Building for Adaptation and Resilience in Maryland's Coastal Zone - Coast Smart Construction Program - Ryland Taylor

Maryland's Coast Smart Construction Program is a state policy enacted to govern capital investments in the coastal floodplain through siting and design criteria. Throughout the coastal zone there is a need for transparent and implementable siting and design criteria for resilient development in the floodplain, but the administration of these policies can be complicated and vary widely. Specific legislation around siting and design criteria is limited across coastal states, but we have an opportunity to learn from each other and facilitate information sharing. Typically, siting and design criteria is pulled from Federal Emergency Management Agency (FEMA) guidelines, but in many cases it can be advantageous to try to take the guidelines beyond the recommendations. To assist in reviews, the State of Maryland has developed the Coast Smart Climate Ready Action Boundary (CS-CRAB) as a mapping component of the screening process, and it is an integral part of making the Coast Smart Construction Program user-friendly. The CS-CRAB map takes into account the current and future projected floodplain with a platform that allows users to overlay their project shapefile or coordinates directly. The ability to visualize and quantify flooding throughout Maryland's coastal zone and use it to inform design criteria has helped developers connect siting and design criteria to effective coastal management. Maryland will share lessons learned along the way as we continue to refine state mechanisms.

Linking Marine Heatwave Events to Potential Impacts to Key Fisheries in Chesapeake Bay - Jamileh Soueidan

The Chesapeake Bay is the largest and one of the most productive estuaries in the United States, providing important ecosystem services to Bay communities. Marine heatwaves create extreme temperature conditions that threaten important economic fisheries in the region, including striped bass (Morone saxatilis), a culturally iconic recreational fishery. Research demonstrating increases in the duration, frequency, and intensity of marine heatwaves in the Bay led to recommendations by the Chesapeake Bay Program to pursue better tracking and the development of early warning indicators for when conditions become unfavorable for economically and environmentally important living resources. This presentation will focus on recent efforts by the NOAA Chesapeake Bay Office (NCBO) to integrate fish habitat considerations into marine heatwave analyses to understand how these extreme events could be affecting key fisheries in the Chesapeake Bay. These efforts included collaborating with climate change and fisheries scientists to develop a framework for detecting marine heatwaves in sea surface temperature data from NOAA buoys and satellites and drawing linkages with fisheries habitat considerations. This presentation will also highlight efforts to integrate this information into NCBO's public-facing seasonal summaries—quarterly reports analyzing environmental impacts on key species—through the development of data visualizations of marine heatwave events from 2022-2023 and linking them to habitat condition thresholds for striped bass. Future work will focus on incorporating emergent fish physiology research and other environmental factors into the analyses and scoping out a forecasting framework for a marine heatwave alert system to inform fisheries management.

Ranking Marsh Geomorphologies and Ecosystem Services for Large Scale Conservation in the Chesapeake Bay: An Expert Consensus Exercise - Taryn Sudol

Marshes can be valued by the numerous ecosystem services they may provide (e.g., habitat, carbon sequestration, flood mitigation), though the number and degree of these services will vary based on the marshes' extent, geography, and geomorphology. In October 2022, Maryland Sea Grant hosted the "Large-Scale Marsh Persistence and Restoration in the Chesapeake Bay" workshop to help identify marshes best suited for large-scale conservation efforts. We tasked 86 participants (i.e., government agencies, non-governmental organizations, academia) through a collaborative rapid assessment process to provide expert input on the site characteristics (e.g. habitat types, stressors, migration corridors), capacity for ecosystem services (e.g. proximity to communities, carbon accretion rates), and management concerns (e.g. management costs, outreach potential) for seven common marsh types in the Chesapeake Bay. This resulted in a "Prioritization Matrix" to rank how well a particular marsh geomorphology provided an ecosystem service. We summarized 1) the benefits geomorphologies provide per ecosystem service; 2) the common site criteria participants considered for investing in marsh conservation (i.e., patch size, sediment supply, community benefits); and 3) research questions identified during participant discussions. Our presentation will highlight marsh site characteristics that achieve the most ecosystem service co-benefits, including where site-specific services converge or diverge, as well as next steps for defining numeric thresholds on specific site criteria (e.g. patch size, salinity change) and implementing regional siting strategies.

Wanting It All - Enhancing the Shoreline at Fort Smallwood Park - Anna Johnson

Fort Smallwood Park is a waterfront Park located in Anne Arundel County, Maryland. The Park offers multiple recreational amenities for residents and visitors such as fishing, swimming, kayaking, a public boat launch, picnicking, birdwatching, children's playground, walking trails and pavilion rentals. Built in the late 1880's, the Park holds historical significance as it served as a sea coast defense from 1890 to 1927 and the Hawthorne Battery is still accessible today.
The Fort Smallwood Park Shoreline Stabilization project was implemented as a park improvements project focused on protecting and enhancing approximately 4650 feet of shoreline. The existing shoreline consisted of highly eroded banks, a dilapidated seawall with stone protection, and a narrow beach serving as one of only two public swim beaches in Anne Arundel County. By 2017, approximately 2.8 acres of land had been lost due to coastal erosion since 1994.
The project to restore, protect, and enhance the shoreline utilized multiple techniques for shoreline protection and a combination of green and gray infrastructure to provide multi-faceted benefits. A living shoreline with offshore breakwaters, sand fill including beneficial use of sandy dredged material placement from a neighboring boating channel, and marsh plantings was implemented as Phase 1, completed in 2020. Phase 2, completed in 2022, included construction of headland breakwaters and beach nourishment for swimming and recreation. Phase 3, also completed in 2022, involved the construction of fishing piers and replacement of the seawall with an elevated revetment to protect against flooding and washout due to wave overtopping.

A Model Approach to Ecological and Community Resilience in Oxford, MD - James Duffy

The National Wildlife Federation, (NWF) in collaboration with the Town of Oxford, MD, Maryland Department of Natural Resources (MD DNR), and Underwood & Associates Inc. (U&A), have completed construction on a model approach to mitigate rapid shoreline erosion. This innovative, scalable, and geographically-transferrable project incorporates "living breakwaters", dune creation and a living shoreline to address the impacts from storm surge within a high energy environment. The innovative project design is the direct result of a long history of assessments and planning conducted by the Town of Oxford, in partnership with MD DNR and other State agencies, to document municipal vulnerability to stormwater, flood, and SLR.

Two secondary project goals included, showcasing an approach with the potential for broad cost-effective replication, and providing an example of an innovative nature-based project with comprehensive monitoring data that supports the efficacy of the design. As such, NWF worked in collaboration with the University of Maryland Center for Environmental Science, the Cooperative Oxford Laboratory, MD DNR, NWF and U&A, the project also includes pre-implementation, and more than a year of post-construction monitoring across a broad suite of ecological and geophysical metrics.