Nationwide estuarine water temperature monitoring by satellite (USA) - Ronald Vogel

With high human populations and competing resources, long-term climate changes in estuaries can impact the economies of coastal communities. Yet, except for a few well-studied estuaries with ongoing monitoring programs, little data exists on water temperature change for most estuaries throughout the United States. Satellites with their vantage point from space offer a means to provide water temperature in locations where measurements are often lacking. Satellite based water temperature can thereby help to establish temperature trends for most estuaries nationwide. Using a NASA data set of cloud-free, daily temperature data at 1 km spatial resolution, we developed an online water temperature history for estuary managers to understand multi-year temperature change in 84 estuaries on the United States' east, west and Gulf of Mexico coasts.

The web tool capitalizes on the NOAA CoastWatch Data Portal for easy access to daily, monthly and annual average temperature imagery for any of the 84 estuaries. In addition, time series of monthly and annual average temperature show seasonal and interannual trends. The tool is designed to easily expand the number of estuaries and to continually add new satellite data as it becomes available. Estuary managers utilize the information in the web tool to inform coastal management decisions, from fisheries and seagrass to water quality and recreation. Future reanalysis of data will extend the time series back 20 to 30 years. Adding time series for other water quality parameters from satellites, such as chlorophyll and turbidity, is also being considered.

Updates to the NFWF Coastal Resilience Evaluation and Siting Tool (CREST) and Coastal Resilience Analyses - Ryan Littlewood

The National Fish and Wildlife Foundation’s Coastal Resilience Evaluation and Siting Tool (CREST) is a web-based tool to inform decisions about siting coastal restoration and resilience projects across the US. Launched in 2019, CREST is based on a series of regional Coastal Resilience Analyses developed in collaboration with the National Environmental Modeling and Analysis Center (NEMAC) at UNC-Asheville. The Coastal Resilience Analyses combine information about local flooding threats, human community assets, and fish and wildlife species of conservation concern to identify Resilience Hubs, areas of open space near human communities where valuable natural resources and habitats can potentially protect the populations and critical infrastructure at greatest risk from flood-related hazards. Resilience Hubs incorporate multiple indices, all of which are available in CREST. Now, ongoing updates to data and methods will ensure that users of the Coastal Resilience Analyses and CREST can take advantage of the latest science, while CREST will benefit from usability updates based on user feedback.

New Geodetic and Tidal Datums are A’Comin! Implications for Restoration Practitioners - Philippe Hensel

Coastal practitioners rely on accurate vertical datums to successfully implement restoration projects. NOAA's National Geodetic Service (NGS) and Center for Operational Oceanographic Products and Services (CO-OPS) are rolling out new tidal and geodetic datums within the next few years, which will impact the foundational data upon which restoration projects are designed and monitored. Accurate water level, tidal datums, and land elevations in relation to water levels are critical for federal, state, and private-sector restoration planning, including coastal engineering, inundation modeling, reference site data, and determining planting zones, among other things. This informational session will socialize these datum updates, highlight the impact they will have on restoration projects, and inform how restoration practitioners can prepare for these changes. We will also provide a listening session format to field questions and solicit feedback from the audience on how to support restoration practitioners during the rollout of the new datums.

Climate Central's Toolkit for Analyzing and Communicating Sea Level Rise and Coastal Flood Risk - Kelly Van Baalen

With sea levels projected to rise a foot and multiply the frequency of moderate flooding ten-fold by 2050 (NOAA 2022), it is more imperative than ever that coastal managers have the resources they need to assess, communicate, and adapt to the risks posed by sea level rise and coastal flooding.

For the past decade, Climate Central has provided publicly available online tools, maps, reports, and visualizations, grounded in peer-reviewed research and informed by the needs of coastal stakeholders. These resources have been shared by the news media tens of thousands of times, used by millions of people, and featured at the UN climate conference.

Climate Central's new flagship tool, the Coastal Risk Finder was built based on the findings of a year-long needs assessment involving interviews with over 100 stakeholders and employs the latest elevation, levee, sea level rise, coastal flood, and Census data. The Coastal Risk Finder allows users to customize their sea level rise and coastal flood scenario, learn who and what is at risk, and share localized maps, statistics, and graphics. Additionally, our cutting-edge FloodVision technology collects elevation data for adaptation planning and produces photorealistic visualizations of flooding for risk communication.

This presentation will demo Climate Central's latest tools for analyzing and communicating sea level rise and coastal flood risk, provide examples of how coastal managers use them, and seek feedback from the audience to inform the continuous improvement of our tools.

Mapping our estuaries -- past, present, and future: Using topography, tidal heights, and historical maps to characterize estuarine habitats - Laura Brophy

Co-authors: Daniel Brumbaugh, Charlie Endris, Andrea Woolfolk, Suzanne Shull, Monica Almeida, Kerstin Wasson

Abstract:
Estuaries are coastal gems. To protect and restore them, we need to know where they are, where they were, and where they could be in the future. Our team, led by the National Estuarine Research Reserves (NERRs), recently completed an ambitious effort to map estuarine habitat in and around the 30 NERRs. We used two approaches: elevation-based mapping to identify habitats within the reach of tides, and historical mapping to understand past conditions. Collaborating with local stakeholders, we found that our methods were effective across all US coastlines, and could be applied to estuaries anywhere. Elevation-based mapping proved to be a powerful tool for mapping areas within reach of tides, yielding better understanding of past, present, and potential estuary extent. This approach revealed that US estuaries are or were often bigger – sometimes vastly so – than what is shown in most maps. In over 80% of studied estuaries, elevation-based mapping detected temperate forested tidal wetlands missed by National Wetland Inventory maps generated primarily from aerial photographs, highlighting critical, understudied, and often-vulnerable tidal habitats. Historical mapping provided a valuable window into past ecological conditions; our change analysis using historical maps revealed that tidal marsh has undergone substantially greater losses on the Pacific coast compared to other US regions. Each mapping approach had strengths and limitations, so we recommend combining multiple methods for improved understanding of both past and present conditions at estuaries.