



Preparing for Coastal Flooding in Harpswell: A Plan for Basin Point Road and adjacent wetlands

"The usefulness of this project has and will continue to benefit the Town of Harpswell and will contribute to the increase in knowledge specific to this site and in the collective study of sea level rise, its effects and the planning for the future as a whole. Harpswell's 216 miles of coastline is an asset to us all. It can also be viewed as a potential liability by investors in the bond market because of sea level rise and storm surge. This year the Town of Harpswell issued for the first time its own bonds to finance the removal of a naval pier at Mitchell Field. The Town of Harpswell received a triple A bond rating resulting in significant interest savings for many factors, including Harpswell's recognition of sea level rise and specifically in its involvement in this project."

Kevin E. Johnson, Chair Harpswell Selectboard

PARTNERS (completed December 2018)

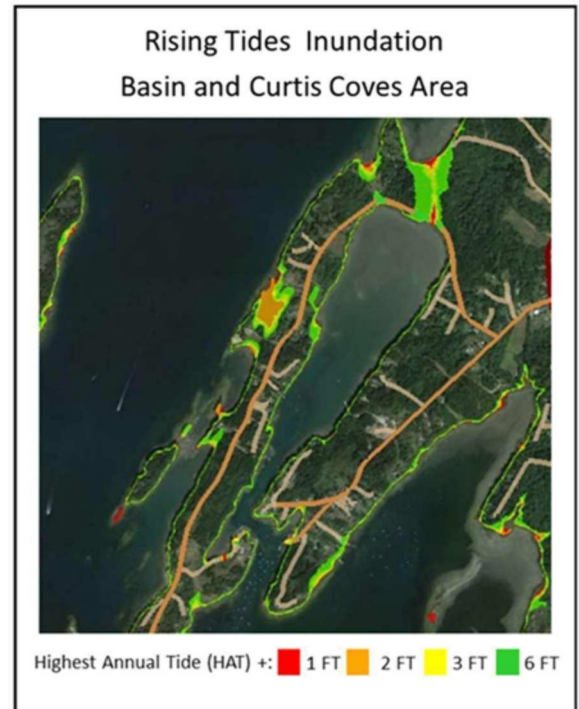
Harpswell Conservation Commission (HCC), Harpswell Heritage Land Trust (HHLT), The Dolphin Marina, and affected small businesses and households on Basin Point Road.

PROJECT DESCRIPTION

In 2017, the Town of Harpswell awarded two studies to plan for the Impacts of sea level rise (SLR) and storm surge on a low-lying road and adjacent ecosystems. The Town commissioned Gorrill Palmer Engineering (GP) to assess design options and costs for upgrading the road and culvert crossing to withstand anticipated sea level rise; and Casco Bay Estuary Partnership (CBEP) to assess current ecological conditions and scenario planning for the impact of culvert replacement and sea level rise on ecosystems adjacent to the road.

APPROACH

Basin Point Road is predicted to be overtopped with as little as one (1) foot of sea level rise (SLR). As this is the only access point for a heavily traveled road, elevated sea levels will have impacts on local infrastructure, the local economy, and habitats of the adjacent wetland and pond. A feasibility study was performed to determine the present status of road infrastructure and determine how the existing culvert crossing is impacting the adjacent pond, wetland and marsh migration.



RESULTS

Conceptual options are available to solve the problems of sea level rise and habitat impacts by raising the road but will require significant expenditures to implement. The study also highlighted that as we mitigate for a six (6) ft. SLR scenario there are flooding impacts on adjacent properties that may prompt a different solution.

- Capital road improvements are designed to have a life expectancy of 20-50 years. Five of Harpswell's public roads currently experience overtopping when a high tide is accompanied with high winds and storm surge. Designing an infrastructure improvement of the magnitude to handle a one (1) or two (2) ft. sea level rise scenario would cost about the same as for a three (3) ft. rise, so it was determined to plan for rises of 3.3 ft. and 6 ft.
- To Accommodate a 3.3 ft. rise: Raise the road 4.3 ft. over the culvert at an estimated construction cost of \$607,000 plus 10% to cover design and permitting.
- To accommodate a 6 ft. rise: Raise the road 6 ft. over the culvert at an estimated construction cost of \$1,210,000 plus 10% to cover design and permitting.
- The ecological study determined the existing pond is already tidal and provides habitat values for a limited range of birds and fish while drowning former salt marsh. Conceptual options above would restore tidal exchange and promote recovery of salt marsh communities in the pond and adjacent low-lying areas.
- These options would also promote marsh migration into low-lying freshwater wetlands and upland habitat as sea level rises.
- The ecological report noted that its 2018 water level and vegetative assessment suggests that current conditions are periodically comparable to a one (1) ft. sea level rise scenario. Sea level rise predictions indicate that Basin Point Road is at risk of overtopping between the 1ft. and 3.3 ft. sea level rise scenario; and in fact, was probably close to overtopping during the January 4, 2018 storm. Road bed depth on a Class A road is between 15 and 18 inches so gravels could now be losing integrity. If water were to spill into the pond from over the top of the road, the existing culvert would be grossly inadequate to drain the volume of water suddenly trapped upstream. As tide levels receded in Basin Cove, stored water of water suddenly trapped upstream. As tide levels receded in Basin Cove, stored water upstream could cause scour, potentially undermining the road and threatening the pond.

NEXT STEPS AND OPPORTUNITIES

- Institute a program to monitor and track road deterioration, flooding damage and associated repair | maintenance costs on vulnerable Town roads.
- Harpswell has a number of high traffic roads that will be affected with 1to 2 feet of sea level rise. Repeat comprehensive feasibility | conceptual design studies at these locations to provide important planning information to the Town.
- Provide information to the Town Roads Capital Improvements Program to start ranking vulnerable locations and prioritize mitigation on Town roads throughout Harpswell.
- Develop a capital improvement funding program to prepare for high costs of mitigating for sea level rise.

LESSONS LEARNED

- The project pointed out that a comprehensive approach of investigating transportation, economic, resiliency and ecological issues will facilitate informed decision making that addresses multiple priorities of the Town and the community.
- This pilot study put numbers on what the Town is facing. There are (8) eight Town roads projected to be affected by one to two feet of rise, and if the cost for one road is extrapolated for 8 roads, what are the implications for a town of 5000 people?
- When one thinks about SLR and coastal flooding, one envisions the water coming over road. However, the engineer noted that when the road base gravels begins to get wet, erosion and deterioration takes place and maintenance costs rise. A road base is usually between 15 and 18 inches below the road surface. Some of our most vulnerable roads are already getting seepage and degrading during king tides.
- The study pointed out the benefits in opening flow and allowing salt marsh migration to replace the current fresh/brackish pond. The public presentation workshop promoted an exchange of thoughts regarding changes to the surrounding environment and pointed out that decisions regarding a final plan should take into account the viewpoints of the affected parties.

APPLICABILITY FOR OTHER MUNICIPALITIES

- Taking a comprehensive approach as part of a feasibility study for a specific location estimates the costs to remediate and will help in prioritization needed road improvements.
- The Casco Bay Estuary Partnership stated at the study's conclusion that this site was useful as an in-depth case study given its constrained but well-defined issues pertaining to habitat impacts, threats to transportation infrastructure, and potential for residential and economic impacts over time. Incorporation of ecological components to a plan is warranted due to the importance of these habitats to local economies, notably fisheries, as well as the values and services they provide. And, in addition coastal habitat restoration is a priority for several state and national entities that provide grant funding to promote ecological restoration and resilience.

FOR MORE INFORMATION

Terri Sawyer, Deputy Town Administrator
tsawyer@town.harpswell.me.us and 207-833-5771

FY18 CCG - 58
7.22.19.

Final Report and maps available at: http://www.harpswell.maine.gov/index.asp?Type=B_BASIC&SEC={E74D5E1F-E607-4F42-A0C4-7D684A1FF398}

Financial assistance provided by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce Grant CZM NA17NOS4190116 to the Maine Coastal Program. Coastal Community Grants are awarded and administered by the Municipal Planning Assistance Program at the Maine Department of Agriculture, Conservation and Forestry .

