to address high-risk assets and direction for further feasibility work. Risk information should inform the comprehensive planning process to ensure growth is targeted toward appropriate locations and public investment will retain long-term value. Risk assessment is one very important tool to ensure the long-term vitality of a region.

From the panel's preliminary understanding of the circumstances of Portland, even the lowest and most conservative amounts of sea-level rise result in major risk exposure to both physical and economic assets.

Planning and Development Strategies for the Built Environment

THIS SECTION FOCUSES ON THE BUILT environment and examines a range of scales, typologies, and strategies to address sea-level rise and storm surge. The intent is to recommend strategies that can protect and enhance property values and economic vitality of the region for a longer time.

Portland's central waterfront district is characterized by historic piers along the waterfront with historic structures across Commercial Street that make up the Old Port Historic District. This district is an important element that defines the character of the city. The panel recommends the city continue to allow limited strategic development on the historic wharves as a strategy for building a more resilient community. In addition, this strategy can provide a physical buffer to protect the district as a whole and make the area more resistant to storm surge. This incremental development needs to be built with high standards for resilience to protect the historic fabric across Commercial Street and the historic structures on the water side of the street within the district.

South Portland's Fore River waterfront is a low-lying area characterized by marinas and a mix of residential, commercial, and industrial uses. As this mix evolves, development along the waterfront should incorporate resilient design strategies that focus on edge protection and grade modification.

This section addresses several major risks and local issues related to resilience: storm surge mitigation, land use protection, street network, parking management, stormwater management, historic preservation, and utilities. For each section, recommendations are provided as guidance to address these issues. Specific strategies will be highly dependent on the individual site, but these recommendations should serve as high-level guidance for design and development throughout the study area.

Storm Surge Mitigation

The study area includes shoreline with significant exposure to storm surge from sea-level rise and storm events. Impacts from wave and wind action are characterized by horizontally directed high-energy surface flow. The following recommendations are intended to mitigate damage from storm surge.

Recommendations

- Require vulnerability assessment for new construction and major renovation that will have been identified in the at-risk areas using a questionnaire tool similar to the city of Boston's "Preparedness Questionnaire."
- Consider a "carrot" approach that offers education and information instead of, or in addition to, regulatory requirements.
- Employ storm surge mitigation strategies using tools appropriate to site-specific conditions and development opportunities.
- Consider opportunities for storm surge protection through the use of surge barriers to protect critical

Mixed-use waterfront.

LIPOFSKY

Mitigation strategies for the built environment.

Implementation Strategies

Policy

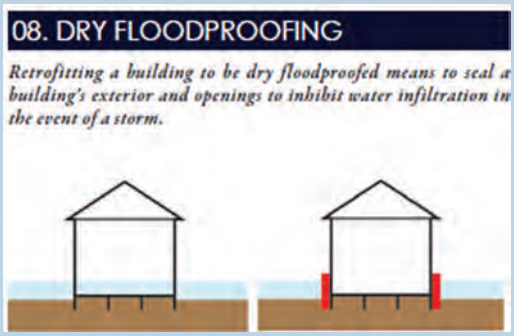
- Required upgrade
- New code
- Remove barriers
- Protect or retreat
- Education and training

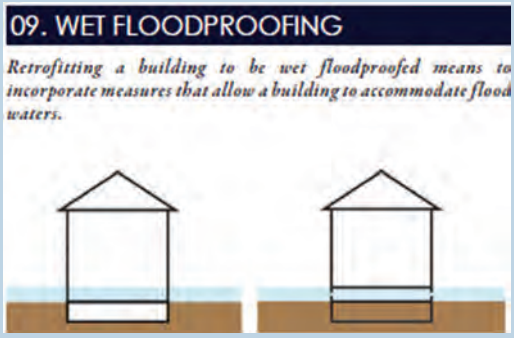
Street and site scale

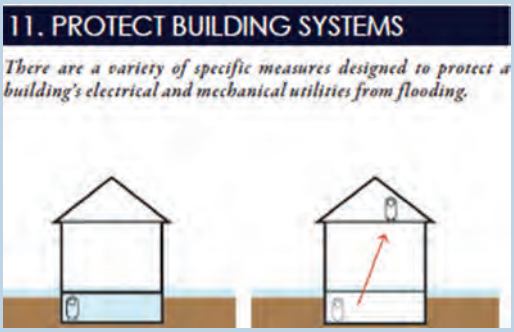
- Raised bulkhead/fill
- Living shoreline
- Floodable land
- Dune restoration or constructed dune
- Storm-surge barrier
- Underground storage
- Street canal
- Backflow prevention
- Safeguard toxic material storage
- Storm-surge resilient landscape design

Building scale

- Dry flood proofing
- Wet flood proofing
- Floating building
- Amphibious building
- Elevated building
- Temporary protection
- Building system protection
- Resource demand reduction
- Backflow prevention
- Slope stabilization for erosion control
- Design structure for increased wind loads
- Backup systems







- Natural ventilation
- Water service protection

Building operations

- Records and inventory protection
- Interior fixtures and finishes

Sources: Linnean Solutions, the Built Environment Coalition, and the Resilient Design Institute, Building Resilience in Boston *(Climate Preparedness Working Group of the Boston Green Ribbon Commission, 2013); Building Resiliency Task Force, Urban Green Council, New York; Sea Change: Boston, Sasaki Associates, Boston; Department of City Planning of New York,* Urban Waterfront Adaptive Strategies *(2013).*

infrastructure, such as the Peaker Power Plant or wastewater treatment facility.

Land Use Protection

Existing waterfront access throughout Portland and South Portland serves many users and types of economic activity. Planning, development, and maintenance of facilities will increasingly need to account for sea-level rise and higher-impact storm events. Examples exist of resilient design strategies that have already been used, such as at the new Marriott Courtyard hotel that elevated the ground floor and moved vulnerable equipment away from flood-prone areas.

Recommendations

- On the historic central waterfront wharves, continue to maintain public access for marine-related uses.
- Continue to consider mixed-use development on the waterfront to allow nonmarine uses to support marine-related activity. This can include limited residential development in the eastern waterfront zone and should be periodically reviewed as market conditions evolve.
- Consider tools such as transfer of development rights that may support continued vitality of the waterfront while allowing protection of desired areas.
- Acknowledge that nonvehicular circulation conflicts among users such as marine workers, tourists, residents, and daytime population are acceptable and, in general, contribute to the experience of waterfront vitality.
- Minimize vehicular conflicts with pedestrians through aggressive parking management and limitations on surface parking lots.
- Provide an integrated regional signage and mobile wayfinding platform for biking and walking.
- Discourage surface parking, which should be allowed only as an accessory to uses on the wharves. Street-level parking can provide stormwater mitigation and can support an active, pedestrian-oriented development on the waterfront, but only if contained within new structures that are carefully and intentionally designed and managed for this purpose.
- Allow below-grade parking that may be designed to serve as intermittent stormwater storage. New mixed-use structure design must support pedestrian-oriented uses at the street level and accommodate flooding.

Street Network

The community is characterized by hills and low-lying areas with roadways that can flood on an occasional basis. In both upland and low-lying areas, roadway pavement is a major source of stormwater runoff. Many locations throughout the study area are characterized by wide roadways. The street network is also critical to support freight access for water-dependent businesses. Development should continue to provide opportunities to create complete streets and improve hydrologic function for resilience.

Recommendations

- As low-lying streets' infrastructure are improved or reconstructed, incorporate strategies for storm surge mitigation.
- Continue to reduce pavement in other locations to reduce upstream impacts with soft green infrastructure.

Parking Management

Surface parking's impervious surfaces are another major contributor to stormwater runoff quantity and detrimental water quality in receiving bodies—especially of concern with economically vulnerable fisheries. Development should be designed to reduce the impact of surface flow across Commercial Street and to mitigate effects on landside structures.

Recommendations

- Identify opportunity sites that, once relieved of surface parking, can provide resilient structures or site development strategies that mitigate surface flow.

- To relieve waterfront sites of surface parking, develop comprehensive program to manage all parking resources as a system that includes on-street parking and all public and private garages.
- Periodically update and report actual parking utilization data. Align with transportation demand management planning and commuter-trip-reduction programs.
- Develop broad-based community support for enacting ordinances and pricing that encourage car sharing and other parking requirements in public and private development.

Stormwater Management

Impervious surfaces reduce urban resilience to heavy storm events and sea-level rise. Impact from this surface-water runoff is characterized by gravity flow that is regionally distributed. In addition, degraded water quality affects health and viability of commercial fisheries. South Portland continues to be very aggressive in implementing on-site stormwater detention policies and already has an impact fee program. Portland has accelerated its Combined Sewer Overflows program and is implementing a stormwater charge. The following recommendations seek to improve resilience and water quality and reduce surface water quantity by reducing impervious surfaces. The goal is to reduce short-term impacts while improving water quality over the long term, including the viability of commercial fisheries.

Recommendations

- Work at the watershed scale. Confirm stormwater quality performance targets are aligned, and prioritize key basin planning among affected jurisdictions to reduce fertilizer runoff and sewage discharge. Focus should include nutrient loading impacts to fisheries.
- Continue to aggressively implement green infrastructure strategies.

Historic Preservation

Portland has a rich fabric of historic districts and structures. The following recommendations are intended to protect historic structures from the effects of sea-level rise and storm surge. For a more detailed examination of historic structures, see the subsection on Historic Preservation in "Governance and Implementation."

Recommendations

- Allow flexibility for using innovative strategies on protected historic buildings.
- Develop guidelines and special provisions that will allow necessary interventions within the Old Port Historic District. This may include techniques and strategies that would not otherwise be permitted on buildings listed on the National Register of Historic Places. The city of Portland's Planning and Development Department would have primary responsibility for this planning activity.
- Work with counterparts in a national coalition to allow implementation of innovative resilience strategies.

Utilities

Greater Portland's utility infrastructure serves critical functions locally as well as for more rural communities throughout the state of Maine, cities of New England, and North America. For example, the Portland fuel terminals supply 90 percent of Maine's heating fuel. However, municipalities in the greater Portland region have a strong record of successful planning and implementing at this scale, as evidenced by the ecomaine solid waste-to-energy facility.

Viewed at the community scale, the panel notes that sea-level rise and the consequences of extreme storm events do not respect jurisdictional boundaries, and therefore planning for greater resilience necessarily must be interjurisdictional and collaborative. This includes planning for responses to reduce storm wind and surge intensity. At the site scale, the panel recognizes the value of low-impact site development strategies and construction of high-performing structures. These approaches can

improve resilience because they are not as heavily affected by interruptions in conventional utility service during and after storms or catastrophic weather events.

Recommendations

- At a policy level, develop comprehensive utility demand reduction strategies for electrical power, liquid fuel oil, and potable water. Similarly, strategies to reduce demand for treatment of stormwater and wastewater can reduce the need for building expensive, additional capacity. Demand reduction strategies also reduce pressure on existing infrastructure that may be compromised by sea-level rise, flooding, and extreme weather events.
- At a site level, in the short term, build flood protection for low-lying utility infrastructure.
- Over the long term as system upgrades are implemented, move critical equipment higher, above flood and storm surge levels.
- Explore the viability of new, offshore wind turbines to dissipate winds and reduce waterfront impacts (see Jacobson, Archer, and Kempton. "Taming Hurricanes with Arrays of Offshore Wind Turbines," *Nature Climate Change 4* [2014], 195–200).
- Require new development on parcels on the historic wharves and on the water side of Commercial Street be built as high-performance buildings and use low-impact site development strategies.
- Exempt new development built to these performance levels from stormwater utility charges.
- To reduce exposure to wind damage, relocate more exposed overhead power and communications infrastructure below ground.
- Elevate electrical vaults and transformers above flood level.

Mill Creek: A Conceptual Approach to Resilience

As an example of how a community might evaluate various resilience strategies, the panel examined the Mill Creek neighborhood in South Portland. This conceptual approach is based on the panel's review of specific uses, site design, topography, and existing protective elements. It is a point of departure for additional study; other nonstructural elements may be appropriate as well. These examples are not specific recommendations but rather an illustration of what the outline of a community resilience plan might look like. The city will need to pursue a specific strategy only after conducting a thorough vulnerability and risk assessment and retaining the appropriate consultants to evaluate the entire edge of the peninsula for applicability of the flood protection elements.

- Revetment/levee (with integrated bike path)
- Sheet pile bulkhead/ flood walls
- Bulkheads/sills and breakwaters
- Deployable barriers/ walls
- Breakwater

- Area to pursue specific federal funding (DHS, FEMA)

Governance and Implementation

THE STRUCTURES AND PROCESSES that a community chooses to govern itself are an expression of the community itself. These governance structures are necessary to enable public engagement, to address civic challenges, and to ensure a thriving, vibrant, efficient place for residents and businesses.

Risks caused by climate change pose unique challenges for governance structures. The importance of establishing a shared vision and purpose that extends beyond municipal boundaries is critical to addressing the impacts of climate change and sea-level rise as they occur in nature: they know no political or jurisdictional boundaries.

In fact, damage from these events often has indirect and cascading effects that extend across jurisdictions. A road that is washed out from an extreme precipitation event can disrupt a supply chain for a manufacturer in a community unaffected by the storm. Vulnerability to storm and flood damage can increase insurance premiums and affect home valuations and tax base across many communities, not just those directly affected. Ocean warming and acidification can have regionwide impacts on the marine economy.

Similarly, response to and mitigation of climate risks require regional coordination to avoid running at cross purposes; a levee built on one part of the shore will inevitably direct water to another part of the shore.

These risks are also challenging on a temporal scale. Sea-level rise poses a long-term, variable risk that creates no sense of urgency yet extends beyond the planning horizon for any given development project. Extreme precipitation events pose an acute risk but challenge thresholds of capacity for long-term capital planning and design for infrastructure.

Leadership and Governance

Because of the unique nature of climate change risks, the public sector must play a central organizing and operational role in governance and leadership. Although collaboration with the business community and civil society are necessary for effective governance, local governments have the long-term view and institutional knowledge necessary to address climate change risk at the municipal level.

Local governments also have a unique vantage point in understanding their relative and complementary strengths to judge how resources may be shared across communities. However, with respect to climate change this understanding is valuable only if cities coordinate effectively with each other.

With local government as the lead actor, appropriate governance structures that include the private, nonprofit, and institutional sectors and other relevant community stakeholders should be established to address climate risks.

In some cases, these entities already exist within the community but may simply need to incorporate resilience planning into their mandated activities. In other cases, they may need to be created to address specific issues.

This section discusses opportunities for leadership and governance on climate change resilience for Portland and South Portland.

Data and Risk Assessment

A key challenge in dealing with resilience and climate change is establishing a clear basis of data and information on climate and weather risks on which to make sound policy decisions. Communicating the resultant decisions to the broader community and individual constituencies

can also be challenging, because information is complex. Here, again, the local government must play an important role as an honest broker and credible source of impartial information.

For the cities of Portland and South Portland, a shared governance strategy around sea-level rise and severe storm impacts offers many benefits: potential for saving costs, leveraging shared resources, and fostering a culture of collaboration and trust.

By empowering a credible, regionally based third party with risk analysis and data collection tasks, decision makers in Portland and South Portland could rely on that entity (the "Risk Data Group") to provide them with the best available scientific information on which to make informed decisions about community resilience (see "Risk Assessment" to better understand the analysis needed).

The panel recommends that the Risk Data Group be tasked with conducting a regular, recurring survey and synthesis of the sea-level rise and severe storm events data, particularly in the face of a changing climate, which has both present and future impacts.

The development of a baseline and repository of information addresses two major goals:

- Shared understanding of the risks associated with climate change and sea-level rise (government *and* general public focus); and
- Buy-in of risk assessment for decision-making purposes (government focus).

For this approach to be a success, a credible and sustained process for compiling climate risk data should be established. This Risk Data Group would serve as the gatekeeper and owner of the data and would be responsible for using the best technical experts to build and maintain the knowledge base. When each cycle of the data-gathering process concludes, the Risk Assessment Group would be charged with sharing the information more broadly with various stakeholders:

- Leadership within the cities of Portland and South Portland (see details below);
- The broader public, with a focus on individual household and business resilience risks and preparedness actions; and
- The land use community.

Because science related to sea level and climate change is in a constant state of flux, the compilation and dissemination process should take place on a recurring basis (for example, every three to five years).

Several existing entities could take on the responsibilities of the Risk Data Group:

- Greater Portland Council of Governments;
- NOAA Maine Sea Grant;
- Climate Change Institute at the University of Maine;
- Gulf of Maine Research Institute; and
- Inter-Governmental Panel on Climate Change.

A number of examples exist of data sets and best available science, such as the following:

- FEMA;
- NOAA; and
- Climate Central.

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A Risk Data Group and a Resilience Working Group can help achieve community buy-in and consensus for resilience planning.

Formalizing Waterfront Collaboration on Resilience

Because the waterfront is such a critical economic, historic, natural, transportation, and recreational resource, a coordinated approach for the cities of Portland and South Portland is critical. Planning decisions related to the waterfront affect both communities, and planning for climate resilience adds a new layer of analysis to those decisions.

Such an approach would continue to build on the commendable efforts already well underway on sea-level rise, in particular among the cities and key stakeholders such as Cumberland County and the Portland Society of Architects. Many strong precedents of collaboration and partnership between the municipalities more generally already exist. One example is the ecomaine waste-to-energy plant. The plant was built to reduce landfill trash volume, produce electricity, and add recycling capacity. Communities in the region acted together to solve a common environmental problem. In addition, the panel recognizes the successful Waterfront Alliance, a convening entity that currently draws members from both cities, private business owners, and other key stakeholders in the region to address waterfront issues of shared concern.

As a parallel effort to the establishment of the Risk Data Group, the panel recommends establishing a sustainable mechanism for focused collaboration around sea-level rise among decision makers in Portland and South Portland. The shared risks associated with sea-level rise and climate change are dynamic and require an integrated, long-term planning and policy approach. Given these considerations, the panel recommends formalizing a joint entity charged with execution of core, recurring tasks that will ensure ongoing coordination on this topic.

For the purposes of this proposal, the panel refers to this entity as the Resilience Working Group of Portland and South Portland (the "Working Group"). It would be governed by decision makers from the civic, business, and nonprofit sectors.

Downtown Denver Partnership

In formalizing its role, the Working Group might choose to model itself after the Downtown Denver Partnership (DDP), a nationally respected but local organization that convenes civic, business, and nonprofit and institutional decision makers to creatively plan, manage, and develop downtown Denver. Like DDP, the Resilience Working Group could consider formalizing and drawing from multiple revenue sources (for example, membership fees and grants) to sustain itself.

To carry out its core mission of enhancing coordination around resilience for the cities of Portland and South Portland, the Working Group would be charged with four core tasks:

- *Using updated storm and sea-level risk assessments from the Risk Data Group to regularly identify financial vulnerabilities and exposures.* These assessments must be conducted at the municipal, neighborhood, and individual parcel levels.
- *Minimizing duplicative efforts and redundant, competing funding requests, and working to align government and decision makers.* The group should establish a shared set of priorities dealing with resilience and waterfront vitality. This will ensure that the cities of Portland and South Portland present unified requests for mutually beneficial infrastructure and mitigation measures, thereby increasing the opportunity for the cities to become regional or national leaders in resilience planning.

Examples of possible funding sources in this context include unique or recurring federal or state grants and philanthropic opportunities.

- *Providing leadership and advocacy in resilience planning around flood insurance.* As individuals and businesses in Maine are already seeing, increased insurance premiums run the risk of making property investments financially unsustainable. After Superstorm Sandy and the Gulf State hurricanes, communities experienced unprecedented losses from the insurance adjustment process, the results of which caused significant property and financial loss and widespread, prolonged disinvestment. Although insurance issues are not unique to Maine, the shared waterfront is disproportionately vulnerable to flooding risk, so the Working Group must take a proactive position.
- *Encouraging stakeholders to think holistically about land use, transportation, and parking as issues that affect both land and water.* An integrated approach to these issues is critical in supporting a resilient, working waterfront, regional mobility, and public access to the waterfront.

Codes and Standards

At the site level, codes, standards, and local permitting processes provide the primary governance tools to address resilience. Local governments need ways to mitigate climate risk on individual building sites to protect public safety, reduce economic loss, and minimize damage to infrastructure. Building owners and developers need clarity, transparency, and consistency in regulations to minimize costs of compliance and to plan for financing and investment in properties.

Both the cities of Portland and South Portland have already taken commendable, serious steps in the direction of creating a code that ensures a more resilient built environment along the waterfront. Portland is also participating in the FEMA Community Rating System, which gives substantial discounts on flood insurance policies in communities that engage in certain risk mitigation activities. The panel encourages South Portland to join this program if eligible and encourages Portland to improve its score to achieve a higher discount benefit for its residents.

To leverage these efforts, corresponding codes should be used as tools to implement site-specific risk mitigation measures over time that respond to changing circumstances. Climate data and forecasting ability, sea level and storm risk, property values, and mitigation costs all will change over time. Building codes and standards follow an existing evaluation and update cycle as mandated by state law. This cycle can be used to modify risk mitigation

The panel at work.

Leveraging Community Groups

Although it is not a land use recommendation, the panel identified the importance of ensuring resilience in the community. Specifically, volunteer efforts to organize and respond are a critical resource in any major storm or disaster. In the state of Maine, regular coordination and pre-planning takes place through the Maine Volunteer Organizations Active in Disaster (VOAD) and the Community Organizations Active in Disaster (COAD). These organizations (such as the American Red Cross and the Salvation Army) are essential to ensuring that communities are able to recover sooner from events by making the best use of resources available.

and management as the Risk Data Group's understanding evolves and as property values and mitigation strategies and technologies change. These tools can also serve to mitigate insurance premiums, business continuity concerns, and other development risks.

Energy Benchmarking

In the United States, buildings account for 36 percent of total energy use and 30 percent of greenhouse gas emissions. Many cities choose to pursue citywide energy benchmarking as a tool to lower energy use, meet climate mitigation goals, or reduce greenhouse gas emissions. Benchmarking involves tracking and reporting energy use, which is then normalized for building size, type, number of occupants, and other factors. The most common tool used for benchmarking is the free Portfolio Manager, developed by the U.S. Environmental Protection Agency through its EnergyStar program. Benchmarking shows how buildings use and waste energy and helps identify opportunities to lower energy costs and improve building operations. Buildings with more efficient envelopes are more resilient to heat and cold stress during energy outages. When efficiency is combined with renewables and energy storage, buildings can also be resilient to grid outages and business interruptions—one of the largest sources of claims in extreme weather events.

Energy benchmarking precedents have already been adopted in a number of cities, such as Boston, Chicago, Denver, New York, Philadelphia, San Francisco, and Seattle. The panel recommends that Portland and South Portland consider adopting a benchmarking and disclosure requirement as a step to identifying opportunities for energy efficiency and demand reduction as strategies for resilience. The cities should lead by first benchmarking and reporting on their own buildings.

Historic Preservation

Both Portland and South have a multitude of unique and treasured historic resources at varying levels of protection and condition. Greater Portland Landmarks is as an existing regional entity advocating for the protection and revitalization of these valuable treasures. According to the City of Portland Department of Planning, Portland has eight historic districts and about 60 designated landmarks.

To appropriately prepare Portland's and South Portland's designated and nondesignated historic buildings for the impacts of sea-level rise and climate change, a comprehensive inventory must be completed. Within the inventory, each individual building should be assigned a priority level based on an evaluation of intactness, integrity, existing landmark status, flood/sea-level rise risk level, and other relevant factors. The priority level will determine how much and what kind of intervention is acceptable or warranted. For example, one of the 60 designated landmarks in a moderate risk area might use flood protection measures only during a flood event, with minimal impact to the historic features by creating positive drainage to encourage water to flow away from the building or installing small floodwalls to protect openings to mitigate flood damage. In contrast, an undesignated historic building in a high-risk

Annapolis Historic Preservation District

The city of Annapolis, Maryland, has been a leader in applying resilience planning to historic preservation. The community went through a process to identify the hazards that affect the community and to determine hazard-prone areas and the magnitude of each hazard. Then an inventory of vulnerable historic and cultural resources was created, and preservation priorities were established. Finally, the amount of potential losses was estimated. This information was used to develop a strategy to provide the optimal protection of historic and cultural resources in the community.

area may provide an opportunity to explore innovative flood and sea-level rise mitigation strategies as well as more visually invasive, but often necessary, strategies: for example, relocation of the building to a less threatened location, or an amphibious retrofit to allow the building to float when it floods. Instituting innovative and creative approaches to flood-proofing historic buildings in this context has the opportunity to push the national debate forward around historic buildings and flooding.

Recommendations

As local governments work to understand how to contend with the consequences of sea-level rise, storm events, and ocean warming and acidification, sustained coordination across municipalities and sectors to leverage expertise and core competencies has value. Following is a summary of the panel's recommendations for this section:

- *Create a Risk Data Group.* The Risk Data Group, a neutral, nonregulatory entity, would be charged with obtaining recurring, accurate scientific data around sea-level rise and likelihood of severe storm events and other climate risks. The Risk Data Group would serve as the clearinghouse for this information and be responsible for disseminating it.
- *Create a Resilience Working Group.* Using information gathered by the Risk Data Group, the Resilience Work Group would
  - Develop risk assessments to understand potential economic exposure of the waterfront to climate risk;
  - Coordinate and prioritize regional funding and planning needs to mitigate waterfront exposures to climate risks;
  - Proactively organize stakeholders to address insurance-related challenges for vulnerable waterfront properties; and
  - Provide strategic guidance on transportation, mobility, public access, and land use issues that support a vibrant, resilient waterfront.
- *Improve codes and standards.* Explore improving development codes and standards to improve protection against storm surge and sea-level rise, increase energy efficiency, and protect historic resources. Consider participating in and improving scores in the FEMA Community Rating System. Use education and outreach to inform landowners and developers about the need for resiliency in their plans and designs.

Conclusion

PORTLAND AND SOUTH PORTLAND have a unique and precious asset in their waterfront. The two cities are very different, but share many commonalities as part of a Maine and Greater New England tradition. Although the exact details of future risks caused by climate change are not yet known, storm surge, flooding, changes in fisheries, and extreme precipitation events clearly will play an increasing role in the long-term ability for these communities to thrive.

The two cities should be commended for taking the initial steps to understand and plan for a changing climate and an uncertain future. After extensively touring the waterfront, consulting briefing documents from city staff, and interviewing dozens of community stakeholders, the panel makes the following key recommendations:

- Economy:
  - Ensure a resilient economy through additional diversification.
  - Pursue incremental targeted development strategies to improve resilience of marine and nonmarine uses on the waterfront.
- Risk assessment:
  - Conduct a comprehensive risk assessment.
- Design strategies for the built environment:
  - Evaluate the feasibility of suggested design strategies for several areas of priority focus.
  - Foster mixed-use development in keeping with the history of the wharves but redefining what a working waterfront means.
- Leadership and governance:
  - Create a Risk Data Group to monitor science and data on risks and establish a shared understanding.
  - Create a Resilience Working Group to collaborate on shared waterfront resource issues and conduct comprehensive risk assessments for waterfront parcels.
  - Explore using codes and standards to increase protection against storm surge and sea-level rise, increase energy efficiency, and protect historic resources.

LIPOFSKY

About the Panel

James M. DeFrancia

Panel Chair
Aspen, Colorado

DeFrancia is a principal of Lowe Enterprises Inc., a national real estate development company engaged in residential, commercial, and resort development activities, and president of that company's national Community Development division. He is also president of Weston Capital Corporation, a privately held firm engaged in real estate asset management and development on behalf of private investors, banks, government agencies, and insurance companies. Earlier, he held several positions with ITT Corp., including president of its Levitt homebuilding subsidiary in Puerto Rico and responsibility for the restructuring and sale of ITT/Levitt's international land assets. Before joining ITT, DeFrancia held executive positions with an international investment group in Venezuela. Prior to his private sector experience, DeFrancia served as an officer in the U.S. Navy. Posts included Naval Headquarters, Saigon; aide to the commanding Rear Admiral NSC San Diego; Office of the Chief of Naval Operations; and the U.S. Embassy, Caracas, Venezuela.

He recently served as the receiver of the Dancing Bear project in Aspen, as the receiver of Mountain Sage Townhomes in Carbondale, Beaver Run Ranch in Pitkin County, and as managing director for the corporate receiver of Base Village in Snowmass, Colorado. DeFrancia also served by British court appointment as the receiver and manager of Shanghai Links Executive Community Inc., a British company holding land use rights in China and actively engaged in community development in Shanghai. He held a Resident Visa in China.

DeFrancia is a life trustee of the Urban Land Institute. He is a past director of the National Association of Home Builders, former Virginia representative to the Southern Growth Policies Board, and former member of the Metropolitan Washington Airports Authority Board. He served as a member of the Defense Department's Marsh Panel and was appointed by the Secretary of Defense specifically to contribute residential development expertise in restructuring the housing systems of the Department of Defense. DeFrancia also served as a member of the Housing Advisory Group to the Committee on Banking, Finance and Urban Affairs (U.S. House of Representatives), and has been a guest lecturer or panelist for the Urban Land Institute; the Bank Lending Institute; the Lincoln Institute of Land Policy; the Graduate School of Design, Harvard University; George Mason University; and the George Washington University.

He recently served as an adviser to the secretary of the Navy on maritime strategy in the Western Pacific, as well as U.S. Navy energy policy, and was awarded the Navy's Distinguished Civilian Service medal for those efforts. He has served as an adviser on growth and development policies to the governments of Bermuda, Mexico, the Netherlands, the United Kingdom, the United Arab Emirates (Dubai), and Saudi Arabia, as well as the Vatican. He has similarly advised several U.S. cities and the Port Authority of New York and New Jersey. In addition, he has been a contributing writer to publications on urban growth, transportation, and real estate development.

DeFrancia is a graduate of the U.S. Naval Academy with a degree in engineering and executive studies in business and finance at the University of Michigan and the Wharton School of the University of Pennsylvania.

Stephen M. Antupit

Seattle, Washington

Antupit uses his 20-plus years of professional experience as an urban strategies designer to help create socially equitable and resilient communities. His expertise in complex urban design, master planning, and private/public partnership challenges (including the creation of mixed-income transit communities) is highly respected. His grasp of market challenges, regional and national policy issues framing green infrastructure, and smart growth fuels his consulting practice.

Antupit is a creative force in crafting unique "fun with a purpose" events that invite people to explore civic and environmental issues. He is equally skilled in navigating among officials, community leaders, and various media and engagement platforms. Currently Antupit is "playing with food" to create partnerships, projects, and interventions that nurture connectedness and grow delicious green infrastructure. In relocalizing and making more resilient urban food systems, Antupit's goal is to leverage food's real power to feed cities that are more shareable.

He cofounded CityLab7, an innovative "do tank" committed to connecting people through tactical urbanism. He previously led green urbanism and strategic brand efforts at Mithun. For more than a decade, Antupit held leadership positions in all aspects of urban design and mixed-income redevelopment in local planning and development agencies. He is a consulting partner to Fish to Water and serves as an expert panelist for the Urban Land Institute.

Corinne Packard Beasley

New York, New York

Beasley is a clinical assistant professor at the New York University Schack Institute of Real Estate and brings experience in both government and private development to her teaching, which is focused on public/private development and postcatastrophe reconstruction. She has led students on projects related to the reconstruction efforts after Superstorm Sandy in New York City, the Haiti earthquake of January 2010, the Chile earthquake in 2011, and the post-tsunami and postwar reconstruction in Sri Lanka.

She is the former vice president of development at the Hudson Yards Development Corporation, which is the city entity charged with spearheading the implementation of the Hudson Yards development program. Before working there, Beasley was a vice president of the Financial Services division of the New York City Economic Development Corporation (NYCEDC), where she structured city incentives and discretionary capital investments in real estate and economic development projects throughout the five boroughs, including Atlantic Yards and Coney Island. Before joining NYCEDC, she worked in real estate finance at Capital Trust and in real estate acquisitions at Heitman.

Beasley has been part of the Clinton Global Initiative Haiti Action Network and the working group on Resilient Communities and is a member of the Regional Post Disaster Housing and Sheltering Planning Team, led by the city's Office of Emergency Management. She was named the cochair of ULI's Post-Sandy Task Force in January 2013.

She graduated from the University of Pennsylvania with a BA in urban studies and real estate development and a master's degree in city planning.

Dennis Carlberg

Boston, Massachusetts

Carlberg is Boston University's first sustainability director. Under his leadership the university is now recognized as a green university by the *Princeton Review*, U.S. Green Building Council, and Sierra Club, as a result of reducing its greenhouse gas emissions by 21 percent, energy use intensity by 19 percent, water consumption by 11 percent, and waste by 12 percent—all despite 14 percent campus growth since 2006. At Boston University, Carlberg collaborates with campus stakeholders to develop and implement a broad-based sustainability strategy to integrate sustainability into the culture and operational functions of the university. This program addresses 18 issue areas from climate and energy to waste reduction and com-

munity engagement. He spearheaded the effort to prepare the university for the impacts of climate change and is a member of the Climate Ready BU Task Force currently conducting a vulnerability assessment for rising seas, higher temperatures, and stronger winds.

An architect and a LEED Accredited Professional, Carlberg has more than 25 years of architectural experience. Before joining Boston University in 2009, he was a principal at Arrowstreet, a Boston-based architectural firm where he focused on sustainable design. His work received Silver at the International Awards for Livable Communities for the Urridaholt Masterplan in Gardabaer, Iceland, a Boston Society of Architects Urban Design Citation in Urban Design for the Urridaholt Masterplan, and a BSA Unbuilt Architecture Citation for Design Wind Train.

Carlberg began his career at the Solar Energy Research Institute (now NREL) and Lawrence Berkeley Laboratory (now LBNL), conducting daylighting research to reduce building energy consumption and improve the indoor environment.

He cochairs the Urban Land Institute Boston's Sustainability Council and Sea-Level Rise Committee, which has convened five events on climate preparedness since 2011, including a daylong collaboration with Ceres on the financial and insurance industry response to climate risk. In addition, he is active in several Boston area sustainability organizations: City of Boston Green Ribbon Commission's Higher Education and Climate Preparedness Working Groups; Metropolitan Area Planning Council's Regional Climate Change Adaptation Strategy Advisory Committee; and Boston Museum of Science's Environmental Sustainability Committee. Carlberg is also a member of the Sustainability Tracking, Assessment, and Rating System (STARS) Steering Committee at the Association for the Advancement of Sustainability in Higher Education.

He received his master of architecture degree from the Massachusetts Institute of Technology where he was awarded the AIA Gold Medal. He received his bachelor of arts in architecture from the University of California, Berkeley.

Jessica Pavone

New York, New York

Pavone serves as the senior director for long-term Sandy recovery for New York state at the American Red Cross. She leads a team of 60 that supports all New York state Sandy-impacted communities in their recovery through granting, case management, and community outreach.

An urban planner who completed her master's degree at New York University's Wagner School in 2002, until Sandy, Pavone's primary focus was overseeing large-scale economic development and land use planning initiatives in Queens, Brooklyn, Manhattan, and Denver.

Immediately before her current role with the Red Cross, Pavone served as an assistant vice president with the New York City Economic Development Corporation, where she directed $90 million in transportation initiatives in the Jamaica, Queens, business district, resulting in the 2013 completion in of a $19 million construction project. She also led multiple urban design initiatives in Lower Manhattan and Brooklyn.

When Sandy hit, Pavone used her knowledge of southeast Queens to support business recovery within affected communities in Queens and to contribute to the Special Initiative for Rebuilding and Resiliency report in 2013, during Mayor Bloomberg's administration. She seized the opportunity to do mission-based work with the Red Cross and to shift her career focus toward supporting individuals and communities throughout New York state on their paths to both recover and become more resilient after Superstorm Sandy.

Byron Stigge

New York, New York

Stigge is a director at Level Agency for Infrastructure. As a global thought leader for urban infrastructure planning, sustainability, and resilience, he has a passion for understanding technical aspects of how cities function and the impact infrastructure can have on everyday lives.

He studies and practices innovative methods of delivering energy and climate change planning, water and wastewater management, transportation planning, and solid waste management through an integrated design process. He founded Level to be a specialist consulting firm that provides technical and planning advice for development projects with grand aspirations to address climate change, resilience, economic justice, and environmental protection in cities.

For the past 15 years, Stigge has been creating sustainable infrastructure plans for large-scale development projects throughout the United States and for cities in more than 20 countries around the world. Since Superstorm Sandy hit New York City in 2012, he has spoken, written, and been deeply engaged in the long-term resilience planning work for the region. Level has fully participated with the U.S. Department of Housing and Urban Development's Rebuild by Design planning process in New York City. Stigge has also been a participant in the Urban Land Institute Post-Disaster Recovery Advisory Services Panel and a juror for the FarRoc competition for resilient coastal development.

Stigge is on the board of directors of the Forum and Institute for Urban Design. He has lectured and taught at Harvard Graduate School of Design, Massachusetts Institute of Technology (MIT), Yale, Washington University in St. Louis, and Columbia University. He earned dual undergraduate degrees from Washington University in St. Louis in civil engineering and architecture, a master of building technology from MIT, and a master of design studies in environmental planning from Harvard Graduate School of Design.

Richard C. Ward

St. Louis, Missouri

Ward Development Counsel was established in 2011 by Ward as a platform for engagement in real estate, economic and community development, planning, and counseling. Previously he managed the St. Louis office of Zimmer Real Estate Services, where he was a vice president and a member of its Development Management Group. Before his work with Zimmer, Ward was the founder and principal owner of Development Strategies Inc., having led that firm to become a leading national provider of planning and development advisory services.

Ward's development planning and counseling services focus on shaping and advising public/private ventures and partnerships; project feasibility and strategy; strategic planning and development team building and selection; structuring incentive agreements between local governments and private investors; site selection, acquisition, and entitlement strategies; urban and land use planning and controls; and litigation support and expert testimony.

His development counseling and planning assignments throughout the United States include the following: downtown revitalization for eight major central cities and an equal number of satellite central business districts; more than a dozen urban medical centers and other major institutions and corporate campuses, all with a focus on stabilization and restoration of surrounding neighborhoods and business and industrial districts; economic development strategic and business plans on behalf of nearly 20 state, metropolitan regional, central city, urban county, and major suburban economic development organizations; comprehensive planning, land use controls, and development management on behalf of over 25 municipalities and counties; technology-focused economic development advisory services in the St. Louis region leading to the successful creation of two research parks, two high-tech incubators, and target industry strategies; and economic, financial, and market feasibility assessments for a wide array of private and public real estate investments and ventures.

Ward has been a member of ULI for over 35 years; chaired its St. Louis District Council, Small Scale Development Council (Silver) and Public/Private Development Council (blue); and served on 14 Advisory Services panels. He served for 20 years on the board of directors of the International Economic Development Council (IEDC). He is certified as an economic developer (CEcD with IEDC); urban planner (AICP); Counselor of Real Estate; and commercial

real estate broker, state of Missouri. He received graduate degrees in urban planning from Virginia Tech and in urban design and business administration from Washington University in St. Louis.

Jeana Wiser

Los Angeles, California

As associate project manager for the Preservation Green Lab, Wiser plays a key role in research and policy initiatives that build upon the intersection of preservation and sustainability. Some of her current work is with two of the Green Lab's primary programs: America Saves! and the Partnership for Building Reuse, where she lends her expertise in project management, collaboration with academic partners, GIS mapping, data analysis, and volunteer coordination. In addition, she manages the Green Lab communications, with specific emphasis on translating the work of the Green Lab to diverse audiences through a variety of outlets.

Recently, she has become more involved with exploring the relationship between older buildings and climate change and the role of adaptation and resilience. This work is currently being applied in Annapolis, Maryland, through her participation on the National Trust's National Treasure team.

Before joining Preservation Green Lab in 2011, Wiser attended the University of Washington in Seattle, earning a master's degree in urban planning and a certificate of historic preservation. She is a member of the Association of Preservation Technology's Technical Committee on Sustainable Preservation and the Urban Land Institute–Los Angeles, and she serves on the Steering Committee of a New Orleans–based nonprofit, Building Resilience Workshop, that convenes diverse sets of stakeholders to explore innovative strategies to build greater resilience (both physical and social) in south Louisiana.

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