Vulnerability Assessments and Infrastructure Resilience -Case Study Daytona Beach - Kiara Horton

How does a coastal utility assess the vulnerability of critical coastal infrastructure facilities to sea level rise (SLR) and storm surge and in turn, create climate resilient infrastructure? Both accurate prediction of impacts from SLR and storm surge over the service life of coastal facilities, and assessing, planning, and implementing risk analysis impacts of storm surge and SLR on coastal facilities are necessary to improve climate resilience and allow utilities adequate time to budget for resilience measures before they are needed. This is a case study to demonstrate the process used at Daytona Beach to make a coastal facility climate resilient.

On October 7th, 2016, Hurricane Mathew pushed up the Atlantic Coast through the City of Daytona Beach as a Category 2 hurricane. The maximum storm surge was within inches of flooding the City's Bethune Point Water Reclamation Facility's Motor Control Center (MCC) building. Flooding of the MCC building would have shut the facility down, and the time to restore this critical piece of infrastructure could take several weeks. The ability to treat wastewater for approximately half of the City would be lost creating an environmental/humanitarian emergency for the region.

Understanding that the amount of storm surge will increase with the impact of rising seas, the City made the decision that this critical coastal facility must be assessed for climate vulnerability and a resiliency plan be created. This presentation will discuss the project background, process, results of the assessment, proposed actions moving forward and funding for the recommended improvements.

Tyndall Air Force Base Coastal Resilience Program –Lessons Learned Six Years Following Hurricane Michael - Katie Konchar

In October 2018, Hurricane Michael damaged nearly all of Tyndall Air Force Base's (AFB) assets. The U.S. Air Force made a commitment to rebuild the base as the "Installation of the Future," focusing on resilience due to its vulnerable coastal location. The Tyndall AFB Coastal Resilience Implementation Plan (CRIP), completed in 2022, advocates for the implementation of Nature-based Solutions (NbS) alongside on-base reconstruction. In 2021, The Nature Conservancy (TNC) began working to secure funding to support the design and permitting of four initial NbS projects: a 1,000 ft. living shoreline, a 1,500 ft. oyster reef breakwater, a 3,500 ft. network of submerged shoreline stabilization structures, and 5 acres of seagrass habitat enhancements. These projects aim to reduce wave energy and mitigating shoreline erosion adjacent to key base assets. Six years after Hurricane Michael, progress includes a base-wide Programmatic Environmental Assessment, extensive data collection, hydrodynamic and wave transformation modeling, and engineering design plans, with construction anticipated in 2026. The four initial NbS projects serve as opportunities to invest in small-scale coastal resilience solutions now and will inform longer-term risk reduction strategy at Tyndall AFB. The project involves TNC, Jacobs Solutions, U.S. Naval Research Laboratory, University of Florida, and local Estuary Program

partners. Funding has been provided by the Readiness and Environmental Integration Program (REPI), NOAA, and Bay County RESTORE Act Direct Component.

"Unraveling Pathogenic Fungal Dynamics in Floridian Mangrove Communities: Implications for Conservation and Management" - Melissa Deinys

In recent years, there has been a noticeable decline in mangrove health along the Floridian coastlines. Despite this concerning trend, there is a lack of information regarding fungal pathogens contributing to this decline. Hence, this study was conducted to evaluate the overall health of mangrove populations across the Floridian coastlines and to identify fungal pathogens associated with tree decline.This study presents the first report of various fungal families impacting mangrove communities along the Floridian coastline in Red Mangroves (Rhizophora mangle). Through extensive surveys covering approximately 300 trees across the Floridian east coast, we identified several fungal species, including Curvularia lunata, Pestaliptiopsis microspora, and Neopestaliptiopsis species. Symptoms observed on leaves encompassed necrotic tissue, chlorosis, black and gray leaf spots, and stomata damage.Seed and leaf samples from symptomatic trees were subjected to in vitro culturing of fungi. Analysis using ITS1 and ITS4 identified the presence of these fungal species, marking the first documented occurrence of these pathogens in Floridian mangrove populations. To assess pathogenicity, under-bark inoculation of R. Mangle seedlings in a controlled greenhouse environment were performed. The prevalence of fungal-induced symptoms underscores the need for further investigation into their impact on mangrove health and potential conservation strategies.This study highlights the significance of understanding fungal dynamics in mangrove ecosystems and emphasizes the importance of continued monitoring and management efforts to preserve the ecological integrity of coastal mangrove habitats along the Floridian coastline.

Seagrass Habitat Restoration in West Bay, St. Andrew Bay, Florida - Becca Hatchell

Anthropogenic impacts likely contributed to ~1,800 acres of seagrass loss in West Bay, St. Andrew Bay, Florida between 1953 and 1992. Since 2015, the Florida Fish and Wildlife Conservation Commission (FWC) has installed ~5 acres of subtidal oyster reef habitat along the deep edge of historic seagrass coverage in an effort to improve water quality and foster the recovery of more than 200 acres of seagrass. In 2019, a yearlong 0.24-acre pilot study was implemented to evaluate the feasibility of seagrass transplantation. Using the lessons learned, in 2021 the FWC scaled up the project to 7.87 acres and transplanted more than 35,640 Cuban shoal grass (Halodule wrightii) planting units. Near-by donor sites were used to harvest bare-root material that was transplanted within seven (1-1.3 acre) restoration plots in a checkerboard design. To gauge the success of the large-scale planting effort, monitoring sites were haphazardly selected and monitored for percent frequency of seagrass occurrence, planting unit survival, and sediment elevation changes across 3 years. The results of this project phase and FWC's most recent spring 2024 planting phase update will be presented at the Coastal & Estuarine Summit. With over $500,000 invested to date, this project is the largest known seagrass transplantation to occur in the Florida Panhandle. Methods, results, and lessons learned can inform seagrass recovery efforts in Gulf of Mexico estuaries where physicochemical roadblocks to seagrass recovery have been addressed.

The Perdido Watershed Initiative: Integrating Innovative Approaches to Achieve Restoration at the Watershed Scale - Katherine Baltzer

With unprecedented opportunities for funding restoration at scales larger than ever before, executing restoration projects that achieve watershed scale impacts requires working across boundaries, using innovative approaches, and developing unique partnerships. The Nature Conservancy's Perdido Watershed Initiative integrates a suite of on-the ground restoration efforts, shoreline assessments to inform planning and restoration, a living shoreline suitability model, and extensive outreach using partner networks across Alabama and Florida. Innovative approaches include beneficial use of dredged material from unlikely sources incorporating seagrass transplanting to reduce impacts of restoration and partnering with graduate and undergraduate students to develop restoration designs for shoreline protection on public property while building job skills. We will also discuss challenges of managing a multi-component project across jurisdictional boundaries and balancing the economic needs of tourism and development with conservation needs. By leveraging our existing networks to establish new connections and solutions, we have been able to incorporate a holistic approach to protecting critical coastal habitats and ecosystem services that communities throughout the Perdido Watershed rely on.