

Project Summary Report

Storm Surge



Project Reporting Period: October 2024-September 2025

Grant number: SEANWS-2023-JeCoWS-00006

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1. Abstract

The Storm Surge Project is derived from Sea Grants King Tide Project. Starting in 2016 a group of volunteers in Port Townsend started to photograph King Tides at three locations around town during King Tides that aligned with meteorological conditions that would result in high total water levels. Low pressure and strong winds can add storm surge and wave run up that can create water levels significantly higher than the tide level.

In 2018 the team started working with Ian Miller, the coastal hazards specialist with Sea Grant to measure the total water level at the Salmon Club Boat Ramp by comparing photographs of the high water with a lidar map of the boat ramp. Although not representative of all shorelines the fixed features of the boat ramp allows consistent measurements over multiple years. The boat ramp is located near the Port Townsend ferry terminal, which has a tide gauge. This allows the measurements to be checked against the tide gauge, and storm surge to be separated from wave run up.

The reports were distributed through a newsletter of Local 20/20, a Port Townsend non-profit focused on sustainability.

The MRC Storm Surge Project was created to help spread the knowledge being gained about flooding risk from storm surge.

2. Project Goals

- Continue to monitor during storm surge conditions.
- Make the new and existing reports easily available.
- Create an index to make it easier to find relevant reports.
- Create a template for the creation of additional index sites.

3. Project Engagement

3.1. Partners/Organizations

- Sea Grant: Dr. Ian Miller
- Local 20/20
- Jefferson County Climate Action Committee

3.2. Participants

Name of Event	Date of Event	MRC members attended (names)	Participants attended (number)
Storm Surge Monitoring	Oct 18, 2024	Jeff Taylor	David Wilkinson Barney Bure
Storm Surge Monitoring	Nov 4, 2024	Jeff Taylor	David Wilkinson Barney Burke
Storm Surge Monitoring	Nov 20, 2024	Jeff Taylor	David Wilkinson Barney Burke
Storm Surge Monitoring	Dec 14, 2024	Jeff Taylor	David Wilkinson Barney Burke

4. Project Methods/Actions

There are two independent action required for monitoring storm surge events. Predicting when storm surge events are going to occur, and making the measurements.

Predicting storm surge is an exercise in meteorological forecasting. This has evolved over time but starts with looking at the winds and pressure data in the North Pacific Ocean days before a King Tide. In recent years as more products have been developed by NOAA storm surge prediction has been simplified. Each report describes the meteorological conditions that caused the storm surge. We also developed a protocol that lists the weather websites that we use.

During the storm surge the team takes photos a fixed location in Boat Haven that can flood in the highest tides. This photo is from the extreme event on December 27, 2022 that caused floods throughout Puget Sound. Storm surge added over two feet to the high tide during this event.



Figure 1) Boat Haven December 27, 2022 Photo: Barney Burke

Photos are also taken at the Salmon Bay boat ramp in Port Townsend. The high water level is referenced to fixed features at the boat ramp and then compared to the elevation in the lidar map of the boat ramp.

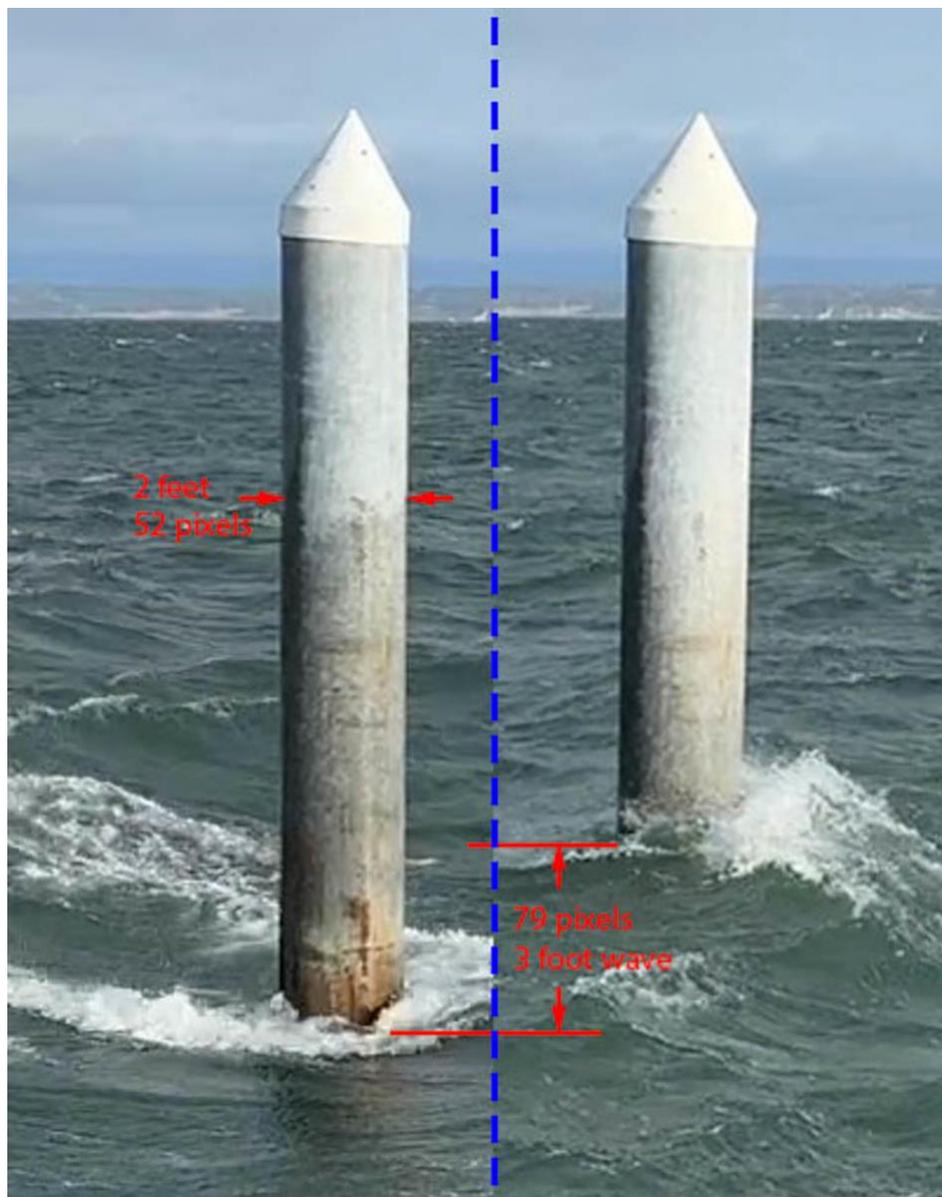


Figure 3: video frames of the peak and trough used to calculate wave height

4.1. Results

All of the existing reports have been added to the NW Straits Sound IQ. Each report details the conditions that caused the storm surge and wave run up. Instructions for accessing the reports can be found in the Jefferson County MRC projects page for Storm Surge Monitoring.

The reports can be accessed through a searchable index on the NW Straits Sound IQ site: [STORM SURGE | SoundIQ](#)

2025 did not have a large number of high total water events, with a total of 4 monitoring events.

We have developed a protocol that can be used to create new monitoring sites.

5. Project Highlights, Innovations & Stories

In this video: [Making king tides more than photos - YouTube](#) Ian Miller explains how this project fills existing observational data gaps.

Two members of the storm surge team, Cindy Jayne and David Wilkinson were on the steering team for Port Townsend's sea level rise risk assessment.

[porttownsend sea level rise report final 12132022.pdf](#)

6. Lessons Learned

- Storm Surge and wind are predicted, but the alignment with the highest tide is harder to predict.
- Wave run up is site specific.
- Shoreline property owners do not always get advanced warning of possible flooding events.

7. Next Steps

There are tools available that can give a few days warning of possible flooding events, but most shoreline property owners are unaware of them. We may add outreach to the project.

We are also going to evaluate different ways to measure total water levels. Considering using a stadia rod, or using a GPS mark on a GIS program with lidar.

Images



Pre dawn monitoring. Barney Burke capturing storm surge event. December 10, 2022.

Photo: Jeff Taylor



Storm Surge event with high winds. Photo: Jeff Taylor



Ian Miller (WA Sea Grant), Jon Waggoner (Herrera Environmental) and Dave Wilkinsor using high resolution GPS to map the boat ramp elevation. January 23, 2023. Photo: Jeff Taylor



David Wilkinson explaining Storm Surge monitoring project to Charlotte Dohrn (Ecology) at the November 11, 2023 NW Straits annual meeting. Photo: Jeff Taylor