APPLIED SCIENCE PROJECTS TO INSPIRE CLIMATE ADAPTATION AND RESILIENCE

Project	Description
Building the Capacity of Coastal Communities to Address Climate Change Risks Through the Use of Role-Play Simulations Contact: Steve Bird, City Planner, City of Dover Email: S.Bird@dover.nh.gov	The Massachusetts Institute of Technology Science Impact Collaborative worked with the Great Bay National Estuarine Research Reserve (NERR), and the Consensus Building Institute to test an innovative way to help coastal communities understand and prepare for the potential impacts of climate change in the City of Dover, NH. The team used role-play simulations as a means to educate the public about climate change threats and to help communities explore ways of decreasing their vulnerability and enhancing their resilience. The project provided insights into techniques for engaging communities in public learning, risk management, and collaborative decision-making around science-based issues, and offers a model approach that communities can use to address climate change.
Climate Resilience Initiative City of Portsmouth Contact: Peter Britz, Sustainability Coordinator Email: plbritz@cityofportsmouth.com	This project provided an assessment and recommendations to be integrated into the Master Plan update process, codes and development regulations. This project also utilized scenario planning to explore uncertainty about the future consequences of climate change induced sea-level rise and adverse impacts on the built environment and natural resources. The assessment used several potential futures (in this case low, medium, and high risk sea-level rise scenarios), providing both quantitative and qualitative information in the decision-making process. This process enabled the City to undertake a focused outreach around climate adaptation, without encumbering the Master Plan process. http://www.planportsmouth.org/cri.html
Wagon Hill Farm Erosion Control Phase I Contact: Kirsten Howard, NHDES Coastal Program Email: kirsten.howard@des.nh.gov	This project seeks to assess the erosion issue at the Wagon Hill Farm shoreline in Durham. The Town of Durham will work with the NHDES Coastal Program and the University of New Hampshire to monitor and assess and design alternatives for erosion control and shoreline protection.
Tides to Storms I and II Rockingham Planning Commission Contact: Julie LaBranche, Senior Planner Email: jlbranche@rpc-nh.org	Part I - This project produced 1) a regional vulnerability assessment report and map set for 7 NH Atlantic coastal municipalities to assess the impacts of climate change on land, natural resources and infrastructure, and provide detailed maps, and 2) adaptation and mitigation strategies to address the projected future effects of sea level rise and storm surge. Part II - RPC provided technical assistance to 7 Atlantic coastal municipalities to implement recommended strategies from the Tides to Storms I Vulnerability Assessment. The project focused on municipal efforts to adaptation implementation improve municipal and community resilience to coastal flooding, protect public health and safety, and increase awareness of coastal flood risks and hazards.
Climate Risk in the Seacoast (C-RiSe) Rockingham Planning Commission Contact: Julie LaBranche, Senior Planner Email: jlbranche@rpc-nh.org Strafford Regional Planning Commission Contact: Kyle Pimental, Senior Regional Planner Email: kpimental@strafford.org	This project team assessed climate change impacts from from sea level rise and storm surge to natural systems and the built environment for ten coastal municipalities. Results of the assessment will help municipalities apply climate impact data directly into programmatic changes such as facilities (infrastructure upgrades and priorities), permit processes, codes, and regulations. The project results will be built into a developing web-based platform (NH Coastal Viewer). Vulnerability analysis results of sea-level rise and storm flooding will be incorporated into master plans and hazard mitigation plans. The UNH Stormwater Center will complete a culvert analysis based on future climate conditions including projected increases in the frequency and magnitude of extreme precipitation events.
Assessing Flood Risk in the Lamprey River Watershed Contact: Cameron Wake, UNH Email: cameron.wake@unh.edu	Coastal communities in New England are confronted with the effects of rapid development and associated land use change, while also dealing with the serious impacts of increases in extreme precipitation events which influences the frequency and magnitude of flood events. In response, local decision-makers and regional planners are using improved scientific information regarding flood risk as a basis for guiding development and planning infrastructure investments. The project assessed flood risk associated with existing and future land use and climate change scenarios for the Lamprey River watershed of Great Bay, NH to support land use decision-making.
Durham Climate Adaptation Hazard Mitigation Plan Chapter Strafford Regional Planning Commission Contact: Kyle Pimental, Senior Regional Planner Email: kpimental@strafford.org	Strafford Regional Planning Commission assisted the Town of Durham in developing a climate adaptation chapter that was adopted as a subset of their Hazard Mitigation Plan. The chapter provides adaptation strategies to protect areas at high risk of flooding due to climate change and sea level rise, and identifies various regulatory and non-regulatory options to address this potential risk. With collaboration from Town officials and staff from the University of New Hampshire, SRPC delivered a product that provided information on how best to plan and act to address the impacts of climate change, thus protecting coastal infrastructure and resources.
Climate in the Classroom: Oyster River Middle School and Hampton Falls Lincoln Ackerman Elementary School Contact: Amanda Stone, UNH Cooperative Extension Email: amanda.stone@unh.edu	The Natural Resource Outreach Coalition (NROC) engaged teachers, and students and their parents in a collaborative process to raise awareness and community support for municipal climate resiliency actions. NROC planned and facilitated a community event to bring together students to present what they learned about climate change to parents and municipal leaders. This type of outreach program is transferable to other classroom settings.
City of Dover: Cocheco Waterfront Development, Dover, NH Contact: Steve Bird, City Planner, City of Dover Email: S.Bird@dover.nh.gov Contact: Robert Roseen Email: rroseen@waterstone-eng.com	This phased project involved a mixed-use development of multiple stories with an architectural character and quality to conform to the appearance of surrounding downtown Dover buildings. The site consists of a 29-acre parcel with over a half mile of frontage along the Cocheco River on its westerly and northerly boundary with approximately 14.5 acres suitable for development. Project design considerations include naturalized shoreline and park space and developed areas planning for 2100 projections for sea level rise and the resultant 100-year flood plain. The project involves several key elements including shoreland blended with a city park and boat house,

	and a combination of residential and commercial properties intended to create an attractive neighborhood and park space.
Coastal Resilience: Building Capacity for Resilience of Human and Natural Communities in New Hampshire Dune Systems Contact: Alyson Eberhardt, NH Sea Grant Email: alyson.eberhardt@unh.edu	The coastal communities of Hampton and Seabrook are increasingly vulnerable to climate-driven threats such as erosion, storm surge, and sea level rise. Sand dunes play an important role in buffering the coastline from erosion and flooding; however, use and development of the dunes has resulted in the current dune extent constituting a small fraction (16%) of the historic extent. The dunes that remain face continued pressure from storm surge, dune die-off, and trampling of beach grass by users of the area. In 2015-2016, a community based restoration effort supported by the NH Coastal Program was initiated. Building on the successes and lessons learned from that project, the second phase expanded restoration and planning efforts to identify and address existing vulnerabilities in the communities.
Coastal Resilience: Building Resilience to Flooding and Climate Change in the Moonlight Brook Watershed of Newmarket Contact: Robert Roseen Email: rroseen@waterstone-eng.com	Moonlight Brook is an important tributary of the Lamprey River drainage basin. Several flood resiliency and risk studies have been performed in the Lamprey River watershed including the Moonlight Brook subwatershed. The project team is conducting a two part effort to: 1) to study flood risk associated with climate change as well as how future development and build out of the community affect these risks, and 2) design robust green infrastructure practices within the Moonlight Brook watershed to help reduce risk of flooding while reducing pollutant load into the Brook and further downstream into the Lamprey River and ultimately Great Bay.
Coastal Resilience: Communicating Flood Risk with the FEMA High Water Mark Initiative Contact: Julie LaBranche, Rockingham Planning Commission Email: jlabranche@rpc-nh.org	The High Water Mark (HWM) Initiative is a community-based project whereby municipalities design, coordinate and implement a HWM project which involves: 1) install a sign/marker in a highly visible location, accessible to the public, that shows the elevation of past flood events and future projected sea-level rise; and 2) identify climate change adaptation actions the municipality can implement. The Rockingham Planning Commission is working with Portsmouth, Rye, Hampton, and Seabrook and other key stakeholders, including FEMA and state agencies, to install at least one and no more than two high water markers in each municipality.
Coastal Resilience: Implementing Phase I of the Lubberland Creek Culvert Restoration Contact: Pete Steckler, The Nature Conservancy Email: psteckler@tnc.org	Culvert replacement at the Bay Road crossing of Lubberland Creek in Newmarket achieves three primary goals: (1) restoration of aquatic connectivity at the system's tidal/freshwater interface allowing diadromous fish passage at the perched Bay Road culvert, (2) enhancement of the resilience of Lubberland Creek salt marsh by removal of the existing tidal restriction at Bay Road with a structure that allows upstream salt marsh migration as sea levels continue to rise, and (3) remediation of the flood hazard of this road-stream crossing, which overtops during major flood events and thereby compromises public safety.
Cutts Cove Restoration Project Contact: David Burdick, UNH Email: dburdick@cisunix.unh.edu	The Cutts Cove Shoreline Restoration Project will restore shoreline that was filled and armored with rip-rap up to 12 feet above MTH. The entire right of way adjacent to Market Street Extension is vacant; with plans to create a city park landward of the restoration area. Our project will restore the hardened shoreline into a living shoreline, creating tidal buffer zone, intertidal marsh, and a short (18-20 inch) sill of repurposed stone from the rip-rap wall.
Town of Durham Flood Overlay District Strafford Regional Planning Commission Contact: Kyle Pimental, Senior Regional Planner Email: kpimental@strafford.org	Develop a draft extended coastal flood hazard overlay district for the Town of Durham. Work with the Durham Leadership Team to develop an extended coastal flood hazard overlay district, which would apply higher standards for building freeboard height and other provisions to lessen vulnerability of new buildings and facilities to flooding due to sea level rise. This effort would build off past and existing efforts, including the Durham Climate Adaptation Chapter and the C-RiSe vulnerability assessment.
Town of Lee Floodplain Mapping Strafford Regional Planning Commission Contact: Kyle Pimental, Senior Regional Planner Email: kpimental@strafford.org	Work with the Lee Conservation Commission, Emergency Management Director and the Planning and Zoning Department to produce a series of maps based on the new floodplain data produced by the Assessing Flood Risk in the Lamprey River Watershed project (see description above).
Resilient NH Coasts: Hampton-Seabrook Estuary Technical Assistance Contact: Amanda Stone, UNH Cooperative Extension Email: amanda.stone@unh.edu	Recognizing their connection through the Hampton-Seabrook Estuary towns, including Hampton Falls worked together to collaborate in addressing the issues and impacts of climate change. UNH Cooperative Extension-NROC coordinated and facilitated a series of five "Preparing for Climate Change" workshops for community members in the three towns, working closely with a steering committee comprised of members of the Seabrook-Hamptons Estuary Alliance (SHEA). The sequence of workshops was created in response to local interests and concerns expressed at each subsequent workshop and included one workshop focused on how sea level rise will affect salt marshes using Fish & Game's Sea Level Affecting March Migration results.
New Hampshire Setting SAIL: Acting on the Coastal Risk and Hazards Commission, Science, Assessment, Implementation, and Legislation Recommendations ("NH Setting SAIL") Rockingham Planning Commission Contact: Julie LaBranche, Senior Planner Email: jlbranche@rpc-nh.org Strafford Regional Planning Commission Contact: Kyle Pimental, Senior Regional Planner Email: kpimental@strafford.org	This project seeks to implement the New Hampshire Coastal Risk and Hazards Commission's (CRHC) final recommendations at state and local levels. The project is divided into three tracks: 1) strategically designed outreach to state agencies and municipalities about the CRHC recommendations; 2) technical assistance to implement municipal projects; and 3) a coordinated effort to ensure that state agencies identify their vulnerable assets and necessary policy changes to improve preparedness. Together, these tracks will ensure that the CRHC's recommendations move forward and that coastal New Hampshire takes key steps toward becoming more resilient in the face of climate change.