Christopher Peters

Sea level rise and climate change present major threats to tidal marshes nationwide. To track and understand these impacts, the National Marsh Synthesis Team (NAMASTE) has synthesized plant community and sediment accretion data at 85 marshes across 17 coastal states within 20 National Estuarine Research Reserves (NERRs). Tidal marsh monitoring in the NERR's began nationwide over 10 years ago, allowing NAMASTE the unique opportunity to conduct a first of its kind analysis on a national scale using data collected through a standardized monitoring program. Our project goals are to provide (1) insight on how climate change is affecting marshes, both at the national-level and Reserve-level; (2) automated tools based in R for data analysis and visualization;, (3) transferable utility for future NERR analyses, other organizations with marsh data, and a template for other coastal habitats (seagrass, mangroves); and (4) to produce science translation products to support management and policy around coastal marshes. To reach these goals, NAMASTE has employed several analytical techniques (innovative metrics, community analysis, conceptual models, and structural equation modeling) as well as a collaborative approach engaging coastal researchers, managers and educators around the country. Preliminary results show the majority of Reserves are seeing significant shifts in plant communities, which is also reflected in the national-level analysis. Our results will inform if, where and how tidal marshes are changing across the country to better inform researchers and managers at local to national scales.

Sarah Crosby

Salt marshes are among the most productive ecosystems on earth, providing ecosystem services from coastal protection to fish nursery habitat. Despite their value, human modification of coastal landscapes combined with the increasing rate of sea-level rise have resulted in significant and increasing habitat loss. For salt marsh restoration and management to be effective, it is imperative to improve our understanding of marsh-building plants that form the ecological foundation of these habitats. Along the U.S. Atlantic and Gulf coasts, that role is played by smooth cordgrass, Spartina alterniflora. Given the observed differences in characteristics between populations of S. alterniflora, the source of plants used for restoration may impact the resilience and biodiversity of restored ecosystems. Understanding differences in genetic diversity and geographic origin of S. alterniflora and the structure, function, and resilience of the ecosystem that results, will enable the long-term success of restoration efforts to be improved. 6 natural and 6 restored salt marshes in Long Island Sound were studied in 2021-2022 for S. alterniflora genetics, biomass, and biometrics, and faunal community composition. The effective number of S. alterniflora genotypes was significantly lower in natural than restored sites, and differentiation between each restored site and natural sites decreased with time. No difference was observed between natural and restored marshes in live belowground biomass, however, natural marshes had significantly more dead belowground biomass. Density of live plants and species richness differed between natural and restored sites. Differences were observed in marsh platform invertebrates between the restored and natural sites, but there was no detected difference in nekton known to use marshes for refuge from predation or foraging at high tide. Abiotic factors were also studied, showcasing differences in elevation and marsh edge steepness between natural and restored sites, but no difference in

other factors such as soil temperature and grain size. With restoration seeking resilient ecosystems, it is important to understand factors that may undermine or improve the persistence and function of restored sites and modify restoration planning accordingly.

Tony Bowron

The practice of re-introducing, where feasible, tidal flow to former agricultural dykelands and the restoration of tidal wetland habitat has been identified as a viable adaptation method to current and future hazards associated with climate change. Building upon the successful implementation of managed realignment and the restoration of 30 ha of tidal wetland habitat in the first iteration of the Making Room for Wetlands (MRFW) project (2017-2022), MRFW 2.0 is being implemented in four tidal river estuaries in the Bay of Fundy, Nova Scotia, Canada. Sites for dyke realignment, habitat restoration and/or drainage improvements, are being selected in collaboration with the Provincial Department of Agriculture, following a comprehensive dyke vulnerability assessment and builds upon over two decades of collaboration and experience in tidal wetland restoration. Many sites have historical and cultural significance to both the Mi'kmaq and Acadian peoples and are known to support culturally important species like the plamu (Atlantic Salmon), punamu (Atlantic Tomcod) and ka't (American Eel). The project will improve the resilience of the surrounding communities, infrastructure, and agricultural lands by re-establishing room for the natural migration of wetlands and reducing flood and erosion risks. This presentation will provide an overview of the MRFW project and associated goals, the integration of two-eyed seeing, and will describe the development of best practices for managed realignment and tidal wetland restoration in these areas.