

Climate Change Adaptation
Maine's Marine Extension Team
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Coastal residents and towns need strategies to address climate change and its effects on sea-level rise, shoreline erosion, and coastal flooding. Extreme weather events can cause millions of dollars in damage and threaten coastal ecosystems and local economies that rely on coastal resources for fisheries, aquaculture, working waterfronts, and tourism, all vital sectors of Maine's economy. The University of Maine Cooperative Extension and Maine Sea Grant are working with coastal communities to help them prepare for the potential local impacts of climate change and minimize the potential hazards by implementing resilient coastal development strategies and practices.

Building a resilient coast is a suite of activities providing stakeholders with easy access to information to facilitate planning for climate and hazards impacts, based in part on NOAA-funded research conducted by Sea Grant. We are developing peer-to-peer learning opportunities, supporting community-initiated planning conversations, and expanding the *Maine Property Owner's Guide to Flooding, Erosion & Other Coastal Hazards* to provide new content related to coastal hazard emergency preparedness, community-level resilience strategies, and resources for professionals.

seagrant.umaine.edu/extension/coastal-community-resilience

seagrant.umaine.edu/coastal-hazards-guide

Climate Change Adaptation in Coastal Communities builds upon several years of National Sea Grant and NSF EPSCoR-funded climate change adaptation projects related to municipal management of extreme rainfall events. We are co-developing potential solutions and tools with the City of Ellsworth to address increasing extreme rainfall conditions for the prevention of flooding and erosion. We are working to better understand the needs of the city including ordinances, prevention and maintenance of stormwater infrastructure, to better protect citizens in Hancock County communities, and work to develop user-friendly models for decision making, which use GIS and Google Earth to show stormwater infrastructure vulnerabilities. These models will help communities assess emergency management needs and prioritize efforts to manage and prevent climate change impacts. We are also working with Ellsworth and surrounding communities to develop a Municipal Stormwater Guide based on biophysical data related to changing seasonality of peak flows and higher peak stormwater events. Our work with Ellsworth has led to exploring work on similar projects in Lincoln County, and we intend to make stormwater information available to all municipalities. Resources include an MPBN-produced video documentary featuring our work, titled "Culvert Operations," and a community forum on stormwater planning. Valuable lessons have been learned by all participants.

umaine.edu/mitchellcenter/helping-communities-weather-the-storms/

Climate change and fisheries Project is based on outcomes from a 2012 NOAA funded project focused on promoting climate change awareness and adaptive planning in Atlantic fisheries communities. We are developing qualitative Systems Dynamic models, which will serve as decision-making tools to help lobster fishermen in Midcoast Maine communities consider factors such as financial information (at both industry and individual scales) and environmental conditions. The models will demonstrate fishing effort vs. vulnerabilities and impacts from climate change and help lobstermen with decisions affecting their effort versus ability to make a profit—as best said by MLA President Dave Cousens, to “fish smarter, not harder.”

seri-us.org/content/fisheries-and-climate

Understanding potential effects of ocean acidification is a looming threat for our marine ecosystems and marine resources. Marine Extension Team members are engaged in assisting Maine's fisheries and aquaculture stakeholders as they begin exploring issues related to ocean acidification and other climate-related changes in Maine's coastal waters, including participation in the Northeast Coastal Acidification Network. neracoos.org/necan

Engaging citizens in science. Since 1999, data generated by volunteers with the Southern Maine Volunteer Beach Profile Monitoring Program has informed beach management decisions at local, state, and regional levels. UMaine Extension/Maine Sea Grant in 2010 developed and continue to coordinate a citizen science effort, *Signs of the Seasons: A New England Phenology Program*, in which communities and individuals of all ages are increasing climate literacy and contributing phenology data to researchers and resource managers through observing the timing of seasonal changes in plants and animals in their backyards and communities.

seagrant.umaine.edu/extension/beach-profile-monitoring/home
umaine.edu/signs-of-the-seasons/

Participating in state, regional, and national networks. We intend to foster collaboration and improve effectiveness of adaptation initiatives by coordinating Maine's Climate Change Adaptation Providers' Network, assisting development of a Maine Climate Change Adaptation Plan, and coordinating a statewide Climate Change Forum. Marine Extension Team staff member is co-chair of the Regional and National Sea Grant Climate Network. We are also working to reinvigorate the New England Regional Phenology Network, including hosting a fall 2015 phenology science forum.

seagrant.noaa.gov/WhatWeDo/Climate/ClimateResources.aspx

In addition to participating in research projects and related outreach, the Marine Extension Team can help connect Maine people with researchers at the University of Maine and other institutions. The following are current climate-related research projects funded by Sea Grant.

Coastal flooding and erosion from severe storms in a changing climate
(University of Maine, \$150,000)

Climate change adaptation and ecosystem service resilience in Northeast coastal communities
(Clark University, \$25,000)

Coastal hazards and Northeast housing values
(Clark University, \$25,000)

Comparing approaches to employing public funding to vulnerable coastal properties
(Woods Hole Oceanographic Institution, \$25,000)

Developing statewide research priorities on ocean acidification
(Island Institute, \$3,000)

seagrant.umaine.edu/research

