

**Building Our National Capacity to Protect Coastal Wetland
Migration Pathways: *Assessing Stakeholder Needs and Creating
Transferable Communications Tools***



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1. BACKGROUND AND INTRODUCTION

The Problem and Need for Project

Coastal Wetlands Existential Challenge: Coastal wetlands provide essential ecosystem services including blue carbon sequestration, storm buffering, fisheries production, wildlife habitat, and water quality enhancement. These wetlands are at significant risk from the impacts of climate change, compounded by shore zone and floodplain development, erosion, and shoreline hardening. Many coastal wetlands are rapidly changing or disappearing as sea-level rise accelerates and storms intensify. Most coastal managers now recognize the need for a multi-pronged approach to foster marsh resilience, adaptation, and transformation to ensure long-term persistence of these habitats. **One key element of this is the protection of pathways at the right elevations to support upslope migration of coastal wetlands as sea levels rise and Great Lakes water levels change.**

Need to Support NERRS Engagement on Pathway Protection: Most of the 29 sites in the National Estuarine Research Reserve System (NERRS) are at the front lines of the climate crisis – experiencing changes and disasters alongside their community neighbors – and 83% have experienced moderate to catastrophic climate impacts in the last decade. Nearly all NERRS sites (90%) recently indicated that fostering coastal wetland resilience is an important priority. NERRS sites are engaged in tracking and understanding coastal wetland changes, piloting and studying adaptive management techniques, fostering marsh migration, educating and learning from vulnerable communities, and training and informing leaders, managers, and practitioners about best practices and needed actions. Because the NERRS are seen as trusted partners and leaders in collaboration, demand is high for NERRS information about coastal wetlands from land managers, planners, floodplain specialists, regulators, land trusts, and others.

Need for Location of Coastal Wetland Pathways: In a 2019 survey conducted as part of the NOAA-funded NERRS project *Aligning for Impact: Harnessing NERRS Capacity to Strengthen Tidal Wetland Resilience*, nearly half the 29 reserves indicated that access to digital maps of the location of coastal wetland migration pathways would help them further their impact on coastal wetlands resilience. The foremost need is to identify pathway protection challenges and opportunities to protect the future of coastal wetlands within the NERRS, which include 1.4 million acres. However, most reserves are routinely working well beyond their boundaries at the scale of sub-state regions, statewide, multi-state, national, and even trans-national. Many would play a role in promoting pathway protection beyond their boundaries if tools were available.

Need to Understand User Needs for Migration Pathway Digital Tools: The rubber meets the road in the hands of the users of tools and information, and we know little about user preferences, needs, and desires for mapping information related to coastal wetland pathway protection. This is essential information for making investments in mapping and to stimulate the use of coastal wetland pathway protection information in decision-making related to planning, land acquisition, stewardship, land management, policy, and regulation.

Need to Compare and Seek to Align Wetland Migration Pathway Mapping Approaches: In order for the NERRS to serve as places where climate adaptation is advanced in collaboration with a multitude of partners, it is essential that consistent, scientifically reliable mapping tools are

available from which to build transferable applications, user guidance, training products, and communications tools. Currently a variety of approaches are being used in the U.S. to model and map migration pathways for coastal wetlands, ranging from straightforward “bathtub” digital elevation models to more sophisticated deterministic models, such as Sea Level Affecting Marsh Migration (SLAMM), which project land cover based on a combination of metrics such as elevation, slope, tide ranges, accretion, and erosion. The models vary in geographic scope, subject focus, time and time-steps, climate change scenarios, units of analysis, source of wetlands data, accretion models used, and elevation data. There is a need to understand and compare approaches, build consensus around best practices, and assess the potential for national standardization so that users can trust the quality of and better understand the resulting data, and in time build in socio-economic and other data.

2. GOALS AND OBJECTIVES

Goal 1: Characterize the needs for coastal wetland migration pathway information in decision-making related to planning, land acquisition, stewardship, land management, and regulation, and identify preferred tools and communication approaches.

Objective 1.1. By April 2021, NERRA and Digital Coast partners will characterize the needs of members of target audience groups for wetland migration pathway-related communication, data and tools.

Objective 1.2. By June 2022, NERRS, NERRA and Digital Coast partners will have communications products that have been piloted and refined at 4-6 NERRS sites and developed so that they may be transferred to other reserves for use, and potentially to other Digital Coast member groups such as ASFP, NACo, APA, TNC, and CSO; communication products will be tailored for use with Office for Coastal Management (OCM) wetland pathway maps generated for 15 reserve sites.

Goal 2: Support NOAA OCM and other Digital Coast partners in the development of best available wetland pathway data and tools to meet the needs of decision-makers.

Objective 2.1. By December 2020, NERRA and other Digital Coast partners will gain insight from experts in wetland migration pathway mapping who assemble for a 1.5 to 2-day workshop to compare wetland migration pathway mapping approaches and discuss opportunities to standardize and align these.

Objective 2.2. By January 2021, NOAA and other Digital Coast partners will gain access to a list of digital data sources of wetland pathways and summary information about these sources for the 15 reserves who have interest in wetland migration pathway data.

Objective 2.3. By October 2021, NERRA and other Digital Coast partners will share findings with experts in wetland migration pathway mapping about the needs and preferences of key decision-makers, stakeholders and users of wetland pathway mapping information and discuss opportunities to improve mapping tools and resources.

3. OUTCOMES AND MILESTONES

1. The fellow has a rewarding, enriching, and enjoyable experience working on this project and develops process, technical, communication, and leadership skills, subject matter expertise, professional contacts, and knowledge of a wide variety of settings for future potential work.
2. The fellow understands the real-world policy implications of protecting wetland pathways, and is able to competently communicate about how the work is important to making our coasts resilient, as well as its role in addressing climate change.
3. The fellow has improved understanding of decision-making at all levels of government and the role nonprofit groups play in helping shape public policy related to wetland protection.
4. The needs of potential users of wetlands pathway maps are better understood, resulting in better tailoring of products and training to those needs and more successful pathway protection.
5. NERRS sites are using mapping and communications products to promote wetland pathway protection and resilience of at NERRS sites and outside reserve geographic boundaries.
6. Digital Coast partners and their members understand user needs, and these inform adaptive processes of a) developing the OCM wetland pathway maps and b) steering a community of practitioners who also develop wetland pathway maps.
7. Digital Coast partner members and other mapping experts have improved their members' local and state capacity by having needed information that results in improved and better aligned wetlands pathway mapping.
8. Digital Coast partners and their members have the tools to communicate about coastal wetland pathway mapping tools and best practices to decision makers who have the authority to protect and restore coastal wetlands.

Milestones and Timeline

August-December 2020: Workshop on coastal wetland mapping approaches planned and held.

September 2020: First meeting of the steering committee to review detailed work plan and guide needs assessment. Coordination with OCM on NERR wetland migration pathway mapping.

October 2020: Attend the National Coastal and Estuarine Summit in Providence, RI.

November 2020: Travel to NERRS/NERRA annual meeting to solicit feedback on approach for assessment of stakeholder needs for pathways mapping, information, and communications. Follow-up consultation with CTP coordinators and others as needed on a draft conceptual map of migration pathway decisions and decision-makers.

December 2020-February 2021: Needs assessment designed and conducted. Periodic coordination with OCM on NERRS wetland migration pathway mapping products.

January 2021: List of digital data sources of wetland pathways and summary information about these sources completed for the 15 reserves interested in wetland migration pathway data.

March 2021: Steering committee meets to discuss needs assessment draft findings, status of OCM mapping products, and approach for 2nd wetland pathway mapping workshop.

April 2021: Assessment of stakeholder needs complete and results conveyed to NERRS, NOAA and other Digital Coast partners via webinar and needs assessment summary.

May-October 2021: Local and regional wetland pathway protection communications products drafted in coordination with NERRS Coastal Training Program Coordinators (CTP) coordinators and project steering committee.

August-October 2021: Possible follow-up workshop on coastal wetland migration mapping.

November 2021: Travel to NERRS/NERRA annual meeting; opportunity to solicit feedback in session on draft local and regional communications products and OCM mapping products. Meeting with Digital Coast partners to review communications products.

December 2021: Roll-out plan developed in concert with OCM and CTP coordinators for completed OCM maps.

December 2021-May 2022: Communications products piloted and refined at multiple reserves.

June 2022: Suite of local communications products are completed, distributed and shared with NERRS, NERRA and Digital Coast partners to assess scalability and transferability.

July 2022: Wrap-up meetings with Steering Committee and other Digital Coast partners regarding next steps and emerging needs. Recommendations for Digital Coast platform changes and for communicating about wetland migration pathway protection locally and at multiple scales are summarized in a report.

4. PROJECT DESCRIPTION

This project has its origins in the long-term, strong, and pervasive interest and investment of the NERRS in coastal wetland resilience activities. All NERRS program sectors are engaged in promoting coastal wetlands resilience in a variety of ways. NERRS sites are considered leaders in collaboration working with numerous partners who are also focused on making our coastal communities more resilient to climate change.

This project also arose from the draft recommendations of the *Aligning for Impact: Harnessing NERRS Capacity to Strengthen Tidal Wetland Resilience* project. In the project's 2019 NERRS survey, 13 reserves indicated that knowing the location of coastal wetland migration pathways would help them further their reserve's impact on coastal wetland resilience to climate change; two other reserves indicated a desire for parcel-level data for wetland migration pathways. In addition, over half the 29 reserves desired guidance on how best to frame communication about coastal wetland resilience, including wetland advancement.

This project will add substantial value to NERRA and the NERRS because decision makers at all levels of government, as well as non-profits, who are grappling with climate change, will have better scientifically based information from which to form a basis for decisions. In addition, based on professional judgement and extensive work with partners, there is reason to believe that this information would also be of value to the majority of Digital Coast Partners--all of whom have indicated that furthering resiliency and expanding the local capacity is a priority for their members. In addition, many of them have represented that improving available tools and training and increasing long term tool usage around resilience is a priority for their members as well (Ballard, *Partner Identified Common Goals and Capacity*, 2018)

The work of the Digital Coast Fellow will consist of 6 parts that are generally sequential:

1. Learn about wetlands migration mapping and explore existing resources.
2. Support the planning and convening of mapping experts' workshops.
3. Assess needs of stakeholders and intended users of wetland pathway mapping resources
4. Develop a communications plan and products.

5. Pilot and evaluate communication tools with NERRS sites and Digital Coast partners in concert with OCM pathway maps at selected reserve sites.
6. Finalize work products and articulate perceived needs for next set of actions to advance wetland migration pathway protection.

The mentor team and project advisory committee (both described below) will provide overarching guidance and direction for the project.

1. Learn about wetlands migration mapping and explore existing resources

The fellow will begin by becoming familiar with the OCM mapping efforts and how to navigate the mapping data. The fellow will then explore current published literature, NERRS Coastal Training Program needs assessment reports, and other relevant background information to characterize the kinds of decisions and decision makers influencing coastal wetland migration pathway protection, as well as the kinds of tools and communication products being used. In addition, the fellow will work with OCM Digital Coast staff and users of the Digital Coast marsh migration tab of the Sea Level Rise viewer or other related tools in order to identify any needs or challenges. The fellow will also develop a list of digital data sources of wetland pathways and summary information about these sources for the 15 reserves interested in wetland migration pathway data. Some of this information was collected in the 2019 NERRS survey. This list will be provided to OCM scientist, Nate Herold, and his team for use and/or context in developing wetland migration pathway mapping resources for the 15 reserves.

2. Support planning and convening of mapping experts' workshops

The fellow will work with Digital Coast partner members and other adaptation professionals in 2020 to plan and organize an initial working meeting to bring together professionals who map projected wetland migration pathways. The workshop purpose is to assemble experts to compare approaches, rationales, data inputs, scale and other factors that impact usability and accuracy, and to explore the potential for standardization or agreement on common approaches or standards. The fellow will assist with the planning and organization of a follow-up workshop a year later for the purpose of sharing the findings about the needs and preferences of the chief decision-maker audiences for this information, as well as to advance discussions about standardization and/or alignment. The fellow will work with NERRA to communicate the state of information and community needs with congressional and local decision makers.

3. Assess mapping, information, and communication needs of stakeholders and intended users of wetland pathway mapping resources

The fellow will work with NERRS coastal training coordinators and other staff and Digital Coast partners (and/or partner members) to identify and prioritize the kinds of decisions and decision-makers to focus on in the needs assessment. They will develop a conceptual map of opportunities to inform pathway protection-related decisions and use it to identify several decision-maker categories to focus on for the needs assessment. Two examples of decision-maker categories are county planners involved in the FEMA Community Rating System program (related decision could be whether to insert pathway protection into CRS planning) and land trust directors (related decision could be whether to acquire wetland pathway lands).

The fellow will develop a representative set of contacts for the decision-maker needs assessment with input from participating reserves, ideally all 15 reserve sites. The fellow will develop and implement a sampling protocol, likely a set of up to 60 semi-structured interviews,

although for larger numbers an online survey instrument may be designed and used in addition to or in lieu of the interviews. The fellow will ask respondents to characterize their technical capacity and any limitations, GIS system requirements, preferred products, and other relevant details. Results will be summarized in a report and communicated to NERRS, Digital Coast partners, and other mapping experts. Information about the utility of existing Digital Coast tools will be highlighted for OCM and partners to use as soon as possible.

4. Develop a communications plan and products

The communication plan will guide the development and implementation of communications messages, products, and strategies to support the objectives of this project. “Communications,” refers to the suite of activities, messages, and products used to engage primary audiences with this project and its results. The plan will be based on meetings with the project team, input from the project advisory committee, and input from the needs assessment of stakeholders. Products will be developed so as to have multiple uses, with provision for addressing the needs of different audiences through the substitution of audience-specific sections. The primary audience can be broadly defined as decision makers at all levels of government, in non-governmental organizations, and others in the private sector who have the ability to act on policies and decisions that pertain to the protection of coastal wetland migration pathways.

5. Pilot and evaluate communication tools in concert with OCM wetland pathway mapping at selected reserve sites

A subset of four to six reserves will be selected in the third quarter of 2021 to pilot the draft communications tools/products with stakeholders and decision-makers. The fellow, with support from the project team and advisory committee, will develop a set of criteria for selection of piloting reserves. Considerable weight will likely be given to actively participating reserves and those with clear pairings of relevant pending decisions and reachable decision-makers. The fellow will work with involved OCM staff and CTP coordinators on a roll-out plan for completed OCM maps. In addition, the fellow will work with NERRA to augment the communication of map completion more broadly at the federal level. The fellow will develop a means to evaluate the communication tools/products being piloted at reserve sites in consultation with host reserves, project team and the advisory committee.

6. Finalize work products and articulate perceived needs for next set of actions to advance wetland migration pathway protection

The fellow will finalize work products for addition to NERRA’s on-line repository, and prepare a brief project summary that identifies emerging issues and next steps for future work.

5. FELLOW MENTORING

This project is structured to provide a rich, cohesive and rewarding professional experience for the fellow who we expect will complete the fellowship with subject matter expertise, professional contacts, science to management communication skills, greater understanding of real world decision- and policy-making processes at federal, state and local government levels, knowledge of a wide variety of settings for future potential work, and process, technical, and leadership skills.

Host Site: The fellow will be based at the Narragansett Bay NERR (NBNERR) headquarters on Prudence Island, Rhode Island, and will also spend a considerable amount of time at the reserve’s Providence office. Narragansett Bay staff are widely regarded as leaders within the

NERRS and are actively engaged in coastal wetland resilience-related research, stewardship projects, outreach and training for decision-makers, and education. The reserve will also be welcoming a NERRS Davidson Fellow in 2020, who, together with the Digital Coast fellow would comprise a small cohort, which may create cross-training opportunities and other benefits.

Project Team: The lead on-site mentor and supervisor will be Jennifer (Jen) West, the NBNERR Coastal Training Program Coordinator. Jen has held her position since 2005, playing a leadership role in connecting NERRS science to decision-making, providing training on a wide variety of topics, and working with a wide range of people. In particular, Jen has fostered collaborative working relationships and contacts with a host of communities in the region as well as many others in the state, academic, and nonprofit arenas. Jen's warmth, intelligence, and strong interest in this project make her an ideal lead mentor. Bob Stankelis, Reserve Director, will be a co-mentor and project participant. Bob is recognized for his environmental and public policy expertise and is keenly interested in this project and in ensuring a successful fellow experience. Betsy Blair, PI of the Aligning for Impact project and former NERR manager, will serve as co-mentor working closely with the project team. Betsy is passionate about supporting early career professional development and fostering leadership development. Rebecca Roth, Executive Director of NERRA, will also play an important mentoring role linked to the non-profit and advocacy realms. Rebecca has wide-ranging expertise, including a land use planning background and experience working with local decision makers, as well as a long track record of communicating science to policy makers and the public. She has a strong commitment to fostering the next generation of coastal leaders.

Communications Plan: Day-to-day communication will occur in person at the NBNERR and by phone and email as needed. The team will maintain regular communication through weekly video conferences and periodic in-person meetings in order to provide project direction and support, including guidance on adaptive management, timing of coordination with Digital Coast partners and other NERRS sites, and completion of project tasks.

Advisory Committee: An advisory committee will be established to provide additional project support and direction, and to promote successful coordination with OCM staff, key Digital Coast partners, an advisory committee will be established of 8-10 highly engaged advisors, including NERRA executive director Rebecca Roth; Nate Herold, a physical scientist and program lead for OCM; other OCM and Digital Coast Partners; selected NERRS staff with relevant expertise and strong interest; and other wetland migration pathway mapping and outreach professionals, for instance Adam Whelchel from the Connecticut Nature Conservancy.

On-the-job Education: The fellow will be oriented to the reserve site and its programming, learn about the reserve's coastal wetland stewardship and research initiatives, attend a variety of training and education programs, learn about communicating science to management, and learn about the NERRS program. Depending on interest, the fellow will be afforded the opportunity to develop skills in GIS, facilitation, strategic planning, and program evaluation. The project will expose the fellow to decision makers at local and national levels, at other NERRS sites, and in Digital Coast organizations. The fellow will also be exposed to how a national non-profit organization (NERRA) works to communicate and educate around environmental issues. The fellow will be invited to present to the NERRA Executive Committee, the NERRA Fall Board Meetings, and at the NERRS/NERRA annual meeting. They will be encouraged to design and lead a panel session for Social Coast 2022 focused on this topic, and work with the NERRA

and a communication support contractor to ensure that key results are incorporated into NERRA communication strategies. The fellow will also be encouraged to attend the National Coastal and Estuarine Summit in October, 2020 in Providence, RI, in addition to the Coastal GeoTools, Social Coast Forum, and up to two Digital Coast partnership meetings.

6. PROJECT PARTNERS

Beyond the Narragansett Bay Reserve, the project will involve up to 14 other research reserves that indicated in a 2019 survey that information about coastal wetland migration pathways would enable them to engage directly and with more impact on protection of coastal wetland pathways. These partner reserves will be part of the advisory committee. Because the partner reserves are geographically dispersed with different physical, biological, social, and political landscapes, they will expose the fellow to stewardship and coastal management from different perspectives. NERRA intends for the fellow to interact with the OCM's technology staff throughout the fellowship. Researchers at the University of Rhode Island were recently funded to map migration pathways and are interested in collaborating with this project.

7. COST SHARE DESCRIPTION

NERRA will provide the \$15,000 non-federal cash match required for this fellowship. The Narragansett Bay NERR will donate working space at the reserve and the associated supplies and utilities, including internet and phone. If needed, NERRA will provide a laptop computer. Travel to selected other reserve locations in the northeast will occur and mileage for that travel will be reimbursed by NERRA. In addition, NERRA will cover travel costs for the fellow to attend the NERRS annual meetings in 2020 and 2021. These additional travel costs of approximately \$4,000 will be covered by NERRA.

8. STRATEGIC FOCUS AREAS ADDRESSED

Through its social science research on user needs and development and use of user-driven tools and communications, this project will foster coastal wetland pathway protection in service of the following Healthy Coastal Ecosystems and Resilient Coastal Communities focus areas.

Under Healthy Coastal Ecosystems:

- Build innovative natural and social science research capacity, products, and applications that reflect user-driven science, and synthesize, visualize, communicate, and transfer research results to strengthen policies and decisions, and effectively manage coastal and ocean resources.
- Support coastal and ocean resource managers through cooperative funding, data, information, tools, training, technical assistance, analysis, and exchange of best practices to strengthen ecosystem policies, build capacity, and implement prioritized management efforts.
- Enable conservation and restoration of critical coastal ecosystems and habitat by integrating priorities and interests across agencies and partner organizations using geospatial applications to align interests, communicate priorities, and pool resources.

Under Resilient Coastal Communities:

- Foster user-driven science and assessment efforts to enhance understanding of natural, social, and economic impacts of coastal hazards and climate change, and the approaches needed to adapt to and communicate about these threats.