NALCC Demonstration Project Title: Integrating Science into Policy: Local Adaptation for Marsh Migration

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NALCC Funds Requested: $20,000 to extend the reach of this project to additional local partners. Funds will be used for technical assistance delivery to municipal governments and local land trusts.

Description of the Proposed Project: Coastal marshes serve a variety of important functions including flood control and spawning/rearing areas for marine life. These marsh systems are also critical breeding, wintering, and migratory stop-over sites for many avian Species of Greatest Conservation Need as identified in state wildlife action plans throughout the North Atlantic LCC region. The providing and maintaining potential for these tidal marsh habitats to migrate is a key approach for long-term adaptation to the more frequent and severe coastal flooding and gradual sea level rise anticipated under changing climatic conditions.

Work proposed under this NALCC Demonstration Project includes identification of the most resilient marshes in Maine (based on habitat size, diversity of marsh communities present, and migration potential, etc.); utilization of LiDAR to identify lands capable of supporting intertidal communities based on several sea level rise scenarios; and development of outreach materials for local planners and conservation partners. However, the focus of the project will be facilitating local actions necessary to accommodate future marsh migration needs though local land use policy and local conservation investment.

Local partners will be engaged initially through regional meetings where climate change associated stressors to intertidal wetlands will be presented together with simulations of marsh migration needs based on ground-truthed, LiDAR-based simulations. A subsequent request for proposals will be issues to coastal localities and land trusts enabling potential partners to self-select for on-site technical assistance in crafting locally tailored adaptation approaches. Each approach will be documented as case studies for distribution to the LCC community.

a.   **In what area or state(s) will your project be conducted?**   This project will address the most significant tidal marshes in Maine including York, Cumberland, Sagadahoc, Lincoln, Knox, Waldo, Hancock, and Washington Counties. Shoreline change and inundation models have already been completed for southern and mid-coast Maine (Kittery to Georgetown). LiDAR has been acquired for remaining portions of the coast and is currently being processed.

b.   **What is the start date of the project and the projected end date?** The activities under the NALCC Demonstration Project will commence in July 2012 and continue through December 2013. The initial phase will include identifying and developing data and mapping tools for defining and assessing marsh vulnerability. Initial outreach efforts will commence in the fall of 2012. Hands on technical assistance and development of local adaptation strategies will occur starting May 2013.

c.   **What is the goal of your project and what major objectives or tasks will you undertake to achieve that goal?**
The primary goal of this project is to engage several (3-5) partner municipalities and local land trusts in developing adaptation strategies that protect the ability of coastal wetlands to migrate inland; or in the case of fringing marshes, continue to receive sediment necessary for elevational build up with sea level rise.

Project partners will complete localized ground-truthing of LiDAR data with respect to field surveyed marsh elevations. This data will then be used in association with existing land cover and terrestrial elevation data to determine areas most likely to support future marsh habitat. Outreach materials including updated assessments of tidal marsh economic benefits, ecosystem services, and vulnerabilities to climate change will be created specific to coastal Maine settings. Multiple public presentations will be held to cover various coastal regions in hopes of inspiring local communities to respond to a request for proposals. Once the request for proposals is issued, respondents will be selected based on readiness, local tidal wetland resources present, and opportunities to significantly address adaptation needs. Project partners will work directly with selected boards and committees to identify potential adaptation strategies, weigh costs and benefits, and ultimately arrive at recommended approaches for citizen or membership approval. It is hoped that these approaches will be readily transferrable to other coastal communities and conservation partners that are considering adaptation planning approaches. Project partners will conclude this project by developing case studies that summarize how science was applied successfully to inform local decisions; identify gaps in science and the ability to translate it for local application; and summarize lessons learned that can be transferred to other LCC science implementation scenarios.

d.   **What are the methods by which you propose to carry out your work?**
Initially, project partners will complete LiDAR mapping of the entire coast, map highest annual tide elevations, existing coastal wetlands of 5 or more acres, and undeveloped coastal uplands and freshwater wetland communities capable of receiving migrating marshes under 0.6, 1 and 1.8 meter sea level rise scenarios.   Results of this effort will be incorporated into the existing Beginning with Habitat map package (provided for each coastal community and land trust) and supporting outreach materials explaining data and its use will be crafted.   Project partners will form a working group to select willing local partners identified through the request for proposal process. The Coastal Adaptation to Sea level rise Tool (COAST) will be utilized to assist selected communities in determining the economic impact of various adaptive approaches. This tool

incorporates a 3D visualization model to help assess avoided costs associated with alternative approaches to sea level rise adaptation. Local decision making processes will be facilitated, but not driven by project partners. Alternatively, project partners will assist by bringing the latest science and translation tools to the table allowing local decision makers to focus on finding solutions that best fit local needs.

Applicable NALCC Science that will inform our approach to selecting local partners and identifying approaches to adaptation include: Anderson's Resilient Sites for Terrestrial Conservation in the Northeast and Mid-Atlantic Region to screen prioritized marsh migration areas against projected long-term resiliency measures; and McGarigal and Compton's Designing Sustainable Landscapes in the North Atlantic Landscape Conservation Cooperative to verify that prioritized sites have capacity to respond to needs of representative species.

e. What measurable products or outcomes will result from your project?
Short term: Coastal communities have the data and assistance they need to assess likely marsh migration and to develop adaptation strategies that address their unique situations. This data will be added to the well-recognized Beginning with Habitat program's outreach package, and will be available on-line.

Mid-term: Coastal communities understand the economic and resource values of coastal marshes and the economic impacts of not planning for their ability to migrate in response to predicted sea level rise. Through wider use and resulting refinement of the COAST tool, this technology will become increasingly accessible and accepted by local planners.

Long term: Coastal communities take action to address coastal marsh migration through changes in local policies, plans, and programs. These actions will be captured in case studies to assist other coastal communities throughout Maine and other NALCC coastal zones.

Products:

~ Completion of spatial datasets that include the potential impacts to coastal wetlands from climate variability for the mid and downeast coastlines as a complement to those already developed for southern Maine. These spatial datasets will be the basis for determining local and regional adaptation approaches and developed based on multiple sea level rise scenarios.
~ Preparation and dissemination of outreach materials and case studies for local decision makers including analyses of economic implications of future conditions under a "no-action" scenario.
~ Increased visibility for the potential impacts of climate variability on marsh systems, given that efforts to date have focused on Maine's sandy beach shorelines.
~ Engagement of three to five partner communities to develop adaptation strategies that protect the ability of coastal wetlands to migrate, or in the case of fringing marshes, continue to receive sediment necessary for elevation build up to keep pace with future shoreline positions.
~ Development of specific, transferrable language that allows coastal communities the flexibility to conserve potential future coastal wetlands using the techniques most pertinent and acceptable to each community.

~ Advancement in the progress towards resiliency and adaptation in a larger number of Maine coastal towns (i.e. those not selected for in-depth work) through outreach efforts.
~ Foster the knowledge and experience of other coastal states through information dissemination.

f. Budget

Completion of SLR Scenarios	$74,595
Outreach and Education Strategy	$6,150
Workshops and Trainings	$30,044
Focused Municipal Technical Assistance	$89,600*
Land Trust Assistance	$10,000*
Total	**$210,389**

* tasks to be supported by NALCC contribution

g. Qualifications of Principal Investigators

Steve Walker, MDIFW Beginning with Habitat Program Coordinator
Steve has served as program coordinator since 2006. Prior to taking this position, Mr. Walker served as the Natural Resources Planner for the Town of Brunswick and was principally involved in the crafting of town planning tools and documents including the Rural Brunswick Smart Growth Plan and Brunswick Parks Recreation and Open Space Plan. Mr. Walker also has many years of experience as a private land use consultant coordinating the permitting of large and small-scale developments throughout the northeast. Mr. Walker has a B.A. in Environmental Studies from Brown University and a B.S. in Wildlife from University of Maine. Currently Mr. Walker is Vice President of his local land trust and a member of his local planning board.

Elizabeth Hertz, Senior Planner, Maine Coastal Program
Ms. Hertz currently directs the Land Use Team who coordinates state level review of municipal compliance with Maine's Growth Management Act including review and approval of local comprehensive plans and ordinance updates. Her recent projects have included the GIS-based wetlands characterization and serving as the Chair of the Beginning with Habitat Steering Committee. Elizabeth has a masters in remote sensing from the University of Michigan and prior to working at SPO she worked at the Maine DEP, International Paper and at the USGS Eros Data Center.

Peter Slovinsky, Marine Geologist, Maine Geological Survey, Department of Agriculture, Conservation, and Forestry
Mr. Slovinsky's work focuses on coastal hazards, developing vulnerability assessments for the built and natural environments to sea level rise and storm surge, and community-level engagement for adaptation strategy development. He was a NOAA Coastal Management Fellow and holds a M.S. in Geological Sciences from the University of South Carolina and a B.A. from Franklin and Marshall College.

Don Cameron, Botanist - Maine Natural Areas Program
Don's responsibilities include managing Maine's official list of Threatened and Endangered plants, monitoring federally listed plant species, conducting field inventories for rare plants and

exemplary natural habitats, addressing issues related to invasive species, and contributing to conservation planning initiatives. Recent projects include an investigation of the potential for tidal marsh migration in south coastal Maine, ecological inventory of the central and western mountain regions of Maine, and research on the globally rare plant Furbish's lousewort. Don has conducted field surveys throughout Maine and is considered one of state's leading botanists. Prior to joining MNAP in 1998 Don was Coordinator of the County Natural Areas Inventories Program for the Pennsylvania Science Office of The Nature Conservancy. Don holds an MS degree in Plant Ecology from the State University of New York College of Environmental Science and Forestry, and a BA in English from Temple University.