

Margaret A. Davidson Fellowship

Reserve Management Needs for the 2027-29 Cohort

October 2026

Fellowship research is focused on addressing a key coastal management question, a question that strives to help the National Estuarine Research Reserves and their communities understand the drivers of environmental change and how that change affects human and coastal resilience. This document describes the current management needs of each reserve. Fellowship projects must address at least one of the listed priorities for the selected reserve.

Expectations for applicants to engage with reserves during the application process are as follows:

- Prior to proposal development, applicants should review the list of reserve management needs, identify reserve(s) whose needs align with their interests, and reach out to the reserve point of contact. The purpose of the outreach is for the applicant to learn more about the need and how their research interests might intersect with those of the reserve, as opposed to discussing the specifics of a project idea. The conversation may also be helpful for better understanding how the reserve approaches collaborative science, reserve facilities, and research equipment.
- Information learned from the reserve is critical for the applicant to discuss with their faculty advisor and develop a proposal for a project. Projects should directly relate to the reserve need and support the applicant's graduate course of study.
- **Please note that reserve points of contact and staff may not co-develop or review a proposal prior to submission.**

For questions, please contact:

NOAA Office for Coastal Management

Email: ocm.davidsonfellowship@noaa.gov

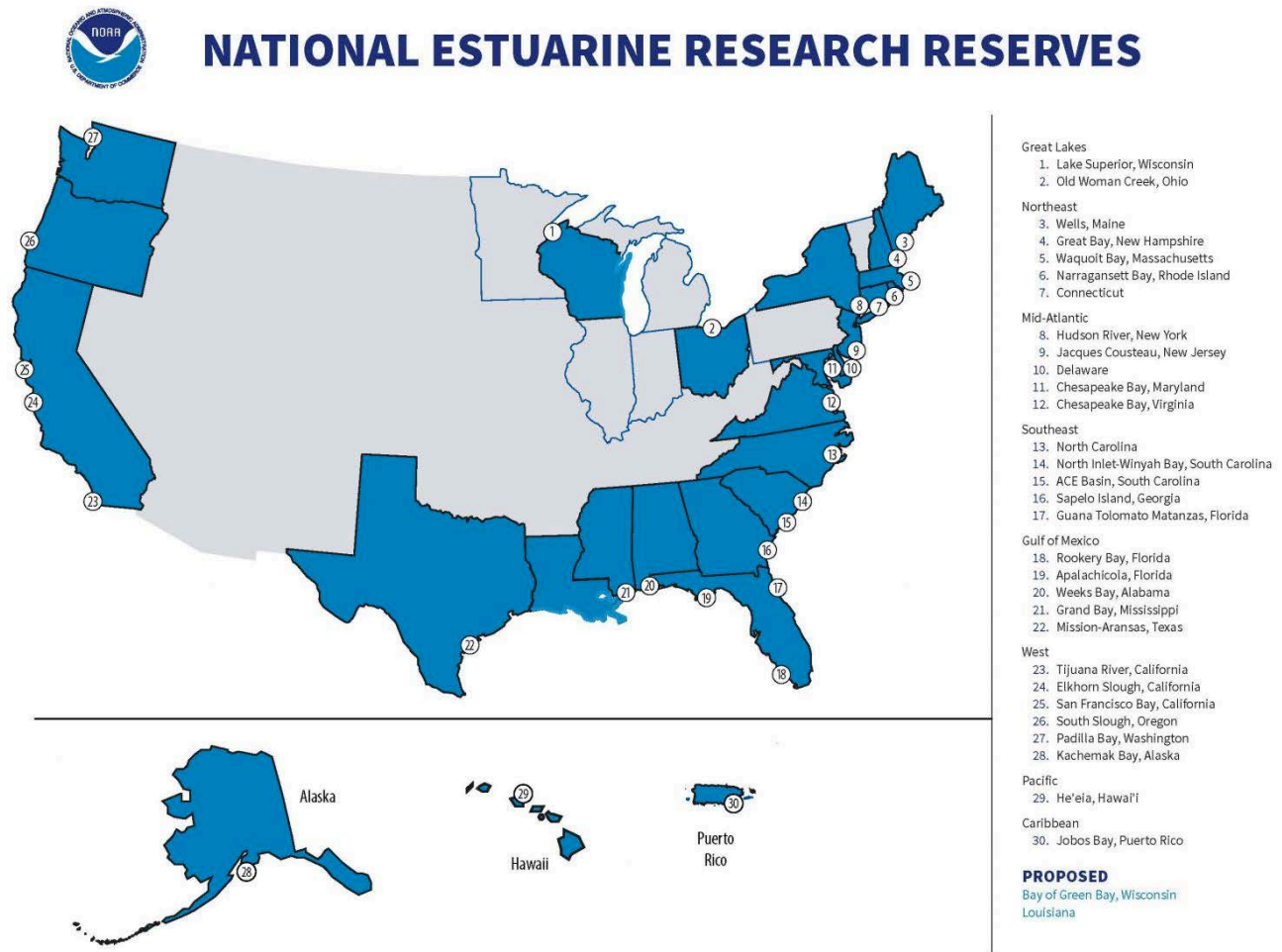


Participating Reserves

Click on each reserve's name to read about its specific management needs.

Caribbean Region	4
Jobos Bay Reserve, Puerto Rico	4
Great Lakes Region	5
Lake Superior Reserve, Wisconsin	5
Old Woman Creek Reserve, Ohio	6
Gulf Coast Region	8
Apalachicola Reserve, Florida	8
Grand Bay Reserve, Mississippi	9
Mission-Aransas Reserve, Texas	10
Rookery Bay Reserve, Florida	11
Weeks Bay Reserve, Alabama	12
Mid-Atlantic Region	14
Chesapeake Bay Reserve, Maryland	15
Chesapeake Bay Reserve, Virginia	14
Delaware Reserve, Delaware	15
Hudson River Reserve, New York	15
Jacques Cousteau Reserve, New Jersey	16
Northeast Region	17
Connecticut Reserve, Connecticut	17
Great Bay Reserve, New Hampshire	18
Narragansett Bay Reserve, Rhode Island	19
Waquoit Bay Reserve, Massachusetts	20
Wells Reserve, Maine	22
Pacific Region	23
He'eia Reserve, Hawaii	23
Southeast Region	24
ACE Basin Reserve, South Carolina	24
Guana Tolomato Matanzas (GTM) Reserve, Florida	25
North Carolina Reserve, North Carolina	26
North Inlet-Winyah Bay Reserve, South Carolina	27
Sapelo Island Reserve, Georgia	28
West Coast Region	29
Elkhorn Slough Reserve, California	29
Kachemak Bay Reserve, Alaska	29
Padilla Bay Reserve, Washington	31
San Francisco Bay Reserve, California	32
South Slough Reserve, Oregon	33
Tijuana River Reserve, California	34

Please use the NERRS national map to identify regions and reserves of interest.



Caribbean Region

Jobos Bay Reserve, Puerto Rico
Ecological, Economic, and Livelihood Assessment of Seagrasses: Extensive seagrass meadows are among the reserve's most valuable natural resources, providing critical ecosystem services that support biodiversity, fisheries, and local livelihoods. Since 2015, the reserve has been affected by the spread of the invasive seagrass <i>Halophila stipulacea</i>. This assessment aims to evaluate its ecological impacts, particularly its effects on native seagrass species and associated benthic and demersal fauna. Despite its continued presence and expansion, limited information is available on how this invasive species is altering native seagrass communities, associated fauna, and the ecosystem services that sustain local livelihoods. Therefore, an integrated ecological, economic, and livelihood assessment is needed to determine the extent of these impacts, inform effective management and conservation strategies, and support the long-term sustainability of seagrass ecosystems and the communities that depend on them. <i>Reserve Contact: Angel Dieppa, adieppa.jbnerr@dma.pr.gov, 787-853-4617 x3161</i>
Coral Reef Resilience and Recovery: The reserve encompasses three major tropical coastal ecosystems: mangroves, seagrass meadows, and coral reefs. These interconnected ecosystems support one another by facilitating ecological connectivity, maintaining genetic diversity and biodiversity, and contributing to overall ecosystem health. Maintaining these ecological relationships is essential to preserving coral reef resilience and the ecosystem services they provide. In particular, addressing the impacts of Stony Coral Tissue Loss Disease (SCTLD) is critical to supporting coral health and reef recovery. The reserve seeks to collaborate with coral reef experts and research institutions to implement science-based best management practices, strengthen coral reef resilience, and promote long-term ecosystem recovery. Therefore, collaborative research and targeted restoration efforts are essential to improving our understanding of coral reef recovery, identifying effective management strategies, and safeguarding the ecological integrity and ecosystem services of the reserve's interconnected coastal habitats. <i>Reserve Contact: Angel Dieppa, adieppa.jbnerr@dma.pr.gov, 787-853-4617 x3161</i>
Ecological, Economic, and Livelihood Assessment of Mangroves: Mangroves are a critical component of coastal ecosystems and play an important role in supporting both ecological processes and human communities. They are closely interconnected with seagrass meadows and coral reefs through the exchange of nutrients, organic matter, food resources, and fauna, contributing to the overall productivity and resilience of coastal ecosystems. However, anthropogenic pressures can disrupt these ecological interactions, resulting in habitat degradation and reduced ecosystem functioning. The reserve is interested in understanding residents' knowledge and perceptions of mangroves, the value they place on the ecosystem services they provide, and how they perceive the role of mangroves in enhancing coastal resilience. Therefore, integrating ecological, socioeconomic, and community perspectives is essential to better understand the value of mangroves, inform effective conservation and management strategies, and strengthen community-based approaches to coastal resilience. <i>Reserve Contact: Angel Dieppa, adieppa.jbnerr@dma.pr.gov, 787-853-4617 x3161</i>
Habitat Restoration: Mangroves function as living shorelines that provide significant ecological, socioeconomic, and protective benefits to coastal communities. However, these ecosystems have been degraded by a combination of anthropogenic pressures, including inadequate watershed management, as well as natural disturbances such as intense storms. The reserve seeks to better understand the factors and processes that influence mangrove resilience, recovery, and long-term ecosystem health, as well as the role mangroves play in enhancing the resilience of adjacent ecosystems and human communities. Therefore, research and restoration efforts should focus on identifying the key drivers of mangrove resilience and recovery, strengthening nature-based coastal protection, and informing management strategies that promote the long-term resilience of interconnected coastal ecosystems and human settlements. <i>Reserve Contact: Angel Dieppa, adieppa.jbnerr@dma.pr.gov, 787-853-4617 x3161</i>

Jobos Bay Reserve, Puerto Rico

Understanding Environmental Responses to Climate and Anthropogenic Pressures: The Jobos Bay Reserve has a long-term environmental monitoring program that collects comprehensive water quality, meteorological, and biological data. These long-term datasets provide a valuable foundation for identifying environmental trends, understanding ecosystem processes, and determining the factors that drive ecological responses to climate variability and anthropogenic pressures. The reserve is particularly interested in projects that analyze existing monitoring data to identify trends, assess changes in ecosystem conditions, and model the potential effects of management actions and climate-related scenarios. Therefore, integrating long-term monitoring data with statistical analyses and predictive modeling can strengthen the scientific basis for management decisions, improve the reserve's ability to anticipate environmental change, and support the development of effective adaptation and conservation strategies. *Reserve Contact:* Angel Dieppa, adieppa.jbnerr@dma.pr.gov, 787-853-4617 x3161

Great Lakes Region

Lake Superior Reserve, Wisconsin

Cyanobacterial harmful algal blooms (cHABs) are becoming increasingly common in the Great Lakes region, having recently emerged in the St. Louis River estuary and coastal Lake Superior. Research is needed to better understand the drivers, phenology, traits of cHABs and assess the potential risks to public health. There is specifically little known about how winter conditions may impact the summer HABs season and how the St. Louis River discharge impacts coastal Lake Superior phytoplankton dynamics. *Reserve Contact:* Hannah Nicklay, hannah.nicklay@wisc.edu

Historical degradation of the St. Louis River resulted in the loss of manoomin (*Zizania palustris*, Northern wild rice) and other coastal wetlands in large portions of the estuary. Efforts since 2010 have been successful at restoring manoomin in many areas, and coastal wetland restoration is ongoing. The Reserve's wetlands and water levels program has over ten years of plant community data that could (alone or paired with additional data collection or partner data) inform improved manoomin and coastal wetland restoration and stewardship practices. Topics of interest include variation of manoomin abundance, density, and distribution with environmental factors, interspecies interactions between manoomin and other species, impacts of herbivory and disease on manoomin, and impacts of manoomin restoration on cultural connections with the river. Additionally, research is needed on the drivers of coastal wetland loss, especially sedimentation history and dynamics, to inform best practices for coastal wetland restoration. *Reserve Contact:* Molly Wick, molly.wick@wisc.edu

The ongoing need for restoration of the St. Louis River estuary is strong, but approaches centered on biocultural restoration and Indigenous knowledge are not common, despite their long-standing application along Chi-gami ziibi (the great lake river). The communities invested in the St. Louis River estuary, including Ojibwe Tribal Nations, would benefit from dialogue and applied learning that invites Indigenous practitioners and knowledge-holders to advance their shared understanding of restoration practice and outcomes, especially as related to ishkode (cultural prescribed fire), manoomin (wild rice) restoration, and loss of wetland forests including black ash. *Reserve Contact:* Deanna Erickson, deanna.erickson@wisc.edu

Long term monitoring efforts in Reserves have to date focused on ecological conditions without exploring how ecological conditions influence human well-being benefits for people. This knowledge, which could be developed based on analysis of social or community indicators and Reserve long term monitoring data, has potential to inform practices for long-term stewardship and protection of the estuary in the context of both restoration and climate variability. Historic estuarine degradation still influences modern perceptions of ecosystem health and safety. An improved understanding of how community perceptions correlate with ecological conditions could help identify interventions to ensure safe and beneficial access to the estuary for current and future generations. *Reserve Contact:* Molly Wick, molly.wick@wisc.edu

Lake Superior Reserve, Wisconsin

The Reserve's education program aims to increase Great Lakes literacy, understanding of freshwater estuaries, and connection to place. The education program seeks research or applied learning projects that leverage evaluation data and examples of program impact and/or increase programming capacity, at the scale of the Reserve or the Reserve system. Research is sought to evaluate the impact of educational offerings and associated practices on visitors and participants. Possible projects include synthesis of 12+ years of immersive educator professional development evaluation data from the Reserve's Teachers on the Estuary program (Rivers2Lake). Research is also needed to learn about and communicate impactful practices, student outcomes, change over time in teachers, and connection with objectives of the national Teachers on the Estuary program. The Reserve's public interpretive center, the Lake Superior Estuarium, which recently celebrated its 10th anniversary, would benefit from research investigating its impact and efficacy. The Reserve is also interested in inquiry-based learning projects that increase capacity to improve or augment educational programming, evaluation, and tracking. *Reserve Contact: Luciana Ranelli, luciana.ranelli@wisc.edu*

Old Woman Creek Reserve, Ohio

Understanding what drives spatiotemporal changes in water quality is essential for predicting future environmental impacts. The reserve has been monitoring nutrient levels at the estuary inflow and outflow since 1980, as well as discharge at the outflow over the past decade. OWC NERR is seeking quantitative analyses that combine these long-term data. Such analyses could reveal historical trends, predict responses to upcoming environmental changes, update nutrient budgets for Old Woman Creek, or evaluate the wetlands' capacity to sequester nutrients. This information will aid management efforts both at the Reserve and throughout the Great Lakes region and beyond. *Reserve Contact: Jacob Cianci-Gaskill, SWMP Coordinator, Jacob.cianci-Gaskill@dnr.ohio.gov*

Great Lakes communities are struggling to mitigate the impacts of nutrient loading, greenhouse gases, sedimentation, and environmental change. The ecological functions of wetlands are known to be influenced by soil, sediment, and hydrological characteristics; however, little is known about how these characteristics, associated processes, and functional properties vary across space and time, particularly under increased weather variability. Therefore, OWC NERR seeks a greater understanding of how specific wetland characteristics, including soil and sediment heterogeneity and hydrological dynamics, influence ecosystem function across space and time, and under increasingly variable weather conditions. *Reserve Contact: Steve McMurray, Research Coordinator, Steven.McMurray@dnr.ohio.gov*

Microbes play fundamental roles in the function of aquatic systems. Several ecosystem processes, including carbon and nutrient cycling, are actively monitored in the OWC estuary; however, the microbial dynamics that mediate these processes in freshwater coastal systems remain poorly understood. Therefore, OWC NERR would like to develop a better understanding of the microbial ecology of the OWC estuary, including temporal and spatial variability of microbial assemblages, their biotic and abiotic drivers, and their roles in ecosystem function. *Reserve Contact: Steve McMurray, Research Coordinator, Steven.McMurray@dnr.ohio.gov*

Habitat restoration and invasive species management have traditionally focused on increasing ecosystem resilience. However, many restoration projects lack monitoring to evaluate their success in maintaining, restoring, or improving ecological health and diversity, as well as in preventing the spread of invasive species. As a result, the Reserve plans to collaborate with researchers to review current habitat restoration plans, explore new restoration methods, identify best practices, and encourage the adoption of effective techniques to enhance ecosystem services in the Lake Erie watershed. *Reserve Contact: Steve McMurray, Research Coordinator, Steven.McMurray@dnr.ohio.gov*

Old Woman Creek Reserve, Ohio

Phytoplankton play a major role in productivity within Old Woman Creek, especially between fall and spring when aquatic macrophytes are not at peak biomass. Previous work has shown frequent nitrogen limitation in the general Old Woman Creek phytoplankton community, but it remains unclear whether different nitrogen forms affect the community and how community composition changes with nutrient form or status. More work is needed to elucidate the relationship between phytoplankton and nutrients, particularly nitrogen, to better understand the role these primary producers play in wetland nutrient cycling and to help prioritize nutrient-reduction efforts within the watershed. *Reserve Contact: Jacob Cianci-Gaskill, SWMP Coordinator, Jacob.cianci-Gaskill@dnr.ohio.gov*

Gulf Coast Region

Apalachicola Reserve, Florida

The hydrology and energy flows of the Apalachicola watershed are nuanced and complex. A greater understanding of nutrient and/or carbon cycling dynamics, how they interact with and move throughout the watershed, floodplain, coastal marshes and forests, and potential influence on trophic dynamics of the floodplain and/or bay is needed. Characterizing current conditions will help inform management needs, future projections, and inform how estuaries in general and the Apalachicola basin specifically fit in with the larger global nutrient exchanges and carbon budget. *Reserve Contact: Megan Lamb, Research Coordinator, megan.lamb@floridadep.gov*

Greater understanding of the primary productivity in the Apalachicola Bay is needed, including effect of hydrology and nutrient inputs on distribution, species occurrence and distribution in the bay area. While the Reserve's System-Wide Monitoring Program monitors gross primary productivity (ie chlorophyll-a) on a monthly basis, other projects that have looked to species level and distribution have been short-term and not addressed all knowledge gaps. The Reserve has a FlowCam 8000 instrument that could be utilized for this project. Outcomes could include the synthesis and standardization of existing monitoring data and/or the collection and analysis of new data. *Reserve Contact: Megan Lamb, Research Coordinator, megan.lamb@floridadep.gov*

The Reserve includes many significant habitat types throughout its large footprint including salt and freshwater marsh, marsh-mangrove transition, submerged aquatic vegetation and seagrasses, beach dune, floodplain forest, coastal scrub, flatwoods, and more that provide important ecosystem services. These habitats face changes in climate and weather patterns, e.g. floods, drought, temperatures, tropicalization, salt water intrusion, and more. The Reserve desires to ensure we 1) understand historic and present extent and function, where poorly understood, and 2) how changes in climate and weather patterns may affect future extent and function. Projects could focus on one or more than one habitat type, interactions between habitats, or transition zones. Outcomes could include the synthesis and standardization of existing monitoring data. *Reserve Contact: Megan Lamb, Research Coordinator, megan.lamb@floridadep.gov*

Restoration is a growing activity within the Apalachicola Reserve, and needs fall across multiple areas:

- a) The Reserve continues to document a loss of sand and sediment in shoreline and marsh habitats due to acute (hurricanes) or chronic (sea level rise) stressors and is heavily involved in applications such as creating living shorelines and monitoring results and engaging in partnerships to share information about shoreline restoration techniques. Additional exploration of novel techniques, materials, technologies need to be considered and tested, and more information about monitoring the restored area and neighboring areas is needed. A needs and restoration suitability assessment of areas within the greater Apalachicola Bay, ecosystem services and economic impact assessment of the restored areas, and community outreach and engagement of these practices, would complement applied restoration activities.
- b) Apalachicola Bay's historically productive oyster reefs have experienced significant decline due to a combination of altered salinity, harvest pressure, disease, and environmental change. The Reserve is interested in oyster restoration success and limitations throughout the bay through monitoring and community engagement. Additional research is needed on substrate selection and reef design, restoration site suitability, impact of limited freshwater into the bay, spat recruitment and survival, disease and predation impacts, and how restored reefs perform compared to natural reefs over time.
- c) The Reserve and the associated floodplain continue to experience altered hydrology. These changes impact floodplain forest health, slough connectivity, and downstream nutrient and sediment delivery to the Apalachicola Bay. The Reserve seeks to better understand current floodplain conditions and restoration potential, including identification of degraded or disconnected sloughs, floodplain forest declines (cypress and tupelo declines), and sediment and nutrient retention.

Reserve Contact: Megan Lamb, Research Coordinator, megan.lamb@floridadep.gov

Grand Bay Reserve, Mississippi

Restoration effectiveness monitoring: Coastal habitats are being restored with a variety of methods. Many have well-defined end points and criteria useful for determining restoration success, but effectiveness monitoring is rarely conducted and monitoring data often is not available for synthesis. Prescribed fire is a particularly important method in Grand Bay's wet pine savanna uplands, but it is costly and difficult to implement. The reserve would like more information about how alternatives, such as mechanical clearing or conservation grazing, could be useful in maintaining habitats and how endpoints differ. Proposals may also address restoration monitoring for invasive species management and living shorelines. *Reserve Contact: Ayesha Gray, ayesha.gray@dmr.ms.gov*

Physical and hydrological processes: The reserve's marshes are affected by many ecological and physical processes, all of which are impacted by restoration actions, infrastructure, and climate change. The reserve seeks projects that investigate overland and groundwater flow, marsh migration, water quality (e.g., contaminants) and circulation patterns (e.g., quantification of inputs from Mobile Bay vs. Mississippi Sound, possible impacts from Bonnet Carre spillway openings including HABs), and sediment dynamics (e.g., composition, erosion, transport, deposition). The goal: improving management actions to better conserve estuarine ecosystem function as conditions change. *Reserve Contact: Ayesha Gray, ayesha.gray@dmr.ms.gov*

Species population distribution, abundance, and ecology: The reserve is a reference site for many research studies and ongoing restoration projects across the Mississippi Coast, but questions remain about various issues, including feral hog management; terrapin nesting success; the extent of submerged aquatic vegetation; prey species in carnivorous plant bogs; and the occurrence of rare and endangered species. Because information about species population distribution, abundance, and ecology provides baseline information and informs management decisions, the reserve is seeking population distribution and ecological studies for terrestrial and aquatic flora and fauna. The goal is to increase understanding of these species' population dynamics in this location and support the site's role as a reference estuary. *Reserve Contact: Ayesha Gray, ayesha.gray@dmr.ms.gov*

Socio-economic impacts of ecosystem restoration: There has been increased effort in recent years to restore coastal habitats and recover ecological processes. Typical habitat restoration projects evaluate the impact on environmental conditions, but generally do little to examine socio-economic impacts. Green infrastructure projects often include specific objectives designed to recover degraded ecosystem services lost to development. The reserve is interested in projects that examine whether and how habitat restoration and green infrastructure projects impact local communities and economies. *Reserve Contact: Ayesha Gray, ayesha.gray@dmr.ms.gov*

Habitat functions and trophic flows: How energy moves through ecosystems is important knowledge for restoration work. There are a range of interconnected habitat types throughout the Grand Bay research reserve: emergent marsh; wet pine savannas under different management regimes; bog habitats; tidal bayous; fringing oyster reefs; constructed inter- and subtidal reefs; submerged aquatic vegetation; and open water. Understanding trophic links is essential to understanding habitat function and energy flow, but this is not an area of research commonly pursued in Grand Bay. Projects are therefore encouraged that enable a better understanding of habitat functions and trophic interactions. This information will be used to inform resource management decisions. *Reserve Contact: Ayesha Gray, ayesha.gray@dmr.ms.gov*

Mission-Aransas Reserve, Texas

The Reserve is subjected to numerous impacts from climate change, including: tropicalization of plant species, alternations in contaminant bioavailability/toxicity, relative sea level rise rate of 5.2mm per year, our location in an area where intense drought followed by heavy rains is frequent, and more intense hurricanes. The Reserve needs to identify the predicted impacts of climate change and determine mitigation strategies from the impacts of the Coastal Bend and to subsequently relay that information to decision makers. *Reserve Contact: Victoria Congdon, Research Coordinator, Victoria.Congdon@austin.utexas.edu*

Erosion, subsidence, sea level rise, storms, climate change, and human development have changed the landscape of the reserve. Vulnerable habitats (such as oyster reefs, fresh- and saltwater marsh, mangroves, rookery islands, tidal flats, seagrass beds, coastal prairie) need to be monitored, identifying what is driving these changes, and their associated stressors and risks. The Reserve strives to understand how habitats are changing, and work on strategies to manage them, including habitat protection in key spawning, nesting, or feeding locations. MANERR seeks to partner with other reserves and researchers to assess these shifts and identify options for adaptive management. *Reserve Contact: Victoria Congdon, Research Coordinator, Victoria.Congdon@austin.utexas.edu*

Changes in species composition of our natural communities is going unnoticed. The use of DNA barcoding and eDNA should be utilized to assess biodiversity of all biota within the reserve, understand trophic relationships, monitor for species range extensions driven by climate change and for invasive species. The use of bioacoustic monitoring allows Reserves to gather baseline data and analyze changes to habitat biodiversity both geographically or temporally. Creating an ecoacoustic community of practice for the Reserve System that would develop standard protocols, gather baseline and change analysis data, would benefit Reserves as well as engage and inform community partners. *Reserve Contact: Victoria Congdon, Research Coordinator, Victoria.Congdon@austin.utexas.edu*

Natural and anthropogenic factors act at multiple scales to drive change in estuarine ecosystems. Understanding how drivers interact at different temporal (e.g., short-to-long term, acute vs chronic) and spatial (e.g., bay-to-watershed, watershed-to-global) scales is essential for addressing management needs, however, our understanding of these drivers is a knowledge gap. Therefore, we are interested in quantitative analyses (e.g. multivariate, time-series, spatial) that synthesize long-term, system-wide monitoring data, collected at the Mission-Aransas Reserve, around the state of Texas, and across the NERRS, specifically when applied to investigate natural and anthropogenic drivers of variability in estuarine responses (e.g., wetland vegetation, water quality, productivity). *Reserve Contact: Victoria Congdon, Research Coordinator, Victoria.Congdon@austin.utexas.edu*

Submerged Aquatic Vegetation (SAV) is a vital component of estuarine ecosystem health, but SAV is either changing or in decline across the NERRS (2022 NERRS SAV Assessment Report). While many Reserves conduct some SAV monitoring, there is no standard monitoring protocol across the system. This inhibits national analysis of SAV trends over time or drivers of change. Therefore, in-depth analysis is needed to compile and synthesize SAV data and SAV monitoring methods from across the NERRS and recommend best practice monitoring protocols that suit research and management needs at the local and national scale. At the MA-NERR, natural resource management agencies need to understand why some SAV have declined, and how SAV will respond to future climate conditions and extreme weather events. *Reserve Contact: Victoria Congdon, Research Coordinator, Victoria.Congdon@austin.utexas.edu*

Rookery Bay Reserve, Florida

Myriad environmental causes have resulted in the expansion of halophytic species, (ex. Mangroves) into interior freshwater marshes and uplands. RBNERR has initiated a vulnerability assessment, established a habitat monitoring network, and actively manages upland habitats using both prescribed fire and exotics removal. However, the Reserve needs additional investigation into the ecophysiological responses and environmental processes associated with ecosystem change. Research that assesses change using a combination of tools and techniques is encouraged, including hydrodynamic modeling, stable isotopes biogeochemistry, and remote sensing using UAV and satellite platforms. *Reserve Contact: Nerea Ubierna, Research Coordinator, Nerea.Ubierna@FloridaDEP.gov*

Florida is conducting large restoration projects to fix altered hydrology such as the Picayune Strand Restoration Project (PSRP), completed just last year. RBNERR has conducted long-term monitoring downstream of PSRP to provide a baseline for pre-restoration conditions. The Reserve seeks post-restoration research and monitoring of environmental and biological components downstream of the restoration. RBNERR encourages research focused on developing data analysis tools, integrating cutting-edge monitoring technologies, and assessing the impacts of restoration on aquatic and benthic species (oysters, clams, seagrass) and on biogeochemical cycles in the bays adjacent to and downstream from the PSRP. *Reserve Contact: Nerea Ubierna, Research Coordinator, Nerea.Ubierna@FloridaDEP.gov*

RBNERR is home to a diverse flora and fauna. RBNERR's diversity includes many imperiled species with limited ranges that are threatened by a combination of development pressures and changing environmental conditions. Baseline data on abundance, distribution, and reproduction exist for some species while additional data collection and synthesis are needed to guide management. RBNERR seeks to develop innovative monitoring tools to understand species responses to disturbance and management, and to predict future abundances and distributions. Research that incorporates eDNA, rapid assessment techniques, and novel experiments is sought to further understand local population trends. *Reserve Contact: Nerea Ubierna, Research Coordinator, Nerea.Ubierna@FloridaDEP.gov*

RBNERR is inextricably linked to the livelihood of local communities and preserves local natural and cultural resources by documenting archeological sites, monitoring flora and fauna, and learning from indigenous communities. A local citizen-science project funded through the Bipartisan Infrastructure Law grant program is accomplishing two goals: monitoring habitat and wildlife changes before, during, and after restoration efforts, and empowering local residents to take a leadership role in the stewardship of the Reserve. RBNERR seeks research that evaluates linkages between environmental education, community engagement, and visitor usage of the Reserve. *Reserve Contact: Jared Franklin, Stewardship Coordinator, Jared.Franklin@FloridaDEP.gov*

RBNERR actively restores both freshwater and brackish wetland ecosystems. Several projects are either recently completed (Fruit Farm Creek mangrove restoration) or ongoing (Henderson Creek flatwoods restoration), with the combined goals of restoring flows and reversing habitat degradation. Often, habitats in need of restoration persist under chronic stress, and this cryptic degradation goes unnoticed until a tipping point is reached, after which restoration efforts may be compromised. Rookery Bay seeks assessments of unrestored and restored areas within the Reserve to identify early signs of stress and to improve our understanding of restoration outcomes. *Reserve Contact: Nerea Ubierna, Research Coordinator, Nerea.Ubierna@FloridaDEP.gov*

Weeks Bay Reserve, Alabama

Weeks Bay Reserve is faced with the problem of managing a narrow but critical marsh habitat under the increasing impact of sea level rise. This need has produced a preliminary body of research that has increased our knowledge of the ecology of these critical habitats, but we need more refined projections of how changes to coastal habitat will develop. Better refined models on the small scale will inform future management of these narrow but important habitats. Weeks Bay Reserve and other sub-estuaries in the Mobile Bay system need design guidance and shoreline protection plans for restoration and living shorelines in relation to wave climate, sediment budgets and rising seas. In addition, we are motivated to improve community focused conservation and general stewardship. Therefore, we need research in the areas of the relative effectiveness of various popular methods of shoreline protection and green infrastructure; the resistance to adoption of more natural and sustainable methods; and ways to overcome this resistance such as incentive programs, improving the permitting process, training, and ways to improve coastal homeowner buy-in to nature-based solutions to resiliency and shoreline stabilization.

Reserve Contact: Scott Phipps, scott.phipps@dcnr.alabama.gov, 251-278-7748 (or 251-928-9792)

Coastal ecosystems provide many natural benefits to human well-being. However, current conservation strategies in the coastal region are unable to cope with the acceleration of human-caused environmental degradation. Additionally, lack of compliance with management policies, and failure to consider the social dimensions and realities of local communities have hindered the success of conservation initiatives. Therefore, increasing engagement with social science to better understand human-nature connections and values are necessary to produce more effective integrated coastal management strategies. *Reserve Contact:* Scott Phipps, scott.phipps@dcnr.alabama.gov, 251-278-7748 (or 251-928-9792)

Many coastal habitats along the northern Gulf Coast are impacted by marine debris, including abandoned and derelict vessels. This problem has been addressed in Weeks Bay through a short-term grant, from NOAA, to remove derelict vessels and other debris in 2018 and by new Abandoned and Derelict Vessel regulations passed by Alabama in 2019. There have been many economic problems associated with the new regulations' enforcement. Several solutions to address the problems have been suggested including a Vessel Turn-In Program (VTIP) and investigation into the social science behind what causes people to discard trash, debris, and to abandon vessels. Therefore, we need to determine solutions to clean up our coastal habitats and social solutions to prevent future deposition of marine debris in all its forms. This social science study would also address the willingness of coastal residents to support these efforts and to fund these efforts through taxes. *Reserve Contact:* Angela Underwood, angela.underwood@dcnr.alabama.gov, 251-928-9792

Weeks Bay Reserve uses prescribed fire for a variety of management needs including increasing ecological diversity and resilience, reduction of unwanted species in bog and marsh habitats, and for increasing the ability of marsh habitats to migrate upslope under pressure of sea level rise – as well as the reduction of the risk of wildfire in an increasingly urban habitat. We have increased our knowledge of fire effects on habitats through interactions with other land managers, professional training, tracking vegetation response to application of prescribed fire, and collection of short-term measurements of carbon dioxide release and uptake in burned and unburned marshes on a preliminary scale. However, there are significant gaps in our knowledge of how prescribed fire affects the coastal habitats that we manage. Therefore, we need research to determine how fire intensity, periodicity and seasonality of application affect the ecology of our coastal habitats. Additionally, we need to know how prescribed fire affects the carbon and nutrient cycles in our habitats and need efficient tools and methods to educate youth and adult audiences on the benefits of prescribed fire and the dangers of wildfire in an increasingly urban environment. *Reserve Contact:* Scott Phipps, scott.phipps@dcnr.alabama.gov, 251-278-7748 (or 251-928-9792)

Weeks Bay Reserve, Alabama

Rapid development within Baldwin County, AL, exists and is likely to affect water quality within Weeks Bay and its tributaries. But qualitative and quantitative data do not exist to model the impacts of these changes in combination with climate change. Therefore, our reserve needs a land change model to describe, project, and explain changes in and the dynamics of land-use and land-cover and its potential effects upon water quantity and quality. *Reserve Contact: Scott Phipps, scott.phipps@dcnr.alabama.gov, 251-278-7748 (or 251-928-9792)*

Mid-Atlantic Region

Chesapeake Bay Reserve, Maryland

The Chesapeake Bay Maryland NERR has spent considerable effort monitoring the changes in wetland vegetation, elevation, and water quality across all three Reserve components. These data have informed numerous NERR Science Collaborative Projects, Davidson fellowships and others on a national level, but local managers, landowners, and the public are oftentimes left out of the discussion of these visualizations and how they apply on a local or regional scale. The Reserve is interested in projects to bridge this gap through innovative analyses and outputs of both novel data, and our existing coastal monitoring data. *Reserve Contact: Kyle Derby, kyle.derby@maryland.gov, 410-260-8724*

Marsh migration is affecting human and natural communities through saltwater intrusion, wetland habitat loss, and increased flooding risk in this zone of coastal change. The reserve is interested in proposals that evaluate the processes and risks of marsh migration and potential of equitable adaptation options. *Reserve Contact: Kyle Derby, kyle.derby@maryland.gov, 410-260-8724*

Submerged aquatic vegetation (SAV) is an extremely important aspect of the Reserve ecosystem and the Reserve conducts both professional and community scientist SAV monitoring. There are opportunities to enhance SAV habitat within the Reserve where less desirable (but still valuable) non native species are dominant, where there has been significant loss of SAV cover, or where other factors have hindered native SAV success. The Reserve is interested in research to inform SAV enhancement or restoration efforts, with the potential of restoration implementation and with the potential of incorporating community science efforts. *Reserve Contact: Becky Swerida, rebecca.swerida@maryland.gov, 410-260-8722*

The use of living shorelines to control erosion, promote resiliency and enhance or create habitat is an important, complex and increasingly common practice in the Chesapeake Bay. There are many variations in restoration design, site conditions as well as complex resource management tradeoffs that impact restoration success. Therefore, well-designed restoration monitoring and analysis is critical. The Reserve is interested in using existing and/or additional shoreline restoration monitoring data to understand shoreline restoration effects, under different conditions and in reference to natural shorelines, to improve design choices, inform adaptive management and refine specialized shoreline monitoring plans. *Reserve Contact: Becky Swerida, rebecca.swerida@maryland.gov, 410-260-8722*

Maryland has established environmental literacy requirements for graduation, supported through a strong foundation of standards, frameworks, and partnerships. The state has set ambitious climate action plans at several scales, including state agency Climate Implementation Plans and statewide mitigation and adaptation strategies, however, education is often overlooked as a strategy to meet climate action goals. Opportunities exist to better integrate climate education into strategies for achieving the state's climate goals. Building on the 2023 Maryland Coastal Training and Climate Change Education Market Analysis and Needs Assessment and the state's 2024 Next Generation Adaptation Plan, further analysis is needed to map and evaluate education pathways within Maryland's climate action landscape. This project would examine national and county models for integrating climate education into multiple pathways at varying scales: from school district/county plans to state-level policy and agency planning. The goal: to generate evidence demonstrating the contribution of climate education to climate outcomes to support increased and sustained state investment in climate education. *Reserve Contact: Coreen Weilminster, coreen.weilminster@maryland.gov, 410-260-8744*

Chesapeake Bay Reserve, Virginia

The Reserve is interested in expanding restoration science and monitoring efforts, and testing new technologies and adaptive restoration management techniques designed to mitigate current and anticipated stressors and enhance tidal wetland and seagrass resiliency (and associated ecosystem services) within the York River estuary. Projects may include the identification, quantification, valuation, and socialization of ecosystem services of these critical habitats (e.g., water quality, carbon sequestration, storm buffering, erosion control) under different environmental conditions and change scenarios, and restoration strategies. *Reserve Contact(s):* Scott Lerberg (lerbergs@vims.edu, 804.684.7129), Erin Reilly (emreilly@vims.edu, 804.832.7555), Erin Shields (eshields@vims.edu, 804.684.7702).

Harmful algal blooms (HABs) have become more common within the York River estuary, and resulting toxins can have detrimental effects on shell and finfish, shallow water ecosystems, and humans. Although a topic of active study, information regarding bloom initiation, dynamics, and impacts on water quality and natural resources is limited. The Reserve is interested in projects that include a synthesis of York River estuary observing network data and focused field and modeling studies to provide guidance for reducing HAB occurrence, assessing toxin production dynamics and impacts, and informing strategies to counter detrimental effects on estuarine aquatic biota and human ecologies and economies (e.g., aquaculture). *Reserve Contact(s):* William Reay, Ph.D. (wreay@vims.edu, 804.684.7119), David Blaine Parrish III (parrishd@vims.edu, 804.832.7835), Cirse Gonzalez (cagonzalez@vims.edu, 804.684.7144).

The York River estuary suffers from chronic water quality issues driven by excessive loads of sediment, nutrients, and oxygen-consuming material, resulting in intense algal blooms, low oxygen, and reduced water clarity. The Reserve's ability to explain observed variability in estuarine response to watershed loads, internal cycling, episodic events, and longer-term climatic changes is somewhat limited. The reserve is interested in projects that use syntheses of long-term meteorological, water quality, physical, and biological datasets in York and other water bodies to develop empirical (data-driven) models and verify theory-based models. *Reserve Contact(s):* William Reay, Ph.D. (wreay@vims.edu, 804.684.7119).

The Reserve is interested in further supporting conservation and protection efforts for target species including species of greatest conservation need present in Reserve components; see State list at <https://dwr.virginia.gov/wildlife/wildlife-action-plan/species-of-greatest-conservation-need/>). To date, efforts have focused on diamondback terrapins and marsh-associated birds. We seek research on the abundance, distribution, and population trends for target species at the Reserve, as well as the potential role of community science programs in these assessments. *Scott Lerberg* (lerbergs@vims.edu, 804.684.7129), *Erin Reilly* (emreilly@vims.edu, 804.832.7555).

The Reserve is interested in human dimensions projects that examine how communication and interpretation programs affect participant knowledge and change attitudes and behavior in coastal stewardship. Community engagement programs include professional training and workshops, place-based interpretation and experiential opportunities, community science, and social media. Suggested projects include: 1) program evaluations and behavior change assessments; 2) frameworks to better understand the mechanisms of behavior change and programming impact in our focal area; and 3) social science and education-based research projects exploring coupled human and natural systems. *Reserve Contact(s):* Cirse Gonzalez (cagonzalez@vims.edu, 804.684.7144), Sara Krebsbach (804.684.7135).

Delaware Reserve, Delaware

The reserve is interested in connecting with local communities and community groups to inform land management and restoration decisions, provide meaningful educational programming and training opportunities, and better understand local cultural values and practices. A social science project is requested that includes identifying local history, finding community connections and methods of communication, and developing an engagement plan.

Reserve Contact: Lynne Pusey, Training & Engagement Coordinator, Lynne.Pusey@delaware.gov

Nutrient Dynamics in Delaware Marshes - Salt marshes are a hotspot for biogeochemical cycling and can provide a range of ecosystem services such as carbon sequestration and denitrification. The Delaware National Estuarine Research Reserve is seeking a project to advance research on nitrogen, carbon, and/or phosphorus dynamics within our St. Jones and/or Blackbird Creek watersheds. *Reserve Contact: Mollie Yacano, Research Coordinator, Mollie.Yacano@delaware.gov*

Characterizing Emerging Contaminants in Delaware Marshes – There is a general lack of understanding of the geochemistry of many emerging contaminants, limiting our ability to characterize and predict the movement of these contaminants once they reach aquatic terrestrial margins such as marshes. The Delaware National Estuarine Research Reserve is seeking projects that investigate the impact and interaction of emerging contaminants on water quality and biota in the St. Jones and/or Blackbird Creek watersheds. *Reserve Contact: Mollie Yacano, Research Coordinator, Mollie.Yacano@delaware.gov*

The Delaware reserve has been monitoring marsh birds since 2012 and, through this research, wetlands within the reserve's watershed have been identified in Delaware as a priority to further assess for future marsh bird habitat work. Marsh birds can be a potentially valuable indicator for the ecological integrity of salt marshes due to their sensitivity to habitat changes, and the DNERR is seeking additional research to better understand marsh bird demographics. *Reserve Contact: Christina Whiteman, Stewardship Coordinator, Christina.Whiteman@delaware.gov*

The Delaware NERR has various upland and forested wetland habitats, but limited capacity for understanding the biodiversity of flora and fauna in the areas to communicate ecological changes and enhance restoration efforts. The Reserve is interested in projects to improve the understanding of ecological biodiversity within upland and forested wetland habitats through innovative research that supports conservation and protection within the watershed. *Reserve Contact: Christina Whiteman, Stewardship Coordinator, Christina.Whiteman@delaware.gov*

Hudson River Reserve, New York

HRNERR conducts education programs that seek to reduce barriers to participation for all audiences. We are building relationships with members of the Lenape and Mohican-Munsee Nations who reside in Wisconsin, Oklahoma, and Canada, but need more work on pedagogy and methods for collaborative development of programs that ensure culturally appropriate approaches, incorporate Indigenous perspectives, and attempt to overcome the burden of tribal relocation on engagement. HRNERR staff and partner educators within the Hudson River Estuary need an evaluation tool or process to assess and collaboratively develop Indigenous engagement and to suggest adjustments to better serve all of our education program participants. *Reserve Contact: Chris Bowser, Education Coordinator, chris.bowser@dec.ny.gov*

Hudson River Reserve, New York

HRNERR collects data on submerged aquatic vegetation (SAV) habitat. State fisheries staff also have decades of data on fish abundance and distributions throughout the Hudson River Estuary. However, ecosystem services provided by native vs. invasive SAV (e.g., dissolved oxygen, predator avoidance, food supply), and how crucial they are to supporting fish life stages, have not been quantified. Identifying and quantifying SAV fish habitat functions across multiple life stages would enhance the management of both habitats and fisheries. Research and data are needed on current conditions to inform habitat restoration and provide a baseline for monitoring potential changes from climate stressors. *Reserve Contact: Brian DeGasperis, Stewardship Coordinator, Brian.DeGasperis@dec.ny.gov*

The Hudson River Environmental Conditions Observing System and other regional environmental monitoring efforts generate valuable long-term data, but stakeholders face challenges in accessing and using these datasets for analyses. A collaborative synthesis is needed to integrate relevant fisheries data, habitat maps, water quality and weather data into an accessible platform for analysis and visualization. Increasingly frequent extreme weather events threaten water quality and ecosystem health. Interdisciplinary research is needed to evaluate extreme weather impacts including salt front shifts that impact drinking water supplies. Outcomes of the analyses of weather impacts will be supported by curricula, a StoryMap, and training materials. *Reserve Contact: Chris Mitchell, Research Coordinator, christopher.mitchell@dec.ny.gov*

There was a 90% loss of submerged aquatic vegetation (SAV) in the Hudson during an extreme storm event in 2012. While SAV is recovering, it has not rebounded to pre-2012 abundance. The 2024 HRNERR Davidson Fellow investigated techniques for rearing and planting SAV for habitat restoration. To apply these techniques for large-scale restoration, areas with a high likelihood of restoration success need to be identified. This research will evaluate key SAV habitat characteristics, including flow, depth, light availability, contaminants, and sediment composition to provide regulatory staff and restoration practitioners with a vital tool for prioritizing locations for SAV restoration projects. *Reserve Contact: Brian DeGasperis, Stewardship Coordinator, Brian.DeGasperis@dec.ny.gov*

The Hudson River Estuary experiences periodic harmful algal blooms (HABs), primarily of the cyanobacteria *Microcystis*, but experienced a widespread event in 2025. HRNERR and partners generate long-term datasets including continuous water quality data (EXO sondes), discrete nutrient samples, and seston throughout the estuary that provide context for understanding the drivers of such episodic events. An evaluation of additional monitoring parameters coupled with research to assess the accuracy and interoperability of methods used to detect cyanobacteria and their toxins will support the analysis of HABs drivers, development of monitoring decision tools, and response strategies specific to Hudson HABs and their impacts. *Reserve Contact: Chris Mitchell, Research Coordinator, christopher.mitchell@dec.ny.gov*

Jacques Cousteau Reserve, New Jersey

Tidal wetlands and other estuarine ecosystems are threatened with increasing rates of loss due to sea level rise and more intense coastal storms. The reserve supports statewide efforts to increase resilience through nature-based solutions, including living shorelines and beneficial use of dredged sediment, but knowledge gaps regarding the implementation and efficacy of these techniques limit their widespread use. The research reserve's request is to test the hypotheses for these projects to address knowledge gaps. The information will be used to develop standards and best practices for nature-based solutions for increasing the resilience of tidal wetlands. *Reserve Contact: Andrea Habeck, habeck@marine.rutgers.edu, 609-249-8823*

Jacques Cousteau Reserve, New Jersey

Water and habitat quality of the pristine Mullica River- Great Bay Estuary are excellent, but periodic upwelling, ocean acidification and saltwater intrusion, and increased precipitation and storms are changing estuary dynamics. Therefore, science-based information and predictive models are needed by the coastal management community to determine how and how fast this environment is changing. For example, Submerged Aquatic Vegetation (SAV) is a vital component of estuarine ecosystem health, but SAV is either changing or in decline across the NERRS. Modeling is also needed to identify areas suitable for future marsh migrations as sea level rises. Research and modeling of changing ecosystem dynamics and range shifts in habitats and species will help coastal managers inform future management of coastal ecosystems and communities. *Reserve Contact: Thomas Grothues, grothues@marine.rutgers.edu, (609)296-5260 x 262*

Shellfish farms which are expanding in the Barnegat Bay estuary, are low-impact forms of coastal food production, and they provide ecosystem services such as nutrient reduction and habitat provisioning. Unfortunately a thorough understanding of the types of fish and wildlife interactions that occur at these farms is lacking. The reserve is interested in proposals to collect data about fish habitat on these farms, and how the farms influence fish and wildlife communities in the bay. *Reserve Contact: Mike De Luca, deluca@marine.rutgers.edu, 609-812-0649*

Growing community concern about lagoon water quality highlights a need to better understand the ecological and human health implications of changing water-quality conditions in New Jersey's coastal lagoons. Research is needed to identify and better understand the factors influencing water quality, including nutrient enrichment, dissolved oxygen, contaminants, and harmful algal blooms (HABs), as well as how these conditions affect aquatic ecosystems, wildlife, and human health. *Reserve Contact: Thomas Grothues, grothues@marine.rutgers.edu, (609)296-5260 x 262*

Information is needed to determine whether local community observations (from MyCoast data) can be used to ground-truth flood models and establish locally relevant flooding thresholds for community-identified assets. Research is needed to identify the data requirements, including elevation, timing, location, water levels, precipitation, tides, and other conditions, and develop a repeatable method for linking observed flooding or erosion to the conditions under which critical sites or communities experience impacts that improve model accuracy (proof of concept and tool improvement). *Reserve Contact: Amanda Archer, amanda.archer@marine.rutgers.edu, (609)249-8821*

Northeast Region

Connecticut Reserve, Connecticut

Carbonate system analyses in estuarine environments are critical to our understanding of acidification and its impacts on vulnerable coastal ecosystems. Over the past decade, collaborative monitoring efforts have increased our understanding of inorganic carbon dynamics in the open Long Island Sound. However, embayment-scale and habitat-focused carbonate system characterization is lacking, especially within CTNERR boundaries. Research is needed to expand our understanding of seasonal and interannual carbonate system dynamics in coastal embayment waters and sediments, especially relating to seagrass and shellfish habitats. Utilization of existing datasets from the open Sound and the CTNERR watershed is encouraged. *Reserve Contact: Kevin O'Brien, Manager, kevin.o'brien@uconn.edu or alternate email: kpobrien@uconn.edu (in case apostrophe causes problems)*

Connecticut Reserve, Connecticut

CTNERR is interested in applied research regarding the restoration and management of eelgrass. Historically, eelgrass meadows were abundant in Long Island Sound, however impaired water quality, increasing temperatures, storms, and vessel activity are impacting current habitat. CTNERR is co-leading several research and management initiatives that have identified more research is needed on: impacts, tracking, and setting thresholds for seed collection in donor meadows; methods to decrease the loss of seed collected and increase seed viability; sterilization of seeds (and resulting viability) for eelgrass and shellfish pathogens; eelgrass-shellfish/aquaculture interactions; and regulatory barriers for transporting seed from southern regions for resilience experiments. *Reserve Contact: Kevin O'Brien, Manager, kevin.o'brien@uconn.edu or alternate email: kpobrien@uconn.edu (in case apostrophe causes problems)*

Continuing attention to water quality is necessary for habitat integrity in an era where environmental change can act synergistically with nutrient pollution to impair water quality. Recent nitrogen loading estimates, high resolution land-use mapping, and planned modeling of embayments advance information available to decision makers and the public. However, habitat assessments related to water quality and habitat integrity within CTNERR are intermittent or lacking. A broadscale assessment of water quality or habitat integrity (particularly of eelgrass and marshes) and/or synthesis of existing data is requested to connect nutrient loading and land-use data and eutrophication in the estuary. *Reserve Contact: Kevin O'Brien, Manager, kevin.o'brien@uconn.edu or alternate email: kpobrien@uconn.edu (in case apostrophe causes problems)*

Blue carbon in coastal forests, marshes, and seagrass beds is a potentially valuable pathway for reducing greenhouse gases. Recommendations from the State of Connecticut include preserving and restoring forests and coastal wetlands as a tool for achieving a targeted 45% reduction in greenhouse gases by 2030. However, relatively few habitats within Connecticut have been assessed for carbon storage capacity. Research and monitoring that assesses the boundaries, typology, and carbon sequestration capacity in these habitats is critical for evaluating preservation priorities, assessing the contribution of these habitats to the state goal, and setting restoration targets within CTNERR. *Reserve Contact: Kevin O'Brien, Manager, kevin.o'brien@uconn.edu or alternate email: kpobrien@uconn.edu (in case apostrophe causes problems)*

Great Bay Reserve, New Hampshire

Monitoring landscape-scale coastal habitat extent, condition, and change requires use of geospatial and remote sensing science. In 2013 and 2023, remote sensing was used to create tidal wetland habitat cover maps, though the process has lacked consistency and future-thinking methodologies. We are seeking further research centered around remote sensing and geospatial methods, resources, and workflows to create more frequent, accurate, and cost-effective tidal wetland (i.e. salt marsh) habitat maps for current and future monitoring use. *Reserve Contact: Chris Peter, Research Coordinator, Christopher.r.peter@wildlife.nh.gov*

Salt marshes are facing unprecedented stress from downstream climate change effects (sea-level-rise, range-expanding species) combined with legacy farming practices that significantly alter these rare habitats in both quantity and quality. Further research centered around restoration science is warranted to enhance our knowledge on what management actions (single channel hydrology, marsh migration, sediment enhancement, etc) best sustain habitat quantity and ecosystem function (resiliency, wildlife habitat, carbon storage, nutrient cycling, etc). *Reserve Contact: Chris Peter, Research Coordinator, Christopher.r.peter@wildlife.nh.gov*

Great Bay Reserve, New Hampshire

Key estuarine habitats (e.g., oysters, eelgrass, salt marsh and terrestrial buffers) and wildlife species (e.g., anadromous fish, lobster, horseshoe crabs) in Great Bay are facing unprecedented impacts from land use and climate change. The Great Bay NERR is interested in how human-induced changes to physical, chemical, and biological conditions are impacting our habitat and wildlife and ways partners in coastal NH can minimize and mitigate these impacts through management (e.g., restoration, regulation, land protection). *Reserve Contact: Chris Peter, Research Coordinator, Christopher.r.peter@wildlife.nh.gov*

Greater science is needed around the impact and interaction of anthropogenic stressors (nutrients, sedimentation, disease, and other contaminants) on water quality and biota in Great Bay to inform how to manage pollutants. Water quality is of high interest to local regulators, communities, and individuals concerned about human and ecosystem health, and municipal spending. Further research is necessary to understand the impacts of pollutants on human and biological communities through conducting innovative and novel research, synthesizing available Reserve and partner water quality data, or monitoring new parameters to increase the effectiveness of water quality management approaches. *Reserve Contact: Chris Peter, Research Coordinator, Christopher.r.peter@wildlife.nh.gov*

Education, training, volunteer, and public programming at GBNERR are designed to engage community members, deepen their connection to Great Bay, and ultimately foster a culture of environmental stewardship. Yet, despite significant investment in these efforts, we have limited information about how place-based programs such as those offered through NERRS influence participants' attitudes, behaviors, and decision-making over time - or how best to measure those changes. GBNERR has opportunities to strengthen existing programs, develop new offerings, diversify educational materials, and create additional experiences for visitors. However, without meaningful social science data, it is difficult to determine where limited programmatic resources will have the greatest impact. This challenge is particularly significant for the many visitors who engage with the Reserve independently, outside of formal programs, and whose experiences, motivations, and subsequent actions are largely unknown. GBNERR therefore seeks projects that will help us better understand, measure, and deepen our impact within the communities we serve. Potential approaches could include developing and testing a theory of change that connects programs and experiences to stewardship outcomes; evaluating the effectiveness of specific programs; assessing visitor experiences, motivations, and barriers to engagement; or piloting practical methods for measuring social indicators of environmental stewardship. Ultimately, this work would provide an evidence-based foundation for making strategic program investments and designing experiences that more effectively translate engagement with Great Bay into meaningful stewardship action. *Reserve Contact: Chris Peter, Research Coordinator, Christopher.r.peter@wildlife.nh.gov*

Narragansett Bay Reserve, Rhode Island

Sea level rise and other climate change stressors (changes in precipitation, temperature, interspecific competition, phenology, etc.) are negatively impacting habitats and threatening coastal communities in Narragansett Bay and its watershed. Coastal decision makers need information to help them prioritize locations and approaches for habitat preservation. Research efforts may focus on the impacts of climate change on coastal and estuarine habitats and communities; the costs and methodologies of different adaptation approaches, and their efficacy in improving the resilience of habitats and communities; or the social and economic barriers (and opportunities) to sound decision-making related to climate change adaptation and increased community resilience. *Reserve Contact: Kenneth Raposa, kenneth.raposa@dem.ri.gov*

Narragansett Bay Reserve, Rhode Island

The value (monetary or non-monetary) that humans place on natural resources and processes can influence management strategies and build a case for investment in natural systems. To advance this concept, the community needs a better understanding of the value placed on ecosystem services such as carbon sequestration, storm buffering, wildlife habitat, recreation, and cultural identity of various coastal and estuarine habitats, particularly salt marshes; how ecosystem services valuation studies may support protection and restoration efforts; if and how increased awareness and understanding of ecosystem services results in behavior change; and what frameworks could be used to understand behavior and to design behavior change programs. *Reserve Contact: Kenneth Raposa, kenneth.raposa@dem.ri.gov*

Restoration and adaptation projects have taken place in a variety of habitats within the reserve and throughout the Narragansett Bay region, but there is limited information regarding the results. Restoration practitioners and coastal decision makers need to better understand the effects of climate change stressors on upland to subtidal coastal habitats and how habitat functions and values change as a result of restoration, adaptation, and ecosystem management projects; which techniques are the most effective at increasing habitat resilience to climate change stressors; and what lessons learned from implemented projects can be shared to increase the likelihood of success of future projects; and how wildlife use of habitats varies by condition and vulnerability to climate change; and effects of adaptation projects on wildlife community structure and function. *Reserve Contact: Jonathan Mitchell, jonathan.mitchell@dem.ri.gov and Kenneth Raposa, kenneth.raposa@dem.ri.gov*

This reserve has led the establishment of salt marsh monitoring within the national system, but more refined user-based products from the monitoring program and sentinel sites are needed. The program wants to better understand end user needs related to the information, products, and tools people need as they work to increase coastal resilience. Also needed to determine trends and patterns: further analysis of Narragansett Bay water quality and other long-term datasets. While there are various reports and data summaries for some datasets, there has been little long-term trend analysis. *Reserve Contact: Kenneth Raposa, kenneth.raposa@dem.ri.gov*

Waquoit Bay Reserve, Massachusetts

Communities in Massachusetts are grappling with degrading water quality in many coastal bays and freshwater ponds due to eutrophication, harmful algal events, and contaminants of emerging concern. The Reserve is particularly interested in exploring the development of a macro- and microalgal monitoring program that can help communities better understand changes in water quality and their potential implications for the ecological, social and economic well-being of the bay. Building on its education and training efforts with decision-makers and the public, the Reserve also facilitates information sharing and research on potential solutions to restore water quality. Resource managers have prioritized the need for locally relevant research-based information on the efficacy of different management approaches including use of non- traditional methods of remediation (e.g. shellfish aquaculture, floating and constructed wetlands, reactive barriers, etc.), as well as on effective policy, regulatory, and community engagement approaches that they can apply. We invite research including social science studies that helps to address this widespread problem, identifies effective strategies that communities can apply, to plan, implement, adapt, and communicate solutions.

Reserve Contact: Tonna-Marie Rogers, tonnamarie.surgeon-rogers@mass.gov, 508-457- 0495

Keywords: water quality; emerging contaminants, algal events, management; education and outreach

Waquoit Bay Reserve, Massachusetts

Sea level rise (SLR) is increasingly threatening communities and salt marshes across New England. Locally we are observing impacts such as salt marsh peat and vegetation loss. Research is needed to help managers better understand and respond to changes occurring in marsh environments due to impact of SLR, erosion, and changes in hydrology, as well as identify effective management, adaptation, and restoration strategies such as sediment placement to enhance marsh resilience and protect and restore ecosystem services. Research is also needed to address coastal hazards utilizing nature-based solutions, blue carbon science, and other marsh ecosystem services.

Reserve Contact: Megan Tyrrell, megan.tyrrell@mass.gov, 508-457-0495

Keywords: salt marsh, resilience; ecosystem services; nature-based solutions; blue carbon

Research is needed to better understand climate change impacts on estuarine systems, including but not limited to, water quality, ecosystem service provision, habitat and species composition change and recovery and nutrient cycling. Based on observations of changes in ecosystem health, such as increasing occurrences of hypoxic/anoxic events, we invite research that examines the impact of climate and other drivers on nutrient management models, and enhances understanding of hypoxic/anoxic zones and their impacts on fisheries, aquaculture, and recreational activities. In addition, we seek to better understand drivers of detrimental changes in species abundance and composition (e.g., excessive macroalgae, *Sesarma* sp., coastal forest change caused by Southern Pine Beetle, etc.,) and effective management strategies. We also invite research that analyzes monitoring data, e.g., data from the Reserve's System-Wide Monitoring Program (SWMP), to inform effective resource management. This information will be useful for informing restoration and remediation efforts within Waquoit Bay and the surrounding watershed.

Reserve Contact: Sonia Ahrabi-Nejad, Sonia.Ahrabi-Nejad@mass.gov, 508-457-0495

Keywords: climate change; anoxia and hypoxia; biological invasions/invasive species; SWMP

As coastal ecosystems become increasingly stressed, the need for restoration to revive and support healthy functions, biodiversity, and other essential ecosystem services has never been greater. Many restoration projects involving the Reserve and partners have successfully achieved discrete habitat or species goals, yet there is incomplete understanding of how restoration projects affect larger ecosystem processes and functions. We seek research to further explore the impacts of restoration activities on biogeochemical processes and other ecosystem functions, including habitat quality as well as biodiversity, that will help guide resource management and community engagement, and increase restoration success in the Waquoit Bay watershed and surrounding areas. We also invite research on the restoration of emergent and submerged aquatic vegetation such as seagrass and utilizing benthic and estuarine/terrestrial mapping and related data to inform habitat management and restoration efforts. Research on prescribed fire in restoration and habitat management is also desired.

Reserve Contact: Ryan Clark, ryan.d.clark@mass.gov, 857-208-2677

Keywords: restoration; biodiversity; biogeochemistry; ecosystem health and function; habitat quality; seagrasses and other submerged aquatic vegetation; benthic; habitat mapping

Coastal hazards, including sea level rise, flooding, and erosion, are increasingly affecting Massachusetts communities. State agencies, academic institutions, and municipalities are working to build resilience through habitat restoration, nature-based solutions, and proactive relocation away from areas at risk. The Reserve seeks research projects that identify and address barriers to advancing these strategies, including permitting challenges, community engagement, and public perceptions and attitudes. Research is needed to better understand these barriers and develop approaches that can streamline implementation and accelerate progress toward coastal resilience. Projects that develop practical approaches, tools, or frameworks to help decision-makers and communities navigate these challenges and support informed, equitable implementation are particularly relevant.

Reserve Contact: Kristen Weir, kristen.weir@mass.gov, 508-457-0495

Keywords: coastal resilience, nature-based solutions, relocation, human dimensions

Wells Reserve, Maine

Coastal hazards are increasingly impacting coastal communities in the Town of Wells and throughout Southern Maine. State agencies, regional planning organizations, and municipal governments are actively pursuing a variety of strategies across the resilience spectrum, but one approach – getting out of harm's way – remains underexplored, owing in part to a sense among practitioners that the public is resistant to or even hostile towards the idea. Therefore, research is needed to better understand resident's knowledge, perceptions, attitudes, and beliefs related to proactive coastal retreat and community-driven relocation. *Reserve Contact: Jessica Brunacini, Training and Engagement Director, jbrunacini@wellsnerr.org*

Communities in coastal southern Maine are facing difficult choices about how to respond to rising sea levels and more frequent flood events. Scientific data and tools are widely available to inform decision making. However, these resources are not always aligned with local knowledge, lived experience, and place-based values, and mistrust of scientific expertise creates a barrier on the uptake of information. Therefore, more research is needed on how different perspectives, ways of knowing, and experiences interact with scientific information in the context of community decision making for adaptation planning and resilience strategies. *Reserve Contact: Jacob Aman, Stewardship Director, jaman@wellsnerr.org.*

The System-wide Monitoring Program (SWMP) measures long-term changes and short-term variability in water quality, weather, and sea level. We seek to better synthesize these data to interpret trends and patterns, but we lack the analytical tools to comprehensively analyze such large datasets. Therefore, we are interested in projects that include the development of novel tools and robust analyses to efficiently summarize trends from these data, and to facilitate the future incorporation of other parameters, particularly aspects of carbonate chemistry. *Reserve Contact: Jason Goldstein, Research Director, jgoldstein@wellsnerr.org*

Partnerships between deaf education programs, American Sign Language linguistics, and the National Estuarine Research Reserve System are rare. Often the deaf community is integrated into projects after the fact, rather than as collaborators from the beginning. The Wells Reserve, a center for coastal science and education, is committed to serving and partnering with diverse communities. Research is necessary to better understand and address the needs and priorities of the deaf community within the Reserve's educational offerings and visitor services. *Reserve Contact: Suzanne Kahn, Education Director, suzanne@wellsnerr.org*

Anthropogenic activities and climate-driven changes alter the distribution and spread of non-native species. Terrestrial and aquatic environments are increasingly experiencing shifts in species composition, yet patterns of distribution, abundance, and interactions between native and non-native species remain poorly understood. In addition, public perceptions of the risks, benefits, and management of non-native species can strongly influence conservation and management outcomes but are often not well characterized. We seek to leverage monitoring datasets and stakeholder perspectives to advance current and future biodiversity monitoring programs, expanding our understanding of non-native species, their ecological impacts on communities and ecosystems, and the social dimensions that shape effective management and policy responses. *Reserve Contact: Jason Goldstein, Research Director, jgoldstein@wellsnerr.org*

Pacific Region

He'eia Reserve, Hawaii

There are different understandings of how to include community perspectives and needs in restoring social-ecological estuarine systems AND NERRS has increasingly identified a need to create and foster meaningful collaborations with Local and Indigenous communities. BUT, there are still gaps in our understanding of socio-cultural impacts of biocultural restoration. THEREFORE, our reserve would benefit from collaborative work within the System and more knowledge exchange with Indigenous and local communities to facilitate experiential learning related to understanding cultural ecosystem services, human dimensions, and well-being to explore community based research and the role of stewardship that support thriving estuaries and coastal communities.

Reserve Contact: Aimee Sato, Stewardship Coordinator, aimeeys@hawaii.edu

Our Reserve provides training and engagement opportunities that weave Indigenous and local knowledge with conventional scientific knowledge. AND community organizations and networks throughout Hawai'i will undergo planning efforts to promote Indigenous resource management practices towards habitat resilience while adaptively managing current scenarios. BUT the Reserve needs to engage with these organizations, facilitate knowledge exchange, and provide training that communicates information to coastal decision makers to respond to these scenarios. THEREFORE, our reserve seeks projects that enhance the transfer of knowledge between organizations within He'eia and from other organizations or networks to inform community-based planning that promotes dual fluency in management. *Reserve Contact: Casey Ching, Training and Engagement Coordinator,*

caseymc@hawaii.edu

The Reserve coordinates place-based education programs among multiple partners, with the goal of increasing public understanding of estuaries and Hawaiian resource management. The education program seeks social or educational research projects to leverage existing evaluation and programs at the scale of the He'eia NERR or Reserve System. We welcome both traditional hypothesis-driven research and action research that adds capacity to or builds upon our existing programs as applied inquiry. Projects may examine the mechanisms and outcomes of our existing programs: volunteer opportunities, preK-12 student programs, undergraduate and graduate fellowships, or our Teachers on the Estuary program that has offered immersive training and support in 'āina-based education for more than 100 participants over the last six years. Projects may also co-develop and analyze new opportunities to enhance educational efforts such as through curriculum, partnerships, infrastructure (e.g. design of signs, trails, and learning spaces), and online materials. *Reserve Contact: Fred Reppun, Education Coordinator,*

freppun@hawaii.edu

SWMP and other projects have been collecting long-term environmental data, AND have amassed a large collection of information about place. BUT, data exist in different databases and are not easily retrievable for modeling or big picture assessment to inform the direction of strategic planning for the reserve. THEREFORE, cross-sector collaborative efforts, such as gatherings and innovative tools such as eDNA and geospatial capability, to synthesize and make available cultural and scientific data across historical and current timelines are needed, with the goal of creating adaptable and accessible products as well as developing useful models to guide adaptive biocultural resource management. *Reserve Contact: Shimi Rii, Research Coordinator, shimi@hawaii.edu*

He'eia Reserve, Hawaii

Our reserve landscape has altered dramatically due to changes in land-use and Indigenous resource management practices AND climate change will further impact the diversity of native species and ecosystem-scale processes. BUT foundational information, such as nutrient cycling, plankton ecology, and food web dynamics, and how they respond to changes such as weather, seawater intrusion, warming temperatures, and decreasing pH at different spatial-temporal scales, is unknown. THEREFORE, our stewards of place have requested knowledge about the responses to change in our watershed, with the long-range goal of supporting native species, ecosystem resilience, and food sustainability in the face of climate change. *Reserve Contact: Shimi Rii, Research Coordinator, shimi@hawaii.edu*

Southeast Region

ACE Basin Reserve, South Carolina

Healthy ecosystems of the ACE Basin Reserve provide commonly recognized natural benefits to coastal communities in the form of jobs, food, carbon sequestration, recreational opportunities, cultural identity, and a sense of place. However, people often do not appreciate the magnitude of these services or connect them to their values. Therefore, there is a need for a deeper understanding of the ways human and natural systems interact through an ecosystem service approach. We need additional research to better: 1) measure ecosystem services, 2) engage the community and use social science to better understand human-nature connections and values, and 3) effectively communicate the valuable services functioning estuaries provide to coastal communities. This information is necessary to produce more effective integrated coastal management strategies that links local values and conservation options. *Reserve Contact: Jessica Kinsella, Kinsellaj@dnr.sc.gov*

The ACE Basin Reserve and the coast of South Carolina are facing climate change-related threats including sea level rise, flooding, shoreline erosion, and changing weather and storm patterns which is compounded by coastal development. Further research is needed to advance the science of habitat restoration and management around the impacts and future threats of climate change on the Reserve's key species and habitats including uplands, riparian areas, forested tidal swamps, and salt marshes. Therefore, the Reserve needs to investigate new technologies and adaptive management techniques designed to mitigate current and anticipated stressors and enhance wetland resiliency (and associated ecosystem services) within the ACE Basin estuary. This data would greatly inform future management techniques at the Reserve and communication strategies with partners throughout the watershed. *Reserve Contact: Jessica Kinsella, Kinsellaj@dnr.sc.gov*

The metropolitan areas of Charleston and Beaufort surrounding the ACE Basin continue to develop and cause water quality and stormwater runoff impacts. Awareness of the human impact on the health of our coastal waterways and nature-based solutions that will have a positive effect on water quality has spread, but there are still barriers that prevent implementation of these best practices. Few local research efforts have focused on identifying these barriers and effective ways to communicate the socio-economic benefits of nature-based solutions to decision makers and community members to affect behavior change. *Reserve Contact: Julie Binz, binzj@dnr.sc.gov*

ACE Basin Reserve, South Carolina

ACE Basin marshes are vulnerable to sea level rise and other climate change impacts. Managers are only beginning to understand the consequences of these potential changes. Research on different factors of salt marsh health, including integration and syntheses of different parameters of marsh health such as vegetation diversity, sediment transport, erosion rates, and oyster reef health need to be conducted and analyzed on a reserve-wide scale to plan for and prioritize restoration projects. Training and educational materials that can effectively communicate this research must be produced for coastal land managers in South Carolina. *Reserve Contact: Denise Sanger, sangerd@dnr.sc.gov*

Long-term meteorological and estuarine data exists for the ACE Basin NERR, and analyses indicate increases in short-term variability and long-term trends occur, but integrated assessments of biological data related to (e.g., blue crabs, red drum, oysters, and shrimp) with meteorological and water quality data has not been conducted. Therefore, integration and syntheses of the long-term meteorological, water quality, and biological datasets to understand the ecological implications of these changes is a high priority. Data visualization and science communication products must be developed to translate this information to natural resource managers and decision-makers. *Reserve Contact: Denise Sanger, sangerd@dnr.sc.gov*

Guana Tolomato Matanzas (GTM) Reserve, Florida

GTM NERR monitoring programs have produced high-quality water quality, weather, oyster, and wetland data over the last 10-25 years. There is a need to synthesize and leverage these data to inform a broader picture of how estuarine structure and function have changed over time and in response to disturbances. Proposals are sought for projects that use patterns observed via these data to inform management recommendations and improve conservation efforts into the future. *Reserve Contact: Nikki Dix, nikki.dix@floridadep.gov*

Algal blooms, fecal bacteria, and heavy metals are stressing the GTM estuary and creating public health risks. Ongoing monitoring provides monthly snapshots of water quality, but interdisciplinary strategies are needed for real-time detection, tracking, toxicity testing, and communicating risks to the public. There are also needs for pollution source tracking to inform restoration and research to investigate the impacts of pollution on ecosystem functioning. *Reserve Contact: Nikki Dix, nikki.dix@floridadep.gov*

The GTM NERR has seen a surge in shellfish aquaculture (bottom-bag clam and floating-cage oyster leases) within its boundaries in the last two years. The economic benefit of these activities is generally known, but little work has been done to quantify their influence on the ecosystem. Proposals are sought for projects that 1) investigate the impact of shellfish aquaculture on nutrient cycling, hydrodynamics, shoreline morphology, marsh and oyster reef condition, and fisheries and 2) determine lease configurations and farming practices collaboratively with farmers and regulatory agencies that meet regulations, enhance shellfish production and profit, and optimize ecosystem services. *Reserve Contact: Nikki Dix, Nikki.Dix@FloridaDEP.gov*

Guana Tolomato Matanzas (GTM) Reserve, Florida

Fisheries and Economic Drivers – Many economically and ecologically important fish species inhabit the GTM NERR for a portion or the entirety of their life cycle. Atlantic tarpon (*Megalops atlanticus*) have long been documented in the GTM NERR, and recent observations by NERR staff have identified potential nursery habitat for bonefish (*Albula vulpes*) within the Reserve. Some research has been conducted in the NERR on other, harvestable species like red drum (*Sciaenops ocellatus*) and snook (*Centropomus* sp.), however much is still unknown about the movement patterns of these fishes within the NERR as it relates to ecological phenomena like tropicalization or changes in water quality. Additionally, recent stakeholder engagement has identified shark depredation as having a significant impact on many of these fisheries in our waters. Therefore, it would be prudent to investigate drivers of habitat use and movement patterns for nekton that utilize the NERR, as well as the economic impacts of these behaviors. The Reserve maintains an acoustic telemetry array, which could be useful in answering some of these questions.

Reserve Contact: Matthew Bernanke, Matthew.bernanke@floridadep.gov

North Carolina Reserve, North Carolina

NCNERR components are a mosaic of habitats that provide ecosystem services AND are impacted by environmental and anthropogenic factors. BUT NCNERR has limited information on component marine/estuarine biodiversity and the provision of ecosystem services. There is growing potential for methods like eDNA, stable isotopes, and acoustic imaging to increase our capacity for ecological community analyses, and there are ongoing efforts within the NERRS that could be leveraged locally. THEREFORE, research is needed to inform future monitoring program approaches to capture species richness and diversity, particularly at Masonboro Island and Zeke's Island Reserves, and quantify and better understand the services the habitats provide. *Reserve Contact:* Justin Ridge, Research Coordinator, justin.ridge@deq.nc.gov

NCNERR shorelines and habitats are changing AND utilizing emerging methods may increase resilience at Masonboro Island, Zeke's Island, and Rachel Carson Reserves. BUT ecological and geophysical dynamics for both natural and modified features are still being investigated, and some environmental planning/assessment has been conducted (e.g., CCVATCH and site-specific resilience planning) to identify vulnerable habitats/locations where restoration techniques would be feasible and provide the best ecosystem outcomes. THEREFORE, the NCNERR seeks research that 1) further assesses spatially explicit habitat vulnerability and/or 2) evaluates current and emerging restoration techniques (e.g., novel nature-based technologies, beneficial use) at project or plot scales to address identified vulnerabilities. *Reserve Contact:* Justin Ridge, Research Coordinator, justin.ridge@deq.nc.gov

As part of the NERRS System-wide Monitoring Program, Reserve habitats are mapped from the uplands to the intertidal marsh-water edge AND Reserve staff have used remote sensing tools to map select areas of intertidal and subtidal habitats. BUT work continues to build our mapping catalog and better incorporate emerging tools to address our mapping needs across the Reserve system and tidal gradient. THEREFORE, the NCNERR is interested in expanding current work and leveraging available mapping products to 1) further assess habitat change trends and drivers across components and 2) develop a standardized monitoring approach for low salinity submerged aquatic vegetation (SAV) habitats at the Currituck Banks Reserve, integrating work with state and national mapping efforts. *Reserve Contact:* Justin Ridge, Research Coordinator, justin.ridge@deq.nc.gov

North Carolina Reserve, North Carolina

The NCNERR Zeke's Island and Currituck Banks components are experiencing changes in water quality, water levels, and ecological communities, with potential stressors including sedimentation, contaminants, harmful algal blooms, hypoxia, salinization of the water and soil, and sea-level rise. The NCNERR has baseline data for Zeke's Island (System-wide Monitoring Program) but not the Currituck Banks component. The extent, timing, and causes of these changes—and their relationships to habitat and ecological community changes—are not well understood, limiting the ability to assess habitat integrity, resilience, and restoration needs. THEREFORE, the NCNERR seeks research to integrate existing and new water quality, water level, and ecological monitoring data to better understand environmental change and its drivers at Zeke's Island and/or Currituck Banks. *Reserve Contact: Justin Ridge, Research Coordinator, justin.ridge@deq.nc.gov*

North Carolina NERR sites provide important opportunities for recreation, education, research, and traditional uses that benefit local citizens and attract visitors who contribute directly to local economies. WHILE some direct visitor expenditures can be estimated, the broader economic contributions of Reserve visitors to surrounding communities have not been well documented. THEREFORE, research is needed to better understand the Reserve's impact by quantifying the quality-of-life benefits to the community and the economic contributions of visitors while complementing ongoing efforts by NOAA and developing a transferable approach for understanding the local economic benefits of Reserve sites across North Carolina. *Reserve Contact: Justin Ridge, Research Coordinator, justin.ridge@deq.nc.gov*

North Inlet-Winyah Bay Reserve, South Carolina

Habitat and Ecosystem Response to Changing Environmental Conditions: Estuaries provide numerous ecosystem services, including nutrient cycling, carbon storage, and fisheries production, yet rising sea levels, warming winter temperatures, increased precipitation variability, and extreme weather events are expected to considerably alter these systems in the southeastern US. We seek projects that investigate the interactive effects of changing environmental conditions on estuarine structure, function, and associated ecosystem services at either the habitat- (e.g., salt marshes, tidal creeks, oyster reefs, soft-sediment benthos, beaches and dunes) or the system-scale, as well as research that explores potential adaptation, mitigation, and management strategies in light of these changes. *Reserve Contact: Erik Smith, Reserve Manager, erik@baruch.sc.edu, 843-904-9035*

Impacts of Coastal Development on Water Quality: South Carolina has some of the fastest rates of coastal development in the nation. This rapid growth may impair downstream water quality and threaten human aquatic resource use, yet the cumulative impact of changing land use, stormwater control measures, and development practices is not well understood. Therefore, research into how coastal land use, stormwater management, and local development practices affect the transport, transformation, and fate of pollutants (e.g., sediments, organic matter, nutrients, pathogens, emerging contaminants, etc.) is needed to better inform effective management of non-point source pollution across NIWB Reserve's watersheds. *Reserve Contact: Erik Smith, Reserve Manager, erik@baruch.sc.edu, 843-904-9035*

North Inlet-Winyah Bay Reserve, South Carolina

Effects of Human and Natural Stressors on Oysters, Reefs, and Services: Oysters are a key ecosystem engineer, yet management of oysters as both a harvested fishery resource and essential habitat presents unique challenges. In addition, coastal population growth may be driving increased anthropogenic pressure on oysters within the NIWB Reserve and other southeastern estuaries at the same time these ecosystem engineers face stressors induced by changing environmental conditions. Therefore, we are interested in research evaluating the condition, status, and trends of oyster populations, oyster reef habitat, and oyster reef ecosystem services at spatial and temporal scales relevant to effective and sustainable management. We are particularly interested in research that leverages emerging or novel techniques (e.g., drone-based sensors, eDNA, bioacoustics, etc.) to better understand the impacts of human and natural stressors on this key fishery and critical habitat. *Reserve Contact: Erik Smith, Reserve Manager, erik@baruch.sc.edu, 843-904-9035*

Estuarine Wildlife: Status, Function, and Stewardship: Estuarine wildlife (i.e., birds, reptiles, and mammals) are the “charismatic megafauna” of the NERR system, yet despite intense interest from the public in these taxa, their status and ecological role within many estuaries is not well understood, even in the face of increasing levels of anthropogenic and natural stressors. The NIWB Reserve is interested in supporting local- and regional-conservation efforts for various estuarine wildlife species and groups (especially marsh and shore birds, Diamondback Terrapins, and small mammals), and therefore seeks research on their abundance, distribution, and population trends within the reserve. We particularly encourage projects that investigate the connections between wildlife and estuarine habitats, the role of wildlife in cross-habitat and cross-system connectivity, or that seek to incorporate community science volunteers. *Reserve Contact: Erik Smith, Reserve Manager, erik@baruch.sc.edu, 843-904-9035*

Sapelo Island Reserve, Georgia

Environmental change will impact the community on Sapelo Island and other nearby low-lying areas on the mainland. Green infrastructure solutions may help increase the resilience of coastal communities. While living shorelines have been explored for coastal Georgia, few other green infrastructure options have been examined for their ability to boost coastal community resilience. A focused study on green solutions to the effects of climate change that balances efficacy and economic feasibility is needed. The results of this research should provide an intuitive decision-making tool for coastal community planning. *Reserve Contact: Brittany Dodge, Training & Engagement Coordinator, brittany.dodge@dnr.ga.gov*

Warmer winters have led to range expansion of species that have not been commonly found in coastal Georgia (e.g. mangroves). As environmental change continues to raise temperatures, these species will likely establish in new geographies. The effects on the ecosystems and ecosystem services for coastal Georgia is not currently known. An analysis of the impact of native range-expanding species on current Georgia coastal ecosystems and SINERR ecosystem services is needed. *Reserve Contact: Colby Pepper, Stewardship Coordinator, colby.pepper@dnr.ga.gov*

Currently, the water quality around McIntosh County and Sapelo Island’s estuaries is in comparatively good standing. These estuaries also support critical habitat for commercially important species. However, recent proposals to develop lands in McIntosh County, including areas near Meridian, may threaten this. Therefore, research is needed to model the impacts of proposed development on the water quality at Meridian (human non-point source pollution, increased water runoff, nutrient loading, sediment loading). *Reserve Contact: Ethan Bourque, Research Coordinator, ethan.bourque@dnr.ga.gov*

West Coast Region

Elkhorn Slough Reserve, California

The reserve restores various coastal habitats (e.g., salt marsh, coastal prairie, freshwater wetlands) to support the recovery of key coastal species (e.g., oysters, otters, amphibians). While we collect monitoring data, there are still many uncertainties about the best restoration methods and barriers to success. We are interested in research proposals that would lead to improved restoration success in the reserve. *Reserve Contact: Kerstin Wasson, kerstin.wasson@gmail.com, 831-728-2822*

The reserve is impacted by a variety of anthropogenic activities (e.g., nutrient loading, diking, invasive species). While we collect monitoring data characterizing indicators of estuarine health and anthropogenic disturbance, the mechanisms of impacts and how they have changed over time or vary spatially under different conditions are poorly understood. We are interested in research about the impacts of these anthropogenic activities on ecosystem functions, and how these impacts vary across time and space. *Reserve Contact: Kerstin Wasson, kerstin.wasson@gmail.com, 831-728-2822*

Responding to climate change and other stressors requires cooperative and collaborative planning among the reserve, many government agencies, and local communities. The reserve has made some progress in marsh restoration projects that are sea level rise-resilient, but future restoration and adaptation efforts within and beyond the reserve's boundaries will require expanded partnerships and collaborative planning, and strengthened understanding of local community priorities. We are interested in projects that investigate the human dimensions of coastal management, including community characterization (e.g., stakeholders, values, attitudes, beliefs, and social networks), resilience and adaptation, policy analysis, and impacts to coastal economies. *Reserve Contact: Kerstin Wasson, kerstin.wasson@gmail.com, 831-728-2822*

Kachemak Bay Reserve, Alaska

Understanding Land Use and Human Impacts

Community partners strive to understand how increased human pressure (e.g., port & harbor expansion, land development, water use, agriculture) combine with environmental change to impact natural and cultural resources. KBNERR seeks to develop and communicate effective management and mitigation strategies that preserve ecological function and protect key habitats for foundational intertidal, marine and freshwater species, and advance peatland conservation and freshwater source security. To accomplish this, research is needed to improve understanding of land use and water management (e.g., hydrology, nature-based infrastructure, coastal erosion, sediment deposition, and estuary connectivity) for stewarding lands, waters, and culturally and ecologically important species. In addition, we seek to align approaches with local knowledge, lived experience, and place-based conservation values, focusing work through a social-ecological estuarine system lens and fostering meaningful connections with local communities. *Reserve Contact: Katherine Schake, Reserve Manager, kschake@alaska.edu, 907-235-1593*

Kachemak Bay Reserve, Alaska

Community Engagement, Strengthening Relationships and Biocultural Restoration

Healthy ecosystems of Kachemak Bay sustain reciprocal relationships where human and natural communities thrive. Alaskan communities are aware of the ways nature contributes to economic, cultural, and other dimensions of wellbeing, but there is a disconnect between decision-making and maintaining ecosystems for generations to come. The Reserve aims to increase community understanding of watersheds, estuaries, coastal ecosystems, and connection to place in order to translate knowledge among multiple domains and promote “dual fluency” among different audiences. Knowledge exchange between NERRs, Alaskan tribal entities and rural communities is fundamental to the expansion of community-based initiatives. Exploration of biocultural restoration activities is needed to co-develop projects that protect our coastlines and ways of life, and social or education research is needed to evaluate the efficacy and impact of community relevant engagement and education that bolsters effective stewardship, research and education while advancing the quality of coastal community livelihoods.

Reserve Contact: Katherine Schake, Reserve Manager, kschake@alaska.edu, 907-235-1593

Translating Long-Term Ecosystem Monitoring

KBNERR collects long-term environmental data standardized across the NERR system to track changes in water quality and ecosystem health. Along with locally driven monitoring of marine primary productivity, harmful algae, and invasive species, these datasets provide a platform to understand seasonality and long term trends in the Gulf of Alaska bioregion. However, limited capacity has made it challenging for many reserves to fully utilize these data for place-based decision-making, management, and education. Therefore, research is needed in ecological data science to analyze ongoing and historic data sets to address gaps in baseline species and habitat data and detect and assess temporal and spatial change of important habitats (e.g., migratory birds utilizing salt marshes; salmon habitat connectivity from headwaters to ocean) and their social-cultural connections (e.g., domestic cattle grazing in salt marshes; salmon streams and freshwater flow reservations). In addition, these efforts require co-development of research questions and science communication that can use long-term data to address locally relevant issues, with development of accessible and useful education and decision support tools. *Reserve Contact: Katherine Schake, Reserve Manager, kschake@alaska.edu, 907-235-1593*

Understanding Environmental Change and Coastal Resilience

Understanding and exploring environmental change and hazards in Alaskan coastal ecosystems requires a multifaceted approach to applied science and education. KBNERR has well-established watershed, nearshore, and ocean ecology programs that collect, analyze, and outreach data focused on habitat change, human dynamics, and cultural resources. KBNERR seeks to expand the impact of these programs to support informed regional decision-making and increased community engagement to prepare for future coastal management challenges (e.g., increased coastal storms, landslides, floods, harmful algal blooms, invasive species). Therefore, research and projects are needed that support techniques for applying new and existing biophysical data (e.g., remote sensing, community monitoring), to assist local decision-makers in creating strategies to understand and plan for ecosystem change. Additionally, social science research is needed on how different perspectives, ways of knowing, and experiences interact with scientific information in the context of community decision making for risk management, adaptation planning and resilience strategies. *Reserve Contact: Katherine Schake, Reserve Manager, kschake@alaska.edu, 907-235-1593*

Padilla Bay Reserve, Washington

Research and monitoring related to biophysical, social, economic and behavioral impacts of habitat change resulting from climate change and/or coastal development. Climate change and increasing atmospheric CO₂ are altering sea level, water temperature, pH, and other factors that cause shifts in the distribution, health, and/or performance of species in Padilla Bay. These effects manifest in eelgrass, saltmarsh, mudflat, rocky intertidal, beach, and other coastal habitats, as well as impacts on workable lands (e.g. farming and saltwater intrusion) and recreational use (birding, hunting, fishing). Despite the diverse research and monitoring efforts and Padilla Bay, we often lack precise, measurable, and reliable metrics of emergent effects of climate change and increasing CO₂ on local waters. We need to predict how our ecosystem will change over time, and identify means of promoting resilience in natural habitats and their cultural and economic value. Therefore, we need to assist local and regional stakeholders in identifying strategies to protect or increase threatened habitats and species, and seek projects that help us understand how climate change will alter species, ecosystem services, and the human communities connected with and reliant upon our coastal ecosystem. *Reserve Contact: Jude Apple, Reserve Manager, japple@padillabay.gov, 360-391-5438*

Understanding how an ecosystem service approach can be utilized to support the protection and restoration of estuarine systems in the face of land use change, eutrophication, and contamination in estuarine ecosystems and the options for management and mitigation. Padilla Bay comprises native & non-native eelgrass, wetland and estuarine habitats, and agricultural lands that represent a valuable ecological, economic, and cultural resource for the region. The Padilla Bay watershed also includes natural areas, pastures, agricultural fields, hobby farms, and older homes with compromised septic systems. Fecal coliform contamination is a recurring problem in Padilla Bay and the surrounding waters, leading to the closure of local shellfish beds. The lands surrounding Padilla Bay, and particularly Bayview Ridge, are seeing the effects of development and land-use change. The implications of these changes on water quality, community resilience, and landscape-estuary interactions are unclear and natural resources are changing dramatically, yet we lack quantitative evidence connecting ecosystem functions with ecosystem services. Therefore, we seek projects that use an ecosystem service approach to understand the socio-ecological systems of Padilla Bay, and use this information to guide protection and/or restoration of local and regional estuarine ecosystems so that cultural, ecological and economic resources can be maintained in the face of global change. Processes of interest include utilization of eelgrass by fish, eelgrass-shellfish interactions, carbon sequestration, and causes of fecal coliform contamination. We also seek to assist local end-users and management agencies to reduce these inputs of contaminants, and explore linkages between large-scale changes in land use and water quality. We are also seeking opportunities to expand the use of our 100 acre demonstration farm to explore the relationship between agricultural practices, carbon sequestration, salinity intrusion, and nutrient delivery to coastal waters and develop best-practices related to agricultural land use in coastal watersheds. *Reserve Contacts: Sylvia Yang, syang@padillabay.gov, and Roger Fuller rfuller@padillabay.gov*

Padilla Bay Reserve, Washington

Strengthening relationships and knowledge sharing with indigenous, local and heritage communities to restore biocultural connections to place for the purpose of detecting habitat change and resilience, and conducting analyses of long-term ecosystem-scale change. Many contemporary restoration efforts focus on restoring ecosystem form, function and organisms, but often fail to address restoration of people's personal, cultural, aesthetic and/or spiritual connections to the land and natural habitats. Effective stewardship, research and education that advances community resilience and social justice needs to be informed by community values and perspectives. We seek to integrate Indigenous, local, and heritage community perspectives into PBNERR programs and work to restore peoples' personal and human connection to the lands and waters of Padilla Bay. We hope that this approach will lead to more authentic co-develop of projects and knowledge, and ultimately arrive at creative solutions for co-management of resources that connects environmental and human well-being. We strive to ensure that the research, monitoring, education, stewardship, technical assistance, and restoration efforts at PBNERR are truly representative of and informed by the communities of Padilla Bay and surrounding lands and waters. *Reserve Contact: Jude Apple, Reserve Manager, japple@padillabay.gov, 360-391-5438*

Syntheses and analyses of long-term monitoring data collected through NERRS SWMP monitoring activities at Padilla Bay and across the nation, and using these analyses to conduct hypothesis-driven studies of coastal ecosystem function, variability, water quality, and response to climate change. Natural and anthropogenic factors act at multiple spatiotemporal scales to drive change in estuarine ecosystems. Understanding how varying drivers interact at different temporal (e.g., short-to-long term) and spatial (e.g., watershed-to-global) scales is essential for addressing management needs. Thus, we are interested in quantitative analyses (e.g. multivariate, time-series, spatial) that synthesize long-term, system-wide (SWMP) monitoring data collected at Padilla Bay and across the NERRS, specifically when applied to investigate natural and anthropogenic drivers of variability in estuarine responses (e.g. in eelgrass, water quality, productivity). We are particularly interested in analyses that are conducted within the context of coastal habitats and land-use, and leverage existing PBNERR and NERRS data resources such as the SWMP Classifying Land-Use and Ecosystems (CLUE) classification tool, long-term eelgrass monitoring data, and aerial imagery. *Reserve Contact: Jude Apple, Reserve Manager, japple@padillabay.gov, 360-391-5438*

Mapping of eelgrass and other benthic habitats for the purpose of detecting habitat change and resilience, and conducting analyses of long-term ecosystem-scale change. Local scientists and managers need to track changes and trends in eelgrass/SAV coverage and distribution. In support of this, the Reserve seeks to integrate Tier 1 (large spatial scale) through Tier 3 (intensive plot scale) habitat monitoring to assess resilience and change. The goal is to identify relationships between eelgrass performance at different scales and identify the extent to which patterns observed at one scale are representative of those on a different scale. In short, does small scale performance predict large-scale patterns? Remotely collected multiband imagery can also be used to map shellfish and seagrass relationships, or understand the distribution and productivity of benthic diatoms. We are also interested in how development and agriculture have altered freshwater inputs and water quality in Padilla Bay, and identifying ways that benthic mapping can help us understand the impacts of land-use on benthic micro- and macro-algal dynamics, and on eelgrass. We are particularly interested in new and innovative methods related to image acquisition, analysis, segmentation, and processing that can be used to achieve these research and management needs. *Reserve Contact: Jude Apple, Reserve Manager, japple@padillabay.gov, 360-391-5438*

San Francisco Bay Reserve, California

Oyster farming is a growing part of the sustainable food economy in northern California, including within the targeted watershed of the SF Bay NERR. Conservation of native Olympia oysters is a priority for supporting healthy ecosystem function and previous research has improved understanding of native oyster ecology, but more research is needed to understand how high variability throughout the life cycle of both native and nonnative oyster species vital to the oyster farming industry. Therefore, we welcome studies that examine how factors affecting oyster growth, survival and population stability impact conservation and farming in the region. *Reserve Contact: Matt Ferner, mferner@sfsu.edu*

The tidal wetlands in Suisun Marsh are negatively impacted by feral pigs and extensive stands of invasive perennial pepperweed (*Lepidium latifolium*), as well as other non-native species, but limited past control efforts have not proven effective. Therefore, we welcome studies that examine management approaches and collaborate with SF Bay NERR, the Solano Land Trust, the Suisun Resource Conservation District, and other state and federal agencies to co-develop and test control or management options. *Reserve Contact: Matt Ferner, mferner@sfsu.edu*

South Slough Reserve, Oregon

Climate change is expected to alter South Slough habitats, negatively impact native species, and facilitate establishment of invasive species. We are beginning to monitor these impacts, yet we do not fully understand the potential effects of climate change or management actions to mitigate impacts. In addition, knowledge and action are essential for building communities resilient to climate change, but our impact on necessary behavior change is unknown. We need additional biophysical and social science research to understand the effect of climate change on habitats and species (particularly upland forest wildfire risk, tidal wetland (including forested swamp) migration pathways, and observed declines in estuarine fish communities), as well as to assess the best ways to engage and communicate climate change effects to diverse community audiences (e.g., recent work on how wetland restoration mitigates nearby urban flooding). *Reserve Contact: Shon Schooler, shon.schooler@dsl.oregon.gov*

For decades, the Reserve has been communicating about the value of estuaries and coastal watersheds, incorporating knowledge built from years of local research and stewardship. Humans benefit from the ecosystem services related to native species and estuarine habitats (including tidal habitats such as eelgrass beds and tidal forested swamps, and connected watershed habitats: uplands, streams, riparian areas, and freshwater wetlands). However, people often do not appreciate the magnitude of these services and the need to manage them effectively and sustainably. Existing management needs also identifies the necessity for social science research to better help the Reserve understand community perceptions related to climate change, ecosystem services, behavior change and education and training product needs. We need additional research to: 1) measure ecosystem services, 2) identify and prioritize management needs and identify effective strategies, and 3) communicate the valuable services functioning estuarine habitats provide to Pacific Northwest coastal communities and translate Reserve information about estuarine issues and management to diverse audiences. *Reserve Contact: Shon Schooler, shon.schooler@dsl.oregon.gov*

Human-induced stressors (i.e., changing climate, land-use practices, invasive species) compromise water quality, the health of animal and plant communities, and human quality of life. In some cases, multiple stressors, such as green crabs, sediment, rising temperatures, and chemical pollutants potentially interact to affect essential habitat, such as eelgrass beds. These effects then impact estuarine fish communities and sustainable fisheries. To effectively protect estuary species and functions, research is needed to prioritize quantifying, modeling, and managing interacting stressors. *Reserve Contact: Shon Schooler, shon.schooler@dsl.oregon.gov*

South Slough Reserve, Oregon

The Reserve is restoring wetlands and thinning dense re-growth forests for late-successional old-growth forest conditions. However, we don't know the effects of restoration thinning on habitat resilience, on faunal communities (e.g., birds), or how restoration projects contribute to bio-cultural resources. In addition, invasive species are affecting habitats and native species and impeding restoration activities. Since we don't fully understand their impacts or know what management strategies will be effective, we need research on restoration trajectories in wetlands and forests; social and cultural impacts of restoration; and the ecology, effects, and management of native and invasive species. *Reserve Contact:* Shon Schooler, shon.schooler@dsl.oregon.gov

The Reserve has data from long-term monitoring programs, and we would like to better understand environmental change over time within the Reserve and in comparison to other Reserves. Because we don't have the capacity to synthesize and interpret the data to identify environmental degradation issues and improvement opportunities, we need research assistance to: 1) analyze and summarize monitoring and spatial data, 2) provide decision-making tools (including modeling outputs) to meet the needs of coastal managers and decision makers, and 3) produce education tools for use by formal and non-formal educators. *Reserve Contact:* Shon Schooler, shon.schooler@dsl.oregon.gov

Tijuana River Reserve, California

The Tijuana Estuary is the largest, most intact coastal wetland left in Southern California, and ongoing restoration and conservation efforts have resulted in a system that supports a diversity of habitats and species, but stressors such as wastewater pollution, habitat degradation, and biological invasions remain. Therefore, more restoration and conservation work is being planned, and we need research and sharing of information related to processes that support native biota and habitats (including wetlands, dunes, and transition zones), as well as approaches for tracking a wide variety of ecological and social indicators that might change in response to management action. Such analyses also provide an excellent opportunity for quantitative comparisons with other systems in the region, across the NERRS, and beyond. *Reserve Contact:* Jeff Crooks; jcrooks@trnerr.org Keywords: restoration; water quality; habitats; species

Excessive sedimentation is one of the principal threats to the integrity of the Tijuana River Valley and efforts are underway to capture and effectively manage this material, but we lack a full understanding of local sediment dynamics and how they might respond to both short- and long-term management interventions and environmental change. Therefore, we need studies and transfer of information related to the role of sediment in coastal ecosystems as well as approaches for sediment management and coastal resilience such as natural and nature-based solutions (e.g., beneficial use in restoration and nourishment). *Reserve Contact:* Jeff Crooks; jcrooks@trnerr.org Keywords: sediment; beneficial re-use; restoration

Debris is a significant source of impairment in the Tijuana Estuary and we have learned lessons related to its management and impacts, but there is still more work to be done in this complex international setting. Therefore, a deeper assessment of the impact of debris—and the behaviors and barriers that contribute to it—is needed to identify actionable solutions and inform targeted training and technical assistance strategies to mitigate its impacts. We also need a greater understanding of the efficacy of interception and removal technologies of debris (including microplastics) on social-ecological systems. Additionally, understanding the Reserve's niche in a marine debris community of practice and in areas such as research, training, stewardship, and education is of interest. *Reserve Contact:* Kristen Goodrich; kgoodrich@trnerr.org Keywords: marine debris; plastics; watershed

Tijuana River Reserve, California

Many Southern California lagoons, such as the Tijuana Estuary, are characterized by small, dynamic river mouths that connect to the sea, and the nature of these inlets fundamentally shape both estuarine and nearshore ecosystems, but changes in hydrology, tidal action, wave climate, and beach processes can dramatically affect inlet functioning. Therefore, we need studies of estuary-ocean connections (physical, chemical, and biological) and how these might change under varying conditions. *Reserve Contact:* Jeff Crooks; jcrooks@trnerr.org Keywords: tidal prism; inlet; ocean-estuary exchange; ecosystem connectivity

The Tijuana River Watershed is a highly complex socio-ecological setting, where three nations meet (U.S., Mexico and Kumeyaay). Environmental stressors impact the river, estuary, and the surrounding communities on both sides of the international border, and occur against a backdrop of many other challenges. Strengthening relationships and knowledge sharing across these communities will bolster restoration, stewardship, and research efforts and deepen understanding of cultural heritage. We are interested in expanding partnerships and building relationships with local communities and Tribal partners and applying social science and other approaches to inform various boundary-spanning practices. *Reserve Contact:* Kristen Goodrich; kgoodrich@trnerr.org Keywords: human dimensions; boundary-spanning; cultural heritage