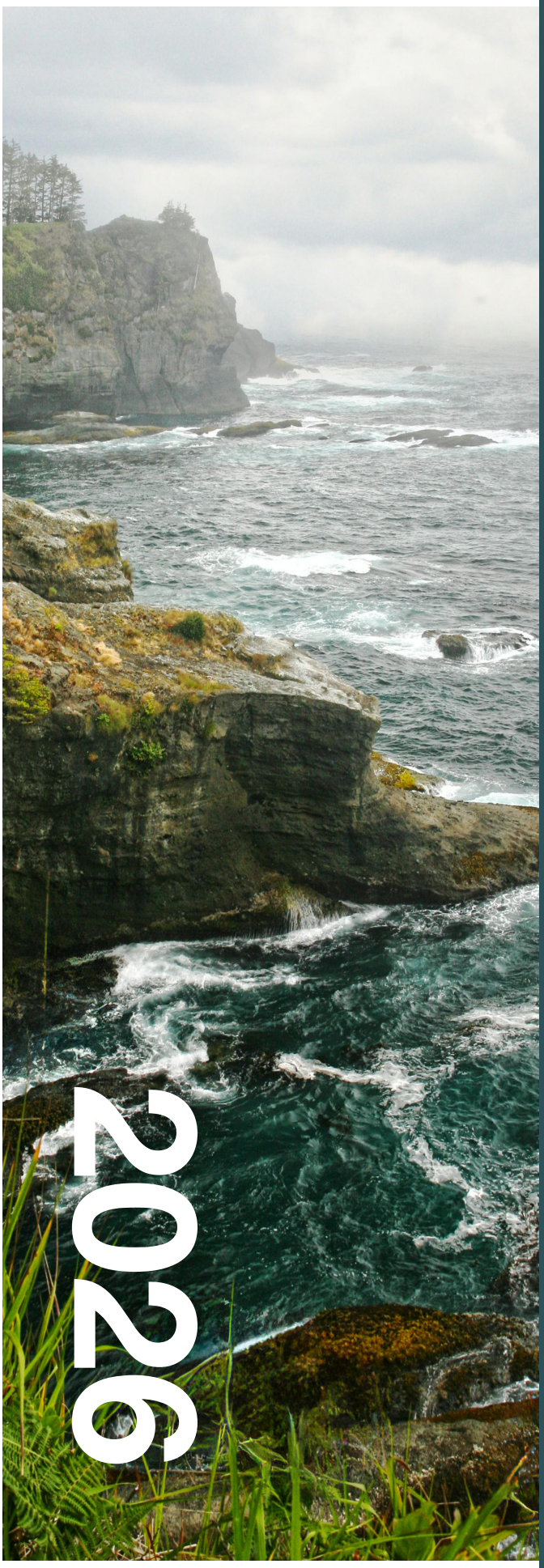



# ADAPTATION OF HISTORIC PROPERTIES TO FLOODING

## Washington State Resource Guide

WASHINGTON TRUST FOR HISTORIC PRESERVATION

MARITIME WASHINGTON
NATIONAL HERITAGE AREA

This guide was produced by the Washington Trust for Historic Preservation and Maritime Washington National Heritage Area.

The Washington Trust for Historic Preservation is a nonprofit dedicated to partnering with communities to preserve, share, and shape the future of historic places in Washington State. The Maritime Washington National Heritage Area supports a network that strengthens the maritime community and connects people with the stories, experiences, resources, and cultures of our state's saltwater shores and waterways. The Washington Trust serves as the local coordinating entity for Maritime Washington, as designated by Congress in 2019.

WASHINGTON TRUST FOR HISTORIC PRESERVATION

MARITIME WASHINGTON NATIONAL HERITAGE AREA
*Shaped by Sea & Story*

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NATIONAL PARK SERVICE

dahp
DEPT OF ARCHAEOLOGY + HISTORIC PRESERVATION

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*Cover image "Dramatic Coast Cliffs in Washington State," photographed by James Wilson from Pexels. Courtesy of Canva.*

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# INTRODUCTION

This guide is intended to serve as a roadmap for property owners and stewards in Washington State as they adapt their historic properties to impacts from flooding. The toolkit is built on the assumption that many of these projects will not have sufficient funding to hire an architect or engineer. The focus of this guide is on buildings, structures, and landscapes affected by coastal flooding, including riparian flooding driven by coastal factors. It does not address vessels. Information within it may be useful for people experiencing non-coastal influenced riparian flooding.



*Aerial view of the Coupeville Wharf on Whidbey Island. Courtesy of Maritime Washington.*

# How to Use This Guide

Use this guide along with the worksheet in "Appendix A. Flood Adaptation Planning Worksheet" to collect and record information about your property. The completed worksheet is intended to support accurate and consistent communication of project details with agencies, contractors, and specialists.

This guide should also be used in conjunction with external resources, including:

- Federal Emergency Management Agency (FEMA) flood maps
- The National Park Service (NPS) *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings* at this link
- The Washington Trust for Historic Preservation (Washington Trust) "Historic Preservation and Coastal Flooding Webinar" videos

"Appendix C. Technical Resources" lists other key websites, publications, and videos referenced in this guide. Step-by-step guidance is provided in "Appendix E. Website Guidance" on using these resources.

### Definitions

*Throughout this guide,* **"property"** *refers to a parcel of land that you own or manage. This may align with a tax parcel or recorded property lot but may also include multiple parcels that function as a single property.*

**"Resource(s)"** *refers to the buildings, structures, and site features located on your property.*

# Tools to Have on Hand

Key tools necessary for using this guide include:

- Computer and internet access
- Printer access
- Tape measure
- Digital camera

# APPROACHING YOUR PROJECT

Regardless of whether flooding is anticipated or already happening at your property, project planning is needed to understand risk, select an approach, and implement a flood adaptation strategy.

Complete the worksheet in "Appendix A. Flood Adaptation Planning Worksheet" as you proceed through the project planning steps. The worksheet, even if not fully complete, provides an important tool for collecting information and working with everyone that you engage with during your project, including contractors, building officials, design professionals, permit reviewers, and grant administrators.

For additional information on each of the following steps, refer to the Washington Trust "Historic Preservation and Coastal Flooding Webinar" videos.



*View of Port Townsend waterfront. Photographed by Wirestock. Courtesy of Canva.*

# Step One: Assessing Risk

## *What is the likelihood and frequency of flooding for your property?*

## *What is the severity of the flooding's impact?*

Answering these questions is key to understanding how you can best manage flood risk. This section takes you through the steps to: 1) document flood risk for your property; 2) identify important factors affecting decision-making; and, 3) evaluate options for adaptations and interventions. Refer to the "Planning and Assessment for Flood Risk Reduction" section of the National Park Service's *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings* at this link for additional information.

### Definitions

**Mean Higher High Water (MHHW)** *is the average (sum of all values divided by the total number of data points) over 19 years of the maximum daily tide recorded for a specific tidal station.*

**Base Flood Elevation (BFE)** *is the level that water is expected to reach during a 100-year flood, meaning there is a 1% chance of a flood at that level happening in any given year. Buildings are evaluated against this number for flood insurance and local ordinances. It is found on Flood Insurance Rate Maps (FIRMs).*

## Determine Flood Risk at Your Property

Understanding how flooding occurs at your property includes knowing how likely your property is to flood, the anticipated frequency of flooding, the height the water may reach on the property, and the type of flooding.

The following steps are intended to provide the most comprehensive picture of the flood risk for your property.

**Figure 1. Risk Assessment Matrix**

Severity →

Likelihood ↑

| | Negligible | Minor | Moderate | Significant | Severe |
|---|---|---|---|---|---|
| **Very Likely** | Low Med | Medium | Med Hi | High | High |
| **Likely** | Low | Low Med | Medium | Med Hi | High |
| **Possible** | Low | Low Med | Medium | Med Hi | Med Hi |
| **Unlikely** | Low | Low Med | Low Med | Medium | Med Hi |
| **Very Unlikely** | Low | Low | Low Med | Medium | Medium |

Risk Matrix Example

Likelihood X Severity = Risk Level

Adapted from the matrix provided by Dr. Ian Miller, Coast Hazard Specialist, in the Washington Trust "Historic Preservation and Coastal Flooding Webinar: Assessing the Risks and Impacts."

## Determine the Likelihood of Flooding

The **Coastal Storm Modeling System,** or COSMOS, from the U.S. Geological Survey (USGS) Hazard Exposure Reporting and Analytics (HERA) website identifies the likelihood of coastal flooding for your property. The modeling in COSMOS accounts for all processes influencing flood risk, including waves and storms. COSMOS is currently only available for Whatcom, King, and Pierce Counties but is planned for all Washington coastal counties. If data is not available for your county, check "no data" for this section on the worksheet and proceed to the next step, "Elevation at Which Flooding Occurs." This uses the National Oceanic and Atmospheric Administration (NOAA) Sea Level Viewer, which is the secondary option for counties not in COSMOS.

*The likelihood of flooding is informed by several factors, including both the elevation of your property and the anticipated elevation that flood waters will reach. Determining your property's likelihood of flooding can make clear the urgency of your need to adapt and will also inform which types of strategies you might take for adapting the property. Adaptations can range from temporary measures to permanent changes.*

To understand the likelihood of flooding at your property, go to the COSMOS website. Refer to "COSMOS Guidance" in Appendix E for directions on navigating the website.

## Identify the Elevation at Which Flooding Occurs

Once you know Mean Higher High Water (MHHW) for your location, then you can determine the elevation above this level that flooding starts to occur for your property.

**Tidal datums** published by NOAA identify the MHHW for your location. It is the average height of the maximum daily tide at a specific location recorded over a 19-year period.

To determine the MHHW elevation for your property, go to the NOAA Tidal Datums website. Refer to "NOAA Tidal Datums Guidance" in Appendix E for directions on navigating the website.

The **NOAA Sea Level Viewer** provides the information to identify at what level in feet the sea level rise above MHHW will result in flooding for your property. To determine the elevation at which flooding occurs related to your property, go to the NOAA Sea Level Viewer website. Refer to "NOAA Sea Level Viewer Guidance" in Appendix E for directions on navigating the website.

## Determine the Frequency of Flooding

Establishing the probable frequency of flooding at your property requires knowing the feet above Mean Higher High Water (MHHW) at which flooding starts to occur, established in the previous step.

The **NOAA Tides and Currents Viewer** models the single scenario of tidal action (including extreme high tide events) relative to the MHHW level. The MHHW in this model is continually being updated and is generally expected to rise rather than decrease over time. To determine the probable flooding frequency at your property, go to the website. Refer to "NOAA Tides and Currents Viewer Guidance" in Appendix E for directions on navigating the website.

## *Identify Decision Factors*

Once you've established the flood risk for your property, the following decision factors will help inform which adaptation strategy you select. These factors include:

- Building use
- Time horizon
- Economics

### Building Use

How you plan to use the building has implications for what you are willing to invest, the length of time you plan to use the property, and how building code applies.

Review the list of "Building Code Use Group categories" to the right to identify the category that most closely matches your intended use. Based on the anticipated users of this guide, the list does not include educational, factory/industrial, high hazard, or institutional uses. Record the category in your worksheet that most closely matches your intended primary purpose for the building, and note if the building will have mixed uses (e.g., an apartment over a retail space).

This categorization provides a starting point for your planning. As you work with your local building official and they begin to understand your intended use, they may change or modify the use group category to better fit local code.

Please keep in mind that there may be additional regulations or restrictions related to historic designation of your property. Depending on your jurisdiction and designation, there may be additional preservation regulations in addition to code requirements, or your building may be exempt from some code requirements because of its historic designation.

### Building Code Use Group categories

- *A (Assembly): Places for 50 or more people gathering for amusement, deliberation, or dining (e.g., theaters, restaurants, churches).*
- *B (Business): Offices, professional services, or transactions (e.g., banks, barbershops).*
- *M (Mercantile): Retail or wholesale stores displaying and selling goods.*
- *R (Residential): Dwellings for sleeping, including houses, apartments, and hotels.*
  - *R-1: Short-term, such as motels, hotels, or vacation rentals (rented for less than 30 days).*
  - *R-2: Permanent multiple-family dwellings (e.g., apartments and condominiums).*
  - *R-3: One- and two-family dwellings.*
- *S (Storage): Warehousing or storing goods, including moderate (S-1) and low (S-2) hazards.*
- *U (Utility/Miscellaneous): Accessory structures (e.g., barns, detached garages, shops).*



*Skansie Net Shed, Gig Harbor. Photographed by Elise Koncsek. Courtesy of Maritime Washington.*

## Time Horizon

The time horizon is the period, in years, that an investment is expected to last.

Your property's time horizon might be, for example, the duration of a 30-year mortgage, the 20-year service life of a new mechanical system, or 50 years due to plans to pass the building on to the next generation of your family.

Defining what the time horizon is based on, as well as its duration, helps to inform your priorities and planning. Be sure to record this in your worksheet.

## Economics

The economics of a project include considerations like funding, holding costs, value, and cost of damage due to flooding. These may all inform your adaptation strategy.

Begin with considering the following economic factors. You'll likely update this information multiple times as you work through planning:

- **Funding**: What is the total dollar estimate of funds available, and from what sources, to pay for the implementation of a flood adaptation strategy? Funding sources can include savings, home equity loans (though these may not be possible due to flood risk), construction loans, grants, and historic preservation financial incentives. Starting this list helps to identify additional funding sources, potential regulatory requirements, and which grants you need to apply for.
- **Costs**: What are current holding costs for the property? This includes annual utilities, property and flood insurance, property taxes, and any other regularly occurring costs. Would implementing the flood adaptation strategy decrease or increase any of these?
- **Value**: What is the county assessor's current assessed land and improvement value for the property? Would implementing the flood adaptation strategy decrease or increase this?
- **Cost of damage**: If the property has flooded previously, what was the cost of repairing that damage? Is the property currently covered under the National Flood Insurance Program? What is your deductible?



*The Puget Sound Naval Shipyard and Intermediate Maintenance Facility for the U.S. Navy in Bremerton.*

*Photograph courtesy of Maritime Washington.*



*Brown's Point Lighthouse, Tacoma.*

*Photograph courtesy of Maritime Washington.*



*The New Dungeness Lighthouse on Dungeness Spit near Sequim, on the Olympic Peninsula in Clallam County. Photograph courtesy of Marinas.com.*



*San Juan- Friday Harbor ferry. Jason Hummel Photography, courtesy WTA photo bank.*

## *Identify Design Factors*

The specific characteristics (design factors) of your property will inform your adaptation strategy selection and will be part of your communication with regulatory agencies, building officials, and grant-making entities.

There are four main flood types, each with different characteristics and advance warning.[1] Identify which are known and/or likely to apply to your property. Consider water features on your property, such as ponds and streams, and where they are located.

### Determine the Most Likely Flood Type(s)

Flooding, at its most basic definition, is water going where you don't want it to go. That is often influenced by the convergence of multiple weather events, such as storm surge, wave action, inverted barometer effect, or wind setup (i.e., a rise in water level due to the horizontal pressure of wind pushing the water towards land).

Identify which are known and/or likely to apply to your property. In addition to the shore or coastline, consider water features on your property, such as ponds and streams, and where they are located.

- **Flash:**
  - Associated generally with a waterway, such as a river or stream, which may be barely noticeable or dry at times
  - No or little warning time, developing over minutes to hours, often due to heavy precipitation or dam failure
  - Fast moving, often carrying debris (e.g., logs, boulders)
  - Intense rainfall is the typical catalyst

1 Washington Trust, "Historic Preservation and Coastal Flooding Webinar: Picking an Adaption Plan," 2025, 1:24:40, https://www.youtube.com/watch?v=vGzTsyAlzBY.

- **Surface/Urban:**
  - Can occur in any developed area, particularly if surrounding areas have been damaged by wildfires, resulting in soil changes and vegetation loss
  - Little warning time, developing over minutes to hours
  - Intense rainfall is the typical catalyst, with water overwhelming the storm sewer system and flooding roads and buildings
- **Riverine/Overbank:**
  - Occurs when a river reaches capacity and the excess water spills into the surrounding areas. It can also cause erosion of the river bank or the river scouring a new channel
  - Areas with wide, flat terrain along the riverbank may experience a gradual floodwater rise with little velocity. Steeper areas flanking rivers can experience floodwater that rises quickly and moves fast with debris
  - Sometimes these are predicted several days in advance, based on river flood stages and precipitation levels
  - Snow melt, ice dams, or heavy or prolonged periods of rain will cause this type of flooding
- **Coastal:**
  - Occurs along coastlines of large bodies of water (e.g., oceans, lakes) and extends inland along connected bays and rivers. This can also include high tide flooding (also known as sunn day or nuisance flooding) due to sea level rise
  - Predicted several hours and often days in advance
  - Often caused when storm surge pushes water onto the shore—affected by the magnitude and characteristics of the storm—and by extreme high tides (king tides) pushing water inland, especially combined with an outflow of water due to heavy precipitation levels and/or other inland flood types

## Establish Property Elevation and Shoreline Distance

Establishing the elevation of ground (or grade) level at your property is essential for understanding the potential depth of floodwaters.

The average height of the ocean's surface (sea level) fluctuates. To help navigate this reality, the North American Vertical Datum was established in 1988 (NAVD 88) to set a fixed, land-based, zero-foot height reference point, which is often (but inaccurately) referred to as "sea level." Topographic maps record the elevation (height) of land in feet relative to this zero-foot reference point. For example, if your property has an elevation of two feet, that means the ground level at your property is two feet higher than that reference point.

There are several ways to **determine your property elevation**:

- The **USGS TopoBuilder website** is a good source for an initial planning number. To use TopoBuilder to determine elevation, go to the website. Refer to the "TopoBuilder Guidance" in Appendix E for directions on navigating the website.

- You can also call and order a **topographic map** from a map company, such as Metsker Maps. Provide them with your location and ask for the highest level of detail available.
- As you progress through the steps and begin designing your property's flood adaptation, you will likely need to get a more formal **elevation certificate**. An elevation certificate is prepared by a professional land surveyor. The surveyor will identify the Base Flood Elevation, determine your FIRM information, and determine if you are in a protected area. The elevation certificate provides basic information about the property, including the elevation for the first floor, the lowest opening, the lowest equipment, and the lowest adjacent grade. A surveyor can also help record your property's distance from the Ordinary High Water Mark. Although the steps above will help you estimate some of the same information yourself, as you proceed in planning, grant applications, and permitting, the official information collected in the certificate becomes more important. These are generally under $1,000 for a typical single-family residential property.

**Establishing your property's distance from the shoreline** is also important for informing subsequent permitting and regulatory requirements.

From a permitting and regulatory perspective, shorelands and shoreland areas (RCW 90.58.030(2)(d)) are generally landward areas for 200 feet from the Ordinary High Water Mark (OHWM), floodways and contiguous floodplain areas, and all wetlands and river deltas associated with the streams, lakes, and tidal waters associated with the shorelines of the state. The OHWM occurs at the transition from plants influenced by the presence and action of water to abutting upland plants which are not. To identify the OHWM for your property, refer to the "Ordinary High Water Mark Guidance" in Appendix E for directions.

## Identify the Potential Depth of Floodwater

The depth of floodwater informs how much of your property and building(s) will be affected by flooding and your adaptation strategy.

The floodwater depth at your building is not measured relative to the ground level around your building. It is measured relative to the fixed, zero, land-based elevation (often and inaccurately referred to as sea level) in NAVD 88. The Base Flood Elevation (BFE) may be 10 feet, but if you are measuring from grade at the property, that level may be just one foot above grade.

In the previous step, you documented your property's elevation. Now that information will help you to determine the depth of floodwater at your building(s).

Prepare a clear, straight-on photograph of your building(s) showing the following lines. You can either mark the lines off on the buliding(s) using tape and then take the photo, or you can draw the lines directly onto a regular photo of the building(s).

- **Base Flood Elevation (BFE)**: This is a regulatory term established by the National Flood Insurance Program/Flood Insurance Rate Maps (FIRMs). Buildings are evaluated against this number for flood insurance and local ordinances. You can find it on the FIRMs. The BFE is limited in understanding real flood risk, since it shows only areas with 1% annual coastal storm event risk (i.e., a 100-year storm) and is based on only one sea level scenario. Calculation of the BFE does not account for sea level rises or co-occurrence with a weather-driven event.

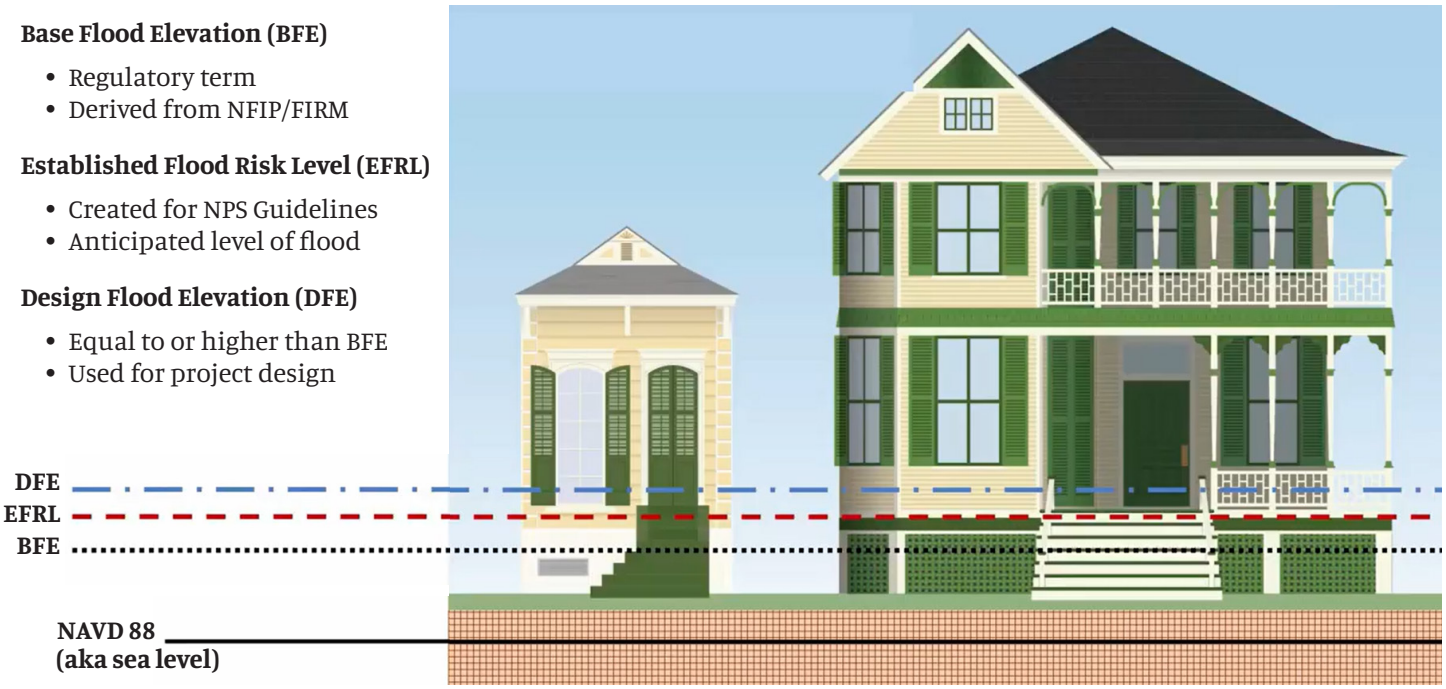
FEMA's National Flood Hazard Layer (NFHL) viewer can provide this information, except for Zone A locations where there is no data. To use the NFHL, go to the map viewer. Refer to the "FEMA's National Flood Hazard Layer Viewer Guidance" in Appendix E for more directions on the website.

- **Established Flood Risk Level (EFRL)**: This is the anticipated level of flooding established by adding up all the risks. It was created for the NPS *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*. This is a property-specific height of anticipated floodwater, based on recognized flood data, past flood events, site-specific reports, and local floodplain ordinances and codes.[2] This may not be the same as the regulatory level (BFE) or what you've designed to (Design Flood Elevation).

  The NOAA Sea Level Calculator can help with this estimate. To use, go to the website. Refer to the "NOAA Sea Level Calculator Guidance" in Appendix E for directions on navigating the website.

- **Design Flood Elevation (DFE)**: This is the estimated flood level that you elect to design for. This level will be set based on the BFE, EFRL, and your time horizon. It is often the BFE plus up to two feet of building height above the BFE to allow for changes. This additional height is often referred to as freeboard and provides a longer term capacity to manage flooding. If your time horizon is long (20 or more years), the cost to provide a larger amount of freeboard may be worthwhile, versus if you are working with a short time horizon and don't need to build in as much of a flood level buffer or have the added cost.

## Figure 2. Floodwater Depth




Adapted from the National Park Service graphic in the Washington Trust's "Historic Preservation and Coastal Flooding Webinar: Picking a Treatment"

2 Jenifer Eggleston et al., *The Secretary of the Interior's Standards for Rehabilitation and Guidelines on Flood Adaptation for Rehabilitating Historic Buildings* (National Park Service Technical Preservation Services, 2021), 13, https://www.nps.gov/orgs/1739/upload/flood-adaptation-guidelines-2021.pdf.

## Document Affected Features

Understanding what resources within your property will be affected by floodwater will inform how you manage and protect them through the flood adaptation strategy selection.

Prepare a list of all resources within your property—including buildings, structures, and landscape features characteristic of the property—and identify which will be affected based on the depth of floodwater established.

As you prepare your list, identify which of the resources impacted are historic. The National Flood Insurance Program defines historic structures under 44 CFR 59.1 by the following general categories:

- Individually listed in the National Register or determined eligible for National Register listing
- Contributing to a listed (or eligible for listing) National Register Historic District
- Individually listed in the Washington Heritage Register
- Individually designated to a local historic register maintained by a Certified Local Government (CLG)

If any of these apply—or if the property is 40 years or older—you should plan for formal review by the Washington State Department of Archaeology and Historic Preservation (DAHP) as part of the permitting process.

To determine if your property is listed to the National Register, within a National Register Historic District, or has been previously surveyed for eligibility, use the state's database for archaeological and architectural records, WISAARD. To use WISAARD, click on the link to go to the map and search for your property. Refer to the "WISAARD Guidance" in Appendix E for directions on navigating the website.

To find out if your property is designated to a local historic register, first determine if your city or county is a CLG program participant by clicking on this link and searching for your city or county, or refer to the "WISAARD Guidance" in Appendix E. If your city or county is listed as a CLG, reach out to the historic preservation officer or historic preservation commission staff using the contact information provided to ask if your property is locally designated. If it is, ask for a copy of the nomination or designation report, which will provide background information and identify what are the significant features of the property. You can also speak with the CLG contact to understand the local design review requirements.

For each affected part of your property, identify the depth of potential floodwater and if there are exterior and/or interior historic features, materials, and/or finishes within the flood-affected areas. You will eventually need to identify whether each will stay or be removed. The following references can help with the identification of character-defining features and spaces:

- Preservation Brief 17, "Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character" at this link
- "Identifying Primary and Secondary Interior Spaces in Historic Buildings" at this link
- Preservation Brief 18, "Rehabilitating Interiors in Historic Buildings: Identifying and Preserving Character-Defining Elements" at this link

# Step Two: Selecting an Adaptation Strategy

Building on the data collected in the "Step One: Assessing Risk" section above, this section outlines the recommended sequence of steps you should follow to determine the best strategies for improving the resilience of your historic property against flooding.

This guide is based on the NPS *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*, which includes detailed technical data and case studies on each of the potential adaptation strategies. From this national guidance, the following strategies focus on the most common types of solutions to the most likely flood scenarios in Washington. It does not include several of the more unconventional options identified in the NPS guidelines, since these are unlikely due to scale and cost.

The goal of this step is to identify which strategies are applicable to your site. You can then select your preferred strategy based on the established flood risk, decision factors, and design factors.

Adaptation strategies are organized into the following three approaches:

- **Fortify** to keep water out (temporary measures, dry flood-proofing)
- **Adapt** to let water in (wet flood-proofing, elevating the interior, abandoning the lowest floor)
- **Relocate** to avoid the flood (fill the basement, elevate the foundation, or move the building)

Once you have an idea of your preferred flood adaptation strategy, contact your local building official to ask if they have any pre-approved designs that match your selection or other approaches that might be similar. Using a pre-approved design can save significant time and expense.

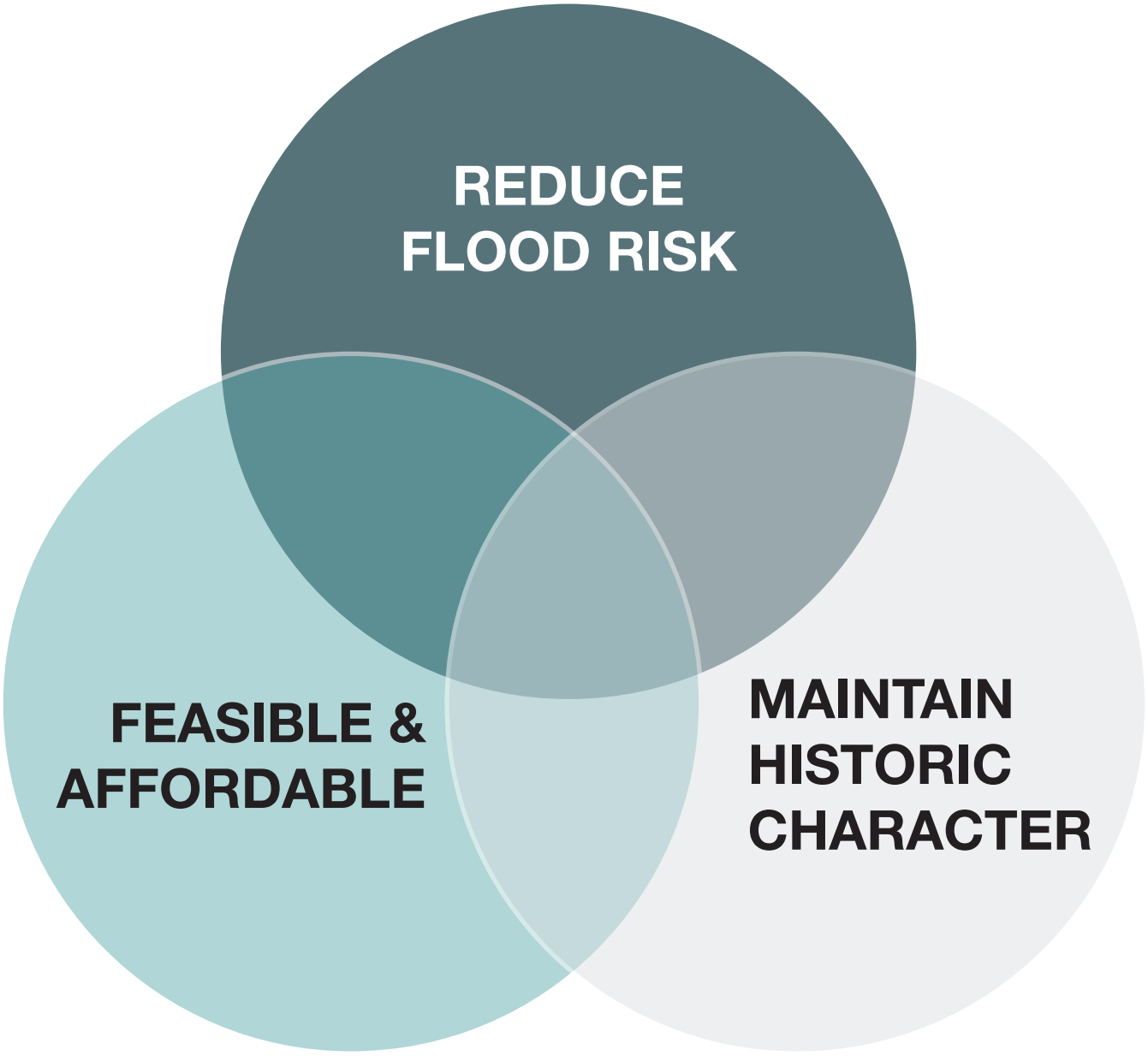



*Aberdeen Bridge, Grays Harbor County. Photographed by Rick Moyer. Courtesy of Maritime Washington.*

## *Assessment Criteria*

The following three questions function as the central criteria that should inform your adaptation strategy selection. The answers will be based on the data you collected about your property in the "Step One: Assessing Risk" section.

**Figure 3. Venn Diagram for Assessing Adaptation Strategy**

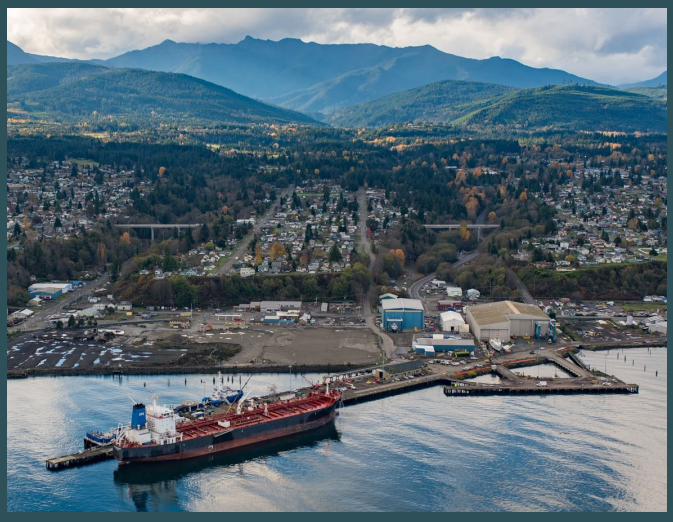


Does the strategy:

- **Reduce flood risk?**
  - Based on your building use, time horizon, and potentially affected features, does this treatment address the expected flood risks?
- **Maintain historic character?**
  - Can the treatment be implemented without visible changes?
  - If visible alterations are necessary, is it possible to match the existing appearance?
  - If the appearance cannot be matched, is there a compatible solution?
  - How does the treatment fit within the surrounding context or neighborhood?
- **Seem feasible and affordable?**
  - Is the treatment technically feasible considering the building type, condition, and structural capacity?
  - Is there available and adequate funding to complete it?
  - Have you engaged with your community (e.g., neighborhood association, building official, planning department, local landmarks board) to find out if any neighborhood-scale or citywide interventions are planned relative to flood management that could affect your decision?
  - Will your treatment be undone or re-done by anticipated or planned government interventions? If so, can you risk waiting for those to happen, or do you need to prioritize an immediate solution despite ongoing planning efforts for a larger-scale treatment?
  - Will there be continued support/maintenance of any city or county infrastructure, or is your property in a possible buyout zone due to repeated flooding?



*Anacortes waterfront. Courtesy of EJ Harris Photography.*



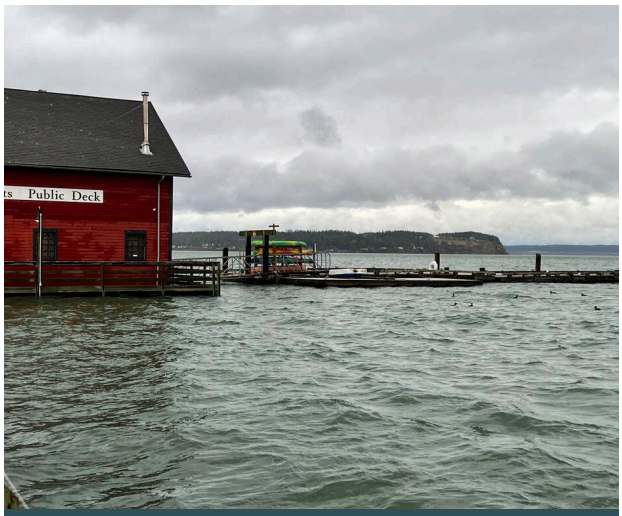
*Port Angeles terminal facilities. Courtesy of the Port of Port Angeles.*

## *Approach 1: Fortify to Keep Water Out*

This category of flood adaptation strategies focuses on keeping the water out and can involve one or more of the following options.

Headings below match those in the NPS *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings* if you would like further details and examples on each.

- **Protect utilities**[3]
  - Designed as measures to protect building utilities, such as sewer, water, electric, communication/data, heating, ventilation, and air conditioning
  - Includes adaptations such as: adding backflow preventers in water and sewer lines, sump pumps at the lowest level, and moving electrical service and equipment out of flood-prone areas
  - Limitations: The need for new equipment and service locations to meet building code and maintenance accessibility requirements. Building code requirements can often limit how high mechanical equipment can be placed above the ground and still be accessible, as well as the size of enclosures needed for safe maintenance access.
- **Temporary protective measures**[4]
  - These are temporary adaptations that can be deployed or activated when flooding is predicted and then removed and stored when waters recede. They are often the most affordable option and generally have a low impact on historic character.
  - Includes adaptations such as: sandbags, temporary dams and flood gates, and flood-wrapping systems
  - Limitations: The time and people required to deploy them, especially if the flood type affecting your property has little advance warning time or if the property is not regularly occupied (e.g., a vacation rental). These measures are not well-suited for areas subject to frequent flooding.




*Flooding at Coupeville Wharf. Courtesy of Maritime Washington.*



*High tide at Port Townsend in December 2022. Courtesy of Jeff Taylor.*




*High tide at Roche Harbor, San Juan Island, in December 2022. Courtesy of Rob Roy.*

3 Eggleston et al., *The Secretary of the Interior's Standards for Rehabilitation and Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*, 39.
4 Ibid, 26.



*King tide at Westport in November 2023. Courtesy of Stephanie Baltzell, My Coast.*

*A "king tide" is a non-scientific term used by people to describe exceptionally high tides. According to NOAA,*

> Tides are long-period waves that roll around the planet as the ocean is "pulled" back and forth by the gravitational pull of the moon and the sun as these bodies interact with the Earth in their monthly and yearly orbits. Higher than normal tides typically occur during a new or full moon and when the moon is at its perigee or during specific seasons around the country.

- **Dry floodproofing**[5]
  - Designed to keep water entirely out of a building by adding a watertight seal on the exterior of the foundation and interior spaces
  - All exterior openings at or below the established flood risk level (EFRL) must be capable of having a temporary or permanent seal. The foundation must be impervious to water, the building's walls must be reinforced to withstand flooding forces, and the building must have an engineered drainage system installed.
  - Best for buildings where flood risk is infrequent and below three feet
  - Limitations: The expense and often significant alterations to historic materials, features, and spaces. Due to the strength of flood forces, this approach is not applicable where flood levels exceed three feet. This approach requires a high frequency of maintenance to renew seals and materials against repeated flooding.

5 Eggleston et al., *The Secretary of the Interior's Standards for Rehabilitation and Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*, 45.

## *Approach 2: Adapt to Let Water In*

These strategies for flood adaptation focus on minimizing damage while allowing floodwaters to interact with and move through the property. These approaches always require cleaning and drying after a flood event.

Headings below match those in the NPS *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*; consult for further details and examples.

- **Site and landscape adaptations**[6]
  - Designed to protect larger areas or multiple buildings and often allows historic buildings to remain unaltered. These adaptations allow floodwaters onto the property but direct them away from vulnerable buildings.
  - Includes adaptations such as: regrading, levees, storm water management systems, berms, and the restoration of natural flood systems like living shorelines, dunes, and wetlands
  - Limitations: Risk to archaeological resources, historic landscape features, and setting due to ground disturbance and regrading. Site work will change how water moves through and around the property and can make flooding worse for other properties. This approach is not possible on sites that are already fully built out.
- **Elevate the interior structure**[7]
  - Removes the first floor and installs a new floor level above the EFRL
  - This requires a tall first-floor ceiling height to accommodate the change. The new floor level is generally kept below the sills of first floor windows or storefront bulkheads and is held back from exterior walls to reduce visibility.
  - Limitations: Requires changes at doorways for exterior access. This approach can have a significant impact on historic first floor spaces and universal access. The space below the new floor has to be either dry or wet floodproofed.
- **Abandon the lowest floor**[8]
  - Designed for buildings with at least two stories, this involves relocating all living spaces and utilities to floors above the EFRL. Any space below the EFRL is then wet or dry floodproofed based on local floodplain ordinance requirements.
  - This approach works well for buildings with unfinished interior spaces built from durable materials (e.g., mills, industrial buildings).
  - Limitations: Loss of habitable space, as the lowest floor can now only be used for parking, storage, and building access. Difficulty in providing universal access to upper floor(s). This approach does not apply to light-frame construction, due to life safety concerns and potential repetitive damage from flooding.

6 Eggleston et al., *The Secretary of the Interior's Standards for Rehabilitation and Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*, 32.

7 Ibid, 100.

8 Ibid, 108.

- **Wet floodproofing**[9]
  - This approach allows water to enter the building and then drain out through vents scaled to the building's interior volume.
  - Best for interiors with minimal partitions and doors, as large open spaces will allow waters to move unobstructed and for the spaces to be more easily cleaned and dried after each flood
  - Anchoring of the building to the foundation and structural reinforcement of the walls may be required, along with a horizontal water stop within the walls
  - Limitations: This approach is not suitable when the duration of standing floodwater within the building will exceed 24 hours. All utilities must be elevated above the EFRL or designed to withstand floodwaters. The interior volume(s) subject to water entry must be easy to clean and dry and be capable of withstanding repeated wet/dry cycles. Due to the length of time involved in cleaning and drying, this approach is best for non-living spaces and is not suitable for historic interiors with a high level of intact materials, features, and finishes, since they will inevitably be damaged by floodwater cycles.



*King tides at Cape Disappointment in December 2025.*

*Photo courtesy of Jason Sperling via KOMO.*

9 Eggleston et al., *The Secretary of the Interior's Standards for Rehabilitation and Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*, 55.

## *Approach 3: Relocate to Avoid the Flood*

These flood adaptation strategies seek to avoid the floodwaters by getting the building out of the floodplain and can involve one or more of the following options.

Headings below match those in the NPS *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*; consult for further details and examples.

- **Move the building**[10]
  - This involves separating the building from its foundation and moving it to a new site and foundation.
  - Designed to address repeated flooding, erosion, or eventual permanent inundation risk based on your applicable flood type and characteristics, frequency, and time horizon
  - The new site should eliminate or reduce the flood risk and be as similar as possible to the original site. The new foundation should match the original in height, design, and materials.
  - Limitations: The building must be able to withstand the move. This approach is often not covered by grants and not recommended for historic buildings except in cases of severe risk, because it will significantly impact the character of the structure by changing its siting and location. This strategy requires significant planning, including the move route, preparing the new site, permitting, and utilities coordination.
- **Fill the basement**[11]
  - Filling the basement is a means of avoiding basement flooding by eliminating the basement. Designed for basements that are below ground level on all sides and constructed of masonry.
  - Limitations: Often has minimal impact above ground for historic buildings. Not suitable for a walkout basement (exposed on one or more sides). Building codes treat basements differently: some as unfinished space and others as occupied space that has to be protected. Access and clearance to the basement must be enough to allow compacting equipment to enter and be removed after the basement has been filled.
- **Elevate on a new foundation**[12]
  - Raises the building up from the existing foundation to move it above the EFRL. This approach is well-suited to frame buildings above crawl spaces on pier or post foundations. The anticipated flood type determines the desired foundation treatment (e.g., open piers or closed masonry).
  - Limitations: Space on the property is needed to accommodate site alterations. Generally, this strategy is not feasible for large masonry buildings or buildings with shared party walls. This approach can often impact the historic character of the property. Local building code may limit how and to what height the building can be elevated. Continued access to infrastructure must be considered.

10 Eggleston et al., *The Secretary of the Interior's Standards for Rehabilitation and Guidelines on Flood Adaptation for Rehabilitating Historic Buildings*, 114.
11 Ibid, 68.
12 Ibid, 74.

# Step Three: Navigating Permitting, Funding, and Implementation

After identifying your risks and adaptation strategy, you'll need to determine which regulations apply to your project. It is important to consider the reviews and permissions you might need—and the time it takes to receive them—when planning your project. Be proactive in reaching out to any agencies or entities that will need to permit or review your project so that you get a clear understanding of their required steps and timeline.

This section also helps you identify what funding is available for your project. It is very important to work through this section as well as the previous sections on establishing flood risk and selecting an appropriate strategy so you are ready to start work when you apply for funding.

**Don't know where to start?**

*Contact the Washington State Governor's Office for Regulatory Innovation and Assistance (ORIA), using the contact information below. This state agency helps people navigate Washington's environmental and business regulatory systems and related permits. ORIA can prepare an Environmental Issues and Constraints Assessment (EICA) for free for one project per property. They also maintain the Online Permitting Assistance System (OPAS) at this link, a tool to help determine which local, state, and federal permits you might need.*

*Connecting with ORIA:*
*www.oria.wa.gov*
*1-800-917-0043*
*help@oria.wa.gov*

## *Permitting and Regulations*

Permits and regulatory processes stem from applicable local, state, and federal laws.

Identifying which permits and regulatory processes apply to your property and selected strategy/strategies is essential for being able to implement your project. The following section outlines key steps to identify these permits and processes and who to contact at each stage.

To start, assemble the information identified in "Appendix B. Project Information Guidance" using the table provided in the worksheet.

### Jurisdiction(s)

Understanding which entities are involved in the regulation of your project is critical. For any given project, the following entities may have jurisdiction and may need to review or issue permits for your work:

- Are you in a city or unincorporated county? This identifies your building department.
- Are you within 200 feet of a shoreline? This identifies if you need a shoreline permit. See "Establish Property Elevation and Shoreline Distance" above for more details.
- Is your property historic? See "Document Affected Features" above for identification. If review is required, this may require a Certificate of Appropriateness or involvement by the Department of Archaeology and Historic Preservation.
- Does any funding for your project have regulatory compliance requirements? For example, if you are receiving state or federal funding, there may be additional regulations to follow. See "Federal Regulations" below for requirements.



*View of Gig Harbor. Courtesy of John Westrock.*

- Will you need a federal permit for your project? Is this based on a federal funding source, project location, or both? See "Federal Regulations" below for requirements.
- Is there electrical, sewer, and/or water service to the property? What is the size/capacity for each? Contact the Washington Utility Notification Center at this link to submit a locate request. Your utility providers can provide information on service size and capacity for your property.
- Are there relevant energy code requirements? This can depend on the extent of upgrades and potential alternative compliance pathways. See "Local Regulations" below, and contact your local building official for additional information.

## Regulatory and Permitting Requirements

The permits and regulatory requirements that might apply to your flood adaptation project are listed below, organized by federal, state, and local regulations, along with a brief description of what would trigger the need for their review or permitting. List which permits and regulatory requirements apply to your property and flood adaptation(s) in the "Appendix A. Flood Adaptation Planning Worksheet" using "Table 2. Your Project Information" to collect data.

The *Permitting Regulatory Handbook* maintained by ORIA provides more detailed information on general permit costs, application, additional documentation needed, and general timeline for the permits listed below. To use, go to the handbook. Refer to the "Permitting Regulatory Handbook Guidance" in Appendix E for help with navigating the site.

As a general rule of thumb, permitting and regulatory review can take six to nine months for a small project and 12 to 16 months for a large project. However, you should consult with the reviewer or primary contact for each required regulatory review or permit process for more accurate estimates on their timing and sequencing.

Some of the common reasons for delays in permitting and regulatory review include:

- Incomplete or inaccurate permit applications
- Revisions to proposed project after permit submittal
- Findings that the project has a significant impact on environmental, historic, or cultural resources
- Agency staff limitations

## Federal Regulations

Federal regulatory requirements that may impact flooding-related adaptation for historic structures are organized under the two federal entities responsible for waterways and shoreline compliance: the U.S. Army Corps of Engineers and the U.S. Coast Guard.

- **U.S. Army Corps of Engineers** (USACE, Seattle District, Regulatory Branch) permits and reviews that may apply:
  - *Section 404 permit (Clean Water Act):* For ground-disturbing work in waters of the United States per 33 CFR 328.3, which generally includes all waters subject to the ebb and flow of tides and connected waters, including tributaries and adjacent wetlands. Work can include dredging, fill placement, grading, and mechanized land clearing. Learn more at this link.
  - *Section 10 permit (Rivers and Harbors Act):* For work in, over, or under navigable waters of the United States. Learn more at this link.
  - *Section 408 permit (33 U.S.C. Navigation & Navigable Waters):* For work altering a federally authorized project, such as a dike, levee, or within a federally authorized navigation channel. Learn more at this link.
  - *Section 106 review (National Historic Preservation Act):* See the National Historic Preservation Act on the next page. The federal involvement would be a permit issued by the USACE.
- **U.S. Coast Guard** (USCG, Pacific Area, Sector Puget Sound, Waterways Management Branch) permits and reviews that may apply:
  - *Bridge Permit (also known as a Section 401 permit; 33 U.S.C. Navigation & Navigable Waters):* For construction or modification of bridges over navigable waters. "Navigable" is a legal definition and does not necessarily mean the waterway is being navigated. The Coast Guard has to be contacted to determine if the waterway is "navigable" and if the project will require a bridge permit. Learn more at this link.
  - *Section 106 review (National Historic Preservation Act):* See the National Historic Preservation Act on the next page. The federal involvement would be a permit issued by the USCG.

In addition, the following regulatory acts, reviews, and programs may impact flooding-related adaptation for historic structures.

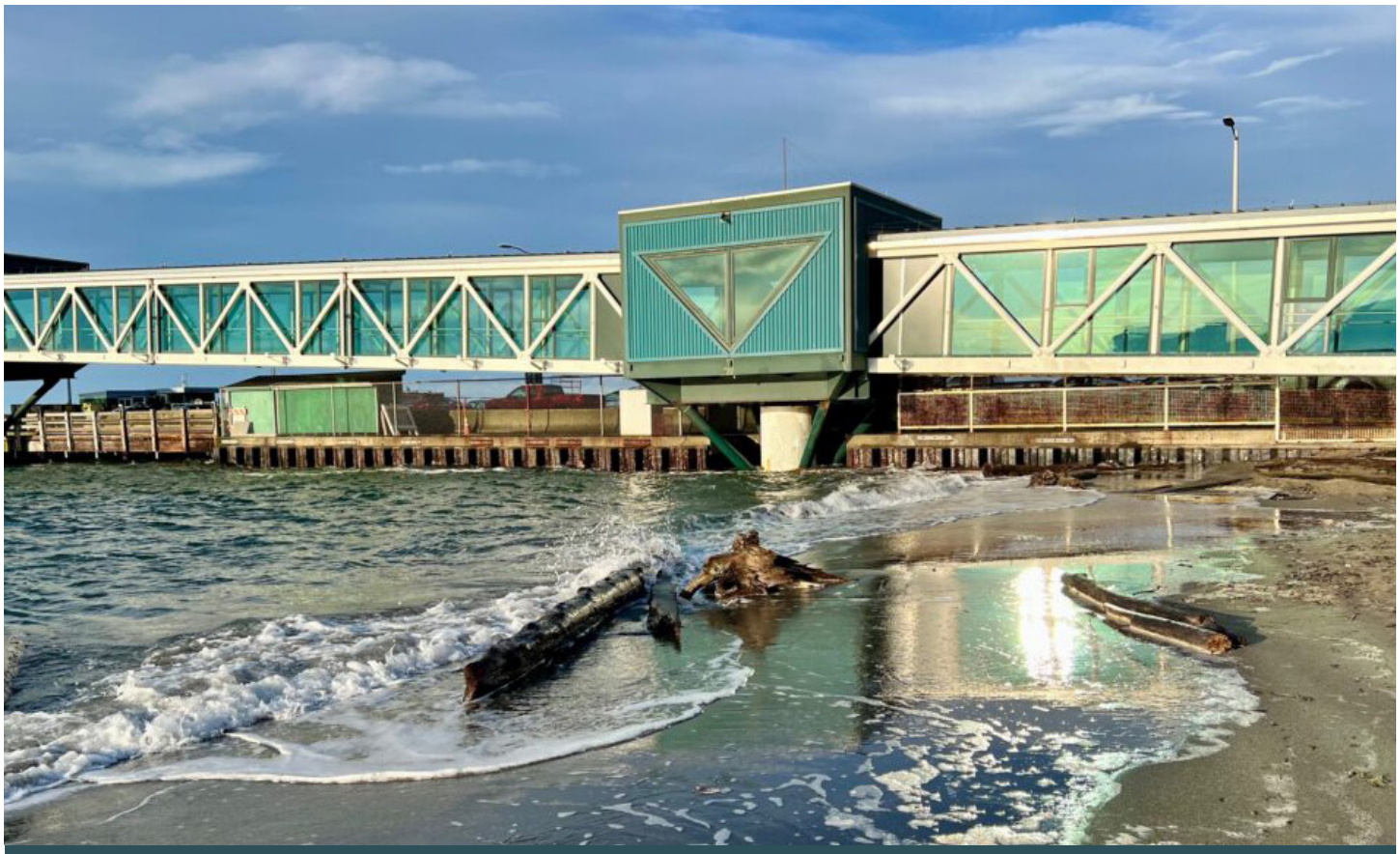
- **Endangered Species Act** (Section 7) consultation: Federal funding or another agency's involvement could trigger review under this act to ensure the work does not jeopardize federally listed species or damage or destroy designated critical habitat. This review is usually handled under USACE, as the likely federal involvement would be a permit issued by the USACE (learn more at this link). Compliance may require a biological assessment to evaluate potential effects on listed and proposed species and designated and proposed critical habitat. Interagency consultation may include the National Marine Fisheries Service (for maritime and anadromous fish species) or the U.S. Fish and Wildlife Service (for terrestrial species and non-migratory fish).
- **National Environmental Policy Act:** This act applies to projects with federal involvement and requires agencies to assess the environmental effects of the proposed work. This is usually handled under USACE, as the likely federal involvement would be a permit issued by the USACE. However, a federal funding source or another agency's involvement could also trigger this.

- **National Flood Insurance Program** (NFIP), managed by FEMA for work affecting an established floodplain. Determining if your community is a participating NFIP community, if you can insure your property, and what role and/or benefit the flood adaptation strategy may have begins with your local government. Under this program FEMA can issue letters to address specific requests that may relate to your project.
- **National Historic Preservation Act** (NHPA): Section 106 of this act applies work with federal involvement (including federal funding, federal lands, and federal permitting). Review under Section 106 requires that the federal agency consider the effects on historic properties (listed or determined eligible for National Register listing; both archaeology and built environment). Learn more at this link. Federal funding or another agency's involvement could trigger this. Grant programs, often through the local (city or county) or state government, use pass-through federal funding from Housing and Urban Development and other agencies that would trigger Section 106 review. Under the NHPA, review of federal actions triggering Section 106 review is handled by the Washington State Department of Archaeology and Historic Preservation to represent the interests of the state and by the applicable Tribal Historic Preservation Officer to represent the interests of affected Tribes. Learn more at this link.

## State Regulations

The following are state regulatory and review requirements that may impact flooding-related adaptation for historic structures. They are organized by the state entities responsible for compliance.

- **Department of Ecology** (DOE) permits and reviews that may apply:
  - *Section 401 Water Quality Certification (Clean Water Act):* For work affecting water quality. This can include dredging a channel or waterway, wetland impacts, and shoreline work including new piers or other structures. If your project requires both this certification and a federal permit, the federal agency will not be able to issue their permit until this certification is obtained. Learn more at this link.
  - *Coastal Zone Consistency Certification (Coastal Zone Management Act):* For work in any of Washington's 15 coastal counties that requires a federal permit to affirm the proposed work is consistent with the state's Coastal Zone Management Program. Learn more at this link.
  - *Waters of the State, Administrative Order (Water Pollution Control Act, RCW 90.48):* For work in non-federally regulated wetlands. A request for an administrative order is needed to affirm the work will not impact wetlands. Learn more at this link.
  - *National Pollutant Discharge Elimination Permit(s) (Clean Water Act):* For any type of point discharge of pollutants and storm water into surface waters of the United States. Although it is a federal program, authority is delegated to the Washington State DOE. This permit depends on what is in the wastewater you are producing and where the wastewater is going (into the ground or a receiving body of water). Learn more at this link.
- **Department of Fish and Wildlife** (DFW) permits and reviews that may apply:
  - *Hydraulic Project Approval (RCW 77.55):* For work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh or saltwaters of the state. This includes dry channels and work waterward and may include work landward of the Ordinary High Water Mark (freshwater) or Mean Higher High Water mark (saltwater). Learn more at this link.



*Edmonds waterfront in December 2024. Photographed by Denise Meade. Courtesy of My Edmonds News.*

- **Department of Natural Resources** (DNR) permits and reviews that may apply:
  - *Aquatic Land Lease (RCW 79.105-140):* For work taking place on state-owned aquatic lands. Learn more at this link.
- **Department of Archaeology and Historic Preservation** (DAHP) permits and reviews that may apply:
  - *Governor's Executive Order 21-02 Compliance:* For work using state funds. Requires that the project considers the effects on historic properties. Learn more at this link.
  - *Archaeological Site Alteration and Excavation Permit:* For work that will alter a known archaeological site (RCW 27.53 .030(3)). Alterations can include placing fill above a site, building on a site, removing trees, using heavy equipment, compacting, or other activities that would change or potentially impact the site. Learn more at this link.
- **Labor and Industries** (L&I) permits and reviews that may apply:
  - *Electrical Permit*: An L&I permit is required for any power drop, service change, or new electrical service to a building and must be inspected prior to the utility company connecting power. Learn more at this link.
- **State Environmental Policy Act** (SEPA) review that may apply:
  - *SEPA Environmental Checklist*: For work that involves a government "action" (e.g., permit) and is not categorically exempt (e.g., repairs or minor new construction; WAC 197-11-800 through 890). Typically the local government, county (unincorporated areas) or city (incorporated areas), is

designated with complying with SEPA requirements. Consult with your local government to find out if SEPA applies to your project and learn more at this link.

## Local Regulations

The following are local government (city or county) regulatory and review requirements that may impact flooding-related adaptation for historic structures. Different cities and counties have different regulations, so it's important to reach out to your relevant local jurisdiction to confirm this information before beginning.

- **Shoreline Substantial Development Permit** (Shoreline Management Act): For all non-exempt developments and uses of shoreline bodies of water and associated upland areas exceeding $8,504 fair market value. The shoreline master program (SMP) developed by each local government regulates development and uses. Development includes, but is not limited to, structures, dredging and filling, bulkheading, or pile driving. A shoreline variance permit may be requested relative to the SMP established numerical development standards (e.g., height limit, setback distance). Learn more at this link. To view the process flow chart, click this link.
- **Conditional Use Permit**: For work that meets specific criteria typically designated in the local government's land use code. If your property is subject to a Shoreline Substantial Development Permit, that permit may serve as a conditional use permit.
- **Environmentally Critical Area** (ECA) Exception: For work on or near specific areas including steep slopes, wetlands, flood-prone areas, and fish/wildlife habitats. These are established and administered by the local government and set specific development standards regulating construction in these areas. Generally, an exception to these standards is applied for to allow construction. Usually, areas within 200 feet of the shoreline are regulated by the shoreline master program rather than the ECA ordinance.
- **Certificate of Appropriateness** (CofA): Required for work affecting locally designated historic resources. This is contingent upon your property being within a Certified Local Government (CLG) and designated to a local historic register administered by the city or county. To find out if your city or county is a CLG program participant, go to this link and search for your city or county. If your city or county is a CLG, reach out using the contact information provided to ask if your property is locally designated.
- **Stormwater Management Code Drainage Review**: For work affecting stormwater drainage and control, including demolition and grading. This is generally based on threshold areas disturbed, if a grading permit is required, or if the work will occur in an environmentally critical area. This will vary by local government.
- **Floodplain Development Permit** (National Flood Insurance Program): For work within a 100-year floodplain (A or V zone) identified on the FEMA Flood Insurance Rate Map (FIRM), a permit is required by the local government prior to development. Refer to the "Depth of Floodwater" section for how to obtain a FIRM map.
- **Demolition Permit**: For demolition of structures, including accessory structures. This is typically required for structures with a roof area more than 120 square feet but will vary by jurisdiction.
- **Building Permit**(s): For work on existing buildings and the relocation and demolition of structures. Often jurisdictions will have minimum work area thresholds that trigger when permits apply.

Work requiring permits can include adding new electrical, mechanical, and plumbing elements or disconnecting and reconnecting existing ones, grading permits for site work if it is not part of a construction permit, construction and roofing permits, land use and side sewer permits, and tree removal permits depending on the location and if any trees will be removed as part of the work. Learn more at this link.

## Tribal and Community Outreach

Engaging with your community (including local government planning staff and/or building officials) and, if applicable, local Tribes before applying for permits is an essential first step that will make the rest of your project proceed more smoothly.

Tribal coordination is conducted at the government (county, city, state, federal) to government (Tribal) level; however, depending on your property location and local Tribal government capacity, early outreach from you as the property owner to ask about concerns and expectations can help later government-to-government coordination go more quickly by having the necessary information in place. DAHP provides information on Tribal consultation and a map to help identify if your property is within a Tribal Area of Interest. To use, click on the link and scroll down to the map.

DAHP's WISAARD website can also help you identify the right local government to contact for planning staff and building official. To use WISAARD, click on the link to go to the map and search for your property. Refer to the "WISAARD Guidance" in Appendix E for directions on navigating the website.

Engaging with your local stakeholders and planning staff, as well as Tribes where relevant, provides an opportunity to:

- Solicit support (why is this work a benefit?)
- Identify any unintended consequences
- Identify and potentially resolve conflicts



*Canoes in front of the Welcoming Pavilion at Swinomish in 2011. Photographed by Erik Mickelson. Courtesy of the Swinomish Tribal Archive.*



*Swinomish pulls water quality sondes for USGS to measure Salish Sea water quality at 2008 Canoe Journey. Courtesy of Swinomish Tribal Archive.*

- Identify value-added opportunities
- Identify local code requirements (pre-application meetings)
- Avoid permitting delays

This engagement should include sharing the information identified in the "Table 2. Your Project Information" worksheet.

*A note on Tribal outreach*: Once your permit application is submitted, it becomes a government matter, and Tribes will expect government-to-government coordination. If you are an individual property owner rather than a government agency or representative, it is important at this stage to check with your local government or applicable reviewing agency to make sure that they are engaging with the Tribe(s). If they are not, this could affect your project.

## *Funding Your Project*

There are several funding sources to support adaptation of historic properties due to flooding; however, the amount of available funds can change year to year. The following points of contact provide some likely sources of support. Each contact may be connected to different funding sources, so it is important to check with all to see if one might be a good fit based on the characteristics of your property or project type. Many of the programs and entities listed below will have details on funding opportunities available on their respective websites.

- **Local Building and Planning Departments**: These entities are actively working with flood adaptations and will know if there are any pre-approved designs that could save you time and money. They may also be aware of other available or planned incentives that the city or county may be funding to support flood resiliency or area buyout programs.
- **Certified Local Government** (CLG): If your property is locally designated (or eligible for local designation) as a historic site, then your city or county may have information or incentives available. Click on the link and search for your city or county for program contact information.
- **Department of Archaeology and Historic Preservation** (DAHP): To view available funding incentives, click on the link. These include available grants, easements, loans, the House Bill 1386 Preservation Fund, and information on the State Special Valuation Program (property tax reduction) and Federal Historic Tax Credit Program.
- **Washington Trust for Historic Preservation**: This statewide nonprofit organization helps communities preserve historic places. To view their available funding opportunities, click on the link. These include a variety of funds, programs, and grants that apply to a range of resource types. Review each to identify if your project might be eligible.
- **Department of Ecology**: Funding incentives relate to water quality, wetland mitigation, and stormwater assistance programs. Click this link for contact information to ask if your project might be eligible. This could include mitigation work that you might not have considered but that could help with the permitting and regulatory process.



*Aerial view of Bellingham. Courtesy of the State of Washington Tourism.*

There are several key elements that will help you succeed in your search for applicable resources and financial incentives. These include:

- **Readiness to complete work**: This means you are already well underway or have completed the permitting and regulatory review process and are able to proceed with your proposed scope of work. Due to the variability on timing for permitting and regulatory processes, often funding goes to projects that have completed these steps and are ready to begin work imminently—or who at least demonstrate a clear understanding of the required steps and timing.
- **Documents for project review**: To receive and manage funding from outside sources, providing clear documentation and descriptions of the work to be performed is essential. This may include:
  - Clear and concise descriptions of the proposed work
  - Photographs of the context and setting, as well as views of where the work will occur and of the completed work. If these are taken with a digital camera or phone, use the highest quality setting.
  - Cost estimates from potential contractors and vendors. Bids need to include more information than just lump sum pricing. The details of work and costs need to be broken out. Include product

sheets for materials used. Depending on the funding source, including some federal grants, you may be asked to provide three bids for the same scope of work, to compare costs.

- **Project records**: Once you have received funding, tracking project costs is important, since many grants function on a reimbursement basis. Having adequate documentation speeds up the process of getting you your money. Different funding sources may require different levels of record-keeping, so be sure to clarify requirements at the outset. In general, your record-keeping should include:
  - Tracking payments made to vendors and contractors. This can be done using a simple written list or with a program like Microsoft Excel or Google Sheets. Regardless of format, tracking should include the name of the payee (the person or company to whom money is paid), the amount and date they were paid, and a description of each expense. For invoices, track the invoice number, description of work performed or goods purchased, and the amount(s) and date(s) of payment.
  - Keeping and digitizing all project receipts. This can be done by taking photographs with your phone. Receipts should include the date, amount, and name of what was purchased, as well as proof the payment was completed. If paying by check, keep copies of all deposited checks from your bank statements.
- **Documenting completed work**: This should include product sheets for materials used, along with in-progress and completed photographs. This documentation can be useful for ongoing maintenance (e.g., to use the same products or paint colors) and adjustments to understand changes over time relative to the finished baseline condition. Grantmaking organizations will often want to collect in-progress and completed work photos.

## *Implementation: Doing the Work*

Assembling a strong project team is a critical step for navigating project planning, permitting, regulations, funding, and implementation. The team size and makeup will vary based on the size and complexity of your project.

As you approach the work, your first key contacts should include:

- **Your local building department**: Your first conversation should explain, "This is my project and what I want to do." They can often help with guidance on permits and what contractors or expertise you'll need.
- **Washington State Governor's Office for Regulatory Innovation and Assistance (ORIA)**: A resource for state and federal permitting and regulatory compliance

The following is an alphabetical list of potential entities, contractors, and vendors who might be involved in your project, including a short description of what each one does.

- **Archaeologist**: If ground-disturbing work is proposed near the shoreline, an assessment by an archaeologist will likely be required to determine if any resources will be disturbed.
- **Architect**: Can work on a wide range of project sizes, with services ranging from design to planning to permitting coordination. It's especially helpful if they have familiarity with your jurisdiction. An architect's design fees can be 10% to 15% of construction costs.
- **Engineer(s)**: Experts in design and construction, engineers can be brought on by the architect or the property owner. Often, engineers will conduct what is known as a Tier 1 assessment as a first step if the building has been damaged, in order to identify concerns about the foundation or structure.

They can also help on small projects for a specific engineered element. A site visit from a structural engineer can range from $500 to $800.

- **General contractor**: The primary manager of a construction project, a general contractor's expertise lies in doing the work, preparing cost estimates, and coordinating permits. They should have experience in the type of work involved for your project. They can work on a range of project sizes and provide planning information relative to constructability and feasibility, along with exploratory work to inform design. Familiarity with your jurisdiction is important.
- **Geotechnical engineer**: Can identify soil conditions, including what is there and how it will perform in a flood.
- **Hazardous materials contractors**: May be brought in at the beginning of a project to conduct surveys identifying what exists at the site and what will need to be remediated. The work removing any hazardous materials will need to be certified that it was done correctly.
- **Land surveyor**: Can prepare an elevation certificate and a site survey to document what exists (e.g., grades, structures, topography) and provide base data for planning and construction documents. Fees for an elevation certificate for a single-family house can be under $1,000, with a full site survey ranging from under $4,000 for small projects to $8,000 for a larger project.
- **Owner's representative**: For large projects ($1 million or more), an owner's representative can put a team together, assemble a preliminary budget and a plan, identify the steps involved, and lead community outreach and engagement.
- **Roofing contractor**: A professional who specializes in the construction, repair, and replacement of roofs. Working with a roofing contractor can be an initial stabilization step for a project to prevent water entry while planning, permitting, and regulatory review proceeds.
- **Washington State Department of Archaeology and Historic Preservation**: This state department has technical expertise for historic buildings, archaeology, and connecting with applicable Tribes.



*Cap Sante Marina in Anacortes. Photographed by Andy Porter. Courtesy of the State of Washington Tourism.*

# Step Four: Planning for Maintenance and Adjustments

Once you've done all the hard work of adapting your structure to flood risks, you'll want to ensure it's kept in good condition. Ongoing maintenance of and adjustments to this work over the course of your time horizon should be part of your planning and budgeting process.

Having funding set aside for this allows you to implement, rather than defer, this work. This is essential to the long-term effectiveness of the flood adaptation strategy that you select and apply.

**Monitoring**: Identify annual steps to inspect and monitor conditions of the work done to provide the flood adaptation and note where work may be needed. Determine the seasonal timing of this to either prepare for flooding or identify repairs following flooding. Think of maintenance as an integral part of the strategy, not an optional add-on later.

**Adjustments**: Any changes or updates needed should be identified through your maintenance inspections. This could include minor adjustments to improve performance or larger corrective actions to address unforeseen issues. Depending on the flood type affecting your property, it may be more prone to needing adjustments based on changing environmental conditions.

# APPENDICES

The following appendices provide the worksheet and guidance to support property owners while using this guide for project planning.



*Gig Harbor. Photograph courtesy of Films by Rach.*

# Appendix A. Flood Adaptation Planning Worksheet

Complete this worksheet as you use the guide to collect and record information about your site. Once completed, this worksheet is intended to support accurate and consistent communication of project details with public agency staff, contractors, and specialists.

## *Property and Owner Data*

Property address: _____

Property owner: _____

Owner address: _____
*(if different from property address)*

Owner phone: _____

Owner email: _____

### Step One: Assessing Risk

#### Determine Flood Risk at Your Property

- Property is within the most likely 100-year flood hazard scenario modeled in COSMOS without additional sea level rise?
  - ☐ Yes
  - ☐ No
  - ☐ No Data
- _____ (Feet) Mean Higher High Water (MHHW) level for your property
- _____ (Feet above MHHW) Elevation above Mean Higher High Water (MHHW) at which flooding due to sea level rise starts to occur for the property
- _____ (Years) Average return frequency of flooding that affects your property

#### Identify Decision Factors

- _____ Building use category that most closely matches your intended building use
- Will your building have mixed occupancy?
  - ☐ Yes
  - ☐ No
- _____ (Years) Time horizon for your project
- _____ (Dollars) Total estimate of funds available
- _____ (Dollars) Total current holding costs for the property
- _____ (Dollars) _____ (Year) Assessed land value

- _____ (Dollars) _____ (Year) Assessed improvement value
- _____ (Dollars) Annual flood insurance rate
- _____ Flood insurance provider
- _____ Flood insurance deductible
- _____ (Dollars) Cost of previous flood damage. Year occurred: _____

## Identify Design Factors

- Flood type: _____
- Water features on your property? If yes, list and identify generally where they are located.

  ☐ Yes _____
  _____
  _____

  ☐ No

☐ On TopoBuilder, download a USGS topographic map for your location,

- _____ (Feet, NAVD 88) Elevation of grade level at your property
- Property (tax parcel) within 200 feet of the Ordinary High Water Mark (OHWM)?

  ☐ Yes. Provide the distance from the OHWM _____ (Feet).
  ☐ No

- Does the OHWM appear to be further inland on your property than the shoreline shown on the topographic map?

  ☐ Yes
  ☐ No

☐ Elevation certificate prepared

☐ On the FEMA Flood Map Service Center, download a FIRM or FIRMette.

- ____ (Feet) Base Flood Elevation (BFE)
- ____ (Feet) Design Flood Elevation (DFE), if known
- ____ (Feet) Established flood risk level (EFRL)

☐ BFE, DFE, and EFRL lines marked on a photograph of the building

☐ List of resources within your property

- Are any of the resources historic (44 CFR 59.1)? If no, are any of the resources 40 years or older?

  ☐ Yes ☐ No

### Table 1. Resources Within Your Property

Please note: you may only have one resource on your property. For example, if your resource is a single historic building, that building might be your only resource.

| Resource | Historic (NR, WHR, Local)* | Depth of Floodwater | Significant Features** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**NR: Listed to the National Register of Historic Places; WHR: Listed to the Washington Heritage Register; Local: Designated on a city or county register of historic places.*

***Significant Features: The character-defining features and spaces (per Preservation Brief 17, "Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character") are those visual aspects and physical features that comprise the appearance of every historic building. Character-defining elements include the overall shape of the building, its materials, craftsmanship, decorative details, interior spaces, and features, as well as the various aspects of its site and environment. Learn more at this link.*

## Adaptation Strategy

- _____ General adaptation strategy (e.g., keep water out, let water in, avoid the flood)
- _____ Specific adaptation strategy(ies) selected within a general strategy (e.g., dry floodproofing).

## Permitting, Funding, Implementation

- Pre-approved solution(s) available through your local building department?

  ☐ Yes ☐ No

- Agencies contacted? (Not sure where to begin? Start by contacting ORIA for more direction?

  ☐ Local government ☐ Department of Ecology ☐ U.S. Army Corps of Engineers

### Table 2. Your Project Information

Refer to "Appendix B. Project Information Guidance" for direction on what information is needed for each item in this table.

| Information | Description |
|---|---|
| Project Description | |
| Purpose and Need | |
| Scope of Work | |
| Description of Work | |
| Proposed Timing of Work | |
| Tribal and Community Outreach | |
| Permits and Regulatory Requirements | |
| Previous Studies | |

- _____ (Name) Jurisdiction, city, or unincorporated county
- Does any funding for your project have regulatory compliance requirements (e.g., state or federal funds)?

  ☐ Yes
  ☐ No

- Will you need a federal permit for your project?

  ☐ Yes, based on:
    ☐ Federal funding
    ☐ Project location
    ☐ Both federal funding and project location
  ☐ No

- Is there electrical, sewer, or water service to the property? What size/capacity for each?

  - Electrical

    ☐ Yes (size and capacity); _____
    ☐ No

  - Sewer

    ☐ Yes (size and capacity); _____
    ☐ No

  - Water service

    ☐ Yes (size and capacity); _____
    ☐ No

## Maintenance and Adjustments

- Annual steps needed to inspect and monitor conditions?

  ☐ Yes
  ☐ No

- List these steps and general time frames: _____
  _____
  _____
  _____

- Budget developed to allow for maintenance and adjustment work?

  ☐ Yes
  ☐ No

# Appendix B. Project Information Guidance

The following corresponds with "Table 2. Your Project Information" in the "Appendix A. Flood Adaptation Planning Worksheet" and provides guidance on what information is needed to complete the table.

**Table 3. Project Information Summary Guidance**

| Information | Description of the Information to Provide |
|---|---|
| Project Description | One to two sentences stating what you will do (e.g., "elevate our National Register-listed, single-family, wood-frame house on a new foundation"). |
| Purpose and Need | Paragraph stating what the flood adaptation strategy is intended to resolve and why it is needed, as documented in the "Determine Flood Risk at Your Property" and "Identify Design Factors" sections. |
| Scope of Work | Paragraph identifying the major tasks required to implement your flood adaptation strategy (e.g., disconnect utilities, raise the house, demolish the existing foundation, construct a new foundation, lower and attach the house to the new foundation, reconnect utilities), as well as mitigation measures. |
| Description of Work | The details for your scope of work to understand how the work will be done. What utilities will be disconnected? How high will the house be raised? To what depth will the foundation be demolished? Will there be any other ground-disturbing activities? What is the cubic volume of any excavation or fill material? What equipment is needed, and how will it get to the work location?<br><br>Start outlining anticipated mitigation measures, such as wetland mitigation, erosion and sedimentation controls, water quality (turbidity), invasive species, protection of historic or cultural properties, and critical areas protection. You won't likely know all of these details until later, but you will add them as you work through permitting and regulatory review. |
| Proposed Timing of Work | When do you propose to do the work? This will be refined through funding sources and permit and regulatory consultation but should initially be the general timeframe for when you want construction to start and end. |
| Tribal and Community Outreach | State whether you have done any or do not know if any is required. For permits from the city or county, the engagement can be as informal as having called your local building official to ask what permits might be needed. |

| Information | Description of the Information to Provide |
|---|---|
| Permits and Regulatory Requirements | This will be an evolving list, as new items are added to the list and others removed, based on your property characteristics and proposed work. Developing the list helps to track what you are working on and to share that information during Tribal, government, and/or public engagement so that ideally you miss nothing and avoid delays. Exempted actions often still require permit applications to document that what is being done meets the exemptions. The Joint Aquatic Resource Permit Application (JARPA) can be used to satisfy multiple permitting requirements. Refer to ORIA's JARPA form site for additional information. (https://www.oria.wa.gov/site/alias__oria/4220/jarpa-form.aspx) |
| Previous Studies | Identify studies previously completed for your property and any that you complete as part of this project. This list will change as you work through the permitting process but could include the following:<br>• Wetland survey and, if present, wetland delineation (https://ecology.wa.gov/water-shorelines/wetlands/tools-resources/delineation-resources)<br>• Habitat survey for sensitive plan and animal species and the presence of invasive species (which, if removing as part of the project, may be mitigation)<br>• Cultural and historic survey, recorded in WISAARD (if more than 10 years old or incomplete, this may need to be updated). WISAARD can help identify this information. Refer to "WISAARD Guidance" in Appendix E<br>• Elevation certificate prepared by a land surveyor |

# Appendix C. Technical Resources

Key websites, publications, and videos include the following:

- Washington Trust "Historic Preservation and Coastal Flooding Webinar" videos: www.youtube.com/playlist?list=PLOHyLlzY_nEQAuImT4kzgkDpy2X6PU5in
- National Park Service (NPS) *Guidelines on Flood Adaptation for Rehabilitating Historic Buildings* publication: www.nps.gov/orgs/1739/upload/flood-adaptation-guidelines-2021.pdf
- Coastal Storm Modeling System, or COSMOS, at the USGS Hazard Exposure Reporting and Analytics (HERA) website: www.usgs.gov/apps/hera/floodTool.php
- NOAA Sea Level Viewer tool: https://coast.noaa.gov/slr/#
- NOAA Tides and Currents Viewer tool: tidesandcurrents.noaa.gov/map/
- TopoBuilder tool: topobuilder.nationalmap.gov/
- FEMA's National Flood Hazard Layer (NFHL) viewer: hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd
- NOAA Sea Level Calculator tool: coast.noaa.gov/digitalcoast/tools/sea-level-calculator.html
- WISAARD database of historic resources in Washington State: wisaard.dahp.wa.gov/#
- CLG Program list: dahp.wa.gov/local-preservation/certified-local-government-program/clg-program-participants
- Online Permitting Assistance System (OPAS) resource: www.oria.wa.gov/site/alias__oria/4235/OPAS.aspx
- Office of Regulatory Innovation and Assistance (ORIA) website: www.oria.wa.gov
- Secretary of the Interior's Standards for the Treatment of Historic Properties: www.nps.gov/orgs/1739/secretary-standards-treatment-historic-properties.htm

# Appendix D. Secretary of the Interior's Standards

The Secretary of the Interior's Standards for the Treatment of Historic Properties guide how to work on historic properties (https://www.nps.gov/orgs/1739/secretary-standards-treatment-historic-properties.htm). They form the basis for design review under federal, state, and most local regulations.

There are four approaches to the treatment of historic properties, each with their own standards: **Preservation**, **Rehabilitation**, **Restoration**, and **Reconstruction**. Each is defined below, and typically only one is selected for a project. Selection of which treatment is most appropriate is informed by the level of significance, resource condition, proposed use, and applicable building codes and regulations.

*The Rehabilitation standard is by far the most commonly used, and will likely be the one you select. It allows for the greatest degree of change and adaptation while still respecting historic character. For this reason, we have provided a more detailed explanation of this standard on the following page.*

- **Preservation** is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses on the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project. However, new exterior additions are not within the scope of this treatment. The Standards for Preservation require retention of the greatest amount of historic fabric, along with the building's historic form.

- **Rehabilitation** is defined as the act or process of making possible a compatible use for a property through repair, alterations, and additions, while preserving those portions or features which convey its historical, cultural, or architectural values. The Rehabilitation Standards acknowledge the need to alter or add to a historic building to meet continuing or new uses while retaining the building's historic character.

- **Restoration** is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project. The Restoration Standards allow for the depiction of a building at a particular time in its history by preserving materials, features, finishes, and spaces from its period of significance and removing those from other periods.

- **Reconstruction** is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location. The Reconstruction Standards establish a limited framework for recreating a vanished or non-surviving building with new materials, primarily for interpretive purposes.[13]

13 "The Secretary of the Interior's Standards for the Treatment of Historic Properties: Technical Preservation Services (U.S. National Park Service)," accessed March 5, 2026, https://www.nps.gov/orgs/1739/secretary-standards-treatment-historic-properties.htm.

## *Rehabilitation*

**Rehabilitation** is defined as the act or process of making possible compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values. Because this is the most commonly used treatment—and is most likely to be applicable for the adaptation of historic structures to coastal flooding—we have included the full Standards for Rehabilitation here. To find the Standards for Preservation, Restoration, or Reconstruction, see the Secretary of the Interior's Standards for the Treatment of Historic Properties linked above.

### Standards for Rehabilitation:

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archaeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.[14]

14 "The Secretary of the Interior's Standards for the Treatment of Historic Properties: Rehabilitation as a Treatment and Standards for Rehabilitation (U.S. National Park Service)," accessed March 5, 2026, https://www.nps.gov/articles/000/treatment-standards-rehabilitation.htm.

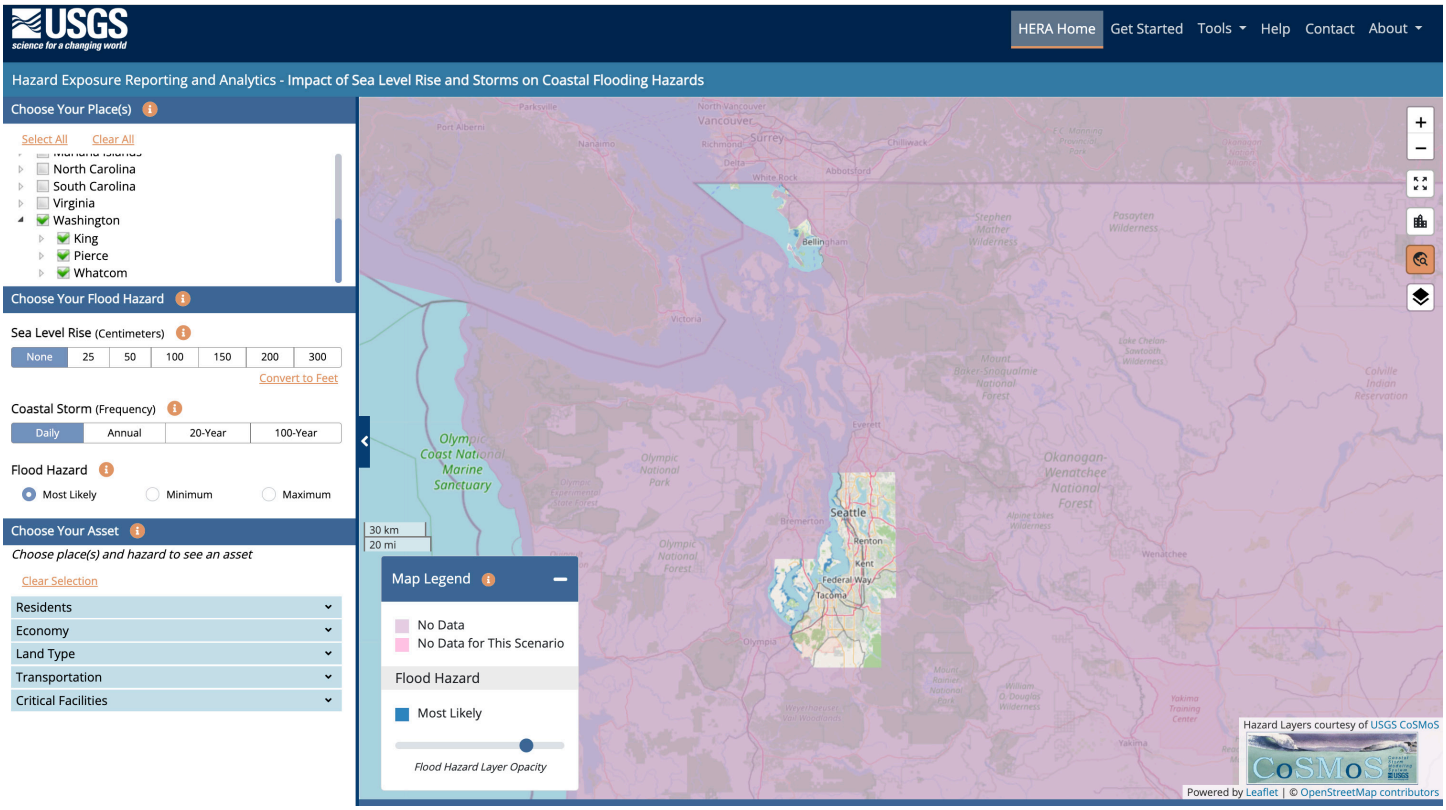
# Appendix E. Website Guidance

Organization of the following websites follows the steps laid out in "Appendix A. Flood Adaptation Planning Worksheet"

## *COSMOS Guidance*

To understand the likelihood of flooding at your property, go to the website: https://www.usgs.gov/apps/hera/floodTool.php

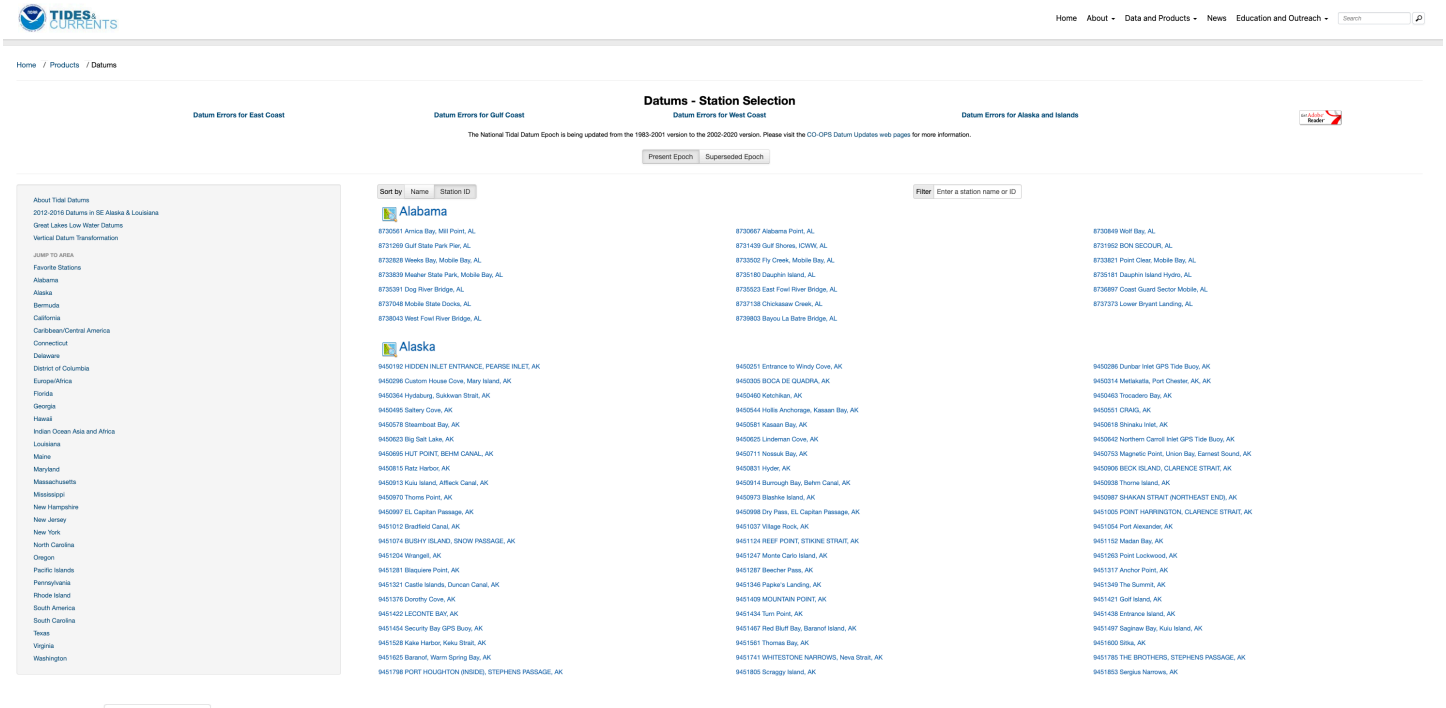
1. Check on "Washington" in the "Choose Your Place(s)" window at left on the screen; this will zoom the view to the counties in Washington for which data is available. In the map legend, don't adjust the flood hazard layer opacity until you are zoomed in on your property, as this can affect what shows up.
2. Under "Choose Your Flood Hazard" window at left, under "Coastal Storm (Frequency)" select "100 Year," which should identify a larger potential for flooded areas and has a 1% chance of occurring in any given year. For context, a 20-year storm has a 5% chance and an annual storm a 100% chance of occurring in any given year.
3. Leave "Sea Level Rise" at "None." Leave "Flood Hazard" at "Most Likely."
4. Zoom in on the map to your property.
5. If your property is inundated under this scenario, check "yes" on the worksheet. If your property is not inundated under this scenario, check "no" (you can expect that the property is out of the way of most flooding events over the next 100 years).



# *NOAA Tidal Datums Guidance*

To determine the Mean Higher High Water (MHHW) for your property, go to the website: [https://tidesandcurrents.noaa.gov/stations.html?type=Datums#Washington](https://tidesandcurrents.noaa.gov/stations.html?type=Datums#Washington)

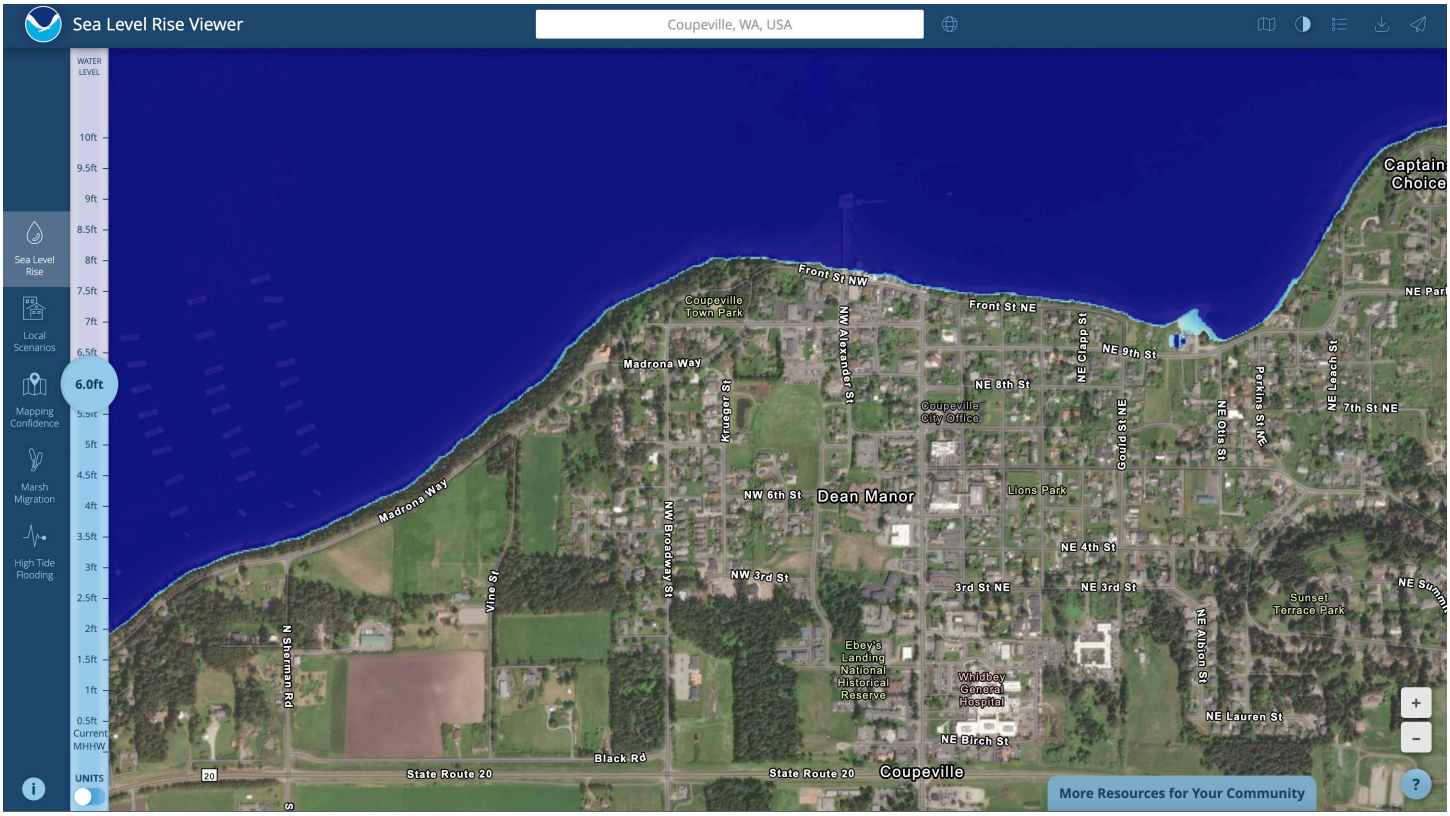
1. In the gray column along the left side of the list of stations, scroll down and go to "Washington." This will scroll the page down to show only tidal stations in Washington.
2. Based on station name, select the one nearest your property, and go to that station.
3. In the column at left, the MHHW will be at the top of the list with the value shown in feet.



## *NOAA Sea Level Viewer Guidance*

To determine the elevation at which flooding occurs related to your property, go to the website: https://coast.noaa.gov/slr/#/layer/slr

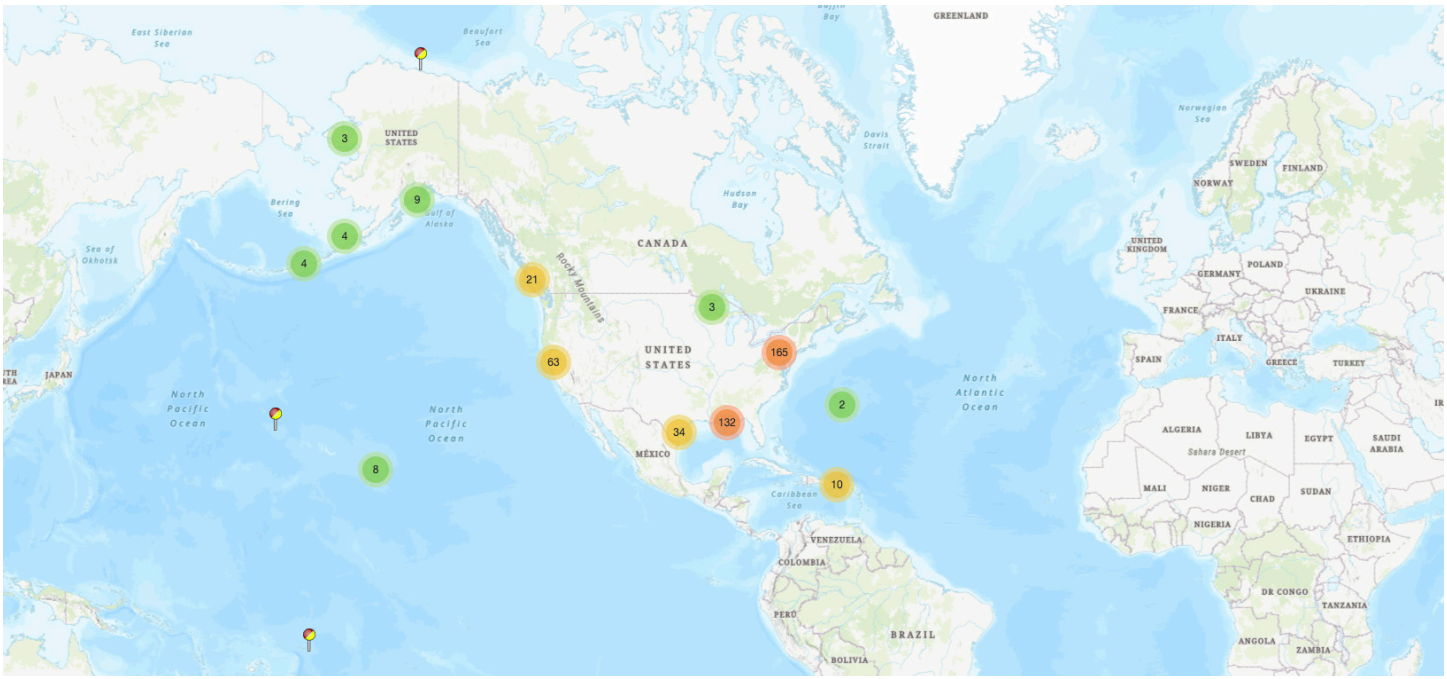
1. Type your address in the search bar at the top of the map and hit "Return" to go to your property's location on the map.
2. The slider along the left side of the map shows the water level above Mean Higher High Water. Confirm the units are in feet (toggle at the bottom of the slider).
3. Raise the slider. Blue (representing water) will expand across the map to show the extent of flooding. When the blue converges on your property, record the elevation in feet relative to Mean Higher High Water on the worksheet.
4. This map shows only surface flooding. It does not account for ground water rise due to water saturation that could impact basements. Basements start to flood when flooding occurs nearby at a lower elevation relative to Mean Higher High Water. If you have a basement, you may want to use a lower elevation based on your knowledge of the site characteristics and basement depth.



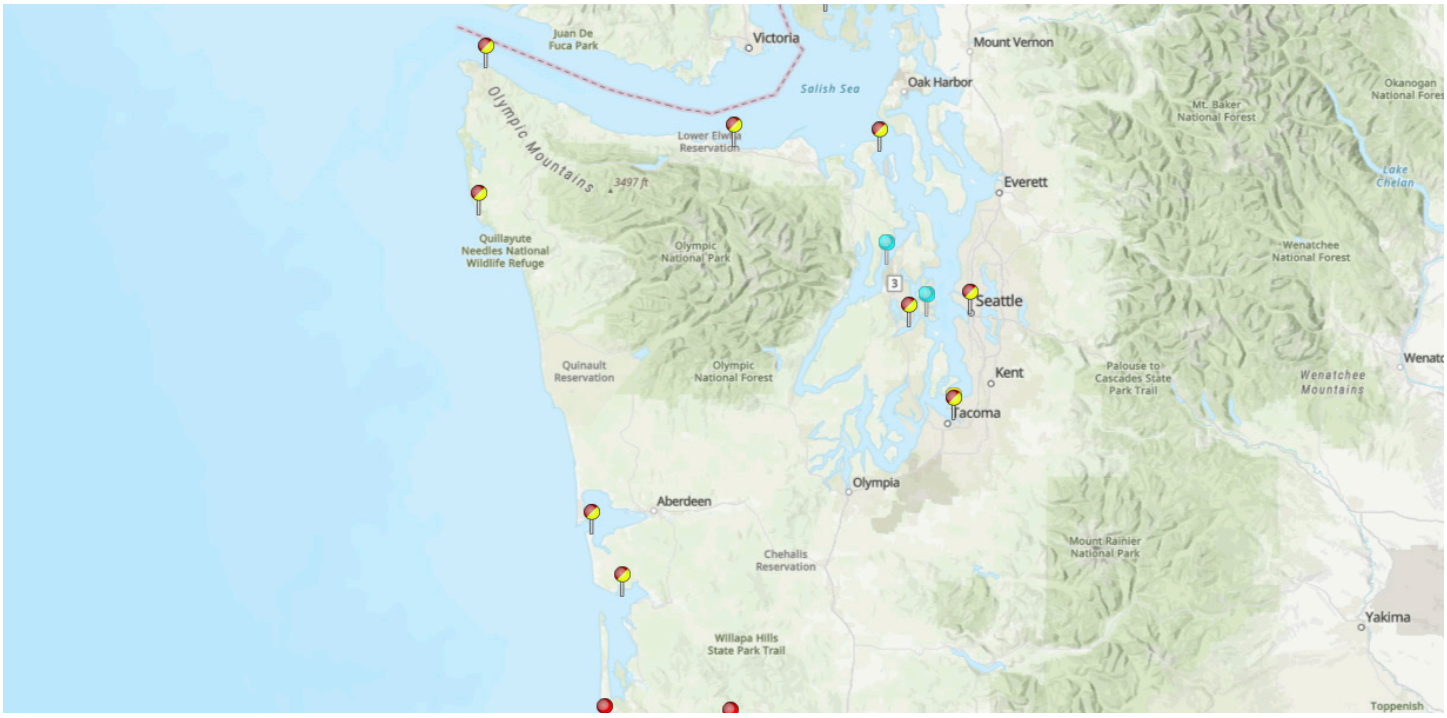
## *NOAA Tides and Currents Viewer Guidance*

To determine the probable flooding frequency at your property, go to the website: [https://tidesandcurrents.noaa.gov/map/](https://tidesandcurrents.noaa.gov/map/)

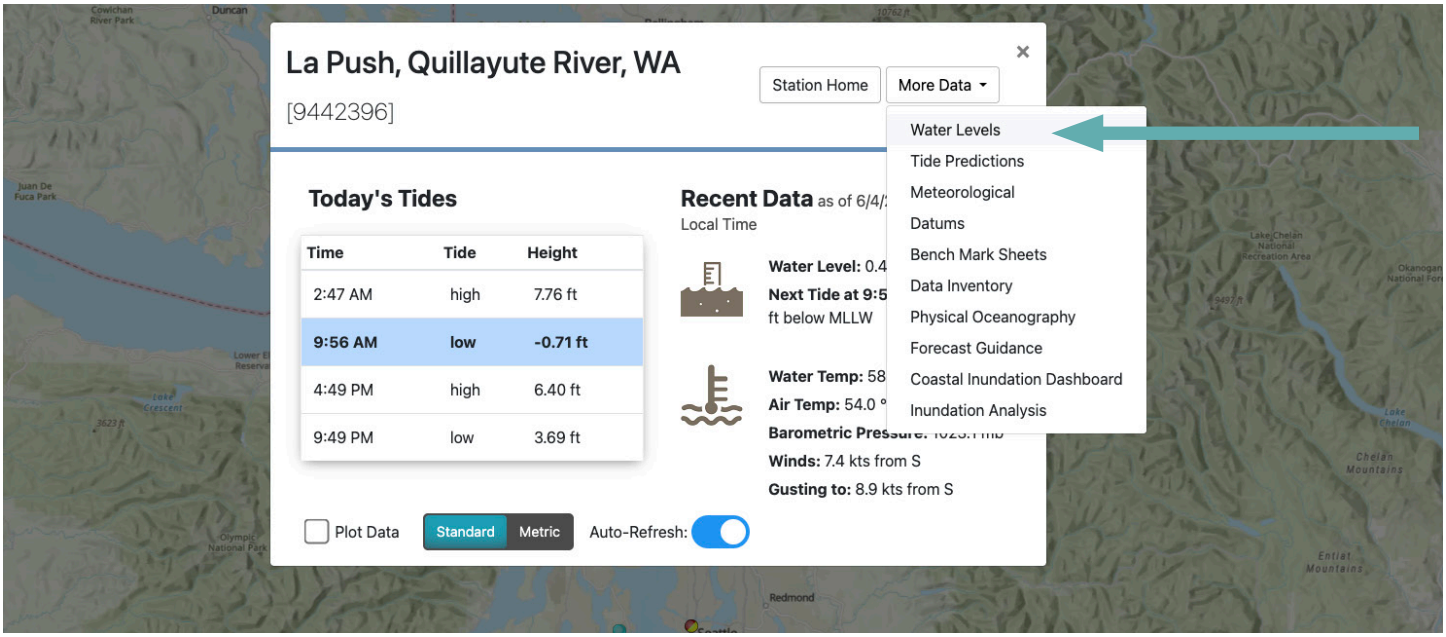
1. Zoom in and go to the green circle closest to your property.



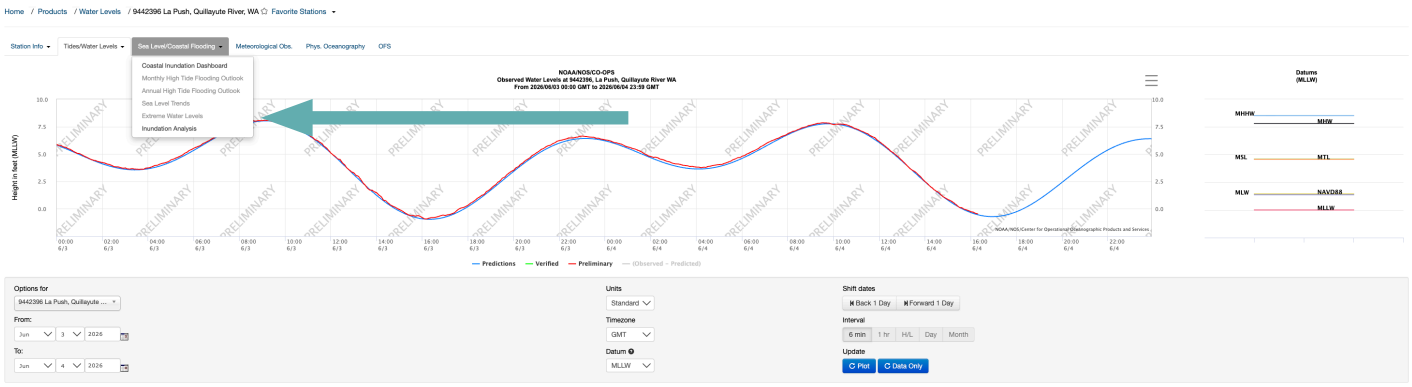

2. Go to the tide gauge closest to your property (represented by red and yellow pins on the map). Note the light blue/green pins correspond to currents and are not applicable for our purposes.

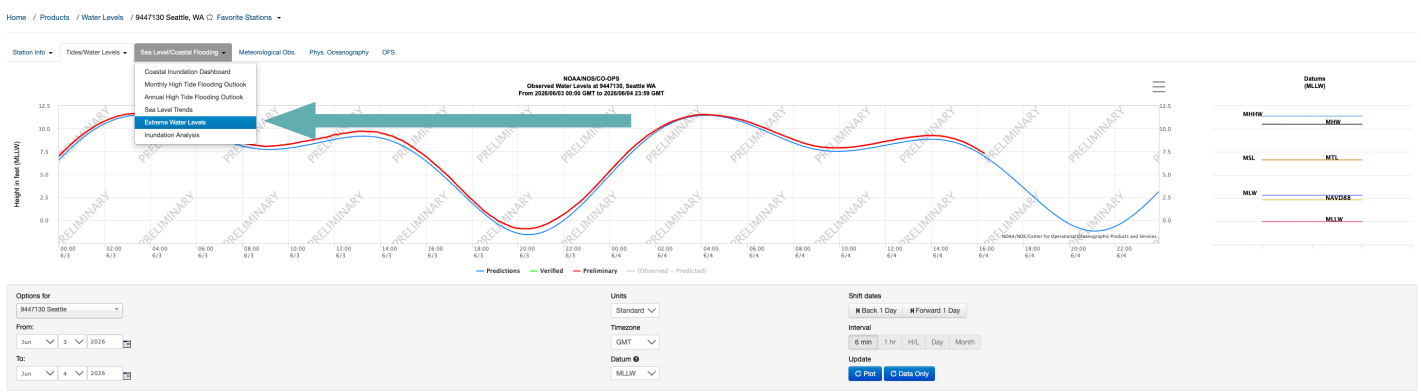


3. In the pop-up window, go to the "More Data" icon on the upper right (also represented by three horizontal lines if your browser screen is not at full screen size). Select the "Water Levels" page.




4. In the row of tabs above the graph on this page, go to the "Sea Level/Coastal Flooding" tab. In the dropdown list, select "Extreme Water Levels." This information may not be available for every location.



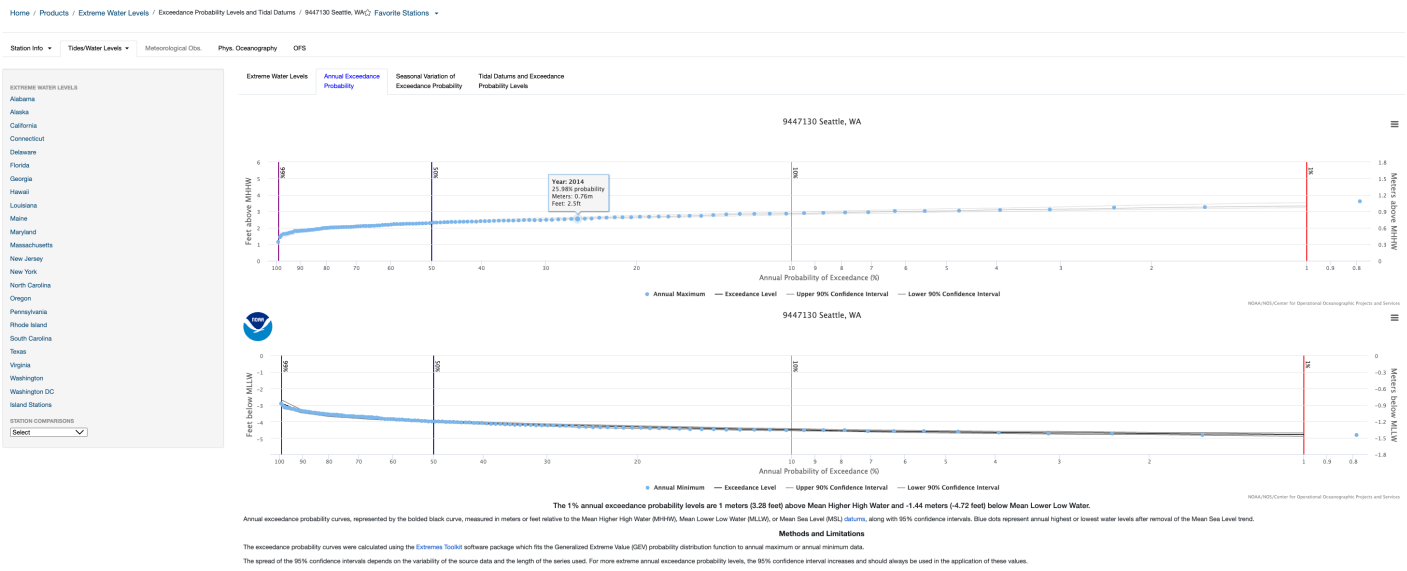



5. In the row of tabs on this page, go to the "Annual Exceedance Probability" tab. This graph takes past data, lows and highs, and shows them as a return (flood) frequency curve. The upper graph shows the feet above Mean Higher High Water.

6. In the upper graph, move your cursor along the line until you get to the feet above the Mean Higher High Water threshold that you established in the previous step. The pop-up window will show a percentage probability relative to 100 years (e.g., 13.7%). There will likely be multiple pop-ups around your threshold elevation with different percentages.

7. Select the percentage probability that has the "Upper 90% Confidence Interval" recorded on the same pop-up. To convert this annual probability of exceedance (flooding) into years, multiply the percentage by 100. Then divide 100 by that result. For example, if your exceedance probability is 15%: 15% [.15] x 100 = 15. Then 100/15 = 6.67. Round up to get a single digit number (7 in this case). Record this as the average return frequency on the worksheet.

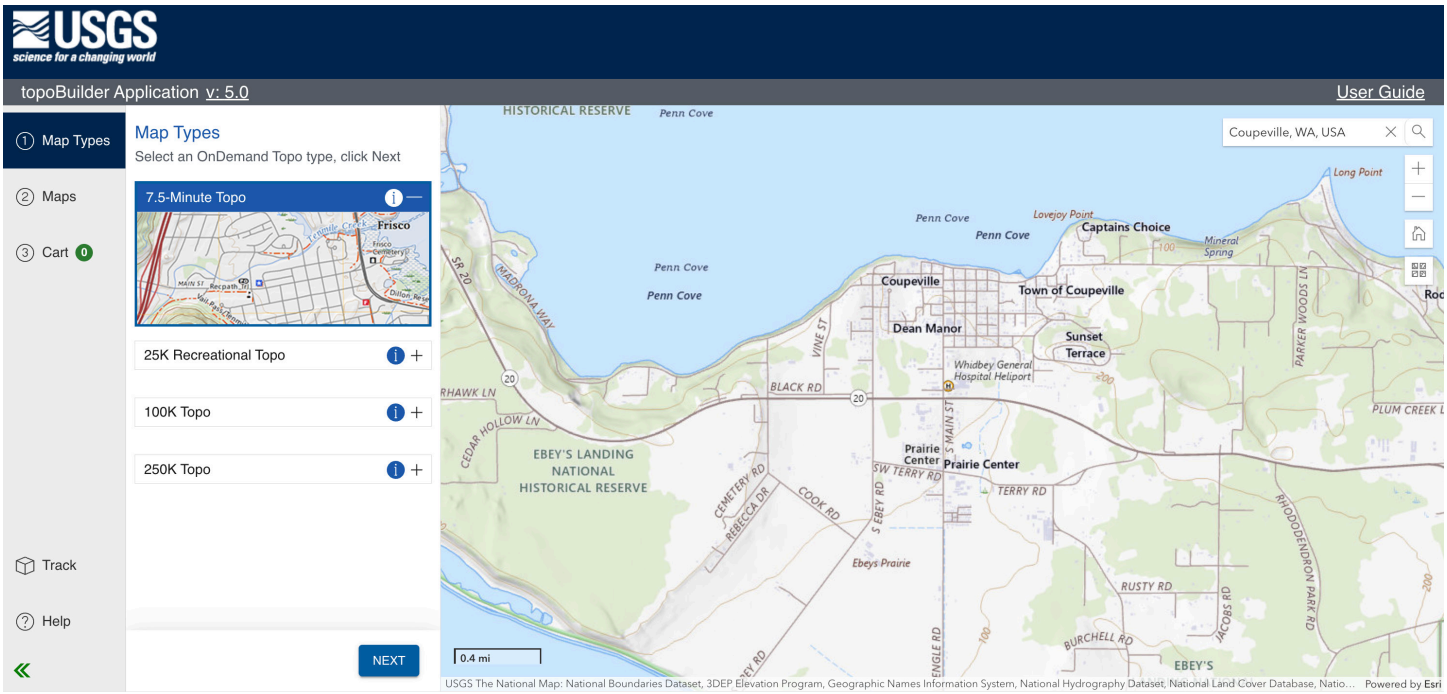
8. Using this example, this means flooding may occur at your property at least every seven years. NOAA is moving away from the average return frequency expressed in years; instead it is emphasizing that in every given year, there is a chance of reaching or exceeding a given water level. For planning purposes, however, converting to years provides a tool to inform subsequent decisions.



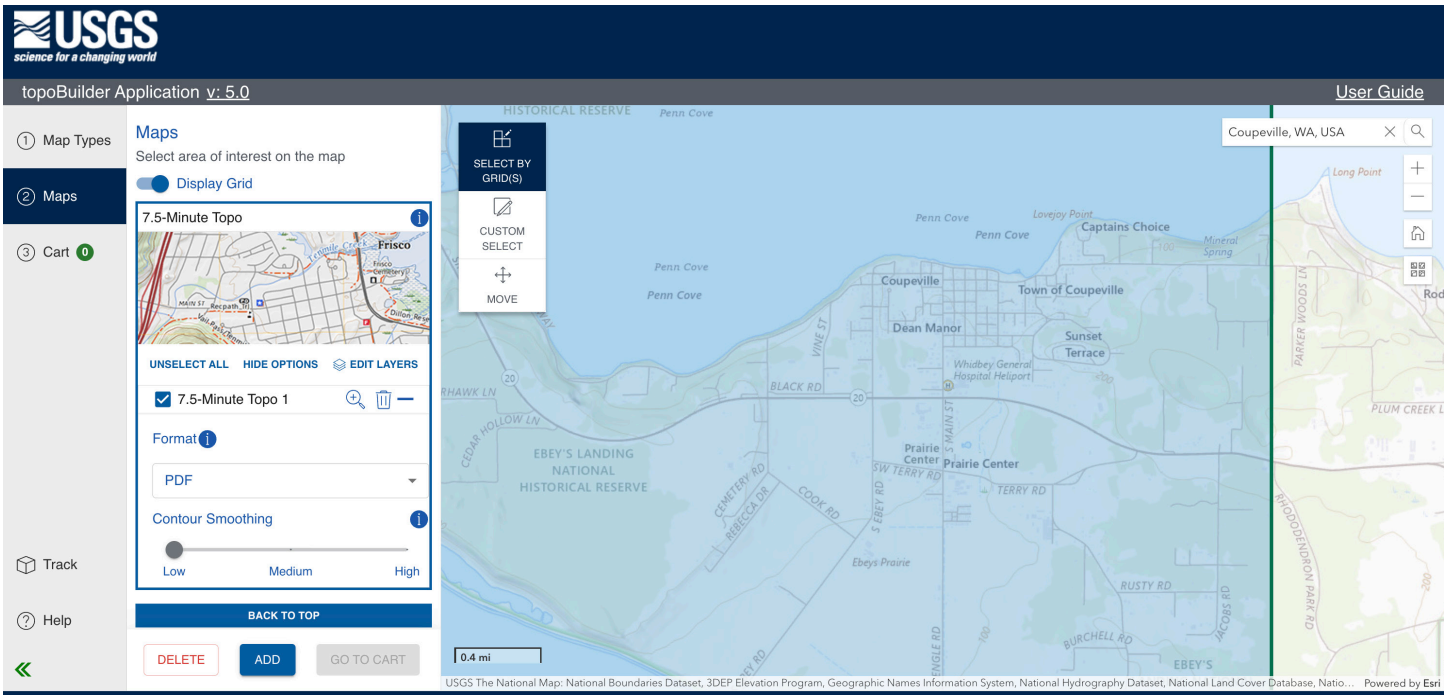
## *TopoBuilder Guidance*

To use TopoBuilder, go to the website: https://topobuilder.nationalmap.gov/

1. Type your address into the search bar on the upper right of the screen.
2. Under map types, select "7.5-Minute Topo" for the highest level of detail and go to "Next."




3. Go to "Select by Grid(s)," and click on the map to the right. Your selection will be shown in the list on the left.
4. Go to the check box to the left of the map title to select it.
5. Under "Contour Smoothing," choose "Low" to retain the highest level of detail, making it easier to identify elevations.
6. Select "Add" at the bottom of the list to add your selection to your cart.
7. Select "Go To Cart," then "Checkout." In the pop-up window, enter the email that you want the map emailed to. You will receive a confirmation email for the order, followed by a second email to download the map. There is no fee for this service. The second email with the map usually arrives in your inbox within 24 hours but may take up to five days.
8. Once you have downloaded the map, open it and go to the legend at the bottom middle to see what the contour interval is (in feet) and check that the datum is NAVD 88.
9. Zoom to your property location. Contour lines in these maps are generally brown (darker brown have elevation labels; lighter brown do not). The numbers with the same brown color and a white outline call out the elevation in feet for the line they are on top of. If your property is not by one of these lines, find the closest one to use as your reference line and determine if this is uphill or downhill from your property.



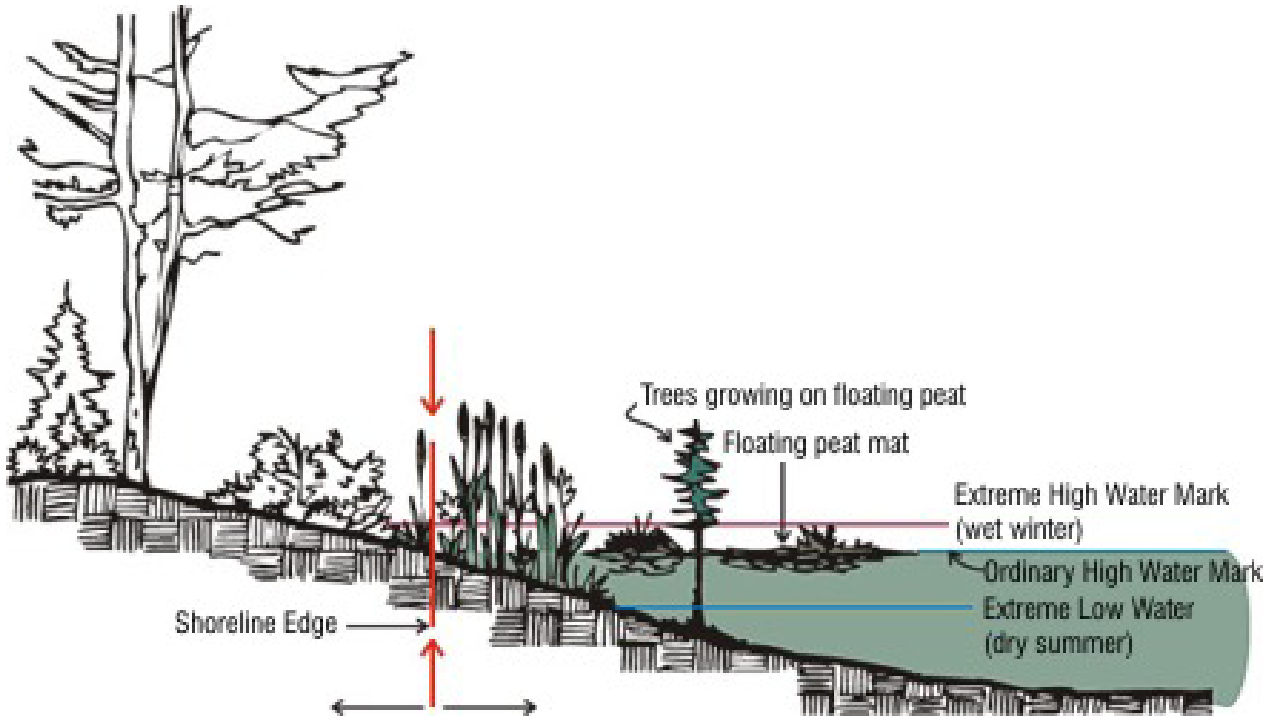

10. Count the number of light brown lines to your property. Multiply the number of lines by the map's contour intervals. For example: If the nearest reference line is 25 feet, the map's contour interval is five feet, your property is downhill from the reference line, and three light brown contour lines are between the reference line and your property, then the calculation looks like this: 25 [reference line elevation] - (3 [number of contours] x 5 [contour intervals in feet]) = 10 feet.

11. To determine the grade level elevation at your property, if your property is uphill from the reference line, add this number to the elevation. If your property is downhill from the reference line, subtract this number from the elevation. Record this number in the worksheet. If your property is sloped, record the elevation at each of the resources within your property.

## *Ordinary High Water Mark Guidance*

To identify the Ordinary High Water Mark for your property, go to the website: https://ecology.wa.gov/water-shorelines/shoreline-coastal-management/shoreline-coastal-planning/shoreline-management-act-sma/shoreline-management-act-jurisdiction/ordinary-high-water-mark

1. Based on the definition and the shoreline section graphic with red arrows showing the vegetation transition at the Ordinary High Water Mark, identify where a similar vegetation change occurs on your property. (Section drawing with a vertical red line showing the vegetation change indicating the Ordinary High Water Mark courtesy of DOE.)



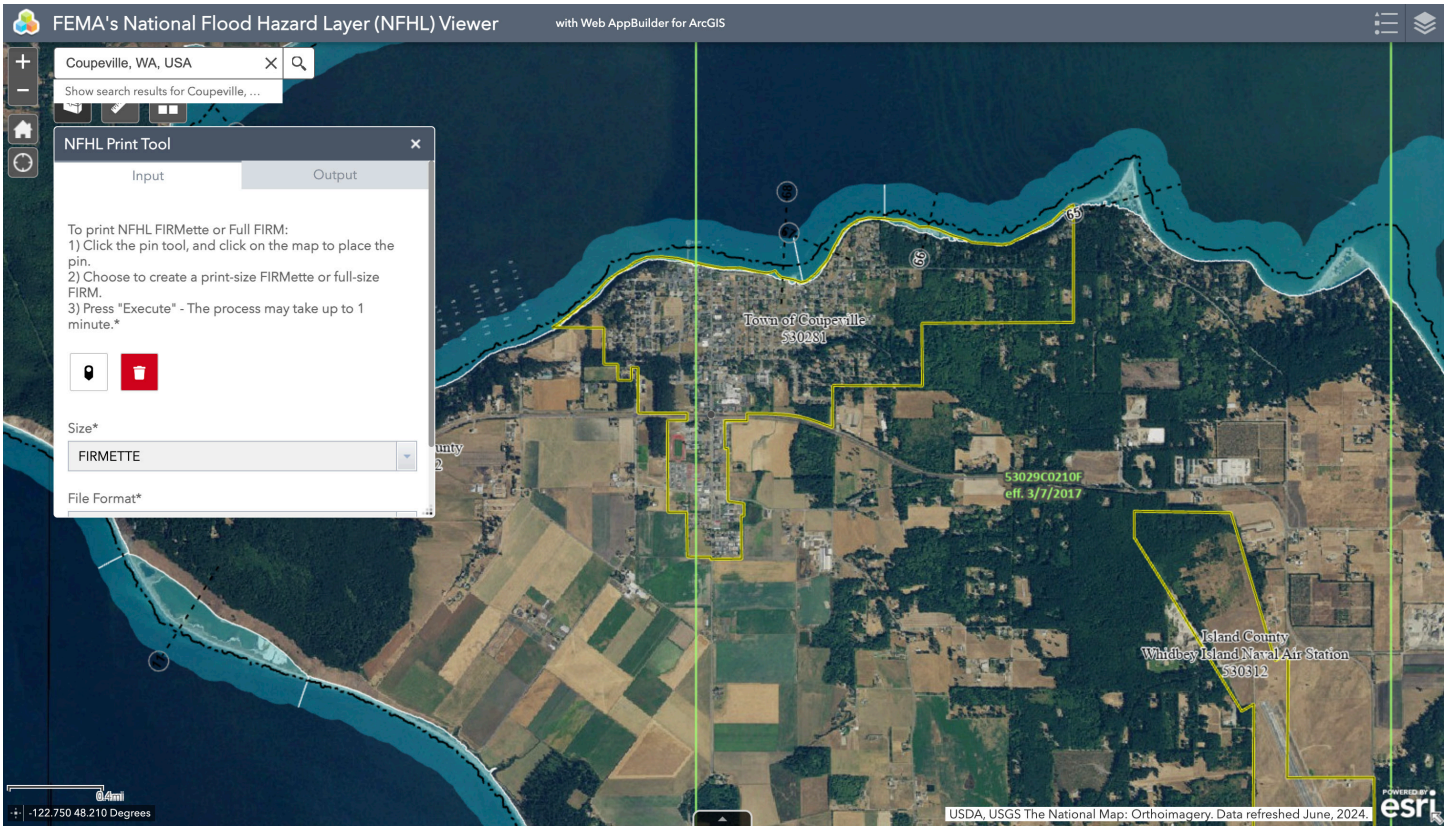

2. Compare this location with the shoreline edge shown in the topographic map downloaded from TopoBuilder. If it looks like the Ordinary High Water Mark is further inland, draw a line at the location you estimate to be closest. It does not have to be exact, since the purpose of this is to get a general idea of where that mark might be and how your property relates to it.

3. Use the scale on the topographic map downloaded from TopoBuilder to measure inland 200 feet from either the shoreline on the map or the mark you made on the map, and draw a line. Use the FIRMette or FIRM downloaded in the"Identify the Potential Depth of Floodwater" section to identify if there are any established floodways, floodplain areas, wetlands, or river deltas; measure inland 200 feet from the edge of these, and draw a line. Record on the worksheet if your property is within 200 feet of a shoreline and the estimated distance from the shoreline. Record on the worksheet if you think the Ordinary High Water Mark is further inland than the shoreline shown on the topographic map.

## *FEMA's National Flood Hazard Layer Viewer Guidance*

FEMA's National Flood Hazard Layer (NFHL) viewer can provide the Base Flood Elevation (BFE), except for Zone A locations where there is no data. To use the NFHL, go to the map viewer: https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd

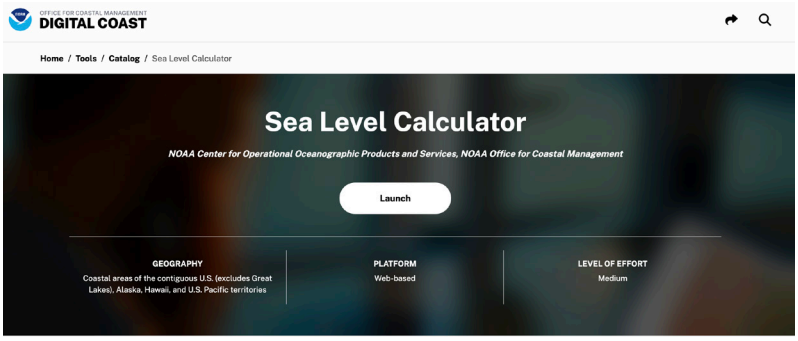
1. Search for your location and zoom in.
2. If your property is within a specific Flood Zone (e.g., Zone AE), the BFE will be listed in feet in parentheses below the zone (e.g., EL 11).
3. Go to the "Print Tool" in the upper left corner of the screen to print out an NFHL FIRMette or full FIRM. The BFE should be confirmed with your local building official as part of the permitting process.

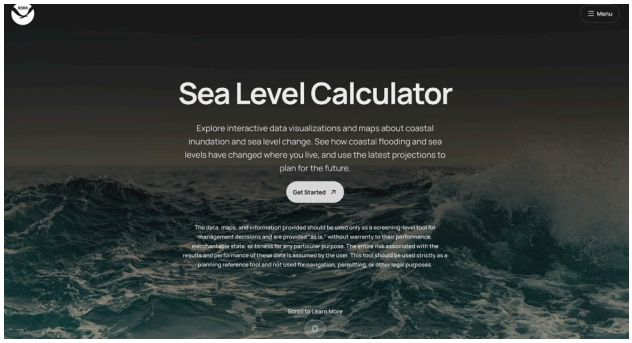


## *NOAA Sea Level Calculator Guidance*

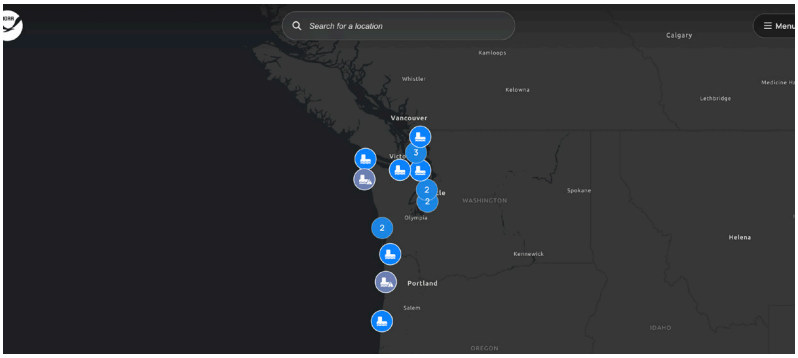
The NOAA Sea Level Calculator can help with the established flood risk level (EFRL) estimate. To use, go to the website: https://coast.noaa.gov/digitalcoast/tools/sea-level-calculator.html

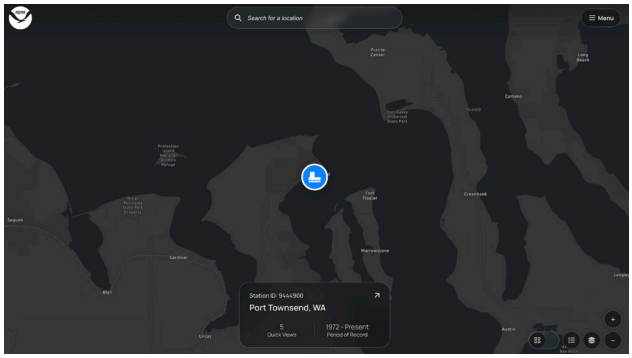
1. Click "Launch," then "Get Started."



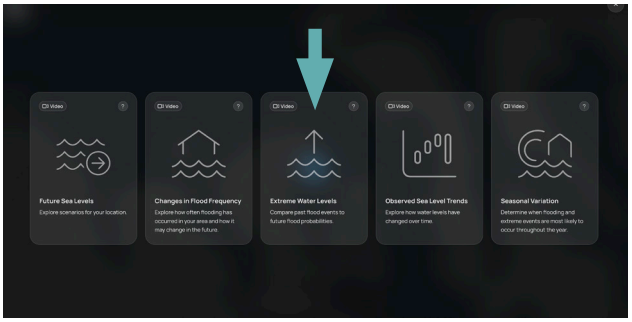



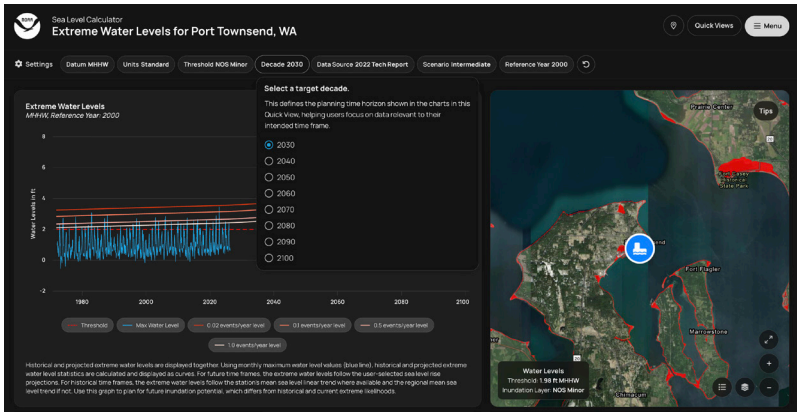

2. In the search field, enter your address or location.
3. Go to the nearest blue "Quick View" dot on the map.
4. In the pop-up window listing the station ID and name, go to the arrow in the upper right corner.




5. Select "Extreme Water Levels."
6. Go to the "Decade" link and select the target decade that most closely aligns with your time horizon (documented in the "Time Horizon" section).

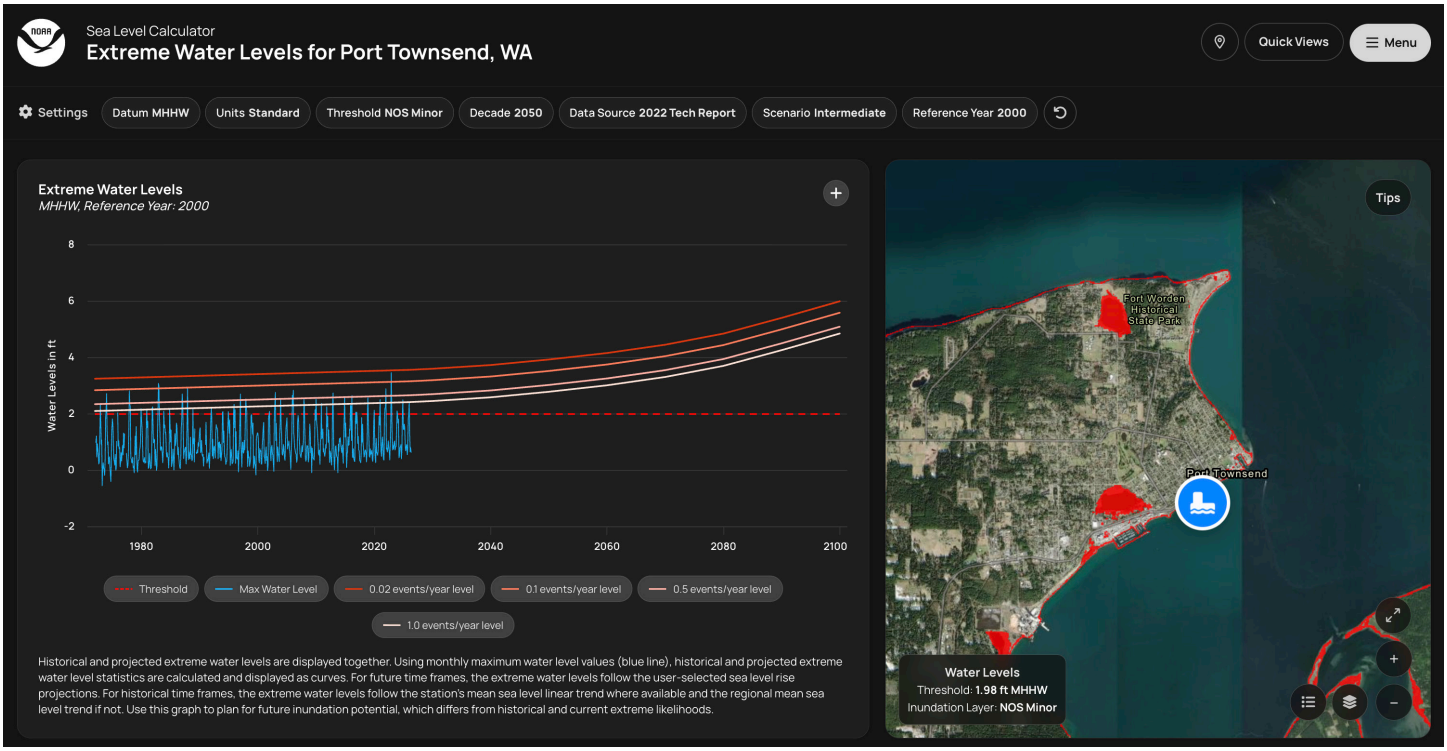


7. Go to the graph to see the elevation and frequency of extreme high water levels by the end of your time horizon.

8. Go to the map to the right of the graph with the aerial imagery. Pan the map, and zoom in to your property. Click on your property location, and a pop-up window within the map will bring up the elevation at that location in feet (NAVD 88).

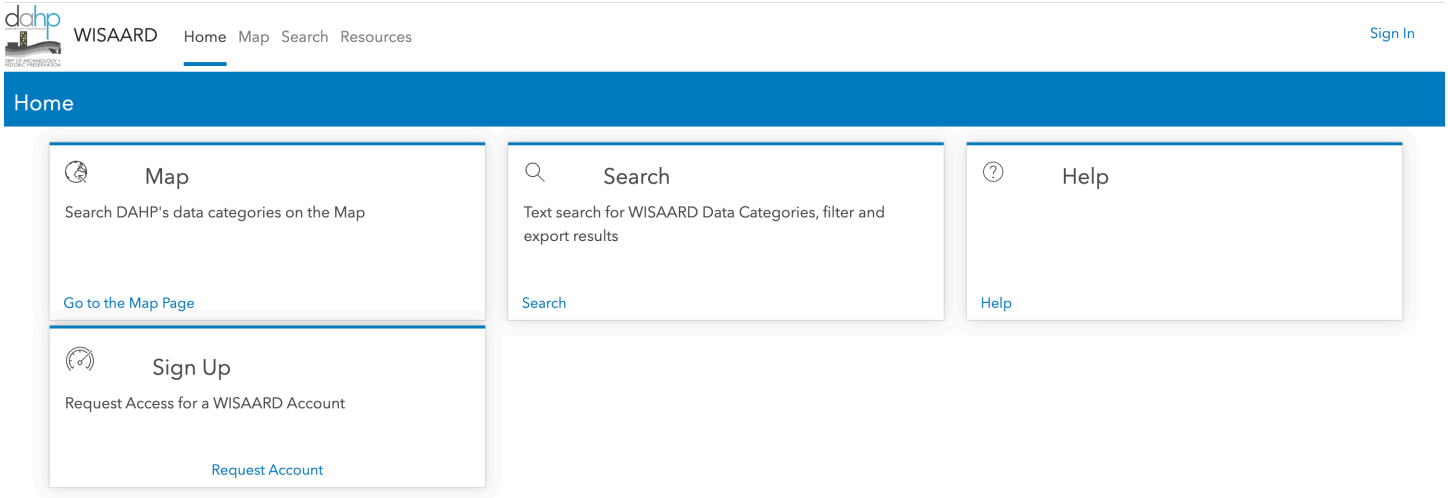
9. Using the elevation of grade at your property documented in "Establish Property Elevation and Shoreline Distance" subtract that from the event with the highest water level. The remainder is the potential depth above the site grade the floodwaters will reach at your property by the end of your time horizon. You can measure up the side of your building to mark the height. Note that this is a planning estimate only. All of the datums used by this viewer are based on tidal values. This is a separate datum used on land (NAVD 88). Due to the changing and localized tidal differences, there is no common reference point between tidal and land datums.

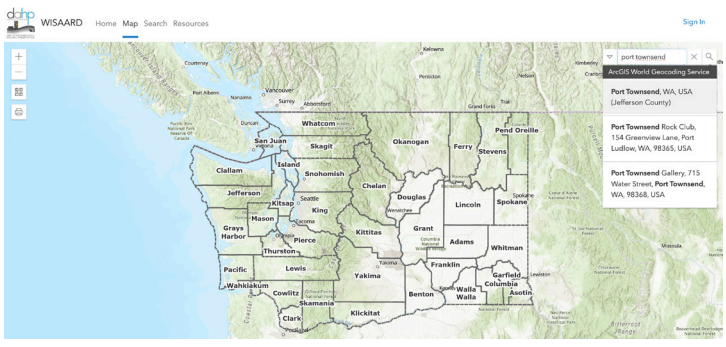


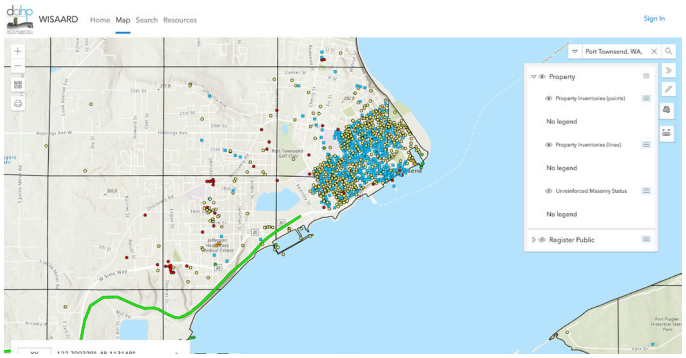
## *WISAARD Guidance*

The state's database for archaeological and architectural records, WISAARD, provides a means to determine if your property is listed to the National Register, within a National Register historic district, or has been previously surveyed. To use, go to the map: https://wisaard.dahp.wa.gov/#

1. Select the "Map" button. In the upper right corner of the screen, type in your address or location. For previous survey data, go to the "Map Legend" icon on the upper right.
2. Select the eye icon next to "Property" to display this data. If there is a point over your property, the map legend explains the color coding. Given the volume of surveyed properties, you may need to zoom in closer on the location to get them to appear on the map.
3. Select the point and use the arrows in the upper or lower right (depending on screen size) of the pop-up window to switch to the property. If it is your property, go to the print icon to print out a copy as a PDF. Record the Property ID number in "Table 1. Resources Within Your Property" in the worksheet.
4. For National Register listing information, select the "Map Legend" icon on the upper right.
5. Scroll down in the pop-out window to "Register Public," and go to the eye icon. This will turn on the layer and show any individually National Register listed properties within or around your property.
6. If your property is listed, it will be shown on the map. Go to it and scroll down in the pop-up window to the link for "Open Nomination Document" to be able to access the nomination. Record the Smithsonian number in the table.



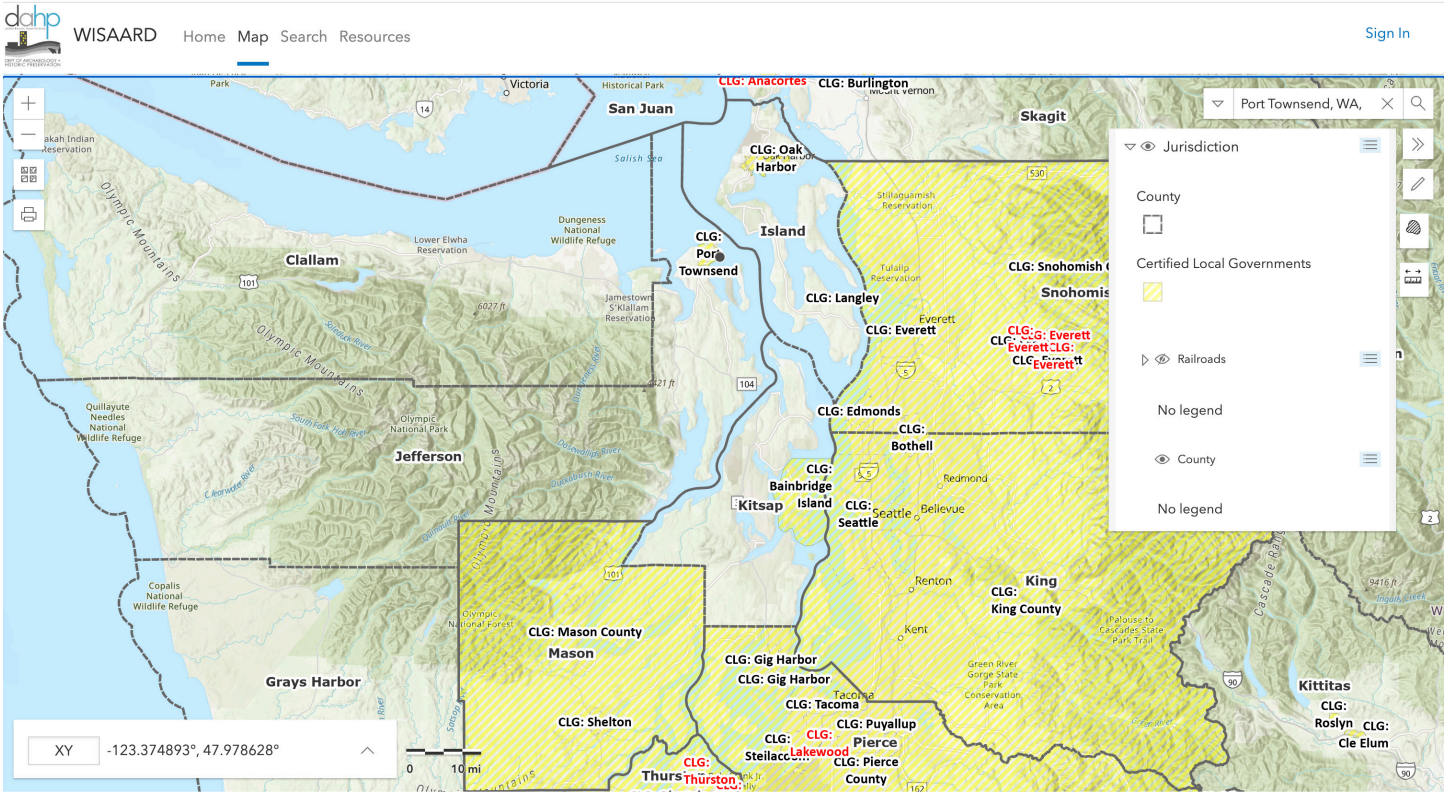


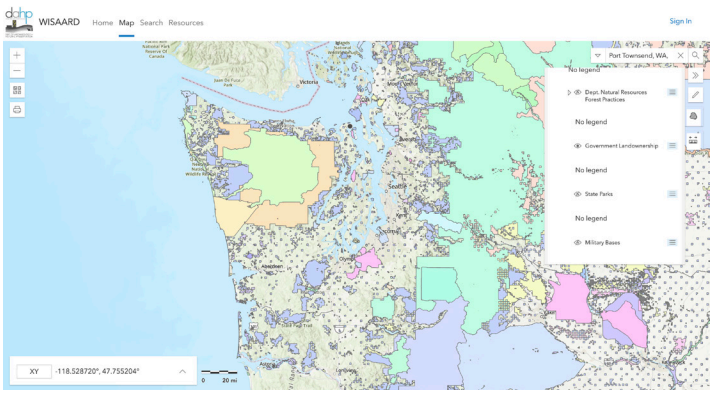
WISAARD can also help you identify the right local government planning staff or building official for your property. To use, go to the map: https://wisaard.dahp.wa.gov/#

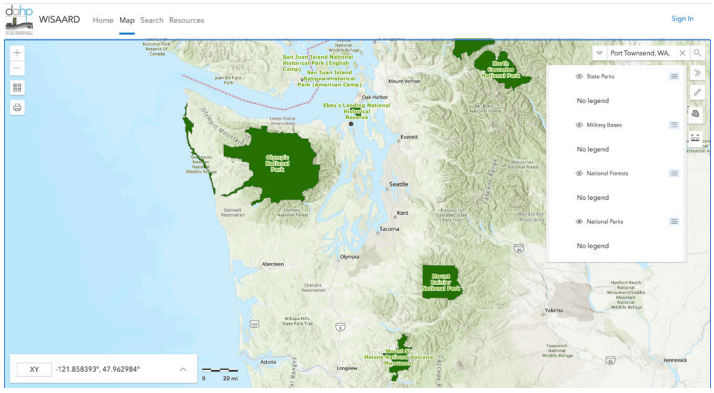
1. Select the "Map" button. In the upper right corner of the screen, type in your address or location. For jurisdiction data, go to the "Map Legend" icon on the upper right.

2. Select the eye icon next to "Jurisdiction" to display this data. Scroll down through the list and turn on the eye icon next to "Certified Local Governments" and "City Boundaries." Record if your property is within a certified local government (CLG), the city name if applicable, and the county name.

3. Then turn off the eye icon next to "Certified Local Governments" and "City Boundaries," and turn on the eye icon next to "State and Federal Boundaries." Click on the triangle icon next to "State and Federal Boundaries" to expand the list. Turn on the eye icon next to each boundary you want to check to see if it overlaps or abuts your property.

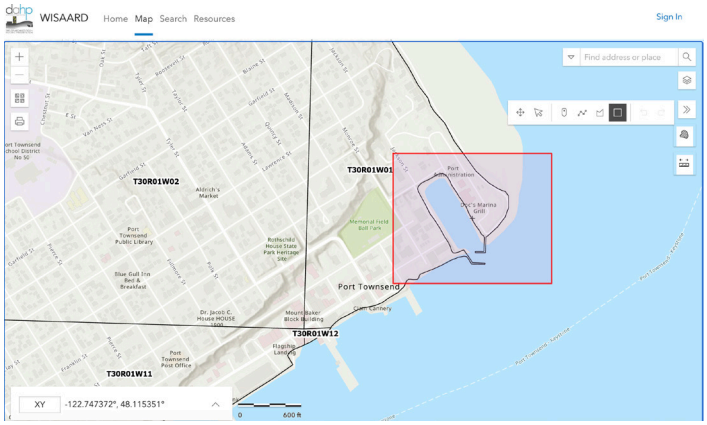


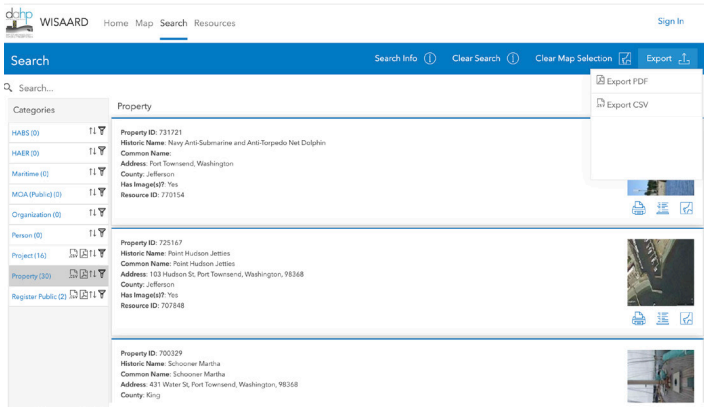



WISAARD can also help you identify previous cultural resource surveys and inventory resources within your property. To use, go to the map: https://wisaard.dahp.wa.gov/#

1. Select the "Map" button. In the upper right corner of the screen, type in your address.
2. In the map tools along the upper right side of the map, click on the "Map Selection Tools" icon (the third icon down from the top). In the pop-out menu bar, select either the square or polygon, then draw a boundary around your property.
3. Once you complete the boundary, the screen will switch to the Search view. In the blue banner along the top, click on the "Export" button. Choose if you want a PDF or a comma-separated file (CSV) that can be opened in Microsoft Excel or Word. The screen will process and bring up the exported file which you can save to your computer. The results will identify any projects and inventoried properties.

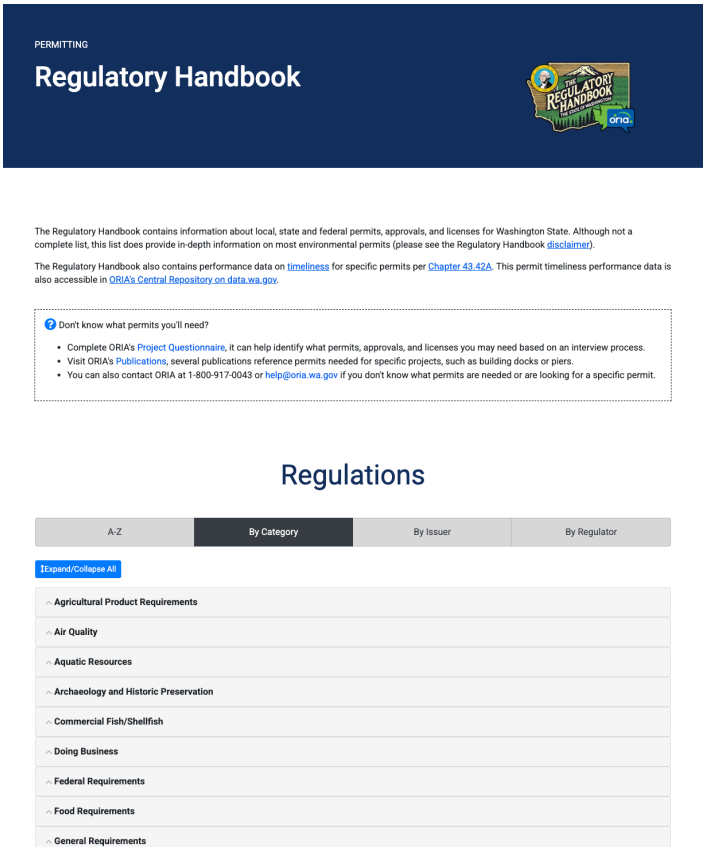


## *Permitting Regulatory Handbook Guidance*

The Permitting Regulatory Handbook maintained by ORIA provides more detailed information on general permit costs, applications, additional documentation needed, and general timelines for the permits listed below. To use, go to the handbook: https://www.oria.wa.gov/site/alias__oria/403/regulatory-handbook.aspx

1. Scroll down to the heading "Regulations." In the gray tabs below, select "By Issuer."
2. Scroll down to each of the entities listed below.
3. Select the entity name to expand the list, then select the permit name, which will take you to the summary page with more detailed information.



# Appendix E. Glossary of Acronyms Used

This guide uses the following acronyms, collected here for easy reference:

- **BFE**: Base Flood Elevation
- **CofA**: Certificate of Appropriateness
- **CFR**: Code of Federal Regulations
- **CLG**: Certified Local Government
- **COSMOS**: Coastal Storm Modeling System
- **DAHP**: Department of Archaeology and Historic Preservation
- **DFE**: Design Flood Elevation
- **DFW**: Department of Fish and Wildlife
- **DNR**: Department of Natural Resources
- **DOE**: Department of Energy
- **ECA**: Environmentally Critical Area
- **EFRL**: Established Flood Risk Level
- **EICA**: Environmental Issues and Constraints Assessment
- **FEMA**: Federal Emergency Management Agency
- **FIRM**: Flood Insurance Rate Map
- **HERA**: Hazard Exposure Reporting and Analytics
- **JARPA**: Joint Aquatic Resource Permit Application
- **L&I**: Labor and Industries
- **MHHW**: Mean Higher High Water
- **NAVD 88**: North American Vertical Datum, 1988
- **NFHL**: National Flood Hazard Layer
- **NFIP**: National Flood Insurance Program
- **NOAA**: National Oceanic and Atmospheric Administration
- **NPS**: National Park Service
- **NR**: National Register [of Historic Places]
- **OHWM**: Ordinary High Water Mark
- **OPAS**: Online Permitting Assistance System

- **ORIA**: Office for Regulatory Innovation and Assistance
- **RCW**: Revised Code of Washington
- **SEPA**: State Environmental Policy Act
- **SFHA**: Special Flood Hazard Area
- **SMP**: Shoreline Master Program
- **USACE**: United States Army Corps of Engineers
- **USC**: United States Code
- **USCG**: United States Coast Guard
- **USGS**: United States Geological Survey
- **WAC**: Washington Administrative Code
- **WHR**: Washington Heritage Register
- **WISAARD**: Washington Information System for Architectural and Archaeological Records Data