

Beaches Conference 7/14/2017

Session Notes: Community and Infrastructure Assessments

Assessing New Hampshire's Tidal Crossings for Coastal Resilience – Peter Steckler, TNC New Hampshire

- Tidal crossing assessment protocol – completed for NH (as of 7/14/17, available online)
 - Collaborative with NH DEP, UNH, and TNC
- Why tidal crossings?
 - Distinct from freshwater protocols for crossings due to variable circumstances like bidirectional flow and unique habitat considerations
 - Can severely impact marsh health
 - Crossings that restrict tidal flow may prevent flooding upstream, so a restoration could lead to variable flood patterns (which should be a consideration in potential restoration projects)
- Tidal crossing protocol was developed to address several management concerns:
 - Are crossings in good condition?
 - Do they restrict flow?
 - Are there fish passage concerns?
 - Is marsh health affected by the crossing?
 - Is the crossing “climate-ready,” i.e. effective under changing climate conditions?
 - Might we expect upstream flooding impacts from a restoration?
- The backbone of the protocol is a field determination based on site specific information – developed the protocol as outlined on data sheets to collect all relevant information while conducting a site survey – some methodological considerations:
 - Size, dimensions, conditions, infrastructure issues – all of these are often more compelling than habitat issues, especially at the municipal level
 - Collect specific elevation data including high-water mark, wrack line, structure ceiling, road surface elevation, marsh plain
 - Longitudinal profile through structure – highlight impacts from structure
 - Helps to show the compatibility of the structure in the tidal system and its readiness for climate change
 - Estimate tidal range up and down the stream
 - Look at marsh/vag type on either side of the crossing and condition of marsh
 - Contact road manager to discuss management issues/potential maintenance schedule
- Conduct the actual assessment → plug in data → generate summary sheet
 - Overlay results against management objectives
- Aims to prioritize project sites through a combination of infrastructure and ecological demands

Understanding the Full Spectrum of Future Coastal Flood Risk on Maine's Coast – Nathan Dill, Ransom Consulting

- What is the hazard we are considering?
 - Storm surge – increased sea level from wind stress and atmospheric low pressure
 - Storm waves – energetic fluctuations on a short time frame
 - Relative sea level rise – gradual increase in mean water level
 - ***these hazards play out at very different time scales and need to be considered accordingly
- FEMA Base flood elevation – calculated for 100 yr storm event
 - Stillwater level (SWL) – see diagram in slides for depiction
- North Atlantic Coast Comprehensive Study (NACCS) – sandy inspired project conducted by the Army Corps – uses the ADCIRC numerical model
 - The study is limited because land elevations are not accurately represented so you can't really use it for overland modelling
 - Coarse resolution in Maine
 - They obtained the data from ACOE for 1976 groundhog day storm in the Gulf of Maine – the model slightly under predicts water levels in Portland but does fairly well
 - In Bar Harbor the model under predicts water levels peaks in the storm much more than in Portland
 - This trend continues as you move further north downeast
 - *Their goal is to fix this in the ACOE model
- Designed a unique model (ADCIRC-based) for Penobscot Bay at a much finer resolution
 - This model was much more successful at predicting land flooding potential – matches closely to measured peaks from Bar Harbor
 - Also some high water marks collected after the 76 storm that they used to validate the model – off by 0.08 ft, mean error 0.5 ft
 - Also wanted to address Sea Level Rise – typical SLR curves are simply empirical and have no information about probabilities and our understanding of the likelihood of increases is limited
 - We need to consider SLR from the view of probability distributions – probabilistic modelling
 - Using a monte carlo approach to get a risk of SLR and storm surge for a given year
 - Can look at a specific flood elevation for a given year to assess flood risk down the road
- Model is useful for towns and communities looking to address flood hazards and risk assessments

Creation and use of a Decision Support Tool (DST) For Culvert Prioritization – Tom Reinauer (Southern Maine Planning and Development Commission) and Jake Aman (Wells Reserve)

- Developing the DST (Tom Reinauer) – looking at large storm events in Maine as back drop for the project – there have been significant impacts from these storms in the past (infrastructure-related, crossing collapses)
- Went back and mapped the patriot's day storm road closures against critical infrastructure (hospitals, police stations, etc.)
 - Sanford had a high number of issues during the past storms – mapped problem areas to they can notify residents of coming issues via reverse 911
- A lot of other SLR/vulnerability assessment work was happening concurrently
- Huge list of partners on steering committee for the project
- Project goal was initial to map all culverts but found that the numbers made this unachievable
- Refocused the project to look at 3-5 ft culverts in the coastal flood zone (larger ones tend to be looked at closely by DOT anyway)
- DST process – several assessment categories (see slides) – relies heavily on the Maine habitat viewer
- Wells Reserve (Jake's Portion) is assessing and prioritizing culverts in southern Maine (in partnership with TNC) – used DST because it prioritized infrastructure and ecological priorities
 - Honed in on the places with dual value
 - Data: field crews from TNC and Maine Audubon
 - Very similar to Peter's protocol measurements
- Lots of sites are barriers or potential barriers to passage by aquatic organisms
- Questions with answers that give a quantitative score for each culvert
 - Jake narrowed the DST down to those that could be answered on a batch basis
 - Left about 21 of the 30
 - Prioritized the culverts that were included in the study
- Looked at DOT road priority list and evacuation route proximity analysis to finalize the DST score and ranking
- Added one criterion to the DST – barriers that posed a potential issue for diadromous fish passage
- Towns/planners should be able to cross reference this information against their maintenance schedules and priority lists for crossings