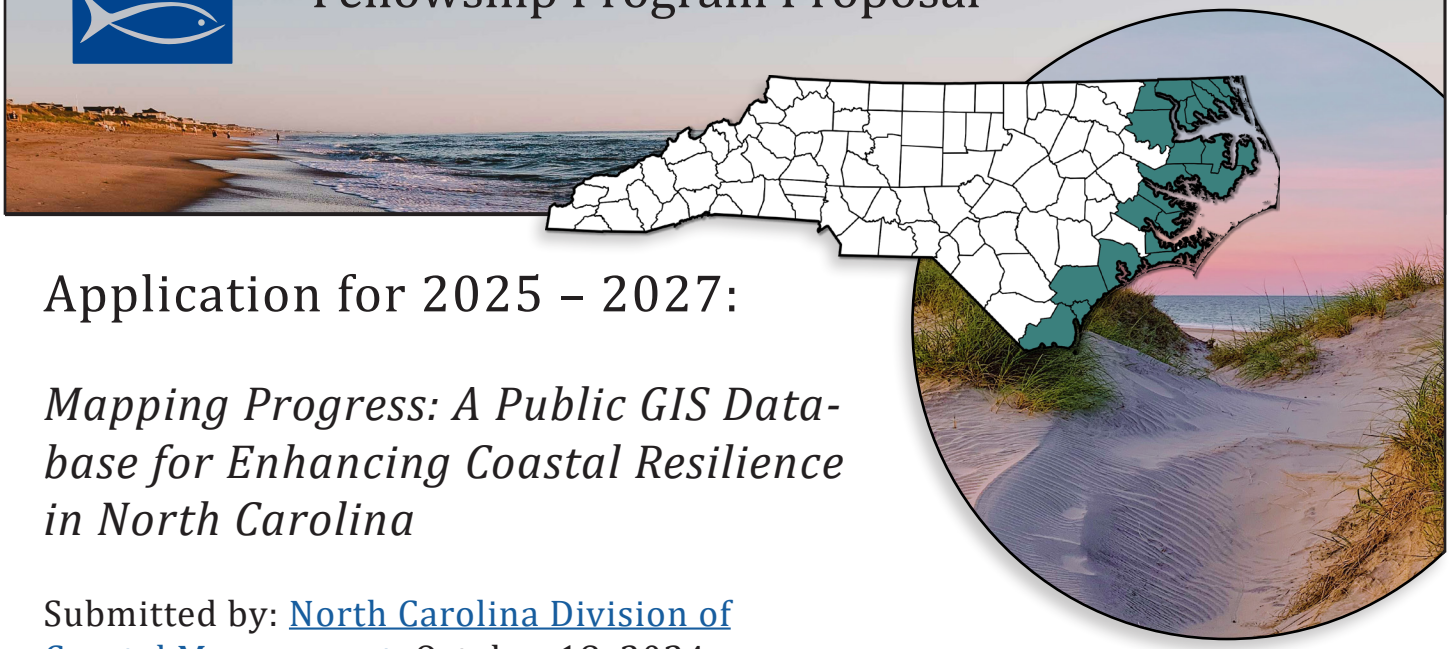
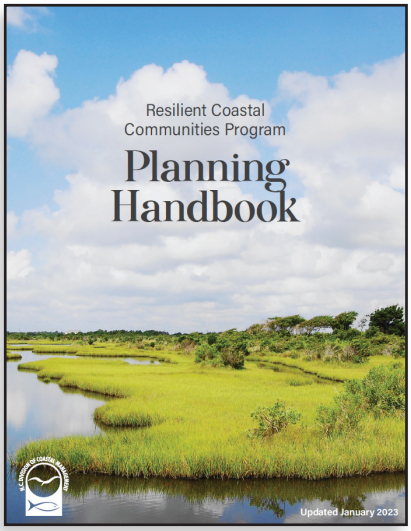
North Carolina Division of Coastal Management
NOAA Coastal Management and Digital Coast Fellowship Program Proposal

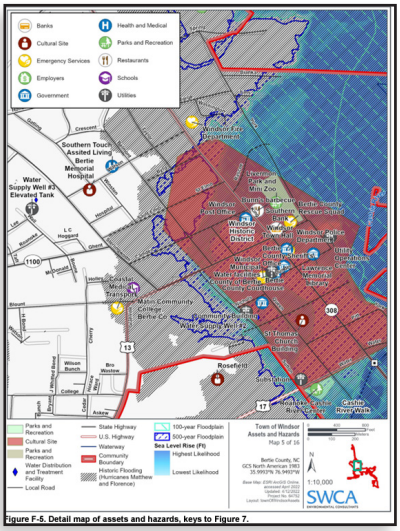


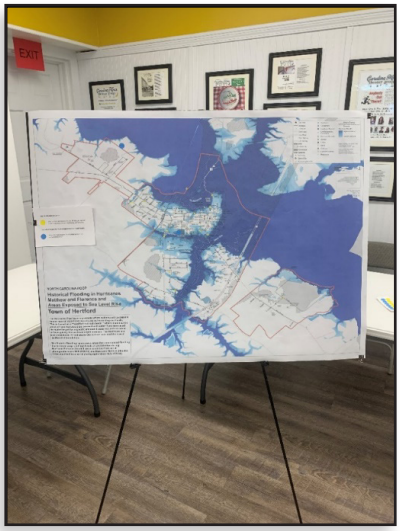
Application for 2025 – 2027:

Mapping Progress: A Public GIS Database for Enhancing Coastal Resilience in North Carolina

Submitted by: North Carolina Division of Coastal Management, October 18, 2024







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Background and Introduction

Web-based mapping, including geographic information systems (GIS), are essential components of coastal management and resilience. These tools enable users to explore data such as flood risk zones, shoreline erosion patterns, sea-level rise projections, and socioeconomic vulnerabilities. By visualizing this information, decision-makers, community planners, and the public can better assess risks, prioritize interventions, and develop strategies for safeguarding coastal communities.

However, many beneficial web-based GIS tools, like ArcGIS Online, remain inaccessible to local governments and the public due to subscription fees, specialized training, and access limitations. These barriers hinder community involvement and prevent local stakeholders from independently using crucial data for their planning and resilience efforts. While GIS software may not always be available, the data produced by coastal management programs—particularly from state and federal agencies—should be publicly accessible whenever feasible. User-friendly government websites offering open access to these datasets are essential for promoting inclusive decision-making and empowering communities to engage in localized resilience planning and respond to coastal hazards.

In North Carolina, the NOAA Coastal Management Fellowship has been pivotal in shaping the state's resilience planning efforts. From August 2016 to August 2018, the Division of Coastal Management (DCM) hosted Fellow Monica Gregory, who led the Resilience Evaluation & Needs Assessment (RENA), a pilot program exploring a cooperative, locally driven approach to coastal resilience. Monica engaged with five communities to gain a deeper understanding of their experiences with coastal hazards and utilized GIS mapping to provide an overview of where state and local resources could focus on mitigating future impacts from flooding, erosion, wind, and other hazards. Her efforts generated the framework for the North Carolina Resilient Coastal Communities Program (RCCP), which launched in 2020 with funding from the NC General Assembly and the National Fish & Wildlife Foundation. Monica's contributions were integral to shaping the initial planning phases of the RCCP, a program now leading resilience efforts across 20 coastal counties.

The RCCP facilitates a community-driven, GIS-supported process that builds local capacity for proactive, sustainable, and equitable coastal resilience planning. Program objectives include addressing barriers to coastal resilience at the local level, assisting communities with risk and vulnerability assessments, developing customized portfolios of well-planned and prioritized projects, advancing those projects to shovel-ready status, and linking participating communities to funding streams for project implementation. The program is organized into four distinct phases:

1. **Community Engagement and Risk & Vulnerability Assessment**: Phase 1 focuses on active public engagement and detailed risk and vulnerability assessments, leading to Resilience Strategies that establish a community's baseline for planning.
2. **Planning, Project Identification, and Prioritization**: Phase 2 employs a data-driven approach to identify and prioritize transformative actions addressing immediate and long-term coastal hazards, combining these actions into a comprehensive Project Portfolio for grant funding.

3. **Engineering and Design**: Phase 3 supports the detailed engineering and design of prioritized projects, ensuring readiness for permitting and implementation.
4. **Project Implementation**: Phase 4 provides competitive grants to communities that complete the previous phases, facilitating the execution of shovel-ready projects.

GIS technology plays a critical role in each phase of the RCCP. For instance, program participants utilize ArcGIS StoryMaps to enhance community engagement and identify local barriers to resilience. They also employ GIS spatial data for conducting assessments and georeferencing unique, prioritized, data-driven hazard mitigation projects. All data collected throughout the program are compiled into Phase 1 and 2 deliverables—the Resilience Strategies and Project Portfolios mentioned above.

To date, the RCCP has assisted 41 municipal and county governments in achieving their resilience goals. Throughout the program's existence, DCM has leveraged state funds to secure supplementary federal grants, ensuring adequate resources for resilience planning and project implementation. So far, the program has been supported by $12.5 million from the NC General Assembly, $4.6 million from the National Fish and Wildlife Foundation (NFWF), $60,000 from NOAA's Coastal Zone Management program, and $500,000 through a Housing and Urban Development Community Development Block Grant via the North Carolina Office of Recovery and Resiliency (NCORR).

This project seeks to establish an accessible GIS Hub dedicated to organizing, visualizing, and sharing resilience data from the RCCP. Selecting the North Carolina Division of Coastal Management (DCM) as a host for the NOAA Coastal Management or Digital Coast Fellowship program will offer the Fellow a unique opportunity to engage in meaningful work that impacts coastal resilience efforts. Through collaboration with DCM and participation in the RCCP, the Fellow will gain valuable experience applying GIS technology to real-world scenarios, enhancing their technical skills while working closely with participating communities. This role will also allow the Fellow to build relationships and network with resilience practitioners while promoting inclusive planning. The Fellow will have opportunities to present the project to key groups such as the Department of Environmental Quality's AGOL Working Group, the N.C. Center for Geographic Information and Analysis (CGIA), and the N.C. GIS Conference, further expanding their network and showcasing their work. For NOAA, placing a Fellow with DCM supports its programmatic goals by strengthening North Carolina's primary resilience-focused coastal management initiative while advancing the development of digital tools, data, and case studies aligned with the Digital Coast Fellowship objectives. Furthermore, the Fellow's contributions will enhance NOAA's collaborative network along the East Coast, fostering stronger relationships among resilience practitioners in local, state, and federal governments and ultimately helping to build more resilient coastal communities.

Goals and Objectives

This proposal aims to enhance the accessibility of GIS data produced by North Carolina's communities through the RCCP, ensuring it is available to residents and external stakeholders in a user-friendly and visually engaging format. To achieve this goal, we have outlined several supporting objectives:

A. **Conduct a Program Deep Dive:** By the end of October 2025 (3 months), the Fellow will review the RCCP's structure, processes, outcomes, and partnerships. They will accompany DCM staff to public outreach events and meetings with leadership, program administrators, and stakeholders. The Fellow will analyze program materials and current metrics to generate a summary report highlighting notable observations and areas for improvement. This report will serve as an onboarding tool to assess the program's status and identify opportunities for creative insights and professional growth.
B. **Create the N.C. Coastal Resilience StoryMap:** By the end of March 2026 (8 months), the Fellow will develop an ArcGIS StoryMap that visually represents North Carolina's coastal resilience efforts. This interactive narrative will showcase key projects, data, and community contributions from Phases 1 and 2 of the RCCP. Hosted on the DCM website and later integrated into the ArcGIS Hub, the StoryMap will serve as an educational tool to promote stakeholder awareness and engagement.
C. **Consolidate and Standardize GIS Data:** By the end of September 2026 (13 months), the Fellow will consolidate all GIS data generated through the RCCP into the ArcGIS online profile. They will organize and standardize materials for accuracy and usability, cleaning and formatting existing datasets to ensure consistency in naming conventions and compatibility for analysis. This task will also involve creating documentation and establishing data management protocols for future use by DCM staff.
D. **Develop Interactive Resilience Hub:** By February 2027 (18 months), the Fellow will utilize Esri software to create an ArcGIS Hub for the RCCP. This website will house the previously developed StoryMap, as well as a Dashboard created using ArcGIS Experience Builder that visualizes consolidated GIS data, highlights program metrics, and showcases key projects and community contributions. Ultimately, the Hub will make programmatic data—such as Resilience Strategies, Project Portfolios, and GIS Map Packages—publicly available. Wherever possible, translations will be provided for non-English speakers to enhance inclusivity.
E. **Generate Impact Report and Conduct Targeted Outreach:** By August 2027 (24 months), the Fellow will analyze trends in GIS data and produce an impact report highlighting areas for improvement. The findings will be presented to DCM leadership for feedback before the deliverables go live. Following this, a targeted outreach initiative will engage coastal communities, particularly underserved populations, to share the project's findings and ensure equitable access to insights and resources through the GIS Hub.

Milestones and Outcomes

Milestone	Description	Outcomes	Timeframe
Kick-off Meeting and Onboarding	Meet with DCM leadership and program administrators to outline project goals, expectations, and timelines.	A clear understanding of project direction and alignment between NOAA Fellow and DCM.	August 2025

Conduct a Program Deep Dive	Engage in a comprehensive review of the RCCP's structure, processes, outcomes, and partnerships by studying program literature and holding initial meetings with relevant staff and stakeholders.	A thorough understanding of RCCP's history, daily operations, partnerships, and how the program is situated within DCM.	September 2025
Document Key Insights	Produce a brief synthesis document that outlines key insights, creative ideas, and opportunities for growth.	A valuable resource for program enhancement and strategic planning.	October 2025–November 2025
Compile Existing Program Materials	Gather and organize existing materials, including reports, visualizations, and GIS data, to inform the StoryMap and ensure a complete programmatic outline.	A well-organized repository of relevant information for storytelling and future reference.	December 2025
Develop the N.C. Coastal Resilience StoryMap	Create an engaging ArcGIS StoryMap showcasing North Carolina's coastal resilience efforts, emphasizing key projects and community contributions.	An interactive educational tool promoting awareness and engagement among stakeholders and the public.	January 2026–March 2026
Consolidate GIS Data	Consolidate GIS data generated through the RCCP into the DCM ArcGIS profile, focusing on cleaning and formatting existing data sets.	Streamlined GIS data that is ready for standardization and improved usability.	April 2026–June 2026
Standardize Data-Management Protocols	Establish data management protocols to maintain consistency in naming conventions, icons, settings, and hazard layers.	A guidebook for managing GIS data, ensuring accuracy, and facilitating future updates.	July 2026–September 2026
Develop an Interactive Resilience Hub	Design and implement a user-friendly Hub for the RCCP to house and visualize resilience data, ensuring broad accessibility.	A user-friendly platform providing critical insights and access to resilience metrics for communities and stakeholders.	October 2026–February 2027
Analyze Data Trends	Compile and analyze trends within the GIS data collected throughout the project, focusing on critical assets and compelling data visualizations.	Insights into data trends that inform future resilience strategies and highlight areas for improvement.	March 2027–May 2027
Generate Insights and Write Impact Report	Create a final report that highlights completed work, areas for improvement, and guidance for future users, presenting findings to DCM leadership and staff.	A comprehensive report that serves as a guide for ongoing resilience efforts and informs decision-making.	May 2027–June 2027
Conduct Targeted Outreach	Engage RCCP participants, particularly underserved communities, to introduce the new GIS Hub and connect them with updated tools and resources.	A smooth rollout of a user-friendly and accessible GIS platform that highlights the resilience efforts of N.C. coastal communities.	July 2027–August 2027

Project Description

This project is vital for supporting the RCCP, resilience practitioners, and North Carolina residents. Forty-one communities have participated in Phases 1 and 2, generating valuable GIS data essential for understanding their resilience needs. However, this data is often reviewed and presented in a fragmented way, reducing its effectiveness due to inconsistent visuals and limited accessibility. Currently, the data is used by technical service providers (contractors) on an individual community basis to conduct risk and vulnerability assessments, relying on tools like NOAA's Sea Level Rise Map Viewer and the CDC's Social Vulnerability Index to assess vulnerability. After a community completes the initial phases of the program, access to this data, including GIS data like hazard and vulnerability maps, becomes limited and can prevent communities from fully utilizing it for independent planning or grant applications. To address this, the Fellow will create a comprehensive online GIS Hub that consolidates community-specific resilience strategies, project portfolios, and ArcGIS map packages, ensuring the data remains accessible and relevant. This Hub will serve as a landing page for the RCCP and a resource for stakeholders, offering tools and tips while displaying community resilience data, strategies, and projects. This will be particularly important for underserved communities facing financial and administrative challenges, as it will provide them with the tools to sustain long-term resilience efforts.

The Fellow will have significant creative freedom to develop results that resonate with a wide range of audiences. Through this project, the Fellow will gain an in-depth understanding of North Carolina's resilience landscape and the contemporary approaches employed by leading practitioners, keeping them at the leading edge of coastal resilience as they advance in their careers. By creating the Hub, the Fellow will establish a legacy within the Division of Coastal Management—a comprehensive template for future GIS data collection and presentation that may also be adopted by other organizations.

This initiative will enhance the RCCP's visibility and improve its accessibility to local communities. The Fellow will engage directly in real-world coastal resilience scenarios while developing technical skills in GIS mapping, data visualization, and project coordination. They will also build a strong network of connections with resilience practitioners, local governments, and stakeholders, fostering collaboration and knowledge-sharing. Additionally, the Fellow will help support and preserve each community's resilience strategies—living documents that can be updated for years to come—and gain insights into the policy frameworks guiding coastal management at the state and federal levels. Participation in key presentations and conferences, such as the N.C. GIS Conference, will also develop their communication skills and showcase their work to practitioners and decision-makers, supporting their career trajectory in coastal management.

Ultimately, the Fellow's work will ensure a sustainable GIS Hub designed for long-term scalability and ease of use. Their documentation of protocols for data management will allow future DCM staff to seamlessly update and maintain the system. And, by integrating the Hub into ongoing DCM and RCCP operations, the Fellow will create a lasting resource that enhances program communication, supports community projects, and facilitates the pursuit of grant funding.

Diversity, Equity, Inclusion, and Justice
Getting from resilience planning to implementation requires jointly created ideas, buy-in, and commitment from a diverse community of stakeholders. The RCCP prioritizes inclusivity by involving vulnerable and historically underrepresented communities and developing targeted outreach strategies for underserved groups. Through robust community engagement, the program ensures that all voices are heard, and that each community's perspectives and needs are considered in the planning process. This project will build on that foundation by making the GIS Hub accessible not only to technical experts but also to individuals with limited technical experience.

This project will continue to prioritize communities selected for the RCCP based on their social vulnerability, financial constraints, and administrative capacity. The goal of making the Hub user-friendly is to empower these communities to access and utilize the resources they helped create, ensuring equitable access to critical resilience data. This approach removes barriers to information, fosters transparency, and supports long-term, community-driven resilience for all.

In addition to promoting the Hub in participating RCCP communities, the project will explore translation services for online materials, allowing non-English-speaking communities to engage with the information. The Fellow will also conduct targeted outreach in DEIJ communities, showcasing the RCCP and the Hub while encouraging future participation in the program, especially from struggling communities.

Through the RCCP's commitment to diversity and inclusion, the GIS Hub will serve as a practical tool for advancing equity in resilience planning, bridging gaps between communities with different capacities, and ensuring all stakeholders have access to the information needed to build long-term resilience.

Fellow Mentoring
The Fellow will be mentored by two of the Division's key leaders in coastal resilience: Mackenzie Todd, RCCP Program Coordinator, and Kasen Wally, Coastal Resilience Specialist. Together, Ms. Todd, with an M.Sc. in Ocean and Coastal Policy, and Mr. Wally, with an M.Sc. in Natural Resource Management, bring over 12 years of combined expertise in coastal management. Both serve as advisors to the DEQ-led NC Flood Resilience Blueprint Initiative and serve on the Steering Committee for the Southeast and Caribbean Disaster Resilience Partnership's annual meetings. Under the guidance of DCM Director Tancred Miller, Ms. Todd and Mr. Wally are the dedicated staff driving the Resilient Coastal Communities Program and will serve as the Fellow's primary mentors, providing close support in both day-to-day tasks and broader programmatic initiatives. Their mentorship is further enhanced by colleagues in DCM's Policy and Planning Section, including Rachel Love-Adrick, a District Planner recognized for her critical role in managing and presenting GIS data for both the RCCP and the Public Beach & Coastal Waterfront Access Program.

In alignment with DCM's highly collaborative nature, the Fellow will have the opportunity to work with a diverse array of key stakeholders, including leading organizations such as The Nature Conservancy, North Carolina Sea Grant, and the North Carolina Office of

Recovery and Resiliency, all of whom serve on the RCCP Steering Committee. The Fellow will also participate in quarterly calls with the state-wide Interagency Resilience Team and similar coordination calls with partners and program participants. DCM places a strong emphasis on professional development, ensuring that the Fellow can engage in webinars, public meetings, workshops, trainings, and conferences to broaden their expertise and enhance their contributions to North Carolina's coastal resilience efforts.

Office Environment

DCM fosters a collegial and supportive office environment, allowing the Fellow to receive ample guidance while working alongside the RCCP team. The office operates on a standard schedule from 8:00 AM to 5:00 PM, Monday through Friday, with an hour for lunch. Depending on need and availability, the Fellow may also have the option to telework 1-2 days per week. The Division of Coastal Management will provide office supplies, including a work computer, working space, and general materials (see cost-share description).

The Division promotes an inclusive office culture where open communication is encouraged. The Fellow can expect regular interactions with staff through in-person meetings, including bi-weekly updates for the Policy and Planning Section Chief and weekly check-ins with the mentorship team to ensure effective planning, support, and workflow. In addition to these structured meetings, an "open-door" policy allows staff to readily answer questions and collaborate informally.

DCM utilizes the Microsoft Office suite for communication, including Microsoft Outlook and Teams for typical correspondence, as well as SharePoint for cloud-based storage, complemented by shared state drives accessible to all employees. The Fellow will have access to ArcPro 3.2.2 and the entire suite of ArcGIS Online (AGOL) tools. Additionally, the Fellow will be invited to participate alongside and present their project to the Department of Environmental Quality's AGOL Team.

For day-to-day specifics, scheduling, and programmatic coordination, the Fellow, the Mentorship Team, and DCM leadership will collaborate to establish a work plan that aligns with the milestones and objectives outlined in this proposal.

Project Partners

The Resilient Coastal Communities Program includes a network of longstanding partnerships, especially on its Steering Committee. Additionally, informal partnerships have emerged through successful rounds of the program, including relationship-building between DCM Staff, program contractors, and participating communities.

Among the formal partnerships, the North Carolina Office of Recovery and Resiliency (NCORR) collaborates closely with the RCCP to promote resilience throughout the entire state, not just along the coast. They play a crucial role in identifying funding opportunities for communities in need and focusing on specific areas of concern, such as the NC Community Disaster Resilience Zones (CDRZ), which are mostly located within the 20 coastal counties and offer opportunities to combine programmatic efforts.

Second, North Carolina Sea Grant has been instrumental in linking the RCCP to educational institutions and community stakeholders. Their extension specialists maintain direct communication with local communities, fostering invaluable relationships and providing outreach capabilities that help connect communities with the program and turn RCCP resilience strategies into tangible results.

The RCCP's third primary partner, The Nature Conservancy (TNC), has brought extensive expertise in legislative matters and the acquisition of state and federal funding. Their deep knowledge of nature-based solutions—central to the RCCP's resilience outcomes—along with their experience in conservation, ecosystem restoration, and stakeholder engagement, provides support for the program's objectives. Their support, like our other partners, encourages program staff to think creatively and view resilience through different lenses.

In addition to these formal partnerships, the RCCP relies on the vital contributions of contractors who provide technical expertise, as well as the active participation of the communities involved in the RCCP. Contractors work closely with local governments to deliver tailored resilience projects while communities engage in the planning process and maintain strong connections with DCM program staff. This collaborative approach ensures that technical expertise aligns with local knowledge, building community-driven outcomes. By engaging both formal partnerships and participants, the RCCP offers a diverse network of partners available to the Fellow to interact with and learn from.

Cost-Share Description

DCM will provide $15,000 in non-federal matching funds, with $7,500 allocated per year of the fellowship. This funding will come from state appropriations (general funds). Additionally, DCM will supply working space, a computer, essential software like ArcGIS Online, office materials, and support/mentoring services. A shared state vehicle will be available as needed, and DCM will reimburse in-state work travel expenses.

Strategic Focus Area

This project proposal directly addresses key priorities within the *Resilient Coastal Communities* focus area by providing GIS data and accessible tools to support technical assistance for coastal communities through the RCCP. The GIS Hub and Fellow-led outreach will enhance public awareness of current and future risks while emphasizing actions to reduce loss of life, property, and economic opportunity. The project promotes the use of natural and nature-based solutions to protect communities and fosters collaboration between public and private sector partners. It also strengthens coastal leadership's capacity by offering a comprehensive overview of community-specific risks and vulnerabilities. Throughout the outcomes of this proposal and the objectives of the RCCP, equity remains a central focus, ensuring that all communities, particularly those at higher risk, are included in resilience planning and maintain open access to community-derived GIS data. Ultimately, this proposal offers the Fellow an opportunity to support a unique resilience-based approach to coastal management across North Carolina that builds on the ambitious work of practitioners along the East Coast throughout the county.