

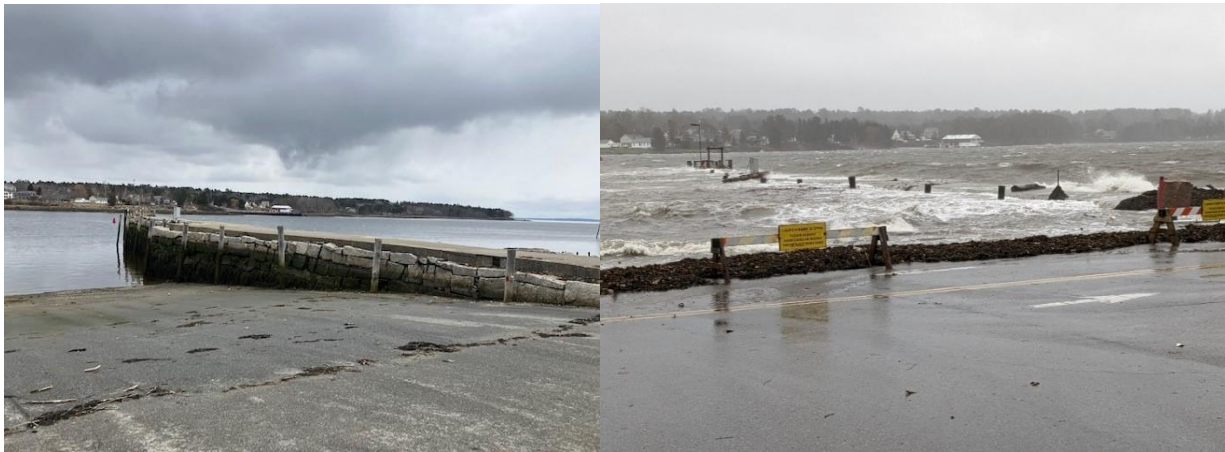


## Shore and Harbor Planning Grants

### City of Belfast

#### ***Breakwater Improvements Planning and Preliminary Design Project (Fiscal Year 2022, project awarded 2021)***

*“This grant process was a very important step in assessing and making decisions on how to protect and maintain Maine’s vitally important shorefront infrastructure and public access in the wake of predicted sea level rise and storm surge. It really takes a ‘thinking out of the box’ approach, grasping the reality of higher sea levels, and recognizing how vulnerable you may be.” – Kathy Given, Belfast Harbor Master*



**Photos:** Kathy Given (left), GMRI Coastal Flooding Map ([Ecosystem Investigation Network - Coastal Flooding: Storms and Sea Level Rise \(gmri.org\)](https://www.gmri.org/Coastal-Flooding-Storms-and-Sea-Level-Rise))

### Project Description

The City of Belfast is planning to raise the breakwater protecting the Belfast Public Landing. The structure is essential for maintaining public access to the water and protecting Belfast Harbor. With an elevation just over 8.5 ft, the breakwater is already vulnerable to wave damage and erosion during large storms. The City applied for the Shore and Harbor Planning Grant in 2021 to explore options for raising and extending the breakwater to maintain and prepare the structure for future conditions.

The resilience of the landing and breakwater to future sea level rise and storm surge conditions was evaluated by WSP Environment & Infrastructure Solutions, Inc. (formerly Wood Environment & Infrastructure Solutions) in 2019 in a separate study funded by Maine Coastal Program ([Penobscot Bay Summary Report 12 23 19.pdf \(maine.gov\)](https://www.maine.gov/penobscot-bay-summary-report-12-23-19.pdf)). That project identified vulnerabilities that would need to be addressed in the near future. The City applied for and received the Shore and Harbor Planning Grant to build on the initial study, and they hired WSP Environment & Infrastructure, Inc. again for the project.

## Project Results

Cost estimates for four design options were completed and presented to the Belfast Harbor Committee and Belfast City Council:

1. Rebuild breakwater in current footprint with similar materials and raise 3.9 feet
2. Rebuild breakwater in current footprint with fiberglass reinforced polymer and raise 3.9 feet
3. Rebuild breakwater with similar materials, extend 60 feet, and raise 3.9 feet
4. Rebuild breakwater with fiberglass reinforced polymer, extend 60 feet, and raise 3.9 feet

The City preferred the options that included extending the breakwater 60 feet, but there was concern that extending the breakwater might impact the movement of sediment in Belfast Harbor. The consultant provided an estimate for a follow-up sediment study to ensure that the extension would be permissible and would not have unintended negative consequences on the harbor. The project was very important to the City and helped the harbor committee and city council consider options and plan for future construction efforts to maintain the resilience of the facility.

## Future Plans

The City reapplied to the Shore and Harbor Planning Grant in 2023 (FY2024 program) and received funding; the sediment study will take place in 2024. The City is also pursuing funding for construction of the updated breakwater. The final report may be found on the City of Belfast website.



*Photo: Kathy Given, Belfast Harbor Master*

## Lessons Learned

It is important to have a designated point person to coordinate among municipal officials and the project contractor. This is essential for keeping the project moving and on track for completion.



*Photo: Kathy Given, Belfast Harbor Master*

*Thanks to Kathy Given for help preparing this summary.*

*This project was funded by award CZM NA21NOS4190082 to the Maine Coastal Program from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration or the Department of Commerce.*

