

**Shoalwater Bay Indian Tribe (SBIT)**

**Multi-Hazard Mitigation Plan Update**

**October 27, 2024**

*Prepared for:*



**Shoalwater Bay Indian Tribe**

**2373 Tokeland Rd.**

**Tokeland, WA 98590**

# Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

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## ***Executive Summary***

*“The purpose of hazard mitigation is to reduce potential losses from future disasters. The intent of mitigation planning, therefore, is to maintain a process that leads to hazard mitigation actions. Tribal mitigation plans identify the natural hazards that affect the tribal government, identify actions to reduce losses from those hazards, and establish a coordinated process to implement the plan (44 CFR § 201.1(b)).” (Federal Emergency Management Agency 2018)*

### ***A. Introduction***

The Shoalwater Bay Indian Tribe (SBIT) has developed this plan to protect lives, property, and the environment; as well as support tribal sovereignty. The Shoalwater Bay Indian Tribe feels strongly about completing mitigation actions, to include education, to help the tribal community to be more prepared and better able to assist themselves and the surrounding local community during disasters. The Shoalwater Bay Indian Tribe looks forward to working with the whole community partners and endeavors to create and sustain a stable, secure, and resilient environment and community no matter what the hazards it faces. Of note, in 2017, the National Institute of Building Sciences (NIBS) [released a finding](#) that every \$1 invested in disaster mitigation by three federal agencies saves society \$6. (Fuchs, PEW 2018) Therefore, in addition to protecting lives, property, and the environment, there is a strong business case for taking pre-disaster mitigation measures.

All SBIT members, departments, enterprises, and whole community partners will benefit from this update to the SBIT Multi-Hazard Mitigation Plan (MHMP). Tribal departments, enterprises, and even tribal members also play a vital role in disaster preparedness, response, and recovery. Therefore, it is necessary to have a plan that strategically outlines the steps necessary to reduce the risk from any natural hazard. It is also important for the Tribe to increase its capacity to respond to natural disasters in a way that is well planned and organized.

### ***B. What is Hazard Mitigation?***

The first step to understanding the Shoalwater Bay Indian Tribe’s Hazard Mitigation Plan is to understand what hazard mitigation is. Hazard mitigation is any action taken to reduce or eliminate the long-term risk to human life and property from human-caused or natural hazards. A hazard is any event or condition with the potential to cause fatalities, injuries, property/infrastructure damage, agricultural loss, environmental damage, business interruption, or other structural and



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financial loss. As communities grow, hazard mitigation will play an even more important role in the government's primary objective of protecting its citizens' health, safety, and welfare.

Hazard mitigation aims to make human development and the natural environment safer and more resilient. Hazard mitigation generally involves altering the built environment to significantly reduce risks and vulnerability to hazards so that life and property losses can be avoided or reduced. Mitigation can also include removing the built environment from disaster prone areas and maintaining natural mitigating features such as wetlands or floodplains. Hazard mitigation makes it easier and less expensive to respond to and recover from disasters by breaking the damage and repair cycle.

Examples of hazard mitigation measures include, but are not limited to the following:

- Development of mitigation standards, regulations, policies, and programs
- Land use/zoning policies
- Strong statewide building code and floodplain management regulations
- Dam safety program, seawalls, and levee systems
- Acquisition of flood prone and environmentally sensitive lands
- Retrofitting/hardening/elevating structures and critical facilities
- Relocation of structures, infrastructure, and facilities out of vulnerable areas
- Public awareness/education campaigns
- Improvement of warning and evacuation systems

Benefits of hazard mitigation include:

- Saving lives and protecting public health
- Preventing or minimizing property damage
- Minimizing social dislocation and stress
- Reducing economic losses
- Protecting and preserving infrastructure
- Less expenditures on response and recovery efforts

### ***C. Why Develop This Plan?***

The future and sovereignty of SBIT is strengthened when the Tribe adapts to climate change, becomes more resilient to disasters, and mitigates the effects of both. Disasters are increasingly devastating and costlier over time. As damage and the associated costs from disasters continue to increase, SBIT realizes the importance of identifying effective ways to reduce its vulnerability to

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disasters. For example, at the time of the writing of this plan, the Tribe is in the process of relocating to higher elevations to avoid the impact of sea level rise. This hazard mitigation plan assists SBIT in reducing risks from hazards by focusing on the effects of the most significant hazards and threats, identifying the Tribe’s vulnerabilities and resources, sharing information, and developing strategies for risk reduction. The plan also helps to guide and coordinate mitigation activities throughout the SBIT Reservation. This plan provides a set of action items to reduce risk from hazards through education and outreach programs and to foster the development of partnerships and implementation of preventative activities, such as land use programs that control development in areas subject to damage from hazards.

An important aspect of sovereignty is ensuring and preserving the option of autonomous prevention, protection, mitigation, response, and recovery activities. Jurisdictions that desire to be direct applicants/recipients (vice sub-applicants) of mitigation grants are required to have a current hazard mitigation plan. In addition, jurisdictions requesting the full complement of Federal aid during disaster recovery must have a current, FEMA-approved hazard mitigation plan (Table 1) (Federal Emergency Management Agency 2023).

*Table 1. FEMA Assistance Programs and Mitigation Plan Requirements.*

<b>FEMA Assistance Program</b>	<b>Required for a State/Tribal Applicant?</b>	<b>Required for a Tribal/Local Sub-Applicant?</b>
<a href="#"><u>Individual Assistance (IA)</u></a>	No	No
<a href="#"><u>Public Assistance (PA)</u></a> Categories A and B (e.g., debris removal, emergency protective measures)	No	No
<a href="#"><u>Public Assistance (PA)</u></a> Categories C through G (e.g., repairs to damaged infrastructure, publicly owned buildings)	Yes	No
<a href="#"><u>Fire Mitigation Assistance Grants (FMAG)</u></a>	Yes	No
<a href="#"><u>Hazard Mitigation Grant Program Post Fire</u></a>	Yes	Yes
<a href="#"><u>Hazard Mitigation Grant Program (HMGP) planning grant</u></a>	Yes+	No
<a href="#"><u>Hazard Mitigation Grant Program (HMGP) project grant</u></a>	Yes+	Yes++

*Table 1. FEMA Assistance Programs and Mitigation Plan Requirements.*

FEMA Assistance Program	Required for a State/Tribal Applicant?	Required for a Tribal/Local Sub-Applicant?
<u><a href="#">Building Resilient Infrastructure and Communities (BRIC) planning grant</a></u>	Yes*	No
<u><a href="#">Building Resilient Infrastructure and Communities (BRIC) project grant</a></u>	Yes*	Yes**
<u><a href="#">Safeguarding Tomorrow Revolving Loan Fund Program</a></u>	Yes	Yes
<u><a href="#">Flood Mitigation Assistance (FMA) planning grant</a></u>	Yes*	No
<u><a href="#">Flood Mitigation Assistance (FMA) project grant</a></u>	Yes*	Yes**

<sup>+</sup> At the time of the Presidential major disaster declaration and at the time of obligation of HMGP grant funds.

<sup>++</sup> At the time of obligation of HMGP grant funds for mitigation projects.

\* By the application deadline and at the time of obligation of the BRIC or FMA award.

\*\* By the application deadline and at the time of obligation of BRIC or FMA grant funds for mitigation projects.

#### ***D. Federal Emergency Management Agency Guidance***

##### ***1. Code of Federal Regulations, Title 44***

The Shoalwater Bay Indian Tribe is updating its multi-hazard mitigation plan in compliance with the Code of Federal Regulations, Title 44, Chapter 1, Subchapter D, Part 201, Section 201.7 ([44 CFR §201.7](#)), which defines tribal mitigation plan requirements. Hazard mitigation plans must be updated every five (5) years to remain current. Title 44, Chapter 1, Part 201 ([44 CFR Part 201](#)) of the Code of Federal Regulations (CFR) contains requirements and procedures to implement the hazard mitigation planning provisions of the Stafford Act. Title 44 CFR Part 201 directs state, local, and American Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources. Tribal mitigation planning requirements were specifically created under 44 CFR §201.7 to give Tribe more flexibility and the ability to meet the eligibility requirements of a grantee or subgrantee for

Federal Emergency Managements Agency (FEMA) Hazard Mitigation Assistance programs. The 44 CFR §201.7 requirements are derived from the Disaster Mitigation Act of 2000 (Public Law 106-390), which amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), which seeks:

*“...to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters.”*

## **2. *Disaster Mitigation Act of 2000***

The Disaster Mitigation Act of 2000 (DMA2K), commonly known as the 2000 Stafford Act Amendments, was approved by Congress on October 10, 2000. Section 322 is the DMA2K amendment<sup>1</sup> to the Stafford Act that primarily deals with hazard mitigation planning as it relates to the development of local hazard mitigation plans. The DMA2K legislation was signed into law on October 30, 2000. Hazard mitigation planning requirements for Tribe wishing to participate as grantees under the public assistance and hazard mitigation programs are implemented in the Interim Final Rule at 44 CFR Part 201.7.

The overall purpose of DMA2K is to establish a national program for pre-disaster mitigation, streamline administration of disaster relief at both the federal and state levels, and control federal costs of disaster assistance. Congress envisioned that implementation of these new requirements would result in the following key benefits:

- Reduction of loss of life and property, human suffering, economic disruption, and disaster costs.
- Prioritization of hazard mitigation planning at the local level, with an increased emphasis placed on planning and public involvement, assessing risks, implementing loss reduction measures, and ensuring critical services/facilities survive a disaster.
- Establishment of economic incentives, awareness and education via federal support to state, tribal, and local governments, that will result in forming community-based partnerships, implementing effective hazard mitigation measures, leveraging additional non-Federal resources, and establishing commitments to long-term hazard mitigation efforts.

In general, the DMA2K legislation requires all local, county, and tribal governments to develop a hazard mitigation plan for their respective community in order to be eligible to receive certain

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<sup>1</sup> Section 322 is enacted under Section 104 of DMA2K.

types of non-emergency disaster assistance. Approval and adoption of this plan will also satisfy the requirements of the Flood Mitigation Assistance Program (FMA) as well (Table 1).

In addition to satisfying the regulatory requirements of DMA2K, the primary purpose of this plan is to identify natural and human-caused hazards that impact SBIT, assess the vulnerability and risk posed by those hazards to community-wide human and structural assets, develop strategies for mitigation of those identified hazards, present future maintenance procedures for the plan, and document the planning process.

### ***E. Organization***

This SBIT Multi-Hazard Mitigation Plan update has significant update from the previous version. This plan is arranged and prepared to satisfy Tribal level planning requirements mandated by the Disaster Mitigation Act of 2000 (DMA2K). DMA2K requirements are provided as appropriate in each section. Notably, the plan is organized in sections around FEMA's five required hazard mitigation planning elements:

- I. Element A - Planning Process
- II. Element B - Hazard Identification and Risk Assessment
- III. Element C - Mitigation Strategy
- IV. Element D - Plan Updates
- V. Element E - Assurances and Plan Adoption
- VI. Appendices

While all the elements are essential, the most important element is the mitigation strategy because it contains the actions that SBIT will take to lessen the impacts of disasters.

### ***Section I – The Planning Process***

As described in the executive summary above, SBIT has developed this MHMP update to protect people, property, and the environment by lessening the impacts of disasters. In creating this update, SBIT took a whole community approach to maximize the input from its staff, tribal members, non-member residents and workers, surrounding jurisdictions and citizens, the State of Washington, the Federal government, the private sector, non-profit organizations, and volunteer agencies. The Shoalwater Bay Indian Tribe used web-based, electronic (email), and hard-copy surveys to establish a baseline assessment with whole community partners (Appendix B). Planners also conducted interviews (Appendix C) of key SBIT staff and held multiple open community workshops to garner input. From that input, the Planning Team and Tribal Council developed a

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new set of goals and objectives. While a full description of the goals and objectives is provided in Section I, the goals are:

- **Goal #1:** Promote sustainable living - Promote development in a sustainable manner.
- **Goal #2:** Protect lives, property, and the natural environment - Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, natural resources, and other property more resistant to hazards.
- **Goal #3:** Increase public awareness of local hazards and involvement in hazard mitigation - Increase public awareness, understanding, support, and demand for hazard mitigation.
- **Goal #4:** Partnerships and Implementation - Build and support local partnerships to continuously become less vulnerable to hazards.
- **Goal #5:** Strengthen Emergency Services Capability - Establish policies and procedures to ensure mitigation projects for critical facilities, services, and infrastructure.

It is important to note that the goals are NOT in a priority order. This is deliberate because many are interdependent and have a temporal element that may require a specific order in accomplishing them. For example, Goal #2 is a typical top goal in emergency management, but SBIT feels strongly about taking all actions in a sustainable manner. In addition, Goal #5 enables the accomplishment of many mitigation actions. What is important is that the SBIT MHMP Planning Team intends to accomplish mitigation actions in a deliberate and methodical manner.

### *Section II – Hazard Identification and Risk Assessment*

Section II changed significantly from the previous MHMP. First, the number and types of disasters addressed has been expanded based on whole community input. The second significant change is the hazard identification and risk assessment terminology has also changed to reflect FEMA’s three factors for evaluating hazards – location, extent, and probability of occurrence. In addition, “worst most likely” scenario-based hazard descriptions are included that match SBIT’s Threat and Hazard Identification and Risk Assessment (THIRA) – a Homeland Security Program requirement and methodology as part of the National Preparedness System. Third, in consideration of climate change as well as actual events, SBIT has evaluated additional natural hazards. Based on whole community input via surveys, workshops, and interviews, the threats and hazards of concern are in Table 2.

*Table 2. Threats and Hazards of Concern.*

Natural Hazards	Technological Hazards	Human-caused Threats
Climate Change	Hazardous Materials Release	Active Shooter
Coastal Erosion	Structure Fire	Civil Unrest & Terrorism
Earthquake	Utility Disruption	Cyber-attack against data
Flood		Cyber-attack against infrastructure (ex. power grid)
Infectious Disease		
Landslide		
Sea Level Rise		
Severe Weather		
Tsunami		
Wildland Fire		

***Section III – Mitigation Strategy***

A significant change from the previous MHMP is the expansion of goals and objectives to include a focus on sustainable living and enhancing emergency services. The Planning Team and community members added new mitigation actions and conducted analysis to prioritize their accomplishment. Mitigation actions increased from 25 in the previous MHMP to 44 in this plan. These mitigation actions will be assigned to specific SBIT staff during the execution of the strategy in the years to come. While most of the actions are executable in three-to-five-year time frame, actions are included that could take decades to accomplish. For example, while actions such as season preparedness activities may occur semi-annually, the Tribe’s relocation into the Willapa Hills will take many years.

### ***Section IV – Plan Updates***

Through its deliberate planning process, the Tribe has made a number of updates from the previous plan.

- New goals reflect a greater priority on sustainable living and development.
- The relocation to the Willapa Hills is an overriding concern.
- There is an extensive analysis of the impact of climate change.
- There are far more GIS-based analyses.
- FEMA’s National Risk Index was used where it was applicable (the county and census tract levels typically do not provide great fidelity to for small jurisdictions such as SBIT).
- FEMA’s Resilience Analysis and Planning Tool (RAPT) tool was used extensively.
- The strategy, especially goals and projects, reflect greater concern for climate change, sustainable living, and resilience.
- The Tribe’s Threat and Hazard Identification and Risk Assessment (THIRA) was updated concurrently – both this Plan and the THIRA are synchronized.

The Tribe has been active in executing its mitigation strategy. Of note, the Tribe enhanced its tsunami tower and began relocation efforts to higher elevations since the last MHMP. While the relocation will be the most significant action in the five-year planning horizon, and one of the most significant events in the Tribe’s modern history, there have been a number of other successful updates since the last Plan update. Other completed actions are in Section III.

### ***Section V – Assurance and Plan Adoption***

This plan was developed with grants and assistance from the Federal Emergency Management Agency (FEMA), as well as other tribal, federal, state, and local resources.

The plan was formally adopted by the Shoalwater Bay Tribal Council on October 1, 2024. The plan was approved by FEMA Region 10 on October 7, 2024.

The effective dates for the Shoalwater Bay Tribal Hazard Mitigation Plan are October 7, 2024 - October 6, 2029.

### ***Section VI – Appendices***

In the interest of minimizing the size of the base plan, where a large volume of supporting information is required, it is located in appendices.



***F. Summary***

The Shoalwater Bay Indian Tribe is dedicated to sustaining and expanding its resilience efforts through hazard mitigation planning and actions. Major projects such as the Tribe's tsunami tower and relocation are evidence that the Tribe seeks to ensure the long-term prosperity and sovereignty of its members. As such, the MHMP is an important foundational document in realizing the overall objective of increasing Tribal resilience.

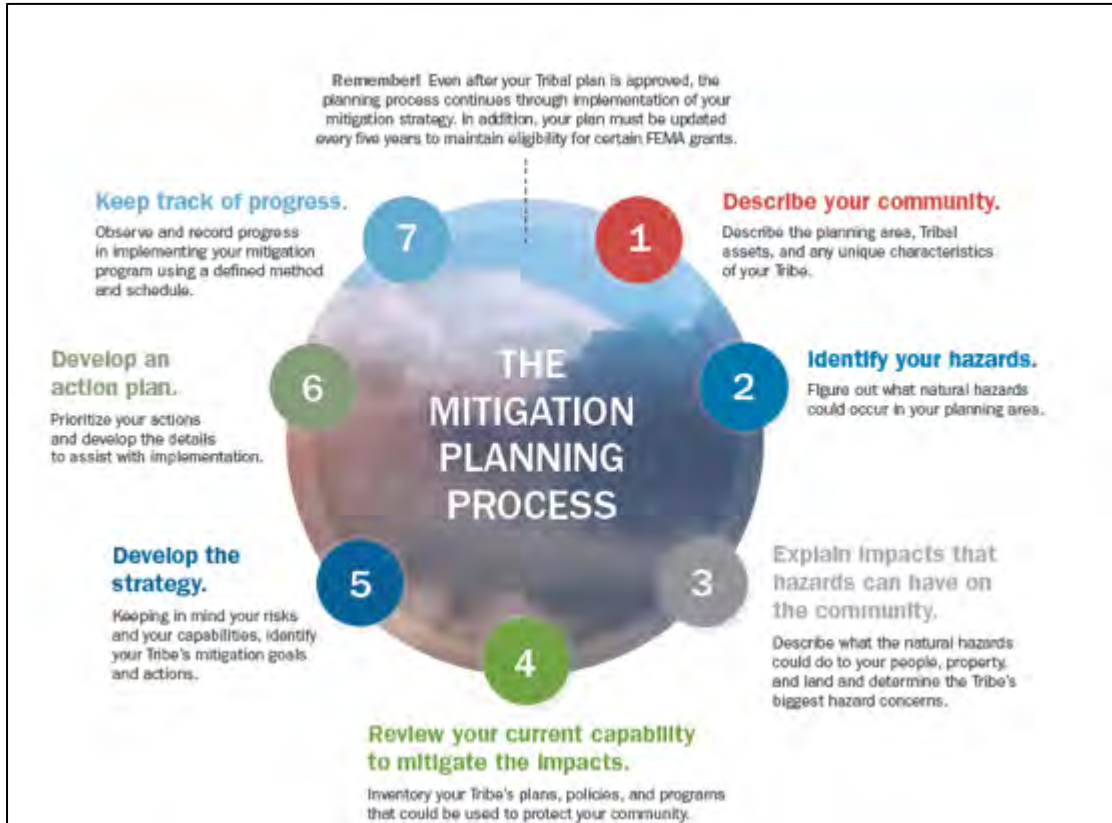
In addition to simply being in the best interest of the tribe, having a FEMA-approved hazard mitigation plan is a condition for receiving certain types of Federal assistance (Table 1). Per 44 CFR §201.7, the Tribe is updating its MHMP within the five (5) year timeframe to keep it current.

This plan is organized along FEMA's five (5) required elements in order to both ensure its completeness and to make reviewing and following the plan as straight forward as possible. First, the Plan describes the planning process itself. Second, a new hazard identification and risk assessment identifies and/or describes the threats and hazard of concern. Third, the Plan contains an updated strategy with new goals, objectives, and mitigation actions items. Fourth, The Plan identifies updates from the previous revision. Fifth, the Plan contains assurances and the adoption of the Plan itself. Finally, supporting information is included in appendices.

Through both mitigation actions and other preparedness efforts, the Shoalwater Bay Indian Tribe endeavors to ensure the resilience of the Tribe for generations to come.

## I. The Planning Process

*“The mitigation plan belongs to the local community.” (Federal Emergency Management Agency 2013, I-2)*



*Figure 1. FEMA's Seven-Step Tribal Hazard Mitigation Plan Development Process.*

### ***A. Plan Development Schedule and Planning Team***

The Shoalwater Bay Indian Tribe used FEMA’s overall seven-step tribal hazard mitigation planning process to develop this plan (Figure 1).

1. **Describe your community** – on September 5, 2023, the Planning Team held a kick-off meeting to officially begin the planning process. In addition to generally describing the community, the Planning Team agreed to initially focus on developing a Threat and Hazard Identification and Risk Assessment (THIRA) / Stakeholder Preparedness Review (SPR) which was submitted to FEMA in December 2023. In addition, the effort focused on developing an Integrated Preparedness Plan (IPP) which was submitted to FEMA January 2024.

The first step in the THIRA/SPR process was to describe the community and its hazards of concern. The THIRA/SPR effort involved reviewing such documents as the existing Shoalwater Bay Indian Tribe MHMP, Pacific County, WA Hazard Mitigation Plan, Washington State Enhanced Hazard Mitigation Plan, the SBIT 2022 THIRA/SPR, and the Tribe’s relocation plan. Given the Tribe’s growth in its effort to relocate to higher elevations, there has been significant change in the planning area itself. In addition, the Tribe seeks to expand its revenue base using natural resources that must be protected.

2. **Identify your hazards** – As detailed in Section II, SBIT used existing plans and assessments, studies, as well as new surveys (Appendix B), workshops, and interviews (Appendix C) to fully capture and articulate the hazards and threats of greatest concern with respect to the location each hazard affects, the extent of the damage due the magnitude and vulnerability of the Tribe, and probability of occurrence. The outreach included tribal members and employees; local city, county, state, and Federal partners. Of note, the Tribe hosted both internal employee and public workshops on October 16, 2023, and on April 3, 2024, to garner whole community input.
3. **Explain impacts that hazards can have on the community** – The first step in explaining the impacts that hazards have on the community was in the THIRA/SPR surveys and workshops. Through the THIRA/SPR effort, the participants first assessed each threat/hazard based on location, extent, probability, and concerns. The follow-on surveys included THIRA/SPR context statements that described in detail the worst most likely impacts of each threat/hazard of concern. Based on the survey results, the Planning Team had open discussions about the impacts of the threats/hazards of concern at the internal employee and public workshops on October 16, 2023, and April 3, 2024. The workshops solidified the

impacts of the threats/hazards. In addition to surveys and workshops, studies, models and additional subject matter expert input was used to explain the impacts of the threats and hazards as depicted in Section II.

4. **Review your current capability to mitigate the impacts** – An analysis of current capabilities to mitigate impacts began with the basic review of the current MHMP. The Planning team then specifically identified capabilities and gaps across FEMA’s 32 core capabilities in the THIRA/SPR process. But perhaps the most important review of current capabilities to mitigate the impacts came from interviews conducted with each Tribal department. The first round of interviews occurred October 16-18, 2023. Additional new and follow up interviews were conducted as needed to both clarify the information and include additional information.
5. **Develop the strategy** – As detailed in Section III, SBIT used a combination of surveys, workshops, and interviews to develop the strategy. Given the immense changes such as the relocation effort, new goals, objectives, and priorities were established. The Tribe used a classic strategy-to-task methodology to then derive supporting action items for each objective.
6. **Develop the action plan** – As detailed in Section III, through a whole community effort, SBIT established goals, objectives, and priorities to guide the Tribe's mitigation efforts over the five-year span of this plan and beyond. The prioritized action plan is based on factors that help identify likelihood of project success:
  - a. **Social Considerations** – Life/Safety Impact
    - i. Will the project have minimal, direct, or significant impact on the safety of businesses, residents, and properties within the Tribe?
    - ii. Will the proposed action have an adverse impact on any one segment of the population within the Tribe?
    - iii. Will the project be a proactive measure to reducing natural hazard risk?
  - b. **Administrative Considerations** – Administrative/Technical Assistance
    - i. Is there sufficient staff currently to implement the project?
    - ii. Is training required for the staff to implement this project?
  - c. **Economic Considerations** – Project Cost
    - i. What is the approximate cost of the project?

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- ii. How will the project be funded?

### **d. Other Considerations – Tribal Objectives**

- i. Does the action advance other Tribal objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of the Tribal reservation master plan (or another comprehensive-type plan)?
7. **Keep track of the progress** – As detailed in Sections IV and V, SBIT has adopted this plan and will begin implementing the plan by conducting the mitigation activities in a prioritized manner. The Planning Team will review the plan and status of the mitigation efforts semi-annually and adjust as required.

**1. How the plan was prepared and who was involved**

Element	Requirements
<p><b>A1. Does the plan document the planning process, including how it was prepared and who was involved in the process?</b></p> <p>44 CFR § 201.7(c)(1)</p> <p><i><b>Intent:</b> To inform tribal members about the overall approach to the plan’s development and serve as a permanent record of how decisions were made and who was involved. This record is also useful for the next plan update.</i></p>	<p>a. The plan shall document how the plan was prepared, including the schedule or timeframe and the activities that made up the plan’s development.</p> <p><i><b>Document</b> means to provide the factual evidence for how the tribal government developed the plan.</i></p> <p><i>The documentation requirement typically is met with a narrative description and other records, such as meeting minutes, sign-in sheets, or newspaper articles. Examples of activities that may be documented include, but are not limited to, planning team meetings, information exchanges at gatherings, meetings between tribal offices or departments or with external agencies, open houses at libraries or school events, radio broadcasts, development of interactive web pages, and posting and distribution of printed materials.</i></p> <p>b. The plan shall document who was involved on the planning team, including each person’s position or title and department/agency.</p> <p><i><b>Involved in the process</b> means engaged as participants and given the chance to provide input to affect the plan’s content. This is more than simply being invited or adopting the plan. Evidence of planning team participation may include documentation of meetings attended, data provided, or other activities by individuals or departments/agencies.</i></p>

First and foremost, this plan was developed using whole community concepts to be inclusive and to ensure the highest-quality information available. This update was developed based on FEMA’s “Tribal Mitigation Planning Handbook,” dated May 2019, and “Tribal Mitigation Plan Review Guide,” effective December 5, 2018. Of note, this update incorporates the option reflected in the handbook and review guide to include technological hazards as well as human-caused threats that

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are described in the “National Preparedness Goal”, Second Edition (2015). Furthermore, this update was developed in conjunction with the SBIT 2023 Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness per FEMA’s Comprehensive Preparedness Guide (CPG) 201, 3<sup>rd</sup> Edition (2018). Information in the Mitigation Plan is based on research from a variety of sources. The intent is to integrate SBIT’s HMP with the six elements of the “National Preparedness System”. Planners conducted data research and analysis, whole community surveys (Appendix B), facilitated Planning Team meetings, SBIT departmental interviews (Appendix C), tribal employee workshop, and public whole community workshops. Workshop and meeting agendas are in Appendix D. Sign-in sheets are available from the Department of Emergency Management on request. In developing the plan, the team followed the following steps:

- Planning Team formation – 2023
  - Planning Team kick-off meeting for the 2018 MHMP update – September 5<sup>th</sup>, 2023
- Preliminary research on existing SBIT plans and risk assessments – Beginning July 2023
  - The 2020 SBIT MHMP was set as the baseline for the revision
    - The layout and format were changed to reflect guidance such as FEMA’s Tribal Mitigation Planning Handbook (2018) and FEMA’s Tribal Mitigation Plan Review Guide (December 5<sup>th</sup>, 2018).
    - Ultimately, the elements of FEMA’s Tribal Mitigation Plan Review Guide were chosen as the organization structure to increase clarity and simplicity.
    - Hazard profiles were expanded based on the Tribe’s 2023 THIRA/SPR effort.
  - The 2020 Shoalwater Bay Indian Tribe Tribal Hazard Mitigation Plan
  - Shoalwater Bay Relocation Plan
  - Shoalwater Bay Reservation Geographical Response Plan
- FEMA Approved Mitigation Plans (State, County)
  - Washington State Enhanced Hazard Mitigation Plan, 2023
    - Provided information about hazards, climate, geography, geology, goals, and objectives
  - Pacific County HMP, 2021
    - County general descriptions, natural hazard considerations, etc.
- Reviewed other external plans and assessments

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- 2018 National Climate Assessment
- University of Nebraska National Drought Monitoring Center
- Western Regional Climate Center
- Cascadia Subduction Zone analysis and plans
- Centers for Disease Control and Prevention
- National Weather Service Storm Prediction Center
- Washington Geological Survey
- Washington State Department of Natural Resources and Washington Forestry
- University of Washington – multiple tools and sites
- U.S. Census
- HAZUS
  - Used to both map vulnerable areas/facilities and identify the magnitude of risks
- FEMA Disaster Data Visualization Tool
  - Provided historical information about the types, number, frequency and times of year for past Federally declared disasters
- FEMA’s Resilience Analysis and Planning Tool (RAPT)
- FEMA’s National Risk Index tools
- NOAA Climate Change
- NOAA Sea Level Rise Viewer
- Washington State Department of Natural Resources Geological Hazard Maps
- Historical research, current wildfire events
  - Provided information about non-Federally declared disasters
  - Current and recent events provided information about the trend of increasing intensity of disaster in Washington
- Online surveys (Appendix B)
  - Provided demographic information for the whole community participation.
  - Provided whole community input regarding the location, extent, and probability of the hazards of most concern.



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- Provided information to prioritize the hazards of most concern.
- Site visits – October 16 – 18, 2023, and April 1 – 3, 2024
  - Tribal Council meetings – October 16, 2023
  - SBIT Planning Team meetings – September October 5<sup>th</sup>, 2023, October 16<sup>th</sup>, 2023; October 16 – 18, 2023, April 1 – 3, 2024.
  - Interviews (Appendix B) – October 16<sup>th</sup> – 18<sup>th</sup>, 2023, and individual follow-up at various times through April 3, 2024
  - Public meetings – October 16<sup>th</sup>, 2023; April 3, 2024
  - Workshop and meeting agendas - Appendix D
- Draft MHMP plan reviews
  - Ongoing section reviews as they were completed
  - First draft plan review – May 30, 2024
  - Second draft plan review – June 27, 2024
  - Final Plan Review – August 12, 2024

### **2. *The Planning Team***

The Shoalwater Bay Indian Tribe’s Multi-Hazard Mitigation Plan (MHMP) is the result of a collaborative effort among the SBIT Planning Team, department directors, and the whole community (Table 3). The SBIT Director of Emergency Management served as the Tribal Project Manager and played a key role in all aspects of the plan’s development.

The SBIT Planning Team guided development of the Multi-Hazard Mitigation Plan. The team played an integral role in developing the mission, goals, and action items for the mitigation plan. The Team consisted of the SBIT Director of Emergency Management, Tribal Council members, Departmental Managers/Directors, and employees.

The SBIT Planning Team has the authority and responsibility to address hazards, develop the mitigation plan, organize resources, find appropriate funding, and oversee the activity for implementation, monitoring, and evaluation. Due to the various members’ work with external partners, they have established relationships to form the baseline of a whole community approach. For example, Planning Team members work closely with their counterparts in Pacific and Grays Harbor Counties.

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*Table 3. SBIT Planning Team Members.*

<b>Name</b>	<b>Role</b>	<b>Contribution</b>
Charlene Nelson	Chairwoman	Tribal government SME
Shane Thomas	Vice Chairman / Land Management	Tribal government and Land Management SME
Ken Ufkin	Emergency Management Director	Overall coordination
James Bergstrom	Chief of Police	Law Enforcement SME
Holly Blake	Transportation and Land Management	Transportation and Land Management SME
Justine Blake	Procurement Officer	Procurement SME
Jesse Downs	Willapa Bay Enterprises COO	Enterprises SME
Larissa Fleeger	Natural Resources Director	Natural Resources SME
Judy Lawrence	Grant Accountant	Accounting SME
James Schaeffer	IT Director	Firefighting SME
Quintin Swanson	Planning Director	Planning SME
Michael Taylor	Facility Maintenance Director	Facilities SME
Risa Thomas	Tribal Resilience Coordinator	Resilience and Relocation SME

**B. Public Partnership**

Element	Requirements
<p><b>A2. Does the plan document an opportunity for public comment during the drafting stage and prior to plan approval, including a description of how the tribal government defined “public”?</b></p> <p>44 CFR § 201.7(c)(1)(i)</p> <p><i><b>Intent:</b> To ensure that tribal members understand what the tribal government is doing on their behalf and to provide a chance for input.</i></p>	<p>a. The plan shall describe how the tribal government defined “public.”</p> <p>For example, “public” is sometimes defined as including only tribal membership, or tribal citizens. It might also be identified as those living on tribal land or in the tribal service area. Tribal members/citizens who do not live on the tribal lands may also want to provide input or comment on the plan.</p> <p>b. The plan shall describe how the public was given the opportunity to be involved in the planning process and how their feedback was incorporated into the plan. Examples of public involvement include, but are not limited to, interactive websites with drafts for public review and comment, questionnaires or surveys, or booths at community events.</p> <p><i>An <b>opportunity to be involved in the planning process</b> means that the public is engaged or invited as participants and given the chance to provide input that may affect the plan’s content.</i></p> <p>The opportunity for participation shall occur during plan development, which is prior to the comment period on the final plan and prior to plan adoption/approval.</p>

**1. The Public**

In addition to tribal employees, the internal public includes tribal members (living both on and off of SBIT lands), non-tribal members living on/adjacent to tribal land, and non-tribal employees who work at the various SBIT enterprises. External partners include citizens and local governments to include the Town of Tokeland, Pacific County, Grays Harbor County, the State of Washington, the Federal government (FEMA, the Bureau of Indian Affairs, Environmental Protection Agency, etc.), and partner tribal nations. In addition, public partners include private

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sector enterprises (especially SBIT vendors and tribal enterprise customers), non-profit and volunteer agencies, and other organizations. One component of SBIT’s public outreach was a risk assessment survey (Appendix B). The survey was available online as well as provided directly to the public as a Microsoft Word document via both soft-copy and hard-copy. Those taking the survey were asked to identify themselves according to common occupations, their tribal affiliation, and/or their residency. Table 4 is the list of categories by which those taking the survey could identify themselves. Those taking the survey could select multiple options as well as write in additional identifiers.

*Table 4. SBIT Public Outreach Partner Categories.*

Agriculture	Forestry	Leisure / Entertainment	Retail trade
Construction	Government - city	Mining (quarrying, oil, gas)	Science
Education - College	Government - county	Natural Resources	Transportation and warehousing
Education K-12	Government - Federal	Non-profit Organization	Tribal Member
Emergency Management	Government - state	Non-tribal member residing or working on tribal land/businesses	Utilities
Facility Maintenance	Government – tribal nation	Parks and Recreation	Volunteer Organization
Faith-based community	Health and social services	Planning	Wholesale trade
Finance and Insurance	Hunting	Professional, technical services	Other services
Firefighting	Information	Public Works	
Fishing	Law Enforcement	Real Estate renting and leasing	

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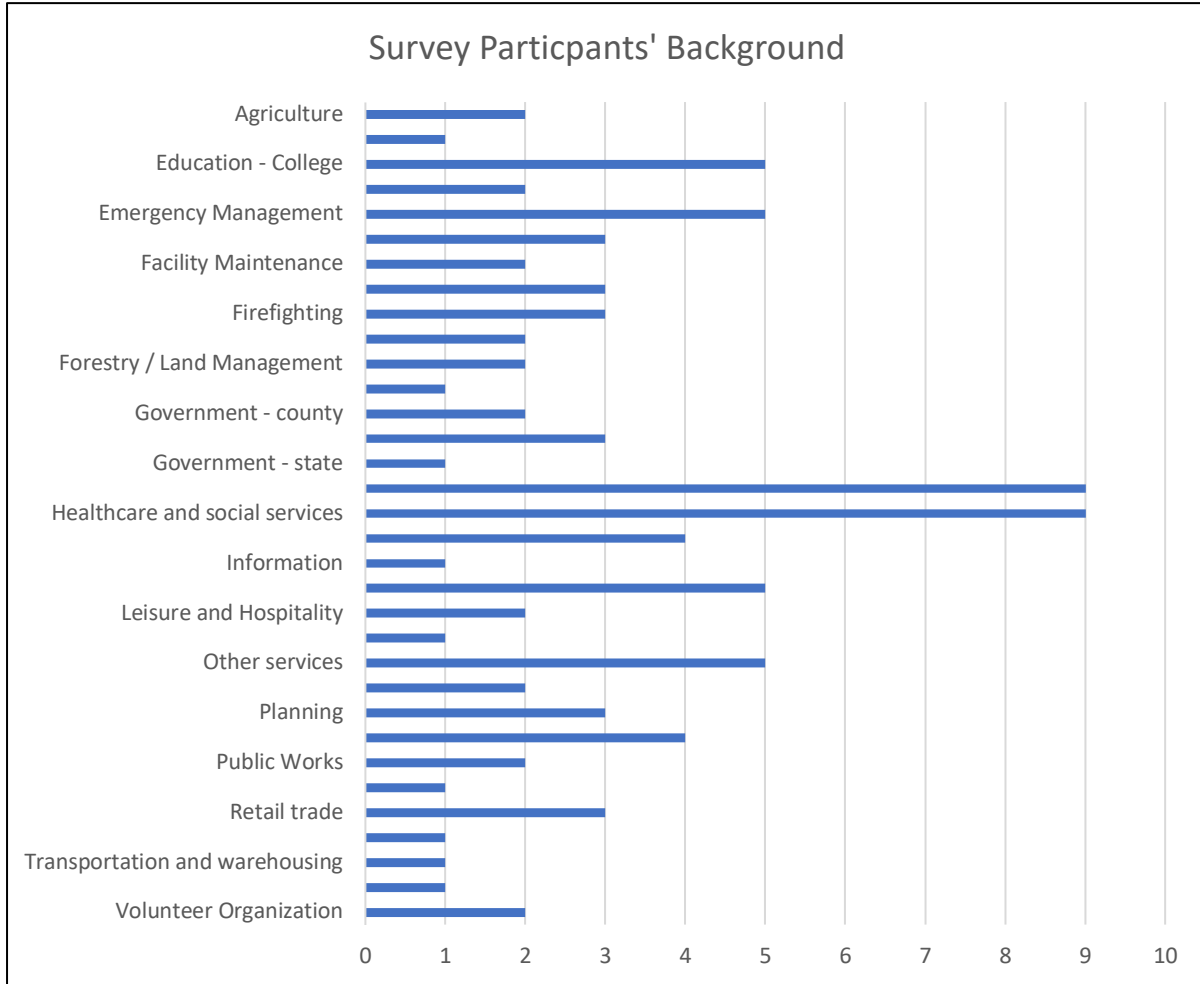
In addition, participants were given the opportunity to identify as having disabilities and/or access and functional needs (AFN) or working with those who work with the AFN population.

### **2. *Public Involvement***

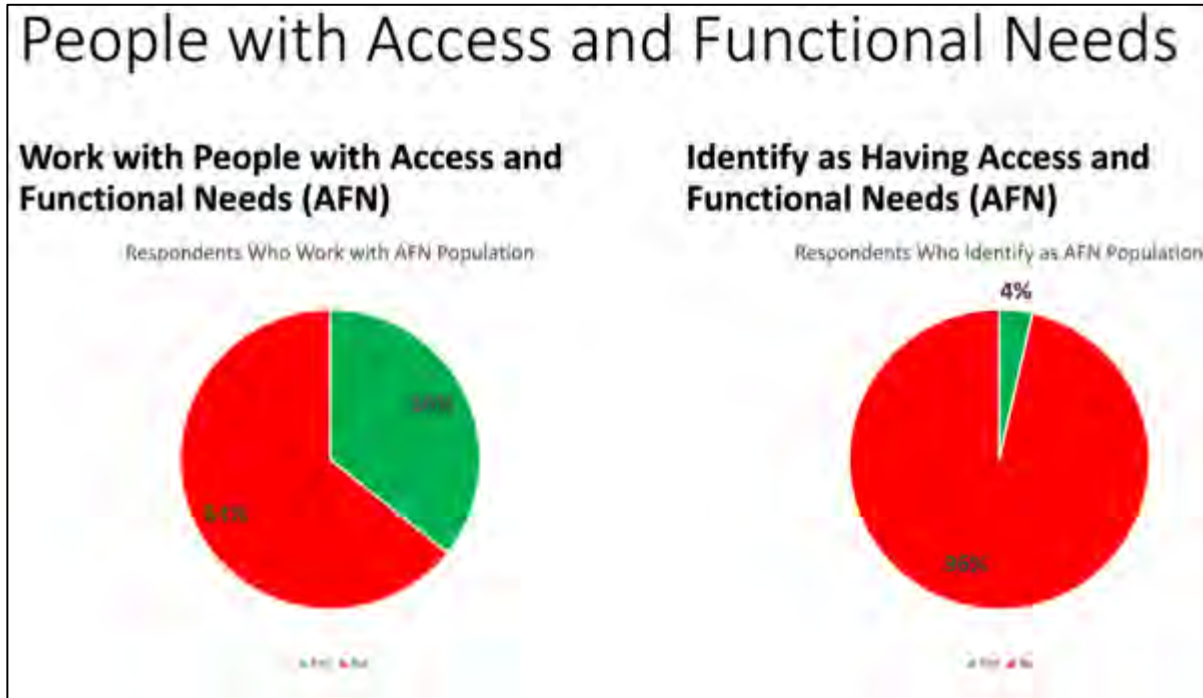
The public was afforded the opportunity to engage in the planning process through multiple means:

- Online Risk assessment survey beginning September 15, 2023
- Microsoft Word-based risk assessment survey beginning September 15, 2023
  - Soft copy emailed
  - Hard copy directly from the SBIT Project Manager
- Tribal employee workshops – October 16 - 18, 2023; April 1 – 3, 2024
- Whole community public workshop – October 16, 2023; April 3, 2024
- Interaction through ongoing whole community meetings such as regular Pacific County and Grays Harbor Emergency Management Agencies
- Publicly available draft plan
  - Electronic beginning June 3, 2024
  - Print copy available at the Office of Emergency Management beginning May 30, 2024. The agendas for the public meetings are in Appendix D. With a tribal membership of 373 (National Indian Gaming Commission 2024), SBIT had a statistically significant response with a 95% confidence level at 3% margin of error from its survey. The survey captured a broad array of backgrounds from both internal and external members of the public. Figure 2 depicts the backgrounds of the 28 survey respondents and Figure 3 depicts their experience with disabilities and others with access and functional needs.

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***Figure 2. Risk Survey Participants.***



*Figure 3. Risk Survey Participants' Experience with Access and Functional Needs.*

### ***3. Incorporation of Public Feedback***

Public feedback informed the SBIT MHMP update during all phases:

- **Organizing the planning process and resources** – public experience garnered since the last plan update led to such outcomes as emphasizing hazards related to relocating in the forested hills and threats to marine-based enterprises and resources. In addition, the effects of climate change are an ever-increasing concern, especially with respect to sea level rise. In addition, technical hazards such as utility failure and human-caused risks such as cyber-attacks also garnered greater concern.
- **Assessing Risks** – multiple versions of the risk assessment survey (Appendix B) were used to collect and incorporate public information in three ways. First, public input was used to establish the final location, extent, and probability values. Second, public input was used to vote on the hazards that most concern to SBIT. Third, whole community workshops provided further context to the survey results. Table 5 shows the mathematical values for each factor in the threat and hazard scoring methodology. Tables 6-8 highlights how public input was used.

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*Table 5: Threat and Hazard Scoring Methodology.*

Location		Extent		Probability		Concern	
Description	Weight	Description	Weight	Description	Weight	Description	Weight
Extensive	3	Catastrophic	4	Highly Likely	4	Very High	5
Moderate	2	Critical	3	Likely	3	High	4
Limited	1	Limited	2	Possibly	2	Moderate	3
		Negligible	1	Unlikely	1	Low	2
						Very Low	1

The results for each assessment category were summed to arrive at a total score for each threat/hazard. The hazard identification and risk assessment resulted in the prioritized natural hazards of most concern shown in Table 6, Technological hazards of concern in Table 7, and human-caused threats of concern in Table 8.

*Table 6: Shoalwater Bay Indian Tribe's Natural Hazards of Greatest Concern.*

Hazard	Location	Extent	Probability	Concern	Total Score	Rank
<b>Coastal Erosion</b>	Extensive	Catastrophic	Highly Likely	Very High	354	1
<b>Tsunami</b>	Extensive	Catastrophic	Likely	High	348	2
<b>Sea Level Rise</b>	Extensive	Catastrophic	Highly Likely	Very High	344	3
<b>Earthquake</b>	Extensive	Catastrophic	Likely	Very High	325	4
<b>Severe Weather</b>	Moderate	Limited	Highly Likely	Very High	291	5
<b>Landslide</b>	Extensive	Critical	Highly Likely	Very High	288	6
<b>Flood</b>	Extensive	Catastrophic	Likely	Very High	280	7
<b>Wildland Fire</b>	Moderate	Catastrophic	Possibly	Moderate	246	8



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*Table 6: Shoalwater Bay Indian Tribe's Natural Hazards of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Climate Change</b>	Moderate	Critical	Likely	Moderate	196	9
<b>Infectious Disease</b>	Moderate	Limited	Possibly	Low	182	10

*Table 7: Shoalwater Bay Indian Tribe's Technological Hazards of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Utility Disruption</b>	Extensive	Critical	Highly Likely	Very High	272	1
<b>HAZMAT Release</b>	Moderate	Critical	Unlikely	Moderate	247	2
<b>Structure Fire</b>	Moderate	Critical	Possibly	Moderate	194	3

*Table 8: Shoalwater Bay Indian Tribe's Human-Caused Threats of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Cyberattack (data)</b>	Moderate	Limited	Highly Likely	Very High	206	1
<b>Cyberattack (Infrastructure)</b>	Moderate	Limited	Likely	Moderate	201	2
<b>Active Shooter</b>	Limited	Critical	Possibly	Very High	194	3
<b>Civil Unrest &amp; Terrorism</b>	Limited	Limited	Possibly	Low	134	4

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- **Developing a Mitigation Strategy** – interviews (Appendix B) during the site visits and workshops during site visits were used to collect input regarding mitigation strategy elements. The public forums were used to establish the goals, objectives, resources, and prioritized actions.
- **Adopting and Implementing the Plan** – the SBIT public information requirements ensured there was multiple means of notification for meetings with Planning Team members and Tribal Council; public workshops; and review of documents, including the final MHMP, before Tribal Council adoption.

***4. Involving Neighboring Communities, Tribal, and Regional Agencies***

Element	Requirements
<p><b>A3. Does the plan document, as appropriate, an opportunity for neighboring communities, tribal and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, as well as other interests to be involved in the planning process?</b></p> <p>44 CFR § 201.7(c)(1)(ii)</p> <p><i><b>Intent:</b> To demonstrate a deliberative planning process that involves the appropriate tribal members and partners for the tribal planning area that have the experience and information needed to develop the plan, as well as the responsibility or authority to make decisions and implement hazard mitigation activities.</i></p>	<p>a. The plan shall identify all tribal members/citizens, and partners who were given an opportunity to be involved in the planning process. During plan review, it is important for the reviewer to consider that variations in tribal capability and/or cultural practice may influence participation.</p> <p>The plan shall identify how tribal members/citizens and partners were invited to participate in the process.</p>

Internally, SBIT advertised information about each step of the planning process through their normal monthly communication outreach - email and traditional mail to tribal members. In addition, flyers about the workshops were posted online via SBIT websites, as well as with hard copies posted in several locations and delivered directly to each home on the Reservation. Department Directors/Managers were specifically invited to workshops during site visits. The Planning Team also conducted interviews (Appendix C) of department directors as well as their staff.

Externally, the Planning Team provided notifications and updates to such partners as:

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

- Willapa Bay Enterprises
- Bureau of Indian Affairs (BIA)
- State of Washington
- Pacific County Emergency Management Agency
- Grays Harbor County Emergency Management Agency
- Pacific County Sheriff
- Town of Tokeland

Flyers for the public workshops, flyers were posted at:

- SBIT Tribal Center
- SBIT Emergency Management Office
- SBIT Wellness Center
- SBIT website
- SBIT Facebook pages

SBIT Staff attend regular coordination meetings with its partners. The staff invited their external partners to participate through a variety of means - in-person, email correspondence, and physical handouts/flyers.

### ***C. Integration with Other SBIT Planning Efforts***

Element	Requirements
<p>A4. Does the plan describe the review and incorporation of existing plans, studies, and reports?</p> <p>44 CFR § 201.7(c)(1)(iii)</p> <p><b><i>Intent:</i></b> <i>To identify existing data and information, shared objectives, and past and ongoing activities that can help inform the mitigation plan.</i></p>	<p>a. The plan shall describe <i>what</i> existing plans, studies, and reports were reviewed.</p> <p><i>Examples of the types of existing sources reviewed may include, but are not limited to, natural resources plans; housing plans; analyses or studies from tribal departments, neighboring Tribe, colleges, universities, and academic institutions; socioeconomic or building information from tribal comprehensive plans; results from hazard-specific studies, plans for sacred sites, or hazard data or plans from tribal, federal, regional, state, or local agencies.</i></p> <p>b. The plan shall document <i>how</i> relevant information was incorporated into the mitigation plan.</p> <p>a. <b><i>Incorporate</i></b> means to reference or include</p>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

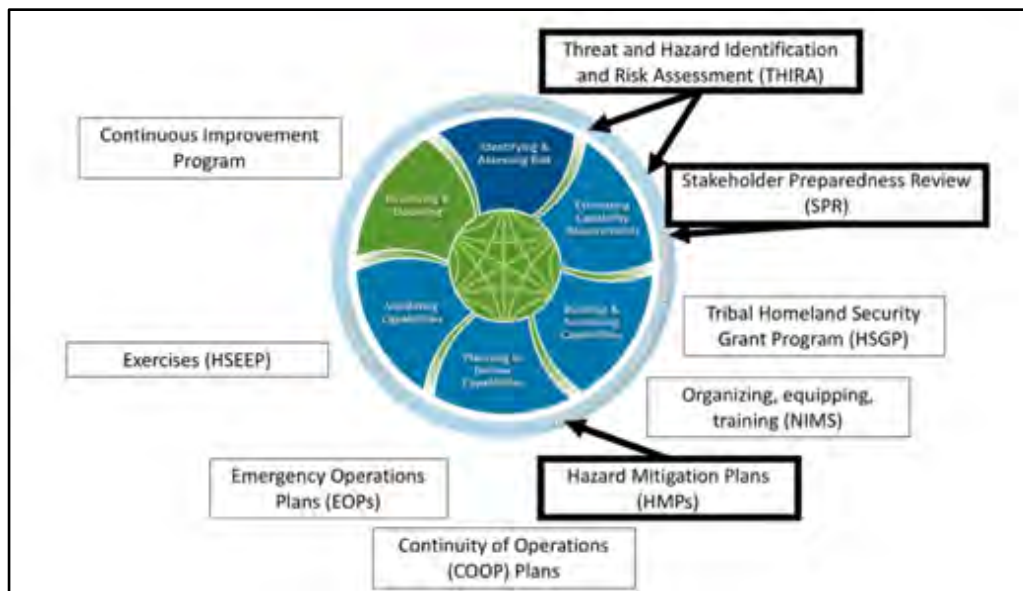
Element	Requirements
	<i>information from other existing sources to develop the content of the mitigation plan.</i>
<p><b>A5. Does the plan include a discussion on how the planning process was integrated, to the extent possible, with other ongoing tribal planning efforts as other FEMA programs and initiatives?</b></p> <p>44 CFR § 201.7(c)(1)(iv)</p> <p><b><i>Intent:</i></b> <i>To identify how the tribal government leveraged any other planning activities or FEMA programs to accomplish hazard mitigation and reduce risk.</i></p>	<p>a. The plan shall describe how the tribal government integrated the current planning process and/or findings with other ongoing tribal planning efforts.</p> <p><b><i>Planning efforts</i></b> means governance structures that are used to manage land use and development and other tribal government decision-making, such as tribal master plans, capital improvement plans, natural and/or cultural resource plans, plans for sacred sites, emergency operations plans, and/or other long-range plans.</p> <p>b. The plan shall describe how the tribal government integrated the current planning process with other FEMA programs and initiatives.</p> <p><i>Examples of other FEMA programs and initiatives include, but are not limited to, the National Flood Insurance Program (NFIP), HMA grant programs, Threat and Hazard Identification and Risk Assessment (THIRA), and recovery programs.</i></p> <p><b><i>To the extent possible</i></b> means that consideration will be given to the inherent differences in governance and capabilities among tribal governments.</p>

The Shoalwater Bay Indian Tribe’s Multi-Hazard Mitigation Plan (MHMP) is just one of a family of disaster preparedness-related plans the Tribe is engaging on. The Tribe developed this MHMP update using a wholistic approach in consideration of the National Preparedness System (NPS) as shown in Figure 4. As highlighted in Figure 4, SBIT is simultaneously developing its MHMP, Threat and Hazard Identification and Risk Assessment (THIRA), and its Stakeholder Preparedness Review (SPR). By doing so, SBIT is ensuring the hazards, threats, vulnerabilities, and capabilities are consistent across the three assessments. In addition, SBIT is realizing efficiencies by not conducting separate assessments. SBIT intends to closely follow the MHMP, THIRA, and SPR

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

with an update of its Emergency Operations Plan (EOP), and Continuity of Operations Plan (COOP) updates.

The Building Resilient Infrastructure and Communities grant is one example of the NPS element, “Building and Sustaining Resources.” Another action under this element is the Tribal Homeland Security Grant Program, which requires the completion of a THIRA, SPR and Integrated Preparedness Plan (IPP). Once SBIT has an updated EOP and a COOP plan, it will continue around the National Preparedness System to “Validating Capabilities” through exercises and then “Reviewing and Updating” all these efforts regularly – including updating this hazard mitigation plan as required.



**Figure 4. National Preparedness System and Representative Actions.**

***D. Method and Schedule for Keeping the Plan Current: How, When, and Who will Evaluate the Plan***

Element	Requirements
<p><b>A6. Does the plan include a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within the plan update cycle)?</b></p> <p>44 CFR § 201.7(c)(4)(i)</p> <p><b><i>Intent:</i></b> <i>To establish a process for the tribal government to track the progress of the plan’s implementation and ensure the plan remains current and viable.</i></p>	<p>a. The plan shall identify how, when, and by whom the plan will be monitored. <b><i>Monitoring</i></b> means tracking the relevance and implementation of the plan over time and includes all elements of the plan.</p> <p>b. The plan shall identify how, when, and by whom the plan will be evaluated. <b><i>Evaluating</i></b> means assessing the effectiveness of the plan at achieving its stated purpose and goals.</p> <p>c. The plan shall identify how, when, and by whom the plan will be updated. <b><i>Updating</i></b> means reviewing and revising the plan at least once every 5 years.</p> <p>The plan shall include the title of the individual or name of the department/agency responsible for leading these efforts.</p>

***1. How, When, and Who will Monitor the Plan***

This plan, and the accomplishment of action items defined in it, will be monitored by the Planning Team. Specifically, Objective #4.3 states, “Build hazard mitigation concerns into the Tribal planning and budgeting process.” Action #4.3.1 states, “Develop a review procedure to ensure mitigation is incorporated into applicable plans and budgets. In addition, Action #5.2.2 states, “Continue to update as required and needed, emergency plans including: FEMA Hazard Mitigation Plan, Comprehensive Emergency Management Plan, Continuity of Operations Plan, Disaster Recovery Plan, Debris Management Plan, Individual Households & Special Needs Assistance Plan.”

Led by the SBIT Emergency Management Director, the Planning Team will regularly report their progress in accomplishing their assigned actions. Tables 44-45 assign responsibility for completing actions to various departments/programs. In addition to regularly scheduled Planning

Team meetings progress reports will be provided to the Tribal Council at least semi-annually and to the public annually (Table 48).

**2. *How, When, and Who will Evaluate the Plan***

At least semi-annually, the Planning Team, led by the SBIT Homeland Security Coordinator will evaluate the effectiveness of the plan and the achievement of planned actions and objectives. If the achievement of actions and objectives are on target, then no remedial actions are necessary. If the accomplishment of actions and objectives deviates from the plan (either positively or negatively), then the Planning Team will decide one of two causes and remedial changes:

- The plan is sound, but the execution of the action is faulty. In this case, a remedy for the action accomplishment is dictated.
- The remedial action is being accomplished according to plan, but the desired effects are incorrect based on the wrong planning assumptions, conditions, or a change in circumstances. In this case, a modification of the plan may be warranted.

**3. *How, When, and Who will Update the Plan***

If correctly executed actions are not achieving the desired effect (for whatever reason), an immediate change in the plan may be warranted. This could occur in circumstances of the risk management strategy of risk transfer. For example, hardening a section of riverbank in one area might cause more rapid erosion in another. In this case, a plan adjustment may be required. Outside of corrective actions, the Planning Team will begin the process of updating this plan 3.5 years after its adoption. This allows approximately six months to contract for support or garner other planning resources required to begin. At the four-year point, the next plan update will begin and follow a nominal one-year planning process to have the next plan revision complete by the five-year point.

*Table 9. Plan Monitoring, Evaluating, and Updating Schedule.*

<b>Plan Monitoring</b>	<b>Point of Contact</b>	<b>Timeline</b>
<b>Planning Team action item accomplishment review</b>	The respective POC responsible for each action item	Monthly Planning Team meetings

*Table 9. Plan Monitoring, Evaluating, and Updating Schedule.*

<b>Plan Monitoring</b>	<b>Point of Contact</b>	<b>Timeline</b>
<b>Tribal Council action item accomplishment report</b>	Planning Team	Semi-annual Tribal Council progress report
<b>Public action item accomplishment review</b>	Planning Team	Annual public progress report
<b>Ad hoc plan updates</b>	Planning Team	As required to ensure the plan is relevant
<b>FEMA-required five-year update</b>	Planning Team	Every five years

***E. Continued Public Participation***

<b>Element</b>	<b>Requirements</b>
<p><b>A7. Does the plan include a discussion of how the tribal government will continue public participation in the plan maintenance process?</b></p> <p>44 CFR § 201.7(c)(4)(iv)</p> <p><b><i>Intent:</i></b> <i>To identify how the public will continue to have an opportunity to participate in the plan’s maintenance and implementation over time.</i></p>	<p>a. The plan shall describe how the tribal government will continue to seek public participation after the plan has been approved and during the plan’s maintenance process.</p> <p><i>Examples include, but are not limited to, periodic presentations on the plan’s progress to tribal officials, schools, or other tribal groups; annual questionnaires or surveys; tribal gatherings; and/or postings on social media and websites.</i></p>

SBIT’s strategic Goal #3 is to, “Increase Public Awareness of Local Hazards.” There are multiple objectives and actions under this goal for the tribe to accomplish (Table 10). SBIT will use its standardized processes for communicating with tribal members about mitigation actions such as its monthly information packets sent out via email and printed materials. Information about significant events is also posted in high traffic areas at Tribal Center. SBIT also holds monthly Community Council meetings to provide updates and solicit input.



*Table 10. Public Participation Objectives and Actions.*

<b>Obj. #</b>	<b>Objective</b>	<b>Action</b>
3.1	Increase public awareness and understanding, support, and demand for hazard mitigation.	<b>Action 3.1.1:</b> Inform the public about hazards.
3.2	Heighten public awareness of the full range of hazards they may face	<b>Action 3.2.1:</b> Update the whole community on mitigation plans and projects.
3.3	Publicize and encourage the adoption of appropriate hazard mitigation measures	<b>Action 3.3.1:</b> Maintain and expand a public outreach strategy of on-going programs providing multiple messages that support all phases of emergency management, including the maintenance of a 7-day supply of food and water. This should include CERT training. Training program should also include an outreach program for elders and sensitive populations to provide assistance as needed.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Externally, Planning Team members will continue to participate local, state, and Federal activities that support this plan. Goal #4, “Partnerships and Implementation,” is a strategic goal with such actions as attending/hosting local mitigation-related events (Table 11).

*Table 11. Partnerships and Implementation Objectives and Actions.*

<b>Obj. #</b>	<b>Objective</b>	<b>Action</b>
4.1	Build and support local partnerships with stakeholders in the community	<ul style="list-style-type: none"> <li>• <b>Action 4.1.1:</b> Work with local utility service providers to harden and/or install underground utility lines (power, phone, internet) and add additional repeaters and network capacity, which will provide higher quality and less disrupted services.</li> <li>• <b>Action 4.1.2:</b> Work with local, federal, and private partners to install and maintain additional early warning and updated communication systems community-wide to provide enhanced coverage and redundancy. This includes additional towers, repeaters, and support equipment.</li> </ul>
4.2	Build a team of committed volunteers to safeguard the community before, during, and after a disaster	<b>Action 4.2.1:</b> Build a CERT or CERT-like team to assist with preparedness, mitigation, response, and recovery.
4.3	Build hazard mitigation concerns into the Tribal planning and budgeting process	<b>Action 4.3.1:</b> Develop a review procedure to ensure mitigation is incorporated into applicable plans and budgets.



**A. The Planning Area**

This plan update encompasses current and planned trust lands and fee properties, including buildings infrastructure, natural and cultural/historical resources, tribal members, employees, and visitors.

Element	Requirements
<p><b>B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the tribal planning area?</b></p> <p>44 CFR § 201.7(c)(2)(i)</p> <p><b><i>Intent:</i></b> To understand the natural hazards affecting the tribal planning area in order to identify which hazard risks are most significant and which locations are most adversely affected.</p>	<ul style="list-style-type: none"> <li>a. The plan shall include a description of the tribal planning area (See footnote 6 on page 7).</li> <li>b. The plan shall include a description of the natural hazards that can affect the tribal planning area. <i>(Note: There is no requirement to include manmade hazards in the mitigation plan. FEMA will not require removal of this information, but if these hazards are included, they will not be reviewed to meet the requirements).</i></li> <li>c. The plan shall provide the rationale for the omission of any natural hazards that are commonly recognized to affect the tribal planning area.</li> <li>d. The description shall include information on the location and the extent of each identified hazard.</li> </ul> <p><b><i>Location</i></b> means the geographic areas in the tribal planning area that are affected by the hazard. For many hazards, maps are the best way to illustrate location. However, location may be described in other formats. For example, if a geographically- specific location cannot be identified for a hazard, such as tornadoes, the plan may state that the entire tribal planning area is equally at risk to that hazard.</p> <p><b><i>Extent</i></b> means the strength or magnitude of the hazard. For example, extent could be described in terms of the specific measurement of an occurrence based on a scientific scale (e.g., Enhanced Fujita Scale, Saffir-Simpson Hurricane Scale, Richter Scale, flood depth grids) and/or other hazard factors, such as the duration and/or speed of onset. Extent is not the same as impacts, which are described in sub-element B3.</p>

## **1. *About the Tribe***

### **a) Origins of Shoalwater Bay Indian Tribe**

The reservation was first established by Presidential Executive Order on September 22, 1866. A 355-acre piece of land was set aside by President Johnson for “miscellaneous Indian purposes.”

Eleven years prior, the Shoalwater Bay chiefs in attendance at the Chehalis River Treaty Council of 1855 refused to sign the non-negotiable treaty offered by Governor Stevens. In effect, without signing anything, the Indians of the Shoalwater Bay retained a small land base to call home and to continue their ancestors’ traditions of hunting, fishing and shellfish harvesting off the land and waterways of the Bay.

In the 1960s, negotiations were held with the United States government to have the Shoalwater Bay Indian Tribe recognized. On March 10, 1971 this recognition came after the membership ratified and amended our constitution to secure the rights and powers inherent in our sovereign status and guaranteed to us by the laws of the United States, develop and protect the Shoalwater Bay Indian Reservation, and all other Tribal resources, preserve peace and order in our community, promote the general welfare of our people and our descendants, protect the rights of the Tribe and of its members, and preserve our land base, culture and identity, to establish our Constitution.

### **b) Tribal Culture**

Native people have lived on the Willapa Bay for over 2,000 years. Early settlers depicted the bay as an Eden for the Indians living here. The term Shoalwater Bay Indians is used to refer to those of Lower Chehalis and Lower Chinook descent and other Indians whose primary home was and is the bay. At the time, the bay was known as Shoalwater Bay and it was named by Englishman John Meares in 1792. The name was later changed to Willapa Bay. Shoalwater Bay is the most accurate name for the bay because half of the bay’s area becomes tide flats at low tide.

The Shoalwater Bay Indians of old were expert canoers and moved with the tides, currents, and winds in their travels about the bay and beyond to visit, trade or obtain food. If the Shoalwater people weren’t in the water or being rained on, the chances were good that they were on the water in one of several different types of canoes. As you can see, the old Shoalwater world was, in a fundamental sense, very different from that which we know today. Yet, it is the same place too, and for all of us to cherish and protect. When the bounty of the ocean is at hand, why move inland? The Shoalwater people are still on the bay and not only surviving but growing and working hard to retain and teach traditions of a sacred heritage. Changes to our world are coming and future years will see a renaissance of Shoalwater ways, with economic independence and initiative.

**c) Tribal Land**

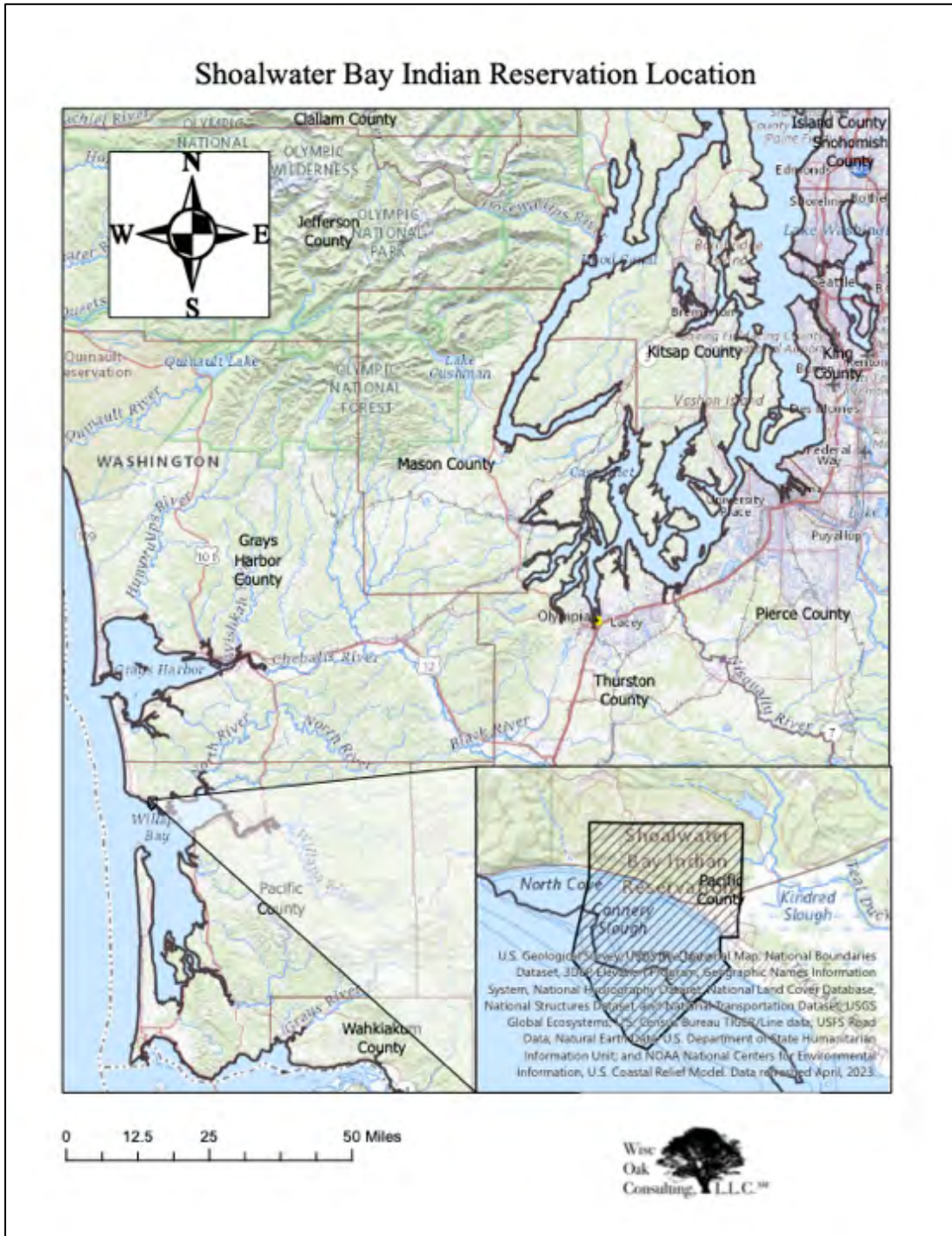
In the days before European settlement, the shores of Shoalwater Bay were a mix of a bountiful natural environment and many native villages. The north end of the bay around the present-day reservation was populated predominantly by Lower Chehalis speaking peoples. The Southern end of the bay, near present day Bay Center and southward was inhabited by Willapa Chinook peoples. The original territory of the Shoalwater Bay peoples was a vast network of waterways along the coast. For the Lower Chehalis Shoalwater's village of nAN'svAC (today's reservation) was the southern tip of the territory. From there it extended northward to CfxII'fs the lower Chehalis word for Westport, meaning "place of sand". Early explorers pronounced the word "Chehalis" and gave this name to the river and the people living upriver who later became the Chehalis Tribe. From Westport the territory went east up the Chehalis river to present day Satsop, Washington. Today the people of the Shoalwater Bay no longer freely roam the Chehalis and Columbia Rivers. Our territory has shrunk to the present-day reservation and a handful of nearby properties purchased by the tribe. However, our people still have deep connection to our ancestral homelands and many of our tribal members are living within those ancestral lands from Ilwaco to Aberdeen and everywhere in between.

**2. *Location and Geography***

The Shoalwater Bay Indian Tribe of the Shoalwater Bay Indian Reservation is located along the north shore of Willapa Bay in Pacific County, Washington. Tribal Center is located at centered geographic coordinates **N 46.7216 - W 124.0165** (6). State Route 105 runs east-west through the Showalter Bay Indian Reservation and is the only highway that provides access to the Tribe. Tokeland Road runs southeast off of State Route 105 and is the only road that services the Tribe out to Toke Point. Eagle Hill Road runs north of State Route 105 and provides access to Tribal land and facilities in the Willapa Hills.

At one-mile square, the original reservation is relatively small, with 2/3 lying at or below the intertidal zone. With additional trust lands and other land acquisitions over the last decade, the tribal land base is about 5.3 sq. miles. The Shoalwater Reservation is mostly in a flat area along the shore, with lands extending north into the Willapa Hills. There are small bays and extensive intertidal marshes within the tidal portion of the Reservation (behind Graveyard Spit and including parts of North Cove). The marsh is a mix of native plants and invasive plants and animals. None of the marsh adjacent to and within the reservation is listed by the Washington Department of Natural Resources as high-quality natural heritage wetland.





**Figure 6. Shoalwater Bay Indian Tribe General Location.**

**B. Ecoregion**

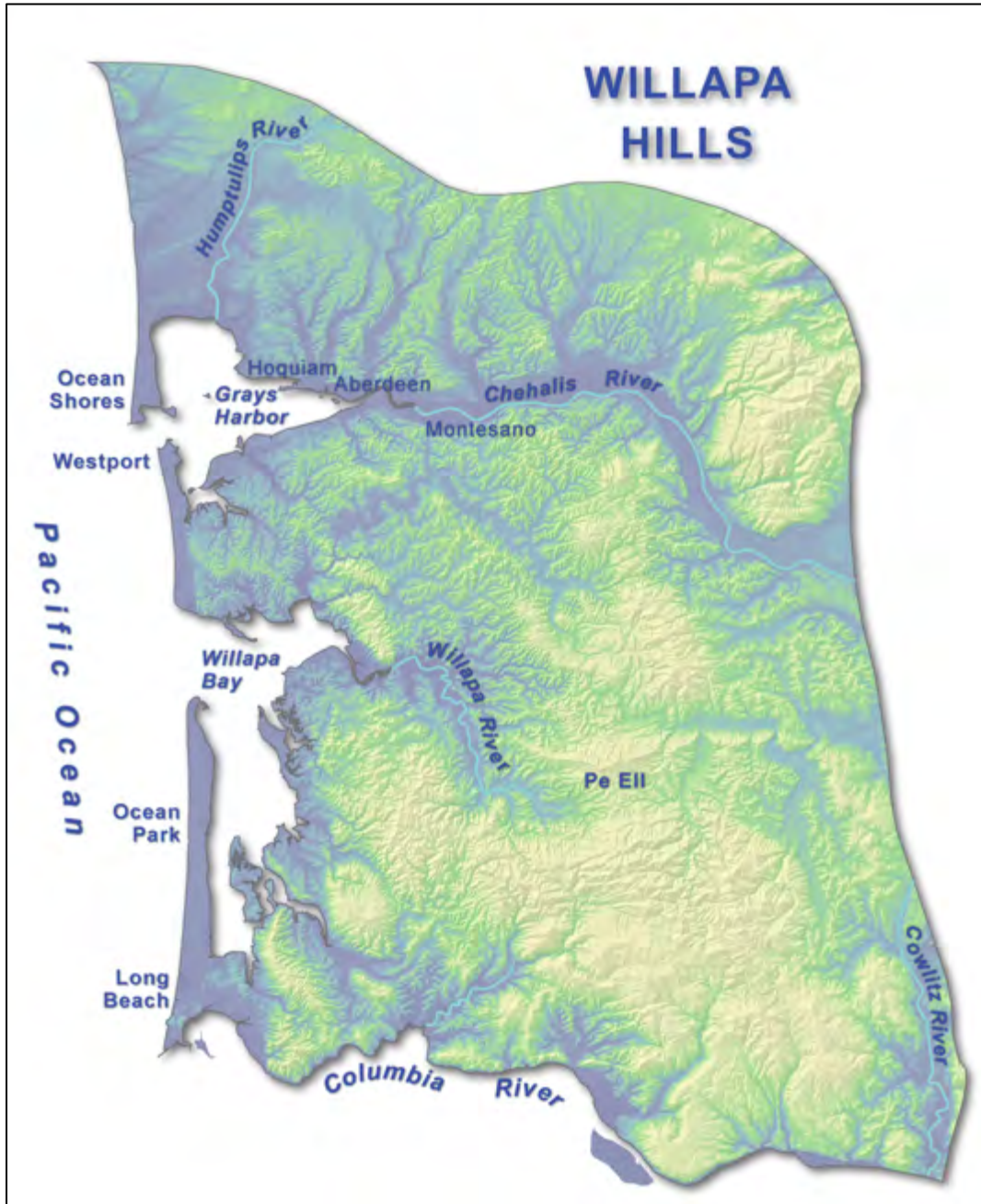
The Shoalwater Bay Indian reservation lies within the Pacific Northwest Coast ecoregion (Figure 7).



**Figure 7. Northwest Coast Ecoregion.**



The Northwest Coast ecoregion includes 150 miles of coastline and is the wettest of Washington's ecoregions. While the ecoregion extends from the coast through the Olympic Mountains, the Reservation is located within the Willapa Hills, Pacific Ocean, and Willapa Bay (Figure 8). (Landscape America 2024)



*Figure 8. Willapa Hills. (Washington State Department of Natural Resources 2024)*

### ***C. Geology***

North Cove area. Figure 9 depicts the general soil types ranging from west of Graveyard Spit through the Reservation in the Willapa Hills. The soils include:

- Andisols in the hills: “Andisols form from weathering processes that generate minerals with little orderly crystalline structure.” (U.S. Department of Agriculture 2024) These minerals can result in an unusually high water- and nutrient-holding capacity. In particular, the Udand suborder is dominant among the hills in this region. “Udands, which have a udic moisture regime, a temperature regime warmer than cryic, and a relatively high content of water held too tightly for plants to use, dominate mostly in western Washington and Oregon and in Hawaii. Most of the soils formed under forest vegetation.” (U.S. Department of Agriculture 2024)
- Entisols in the mud flats and marshes: “Entisols are soils that show little or no evidence of pedogenic horizon development.” (U.S. Department of Agriculture 2024) In particular, the Aquent suborder is dominant where sediment is deposited. “Aquents, or the wet Entisols, are widely distributed...They support vegetation that tolerates permanent or periodic wetness.” (U.S. Department of Agriculture 2024)
- Inceptisols interspersed between and within the other two soils: “Inceptisols are soils of semiarid to humid environments that generally exhibit only moderate degrees of soil weathering and development.” (U.S. Department of Agriculture 2024) In particular, the Udept suborder is dominant in this region. “Udepts are mainly freely drained Inceptisols that have a udic or perudic moisture regime. They are most extensive in the Appalachian Mountains, on the Allegheny Plateau, in northeastern Minnesota, and in Oregon. Most of the soils currently support or formerly supported forest vegetation, but some support shrub or grass vegetation. The vegetation was mostly coniferous forest in the Northwest and mixed or hardwood forest in the Eastern States.” (U.S. Department of Agriculture 2024)

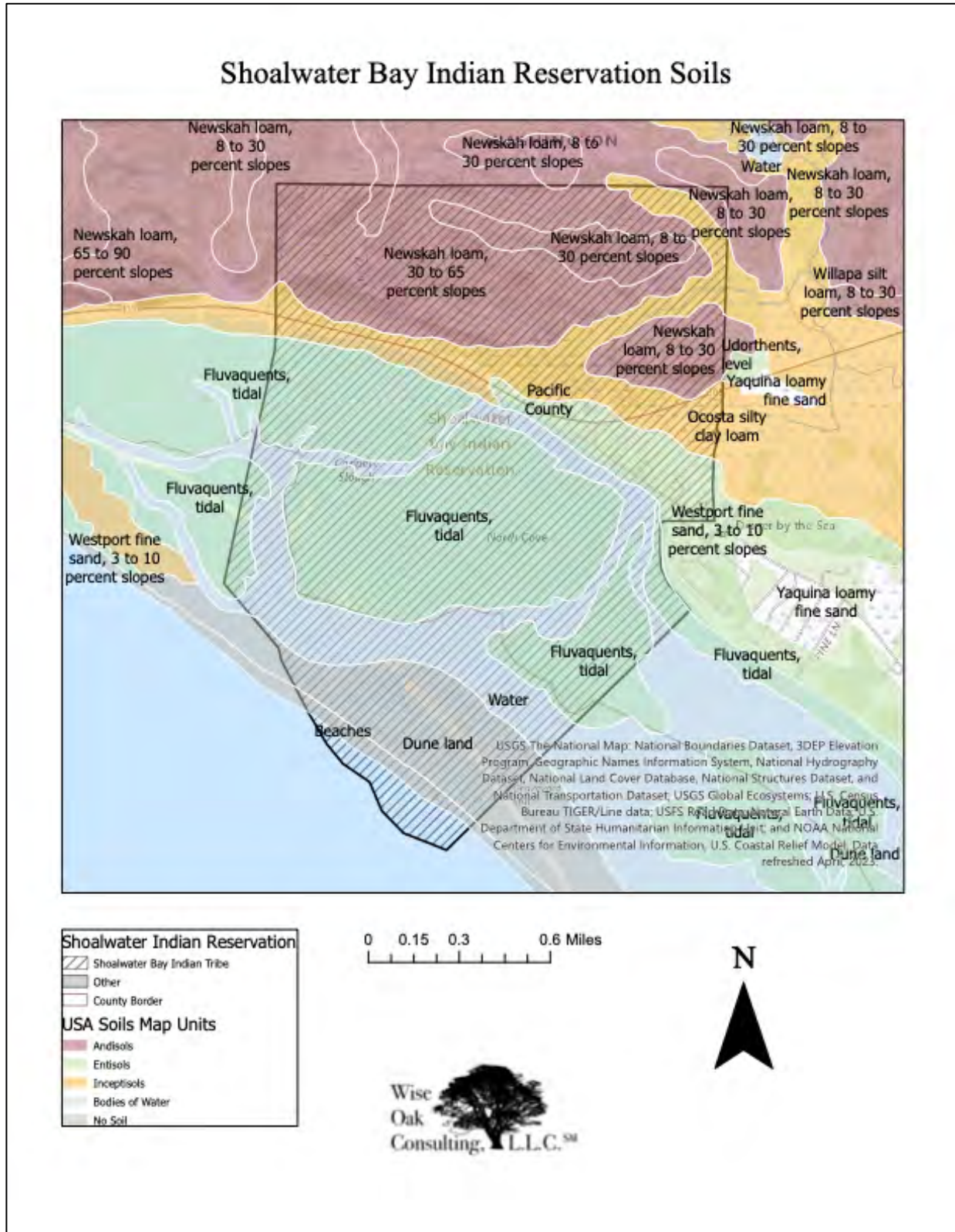
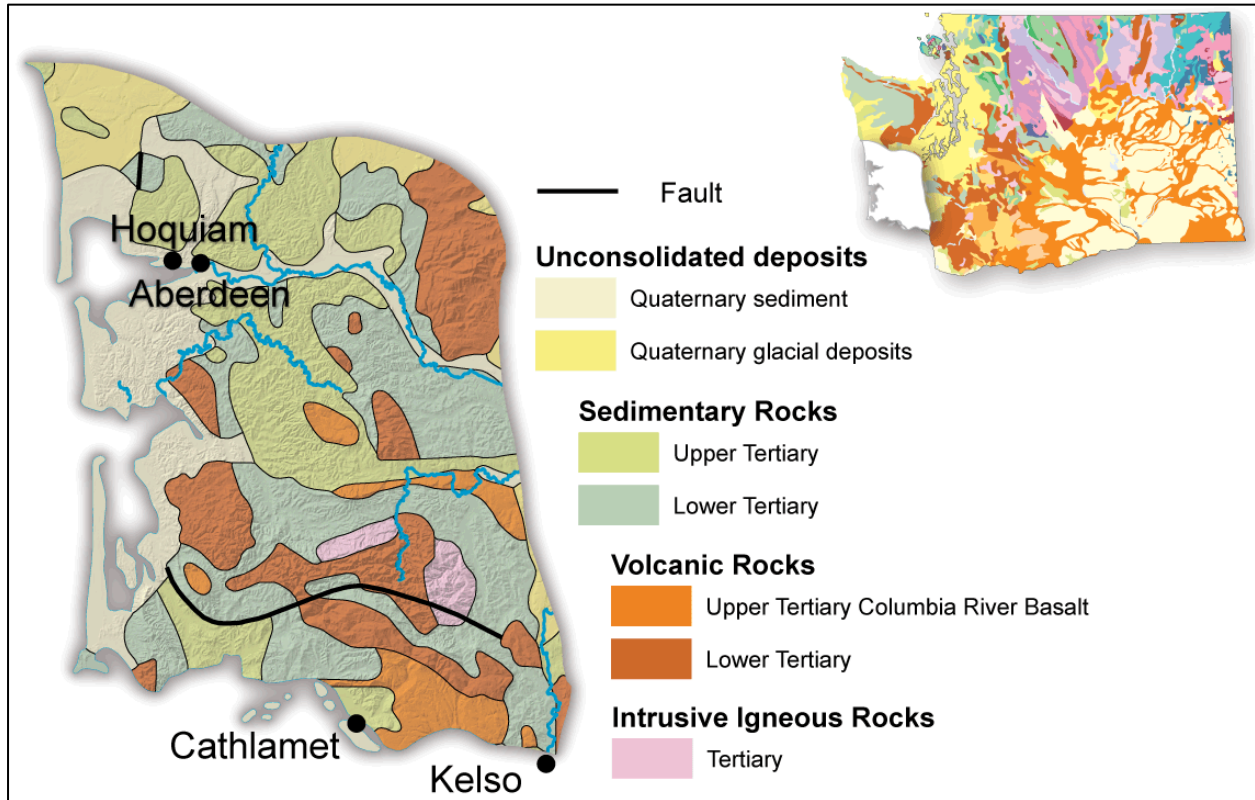


Figure 9. Soil Types.



While the Willapa Hills rise to more than 3,000 feet, the Shoalwater Bay Indian Reservation is located at the southern portion with the terrain rising steeply to over 200 feet. The Reservation lies in a well-weathered / well-rounded region of the Willapa Hills that consists of Quaternary sediment (Figure 10).

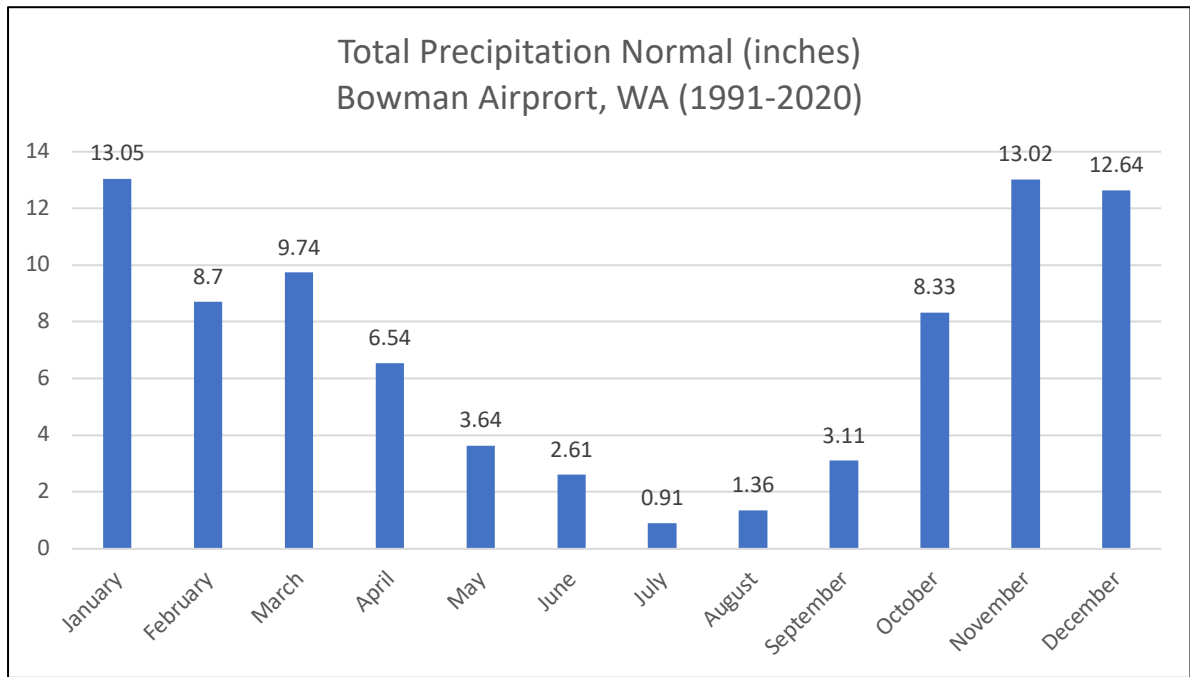


**Figure 10. Willapa Hills Geology. (Washington State Department of Natural Resources 2024)**

Due to the sedimentary makeup essentially means that the material never solidified into rock. The most significant geological hazards that the Reservation faces are earthquakes, tsunamis, and landslides. The greatest risk is the Cascadia Subduction Zone (CDZ) earthquake and tsunami, which can produce all three of these geological hazards.

**D. Climate**

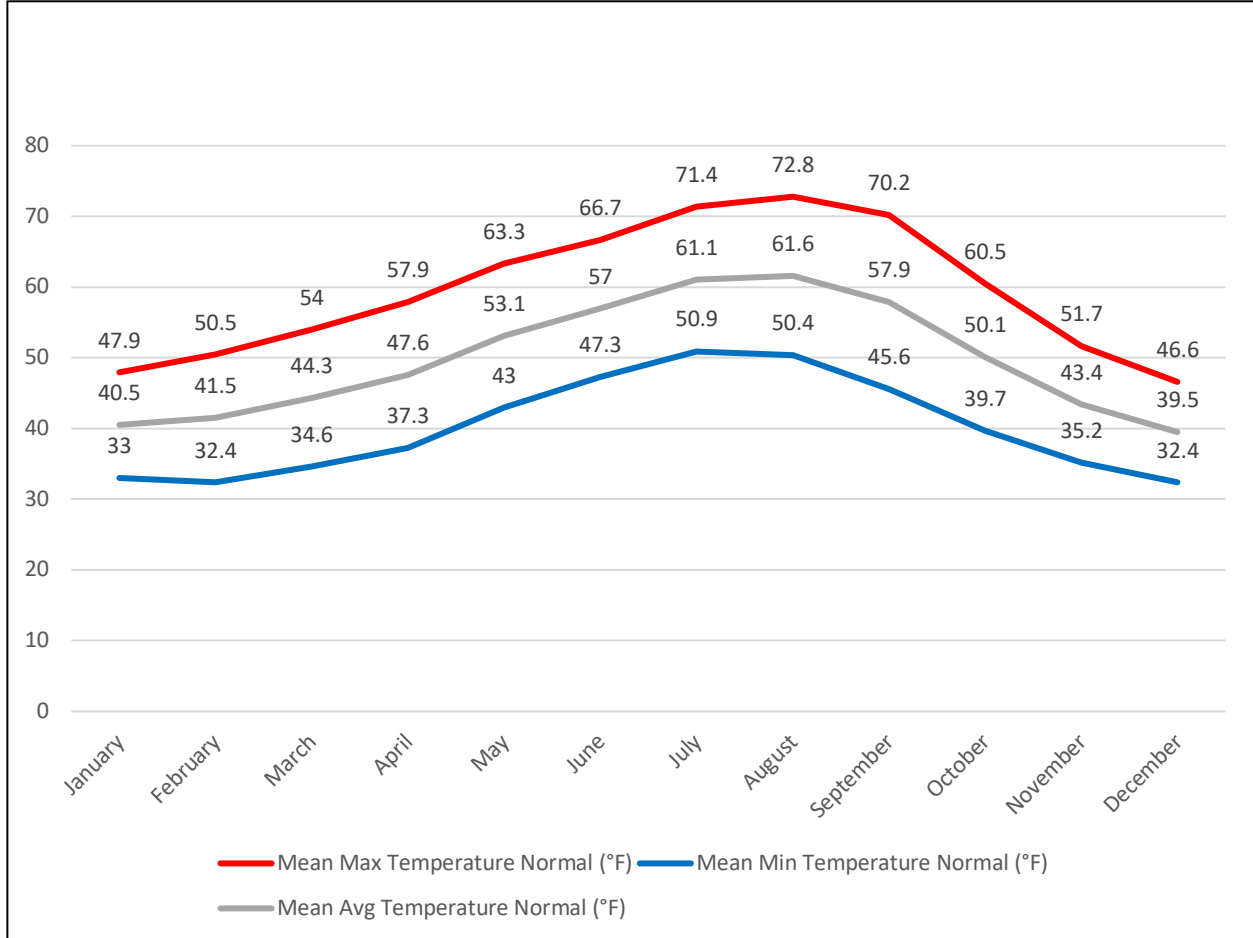
Again, as the wettest ecoregion within Washington, the Northwest Coast averages 60 to 240 inches of rainfall annually. Bowerman Airport, WA (27 miles north of the Reservation on Grays Harbor) registered an average on 83.65 inches of rain per year between 1991-2020. (National Weather Service 2024) In addition, the coast and adjacent valleys experience fog and cool temperatures in the summer. (Landscape America 2024) Figure 11 displays precipitation normals for Bowerman Airport on Grays Harbor. (National Weather Service 2024)



**Figure 11. Rainfall Normals. (National Weather Service 2024)**

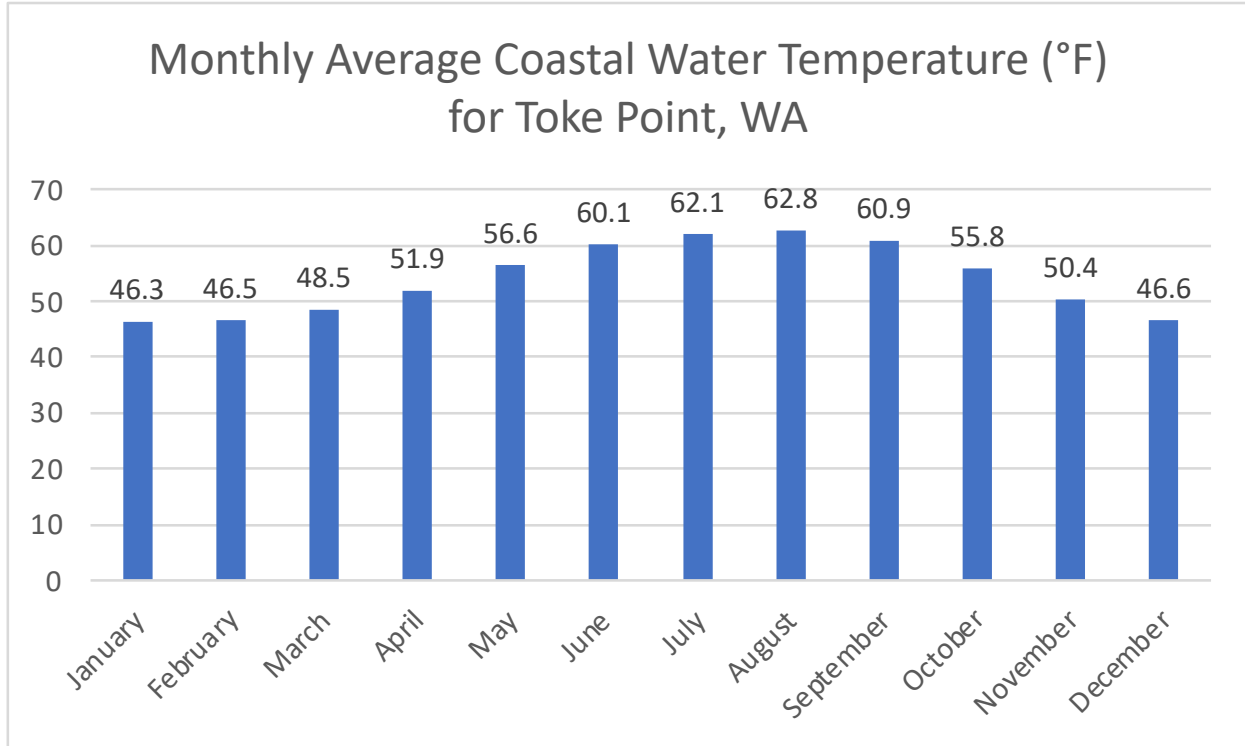
## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Figure 12 displays the temperature normals for Bowerman Airport on Grays Harbor.



**Figure 12. Temperature Normals. (National Weather Service 2024)**

Figure 13 displays the monthly average coastal water temperature for Toke Point, Washington.



**Figure 13. Monthly Average Coastal Water Temperature for Toke Point, WA. (National Oceanic and Atmospheric Administration 2024)**

### ***E. Sea Level Rise***

While sea level rise will be addressed in detail in Section II, J, 8, it impacts the entire northwest coastline, which represents an existential threat to the Tribe. Figure 14 depicts the National Oceanic and Atmospheric Administration (NOAA) the seal level rise confidence for a seven (7)-foot sea level rise. (National Oceanic and Atmospheric Administration 2022) While a seven-foot sea level rise may not be seen for generations, lower levels of sea level rise lead to increased impacts from flooding, erosion, salt water inundation in marshes and groundwater, etc.. Therefore, that the Tribe has made the decision to relocate into the Willapa Hills.



*Figure 14. Seven-Foot Sea Level Rise Confidence. (National Oceanic and Atmospheric Administration 2022)*



***F. Plants and Animals***

With the topography ranging from the marine to sandy beaches to marshland to rapidly rising sedimentary hills, the Reservation and surrounding region contains a wide variety of plants and animals. The marine environment presents opportunities for aquaculture and numerous grasses, shrubs, and trees populate the sand dunes. The marine environment has abundant kelp beds that not only provide a habitat for many animals, but also protect beaches from wave erosion. The marshes contain a variety of plants such as seashore salt grass, sedges, rushes, *Salicornia*, *Spartina*, *alterniflora*, milkwort, jaumea, pickleweed, sea blight, and arrow grass .” (Washington Department of Fish and Wildlife 2024) Eelgrass dominate in the intertidal mudflats, which are sparsely vegetated.

The Shoalwater Bay Indian Reservation lies within the Sitka spruce vegetation zone (Figure 15). The terrain then rises rapidly from sea level into the Willapa Hills. The western edge of the Northwest Coast is the nation’s greatest example of temperate rainforest. The high rainfall and mild temperatures have produced thick coniferous forests and include western hemlock, western cedar, and Sitka spruce. (Washington State Department of Natural Resources 2024) “Black cottonwood, big leaf maple, red alder, and Oregon ash grow in moist ground, accompanied by thickets of willow and Pacific ninebark.”



Figure 15. Vegetation Zones.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

The region is abundant with animals. The marine life includes many varieties of fish, sea mammals, and other sea creatures. The tidepools are rich with invertebrates as well. Of note, oysters present a revenue generating opportunity and thousands of people per day harvest razor clams at the height of the season. (Landscape America 2024) The dunes (including dune shrubs) and beaches also provide nesting and foraging areas for a variety of birds. Forage fish that spawn on beaches are an important source of food for other fish, marine mammals, and birds. The estuaries are especially important to salmon as they transition between fresh and saltwater.

“Salt and brackish marshes and intertidal mudflats are important habitats used by insect larvae, amphipods (shrimp-like animals), polychaetes (marine worms), snails, and other invertebrates. These species are prey for numerous fish and wildlife, including waterfowl, shorebirds, herons, raccoons, otter, mink, salmon, and steelhead. In sandy or muddy areas, these invertebrates, as well as algae, depend on the structure of eelgrass beds. Brant geese eat eelgrass – an important food source during their twice-annual migration on the Pacific Flyway. Commercially important species such as Dungeness crab and red rock crab, Pacific herring, salmonids, shrimp, and flatfishes all rely on eelgrass beds at some point in their life cycles.” (Washington Department of Fish and Wildlife 2024)

The abundant marine life is threatened by invasive species, especially the *Spartina* invasive plant, the New Zealand mudsnail, and the European green crab (Figure 44). The Tribe’s Wildlife Resource Management Division actively monitors and works to control/eradicate these invasive species.

## ***G. Demographics***

As of the writing of this Plan, the Shoalwater Bay Indian Tribe has 311 total members, with 120 living on the Reservation and off-reservation trust land. Of particular concern are approximately 22 (18%) are 65 years of age or older and 12 (13%) have a disability. (United States Census 2024)

## ***H. New and Future Development***

As of 2019, the Shoalwater Bay Reservation Trust lands and fee lands totaled approximately 3,388 acres. This is significant growth from the original 2008 plan, when tribal lands totaled about 845 acres. Although no major structural developments occurred, the Tribe has expanded some facilities such as the Emergency Management Facilities in the Eagle Hill Road area.

### ***1. Economy***

Many tribal members work for the tribal government or one of the enterprises. Both historically and in recent times, the Shoalwater Bay Indian Tribe has relied on the diversity and productivity of the 700 acres of intertidal habitat and tide flats in the North Cove embayment. The barrier dune on Graveyard Spit afforded protection to the Cove from winter storm wave attack. The Shoalwater Bay Indian Tribe has relied on ocean fisheries as well as on shellfish grown and harvested in North Cove for subsistence. In addition, tribal members harvested local native plant species from the North Cove embayment for tribal crafts and ceremonial use. Tribal members are also commercial fishermen within Willapa Bay and make use of local native plant species for Tribal crafts and ceremonial use.

### ***2. Industry***

#### ***a) Government as Employer***

An estimated 50% of workers in the labor force over 16 years of age work for the government (primarily the tribal government). (United States Census Bureau 2024) “The Shoalwater Bay Indian Tribe is governed by a General Council, comprising of all enrolled tribal members at least eighteen years of age. An elected five-person Tribal Council conducts the day-to-day business operation of the Tribe. Administrative duties are overseen by a Tribal Administrator who works for the Tribal Council. The administrator manages departments with the help of department directors.” (Shoalwater Bay Indian Tribe 2024)

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

SBIT Tribal Government includes more than fifteen (15) committees and departments providing all of the services needed for the members of a sovereign nation. From law enforcement to housing to economic development, SBIT's Tribal government endeavors to improve the quality of life on the SBIT reservation and provide as much opportunity as possible for Tribal members.

### *b) Services*

The Shoalwater Bay Indian Tribe provides a robust set of services including courts, law enforcement, firefighting (via the South Beach Regional Fire Authority), utilities, education, food programs, fish and game, health and fitness, a museum, and more.

### *c) Business Opportunities*

Willapa Bay Enterprises (WBE) was incorporated in 2007 by the Shoalwater Bay Indian Tribe to build a stronger base for their economic development goals. The WBE has a five-member board of tribal members with business experience devoted to furthering the diversity of our Tribe's business ownership. Willapa Bay Enterprises include:

- WBE Consulting
- Shoalwater Bay Casino
- Georgetown Gas Station
- Tradewinds Motel & Conference Center,
- Smoke N' Spirits Liquor Store
- Willapa Bay Oyster Co.
- Restaurant
- Event center
- Daycare

Each business created by WBE incorporates tribal preference as a strategy to support our tribal members and employs 85 - 125 people annually based on seasonal demand.

### *d) Critical Facilities & Infrastructure*

#### *a. Vulnerability Assessment*

Vulnerability is best defined as 'open to attached, harm and/or damage'. The purpose of the Vulnerability Assessment is to answer the question of "What could my community lose due to the impact from this/these hazard(s)?"

For the Plan, the following tasks were performed as a part of the vulnerability assessment:

- Asset Inventory

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

- Potential Loss Estimations
- Identifying Future Structures
- Development Trends Analysis

The following sections summarize the Team efforts to assemble and analyze the data needed for the vulnerability assessment, and to present the results of the vulnerability analysis.

### *b. Asset Inventory*

A list of the Tribe's insured facilities and equipment, housing, and commercial property (current for 2018-19) was also reviewed. The updated GIS database includes 108 structures owned by the tribe and/or on tribal lands (213). Assets identified by the Team are classified as either critical or non-critical facilities and infrastructure.

*Table 12. GIS Summary of Tribal Structures - 2019.*

<b>Facility Type</b>	<b>Number of Facilities</b>
<b>Tribal facilities and offices, including infrastructure</b>	14
<b>Commercial facilities &amp; related structures</b>	15
<b>Residential structures (single, duplex, manufactured)</b>	48
<b>Storage sheds, garages and similar structures</b>	31
<b>Total</b>	<b>108</b>

The Team performed a detailed asset inventory for SBIT. Information that was compiled included the facility's physical location, description, and replacement cost. Replacement costs were generally estimated using insurance and/or current market value estimates or using imagery and measuring the square footage multiplied by \$150 for an estimate. Each facility was geospatially located by obtaining initial latitude and longitude coordinates. Table 13 summarizes the type, number and replacement cost of the facilities identified for the SBIT.

*Table 13. Inventoried Value of Tribal Facilities and Equipment - 2019.*

Type of Facility	Number of Structures	Insured Value
<b>Tribal housing</b>	30 structures	\$3.6 million, total insured value
<b>Tribal facilities</b>	28 structures, including equipment	\$14.78 million, total insured value
<b>Willapa Bay Enterprises (tribal commercial facilities)</b>	20 facilities and equipment	\$19 million, total insured value
<b>Total</b>	<b>78 structures &amp; equipment</b>	<b>\$37.38 million total insured value</b>

Critical Infrastructure includes:

- Water system consisting of two wells and a 57,000-gallon storage reservoir
- Main Tribal Municipal Sewer Treatment Plant
  - Located near Gym
  - Built by Indian Health Service
  - Capacity of 30 homes
- Tribal roads
  - Eagle Hill Road
  - Some residential roads/driveways
  - Miscellaneous logging roads
- Non-tribal roads: SR 105, Tokeland Rd, misc. residential streets
- Power grid
- 1700 ft. protective berm, built by US Army Corps of Engineers in 2001 and restored and improved in 2023
  - Along coast parallel to Tokeland Rd from the RV Park to behind the Tribal Center
- Two AHAB Warning Sirens
- Tsunami Evacuation tower

The critical facilities include:

- Tribal Center

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

- Shoalwater Bay Casino
- Wellness Center
- Tribal Police Station
- Shoalwater Bay Learning Center (library)
- Gymnasium (also used as Emergency Shelter)
- Eagle Hill Rd emergency shelter/all-purpose building

Non-critical facilities include:

- Natural Resources offices
- Smoke Shop
- Fireworks Stand
- RV park adjacent to the Casino

### **3. *Loss Estimations***

Economic and human loss estimates for each of the major hazards identified in Section II begins with an estimate of the potential exposure of critical and non-critical assets and human populations to those hazards. Exposure to critical and non-critical assets identified by the Team is accomplished by intersecting the hazard profiles with the assets.

Human or population exposures were attempted by intersecting the same hazards with 2020 Census Data population statistics that have been re-organized into GIS compatible databases and distributed with HAZUS®-MH. However, the HAZUS Data population statistics do not equate to the population statistics provided in Section II due to GIS positioning anomalies, and the way HAZUS depicts certain census block data. For example, the Reservation is just a portion of the census tract so all values would be overstated for the Tribe. Therefore, the results were not representative of the general magnitude of population exposures to flooding. Additional loss estimations were attempted for general residential, commercial, and industrial building stock inventories compiled in the HAZUS®-MH databases also was intended to further depict the potential exposure. The identification of residential structures is also limited and did not accurately represent the current building counts.



#### **4. *Identifying Future Structures***

In recent years, the Tribe has completed several building projects to upgrade and enhance the Tribe's infrastructure. Currently, planned projects include relocation of all facilities into the Willapa Hills.

##### **a) Development Trend Analysis**

In the past, the development within the SBIT boundaries is considered on case-by-case basis by the Tribal Council.

##### **b) Economic Development Projects**

Willapa Bay Enterprises (WBE) Corporation strives to find, evaluate and recommend new business opportunities for Shoalwater Bay Indian Tribe, to promote and enhance sovereignty, to promote Native American businesses and to protect tribal assets and investments. WBE strives to increase tribal economic development opportunities through innovation, growth, leadership, professionalism and financial discipline... "For our Tribe; our People; our Future."

The most significant growth area is in the oyster farm in which WBE is seeking to grow from 2 million to 10 million oysters. In addition, WBE is seeking ways to establish businesses in the previous restaurant and catering facility at Georgetown Station.

##### **c) Development History and Planning**

As a community, SBIT desires to foster a sustainable way of life both locally and globally through the safeguarding and enhancing of Tribal resources and by preventing harm to the environment and human health. The Tribe is resolved that their impact on the environment must not jeopardize the prospects of future generations.

##### **d) Tribal Council**

The Tribe is governed by a General Council, comprising of all enrolled tribal members at least eighteen years of age. An elected five-person Tribal Council conducts the day-to-day business operation of the Tribe - Chair, Vice Chair, Treasurer, Member at Large, Secretary. Administrative duties are overseen by a Tribal Administrator who works for the Tribal Council. The administrator manages departments with the help of department directors.

**e) Cultural/Sacred Sites Analysis**

Figure 16 displays historic tribal villages and camps. The ancestors to the Shoalwater Bay Tribe inhabited the shorelines of Willapa Bay for thousands of years. Early historical records note many of the former village and seasonal campsites around the bay and at the mouths of creeks. This plan does not specifically analyze such historic sites, but it remains a primary mitigation concern for the tribe, especially in regard to the effects of climate change and sea-level rise. In addition to village/campsites, the Georgetown Graveyard is of cultural significance for the Tribe.



Figure 15. Historical Tribal Villages / Camps.

***A. Identified Hazards of Concern***

To take a more wholistic approach to its risk management, SBIT is including the three categories of hazards and threats defined by the National Preparedness Goal:

- *Natural hazards, which result from acts of nature, such as hurricanes, earthquakes, tornadoes, animal disease outbreak, pandemics, or epidemics.*
- *Technological hazards, which result from accidents or the failures of systems and structures, such as hazardous materials spills or dam failures.*
- *Human-caused incidents, which result from the intentional actions of an adversary, such as a threatened or actual chemical attack, biological attack, active shooter, or cyber incident.*

While technological hazards and human-caused threats are optional and not evaluated by FEMA as a part of Tribal Hazard Mitigation Planning reviews, SBIT is including them in its Hazard Mitigation Plan to better integrate the HMP with all elements of the National Preparedness System such as the Tribe Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) as shown in Figure 4.

***1. Hazard Selection***

Element	Requirements
<p><b>B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the tribal planning area?</b></p> <p>44 CFR § 201.7(c)(2)(i)</p> <p><b><i>Intent:</i></b> <i>To understand the natural hazards affecting the tribal planning area in order to identify which hazard risks are most significant and which locations are most adversely affected.</i></p>	<p>a. The plan shall include a description of the tribal planning area (See footnote 6 on page 7).</p> <p>b. The plan shall include a description of the natural hazards that can affect the tribal planning area. <i>(Note: There is no requirement to include manmade hazards in the mitigation plan. FEMA will not require removal of this information, but if these hazards are included, they will not be reviewed to meet the requirements).</i></p> <p>c. The plan shall provide the rationale for the omission of any natural hazards that are commonly recognized to affect the tribal planning area.</p> <p>d. The description shall include information on the location and the extent of each identified hazard.</p> <p><b><i>Location</i></b> <i>means the geographic areas in the tribal planning area that are affected by the hazard. For many hazards, maps</i></p>

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

	<p><i>are the best way to illustrate location. However, location may be described in other formats. For example, if a geographically- specific location cannot be identified for a hazard, such as tornadoes, the plan may state that the entire tribal planning area is equally at risk to that hazard.</i></p> <p><b><u>Extent</u></b> means the strength or magnitude of the hazard. For example, extent could be described in terms of the specific measurement of an occurrence based on a scientific scale (e.g., Enhanced Fujita Scale, Saffir-Simpson Hurricane Scale, Richter Scale, flood depth grids) and/or other hazard factors, such as the duration and/or speed of onset. Extent is not the same as impacts, which are described in sub-element B3.</p>
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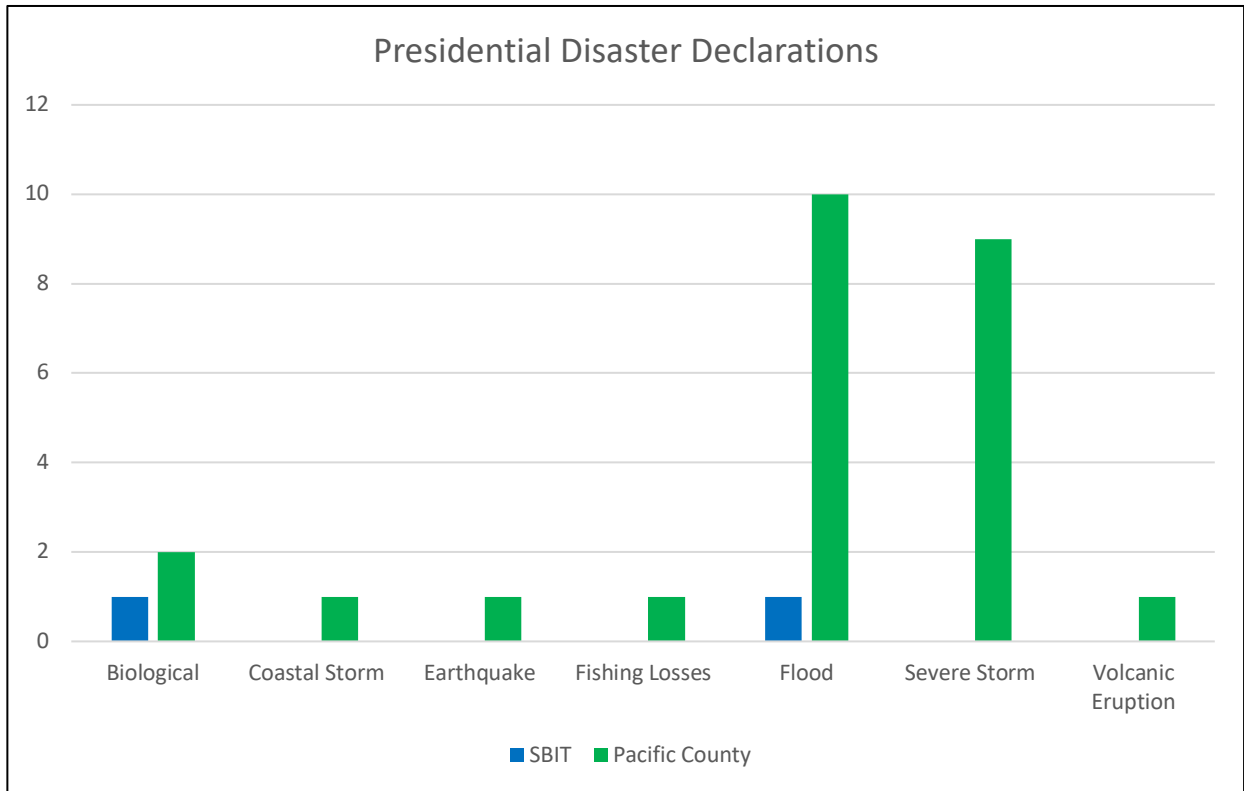
Element	Requirements
<p><b>B2. Does the plan include information on previous occurrences of hazard events and on the probability of future hazard events for the tribal planning area?</b></p> <p>44 CFR § 201.7(c)(2)(i)</p> <p><b><u>Intent:</u></b> <i>To understand potential impacts to the tribal planning area based on information on the hazard events that have occurred in the past and the likelihood of those will occur in the future.</i></p>	<p>a. The plan shall include the history of previous events for each of the identified hazards.</p> <p>b. The plan shall include the probability of future events for each identified hazard. Probability must include considerations of future conditions, including the effects of long-term changes in weather patterns on identified hazards.</p> <p><i>Probability may be defined in terms of general descriptors (for example, unlikely, likely, highly likely), historical frequencies, statistical probabilities (for example a 1-percent chance of occurring within any given year), and/or hazard probability maps.</i></p> <p><i>If general descriptors are used, then they shall be defined in the plan. For example, “highly likely” could be defined as equal to or near 100 percent chance of occurring next year or happens every year.</i></p> <p><i>Probability of future events and considerations of changing future conditions may be described using qualitative and/or quantitative information:</i></p> <ul style="list-style-type: none"> <li>• <i>Qualitative information (e.g., transcribed oral history) about changing weather patterns and potential effects on identified hazards.</i></li> <li>• <i>Quantitative information that describes predicted changes in temperature and precipitation and potential effects on identified hazards.</i></li> </ul>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Element	Requirements
<p><b>B3. Does the plan include a description of [each] identified hazard’s impact, as well as an overall summary of the vulnerability of the tribal planning area?</b></p> <p>44 CFR § 201.7(c)(2)(ii)</p> <p><i><b>Intent:</b> For the tribal government to consider their tribal planning area as a whole and analyze the potential impacts of future hazard events and the vulnerabilities that could be reduced through hazard mitigation actions.</i></p>	<p>a. The plan shall describe the potential impacts of each of the identified hazards on the tribal planning area.</p> <p><i><b>Impact</b> means the consequence or effect of the hazard on the tribal government and its assets. Assets are determined by the tribal government and may include, for example, people, structures, facilities, systems, and populations that are susceptible to damage and loss from hazard events. Assets may also include cultural sites, sacred sites, capabilities and/or activities that have value to the tribal government. Impacts could be described by referencing historical disaster impacts and/or an estimate of potential future losses (such as percent damage of total exposure).</i></p> <p>b. The plan shall provide an overall summary of the vulnerability of the tribal planning area to the identified hazards. An overall summary of vulnerability identifies structures, systems, populations, and other assets as defined by the tribal government.</p> <p><i>Vulnerable assets and potential losses are more than a list of the total exposure of population, structures, and critical facilities in the tribal planning area. An example of an overall summary is a list of key issues or problem statements that clearly describes the tribal government’s greatest vulnerabilities and that will be addressed in the mitigation strategy.</i></p>

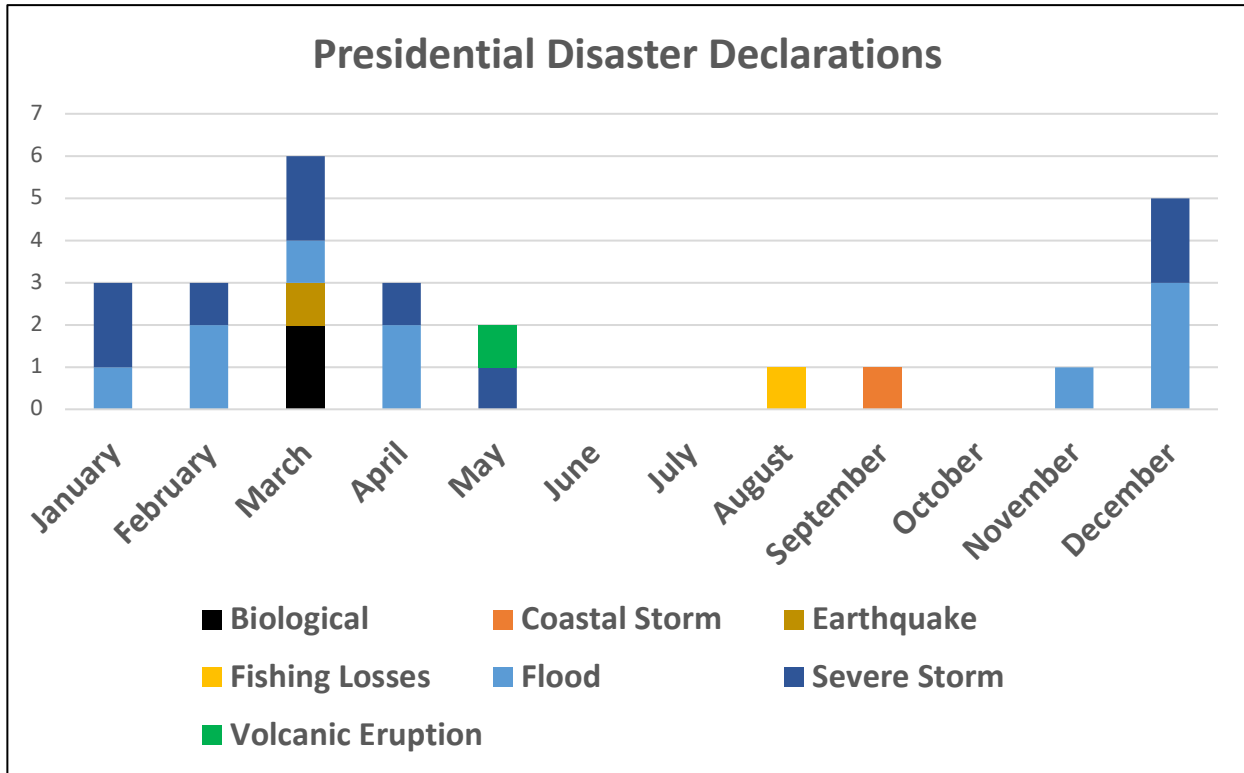
## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Shoalwater Bay Indian Tribe has had two (2) and Pacific County has had twenty-five Presidential Disaster Declarations. Figure 17 clearly shows that the greatest number of disaster declarations are due to floods and severe storms (largely interrelated).



**Figure 17. SBIT and Pacific County Presidential Disaster Declarations by Type.**

Furthermore, Figure 18 shows that that most disasters are during winter and early spring. The main takeaway is the most historically significant natural hazard risk has been severe winter storms.



**Figure 18. SBIT and Pacific County Presidential Disaster Declarations by Month.**

Table 14 lists the FEMA Federal disaster declarations, including financial assistance, for the Shoalwater Bay Indian Tribe and Pacific County. While the total FEMA assistance includes all designated areas (not just Pacific County and SBIT), the amount of financial assistance indicates the magnitude of the impact of the disasters.

*Table 14. SBIT/Pacific County Presidential Disaster Declarations & FEMA Financial Assistance.*

Disaster Type	Jurisdiction	Disaster Declaration*	Dates	Total FEMA Assistance (\$)***
Flood	Pacific County	DR-185-WA Heavy Rains & Flooding	1964-12-29 to 1964-12-29	Unknown
Flood	Pacific County	DR-322-WA Severe Storms & Flooding	1972-02-01 to 1972-02-01	Unknown



Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 14. SBIT/Pacific County Presidential Disaster Declarations & FEMA Financial Assistance.*

<b>Disaster Type</b>	<b>Jurisdiction</b>	<b>Disaster Declaration*</b>	<b>Dates</b>	<b>Total FEMA Assistance (\$)***</b>
<b>Flood</b>	Pacific County	DR-545-WA Severe Storms, Mudslides, & Flooding	1977-12-10 to 1977-12-10	Unknown
<b>Volcanic Eruption</b>	Pacific County	DR-623-WA Volcanic Eruption, Mt. St. Helens	1980-05-21 to 1980-05-21	Unknown
<b>Flood</b>	Pacific County	DR-784-WA Severe Storms & Flooding	1986-11-22 to 1986-11-29	Unknown
<b>Flood</b>	Pacific County	DR-883-WA Severe Storms & Flooding	1990-11-09 to 1990-12-20	Unknown
<b>Fishing Losses</b>	Pacific County	DR-1037-WA The El Nino (The Salmon Industry)	1994-05-01 to 1994-10-31	Unknown
<b>Severe Storm</b>	Pacific County	DR-1079-WA Severe Storms, High Wind, And Flooding	1995-11-07 to 1995-12-18	Unknown
<b>Severe Storm</b>	Pacific County	DR-1159-WA Severe Winter Storms, Land & Muds Slides, Flooding	1996-12-26 to 1997-02-10	Unknown
<b>Flood</b>	Pacific County	DR-1172-WA Heavy Rains, Snow Melt, Flooding, Land & Mud Slides	1997-03-18 to 1997-03-28	Unknown
<b>Earthquake</b>	Pacific County	DR-1361-WA Earthquake	2001-02-28 to 2001-03-16	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$7,138,998.70</li> <li>• PA (Categories C-G): \$54,761,534.37</li> </ul>
<b>Coastal Storm</b>	Pacific County	EM-3227-WA Hurricane Katrina Evacuation	2005-08-29 to 2005-10-01	<ul style="list-style-type: none"> <li>• PA (Categories C-G) \$1,730,746.78</li> </ul>
<b>Severe Storm</b>	Pacific County	DR-1641-WA Severe Storms, Flooding, Tidal	2006-01-27 to 2006-02-04	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$1,020,157.17</li> </ul>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 14. SBIT/Pacific County Presidential Disaster Declarations & FEMA Financial Assistance.*

<b>Disaster Type</b>	<b>Jurisdiction</b>	<b>Disaster Declaration*</b>	<b>Dates</b>	<b>Total FEMA Assistance (\$)***</b>
		Surge, Landslides, And Mudslides		<ul style="list-style-type: none"> <li>• PA (Categories C-G) \$5,058,677.43</li> </ul>
<b>Severe Storm</b>	Pacific County	DR-1671-WA Severe Storms, Flooding, Landslides, And Mudslides	2006-11-02 to 2006-11-11	<ul style="list-style-type: none"> <li>• IA: \$5,388,213.23</li> <li>• PA (Categories A-B): \$6,411,805.81</li> <li>• PA (Categories C-G) \$21,637,795.99</li> </ul>
<b>Severe Storm</b>	Pacific County	DR-1682-WA Severe Winter Storm, Landslides, And Mudslides	2006-12-14 to 2006-12-15	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$8,487,345.37</li> <li>• PA (Categories C-G) \$21,269,934.67</li> </ul>
<b>Severe Storm</b>	Pacific County	DR-1734-WA Severe Storms, Flooding, Landslides, And Mudslides	2007-12-01 to 2007-12-17	<ul style="list-style-type: none"> <li>• IA: \$21,160,441.15</li> <li>• PA (Categories A-B): \$14,834,816.77</li> <li>• PA (Categories C-G) \$44,060,015.93</li> </ul>
<b>Severe Storm</b>	Pacific County	DR-1825-WA Severe Winter Storm And Record And Near Record Snow	2008-12-12 to 2009-01-05	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$12,516,048.66</li> <li>• PA (Categories C-G) \$12,588,742.81</li> </ul>
<b>Flood</b>	Pacific County	DR-1817-WA Severe Winter Storm, Landslides, Mudslides, And Flooding	2009-01-06 to 2009-01-16	<ul style="list-style-type: none"> <li>• IA: \$9,506,708.04</li> <li>• PA (Categories A-B): \$10,141,788.69</li> <li>• PA (Categories C-G) \$39,167,726.80</li> </ul>
<b>Flood</b>	Pacific County	DR-4253-WA Severe Winter Storm, Straight-Line Winds, Flooding,	2015-12-01 to 2015-12-14	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$1,506,365.25</li> </ul>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 14. SBIT/Pacific County Presidential Disaster Declarations & FEMA Financial Assistance.*

<b>Disaster Type</b>	<b>Jurisdiction</b>	<b>Disaster Declaration*</b>	<b>Dates</b>	<b>Total FEMA Assistance (\$)***</b>
		Landslides, Mudslides, And A T		<ul style="list-style-type: none"> <li>• PA (Categories C-G) \$8,419,337.83</li> </ul>
<b>Severe Storm</b>	Pacific County	DR-4418-WA Severe Winter Storms, Straight-Line Winds, Flooding, Landslides, Mudslides, Tornado	2018-12-10 to 2018-12-24	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$922,370.28</li> <li>• PA (Categories C-G) \$11,066,753.66</li> <li>• HMGP: \$1,496,076.00</li> </ul>
<b>Flood</b>	Pacific County	DR-4539-WA Severe Storms, Flooding, Landslides, And Mudslides	2020-01-20 to 2020-02-10	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$3,199,367.00</li> <li>• PA (Categories C-G) \$40,680,715.13</li> <li>• HMGP: \$4,741,267.50</li> </ul>
<b>Biological</b>	Pacific County	EM-3427-WA Covid-19	2020-01-20 to 2023-05-11	<ul style="list-style-type: none"> <li>• Unknown</li> </ul>
<b>Biological</b>	Shoalwater Bay Reservation	DR-4481-WA Covid-19 Pandemic	2020-01-20 to 2023-05-11	<ul style="list-style-type: none"> <li>• Unknown</li> </ul>
<b>Biological</b>	Pacific County	DR-4481-WA Covid-19 Pandemic	2020-01-20 to 2023-05-11	<ul style="list-style-type: none"> <li>• IA: \$19,496,820.55</li> <li>• PA (Categories A-B): \$2,380,611,093.06</li> <li>• HMGP: \$10,185,496.10</li> </ul>
<b>Severe Storm</b>	Pacific County	DR-4593-WA Severe Winter Storm, Straight-Line Winds, Flooding, Landslides, And Mudslides	2020-12-29 to 2021-01-16	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$1,943,568.84</li> <li>• PA (Categories C-G) \$15,144,142.51</li> </ul>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 14. SBIT/Pacific County Presidential Disaster Declarations & FEMA Financial Assistance.*

<b>Disaster Type</b>	<b>Jurisdiction</b>	<b>Disaster Declaration*</b>	<b>Dates</b>	<b>Total FEMA Assistance (\$)***</b>
				<ul style="list-style-type: none"> <li>• HMGP: \$3,301,155.39</li> </ul>
<b>Flood</b>	Shoalwater Bay Reservation	DR-4650-WA Severe Winter Storms, Snowstorms, Straight-Line Winds, Flooding	2021-12-26 to 2022-01-15	<ul style="list-style-type: none"> <li>• Unknown</li> </ul>
<b>Flood</b>	Pacific County	DR-4650-WA Severe Winter Storms, Snowstorms, Straight-Line Winds, Flooding	2021-12-26 to 2022-01-15	<ul style="list-style-type: none"> <li>• PA (Categories A-B): \$2,808,901.10</li> <li>• PA (Categories C-G) \$8,967,253.36</li> <li>• HMGP: \$547,445.92</li> </ul>

\*Types of disaster declarations

- EM (Emergency Declaration): “Emergency Declarations, an incident is any instance that the President determines warrants supplemental emergency assistance to save lives and protect property and public health and safety, or to lessen or avert the threat of a catastrophe.” (Federal Emergency Management Agency 2020)
- DR (Major Disaster Declaration): “For Major Disaster Declarations, an incident is any natural catastrophe (including any hurricane, tornado, storm, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion. Major Disaster Declarations may include a combination of incident types, such as storms and landslides.” (Federal Emergency Management Agency 2020)

\*\* Public Assistance - Dollars Obligated: Funds made available to the State/Tribe via electronic transfer following FEMA's final review and approval of Public Assistance projects.

This plan focuses the impact of hazards specifically as they relate to SBIT members, its property, and its assets. The analysis for each hazard follows the following format:

1. General hazard description as it relates to SBIT
2. Location

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

3. Extent
4. Previous Occurrences on SBIT
5. Probability of Future Events on SBIT
6. Impact on SBIT
7. Vulnerability of SBIT

Based on the 2020 SBIT Multi-Hazard Mitigation Plan and additional hazards of concern that have emerged since that time, the natural hazards that are evaluated in this plan for SBIT are as follows:

- Climate Change
- Coastal Erosion
- Earthquake
- Flood
- Infectious Disease
- Invasive Species
- Landslide
- Sea Level Rise
- Severe Weather
- Tsunami
- Wildland Fire

No natural hazards common to the planning area have been intentionally omitted.

Based on the 2023 SBIT Threat and Hazard Identification and Risk Assessment (THIRA), the technological hazards of concern are:

- Hazardous Material (HAZMAT) Release
- Marine Oil Spill
- Structure Fire
- Utility Disruption

Based on the 2023 SBIT Threat and Hazard Identification and Risk Assessment (THIRA), the human-caused threats of concern are:

- Active Shooter
- Civil Unrest and Terrorism
- Cyberattack on Data (ransomware)
- Cyberattack on Infrastructure

## 2. *Risk Assessment Factors*

Per FEMA's Tribal Mitigation Planning Handbook, the analysis factors of used to compare the hazards and threats are location, extent, previous occurrences, and probability of occurrence. (Federal Emergency Management Agency 2019) In order to quantify the whole community's assessment for the threats and hazards of concern, the planning team used location, extent, probability of occurrence and general concern for each threat and hazard as described in this section.

### *a) Location*

- Extensive: 50% or more of tribal land/assets affected
- Moderate: 25%-50% of tribal land/assets affected
- Limited: 25% or less of tribal land/assets affected

### *b) Extent*

The magnitude of the hazard (Richter Scale, tsunami height, etc.)

- Catastrophic:
  - Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure).
  - Injuries or illnesses result in permanent disability and multiple deaths.
  - Overwhelming damage requires Federal assistance and requires months to years to recover.
- Critical:
  - Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure).
  - Injuries or illnesses result in permanent disability and at least one death.
  - Shut down of critical facilities for more than 1 week and less than 1 month.
- Limited:
  - Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure).
  - Injuries or illnesses do not result in permanent disability and there are no deaths.
  - Moderate quality of life lost.
  - Shut down of critical facilities for more than 1 day and less than 1 week.
- Negligible:
  - Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

- Negligible quality of life lost. Shut down of critical facilities for less than 24 hours.

### *c) Probability of Occurrence*

- Highly Likely: Frequent events with a well-documented history of occurrence. Annual probability that is greater than 10%.
- Likely: Between Occasional occurrences with at least two or more documented historic events. Annual probability that is between 10% and 1%.
- Possibly: Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 1% and .1%.
- Unlikely: Extremely rare with no documented history of occurrences or events. Annual probability of less than .1%.

### *d) Level of Concern*

- Very High: Keeps people up at night.
- High: Of great concern.
- Moderate: General concern.
- Low: On people's radar but they are not particularly worried.
- Very Low: Not worth addressing.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

The results from the survey and workshop participants using each of the definitions were given numerical factors based on the weight values in Table 15.

*Table 15: Threat and Hazard Scoring Methodology.*

Location		Extent		Probability		Concern	
Description	Weight	Description	Weight	Description	Weight	Description	Weight
Extensive	3	Catastrophic	4	Highly Likely	4	Very High	5
Moderate	2	Critical	3	Likely	3	High	4
Limited	1	Limited	2	Possibly	2	Moderate	3
		Negligible	1	Unlikely	1	Low	2
						Very Low	1

The results for each assessment category were summed to arrive at a total score for each threat/hazard. The hazard identification and risk assessment resulted in the prioritized natural hazards of most concern shown in Table 16, Technological hazards of concern in Table 17, and human-caused threats of concern in Table 18. Note that invasive species was not included during the initial analysis but was added later after departmental interviews and based on one of the impacts if climate change.

*Table 16: Shoalwater Bay Indian Tribe's Natural Hazards of Greatest Concern.*

Hazard	Location	Extent	Probability	Concern	Total Score	Rank
<b>Coastal Erosion</b>	Extensive	Catastrophic	Highly Likely	Very High	354	1
<b>Tsunami</b>	Extensive	Catastrophic	Likely	High	348	2
<b>Sea Level Rise</b>	Extensive	Catastrophic	Highly Likely	Very High	344	3
<b>Earthquake</b>	Extensive	Catastrophic	Likely	Very High	325	4
<b>Severe Weather</b>	Moderate	Limited	Highly Likely	Very High	291	5



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*Table 16: Shoalwater Bay Indian Tribe’s Natural Hazards of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Landslide</b>	Extensive	Critical	Highly Likely	Very High	288	6
<b>Flood</b>	Extensive	Catastrophic	Likely	Very High	280	7
<b>Wildland Fire</b>	Moderate	Catastrophic	Possibly	Moderate	246	8
<b>Climate Change</b>	Moderate	Critical	Likely	Moderate	196	9
<b>Infectious Disease</b>	Moderate	Limited	Possibly	Low	182	10

The results in Table 16 set the priorities with respect to the natural hazards of greatest concern. The prioritized hazard list, in conjunction with the SBIT’s objectives, were used to develop the mitigation strategy in Section III.

*Table 17: Shoalwater Bay Indian Tribe’s Technological Hazards of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Utility Disruption</b>	Extensive	Critical	Highly Likely	Very High	272	1
<b>HAZMAT Release</b>	Moderate	Critical	Unlikely	Moderate	247	2
<b>Structure Fire</b>	Moderate	Critical	Possibly	Moderate	194	3

Note that Marine Oil Spill is addressed in this plan but is not included in technological hazard calculations because it was identified as a concern during departmental interviews following the threat and hazard assessment process.

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 18: Shoalwater Bay Indian Tribe’s Human-Caused Threats of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Cyberattack (data)</b>	Moderate	Limited	Highly Likely	Very High	206	1
<b>Cyberattack (Infrastructure)</b>	Moderate	Limited	Likely	Moderate	201	2
<b>Active Shooter</b>	Limited	Critical	Possibly	Very High	194	3
<b>Civil Unrest &amp; Terrorism</b>	Limited	Limited	Possibly	Low	134	4

**B. Natural Hazard Analysis**

Element	Requirements
<p><b>B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the tribal planning area?</b></p> <p>44 CFR § 201.7(c)(2)(i)</p> <p><i><b>Intent:</b> To understand the natural hazards affecting the tribal planning area in order to identify which hazard risks are most significant and which locations are most adversely affected.</i></p>	<ul style="list-style-type: none"> <li>e. The plan shall include a description of the tribal planning area (See footnote 6 on page 7).</li> <li>f. The plan shall include a description of the natural hazards that can affect the tribal planning area. <i>(Note: There is no requirement to include manmade hazards in the mitigation plan. FEMA will not require removal of this information, but if these hazards are included, they will not be reviewed to meet the requirements).</i></li> <li>g. The plan shall provide the rationale for the omission of any natural hazards that are commonly recognized to affect the tribal planning area.</li> <li>h. The description shall include information on the location and the extent of each identified hazard.</li> </ul> <p><i><b>Location</b> means the geographic areas in the tribal planning area that are affected by the hazard. For many hazards, maps are the best way to illustrate location. However, location may be described in other formats. For example, if a geographically- specific location cannot be identified for a hazard, such as tornadoes, the plan may state that the entire tribal planning area is equally at risk to that hazard.</i></p> <p><i><b>Extent</b> means the strength or magnitude of the hazard. For example, extent could be described in terms of the specific measurement of an occurrence based on a scientific scale (e.g., Enhanced Fujita Scale, Saffir-Simpson Hurricane Scale, Richter Scale, flood depth grids) and/or other hazard factors, such as the duration and/or speed of onset. Extent is not the same as impacts, which are described in sub-element B3.</i></p>

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Element	Requirements
<p><b>B2. Does the plan include information on previous occurrences of hazard events and on the probability of future hazard events for the tribal planning area?</b></p> <p>44 CFR § 201.7(c)(2)(i)</p> <p><i><b>Intent:</b> To understand potential impacts to the tribal planning area based on information on the hazard events that have occurred in the past and the likelihood of those will occur in the future.</i></p>	<p>c. The plan shall include the history of previous events for each of the identified hazards.</p> <p>d. The plan shall include the probability of future events for each identified hazard. Probability must include considerations of future conditions, including the effects of long-term changes in weather patterns on identified hazards.</p> <p><i>Probability may be defined in terms of general descriptors (for example, unlikely, likely, highly likely), historical frequencies, statistical probabilities (for example a 1-percent chance of occurring within any given year), and/or hazard probability maps.</i></p> <p><i>If general descriptors are used, then they shall be defined in the plan. For example, “highly likely” could be defined as equal to or near 100 percent chance of occurring next year or happens every year.</i></p> <p><i>Probability of future events and considerations of changing future conditions may be described using qualitative and/or quantitative information:</i></p> <ul style="list-style-type: none"> <li>• <i>Qualitative information (e.g., transcribed oral history) about changing weather patterns and potential effects on identified hazards.</i></li> <li>• <i>Quantitative information that describes predicted changes in temperature and precipitation and potential effects on identified hazards.</i></li> </ul>

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Element	Requirements
<p><b>B3. Does the plan include a description of [each] identified hazard’s impact, as well as an overall summary of the vulnerability of the tribal planning area?</b></p> <p>44 CFR § 201.7(c)(2)(ii)</p> <p><i><b>Intent:</b> For the tribal government to consider their tribal planning area as a whole and analyze the potential impacts of future hazard events and the vulnerabilities that could be reduced through hazard mitigation actions.</i></p>	<p>c. The plan shall describe the potential impacts of each of the identified hazards on the tribal planning area.</p> <p><i><b>Impact</b> means the consequence or effect of the hazard on the tribal government and its assets. Assets are determined by the tribal government and may include, for example, people, structures, facilities, systems, and populations that are susceptible to damage and loss from hazard events. Assets may also include cultural sites, sacred sites, capabilities and/or activities that have value to the tribal government. Impacts could be described by referencing historical disaster impacts and/or an estimate of potential future losses (such as percent damage of total exposure).</i></p> <p>d. The plan shall provide an overall summary of the vulnerability of the tribal planning area to the identified hazards. An overall summary of vulnerability identifies structures, systems, populations, and other assets as defined by the tribal government.</p> <p><i>Vulnerable assets and potential losses are more than a list of the total exposure of population, structures, and critical facilities in the tribal planning area. An example of an overall summary is a list of key issues or problem statements that clearly describes the tribal government’s greatest vulnerabilities and that will be addressed in the mitigation strategy.</i></p>

## 1. *Climate Change*

*“Throughout the United States, climate-related disasters are causing Indigenous communities to consider or actively pursue relocation as an adaptation strategy. Challenges to Indigenous actions to address disaster management and recovery, displacement, and relocation in the face of climate change include economic, social, political, and legal considerations that severely constrain their abilities to respond to rapid ecological shifts and complicate action toward safe and self-determined futures for these communities.” (U.S. Global Change Research Program (USGCP) 2018)*

### 1. **General hazard description as it relates to SBIT:**

According to the United Nations Climate Action effort, “Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun’s activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.” (United Nations n.d.)

As a coastal community, the Shoalwater Bay Indian Tribe is especially vulnerable to the impacts of climate change. The historical climate is cool and wet with fog. Communities on the northwest coast can expect: (U.S. Environmental Protection Agency (EPA) 2016)

- Sea level rise.
- Increased coastal erosion.
- Wetlands become submerged.
- Increased flooding.
- Increased temperatures – greater evaporation which decreases river and stream flow.
- Increased water temperatures – increases frequency of toxic algae blooms that cause shellfish poisoning.; increase invasive species.
- Glaciers retreating – snowpack in Washington has decreased 20% since 1950.
- Snowpack melting earlier in the year.
- Decreased stream flow in the summer – harms agriculture.
- Coastal waters increase in acidity due to more carbon dioxide – inhibits shell growth in some shellfish; reduces productivity of oyster hatcheries; harms plankton.
- Warmer streams – harm Chinook and sockeye salmon, steelhead, and trout.
- Several fish species will decline.
- Wildfire may become more common – likely to double the area burned by the end of the 21<sup>st</sup> century.

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- Increase in forest pests and disease.
- Harm to health and vulnerable people.

Of great significance, the Shoalwater Bay Indian Tribe is already adapting to the impact of climate change as it is relocating from the coastal flatlands into the Willapa Hills due to sea level rise and coastal erosion. While the relocation decreases the risk to sea level rise, other impacts of climate change create new risks from such hazards as wildfire and landslides.

Where information is available, this section compares future projections of the impact of climate change using the Representative Concentration Pathway (RCP) 4.5 and RCP 8.5 scenarios. The RCP scenarios include predictions about the impact of economic activity, energy sources, population growth, and socioeconomic factors. There are four RCPs in current modeling and the larger the number, the greater the impact on the climate. RCP 4.5 is one of the moderate models, “in which radiative forcing is stabilized at approximately 4.5 W/m<sup>2</sup> after 2100.” (Wayne 2013) RCP 8.5 is one of the moderate models, “in which radiative forcing reaches more than 8.5 W/m<sup>2</sup> by 2100 and continues to rise.” (Wayne 2013) Essential, the RCP 4.5 scenario involves human intervention to slow greenhouse gas emissions and RCP 8.5 involves greenhouse gases growing unmitigated.

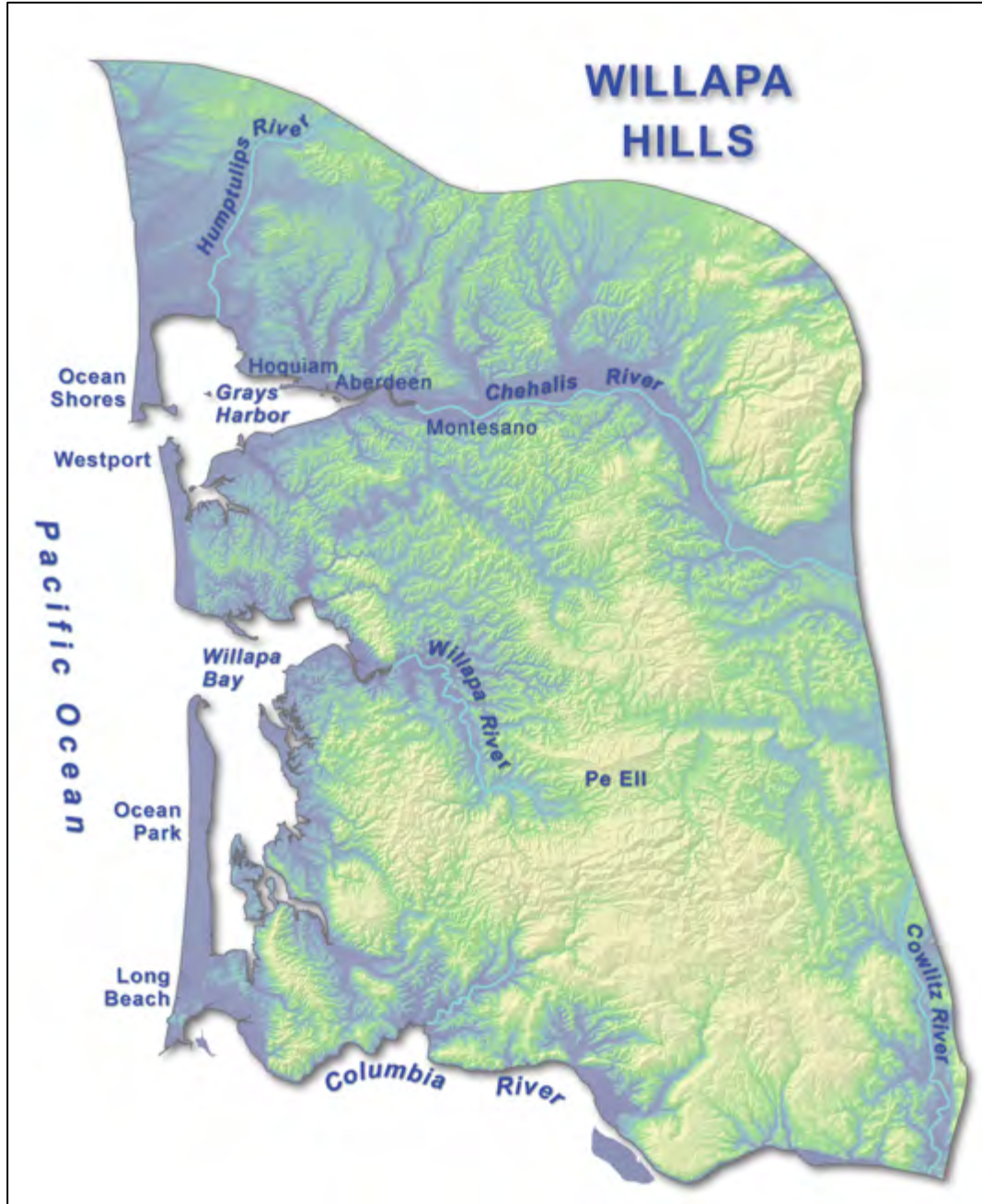
### **2. Location:**

Due to the limited size of the reservation and the global impact of climate change, the entire Shoalwater Bay Indian Tribe can expect to be impacted as long with the Pacific Northwest Coast ecoregion (Figure 18). The Northwest Coast ecoregion includes 150 miles of coastline and is the wettest of Washington’s ecoregions. While the ecoregion extends from the coast through the Olympic Mountains, the Reservation is located within the Willapa Hills, Pacific Ocean, and Willapa Bay (Figure 19). (Landscape America 2024)



Figure 18. Northwest Coast Ecoregion.





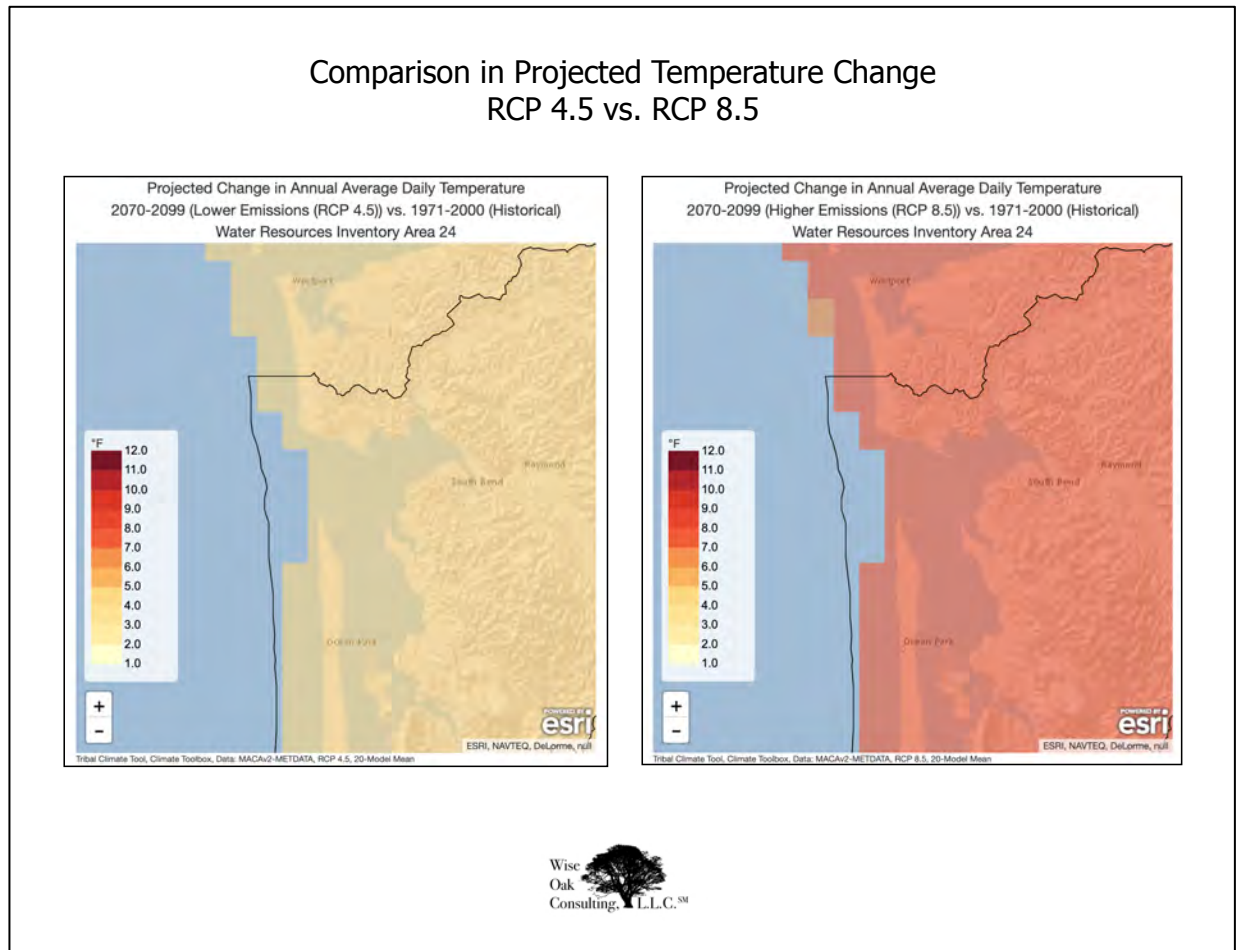
*Figure 19. Willapa Hills. (Washington State Department of Natural Resources 2024)*

**3. Extent:**

Although sea level rise is addressed in its own section, it is important to recognize that it is a key effect of climate change globally, it significantly impacts the Shoalwater Bay Indian Tribe and is driving the Tribe’s relocation into the Willapa Hills.

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The Tribe can expect temperatures to increase 2°F-3°F for the RCP 4.5 and 6°F-7°F by the end of the century (Figure 20). (University of California Merced 2024)



**Figure 20. Comparison Projected Temperature Rise for RCP 4.5 and RCP 8.5. (University of California Merced 2024)**

# Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

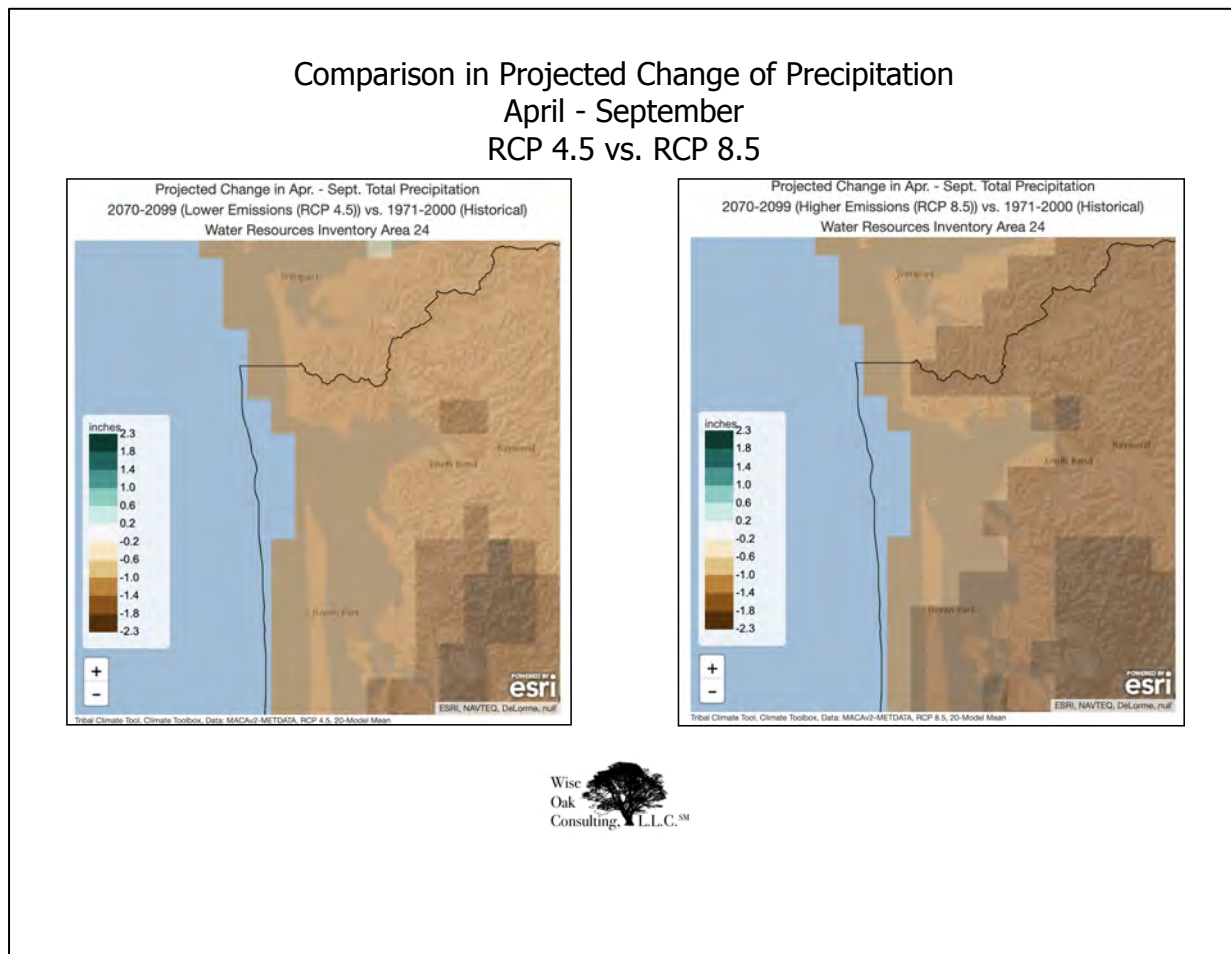
As depicted in Figure 21, Shoalwater Bay can expect a 2%-10% increase in precipitation due to climate change.



**Figure 21. U.S. EPA Climate Indicator for Precipitation.**

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

While the total annual precipitation is expected to increase, the summer precipitation is expected to decrease in both the RCP 4.5 and RCP 8.5 scenarios (Figure 22).

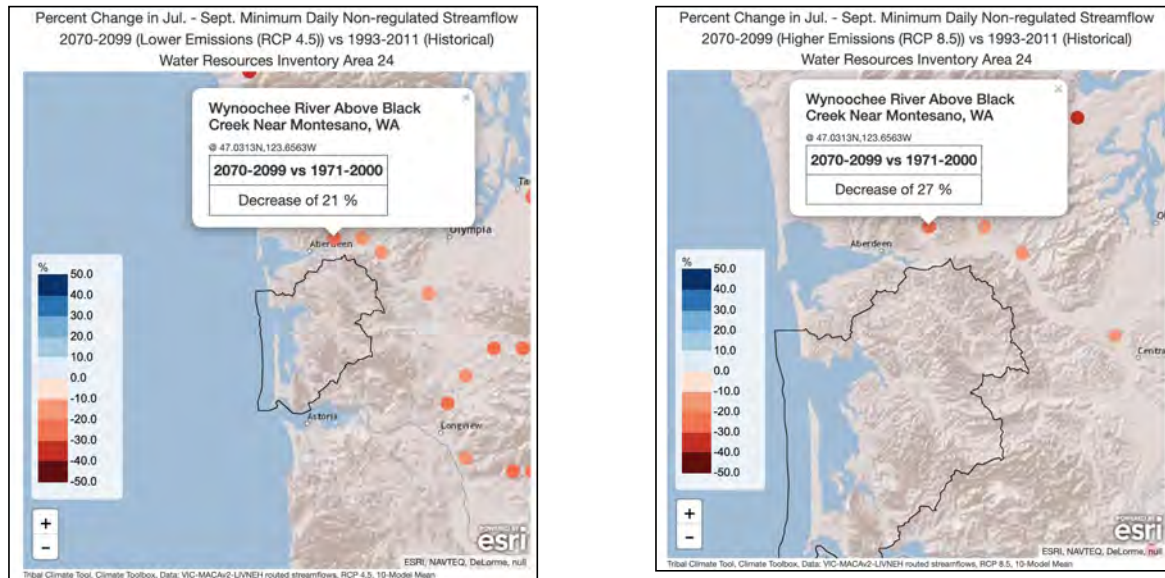


**Figure 22. Comparison Projected Summer Precipitation Decrease for RCP 4.5 and RCP 8.5. (University of California Merced 2024)**



Lees precipitation in the summer months, coupled with less projected snowpack and an increase in temperature is expected to decrease streamflow in the summer months. As can be seen in Figure 23, the local streamflow decrease is expected to be approximately 10% regionwide with the Wynoochee River above Black Creek near Montesano, WA, decreasing 21%-27% for RCP 4.5 and RCP 8.5 respectively.

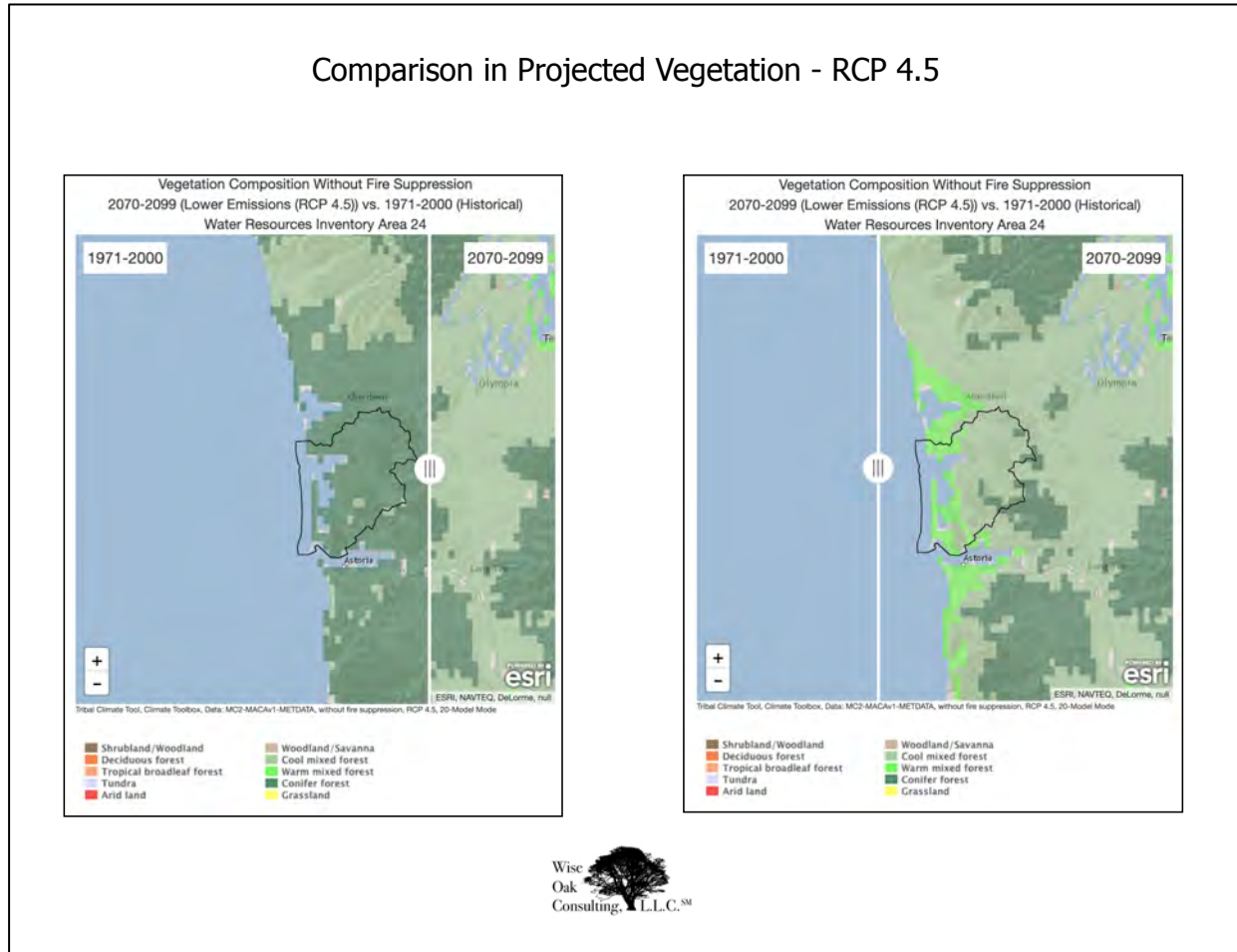
### Comparison in Projected Non-regulated Streamflow RCP 4.5 vs. RCP 8.5



**Figure 23. Comparison in Un-regulated Streamflow for RCP 4.5 vs. RCP 8.5. (University of California Merced 2024)**

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The climate change is also expected to alter the very makeup of the forest that the Tribe is relocating into. As seen in Figure 24, the vegetation is expected to change from cool mixed forest and conifer forest to a warm mixed forest for both the RCP 4.5 (Figure 25) and RCP 8.5 (Figure 26) scenarios.



**Figure 24. Projected Vegetation Change for RCP 4.5. (University of California Merced 2024)**

Comparison in Projected Vegetation - RCP 8.5

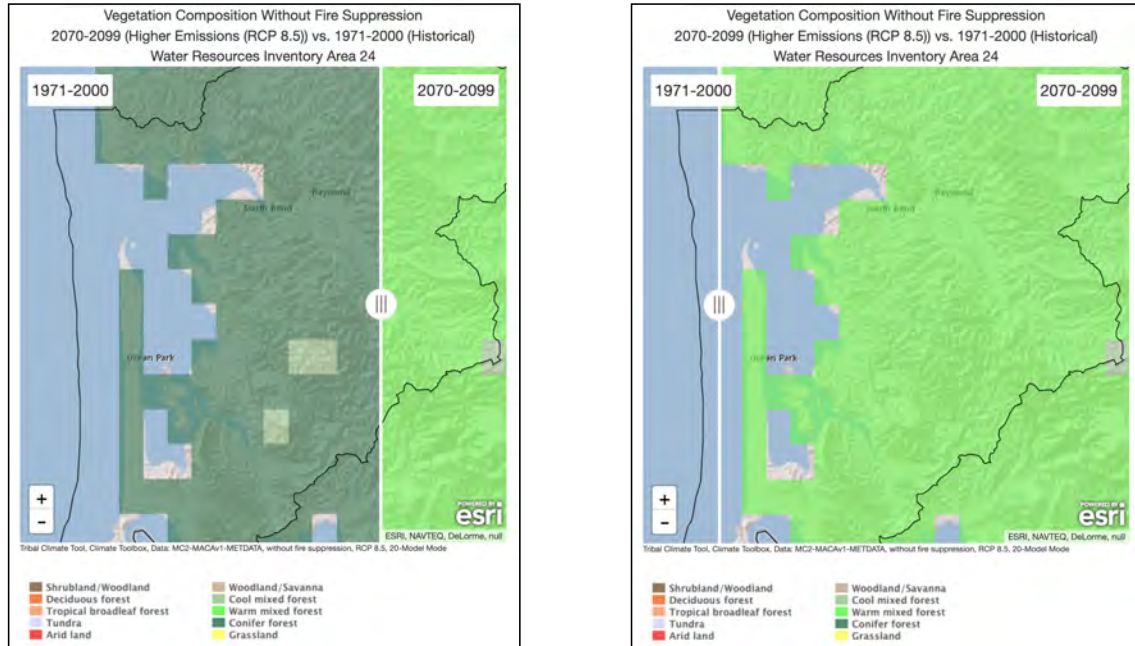
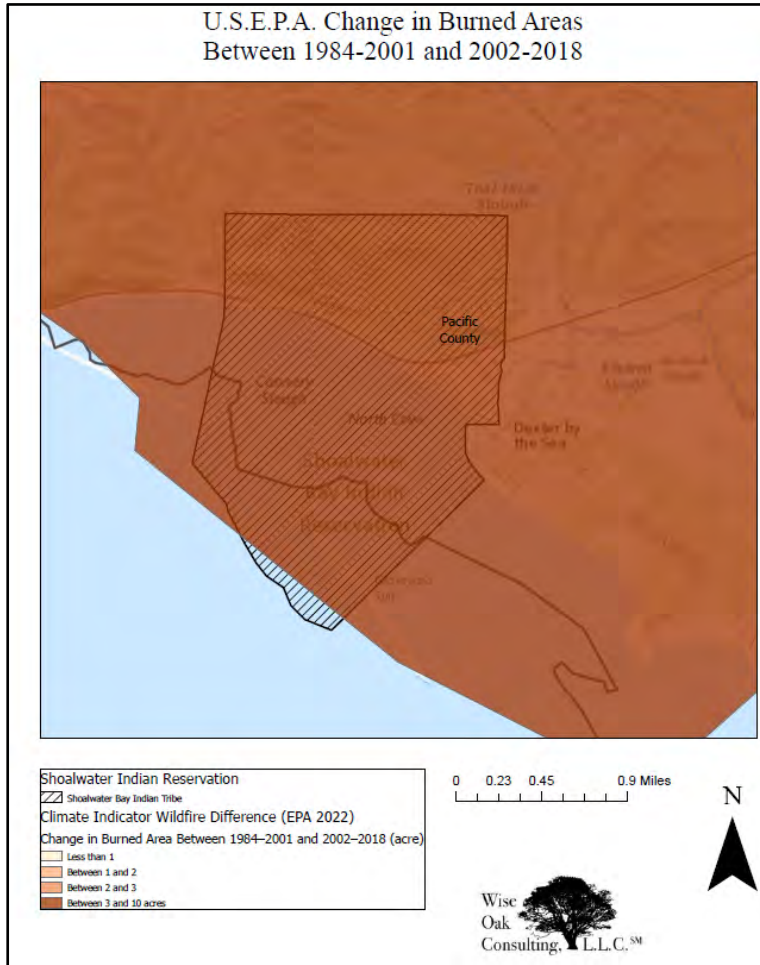


Figure 25. Projected Vegetation Change for RCP 4.5. (University of California Merced 2024)



Of significance to the Tribe as it relocates into the Willapa Hills, is the potential for wildfire. With the expected increase in temperatures, decrease in summer precipitation and streamflow and change in vegetation, the U.S.E.P.A. assesses an increase in acres burned as a proportion of the total State of Washington land based on a comparison between wildfires in 1984-2001 and 2002-2018 (Figure 26). With expected rising temperatures and less summertime water for vegetation, the Tribe can expect an increase in future wildfires.

**Figure 26. U.S. EPA Climate Indicator for Wildfire.**



#### **4. Previous Occurrences on SBIT:**

As with coastal communities across the world, the Shoalwater Bay Indian Tribe has been directly impacted by the effects of climate change. Recognizing climate change as an existential threat, the Tribe is currently relocating away from its current location at sea level to the Willapa Hills.

#### **5. Probability of Future Events on SBIT:**

Climate change is a certainty. The only question is how significant it will be. As described in the introduction of this section, the planning team chose the moderate RCP 4.5 scenario and extreme RCP 8.5 scenario to estimate the extent of climate change, which are reflected in the figures in this section.

#### **6. Impact on SBIT:**

As depicted in the figures in this section, the entire reservation is impacted. The natural impacts are thoroughly depicted under “Extent” in this section. While sea level rise is detailed in another section, it is the most urgent impact due to climate change and has forced the Tribe to relocate its traditional infrastructure from sea level into the Willapa Hills. The Tribe received \$24.98 million in grant funding to construct a road with utility infrastructure that will provide access to areas for future development, including essential and government services, economic development projects, a cultural museum, and housing. However, the relocation is in its infancy and according to the Tribal treasurer has estimated that a full relocation could cost \$500 million. (Flavelle 2022)

As depicted under Extent in this section, the effects of climate change include an increase in risk to wildfire, severe storms, changes in precipitation patterns, and changes to both land and marine life.

As the Tribe relocates into the Willapa Hills, the primary direct impacts will shift from sea level rise and tsunami to earthquake, landslide, and wildfire. Because the move is largely in the planning phase, the specific impact to these hazards cannot yet be estimated and will shift as infrastructure is built, occupied and/or used.

#### **7. Vulnerability of SBIT:**

The impacts due to climate change present an existential threat to the current Shoalwater Bay Indian Reservation and have forced the Tribe to relocate from sea level to the Willapa Hills. Due to the current great transformation of the Tribe’s very land and infrastructure, it is not possible to clearly estimate the numerical vulnerability of many aspects of climate change. For example, the entire reservation is vulnerable to sea level rise, coastal flooding, coastal erosion, etc. As the Tribe

relocates, the vulnerability will shift. The number of mitigation measures that can be built into the new infrastructure will largely be determined by funding levels that are not yet known.

**Changing Precipitation:** While overall precipitation is expected to increase (Figure 21), summertime precipitation is expected to decrease (Figure 22). The greater precipitation during the winter storms will likely lead to more flooding and landslides. The increased vulnerability due to landslides will become clearer when the Tribe solidifies plans and continues construction for its relocation into the Willapa Hills. The Tribe will need to incorporate mitigation measures into its planning and construction. The expected decrease in summer precipitation (along with increased temperatures) will lead to a decrease in stream flow and increase in wildfire risk. The loss of groundwater and stream water in the warmer months will affect the agriculture and aquaculture enterprises.

**Changing Streamflow:** While wetter winters will lead to greater flooding and resulting erosion during that season, the streamflow will decrease in the summer (Figure 23). Agriculture and aquaculture will both be affected by the reduce streamflow in the growing seasons. In addition, the reduced streamflow and ground moisture in the summer will increase vulnerability to wildfire as well.

**Increased Temperature:** As temperatures increase (Figure 20), the makeup of the ecosystem will also change (Figure 24). Native flora and fauna which are historically, culturally, and financially important will be displaced by invasive species. The growing season will increase and may provide a positive impact on tribal agriculture, but the Tribe will also lose traditional practices. Increasing temperatures, along with drier summers, will lead to greater vulnerability to wildfires (Figure 26).

**Increased Wildfire:** As described throughout this section, the increased temperature; decreased precipitation, streamflow, and ground moisture; along with the relocation to a forested region, will increase the Tribe's vulnerability to wildfire. While a quantitative assessment will depend on the nature of the new infrastructure and funding available for mitigation measures, what is clear is the Tribe is trading the potential total of lands at sea level for longer survival in an ecosystem more prone to wildfire.

**Sea Level Rise.** The resulting sea level rise (addressed in another section) results in ocean water inundation first on wetlands, and then on tribal infrastructure itself.

**Increased Ocean Acidity:** The Tribe's Oyster beds could be threatened with the change in level and composition of the sea water. With acidity expected to increase with warmer ocean temperatures, the shells of the shellfish may be damaged. This may directly impact the Tribe's

oyster enterprise that could generate \$3 million per year in revenue. The wild razor clams and Dungeness Crabs may be affected as well. Approximately 10,000 people per day descend upon the beaches during the height razor clam season – 2,000 in the vicinity of the Tribe. Similarly, as many as 1,000 people per day descend upon the region during Dungeness Crab season. As tourism decreases due to the loss of the natural resources, the Tribe can expect to directly lose revenue to impacts on its oyster beds; as well as indirect losses on enterprises that the tourists use – the market, restaurant, gas station, casino, and hotel.

**8. Impact of Climate change:**

Since this section describes the impact of climate change, no additional information is included here.

## 2. *Coastal Erosion*

*“Many of Washington State’s bluffs, beaches, and estuary mouths are already eroding, which will likely increase with sea level rise.” (Washington Coastal Hazards Resilience Network 2024)*

### 1. **General hazard description as it relates to SBIT:**

As a coastal community, the Shoalwater Bay Indian Tribe has lived with the effects of both coastal erosion and deposition throughout its coastal existence. Coastal erosion is the loss of coastal land due to sediment being moved by various forces – water, wind, ice, or gravity. The opposite effect is when sediment or woody debris that have been moved from another location are deposited and create and create new landforms or topography – coastal deposition. The causes of coastal erosion and deposition include:

- **“Longshore currents** – when ocean currents move parallel to shore, they move water and materials along shorelines. Sections of shoreline where materials are transported from a source area to a deposition area are called “drift cells.”
- **Storms** – high-energy waves and extreme water levels can erode the land and affect how material moves within drift cells, streams, and other coastal waterways.
- **Flooding** – inundation can carry away sediment, redistributing it elsewhere. Conversely, river flooding can carry sediment to the coast, leading to deposition.
- **Sea Level Rise** – as water levels increase, tides and high energy waves may reach further inland, potentially causing erosion in new places.
- **Human Activities** – shoreline development, shoreline armoring (such as riprap—large rocks—and bulkheads—wood, concrete, or metal walls), removal of vegetation, recreation (such as hiking on sensitive bluffs or boating with large wakes), and other activities can increase the rate of erosion in a given location.” (Washington Coastal Hazards Resilience Network 2024)

### 2. **Extent:**

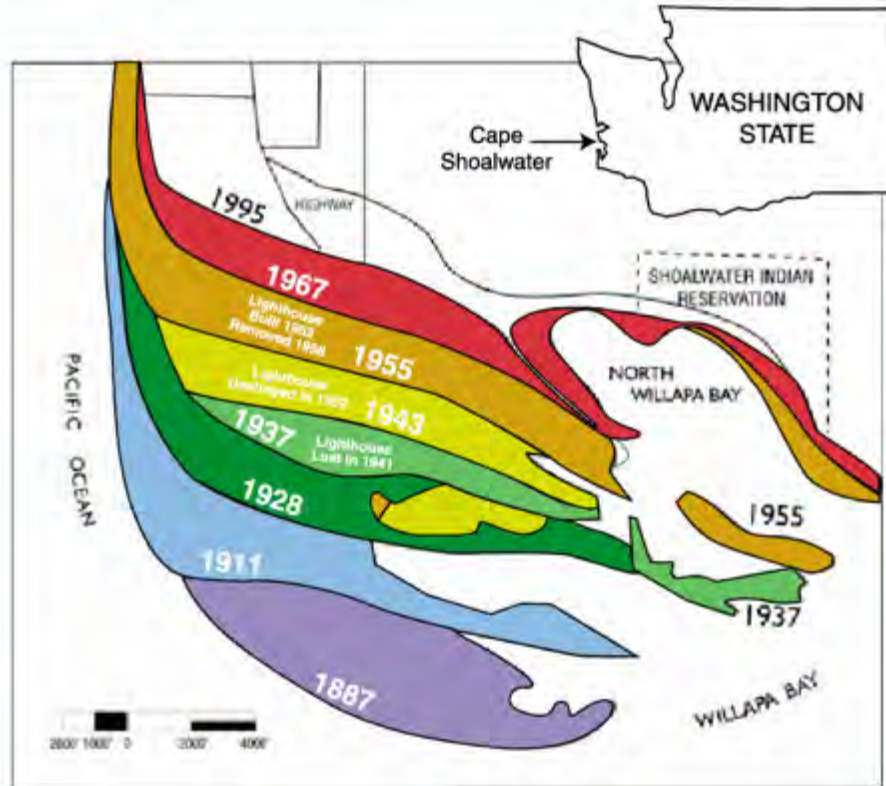
The southwest Washington Coast has been a major erosion hotspot in the United States for the past century. Erosion along Washington's southwest coast is affected by jetties, dams, sediment supply, geologic history, wave action, and weather.

- **Jetties caused beaches to grow and possibly erode** Jetties have influenced accretion and possibly erosion patterns on the beaches over distances of 12 miles (20 kilometers) or more.

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- **Dams on the Columbia River have reduced the sand supply** Dams on the Columbia River have reduced the sand supply to coastal beaches by two thirds.
- **Beach growth has slowed** Accretion rates along the coast have slowed dramatically over the past few decades.
- **Beaches that once grew rapidly are now eroding** High rates of erosion are occurring along sections of beach that previously grew most rapidly.
- **El Niño impacts the shoreline** El Niño, a recurring atmospheric phenomenon, can bring higher sea levels, intense storms, and extreme high waves from the southwest.
- **Earthquakes hit Washington's coast** Large earthquakes in the past caused the coast to sink 3 to 6 feet suddenly (1 to 2 meters).
- **Columbia River sand-built beaches and barriers** Supplied by sand from the Columbia River, beaches on the Long Beach Peninsula grew for 4,000 to 5,000 years.

Washaway Beach and Empire Spit at Cape Shoalwater is the most rapidly eroding beach on the U.S. Pacific Coast (Figure 27). The Cape has been eroding an average of 100 feet year for the last century. At one time Cape Shoalwater provided protection to shallow North Cove and its excellent clamming, and the Shoalwater Bay Reservation on the landward side, from the full onslaught on winter storms and waves. Today Cape Shoalwater Spit is gone, North Cove has filled-in with invasive spartina grass, and the remaining Graveyard Spit and tide/marshlands serves as the only barrier for the Reservation from the ocean.



**Figure 27. Historic Erosion at Cape Shoalwater Washington from 1887 to 1995. (U.S. Geological Survey 2000)**

### 3. Previous Occurrences on SBIT:

As described in “Climate Change,” the Shoalwater Bay Indian Tribe is already adapting to the impact of climate change as it is relocating from the coastal flatlands into the Willapa Hills due to sea level rise and coastal erosion.

During the early 1900s, Cape Shoalwater, a massive spit, began eroding rapidly. Between 1890 and 1965, the cape eroded 12,303 feet (3750 meters) at about 124 feet per year (37 meters).

During the 1920s, in the nearby town of North Cove, over 30 homes were claimed by erosion or relocated. In the years that followed, erosion destroyed a lighthouse, a life-saving station, a clam cannery, a school, and a Grange Hall. Erosion also forced the relocation of a cemetery and State Highway 105. In recent decades, erosion has destroyed 20 homes, private property, and part of the Willapa National Wildlife Refuge.

The Shoalwater Reservation has had a history of flooding and storm damage which was further exacerbated by coastal erosion. On March 3, 1999, a combined storm and high tide caused severe

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flooding of the Shoalwater Reservation shoreline and surrounding community. The Reservation also experienced severe flooding and debris damage from winter storms in February 2006 and December 2007. The flooding is believed to be a direct result of the erosion and breaching of the barrier dune on Empire Spit that fronts the Tokeland Peninsula.

The beach continues to erode, and the Washington State Department of Transportation (DOT) and US Army Corp of Engineers (USACE) have implemented mitigation measures to reduce its hazard. The Washington State DOT implemented Erosion control measures in 2015 and 2017 on State Route 105 northwest of the reservation to prevent its erosion.

The USACE published a study in July 2009 titled, “Shoalwater Bay Shoreline Erosion, Washington Flood and Coastal Damage Reduction: Shoalwater Bay Indian Reservation.” (U.S. Army Corps of Engineers 2009) In the study, the USACE noted that as the barrier dune on Graveyard Spit has eroded, the Tribe’s North Cove embayment has seen an increase in damaging waves and coastal storms. The resulting deposition of woody debris and sand has degraded the intertidal habitat. As a result, the Tribe has lost as well as valuable clam beds and other tidal natural resources.

In addition to the deposition harming the intertidal habitat, the increased wave energy and coastal storms have increased flooding and erosion of Shoalwater Reservation uplands during storm events during periods of extreme water levels. The increased impact is due to storms over washing the eroded barrier dune on Graveyard Spit that fronts the Shoalwater Reservation. (U.S. Army Corps of Engineers 2009)

“Winter storms in 1998-1999 caused two breaches to form in the barrier dune, resulting in storm wave run-up and flooding of shoreline areas where tribal development is concentrated. To provide partial protection to the Tribal Center, a 1,700-foot-long shoreline flood berm was constructed in 2001 by the Corps. In December 2007, a 300-foot extension of the flood berm was constructed by the Corps. Six of the twelve extreme water levels recorded since 1973 have occurred since 1999. Coastal storms that coincided with these extreme water levels in March 1999, December 2001, February 2006, and December 2007 resulted in significant erosion and storm wave overtopping of the barrier dune, some erosion of the shoreline, and flooding of tribal uplands.” (U.S. Army Corps of Engineers 2009)

The USACE determined that dune restoration was the most appropriate long-term solution and constructed a barrier dune on Graveyard Spit in 2013 (sometimes the name Empire Spit is used) in 2013 to protect the Shoalwater Bay Reservation, which needed to be repaired and expanded in 2018.

#### **4. Probability of Future Events on SBIT:**

As with climate change, coastline erosion is a certainty as it is a natural force. Unfortunately, climate change creates multiple factors that exasperate the coastal erosion such as sea level rise and stronger and more frequent storms. The Tribe, in concert with partners such as the USACE, can expect to continuously manage the barrier dunes and seawall.

#### **5. Impact on SBIT:**

The impacts to the Shoalwater Bay Tribe from the erosion of Cape Shoalwater have been severe. The biggest impact from coastal erosion is loss of the barrier beaches which could buffer the inundation and velocity of a tsunami. As described multiple times in this Plan, the most significant impact is that the loss of land has caused the Tribe to relocate into the Willapa Hills. Coastal erosion results in the loss of protective barrier beaches that protects the Tribe's lands from storm surges, flooding, and debris. Although the 1,700-foot berm constructed in 2001 and extended by 300 feet in 2007 and has generally served its purpose in mitigating flooding, the increasingly severe storms result in flood water overtopping the berm.

The erosion of Washaway Beach/North Cove have also led to the loss of valuable clam beds and tidal marsh. Invasive spartina grass has taken root in the remaining lands.

Erosion has also continued to impact the tribe's only road north, SR 105. The Washington State DOT implemented erosion control projects for the road in 2015 and 2017 in order to maintain the viability of the road and allow access north to Westport.

#### **6. Vulnerability of SBIT:**

Again, the loss of land and risk due to other coastal hazards has out the entire Reservation at risk and has resulted in the relocation of the Tribe.

#### **Buildings and Infrastructure**

Although the Tribe's buildings and infrastructure are not directly vulnerable to coastal erosion per se, continued erosion of Graveyard Spit and North Cove increase the impacts from storm surge and debris. Structures most vulnerable are those adjacent to the shoreline, such as the Tribal Center, Georgetown Station store/offices, Tradewinds Hotel, and buildings/homes in the Dexter-by-the-Sea community.

#### **Economic Assets**

Storm surge and debris could potentially affect the Georgetown Station, which is located adjacent to the protective berm, as well as the Tradewinds Hotel. As described above, erosion and resulting



deposition at Cape Shoalwater destroyed intertidal habitat and the clamming industry. Continued erosion threatens any potential for revitalization of this industry at North Cove. Of note, the Willapa Bay Enterprises planned oyster beds are put at immediate risk.

### **Natural Resources**

Erosion has destroyed acres of the Tribe's tidal lands, as well as critical habitat located within it. The remaining land has been overtaken by invasive spartina cordgrass, which "out competes native plant species, including rare and endangered plant species, reducing marsh biodiversity and ecology functions" (Washington Invasive Species Council 2024)

#### **7. Impact of Climate change:**

Two main factors that drive erosion are water and wind. Climate change creates more severe and frequent storms, along with the resulting increase of waves, floods, and winds. Climate change causes greater coastal erosion not just during storms but the ongoing wave and wind action. "El Niño winter storms contributed to storm surge, large waves, coastal erosion, and flooding in low-lying coastal areas." (Barnard 2017) Along the coast, severe winter storms and strong El Niño events are projected to occur more often.

### 3. *Earthquake*

*“Washington has the second highest risk in the U.S. of these large and damaging earthquakes because of its geologic setting.” (Washington State Department of Natural Resources 2024)*

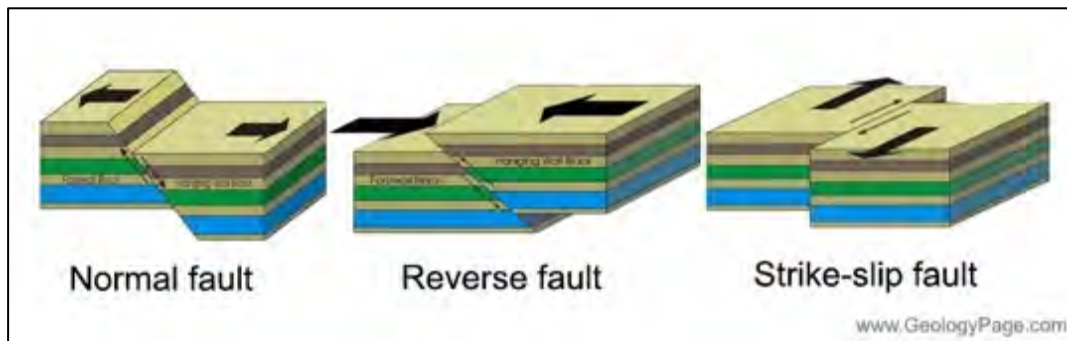
#### 1. **General hazard description as it relates to SBIT:**

While earthquakes occur nearly daily in Washington, most are too small to be felt or cause damage. While they are less common, large earthquakes can cause significant damage to infrastructure - buildings, roads, bridges, dams, utilities, etc.

Washington has the second highest risk in the U.S. of these large and damaging earthquakes because of its geologic setting. Within Washington State, its Pacific Coast is the most vulnerable, subject to intense shaking, liquefaction, land subsidence, and devastating tsunamis.

Earthquakes occur along faults which are features in the Earth’s crust where rock periodically breaks and moves, releasing seismic energy. Faults may be categorized into three types that produce different types of earthquakes – normal, reverse, and strike-slip (Figure 28). USGS scientist who studied the Willapa Bay fault zone have not been able to definitely determine if the faults are strike-slip or reverse faults. (U.S. Geological Society 2017)

The Shoalwater Bay Tribe, located on a sandy coastal plain at Willapa Bay, can be affected by Subduction Zone earthquakes and Deep earthquakes.

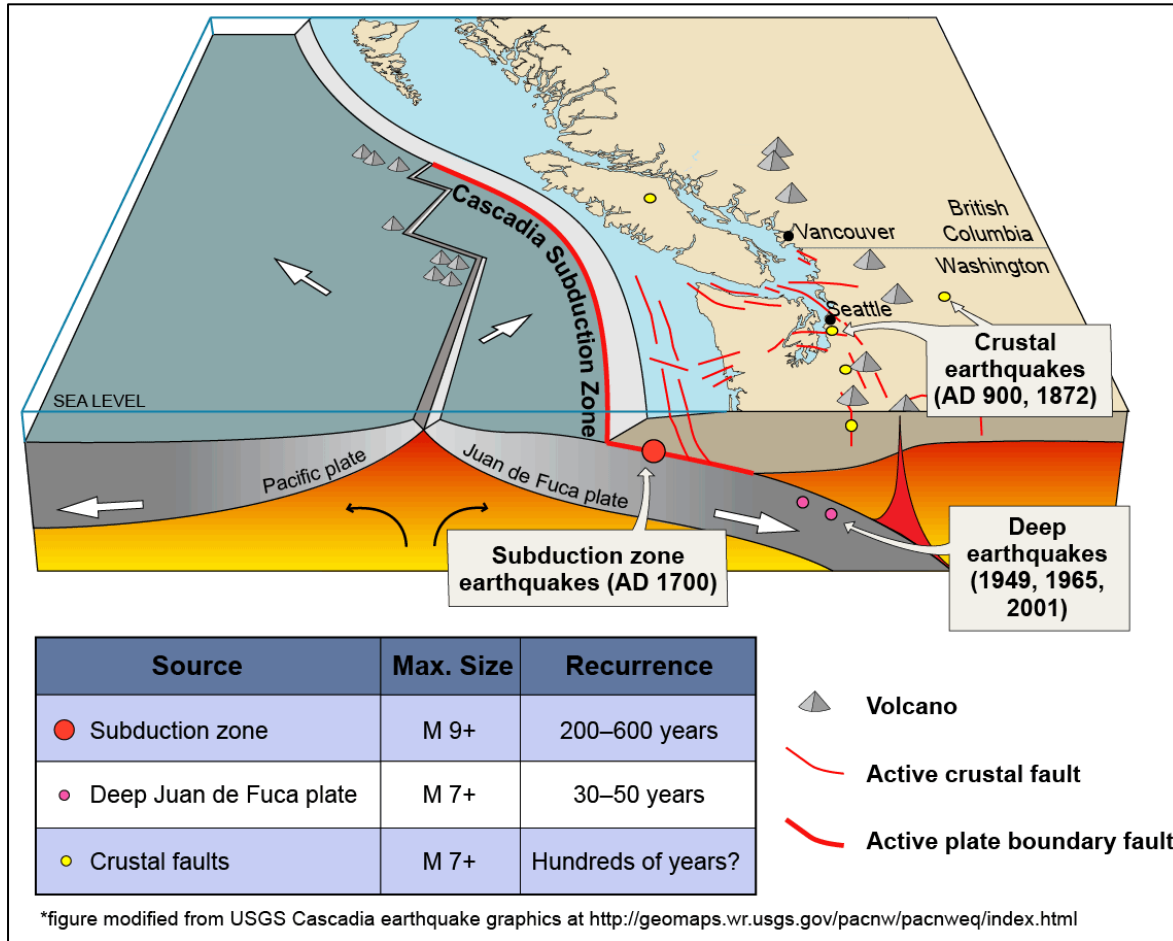


**Figure 28. Three Main Types of Faults. (Geology Page 2017)**

**Normal Faults** occur when two blocks are pulled away from each other. Because Washington is generally in compression, there are few of these types of faults in the state.

**Reverse faults** occur when two block are pushed together and one moves up and over the other. The Seattle faults is of this type and when it ruptures the south side will move up relative to the north side.

**Strike-slip faults** occur when two blocks move past each other. The San Andreas fault in California is a well-known strike-slip fault. The USGS has identified the **Willapa Bay Fault Zone** as an oblique slip fault. (State of Washington Department of Natural Resources 2024) However, USGS scientist who studied the Willapa Bay fault zone have not been able to definitely determine if the faults are strike-slip or reverse faults. (U.S. Geological Society 2017)



*Figure 29. Select Active and Historical Faults in Washington. (State of Washington Department of Natural Resources 2024)*

**Thrust faults** are a special kind of reverse fault in which the fault has a shallow dip. The **Cascadia Subduction Zone (CSZ)** is an example of this type of fault and is the greatest threat to the Shoalwater Bay Indian Tribe due to both the shaking and the tsunami it may generate (Figure 29).

The intensity level, shaking, and damage are often defined by the Modified Mercalli Intensity Scale (Figure 30).

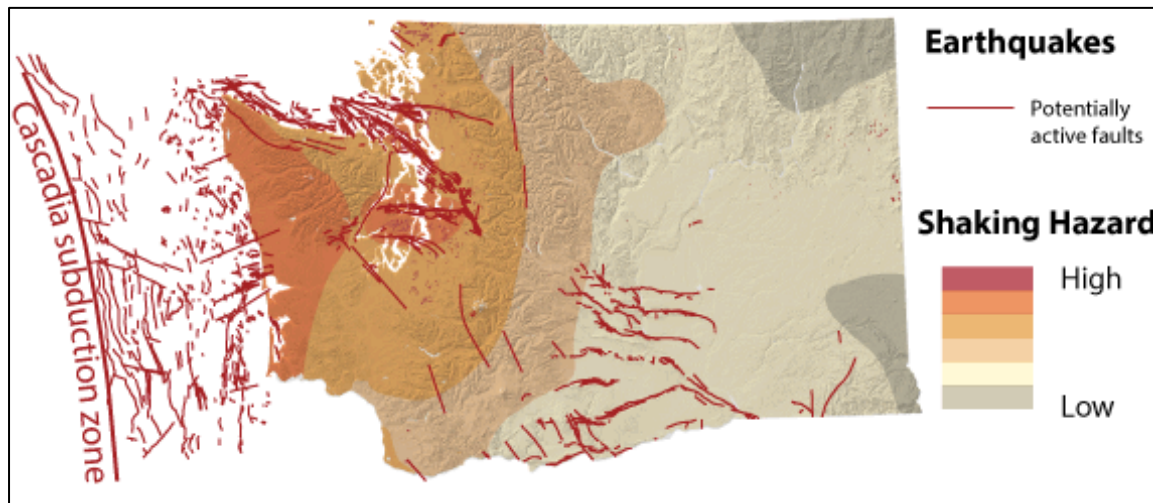
## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

**Figure 30. Modified Mercalli Intensity Scale. (Society 2024)**

### 2. Extent:

The entire Reservation is at risk of an earthquake. As depicted in Figure 31, the Reservation is impacted by a variety of other faults, including the Cascadia Subduction Zone.



**Figure 31. Potential Active Faults and Shake Intensity. (State of Washington Department of Natural Resources 2024)**

As depicted in Figure 32, the Willapa Bay Fault Zone immediately impacts the Reservation.

### Shoalwater Bay Indian Reservation Earthquake Risk

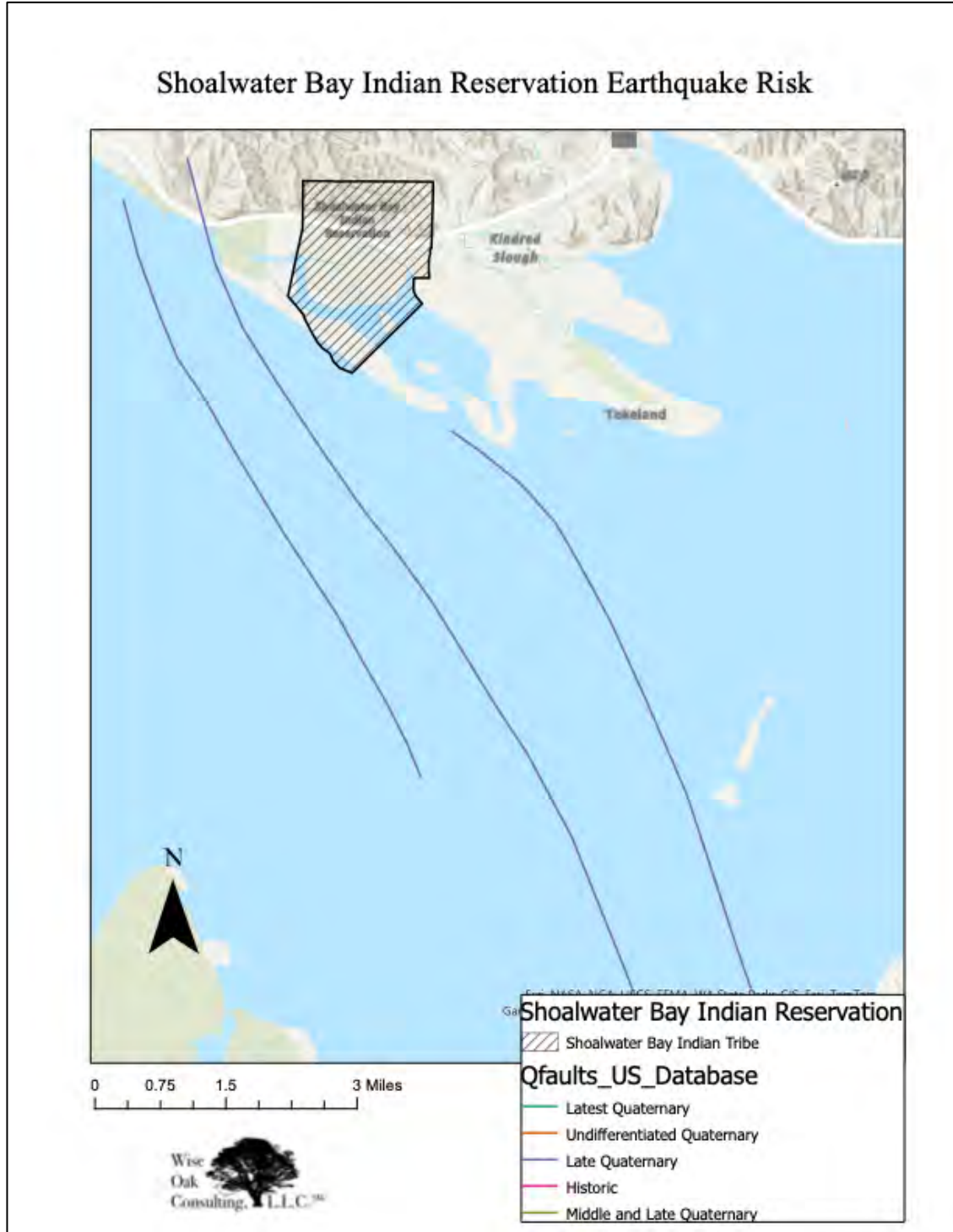


Figure 32. Willapa Bay Fault Zone.

### 3. Previous Occurrences on SBIT:

There have been numerous earthquakes experienced in the Willapa Bay area for hundreds of generations of people. This section will recount some of the past events felt here but is by no means exhaustive.

- **1700 Cascadia Subduction Earthquake:** Between 9:00 PM and 10:00 PM, local time, on January 26th, 1700, a great earthquake shook the Pacific Northwest. This quake, with magnitude estimated at 9.0, rocked the region with strong shaking for several long minutes while coastal Washington plummeted as much as 5 feet relative to coastal waters. This earthquake generated a massive tsunami that affected many of the Indian Tribe living on the coast and adjacent bays and creeks and was recorded in their folklore and histories. The tsunami generated also affected Japan.

This earthquake is used as the basis to help predict and prepare for future events.

- **1872, Entiat, WA (Chelan Co.):** On the evening of December 14, 1872, severe earthquake shaking was widely felt in Washington, Oregon, British Columbia, Idaho, Montana, and Alberta.
- **1949, Nisqually Delta Area north of Olympia:** This earthquake had a magnitude of 7.1 on the Richter scale
- **2001, Nisqually Delta Area north of Olympia:** This earthquake had a magnitude 6.8 on the Richter scale.

The Pacific Northwest Seismic Network<sup>11</sup> published a compilation of past earthquake events in Southwest Washington that was produced by Pacific County Historical Society and Museum, “Columbia River Chronology Historical Dates.”

#### Southwest Washington Earthquakes

- December 2, 1841, earthquake near Ft Vancouver Washington (*Wong and Bott p 128*)
- December 23, 1854, tsunami recorded at Astoria (*Lander p 121*)
- December 24, 1854, tsunami recorded at Astoria (*Lander p 121*)
- April 3, 1868, tsunami recorded at Astoria (*Lander p 122*)
- August 14, 1868, tsunami recorded at Astoria (*Lander p 123*)
- August 23, 1872, teletsunami recorded at Astoria (*Lander p 24, 47*)
- October 12, 1877, earthquake tremors felt in Astoria oscillating from east to west (*Daily Astorian October 13, 1877 p 1*)

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

- December 12, 1880, 2 earthquakes shocks felt (*Daily Astorian [Dec?] 14, 1880 p 3; Algermissen and Harding*)
- April 30, 1882, Severe tremors (*Daily Astorian May 2, 1882 p 3*)
- May 3, 1882, p 3 mentions that earthquake was felt in Westport and Ft Canby about 10:30 pm [on] April 30. Daily Astorian May 4, 1882, tells that 3 shocks vibrated from SW to NE on April 30.
- March 27, 1884, earthquake felt in Hoquiam (*Workman p 38*)
- November 30, 1891, slight earthquake on Grays Harbor (*Workman p 49*)
- February 2, 1892, earthquake in Astoria (*Bott and Wong p 118*)
- February 26, 1895, earthquake hits Astoria (*Daily Morning Astorian p 4*)
- August 6, 1899, earthquake hits Astoria (*Astoria Daily Budget August 8, 1899, p 4*)
- November 20, 1899, tidal wave at Shoalwater Bay (*Astoria Daily Budget November 20, 1899, p 4*)
- September 12, 1903, quake hits city (*Astoria Daily Budget p 4*)
- March 16, 1904, Earthquake felt along Washington Coast and in Aberdeen, Hoquiam (*Lander p 59, 127 not mentioned in Astoria newspapers*)
- March 30, 1904, possible tsunami off Washington coast caused flooding (*Lander p 19 not mentioned in Astoria newspapers*)
- January 11, 1909, Grays Harbor Earthquake (*Workman p 68*)
- November 9, 1920, earthquake hits Astoria (*Astoria Budget p 1*)
- November 29, 1920, slight earthquake hits Astoria (*Astoria Budget p 1*)

There have been numerous other earthquakes felt in the Shoalwater Bay area over the years. The most severe of these can be attributed to the numerous faults found in Western Washington. The most severe crustal earthquake ever felt in Washington occurred in the North Cascades area in 1872. Table 19 is a summary of large earthquakes that have occurred in Western Washington.

*Table 19: Historical Earthquakes in Western Washington.*

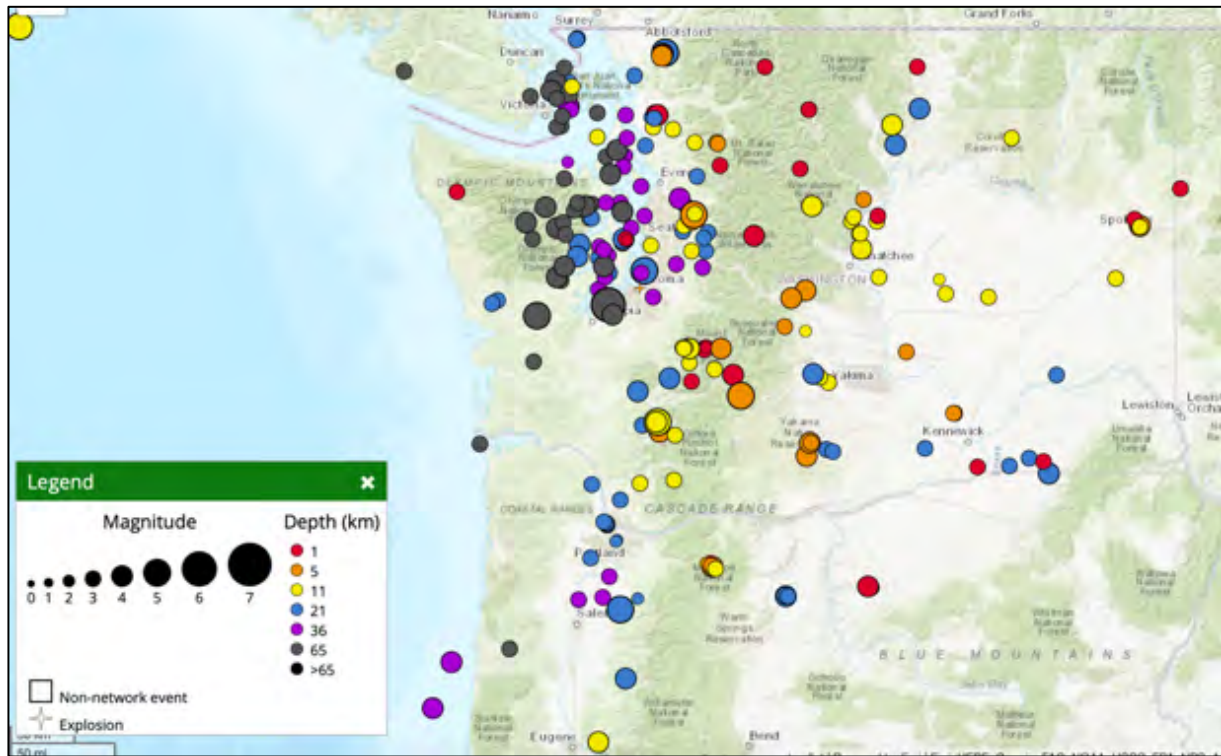
<b>Date</b>	<b>Location</b>	<b>Magnitude</b>	<b>Type</b>
<b>1872</b>	Entiat or North Cascades	6.8 or 7.4	Crustal Zone
<b>1882</b>	Olympic Area	6.0	Deep Zone
<b>1909</b>	Puget Sound	6.0	Deep Zone
<b>1915</b>	North Cascades	5.6	--

*Table 19: Historical Earthquakes in Western Washington.*

<b>Date</b>	<b>Location</b>	<b>Magnitude</b>	<b>Type</b>
1918	Vancouver Island	7.0	--
1920	Puget Sound	5.5	--
1932	Central Cascades	5.2	Crustal Zone
1939	Puget Sound	5.8	Deep Zone
1945	North Bend	5.5	Crustal Zone
1946	Puget Sound	6.3	Deep Zone
1946	Vancouver Island	7.3	Deep Zone
1949	Olympia	7.1	Deep Zone
1965	Puget Sound	6.5	Deep Zone
1981	Mt. St. Helens	5.5	Crustal Zone
1990	NW Cascades	5.0	Crustal Zone
1995	Robinson Point	5.0	Crustal Zone
1996	Duvall	5.6	--
1999	Satsop, Grays Harbor Co.	5.6	Deep Zone
2001	Nisqually\Puget Sound	6.8	Deep Zone



While Washington is an active region for earthquakes, SBIT lies between the major offshore faults and the most active faults through the Cascades to the East (Figure 33).



**Figure 33. Notable Earthquakes. (Pacific Northwest Seismic Network 2024)**

#### **4. Probability of Future Events on SBIT:**

The Cascadia subduction zone last ruptured over 300 years ago on January 26, 1700. The average time between large earthquakes is about 535 years, but has been as little as 200 years, and more than 1,000 years.

Other faults in the region, such as the Willapa Bay Fault Zone, could be produce strong earthquakes, but it is not known at this time if there has been past activity or what magnitude a future event could generate.

#### **5. Impact on SBIT:**

Historic records and past events, previous versions of the Tribal Hazard Mitigation Plan, a review of state and county plans, as well as

As depicted in Figure 32, the Willapa Bay Fault Zone is in the immediate vicinity of the Reservation but the potential magnitude of an earthquake from these faults has not been categorized.

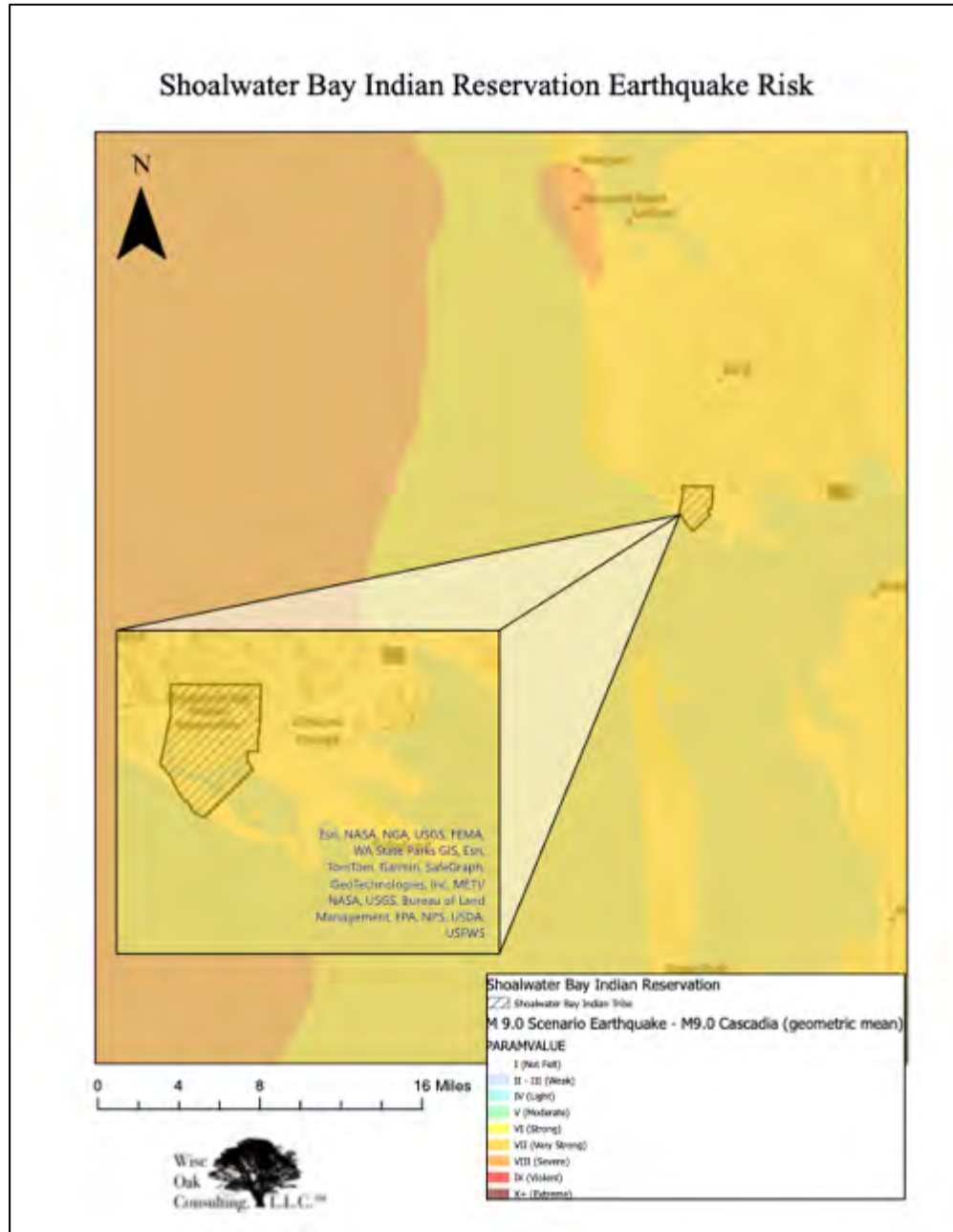
## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

A Cascadia 9.0 and Cascadia North 8.3 subduction zone earthquake will be used to discuss impacts, but it should be noted that other earthquake events would have similar, though less severe impacts. Updated HAZUS-MH analysis utilized the modelled Cascadia 9.3 event to estimate impacts.

All of the Tribe's people, property and structures would be impacted by an earthquake. Disruptions caused by power outages and loss of communications would also have economic impacts, particularly to the Tribal Casino.

All of the Tribe's buildings and infrastructure, apart from those on Eagle Hill Road, are in a "Moderate to High" Liquefaction zone (Figure 36). This could further impact structures and undermine foundations.

The primary threat to coastal communities, such as the Shoalwater Bay Reservation, is the Cascadia Subduction Zone (CSZ), and the earthquakes/tsunamis generated by its rupture. It is located about 485 miles off the coast from the Reservation. It is estimated that an earthquake on this fault can generate a magnitude 9+ megathrust earthquake. As depicted in Figure 34, the Reservation lies within an estimated Modified Mercalli Intensity Scale Level VII for an M 9.0 CSZ earthquake. Per Figures 30 and 34, the Tribe can expect to feel Very Strong shaking, resulting in, "Negligible damage in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built structures. Fall of chimneys, factory stacks, columns, walls. Heavy furniture overturned." (Society 2024)



**Figure 34. Shake Intensity for a M 9.0 Cascadia Subduction Zone Earthquake.**

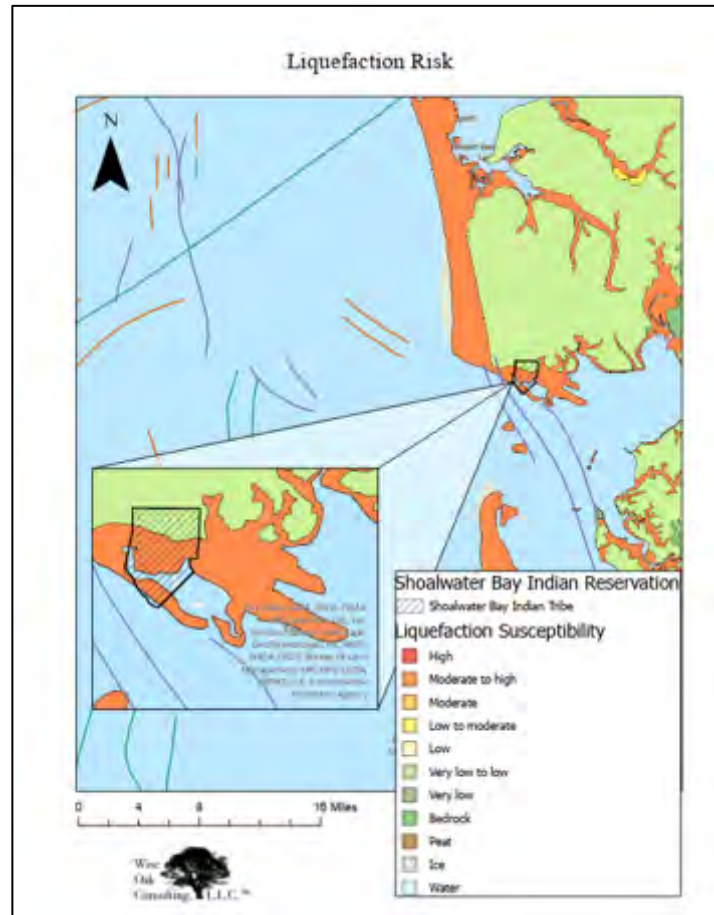
Table 20 shows the HAZUS damage estimates conducted for the 2014 plan update for an M 9.0 CSZ earthquake. Tribal Infrastructure such as the coastal berm and the engineered dune on Graveyard Spit may also suffer damage and loss of functionality due to sever shaking and liquefaction.

*Table 20: Estimated Damage to Facilities from a M 9.0 CSZ Earthquake.*

Category	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage
Tribal Facility	4.90%	35.20%	50%	9.20%	0.60%
Commercial	4.20%	34.30%	51.80%	9.10%	0.60%
Industrial	6.50%	45.50%	44.80%	3.10%	0.10%
Residential	7.50%	47.50%	42.30%	2.60%	0.00%
Average	6.60%	43.70%	45%	4.50%	0.20%

The shaking is only one of the impacts from the CSZ earthquake. The secondary hazards caused by a Cascadia Earthquake would have much more severe impacts than the earthquake itself.

- Moderate to High liquefaction will cause damage throughout the sea level lands (Figure 35).
- The coastline is expected to drop as much as 6.6 feet due to subsidence. (Cascadia Region Earthquake Workgroup 2013) This would permanently inundate all of the Tribe’s coastal properties at high tide.
- A tsunami would most likely destroy all the people, buildings, and infrastructure at sea level.
- Landslides could block SR 105, limiting access in and out of the Reservation, and prevent emergency services from accessing the area except by air or possibly boat.



**Figure 35. Liquefaction Risk.**

The tsunami and flood impacts and vulnerability to subsidence will be discussed in their respective sections in more detail.

#### **6. Vulnerability of SBIT:**

The Tribe has an estimated 108 structures as of 2019, worth about \$38 Million total. Updated HAZUS modelling, conducted in 2019, indicated increased earthquake impacts. Due to the construction of Tribal buildings, there is an 88% probability that all structures will have at least extensive damage and 66% probability that all structures will have complete damage.

The Shoalwater Bay Tribe's remote geographic location, on a flat, narrow and sandy coastal plain, with one of the world's most active subduction zone fault just offshore, makes it one of the most vulnerable communities in the nation to the impacts from an earthquake, as well as the secondary hazards of tsunami and land subsidence.

Limited governmental capabilities and economic assets also limit post-disaster response and recovery.

The populations most vulnerable to an earthquake are those with limited resources, with special needs, and the elderly. Many structures, as well as the personal property within them, may be damaged or destroyed. Vulnerable populations may rely on these structures and property after the disaster, and won't be able to utilize or replace, and will need to rely on outside help for personal needs and shelter.

Many structures, including tribal housing, are older and not built to the most current seismic standards, and thus are vulnerable to damage from severe shaking and liquefaction.

The tribe is also vulnerable to isolation from blocked roads, loss of power and communications. These systems are owned and operated by non-tribal entities, and the tribe would most likely have to wait while systems are prioritized and restored in higher population areas.

The Tribe's economy would also be affected, as the Tribe's casino may be closed or would have a significant loss of revenue while the region recovers from the earthquake. There is also concern of loss of employment by tribal members or staff as transportation and business closures prevent work and income.

Lastly, it should be noted that the secondary effects of a Cascadia earthquake, land subsidence and tsunami, is the Tribe's biggest vulnerability. Either event, or combined, would most likely make the Tribe's current development footprint on the coastal plain uninhabitable due to damage and future high tides and storm surges.

#### 4. *Flood*

*“Coastal flooding can be exacerbated by increased river flows, sea level rise, coastal storms, King Tides, or tsunamis.” (Washington Coastal Hazards Resilience Network 2024)*

##### 1. **General hazard description as it relates to SBIT:**

As is apparent in this section, various other natural hazards directly impact flooding. The greatest flood hazard is due to coastal flooding. The Shoalwater Coastal flooding occurs when low-lying land is flooded by seawater. “Multiple factors can combine to cause coastal flooding:

- Storm surge – changes in atmospheric pressure can elevate seawater levels during a storm, pushing more water toward the shore.
- Wind-driven waves – wind can push water higher and further onto land, causing coastal flooding.
- High tides and king tides – high tides can combine with other factors to cause coastal flooding. [King tides](#) are exceptionally high tides caused by one or more astronomical events.
- Sea level rise – as daily tides become higher, smaller magnitudes of storm surge, wind and other factors will result in coastal flooding.
- Increased river flows – increased river discharge (caused by changes in rainfall, groundwater storage, and melting snowpack) can combine with seawater levels to flood coastal areas.
- Tsunamis – these giant waves (caused by earthquakes and large landslides) can lead to particularly disastrous coastal flooding.” (Washington Coastal Hazards Resilience Network 2024)

Topography affects how coastal flooding occurs. Washington is a geologically varied area with steep rocky coastlines, sandy shores, bays and estuaries. The variation in our shorelines means that coastal flooding has different intensities at different locations, which is amplified by changing wind conditions.

According to FEMA’s 2013 Pacific County Flood Insurance Study, “Flooding in Pacific County occurs primarily during the winter months. In the coastal areas, the high spring tides and strong winds from winter storms that produce storm surges are responsible for coastal flooding. Heavy rains with some snowmelt produce the highest runoff flows in the winter. The storms that produce the storm surges also bring heavy rains, and, therefore, the high river flows are held basically by tides, producing the greatest flooding at river mouths, which have cumulative water levels that are sufficient to create flood hazards in the adjacent communities.

High tidal waters can also enter communities through malfunctioning tide gates on the underground storm sewer system that drains either the Willapa or South Fork Willapa Rivers. These gates occasionally become blocked open with accumulated debris. Flooding is relieved as tides recede and tide gates that hold back storm water runoff reopen.

Runoff and accumulation of precipitation are secondary source of flooding problems. The capacity of the present water drainage system is hampered by undersized culverts and conduits. During high tide periods, there is insufficient hydraulic gradient to allow precipitation runoff to drain into the river; so, it accumulates in low areas.” (Federal Emergency Management Agency 2013)

**2. Extent:**

The regions of Shoalwater Bay Indian Reservation at or near sea level location makes it especially susceptible to coastal flooding. The combination of the low-lying land and the effects of climate change make coastal flooding an existential threat – especially for tsunamis. Figure 36 depicts the 1% (100-year flood) annual chance of flooding and 0.2% (500-year flood) annual chance of flooding per FEMA flood maps. In both scenarios, the wetlands are inundated. The 500-year flood chance clearly increases along the rivers and streams.



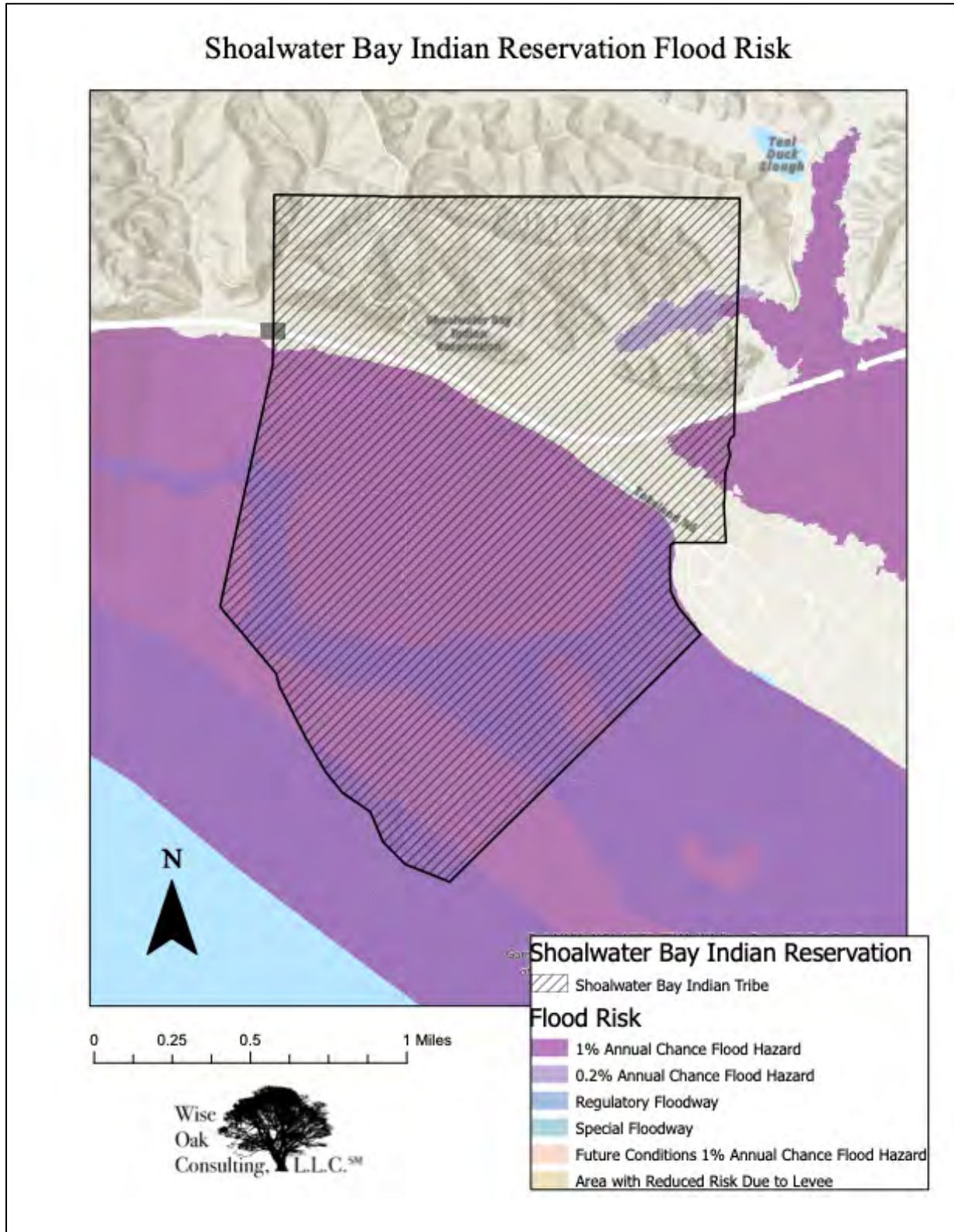


Figure 36. Flood Risk.



### 3. Previous Occurrences on SBIT:

As displayed in Figure 17 and Table 14, there have been 10 Flood and 9 additional Severe Storm (Typically included flooding) Federal Disaster Declarations in Pacific County and/or on the Shoalwater Bay Indian Reservation. Anecdotally, tribal staff have stated that water routinely tops the berm during high tides and stormy conditions.

In the 2013 Pacific County Flood Insurance Study, FEMA noted that Major coastal and tidal floods, in order of highest water, have occurred in 1934, 1933, 1973, 1969, 1967, 1972, and 1960. The flood in 1934 is estimated as having a recurrence interval of 19 years, while the 1973 flood had a recurrence interval of 10 years. (Federal Emergency Management Agency 2013) More recent events include:

- **1999 storm surge.** On March 3, 1999, a storm surge of 4.6 feet, accompanied by 49.7 mile an hour winds, caused widespread coastal flooding. Wave heights exceeded 29.5 feet for over 5 hours, peaking at 34.8 feet. At Ocean Shores, several houses were damaged and a public restroom was destroyed. This combined storm and high tide caused severe flooding of the Shoalwater Bay Reservation shoreline and the surrounding community.

The flooding prompted the initiation of a Corps of Engineers emergency flood protection planning process. As a consequence, in March 2001, the Corps of Engineers constructed a riprap flood berm along a small portion (1,700 feet) of the Shoalwater Reservation shoreline. This flood berm provides protection from direct wave attack and further shoreline erosion during combined storm and high tide events only to this portion of the Reservation shoreline, including the Tribal headquarters building.

- **February 2006 flooding.**
- **November 2007 flooding.**
- **December 2007 flooding: Disaster Declaration.**

In its report, “Shoalwater Bay Shoreline Erosion, Washington Flood and Coastal Storm Damage Reduction: Shoalwater Bay Indian Reservation,” the U.S. Army Corps of Engineers highlighted three significant historical events – flooding due to storms in March 1999, February 2006, and December 2007. For the 2006 and 2007 events, the USACE noted that the flooding on the Reservation was due to breaching of the barrier dune on Graveyard Spit that fronts the Tokeland Peninsula. At the time, the Graveyard Spit dune elevation was sufficient to prevent the worst and flooding was generally a nuisance and disrupted traffic. However, the flooding did affect the Tribal Community Center grounds, recreational vehicle parking, the casino parking lot, and portions of Old Tokeland Road. Figure 37 depicts the flooding due to the March 1999 event, which had a total water elevation of 13.61 feet mean lower low water (MLLW).

#### **4. Probability of Future Events on SBIT:**

Due to both the topography and natural forces such as the effects of climate change, future flooding events are a certainty. In its report, “Shoalwater Bay Shoreline Erosion, Washington Flood and Coastal Storm Damage Reduction: Shoalwater Bay Indian Reservation,” the U.S. Army Corps of Engineers modeled the potential for future flooding events such as that of March 1999 with and without its recommended Graveyard Spit Dune restoration and maintenance projects.

The most significant potential impacts from future coastal flooding are from the following sources:

- Continued coastal erosion to Graveyard Spit, Washaway Beach.
- Sea level rise from climate change related global warming.
  - Median probability by 2039: 0.2 feet, likely range = 0.1-0.3 ft.
  - Median probability years 2090 – 2109: 1.6ft , likely range: 0.9-2.4 ft.
- Tsunamis
- Land subsidence from an offshore Cascadia earthquake.

“Based on the deformation model for the Cascadia L1 scenario Tokeland Peninsula has 2.3-2.6 meters (7.5-8.5 feet) of subsidence. The amount of subsidence from the next subduction zone event will vary depending on the severity of the earthquake, however in the 3,500-year land-based record of earthquake subsidence the largest preserved event only approached 1.75 meters (5.7 feet). Thus, the modeled value of 2.6 meters would be a conservative value and appropriate for planning purposes”. (Ungard 2018)

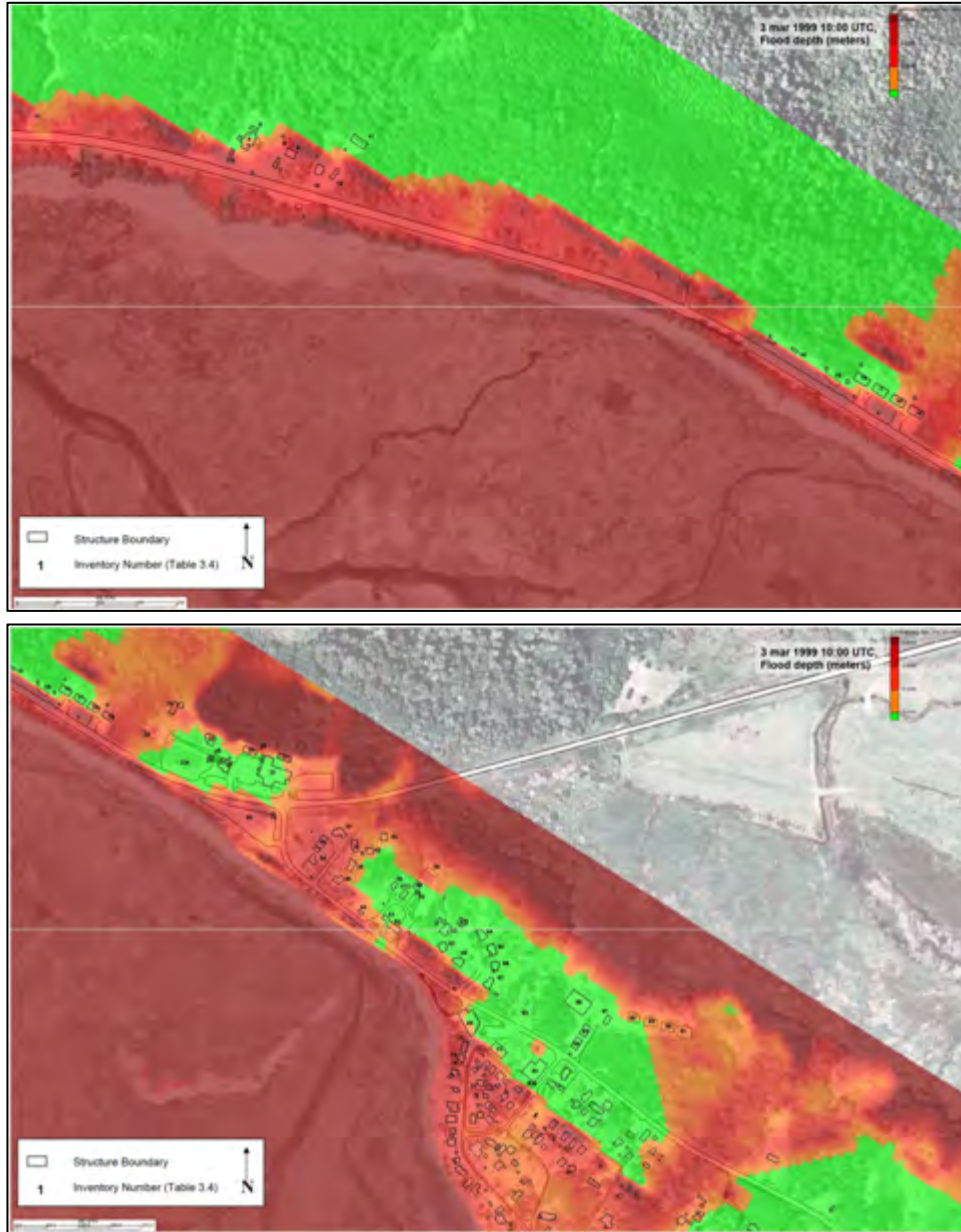
#### **5. Impact on SBIT:**

As depicted in Figure 36, flood maps show minimal impacts from coastal flooding. The 3,000-foot berm near the Tribal Center has protected the Reservation from flooding and storm surge, although water and debris may occasionally overtop the berm.

HAZUS-MH modelling indicated 4 structures exposed to a 500-year flood event: 2 homes on Toke Point, 1 home on Shoalwater Bay Drive closest to Tokeland Rd., and the Tradewinds Hotel meeting hall. Of a combined \$1.078 M in exposed assets, HAZUS estimates about \$180,000 in damage to the structures and contents.

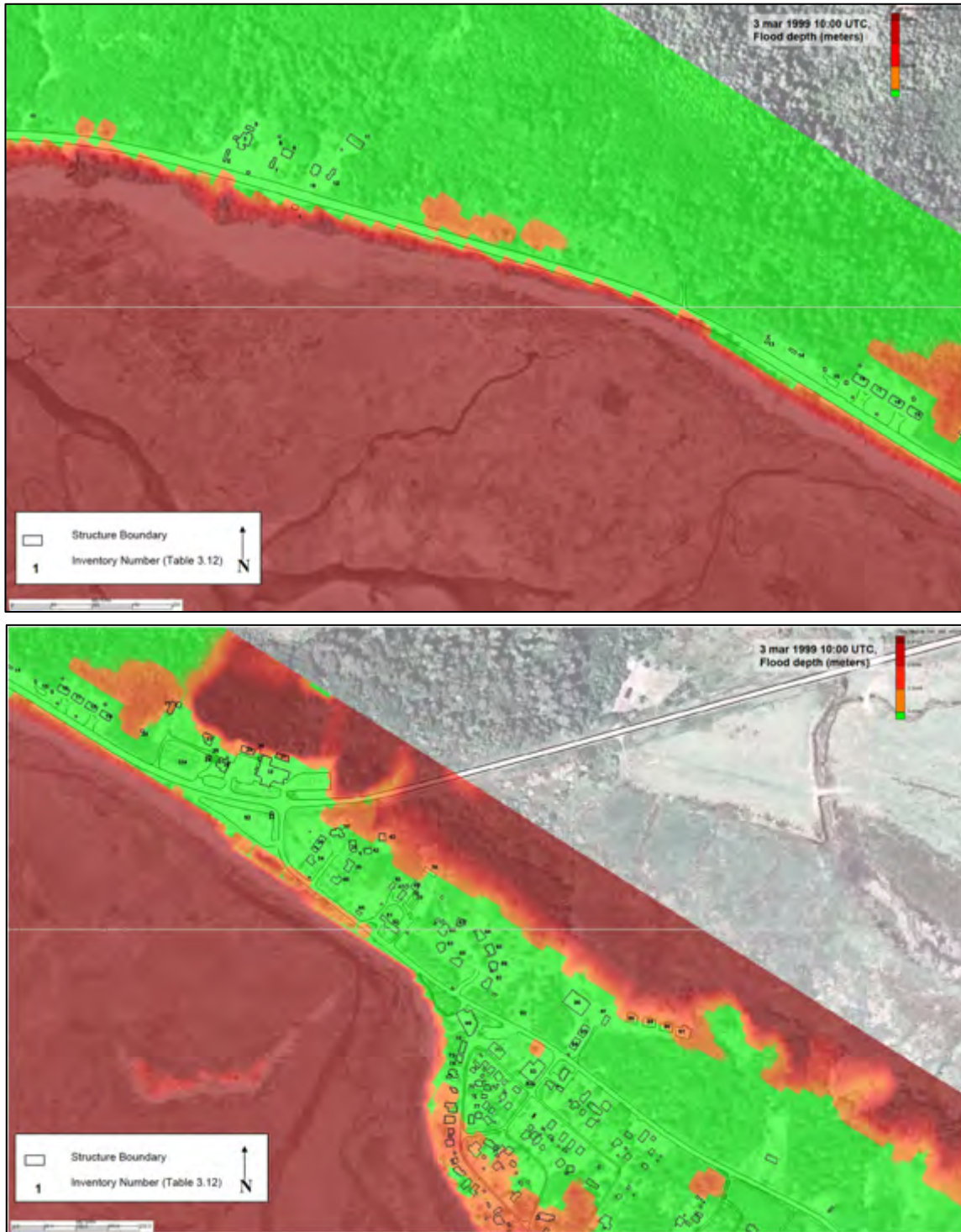
Repairs and nourishment the dune berm on Graveyard Spit in 2018 has also reduced the impacts from storm surge.

Figure 37 depicts predicted Reservation flooding without the project along State Route 105 and on Tokeland Road. Clearly, a great amount of tribal infrastructure would be at risk.



***Figure 37. Shoalwater Reservation Flooding Potential for a March 3, 1999, Storm Without the Dune Protection Project. (U.S. Army Corps of Engineers 2009, 100)***

Figure 38, on the other hand, depicts predicted Reservation flooding with the project along State Route 105 and on Tokeland Road. The berm project has moved the entire flood zone.



**Figure 38. Shoalwater Reservation Flooding Potential for a March 3, 1999, Storm With the Dune Protection Project. (U.S. Army Corps of Engineers 2009, 100)**

## 6. Vulnerability of SBIT:

The Shoalwater Bay Tribe will remain vulnerable to coastal flooding and storm surge. While current mitigation efforts help, the long-term effects of climate change will make the mitigation effort and ongoing challenge.

Longer-term, the Tribe's vulnerability will decrease as the Tribe moves its development to higher ground. This would also mitigate its vulnerability to increased flooding from coastal erosion, sea level rise, and land subsidence.

The Tribe also plans to remove the levee at Kindred Island, restoring the natural salt marsh habitat, but may also increase vulnerability from storm surge from the Kindred Slough marsh areas.

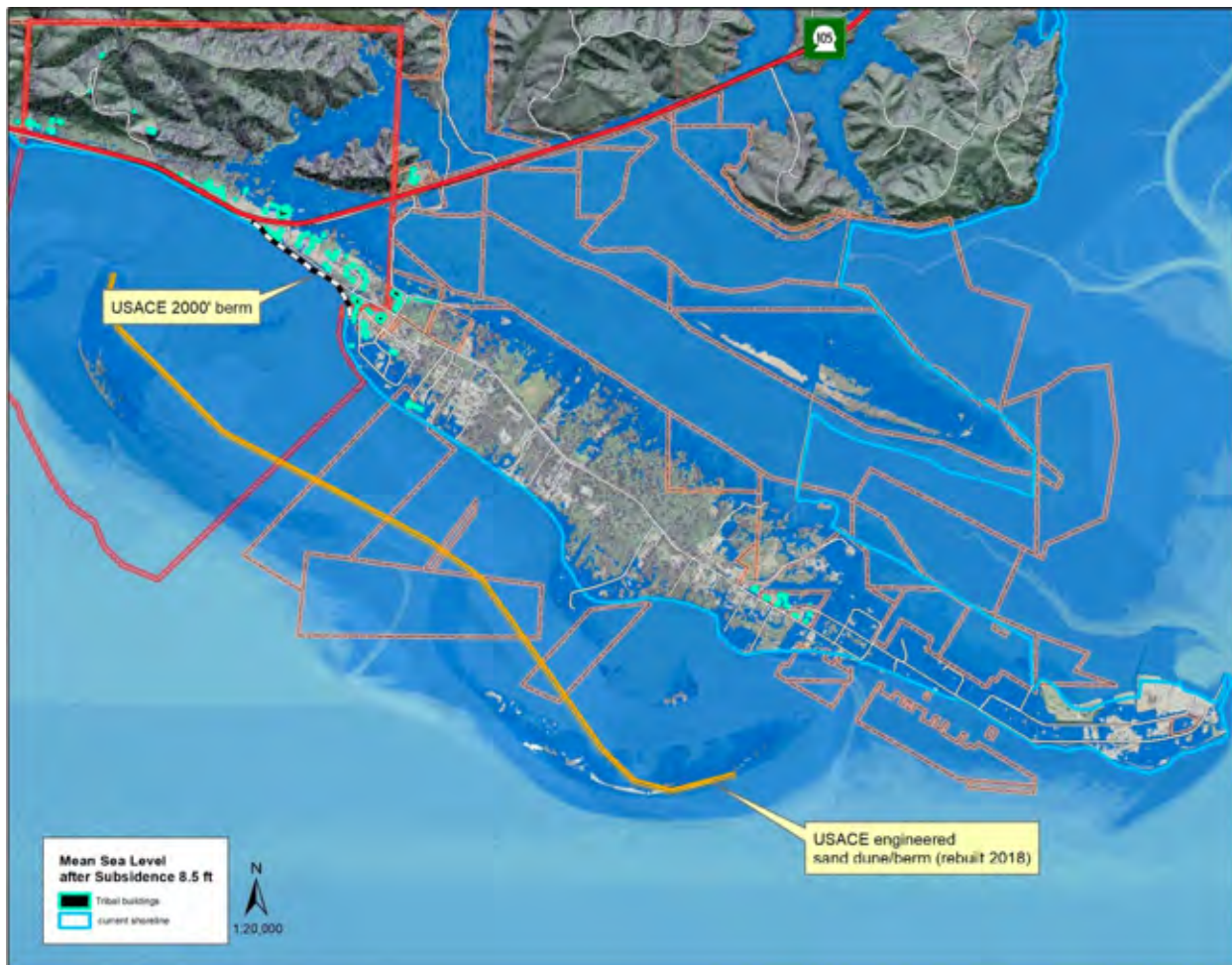
Vulnerability could increase due to four potential future conditions:

- **Continued erosion of Graveyard Spit and/or lack of monitoring and maintenance of beach barrier berm.** Although the additional beach barrier dune at Graveyard Spit (built in 2013) was successful in reducing storm surge, a strong El Nino year in 2015/16 severely damaged and breached the berm, increasing flood risk for the Reservation. It was repaired and hardened in 2018. The U.S. Army Corps of Engineers estimates that the dune berm will need to be re-nourished with sand at least every five years to maintain protection to the Reservation.
- **Deterioration of berm near Tribal Center.** The USACE-constructed berm provides the main barrier of protection from storm surge and coastal flooding. The initial 1,700-foot long was originally constructed in 2001 to protect the Tribal Center and other tribal development from flooding similar to that caused by the 1999 flood. The berm was expanded by 300 feet in 2007.  
Long-term the berm will need to be maintained. It may also need to be expanded to protect against changing conditions, such as increased coastal erosion, sea level rise or land subsidence from an earthquake.
- **Sea level rise.** Geological conditions cause the coastal area of Washington, including the Shoalwater Bay reservation, to slowly rise. This potentially mitigates from extreme sea level rise that other areas may encounter but does not eliminate vulnerability. Estimated Sea level rise with median probability ranges up to 2.8 feet by the end of the century. Newly adopted FEMA flood maps depict flood zones 3 feet above the official 100-year floodplain. This data indicates that no tribal assets are exposed at this time. Nonetheless storm surge and debris overtopping the berm may increase during storms combined with high tides.

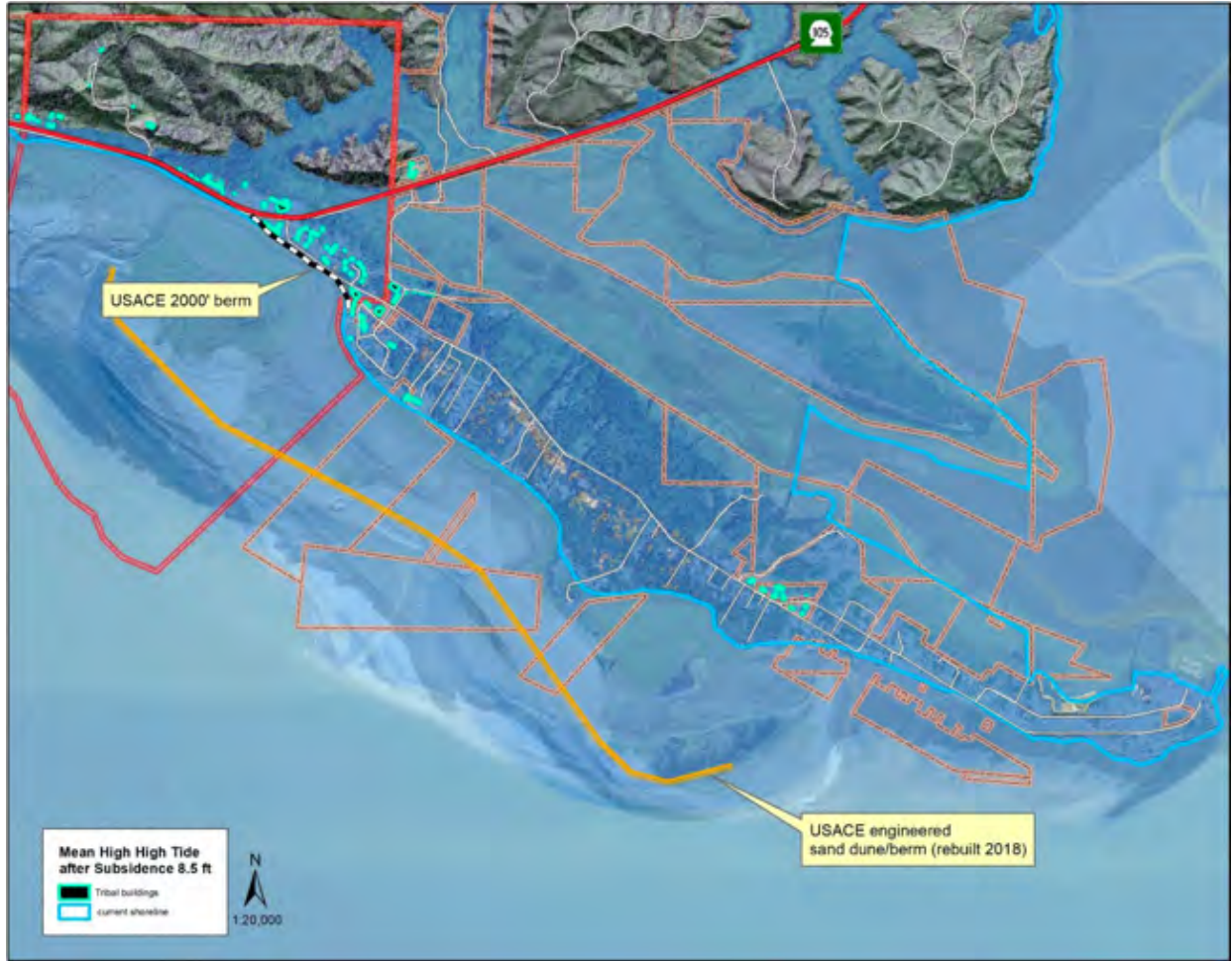


- **Land subsidence.** Following a Cascadia earthquake, the land may drop by as much as 8.5 feet. (Cascadia Region Earthquake Workgroup 2013) This would catastrophically change the Tribe’s vulnerability to flooding, as subsidence this extreme would typically inundation all the Tribe’s coastal assets during high tide. Even a lesser land subsidence would increase the Tribe’s vulnerability to flooding during high tides, as well increased impacts from storm surge. Figures 39-41 show the effect of an 8.5-foot land subsidence for mean sea level (Figure 39), mean high tide (Figure 40), and mean high tide in detail (Figure 41).

Again, coastal flooding represents an existential threat, especially for a tsunami and/or subsidence caused by a major earthquake such as the Cascadia subduction zone M 9.0 scenario. All low-lying facilities are impacted.

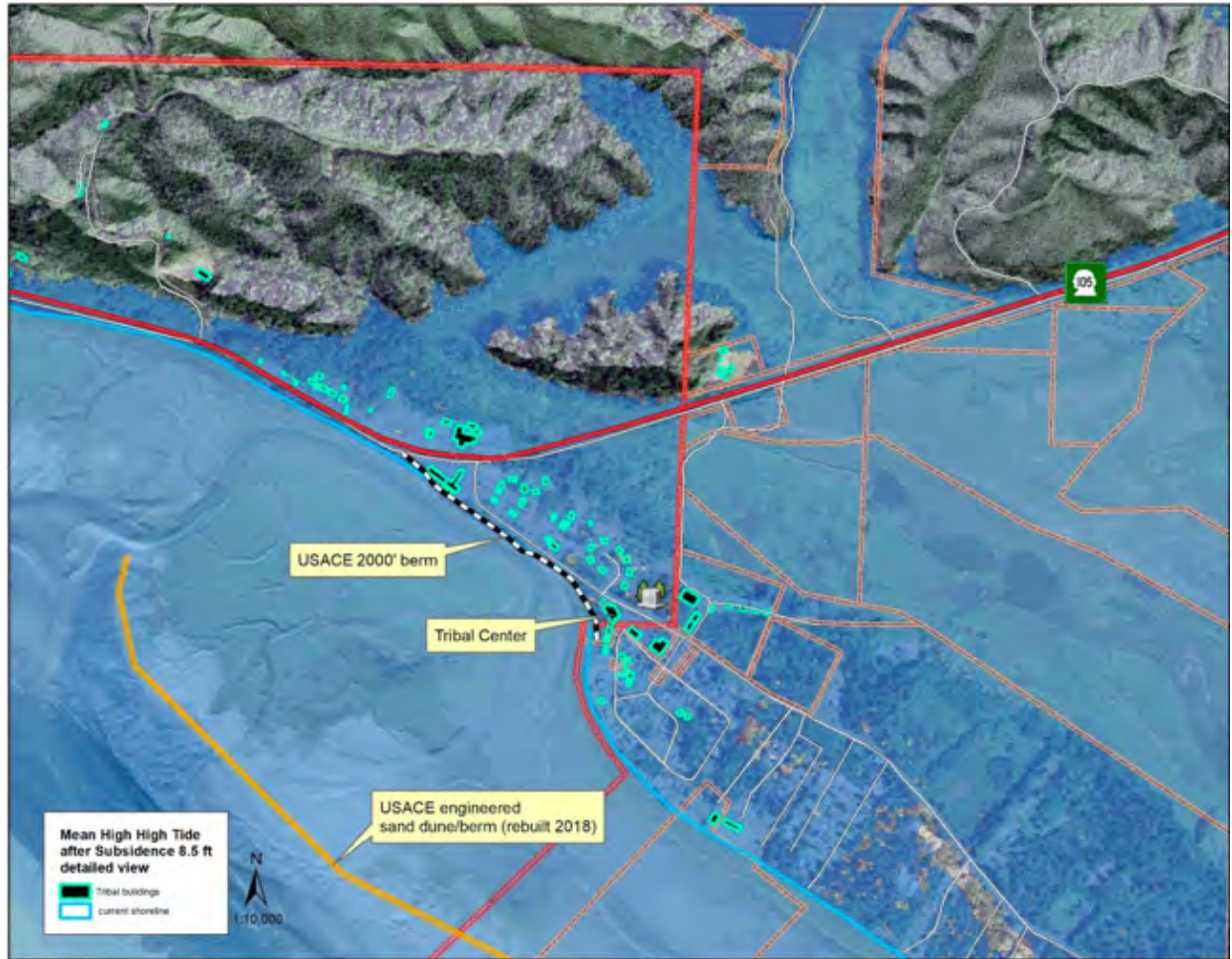


*Figure 39. Mean Sea Level After an Earthquake Subsidence of 8.5 Feet.*



*Figure 40. Mean High Tide After an Earthquake Subsidence of 8.5 Feet.*





*Figure 41. Mean High Tide After an Earthquake Subsidence of 8.5 Feet - Detail.*

### 7. Impact of Climate Change:

Overall, the Reservation can expect to see more flooding during the winter months – which are already the hazard with the largest regular impact. As described in the Climate Change section, greater precipitation during the winter storms will likely lead to more flooding and landslides. Wetter winters will lead to greater flooding and resulting erosion during that season. Sea level rise will result in ocean water inundation first on wetlands, and then on tribal infrastructure itself.



## 5. *Infectious Disease*

### 1. General hazard description as it relates to SBIT:

An infectious disease (aligns with the Nation Risk Index hazard Pandemic) that appears suddenly or presents in greater than normal numbers for a particular location is considered an outbreak. An infectious disease that occurs in greater than normal numbers in several communities or that crosses geographical boundaries is considered an epidemic. The same infectious disease that involves a large population in several countries or continents is considered a pandemic. The use of these terms is somewhat subjective and frequently used interchangeably. Infectious diseases emerge, suddenly or gradually, in various environments, and may spread across a region or even the world. If the disease was previously unknown, then the disease is said to be a *novel disease*. If the disease had never occurred in the region before, it is considered a virgin soil outbreak. If the disease is continuing to spread, or rapidly increasing in incidence or range, it is considered an emerging disease.

These terms are used to illustrate the number of occurrences, size, or scope of the disease impact and the healthcare sector's familiarity with the disease; the terms do not indicate the virulence, mortality, or morbidity of a particular illness. Epidemics are described as contemporary health catastrophes by the World Health Organization (WHO). Epidemics are commonplace in the world. According to the WHO, every country on earth has experienced at least one epidemic since the year 2000. Some epidemics such as the H1N1 (2009), SARS, Ebola and, COVID-19 have developed into pandemics with a global reach, but far more often epidemics strike at lessor geographic levels causing loss of life and livelihoods on a more regional or local level.

Although epidemics and outbreaks of disease have traditionally been associated with disease caused by infectious agents, in the second half of the 20<sup>th</sup> century the term epidemic has also become associated with non-infectious disease such as obesity and diabetes, or disease caused by lifestyle and environmental factors such as smoking-related heart disease and cancer clusters. In this plan, we will address only epidemic disease caused by infectious agents.

The impact of outbreaks of pathogens on communities differs depending upon the disease, the population of the community, the age of the primary targets, socio-economic situation of the community affected and the public health and medical response capabilities of the affected community. For example, 100 cases of meningitis across Las Vegas may be a concern, but 10 cases of the same meningitis may close the entire school system in Fallon. Four deaths from an infectious disease may not stretch public health resources in Reno but may create an emergency in Yerington.

“Epidemics almost always produce unanticipated questions and novel problems which are likely to vary over the course of the outbreak. Recognizing these problems when they arise and formulating effective responses requires adequate and timely situational awareness.”<sup>2</sup> “There is an observable pattern of indicators associated with the demand placed on healthcare and public health infrastructures by routine versus non-routine infectious disease. Indicators of a health security crisis evolve as the extent of the impact to a given community change from that of an event to crisis to disaster. Different patterns of indicators are associated with different types of infectious diseases (e.g., respiratory disease versus mosquito-transmitted disease) and some indicators are considered critical and especially characteristic for health security crisis and cannot be missed due to the potential for high consequences.”<sup>3</sup>

Disease outbreaks and epidemics are not confined to human populations. Diseases such as hoof-and-mouth disease and mad cow disease, if introduced into the livestock population, could decimate the beef industry for decades. In the past, global pandemics involving avian influenza and birds have also occurred.

Pandemic influenza and other emerging diseases present a major threat to life, economies, and security in an increasingly globalized world. The impact of disease epidemics has increased dramatically as the world becomes ever more interconnected. In the past 25 years, emerging diseases have included: HIV/AIDS, Hepatitis C, Ebola, Lyme disease, Hantavirus, SARS, MERS, COVID-19, Enterovirus D68 Ebola, and Chikungunya virus. Additionally, some “old-school” diseases are now re-emerging as the disease becomes resistant to anti-microbial medications and vaccines. These diseases include things such as: measles, TB, pertussis (whooping cough) and bacterial pneumonia. Trade, commerce, and financial markets are increasingly interrelated.

Some challenges presented by epidemics:

- Epidemics associated with emerging and re-emerging infectious diseases are now occurring in historically unprecedented numbers.

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<sup>2</sup> iqt. “Roundtable Report: Identifying, Collecting and Analyzing Actionable Intelligence in an Outbreak Event.” January 2023. [https://assets.iqt.org/pdfs/IQT\\_Public\\_Health\\_Data\\_Roundtable\\_Report\\_Jan\\_2023\\_Final.pdf/web/viewer.html](https://assets.iqt.org/pdfs/IQT_Public_Health_Data_Roundtable_Report_Jan_2023_Final.pdf/web/viewer.html)

<sup>3</sup> Wilson, J.W., Lake, C., Matthews, M., Southard, M., Leone, R., McCarty, M. “Health security warning intelligence during first contact with COVID: an operational perspective.” *Intelligence and National Security* 37, no. 10 (2022) 216-240.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

- Inconsistent leadership and politicization of a health crisis creates considerable obstacles to emergency response and efforts to unify public trust<sup>2</sup>.
- Warning operations are not specifically funded<sup>2</sup> limiting maintenance of “warm” capabilities and public health and healthcare resources have to acquiesce to the “panic and neglect” cycles that characterize grant funding<sup>1</sup>.
- Public health and hospital systems are weak in many areas and vulnerable populations are further stressed by social determinants of health.
- Climate change is believed to be contributing to emerging diseases progressing into new geographies such as Zika, Chikungunya, and other vector borne diseases.

### 2. Extent:

Pandemic and infectious disease events cover a wide geographical area and can affect large populations, potentially including the entire population of the State of Washington. The exact size and extent of an infected population is dependent upon how easily the illness is spread, the mode of transmission and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in denser areas where there are large concentrations of people. The transmission rate of infectious disease will depend on the mode of transmission of a given illness.

The magnitude of a pandemic or infectious disease threat in Washington will range significantly depending on the aggressiveness of the virus in question and the ease of transmission. Pandemic influenza is easily transmitted from person-to-person, but advances in medical technologies have greatly reduced the number of deaths caused by influenza over time – until COVID-19. As highlighted in Table 21, in terms of lives lost, the impact various pandemic influenza outbreaks have had globally over the last century declined. But despite the unprecedented rapidity in which a vaccine was developed, the world saw the most deaths from a novel virus since the 1981 Spanish Flu.

*Table 21. Significant Outbreaks of Influenza over the Past Century.*

Date	Pandemic Name/Subtype	Worldwide Deaths (Approximate)
1918-1920	Spanish Flu / H1N1	50 million
1957-1958	Asian Flu /H2N2	1.5-2 million

*Table 21. Significant Outbreaks of Influenza over the Past Century.*

<b>Date</b>	<b>Pandemic Name/Subtype</b>	<b>Worldwide Deaths (Approximate)</b>
<b>1968-1969</b>	Hong Kong Flu / H3N2	1 million
<b>2009-2010</b>	Swine Flu / A/H1N1	151,700-575,400 (as of April 2010) *
<b>2019-2024</b>	COVID-19	7 million**

\*The range in fatalities is due to the underreporting of deaths in third-world countries, and the WHO has acknowledged that official, lab-confirmed reports are an underestimate. Source: Global Security, 2009; WHO, 2009

\*\*As of April 2, 2024. (World Health Organization 2024)

Quite simply, infectious disease outbreaks can affect the entire Reservation, but also the State, Nation, and the World as a whole. Due to the tourists that frequent the beaches as well as Tribal enterprises, the Shoalwater Bay Indian Tribe can expect to be affected by general infectious disease outbreaks that cover the entire reservation.

### **3. Previous Occurrences on SBIT:**

An infectious disease outbreak, whether a secondary effect of natural hazards, or spread from nature, can have devastating impacts on Native communities. Specifically, the Shoalwater Bay Indian Tribe’s ancestors in the lower Colombia River region were nearly wiped by epidemics in the late 18<sup>th</sup> century and throughout the 19<sup>th</sup> century, and possibly impacted by earlier outbreaks. The worst disease outbreaks include smallpox, malaria, and measles. Epidemics of Influenza, dysentery, yellow fever, bubonic plague, typhoid fever, cholera, and whooping cough also caused many deaths. As with the nation and world as a whole, SBIT was impacted by COVID-19. The 1918 Spanish Flu had a 50% morbidity 10% mortality rate that infected 500 million people worldwide and killed 50 million – 675,000 in the U.S. (Centers for Disease Control and Prevention n.d.) Despite the advances in healthcare, especially in preventing and treating flu viruses, a novel influenza outbreak remains a serious hazard. The healthcare community still needs to be able to produce more broadly effective vaccines much quicker. In addition, vaccine distribution; cheaper and more effective treatments; and better surveillance of animal viruses are needed.

In 2009, the public health community focused on, and developed vaccines specifically for, an expected avian virus (H5N1) outbreak. Instead, there was an H1N1 outbreak. The World Health Organization declared a pandemic as H1N1 rapidly spread around the world. In the United States,

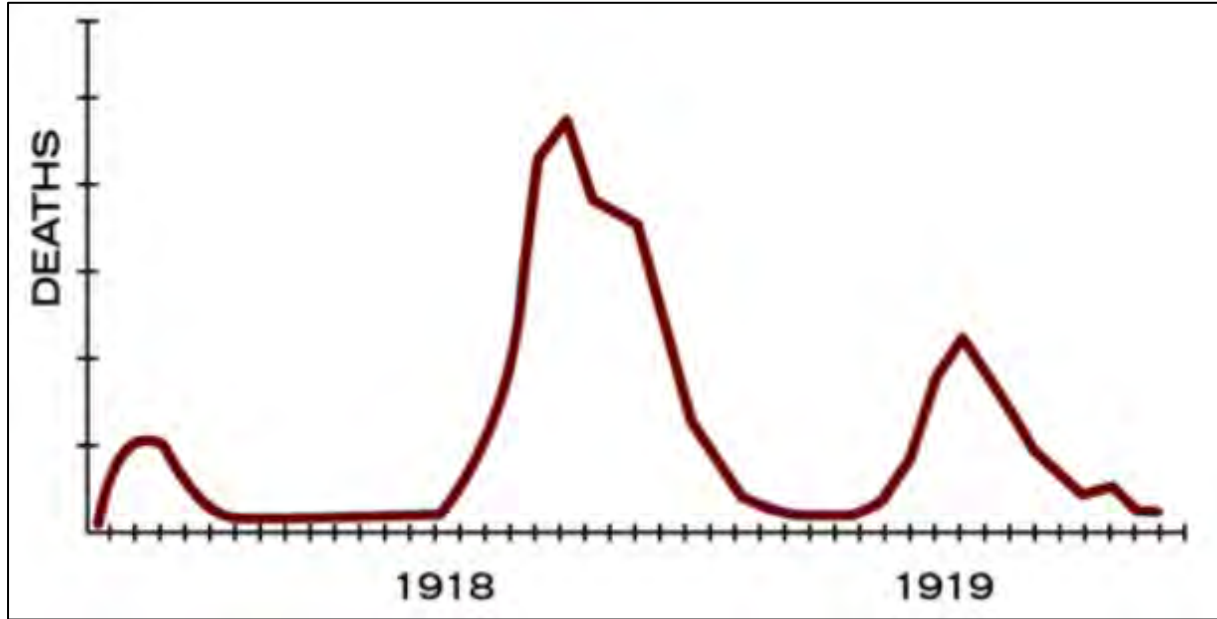
there were approximately 60.8 million cases, 274,304 hospitalizations, and 12,469 deaths. (Shrestha SS1 2011)

The State of Washington was at the forefront of the COVID-19 pandemic. Now endemic, COVID-19 emerged in December 2019 in China's Hubei Province, in the city of Wuhan. On January 18, 2020, the CDC reported the first laboratory-confirmed case of the 2019 Novel Coronavirus in the U.S. from samples taken in Washington state and on the same day activated its Emergency Operations Center (EOC) to respond to the emerging outbreak. February 28, 2020, the CDC reported four additional presumptive positive cases of COVID-19 in California, Oregon, and Washington: one case was likely travel-related, but three are likely due to community spread of the SARS-CoV-2 virus in the U.S. CDC and the Washington Department of Public Health report the first death in an individual with laboratory-confirmed COVID-19 in the U.S. The patient was a male in his 50s who was hospitalized with a pneumonia of unknown cause and later died of his illness. On March 11, 2020, after more than 118,000 cases in 114 countries and 4,291 deaths, the WHO declares COVID-19 a pandemic. On March 13, the Trump Administration declares a nationwide emergency and issues an additional travel ban on non-U.S. citizens traveling from 26 European countries due to COVID-19. (Centers for Disease Control and Prevention 2023)

In February 2023, the HHS Secretary gave a 90-day notice to Governors to prepare for the unwinding of the COVID-19 Public Health Emergency. The Federal Public Health Emergency (PHE) for COVID-19 expired on May 11, 2023. However, preventing the spread of COVID-19 remains a public health priority. (U.S. Department of Health and Human Services 2023)

As of March 23, 2024, 6,901,176 people in the U.S. have been hospitalized and 1,186,671 have died from COVID-19. (Centers for Disease Control and Prevention 2024) As of July 5, 2023, it was estimated that 77.5% of U.S. citizens ages 16 and older had been infected with COVID-19. (Centers for Disease Control and Prevention 2023)

Although the spikes varied and waves continued longer than for the Spanish Influenza, COVID-19 generally followed the natural pattern of infectious diseases as shown in Figure 42. Future novel viruses may follow a similar pattern.



*Figure 42. 1918 Spanish Flu Deaths. (Centers for Disease Control and Prevention 2018)*

#### **4. Probability of Future Events on SBIT:**

Endemic infectious diseases such as influenza and COVID-19 are a part of natural life. The tribe faces them on an ongoing basis. Based on even recent experience ranging from the 1918 Spanish Flu, to the 2009 H1N1, to the 2019 COVID-19 outbreak (to name just a few), it is a certainty that the Tribe (and the world) will face novel infectious diseases in the future as well.

“The probability and magnitude of infectious disease is difficult to evaluate due to the wide variation in disease characteristics, such as the reproduction number, virulence, morbidity and mortality, detection and response time, and the availability of vaccines and other forms of prevention. There is growing concern, however, about emerging infectious diseases due to new and more resistant strains of pathogens, also called, “Super Bugs,” and viral reassortments/recombination. The probability of a serious outbreak goes up as new resilient pathogens are identified.”

(State of Arizona, Department of Emergency and Military Affairs 2018)

The probability of a future novel virus outbreak is a certainty – the unknown questions include when the next outbreak will occur and what the magnitude of the impact will be.

### **5. Impact on SBIT:**

Tribal communities continue to be among the vulnerable in the United States from epidemics and pandemics. Native Americans are at an extreme risk due high rates of health problems, like diabetes and heart disease, a large elder population. Tribal communities also often have a higher rate of health needs, less funding and access to medical care. Cultural traditions that impart a large role in communal family and tribal gatherings that can spread diseases.

The recent history and experience of the COVID-19 pandemic has taught us that the location of a pandemic doesn't have to be proximal to the Reservation to have major impacts to supply-chains or to our enterprises. The COVID-19 pandemic, while isolated to China was creating havoc on supply-chains in the United States even before the disease reached our shores. Once COVID-19 was detected within Washington, illness, hospitalizations, death, and economic and political turbulence wasn't far behind.

### **6. Vulnerability of SBIT:**

While infectious diseases impact state operations, they generally do not caused damage to assets. The most significant impact is on cleaning and disinfecting facilities and equipment. Perhaps one of the greatest concerns is that the Reservation lacks hospital or urgent care. The Wellness Center provides weekday primary medical, dental, and behavioral health care. The vulnerability of tribal members is highly dependent on the nature of the disease itself, good public health, and preventative care practices. However, given the small Reservation size and close-knit community, any novel virus can expect to impact the entire tribe.

### **7. Impact of Climate Change:**

Vectors, pathogens, and hosts each survive and reproduce within a range of optimal climatic conditions: temperature and precipitation are the most important, while sea level elevation, wind, and daylight duration are also important. Specifically, the WHO has recorded a five-fold increase in malaria epidemic risk the year after El Nino events. Because moisture and temperature are such significant factors, elevated temperatures and extreme rain events resulting from climate change increase the risk. WHO models have shown that climate change increases the transmission of malaria and dengue fever worldwide, and encephalitis in the U.S.

Vectors, pathogens and hosts each survive and reproduce within a range of optimal climatic conditions: temperature and precipitation being most important, while sea level elevation, wind and daylight duration are also important. Climate changes may affect important determinants of vector-borne disease transmission including vector survival and reproduction, (the vector's biting rate, and the pathogen's incubation rate within the vector organism.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Droughts can increase the dissemination of arboviral diseases in urban areas by allowing a boost in the population of mosquitoes in foul water concentrated in catch basins where they breed. Furthermore, eggs can be vertically infected with arboviruses and heat waves speed up the maturation of the mosquitoes and of the viruses within mosquitoes. Droughts also cause a decline in mosquito predators like frogs, damming needles, and dragonflies. In addition, birds congregate around shrinking water sites, enhancing circulation of viruses among birds and mosquitoes. In conclusion, the seriousness of some of the recent epidemics like West Nile virus and Dengue appear to have been influenced by climate change. As most of the arboviral infections are asymptomatic in humans, there is an increased opportunity for blood, organ, and tissue donations by infected individuals during the viremic period, resulting in an increased risk of transmission of arboviruses.



## **6. *Invasive Species***

### **1. General hazard description as it relates to SBIT:**

*“An “invasive species” is a species that:*

- 1) non-native (or alien) to the ecosystem under consideration and,*
- 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.*

*Non-native species are plants and animals living in areas where they do not naturally exist. “Non-native species” and “invasive species” can not be used interchangeably. Many commonly grown fruits and vegetables are not native to the U.S. For example, tomatoes and hot peppers originated from South America, while lettuce was first grown by the Egyptians. Domestic cows are non-native to North America and were introduced as a food source, and considered to be a beneficial organism in an agricultural setting.” (U.S. Department of Agriculture 2024)*

Infestations impact the Tribe’s economy through the destruction of natural resources. Some of the plant infestations are more flammable than native species and increase the spread of wildfires. Human actions are the primary means of introduction and spread of invasive species.

### **2. Location:**

The Washington Invasive Species Council is monitoring and taking action on invasive animals and insects; noxious weeds, and wildlife diseases. The invasive species of most concern for the Tribe are described here.

#### **Invasive Animals**

Due to the importance of marine life to the tribe, the animal invasive species of most concern are the New Zealand mud snail and the European Green crab. They have been found in locations identified in Figure 43.

### European Green Crab (EGC) and New Zealand Mud Snail Sites



**Shoalwater Indian Reservation**  
▨ Shoalwater Bay Indian Tribe

**EGC Observation Status**

- Site Sampled - EGC Observed
- Site Sampled - No EGC Observed
- Not sampled or no data
- Aquatic Invasive Species

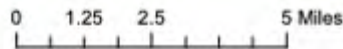


Figure 43. European Green Crab and New Zealand Mud Snail Observations.

“The European green crab eats smaller crustaceans and many other plants and animals and can have dramatic negative impacts to native shore crab, clam, and oyster populations. Green crabs are believed to have caused the collapse of the soft-shell clam industry in New England. Their digging habits also have slowed eelgrass restoration efforts. European green crabs also may impact the health of shore birds by transmitting the worm *Profilocollis botulus*.” (Washington Invasive Species Council 2024)

“New Zealand mud snails are considered a high invasive threat to freshwater and brackish water environments. They can dominate river and lakebed habitat by achieving densities of more than 100,000 per square meter. They out-compete native aquatic snails and insects that other species depend on for food. Disruption of the food chain can lead to reduced growth rates and lower populations of fish.” (Washington Invasive Species Council 2024)

In addition to the European Green Crab and the New Zealand Mud Snail, the Tribe is monitoring other invasive species such as marine clams, and Tunicates.

“The purple varnish clam grows prolifically, forming dense colonies very rapidly and displacing native species. It can be harmful to humans because of its higher level of toxins.” (Washington Invasive Species Council 2024)

“The overbite clam also grows very quickly and can live in a variety of habitats. Its presence has been cited in the declines of recreational fishing stocks as well as native species.” (Washington Invasive Species Council 2024)

“*Didemnum* and *styela clava* (Tunicate) have been invading coastal waters in several countries, where they spread rapidly. Mats of these species can smother other sea life, and nothing eats them because they are toxic to other species. In some areas of the country, invasive tunicates are becoming a major threat to aquaculture operations because they compete with native filter feeders such as clams, mussels, and oysters.” (Washington Invasive Species Council 2024)

### **Invasive Insects**

While the Tribe is monitoring invasive insects, there are not currently any of concern within the reservation.

### **Noxious Weeds**

The noxious weeds of most concern are *Spartina* Cordgrass and Saltcedar.

“Rhizomes, a type of underground stem, spread outwards from a cordgrass plant in all directions. New plants can grow from the outstretched rhizomes, eventually forming large patches. Clumps

of cordgrass or seeds can break off and wash across bays and root in new areas. Cordgrass reduces open mud feeding habitats of shorebirds, competes with indigenous salt marsh vegetation, and alters the hydrology, structure, and function of wetlands. Once established, controlling and managing cordgrass is extremely difficult and expensive.” (Washington Invasive Species Council 2024)

“Saltceder causes significant impacts to riparian (shoreline) areas and wetlands. Its deep root system and large water demands can lower groundwater tables significantly and increase surface soil salinity, stressing many native plants. It increases fire risk and rebounds following fires. Saltceder’s root system can choke streambeds and aquifers, causing flooding. The plant offers poor forage and habitat for most species.” (Washington Invasive Species Council 2024)

### **Wildlife Diseases**

While infectious shellfish diseases have not yet been found in Washington, they are of great concern to the tribe.

“The OsHV-1 microvariant and POMS have badly damaged shellfish industries in other countries and OsHV-1 has had impacts in California. There is obvious potential for spread and damaging consequences in new locations. Washington is home to the nation’s largest shellfish aquaculture industry, and recreational shell fishing, which is enjoyed by more than 200,000 Washingtonians, is a significant part of the state’s outdoor way of life. Treaty Tribes also depend on shellfish for important economic and sociocultural resources. In addition, shellfish serve important roles in the marine environment from providing habitat and food resources to contributing to water quality.

The introduction or spread of shellfish diseases could have substantial ecological, economic, and cultural impacts.” (Washington Invasive Species Council 2024)

### **3. Extent:**

European Green Crabs are considered one of the most invasive species in the marine environment and are currently the greatest threat to the Tribe. As depicted in Figure 43, the European Green Crab (EGC) has been located at multiple locations along the coast and in Willapa Bay. With few predators, the EGC aggressively hunts and eats its prey, destroys seagrass, and outcompetes local species for food and habitat.

“The green crab feeds on many organisms, including clams, oysters, mussels, marine worms, and small crustaceans. Because it can also prey on juvenile crabs and shellfish, a northward spread to the Washington coast and Puget Sound could put our Dungeness crab, clam, and oyster fisheries at risk, and the green crab might compete with native fish and bird species for food. In addition,

the green crab is an intermediate host to a marine worm that can harm the health of local shorebirds.” (University of Washington College of the Environment 2024)

#### **4. Previous Occurrences on SBIT:**

As depicted in Figure 43, the European Green Crab (EGC) has been located at multiple locations along the coast and in Willapa Bay. The SBIT Environmental Department is actively monitoring and eradicating the EGC on a daily basis.

#### **5. Probability of Future Events on SBIT:**

Invasive species are clearly present and the Tribe has a program to prevent the introduction of, monitor, and eradicate invasive species. As a small jurisdiction, the Tribe has little influence of national and global forces that introduce invasive species. Therefore, the continued battle against invasive species is guaranteed.

#### **6. Impact on SBIT:**

The Tribe, along with external partners, is controlling invasive species such as the European green Crab. The European Green Crab is blamed for causing the collapse of the soft-shell clam industry in Maine. Quite simply, invasive species such as the EGC represent a catastrophic threat to the Tribe’s marine resources.

#### **7. Vulnerability of SBIT:**

Because the Tribes culture is based on sea life, the loss of its native species would be devastating for multiple cultural programs. The economic impact grows steadily as the Tribe expand its oyster enterprise. At the writing of this Plan, the price of oysters is between \$14 (medium wholesale) and \$25 (Toke Point retail) per dozen. With two (2) million oysters in seed/nursery/farm, and growing to 10 million total, a collapse of the oyster industry would represent a \$3 million to \$30 million loss.

#### **8. Impact of Climate Change:**

While further study and analysis is required to quantify the impact of climate change on infestations, there are clear impact due to climate change. Climate change can have significant impacts on invasive species, affecting their distribution, abundance, and ecological interactions with native species. Warmer temperatures, changes in precipitation patterns, and increased frequency and severity of extreme weather events can create new opportunities for invasive species to establish and thrive in new areas, as well as expand their ranges and outcompete native species.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Overall, the impacts of climate change on invasive species in are complex and multifaceted and can have far-reaching ecological and economic consequences. Effective management and mitigation strategies will require a comprehensive understanding of the interactions between climate change, invasive species, and native ecosystems.

## 7. *Landslide*

*“Washington is one of the most landslide-prone states in the country, with hundreds to thousands of events each year. The direct cost of landslide damage includes the repair of roads and property and the loss of life. Indirect costs, such as loss of property value and tax revenue, and environmental effects, such as the degradation of water quality, can exceed direct costs.”*

*(Washington State Department of Natural Resources 2024)*

### 1. **General hazard description as it relates to SBIT:**

A landslide is the movement of rock, soil or debris down a hillside or slope. As with the Shoalwater Bay Indian Tribe, people across the state are moving into hilly and mountainous rural forests and agricultural lands. Accordingly, the State of Washington is developing maps to characterize the landslide risk. Once geologists understand the underlying factors for the various types of landslides, they may develop mitigation techniques to eliminate or minimize the risk. Unfortunately for the Tribe, the Willapa Hills encompassing the Reservation have not been studied.

### **Landslide Categories**

Landslides are generally categorized as shallow or deep-seated and this difference can determine their speed and size. Of most significance to the Reservation are shallow landslides that typically occur during the winter months in western Washington (they are possible at any time). Deep-seated landslides can also occur at any time. Many of the landslide areas in Washington are a mixture of different slide types.

### **Shallow Landslides Categories**

Shallow landslides, often call mudslides, are rooted in the soil layer and often form slumps along roadways or fast-moving debris flows down valleys. Shallow landslides also occur as flows, slides, or rockfalls and topples.

### **Deep-seated Landslides**

Deep-seated landslides fail below the rooting depth of trees and vegetation. They are often slow moving but can also move rapidly. Deep-seated landslides can cover large areas and devastate infrastructure and housing developments. These landslides usually occur as translational slides, rotational slides, or large block slides. Deep-seated landslides are typically much larger than shallow landslides, in terms of both surface area and volume. A deep-seated landslide may appear

stable for years, decades, or even centuries. These long-lived features can be partially or entirely reactivated for a variety of reasons.

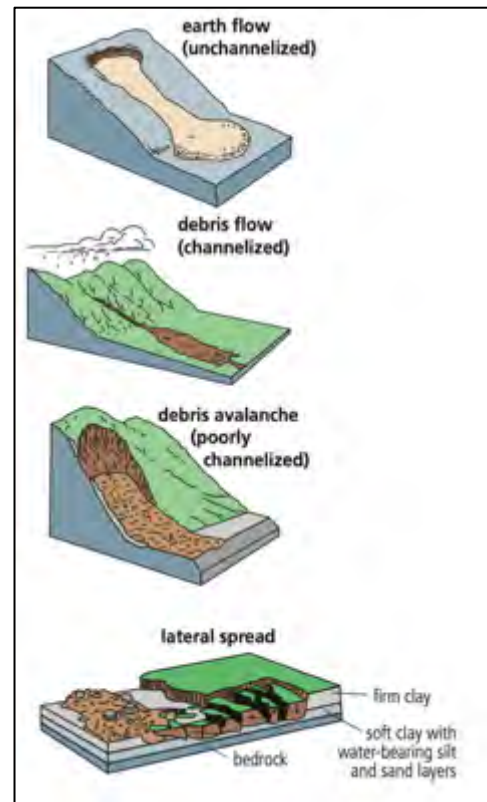
### **Landslide Types**

Landslides can occur as flows, slides, or rockfalls and topples. Although there are a number of triggers such as earthquakes and storms, two factors that affect the possibility of landslides are slope and water. As slopes get steeper, the force of gravity overcome friction and slides occur. Water both reduces friction and adds weight (increased force of gravity) and causes slides. A major difference between the three types of slides is the amount of water—flows have the most and rockfalls usually have the least.

### **Flows**

Flows are what their name implies - generally a slurry mixture of water, soil, rock and (or) debris that moves rapidly downslope. Types of flows include (Figure 42):

- **Earthflows** have a characteristic 'hourglass' shape. The slope material liquefies and runs out, forming a bowl or depression at the head. Flows usually occur in fine-grained material on moderate, water-saturated slopes.
- **Debris flows** usually occur in steep gullies and contain more coarse material than a mud- flow. They move very rapidly and can travel for many miles. Slopes where vegetation has been removed by fire or humans are at greater risk for debris flows.
- **Debris avalanches** are unchanneled debris flows that move very rapidly. They typically do not mobilize far and sometimes move like a snow avalanche.
- **Lateral spreads** occur on very low-angle slopes toward a free face such as a cliff or embankment. Movement is accompanied by cracking of the ground. Failure is caused by liquefaction (when soil is transformed from a solid to a liquid), usually because of an earthquake.



*Figure 44. Types of Flows.*



- **Lahars** are debris flows that originate on volcanoes. A volcanic eruption can rapidly melt snow and ice, causing a deluge of rock, soil, ash, and water that accelerates down the slopes of a volcano, devastating anything in its path. They can travel great distances and damage structures in flat areas far from their source. Communities near rivers draining Mount Rainier and Glacier Peak are at greatest risk.
- **Soil creep** is the very slow (inches/year), steady, downward movement of soil or rock. Creep is indicated by curved tree trunks, bent fences or retaining walls, tilted poles or fences, and small soil ripples or ridges.

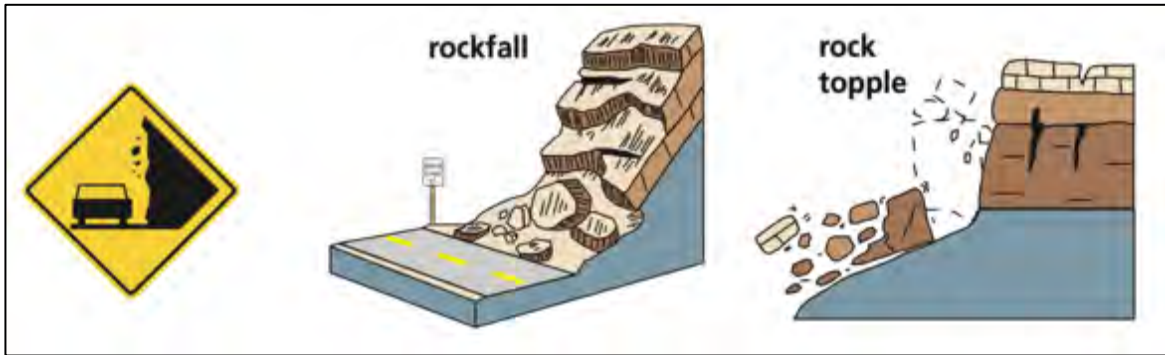
### Slides

Slides are the downslope movements of soil or rock along a surface and can be deep-seated or shallow. The initiation of slides, like flows or rockfalls, is sensitive to steep slopes, the additional weight of water or other loads, and friction along their base. Types of slides include:

- **Translational slides** usually fail along geo-logic discontinuities such as faults, joints, bedding surfaces, or the contact between two rock types. They move out or down along a planar surface with little tilting and can travel great distances. Translational slides can contain loose sediments or large slabs of bedrock.
- **Rotational slides (slumps)** are landslides that occur along a curved or spoon-shaped surface. Back-tilting may occur near the scarp of the landslide and there is often a toe of displaced material. Rotational slides often occur because the internal strength of the material is overcome by its own weight. They are usually composed of relatively loose or unconsolidated material.
- **Block slides** are a particular type of translational slide that occur when large and relatively intact slabs of rock or earth are rapidly transported downslope. These types of landslides can be large and damaging and occur where alternating layers of strong and weak rock slope downhill.

### Rockfalls and Topples

Rockfalls and topples are common in Washington's mountain passes and are the large pieces of rock we see that have rapidly fallen down a slope (Figure 45). They can cover roads and bury streams.



*Figure 45. Rockfalls and Topples.*

## 2. Extent:

The Shoalwater Bay Indian Reservation is located in the Southwest Washington landslide province, one of the six landslide provinces of Washington State. The primary characteristics of this landslide province are the lack of glaciation and localized exposure to glacial melt waters. In places, weathering processes exposed surfaces in this province for millions of years. Much of the province has deeply dissected terrain, with gentle slopes uncommon.

**Earth flow** – This is the dominant form of landslide in the province. Both ancient and active earth flows are common, not only in the high and steep terrain, but also in the low, rolling hills of the Chehalis-Centralia area. Stream erosion along the toes of the flow usually causes reactivation of these landslides. Excavations, such as those for freeway construction, also may reactivate dormant earth flows or start new ones.

**Debris flow** – These types of landslides are locally a problem in the western Cascades and Olympic mountains; they tend to occur where the rocks are strong and relatively un-weathered. These rocks tend to have steep slopes and smooth surfaces overlain by thin soils. Intense rainstorms, or rain on the wet snow in the mountains trigger these landslides.

Although the developed areas of the Shoalwater Bay Indian Reservation are on the flat coastal plain, the northern part of the Reservation is made up of steep hills subject to landslides. Eagle Hill Road and the Potable Water system are in this area. Future development of tribal lands in the hills may cross or be near landslide hazard areas.

Landslide hazards are not officially mapped for the Shoalwater Bay Tribal Indian Reservation. However, Pacific County's Critical Areas Ordinance defines a Landslide Hazard Area using various factors including slopes having gradients greater than eighty percent (80%) subject to rock fall during seismic shaking and any area with a slope of forty percent (40%) or steeper and with a vertical relief of ten (10) or more feet except areas composed of solid rock. (Board of

Commissioners, Pacific County, Washington n.d.) Figure 46 is a GIS-LIDAR map that highlights slopes greater than 40%, and 80% that provides an indication of landslide susceptibility.



*Figure 46. Landslide Hazard Areas – Slopes Greater than 40%.*

### **3. Previous Occurrences on SBIT:**

There have been no significant landslides recorded in the tribal planning area or region. It has been noted that minor mudslides and debris flows have affected the Eagle Hill Road area, but nothing causing any damage.

### **4. Probability of Future Events on SBIT:**

Determining the probability of future landslide events is difficult to determine as usually a record of past activity in an area determines the probability of future activity. The Tribe's planning area and surrounding Pacific County has a minimal record of past landslides. Landslides are often triggered by other natural hazards such as earthquakes, heavy rain, floods, or wildfires. Thus, the probability of a landslide is related to the probability of future earthquakes, heavy rain, floods, and wildfires, in combination with areas of steep slopes. While the landslide potential has not been formally

characterized, Figure 47 displays FEMA’s National Risk Index of “Moderately High” for landslide.



**Figure 47. National Risk Index Landslide Risk.**

Figure 48 displays the potential erosion hazard. As the Tribe relocates into the Willapa Hills, it is moving into an area of sever erosion potential. This may be as important as landslide assessments as the ground disturbance and other impacts of development may induce slides and require ongoing mitigation measures.



### Shoalwater Bay Indian Reservation Potential Erosion



0 0.2 0.4 0.8 Miles

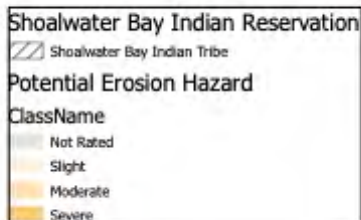


Figure 48. Erosion Potential.

## **5. Impact on SBIT:**

The impact to the Tribe from landslides is currently minimal.

- Small landslides could block Eagle Hill Road.
- No structures would be affected.
- The worst-case damage loss to the Water tower and related infrastructure is approximately \$400,000, in addition to costs from temporary loss of water supply.

However, as the Tribe relocates infrastructure into the Willapa Hills, the impact of landslides will increase. Not only will the impacts of blocked roads increase, but tribal infrastructure will increasingly be directly affected. Future impacts include:

- Loss of road access due to slides or debris.
- Loss of and/or delayed access to the Office of Emergency Management facilities.
- Loss of and/or delayed access to Tribal Police and healthcare facilities.
- Loss of and/or delayed access to other tribal government facilities.
- Loss of and/or delayed access to tribal homes.

Built in mitigation measures will be increasingly critical, such as:

- Slope stabilization.
- Foundations anchored to bedrock.
- Redundant access.

## **6. Vulnerability of SBIT:**

The Tribe's main vulnerability to a landslide is in conjunction with an earthquake and tsunami. Eagle Hill Road has a history of landslides, and a landslide following an earthquake, blocking and/or damaging the road, would hinder evacuation from a potential tsunami.

The tribe is also vulnerable to landslides that could block SR 105 outside of its tribal lands and which the tribe has no jurisdiction over. Landslides on SR 105 could prevent access to and from the Reservation, which would also be a concern following a major earthquake/tsunami.

Climate change may also increase rain and drought, as well as wildfire risk, which could lead to increases in landslides and unstable slopes.

Future development may also increase impacts from landslides. As the Tribe acquires the hills and uplands to relocate development away from tsunami hazard areas, the risk of development in or

near landslide hazard areas increases. As the Tribe develops new structures, it must also build with landslide risks in mind and mitigate appropriately.

### **7. Impact of Climate Change:**

Climate change has resulted in warmer temperatures and higher snow levels in the western U.S. As a result, more precipitation is expected to fall as rain, leading to higher occurrences of ground saturation and increased runoff in areas susceptible to landslides and debris flows, and consequently leads to a higher probability of landslide failure. The greater precipitation during the winter storms will likely lead to more flooding and landslides. The increased vulnerability due to landslides will become clearer when the Tribe solidifies plans and continues construction for its relocation into the Willapa Hills. The Tribe will need to incorporate mitigation measures into its planning and construction. The expected decrease in summer precipitation (along with increased temperatures) will lead to a decrease in stream flow and increase in wildfire risk. The loss of groundwater and stream water in the warmer months will affect the agriculture and aquaculture enterprises.

Further, droughts induced by climate change can decrease vegetation that helps anchor soils/deposits to a hillside. This coupled with potentially more intense rainstorms can dramatically increase the probability of slope failure and lead to landslides in places that where they have not previously occurred.

As described throughout this section, the increased temperature; decreased precipitation, streamflow, and ground moisture; along with the relocation to a forested region, will increase the Tribe's vulnerability to wildfire. As with vegetation loss to drought, the burn scars left by wildfire increase probability of slope failure and lead to landslides in places that where they have not previously occurred.

## 8. *Sea Level Rise*

### 1. **General description:**

*“Washington’s coastal areas and marine waters are not only an important economic engine for the state but also provide an important sense of place and figure irreplaceably in the traditions and cultures of tribal communities. The state’s coastlines also provide valuable ecosystem services that support human and natural communities alike. Sea level rise will exacerbate existing risks and vulnerabilities, such as shoreline and coastal bluff erosion, storm surge, flooding, and groundwater intrusion. This assessment provides new up-to-date projections for use in coastal habitat restoration, community and land-use planning, and infrastructure design and operations.”*  
*(The Washington Coastal Resilience Project 2018)*



**Figure 49. Seven-Foot Sea Level Rise Confidence. (National Oceanic and Atmospheric Administration 2022)**



## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Relative sea level rise is based on a combination of absolute sea level rise itself and land uplift or subsidence. Clearly, land uplift will decrease relative seal level rise and subsidence will increase it. Table 22 depicts absolute sea level rise for the State of Washington. The “Low” Greenhouse Gas Scenario equates the RCP 4.5 scenario described in Section II, B,1 Climate Change. The “High” Greenhouse Gas Scenario equates the RCP 8.5 scenario.

As depicted in “Central Estimate (50%)” and “Likely Range (83-17%), the Washington Coastal Resilience Project predicts a likely sea level rise of approximately 1.6 feet – ranging between 1.0 feet to 2.2 feet for the RCP 4.5 scenario by 2050. The RCP 8.5 scenario is projected to result in 2.0 feet of sea level rise (range of 1.4 – 2.8 feet), by 2050.

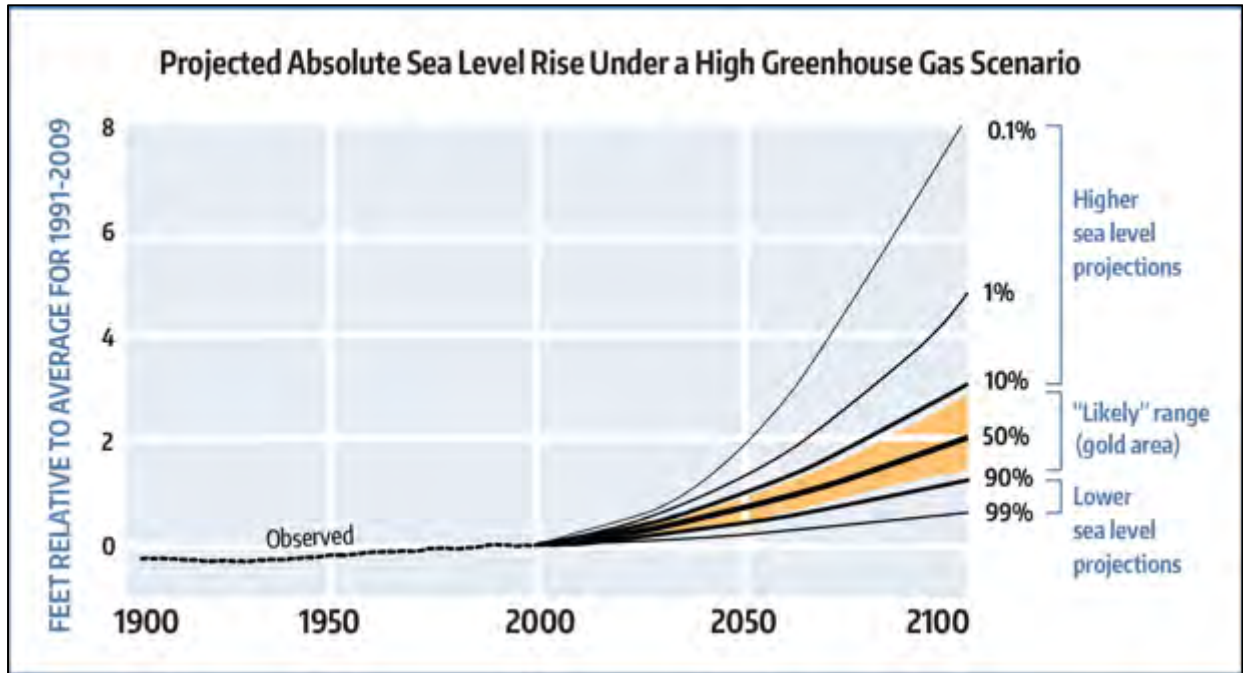
When considering both the RCP 4.5 and RCP 8.5 scenarios, the Washington Coastal Resilience Project estimates that sea level rise across the state will be between 1.6 feet (50% probability or greater) and 8.3 feet (0.1% probability of exceedance) by the end of this century.

*Table 22. Projected Absolute Sea Level Change (feet, averaged of 19-year time period). (The Washington Coastal Resilience Project 2018)*

Time Period	Greenhouse Gas Scenario	Central Estimate (50%)	Likely Range (83%-17%)	Higher magnitude, but lower likelihood possibilities		
				10% probability of exceedance	1% probability of exceedance	.1% probability of exceedance
2050 (2040-2059)	Low	0.6	0.4 – 0.8	0.9	1.2	1.8
	High	0.7	0.5 – 0.9	1.0	1.3	2.0
2100 (2090-2009)	Low	1.6	1.0 – 2.2	2.5	4.1	7.2
	High	2.0	1.4 – 2.8	3.1	4.8	8.3
2150 (2140-2159)	16.2	2.5	1.5 – 3.8	4.4	8.5	16.2
	High	3.4	2.3 – 4.9	5.6	10.0	18.3

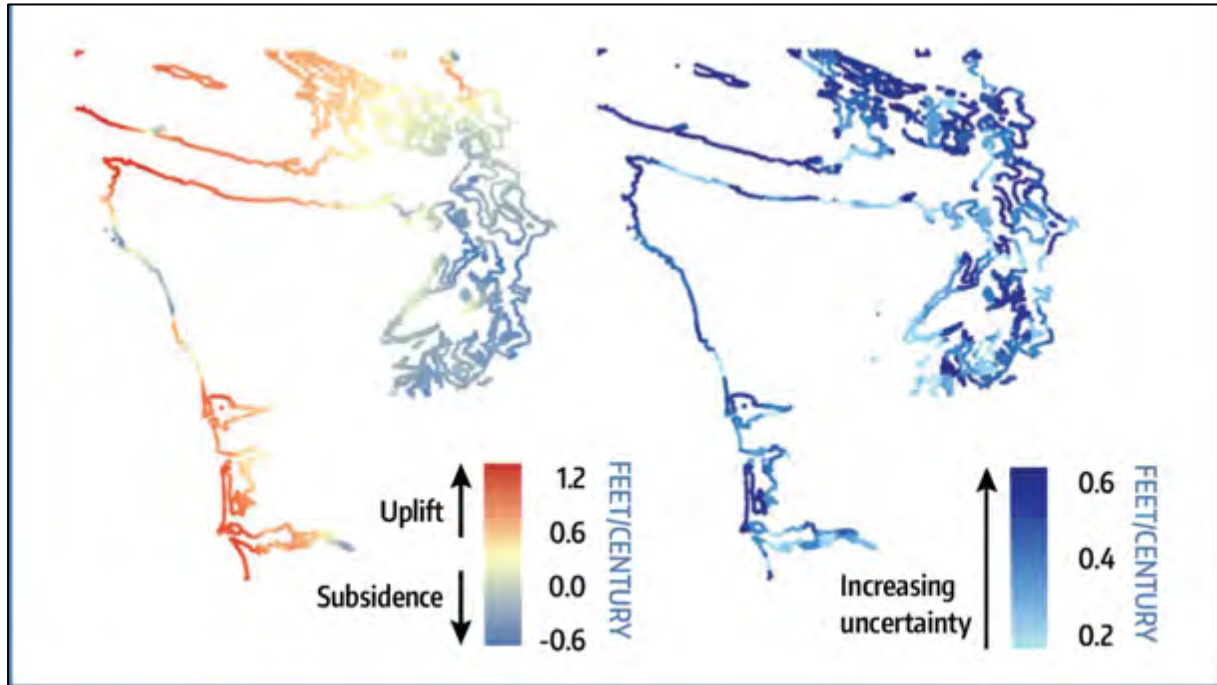
## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Figure 50 depicts the Table 22 data in a graph for absolute sea level rise by 2100 for the RCP 8.5 scenario. As can be seen the model predicts a 2.0-foot sea level rise (50% probability) with the expected range of 1.4 – 2.8 feet (83% - 17% probability). The three lines above the heart of the prediction show a predicted sea level rise of 3.1, 4.8, and 8.3 feet for the 10%, 1%, and 0.1% probability of exceeding the central estimate.



*Figure 50. Projected Absolute Sea Level Rise Under a High Greenhouse Gas Scenario. (The Washington Coastal Resilience Project 2018)*

As described in the Flood section, geological conditions are causing the coastal area of Washington, including the Shoalwater Bay Reservation to slowly rise, potentially lessening the effect of sea level rise. Figure 51 depicts the estimate that the Reservation vertical land movement will be an uplift of 0.6 – 1.2 feet per century.



**Figure 51. Estimated Vertical Land Movement in Feet per Century. (The Washington Coastal Resilience Project 2018)**

## 2. Location:

While Figure 49 depicts the National Oceanic and Atmospheric Administration (NOAA) the sea level rise confidence for a seven (7)-foot sea level rise, Figure 52 depicts a more modest three (3) sea level rise projection (National Oceanic and Atmospheric Administration 2022) While a seven-foot sea level rise may not be seen for generations, lower levels sea level rise leads to such increased impacts as increased flooding, erosion, salt water inundation in marshes and groundwater, etc. Therefore, the Tribe has made the decision to relocate into the Willapa Hills.



*Figure 52. Three-Foot Sea Level Rise Confidence. (National Oceanic and Atmospheric Administration 2022)*



### 3. Extent:

Figure 53 displays NOAA’s depiction of the potential seal level rise of one (1)-foot and three (3)-feet above the current Mean Higher High Water (MHHW). Mean Higher High Water is the average of the highest of the two high tides per day over a 19-year period. Essentially, Figure 53 shows that while the berms largely protect Tribal critical infrastructure, the wetlands become inundated.



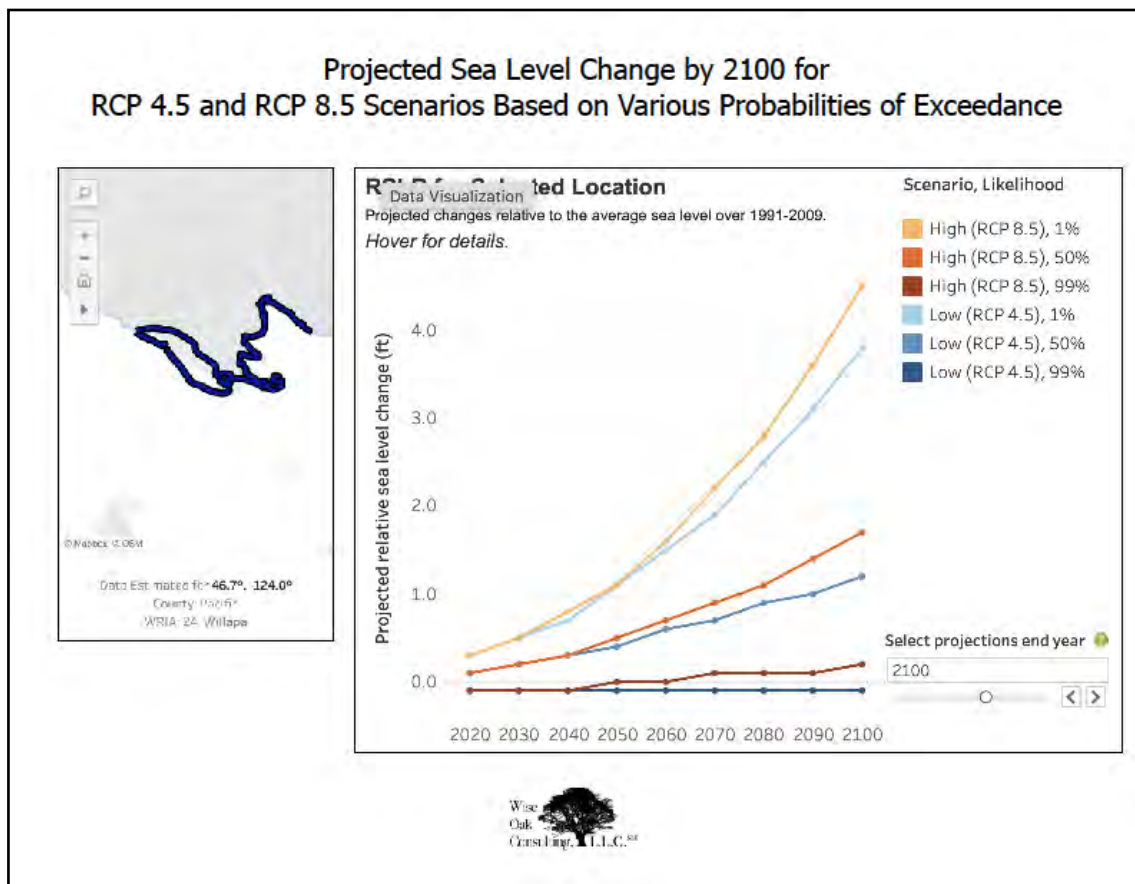
*Figure 53. Three-Foot Sea Level Rise Confidence. (National Oceanic and Atmospheric Administration 2024)*

### 4. Previous Occurrences on SBIT:

Quite simply the Reservation experiences sea level rise as it occurs. While the berm protects against sea level rise, local coastal erosion and severe storms, sea level rise is one of the main factors for relocating into the Willapa Hills.

**5. Probability of Future Events on SBIT:**

Sea level rise is a certainty as climate change continues. The real question is how much the Reservation will be impacted. Building upon Table 22, Figure 54 depicts the **relative** sea level change based on various probabilities of exceeding the predicted sea level rise. The relative sea level change incorporates both the absolute sea level change prediction and the 2.8 feet of estimated uplift for the region. As can be seen for both the RCP 4.5 and RCP 8.5 scenarios there is an estimated 50% probability of one (1)-foot of sea level rise or greater and a 1% probability of around four (4)-feet of sea level rise by 2100.



*Figure 54. Projected Sea Level Change by Year. (The Washington Coastal Resilience Project 2018)*

**6. Impact on SBIT:**

The impact of sea level rise is modest in of itself as it largely results in inundation of wetlands. The protective berms largely protect critical infrastructure. However, the overall impact die to

climate change, resulting sea level rise, coastal erosion and the tsunami threat put all critical assets at risk. One immediate impact is the need to maintain the berm and stabilize the sand dunes that protect the critical infrastructure. The other main immediate impact is the need to maintain flood gates to protect wetlands. The long-term impact is that the Tribe is relocating off of sea level land and into the Willapa Hills.

**7. Vulnerability of SBIT:**

As already stated, the berm has shifted the flood zone and provides protection from sea level rise. As such, critical infrastructure is not vulnerable to sea level rise in and of itself. However, the seawater inundation of the wetlands will destroy natural and cultural resources within those regions (Figure 53). The Tribe will need to devise strategies for preserving natural resources within the wetlands to preserve native species. The Tribe will also need to devise strategies to protect or move historic cultural sites that will be inundated.

**8. Impact of Climate Change:**

Climate change is the driver of sea level rise. The RCP 4.5 scenario assumes a changed of human behavior to reduce greenhouse gases and the RCP 8.5 scenario assumes no change in human behavior. Again, sea level rise has occurred and will continue. The only question is how much and how quickly. Since the Tribe cannot affect the global behavior, it will continue to take mitigation actions that it can control. The Tribes relocation into the Willapa Hills (Managed Retreat) is the ultimate Risk Management Strategy – avoidance.

## 9. Severe Weather

*“A hard rain all the last night we again get wet the rain continues at intervaes all day.*

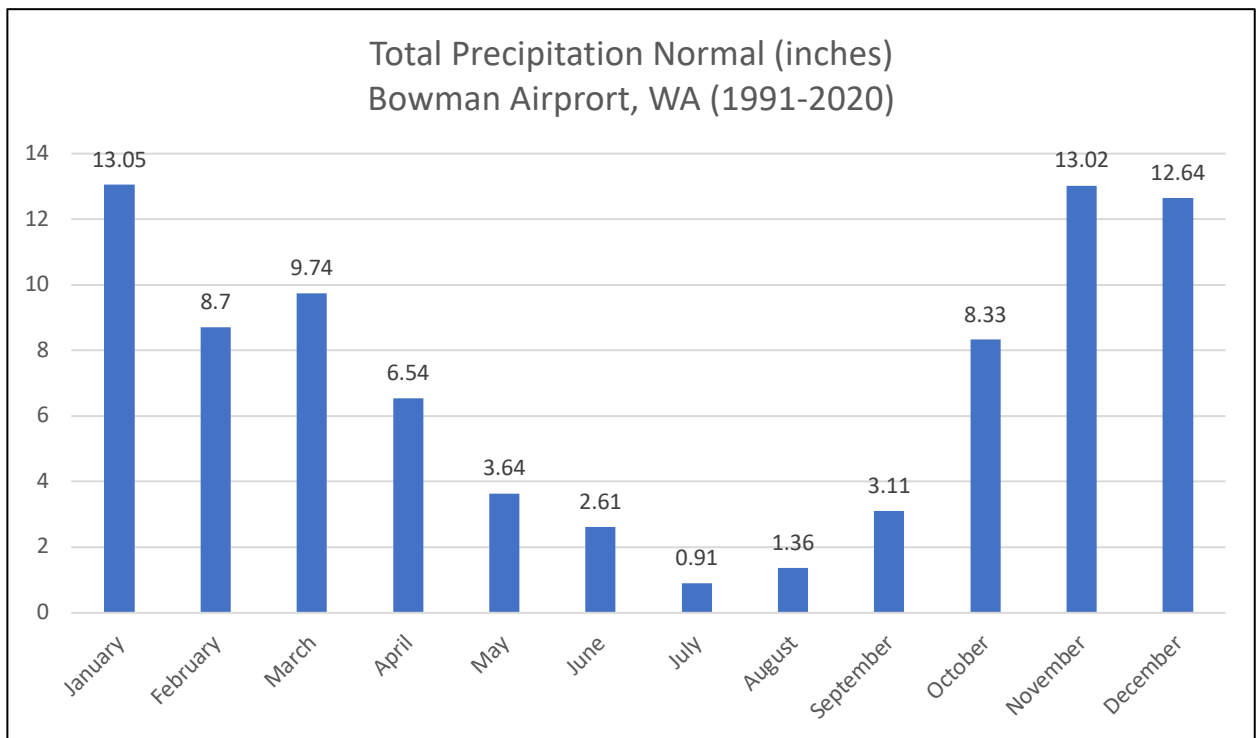
*Wind verry high from SW and blew a storm all day...*

*...and our situation is truly a disagreeable one.”*

*William Clark, Lewis & Clark Expedition, Monday, Nov. 11, 1805*

### 1. General description:

Severe weather typically occurs in the fall and winter with winds out of the south or southwest. The uplifting of air due to the coastal terrain results in November through January being the wettest months (Figure 55) with precipitation is frequently recorded on 20 to 25 days or more each month.



**Figure 55. Rainfall Normals. (National Weather Service 2024)**

The rain is typically steady and light to moderate intensity and continuous over a period of time rather than heavy downpours for brief periods. “Maximum rainfall intensities to expect in one out of ten years are: .6 to 1.0 inch in one hour; 1.0 to 2.5 inches in three hours; 1.5 to 5.0 inches in six hours; and 2.0 to 7.0 inches in 12 hours. The heavier intensities occur along the windward slopes of the mountains.” (Western Regional Climate Center 2024)



## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

The greatest annual precipitation recorded in the "rainforest" area is 184 inches at Wynoochee Oxbow, less than 50 miles north-northwest of the Reservation. The heaviest rainfall during a single storm was 12 inches in 24 hours; 23.5 inches in 48 hours; 28.6 inches in 72 hours; and 35 inches in four days recorded at Quinault Ranger Station, just 53 miles north-northwest of the Reservation. (Western Regional Climate Center 2024)

The strongest winds are generally from the south or southwest and occur during the late fall and winter. Wind data from a well exposed site on a ridge near the ocean, elevation 2,000 feet, indicates that wind velocities in excess of 100 m.p.h. occur in the higher elevations almost every winter.

In addition to rain and wind, the snowline in the Willapa Hills is between 1,500 and 3,000 feet above sea level. The snow melts rather quickly and depths seldom exceed six to 15 inches.

### **2. Location:**

Lying fully exposed on the coast; the entire reservation is subject to severe weather that impacts southwest Washington.

### **3. Extent:**

With their elevation ranging from 1,000-3,000 feet along the coast, the Willapa Hills receive the full force of storms moving inland from over the ocean with the uplifting caused by them causing heavy precipitation. The Willapa Hills receive gale force winds and, "...velocities in the lower elevations can be expected to reach 90 to 100 m.p.h. once in 100 years." (Western Regional Climate Center 2024)

### **4. Previous Occurrences on SBIT:**

The Shoalwater Bay Indian Reservation is continually affected by severe storms every fall and winter. Most recently, the Reservation was part of DR-4650-WA, "Washington Severe Winter Storms, Snowstorms, Straight-Line winds, Flooding." During the storm, NOAA reported breaking four records in the State of Washington.

One of the most significant storms in memory for the Planning Team and community members was major storm in December 2007, that led to a Presidential Declaration and cut off the Shoalwater Bay Tribe's electricity and water supply (which runs on electricity) for days. Communications and access to the area were also limited. Figure 56 highlights damage at Tribal Center.



***Figure 56. Tree Down on Power Line at Tribal Center, November 11, 2007.***

There is an extensive history of windstorms and related storm surges over the last century. Significant events, particularly those affecting the tribal lands include:

- November 11-12th, 2007 Windstorm, numerous trees down around Reservation and Tokeland Peninsula. Power out to the Tribe.
- January – March 1999 – La Niña Winter Windstorms.
- December 1996 - January 1997 "Holiday Blast" Storm.
- October 12, 1962 – The Columbus Day Windstorm, including a tornado warning.

Tribal staff also noted that there were two tornado warnings in the Tokeland area in 2019.

Also of note is that El Niño weather cycles caused erosion and flooding to the Reservation in 1997/98 as well as 2015/16, which led to the initial development of the berm at Shoalwater Bay Reservation, as well as the subsequent rebuilding of the berm/barrier beach (initially built in 2013) on Graveyard Spit in 2018.

NOAA recorded 17 events in the region that include Coastal Flood, Strong Wind, Winter Storm, or Winter Weather (Table 23).

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 23. NOAA Storm Events: January 2014 – May 2024.*

<b>Event Type</b>	<b>Begin Date</b>	<b>End Date</b>	<b>Narrative</b>
<b>Coastal Flood</b>	12/10/2015	12/11/2015	High tides combined with swollen rivers resulted in flooding of many roads in Bay Center, South Bend, and Raymond including parts of Highway 101.
<b>Coastal Flood</b>	01/17/2018	01/18/2018	Large waves pounded the surf zone and adjacent beach area near Cape Disappointment and Long Beach. The large waves also caused coastal flooding and severely damaged 10 campsites at Cape Disappointment State Park.
<b>Winter Weather</b>	10/08/2019	10/09/2019	October 7th, Hurricane Ridge received 4 inches of snow. Snow depth then remained consistent through the day October 8th.
<b>Winter Weather</b>	10/17/2019	10/20/2019	Hurricane Ridge received about 5 inches on the 17th and another 6 inches on the 19th.
<b>Coastal Flood</b>	11/15/2020	11/15/2020	Water across Highway 101 in Raymond around the time of high tide. The high tide at Toke Point was 12.2 feet.
<b>Coastal Flood</b>	11/17/2020	11/17/2020	A road was flooded in Deep River. A large field was flooded near where the Naselle River meets Willapa Bay. The high tide at Toke Point was 12.79 feet.
<b>Coastal Flood</b>	12/13/2020	12/15/2020	The tide gage at Toke Point, WA reported water levels exceeding 11 feet during the higher high tides from the 13th through the 15th. The water levels were 11.1 feet at 1106PST on the 13th, 11.2 feet at 1154PST on the 14th, and 11.7 feet at 1236PST on the 15th. Water levels at this height usually results in road closures for low lying areas.

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 23. NOAA Storm Events: January 2014 – May 2024.*

<b>Event Type</b>	<b>Begin Date</b>	<b>End Date</b>	<b>Narrative</b>
<b>Coastal Flood</b>	01/12/2021	01/12/2021	The Toke Point, WA tide gage reported at peak water level of 12.81 feet at 1142PST. This compares to a predicted tide of 10.84 feet. The Willapa River near Willapa was approaching flood stage during this time. The calculated surge height is of 1.97 feet by subtracting the astronomical tide height from total water level.
<b>Coastal Flood</b>	01/13/2021	01/13/2021	Coastal flooding inundated a picnic area at Rialto Beach in Olympic National Park during the morning hours of January 13.
<b>Winter Storm</b>	02/11/2021	02/13/2021	The public reported 6.5 inches of snow in Ryderwood, Cowlitz County. A trained spotter report of 14.5 inches in the hills 4 miles NW of Castle Rock. This is close enough to assume the Willapa Hills received similar totals.
<b>Winter Storm</b>	02/12/2021	02/13/2021	Wide variation of snow and ice accumulations, with impacts mainly felt near the Columbia River. Cathlamet reported 12 inches of snow, while Astoria and Long Beach reported very little snow. US Hwy 101 was closed at the Megler Bridge due to falling chunks of ice from the bridge structure. Estimated ice near Astoria ranged from 0.33 to 0.66, and similar amounts can be assumed for the other side of the river.
<b>Strong Wind</b>	10/24/2021	10/24/2021	Hoquiam ASOS at the airport reported a gust of 56 mph around 1615L on 10/24.
<b>Coastal Flood</b>	11/04/2021	11/06/2021	Tidal overflow flooding occurred in the late morning through early afternoon hours on 4th through 6th. Waters covered fields around

*Table 23. NOAA Storm Events: January 2014 – May 2024.*

<b>Event Type</b>	<b>Begin Date</b>	<b>End Date</b>	<b>Narrative</b>
			Raymond, WA. The water did not rise high enough to close highway 101. The Toke Point tide gage was used to determine the time the water level rose above 11 feet, the point at which tidal overflow usually begins. The start time was the first time it rose above 11 feet on the 4th and the end time was the last time it dropped below 11 feet on the 6th.
<b>Coastal Flood</b>	01/03/2022	01/03/2022	The worst flooding in a number of years (over a decade per the Emergency Manager) in the Tokeland area. Water level made it up to the Tokeland Hotel. In the Raymond area, a 1/2 miles stretch of Highway 101 was closed, and 7 homes in the Peter St and Sherman Avenue reported flooding. During this time high seas and high river levels in the area contributed to the flooding. As a result, the tide peaked at 13.4 feet around 1230PST at the Tokeland tide gauge.
<b>Winter Weather</b>	12/01/2022	12/03/2022	A period of wintry weather was experienced along the coast at the beginning of December. Reports on Dec 1 generally averaged around an inch (highest report of 2.1 inches), with an average of less than 1 inch on Dec 2 and Dec 3.
<b>Winter Storm</b>	12/22/2022	12/23/2022	Grays River CoCoRaHS reported 0.25-inch mix of snow, sleet, and freezing rain. Roads were very slick.
<b>Coastal Flood</b>	12/25/2022	12/25/2022	The tide at Toke Point, WA peaked at 11.4 feet at 1348PST. Around 11 feet, minor flooding of low-lying areas and roads around Raymond, WA occur.

## **5. Probability of Future Events on SBIT:**

Winter storms are an annual occurrence and a virtual certainty. However, the magnitude of the storms that make them “Severe Weather” events does vary. Wind speeds exceed:

- 55 mph every year 76 mph every 5 years
- 83 mph every 10 years
- 92 mph every 25 years
- 100 mph every 50 years
- 108 mph every 100 years

Of course, the most severe effects occur during atmospheric river storms that bring heavy rains with severe winds – resulting in uprooting of trees and toppling of infrastructure due to the saturated ground.

El Niño is a recurring ocean-atmosphere phenomenon that occurs every two (2) to seven (7) years. Along Washington's coast, strong El Niños can bring extreme waves from the south-southwest, more frequent severe storms, increased sea levels, above average river flows, warmer than normal water temperatures, flooding, and erosion.

## **6. Impact on SBIT:**

Coastal storm winds regularly top 40 miles per hour. The annual peak speed of 55 miles per hour can topple chimneys, utility lines, and trees. Strong winds particularly affect older structures and/or those that have not had mitigation efforts in place. The region has seen hurricane-force winds as strong with 140-150 mph gusts recorded in the area. Based on the effects of climate change and the 2019 Tornado Warning, the Tribe's is also concerned about the possibility of tornados.

The Tribe has not mitigated for extreme winds, such as those from tornadoes, and will focus its efforts on minimizing the impacts from those type of events. Based on past events, the main impacts that the Tribe faces include:

- Extended loss of access with State Route 105 washing out and being blocked by slides.
- Extended loss of utilities due down poles/lines.
- A need for mass care services both for sheltering and community points of distribution.
- Rapid damage assessments and repairs.
- Increased slides directly impacting infrastructure as the Tribe relocates into the Willapa Hills.
- Land and marine search and rescue.

## **7. Vulnerability of SBIT:**

The Tribe's vulnerability to severe weather and related storm surge has been greatly reduced by the development of the protective berm along the coastline and the barrier beach berm at Graveyard Spit. Mitigation is in place to prevent storm surge related flooding, but further monitoring and replenishment of the beach barrier berm on Graveyard Spit needs to occur, or impacts will increase such as coastal storm surge and related flooding and debris.

The Tribe is still vulnerable to extreme wind events, such as tornados, and is seeking to develop mitigation efforts, such as storm shelters and safe rooms, to reduce this vulnerability. The Tribe has not mitigated for extreme winds, such as those from tornadoes, and will focus its efforts on minimizing the impacts from those type of events.

Historic village/camp and other cultural sites are also at risk of increased erosion from storm surge and sea-level rise as result of increased severe weather.

The most important overall consideration for future development, especially with the Managed Retreat project, will be to ensure new infrastructure in the Willapa Hills is survivable given the increased exposure to high winds and slides.

In addition, as described in the general description, wind speeds are higher in the hills. As with landslide mitigation measures, new infrastructure should be built with hurricane-force winds in mind.

**8. Impact of Climate Change:**

With respect to Severe Weather, there are at least three main impacts due to climate change with respect to precipitation, landslides, coastal flooding, and strong winds.

Precipitation will likely increase during the winter storms and will likely lead to more flooding and landslides.

Climate change could potentially increase the Tribe's vulnerability. Sea-level rise could increase storm surge and/or destroy and/or reduce the effectiveness of the storm berms and beach barriers in place.

Increased severe weather could lead to more frequent high wind events, including tornadoes, for would increase need for additional mitigation efforts to adapt current and future structures to these scenarios.



## 10. *Tsunami*

*“... there was a big flood shortly before the white man’s time,  
... a huge tidal wave that struck the Oregon Coast not too far back in time  
... the ocean rose up and huge waves swept and surged across the land.*

*Trees were uprooted and villages were swept away. Indians said they tied their canoes to the top of the trees, and some canoes were torn loose and swept away.*

*... After the tidal wave, the Indians told of tree tops filled with limbs and trash and of finding strange canoes in the woods. The Indians said the big flood and tidal wave tore up the land and changed the rivers. Nobody knows how many Indians died.” (R. S. Ludwin 2005)*

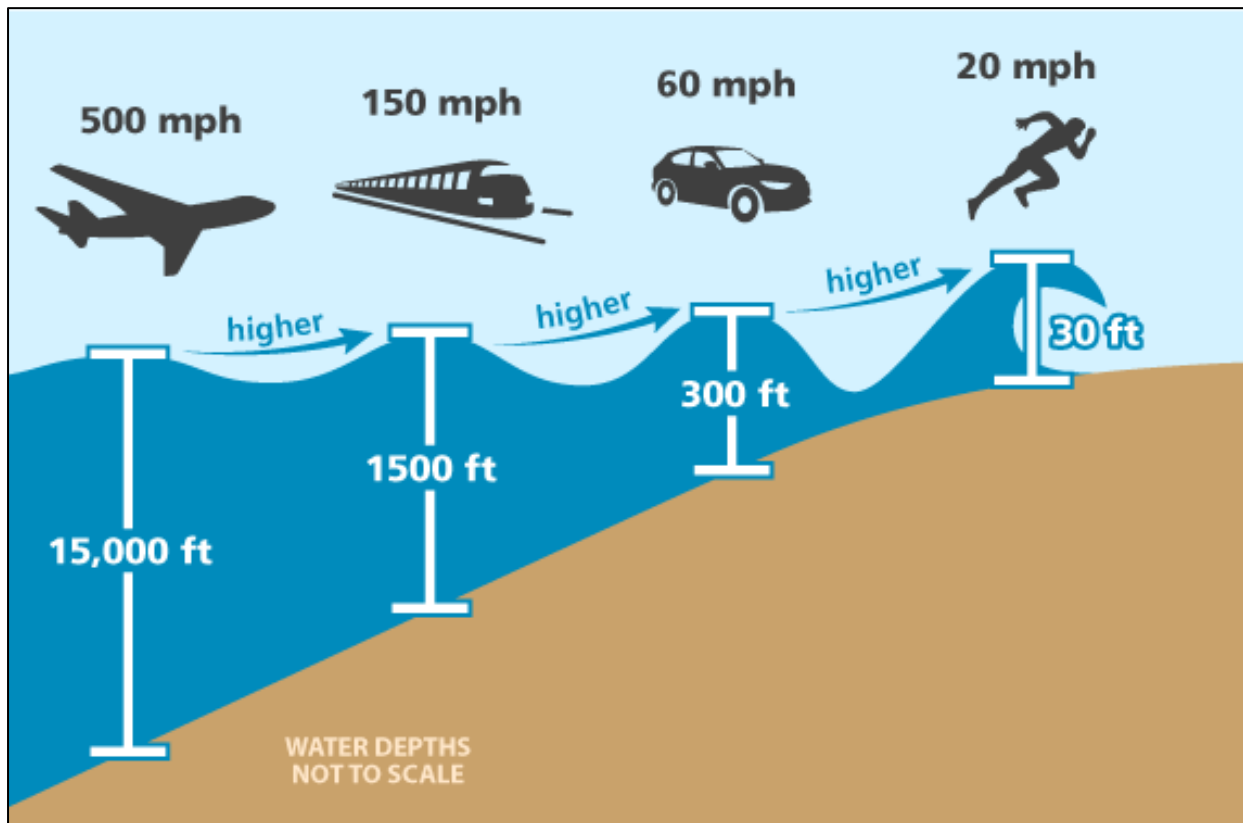
*-- Beverly Ward, recounting stories told to her around 1930 by Susan Ned, born in 1842.*



**Figure 56. Tsunami Evacuation Tower. (Banse 2022)**

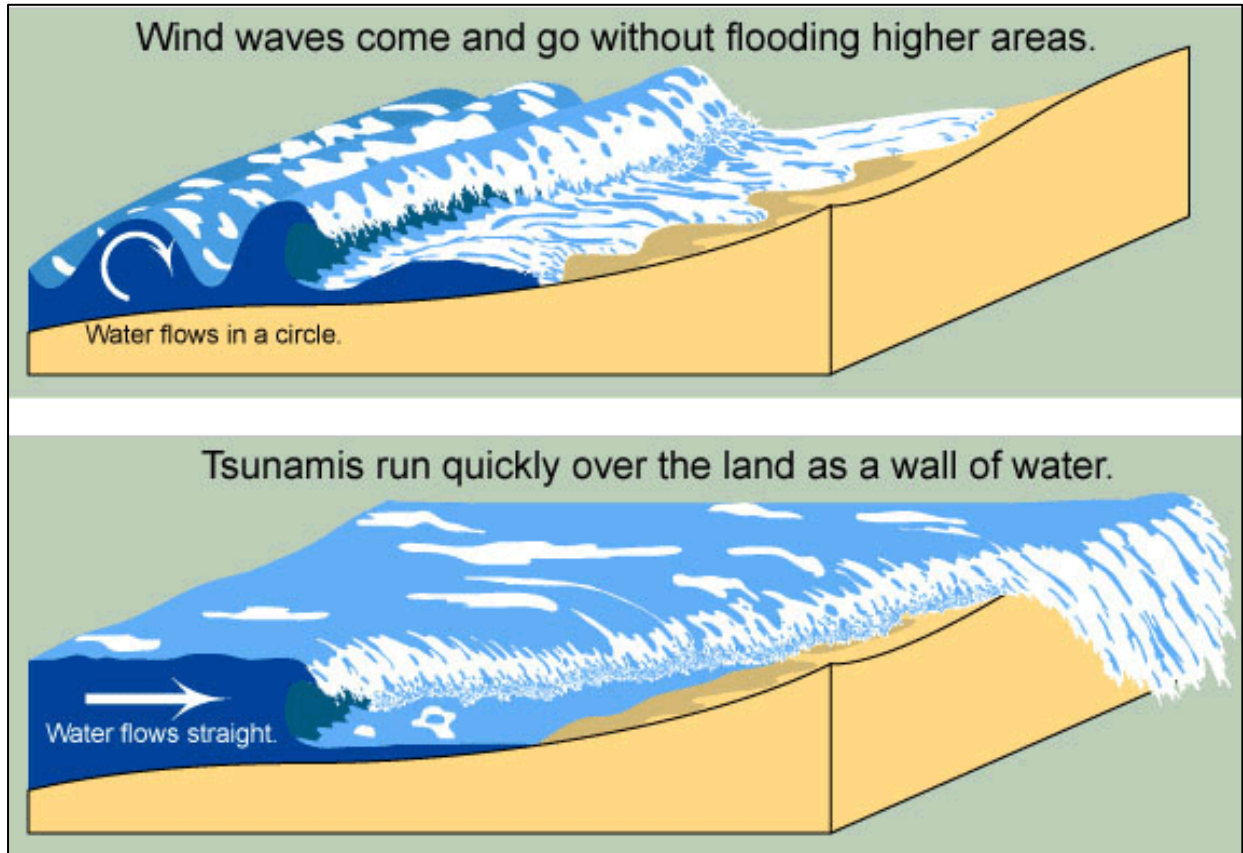
**1. General hazard description as it relates to SBIT:**

A tsunami is a series of extremely long waves caused when an event, such as an earthquake, suddenly shifts water in the ocean or in a lake. A tsunami radiates outward in all directions from its source and can move across entire oceans in less than a day. As depicted in Figure 57, tsunami wave heights are small but travel extremely quickly across the deep ocean. As the tsunami approaches shore, it slows considerably but the wave height also grows. As depicted in Figure 57, even a tsunami that has slowed to 20 m.p.h. is faster than people can run. A wave of almost any height will sweep people away at that speed.



**Figure 57. Comparable Speed of Tsunami Propagation Based on Water Depth. (Washington State Department of Natural Resources 2024)**

Unlike a typical wind wave with a short wavelength that breaks as it approaches shore, a tsunami has a long wavelength and will often approach as a wall of water that does not break but can travel far inland (Figure 58). Tsunamis may also strike with the trough of the wave first – causing the water to first suddenly recede like a very low tide – exposing the ocean floor, reefs, and fish.



**Figure 58. Wind Wave vs. a Tsunami Wave.** (Washington State Department of Natural Resources 2024)

Since the time between waves may be between minutes and hours, people must remain out of the inundation zone until they receive an all-clear signal. A number of phenomena may cause tsunamis (Figure 59), including:

- Earthquakes
- Submarine explosions
- Landslides – terrestrial and submarine
- Meteorite impacts
- Weather disturbances

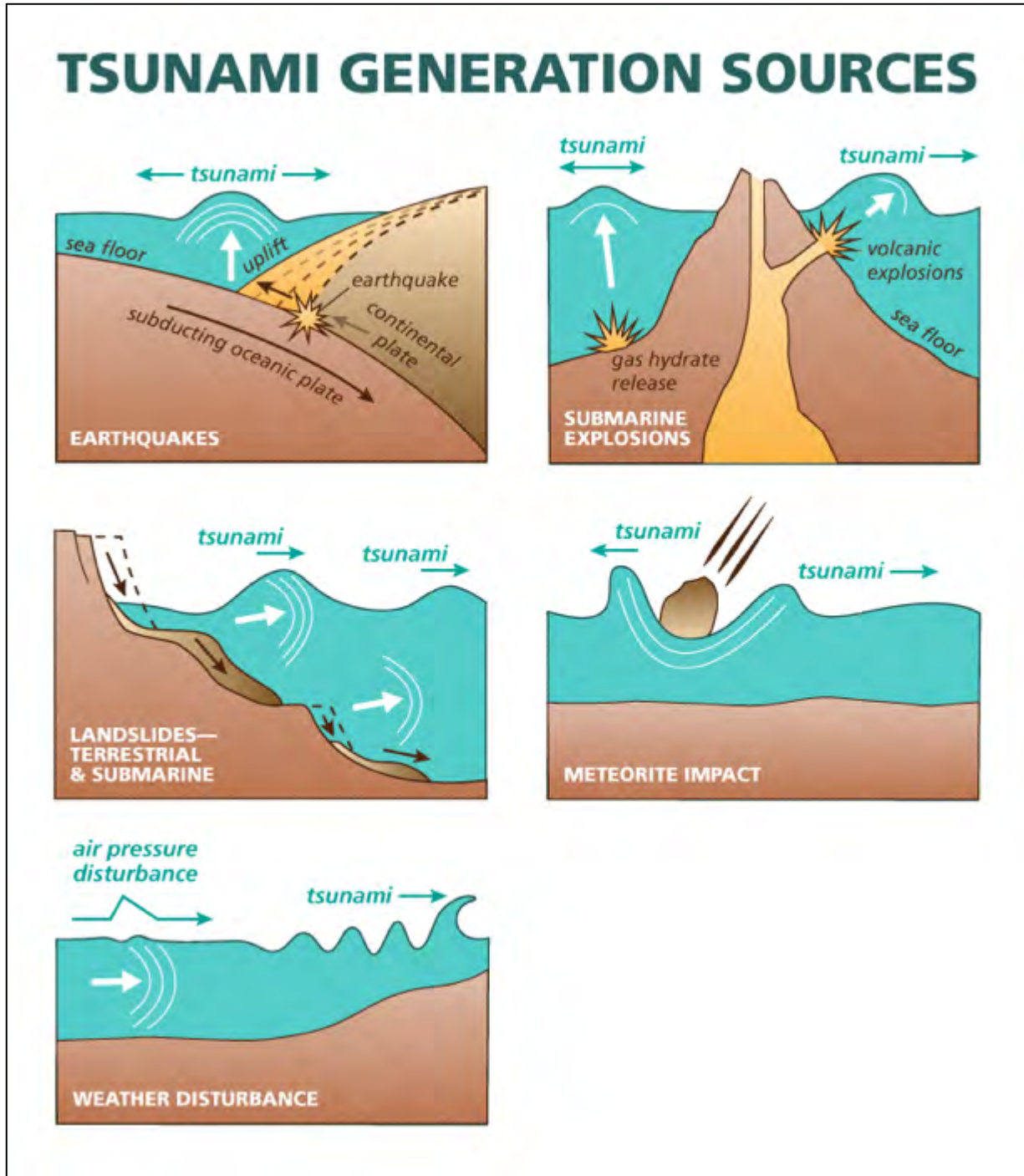


Figure 59. Tsunami Generation Sources. (Washington State Department of Natural Resources 2024)

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

The tsunami risks to the Washington Coast are summarized in Table 24.

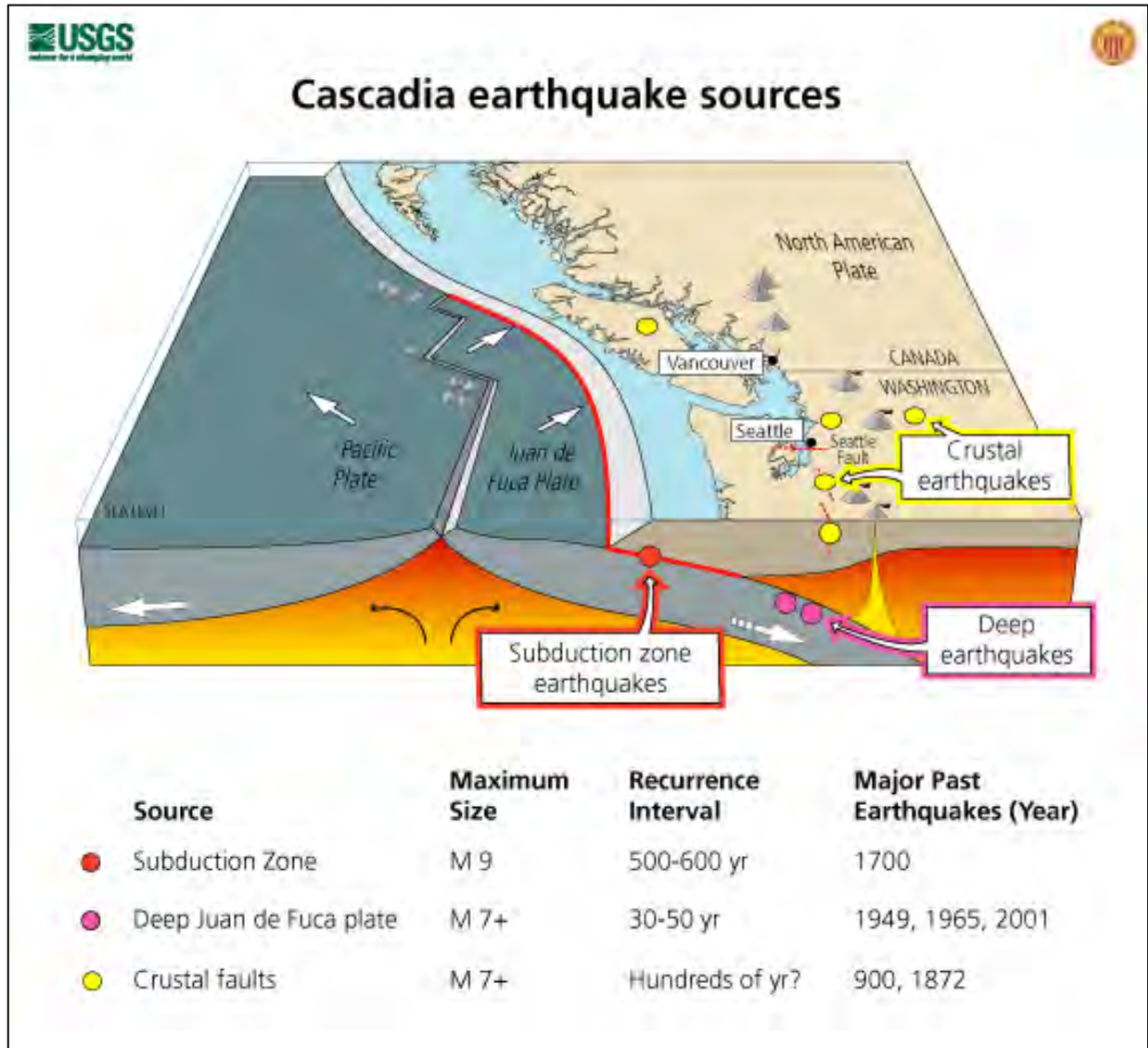
*Table 24. Types of Tsunami Risk.*

<b>Type of Tsunami</b>	<b>Description</b>	<b>Areas of Greatest Impact</b>	<b>Time to Evacuate</b>
<b>Distant</b>	A tsunami is created by a distant earthquake or landslide and travels across the ocean	Pacific coastal communities	Hours
<b>Cascadia subduction zone</b>	Tsunami created by large Magnitude 8–9 earthquake off the Washington, Oregon, or British Columbia coasts	Pacific coastal communities	Tens of minutes
<b>Local earthquake (for example, the Seattle or Tacoma faults)</b>	Tsunami created in large body of water from an earthquake on local faults	Communities close to the body of water	Minutes to tens of minutes
<b>Landslide-caused tsunami</b>	Large landslide occurs underwater or slides from land into water	Depends on where the landslide occurs	Minutes to tens of minutes



As depicted in Figure 60, Washington has three major earthquake sources that have the potential to cause tsunamis:

- subduction zone earthquakes,
- deep (Benioff Zone) earthquakes, and
- shallow crustal fault earthquakes.



**Figure 60. Washington Sources of Earthquakes and Relative Frequencies. (Washington State Department of Natural Resources 2024)**

Figures 61-62 depict how tsunamis are created in subduction zone earthquakes – the hazard of greatest concern for SBIT.

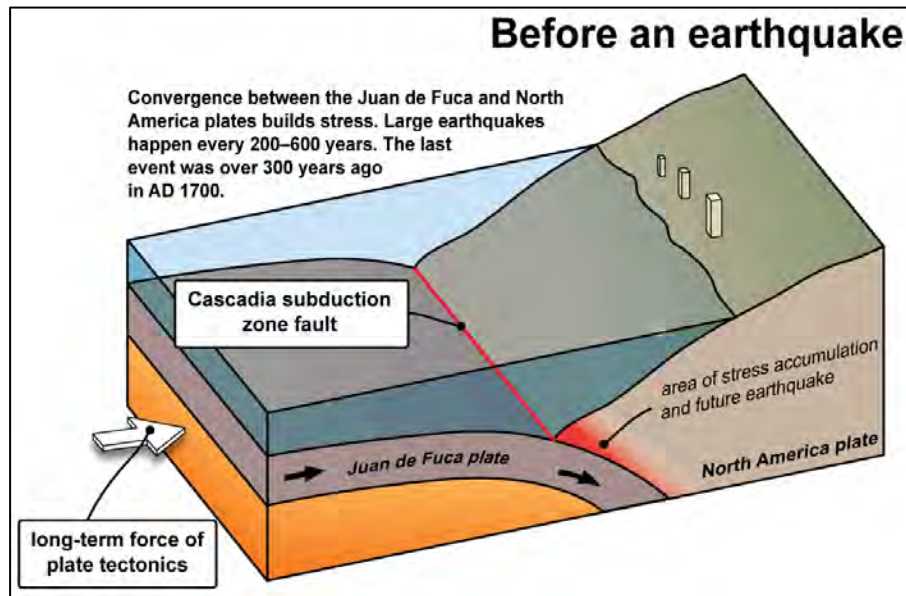


Figure 61. Before a Subduction Zone Earthquake. (Washington State Department of Natural Resources 2024)

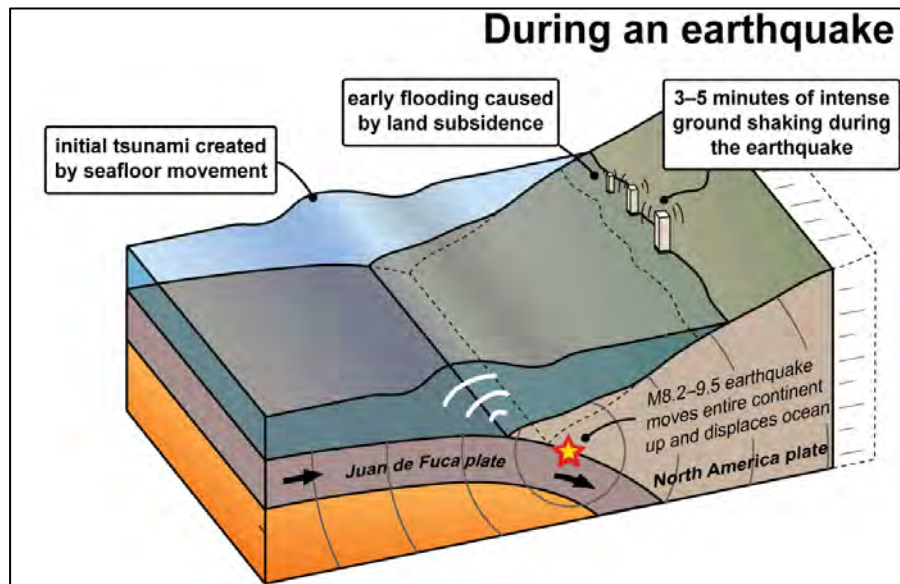
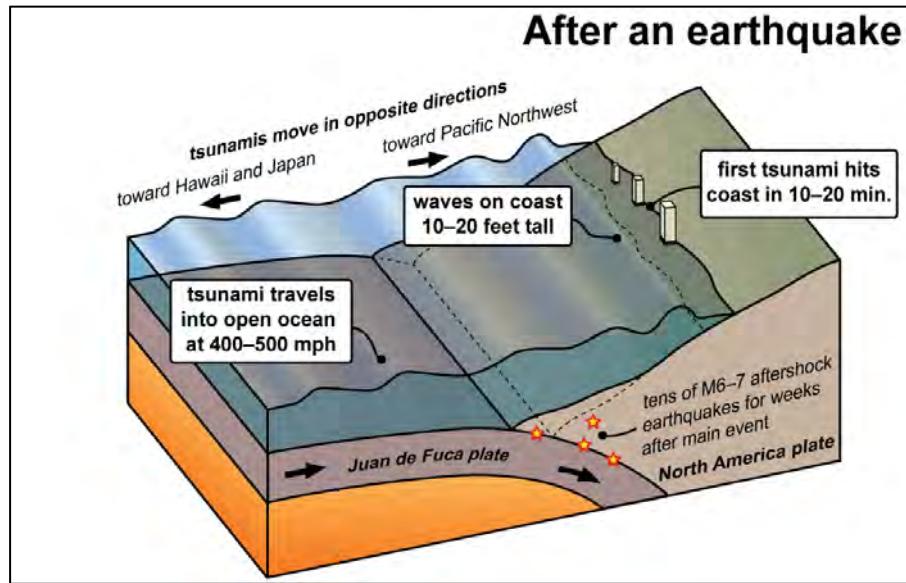


Figure 62. During a Subduction Zone Earthquake. (Washington State Department of Natural Resources 2024)



**Figure 63. After a Subduction Zone Earthquake. (Washington State Department of Natural Resources 2024)**

Again, in addition to subduction zone earthquakes, crustal fault and deep (Benioff Zone) earthquakes; and landslides may cause tsunamis. These are largely a threat in the Seattle-Puget Sound region and less of a concern for the Reservation. Tsunamis generated from earthquakes at other subduction zones and faults around the Pacific Ocean have the potential to impact our shores. Of the numerous historical events that have occurred, only the 1964 Alaska earthquake-generated tsunami has caused damage to the Washington coast. Most tsunami alert messages received for Washington are related to earthquakes in Alaska. Therefore, this section focuses on the subduction zone earthquake.



## 2. Location:

The most significant tsunami for the State of Washington in general and the Shoalwater Bay Indian Tribe specifically, is the Cascadia Subduction Zone Earthquake and Tsunami. As is evident in Figure 64, the Cascadia Subduction Zone is parallel to the Pacific Northwest Coast with the Reservation right in the heart of it.



*Figure 64. Cascadia Subduction Zone.*

Figure 65 depicts the tsunami hazard zone for the Reservation and surrounding region.

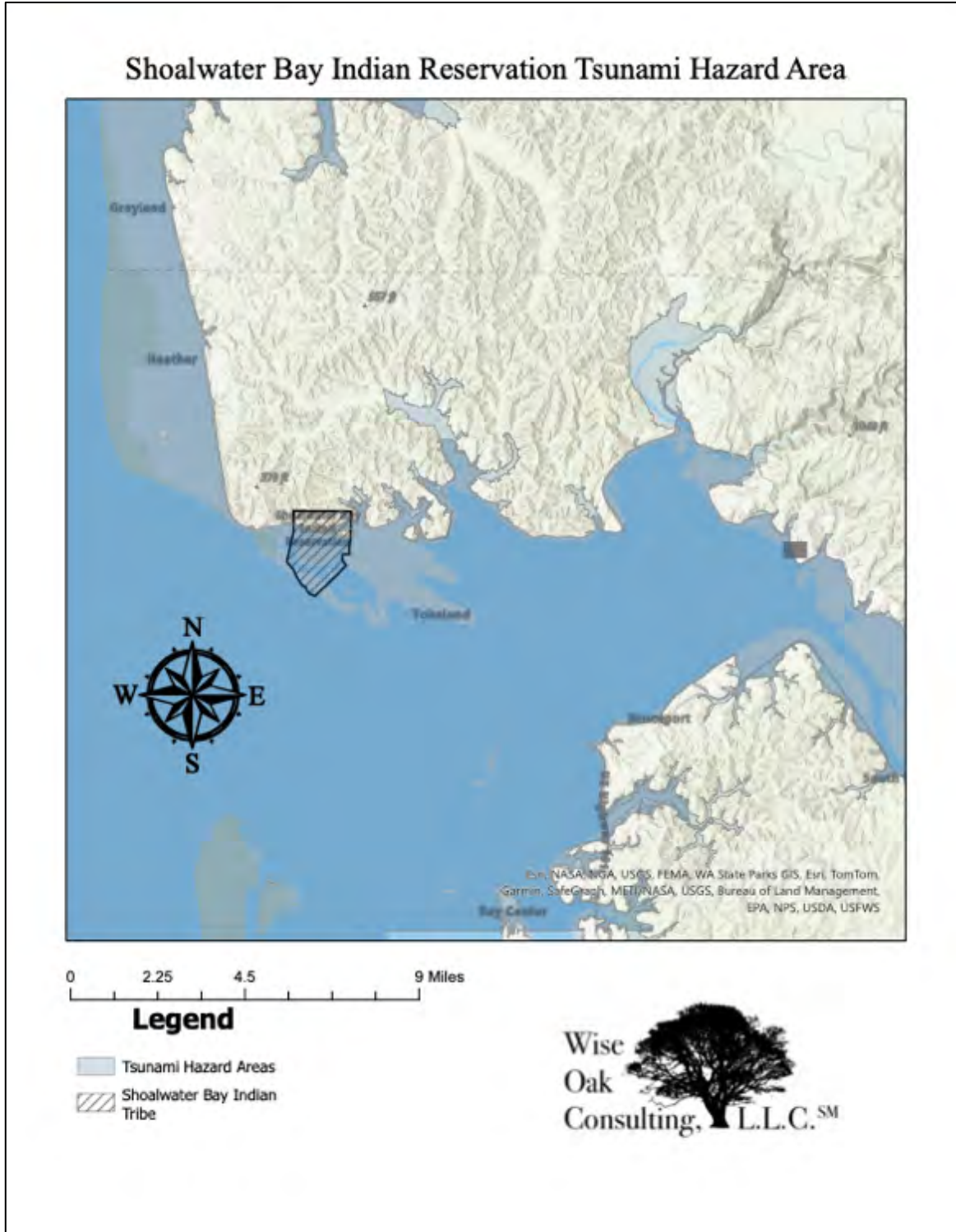


Figure 65. Tsunami Hazard Area.

### 3. Extent:

A magnitude (M) 9.0 catastrophic Cascadia Subduction Zone Tsunami is an existential threat to the Reservation and represents the hazard of most concern for the Tribe. The catastrophic (M9.0) Cascadia Subduction Zone Earthquake and Tsunami "...scenario assumes:

- The earthquake will be felt throughout the Pacific Northwest,
- Shaking will last for four to six minutes,
- The coast will subside approximately six feet (two meters), and
- A tsunami will reach the coast in 15 to 30 minutes in some locations.

The height of the tsunami will vary along the coast depending on local bathymetry and topography. It may be as high as 30 to 40 feet (9 to 12 meters) in some places.

Recently updated data and modelling indicated the potential exposure of the Shoalwater Bay Reservation. Using a 9.0 Cascadia Subduction Zone earthquake off of the coast of Washington as a worst-case scenario, models indicate that all of the Tribe's people, property and lands below 40-50 feet elevation would be significantly impacted by tsunami inundation and high velocity waves.

The amount of subsidence caused by the earthquake and the tide will also affect wave heights. Waves of varying heights will continue over a period of hours, and the first may not be the largest." (National Oceanic and Atmospheric Administration 2023)

Figure 66 is a tsunami evacuation walk time map for the Tokeland Peninsula. It is based on a tsunami arrival time of 20-35 minutes at the north end and south end of the peninsula respectively. The approximate tsunami evacuation slow-walk times are based on either seeking higher ground ("A" symbol) or reaching the tsunami evacuation tower (Figure 66 above). The approximate slow-walk times in minutes are depicted in circles – 15, 30, 45.

Exacerbating the tsunami wave height itself is the land is expected to sink up to 16 feet due to the subduction.

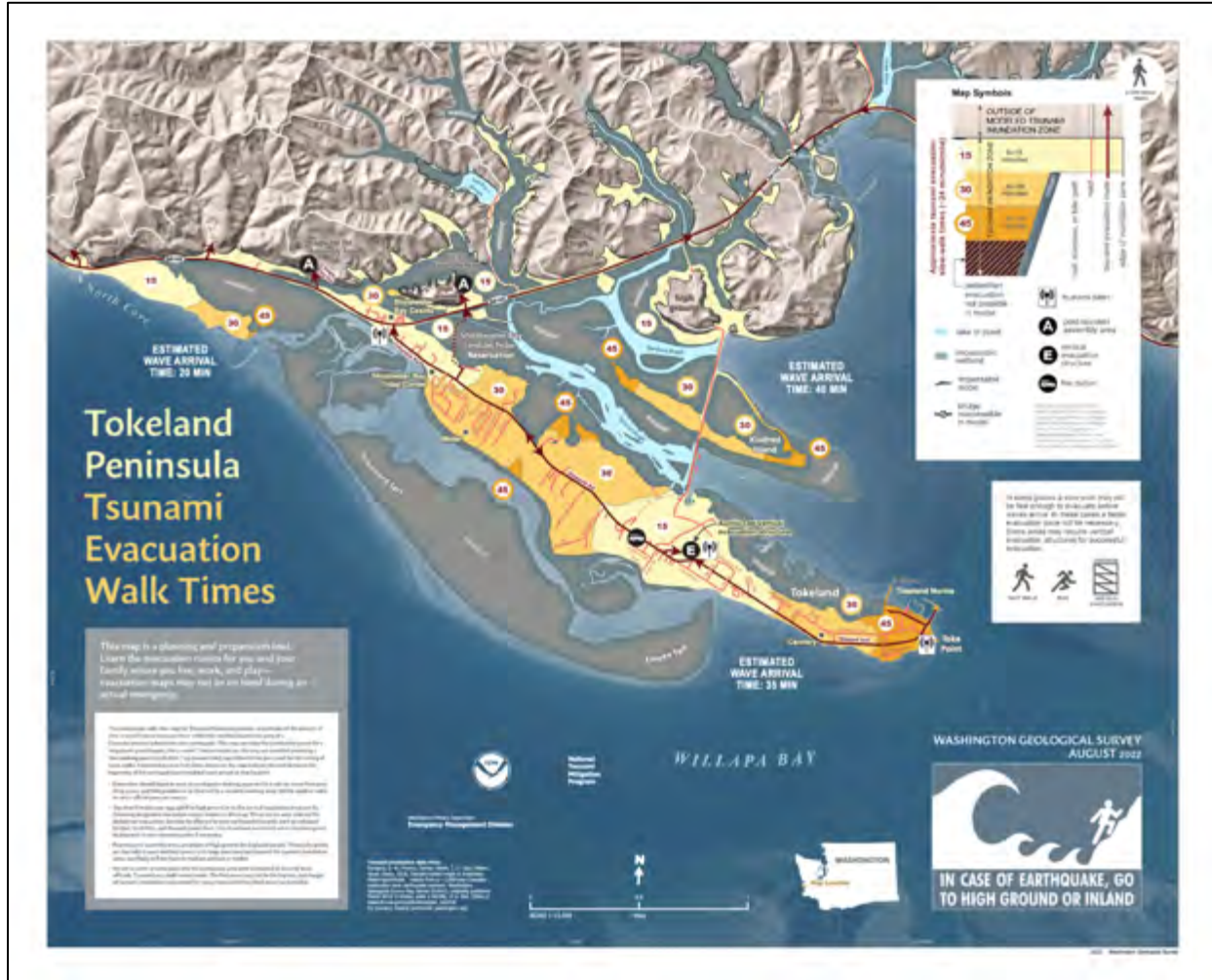


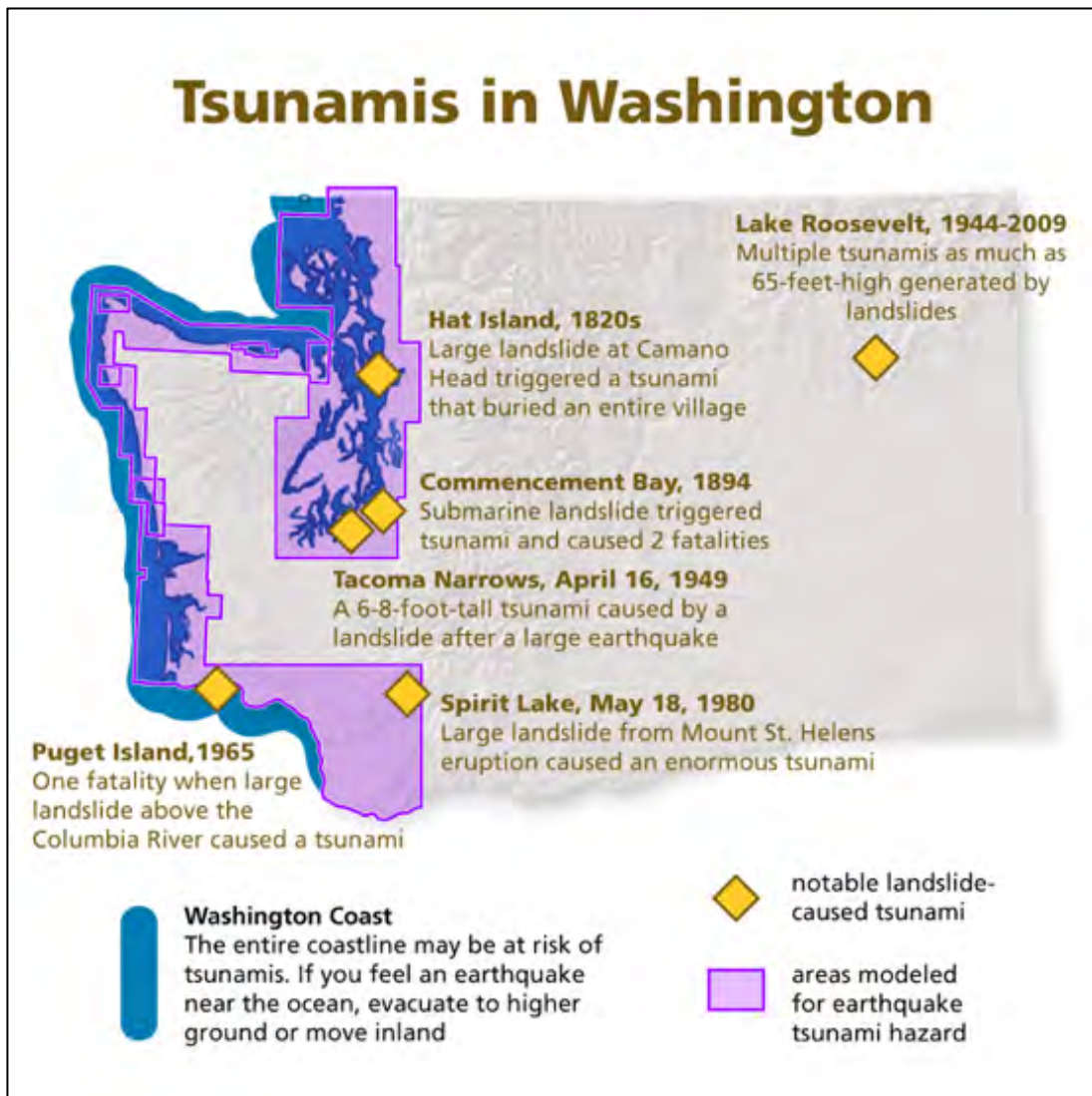
Figure 66. Location of the Cascadia Subduction Zone. (National Oceanic and Atmospheric Administration 2023)



**4. Previous Occurrences on SBIT:**

While tsunamis have caused significant damage, deaths and injuries elsewhere in the world, only one significant tsunami struck Washington’s Pacific coast in recent history.

The 1964 Alaska earthquake generated a tsunami that resulted in more than \$1,062,880 (in 2024 dollars) in damage. However, geologic investigations, combined with Native stories and other historical records, indicate that tsunamis have struck the coast a number of times over the last few hundred years. Figure 67 depicts notable, locally derived tsunamis in Washington. Of note, all fatalities have been from landslide induced tsunamis.



*Figure 67. Notable Locally Derived Tsunamis. (Washington State Department of Natural Resources 2024)*

Figure 68 depicts locations of distinct sediment deposits that were caused by tsunamis. Deposits found on the outer coast are dominantly from the Cascadia subduction zone. The entire Washington coastline, including Willapa Bay, have evidence of previous subduction zone earthquakes.



*Figure 68. Locations of Identified Tsunami Deposits. (National Oceanic and Atmospheric Administration 2023)*

### **1700 Cascadia Tsunami**

An estimated magnitude 9 Cascadia Subduction Zone earthquake occurred on January 26, 1700, at about 9 P.M. PST. The subsequent tsunami overran native fishing camps and villages and triggered landslides that also destroyed some villages. Many native village sites were abandoned or relocated after this event.

The land also subsided by a few feet after the earthquake, covering the lands with tsunami deposits as the tides overtook formally dry upland.

**May 1960 Chilean Tsunami**

A M 9.5 earthquake along the coast of Chile generated a tsunami that struck the Washington coast at Grays Harbor (small waves), Tokeland (two feet), Ilwaco (two feet), Neah Bay (1.2 feet), and Friday Harbor (0.3 feet). No damage occurred.

**March 1964 Alaskan Tsunami**

The tsunami generated by the March 27, 1964, Alaska earthquake was the largest and best-recorded historical tsunami on the southern Washington coast. Tsunami wave heights generally were greatest on the south coast and smaller on the north coast; additionally, the tsunami was recorded inland in the Strait of Juan de Fuca (Friday Harbor), Puget Sound (Seattle), and the Columbia River (Vancouver).

Table 25 highlights observations of the tsunami in Grays Harbor County at Westport, Joe Creek, Pacific Beach, Copalis, Grays Harbor City, and Boone Creek.

Damages included debris deposits throughout the region, minor damage in Ilwaco, damage to two bridges on State Highway 109, a house and smaller buildings being lifted off foundations in Pacific Beach (the house was a total loss) and piling damaged at the Moore cannery near Ilwaco.

*Table 25. Local Observations of the 1964 Alaskan Earthquake Tsunami.*

<b>Location</b>	<b>Magnitude</b>	<b>Location</b>	<b>Magnitude</b>
<b>Wreck Creek</b>	4.5 meters	<b>Neah Bay</b>	0.7 meters
<b>Seaview</b>	3.8 meters	<b>Taholah</b>	0.7 meters
<b>Moclips</b>	3.4 meters	<b>Hoh River Mouth</b>	0.5 meters
<b>Ocean Shores</b>	2.9 meters	<b>Friday Harbor</b>	0.4 meters
<b>La Push</b>	1.6 meters	<b>Vancouver</b>	0.1 meters
<b>Ilwaco</b>	1.4 meters	<b>Seattle</b>	0.1 meters

**November 2006 Kuril Island Tsunami**

On Nov 15, 2006, a M 8.3 earthquake occurred near the Kuril Island northeast of Japan. Washington was put into a Tsunami Advisory which resulted in a 5 cm tsunami that was reported on the Neah Bay tide gage. However, after the cancellation of the Tsunami Advisory, a train of tsunami waves hit Crescent City, California six hours after the

earthquake and destroyed docks, tore about a dozen boats lose from moorings, and sank at least one boat. Table 26 highlights the local observations.

*Table 26. Local Observations of the 2006 Kuril Island Tsunami.*

<b>Location</b>	<b>Magnitude</b>
<b>La Push</b>	0.15 meters
<b>Neah Bay</b>	0.3 meters
<b>Port Angeles</b>	0.11 meters
<b>Westport</b>	0.04 meters

**February 2010 Chilean Tsunami**

On February 27, 2010, a M 8.8 earthquake struck Chile along the boundary of the Nazca and South American plates. The 62-mile-wide and 310-mile-long rupture created a local tsunami up to 8.6 feet and shaking was felt as far away as Louisiana. Locally, a 0.8-foot tsunami wave was observed at Neah Bay.

**November 2011 Tohoku Tsunami**

On March 11, 2011, a M 9.0 earthquake in Tohoku, Japan (38.297 N, 142.373 E, depth 29 km), generated a tsunami across the Pacific and caused tremendous local devastation as the impacts were experienced over a large area. While the tsunami did not cause any damage within the planning area, there was slight increase in wave activity as a result of the earthquake, as well as debris found along the beaches of Pacific County for a few years after. Table 27 highlights the local observations.

*Table 27. Local Observations of the 2011 Tohoku Tsunami.*

<b>Location</b>	<b>Magnitude</b>
<b>La Push</b>	0.7 meters
<b>Neah Bay</b>	0.43 meters
<b>Port Angeles</b>	0.58 meters



*Table 27. Local Observations of the 2011 Tohoku Tsunami.*

Location	Magnitude
Port Townsend	0.15 meters
Westport	0.45 meters
Toke Point	0.33 meters

**5. Probability of Future Events on SBIT:**

The 1700 Cascadia Subduction Zone Earthquake and Tsunami is the model for the catastrophic planning scenario in the Northwest. Because earthquakes occur in geological time, the next occurrence is difficult to predict. It could be immediately or many years into the future. As described in Section 9.4, the last Cascadia M 9.0 tsunami was 300 years ago and there have been more than 40 magnitude 8+ earthquakes over the last 10,000 years – approximately every 250 years. The reoccurrence interval for a Cascadia Subduction Zone M 9.0 Earthquake and Tsunami is estimated to be 500-600 years.

**6. Impact on SBIT:**

A M9.0 Cascadia Subduction Zone Earthquake and Tsunami will inundate all SBIT infrastructure currently on the Tokeland Peninsula. Due to its modern construction, infrastructure in the Willapa Hills should survive with limited damage. The Cascadia Subduction Zone Tsunami will strike the Reservation both quickly and with significant height. Figure 69 depicts the tsunami wave velocity. The waves will arrive at faster speed than most humans can run – especially for any distance. Figure 70 depicts the modelled wave height. Again, all structures except the tsunami evacuation tower are expected to be inundated.

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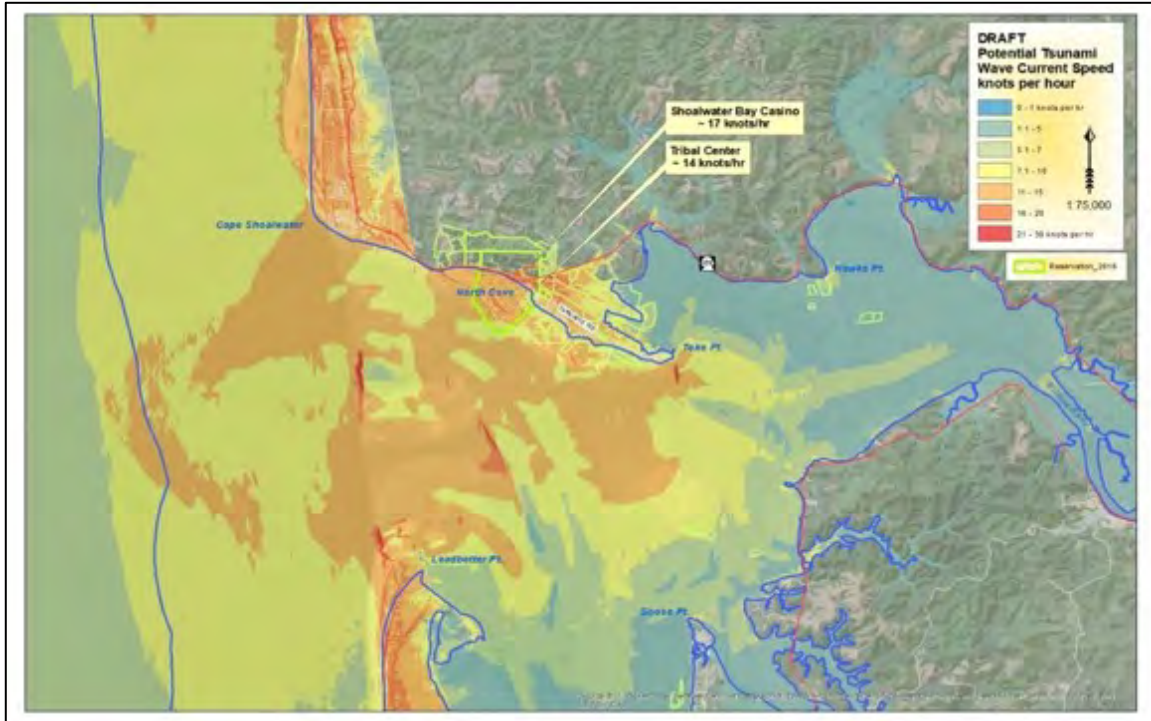


Figure 69. Tsunami Wave Velocity.

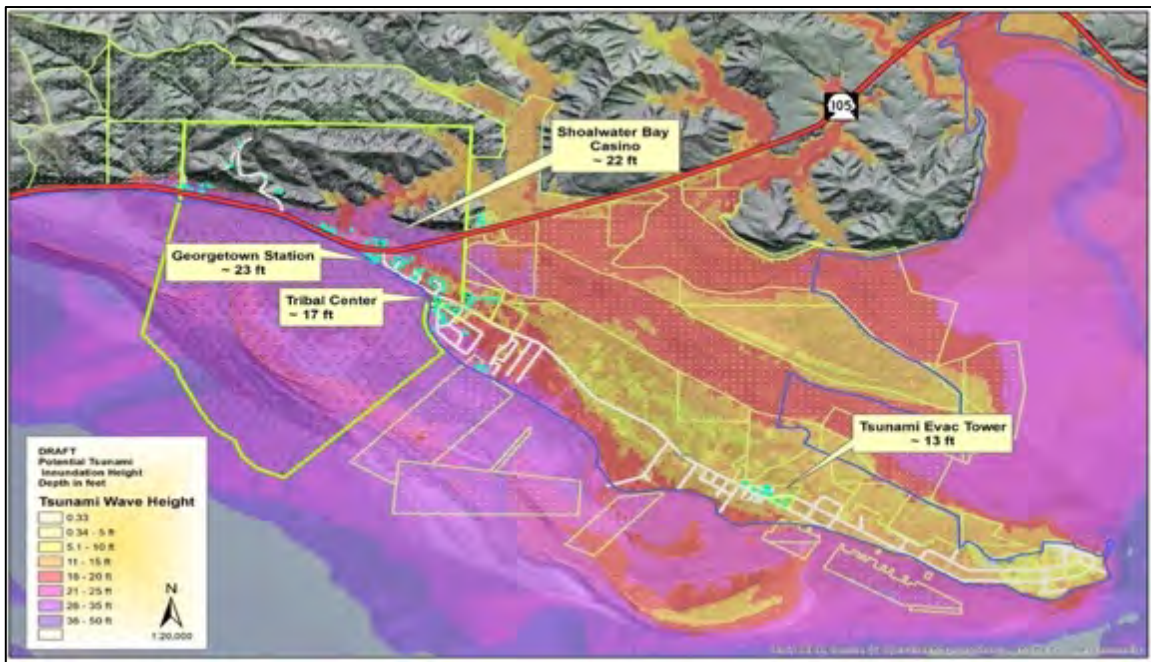


Figure 70. Tsunami Wave Velocity.

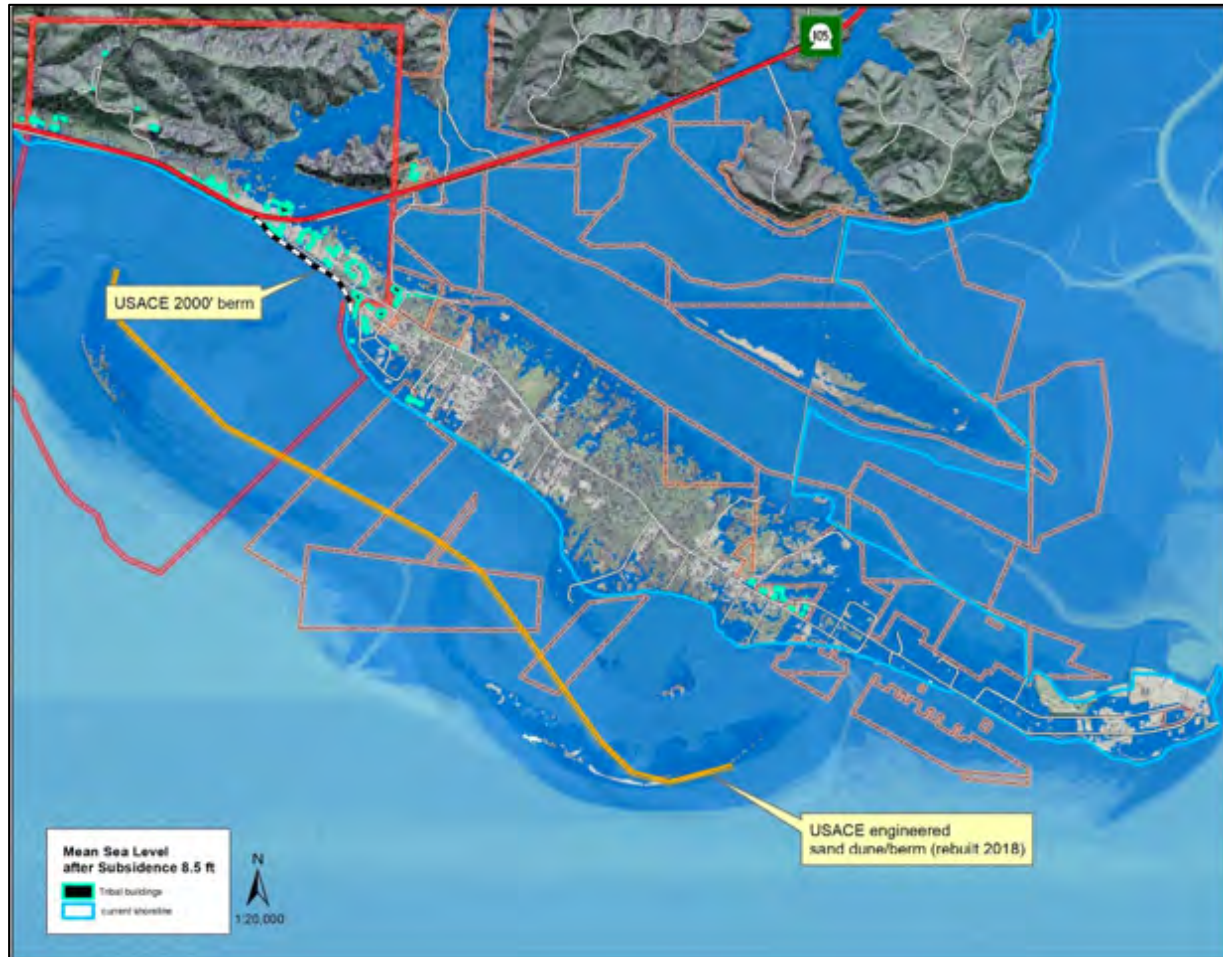
## **7. Vulnerability of SBIT:**

The Shoalwater Bay Tribe is one of the most vulnerable communities in the United States to the impacts from tsunami. Apart from an evacuation shelter built on Eagle Hill road, all of the Tribe's people, visitors, infrastructure, buildings and businesses are located at sea-level on the coastal plain.

Limited evacuation routes and staging areas also increases vulnerability. Evacuation is further hindered by the fact that the first tsunami waves could reach the Reservation within 30 minutes.

The community would already be impacted by the earlier earthquake, which could potentially cause massive property damage, injuries and debris, and hinder subsequent response, rescue and evacuation efforts.

A M9.0 Cascadia Subduction Zone Earthquake and Tsunami will destroy 100% of existing infrastructure on the Tokeland Peninsula. Following damage from the earthquake and subsidence, waves will overtop most of the structures. Again, it would be an existential event that will result in a total loss – except for the Tribe's tsunami evacuation tower. The entire peninsula will be covered with debris. After the final waves of the tsunami stop, a new situation becomes apparent – a land that dropped 8.5 feet, meaning that the highest tides now lap along the base of the hills as they inundate most of the property of the Tribe along SR 105 and Tokeland Rd. including the Tokeland peninsula, with low tide now considered similar to high tide before the earthquake (Figure 71).



*Figure 71. Mean Sea Level After an Earthquake Subsidence of 8.5 Feet.*

The tsunami threat is the primary reason that the Tribe is currently executing its Managed Retreat project to move all infrastructure off of the Tokeland Peninsula and into the Willapa Hills.

### **8. Impact of Climate Change:**

There are five (5) ways that climate change can increase the threat of tsunamis. (Cunneen 2022)

- Sea level rise
- Landslides
- Iceberg calving and collapsing ice shelves
- Volcanic Activity from Ice Melting
- Increased Earthquakes

First, climate change leads to sea level rise. The sea level rise, in turn, increases the frequency and magnitude of flooding, including for tsunamis.

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Second, wetter soil from more frequent and intense rainfall is less stable and more prone to slide either from the rain itself or triggered by such events as earthquakes. When those slides occur into or under water, tsunamis may result.

Third, wandering icebergs can trigger tsunamis far from the original iceberg source when they collide with unstable sediment on the seafloor. Climate change causes an increasing number and frequency of iceberg calving – when ice falls into the ocean. This includes an increasing number and frequency of ice shelves collapsing.

Fourth, climate change may be causing more volcanic activity which can lead to tsunamis.

Fifth, ice melting may relieve pressure that is holding fault movement. As massive glaciers melt and relieve that pressure, more earthquakes may result.

## ***11. Wildland Fire***

### **1. General hazard description as it relates to SBIT:**

Wildfires have been a part of the ecosystem for thousands of years. The National Weather Service (NWS) defines a wildfire as: “Any free burning uncontrollable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment.” (National Weather Service 2024) They can occur naturally, by human accident, or by intentional human action. They are often located far from human development with the exception of roads, power lines, and similar rural infrastructure. However, there is an ongoing threat to (and from) hikers, campers, and other people engaging in outdoor activities. Wildfires become particularly dangerous at the wildland-urban interface (WUI) - areas where structures and other human development meet or intermingle with undeveloped wildland.

Most wildfires occur without warning and spread quickly depending on such factors as the level of moisture and available fuel based on the area’s land use. The threat of wildfire and grass fires also increases in areas prone to intermittent drought or are generally arid or dry.

Various factors have resulted in rapid development in the outlying fringe of metropolitan areas and in rural areas with attractive recreational and aesthetic amenities, especially forests, communities bordering forests and prairies where fires branch off. This demographic change is increasing the size of the wildland-urban interface. The WUI expansion has increased the likelihood that wildland and grass fires will threaten life and property. As the Tribe relocates into the Willapa Hills, it essentially moving from a region of high risk for tsunami to a region of lower risk for wildland fire.

In Western Washington, wildfires generally occur during late spring and summer, ending when the rainy season begins October. However, drought, light snowpack, and local weather conditions can expand or shorten the length of the fire season. The early and late shoulders of the fire season are usually associated with human-caused fires. The peak months of July, August, and September are usually related to thunderstorms and lightning strikes.

On the southwest Washington coast, wildfire risk is considered low. Although heavily vegetated, with a history of logging, the area’s wet coastal climate leads to damp conditions that makes it difficult for wildfires to start naturally and spread.

Wildfires in Washington have been growing in size and impact as climate change has increased the risk. The three largest recorded fires in Washington have occurred since 2014 and are highlighted in Table 28.



*Table 28. Largest Wildfires in the State of Washington.*

Year	Fire Name	County	Size (acres)	Structures Lost	Deaths
2020	Cold Springs Canyon/Pearl Hill Fires	Okanogan / Douglas	410,000+	0	1
2015	Okanogan Complex	Okanogan	304,782	195	3
2014	Carlton Complex	Okanogan	256,108	300	1

Fortunately, the wet climate in the region results in a relatively low wildfire risk as depicted in Figure 72.



**Figure 72. Wildfire Risk to Communities.**

## **2. Location:**

While the Tribe's current location on the Tokeland Peninsula has a very low probability of wildfire, the Tribe will face a higher one when it relocates into the Willapa Hills. The sporadic brush fires along coastal areas are typically small and burn less area as they are mostly fed by grass and brush versus heavily forested areas. Almost all fires in the area are caused by humans, primarily by logging related debris burns, as well as by campers and other recreational activities.

The heavily forested hills are nearly completely covered in by some form of vegetation that could act as fuel for a fire. In addition, the steep terrain makes accessing wildfires difficult

Although wildland and grass fires can occur almost anywhere throughout the Reservation, the damp and humid climate conditions typically help prevent and contain wildfires. However, the planning area has been experiencing drier and conditions since the development of its last HMP.

Wildland-urban interface zones exist throughout the Pacific County, generally along more common along the coastal and river basins. While the Tribe currently has limited WUI exposure, as it relocates into the Willapa Hills, the entire infrastructure will essentially become a WUI.

## **3. Extent:**

In its 2021 hazard mitigation plan, Pacific County rates expected fires according to the fire severity index depicted in Figure 73. The County expects wildfire occurring outside the forested areas to occur at a rank 0 to 1 on the burn severity index, while major wildfires that originate anywhere in the forested regions can likely occur anywhere from 0 to 2 on the burn severity index. Based on historical data, the planning area should expect its wildfires to average around 4.7226 acres per wildfire but should expect most to burn below 10 acres with a rare outlier burning in excess of 50 acres. The Tribe can expect burn severity index of 0 to 2 within the Willapa Hills.








BURN SEVERITY	RANK	DESCRIPTION	CHARACTERISTICS
 Unburned	RANK 0	Fire extinguished before reaching microsite	<ul style="list-style-type: none"> <li>• Leaf litter from previous years intact and uncharred</li> <li>• No evidence of char around base of trees and shrubs</li> <li>• Pre-burn seedlings and herbaceous vegetation present</li> </ul>
 Low Severity Burn	RANK 1	Surface fire which consumes litter yet has little effect on trees and understory vegetation	<ul style="list-style-type: none"> <li>• Burned with partially consumed litter present</li> <li>• Evidence of low flame heights around base of trees and shrubs (&lt;0.5 m)</li> <li>• No significant decreases in overstory &amp; understory basal area, diversity or species richness from pre-burn assessments</li> <li>• Usually burning below 80 degrees Celsius</li> </ul>
 Medium-Low Severity Burn	RANK 2	No significant differences in overstory density and basal area, & no significant differences in species richness. However, understory density, basal area, and species richness declined.	<ul style="list-style-type: none"> <li>• No litter present and 100% of the area covered by duff</li> <li>• Flame lengths &lt; 2 m</li> <li>• Understory mortality present, little or no overstory mortality</li> </ul>
 Medium-High Severity Burn	RANK 3	Flames that were slightly taller than those of Medium-low intensity fires, but these fires had occasional hot spots that killed large trees, with a significant reduction in the understory.	<ul style="list-style-type: none"> <li>• Soil exposure on 1-50% of the area</li> <li>• Flame lengths &lt; 6 m</li> <li>• High understory mortality with some overstory trees impacted</li> </ul>
 High Severity Burn	RANK 4	Crown fires, usually a stand-replacing burn with relatively high overstory mortality.	<ul style="list-style-type: none"> <li>• Soil exposure &gt; 50%</li> <li>• Flame lengths &gt; 6m</li> <li>• Higher overstory mortality 20%</li> <li>• Usually burning above 800 degrees Celsius</li> </ul>

Figure 73. Burn Severity Index.

4. Previous Occurrences on SBIT:

Historically, there have not been any major wildfires in the Shoalwater Tribal area or surrounding region. GIS analysis was conducted of past wildfire events using WA Dept. of Natural Resources GIS data. All events from 1970 (earliest GIS data) to 2024 were identified and analyzed within five (5) miles of the Shoalwater Bay Reservation.

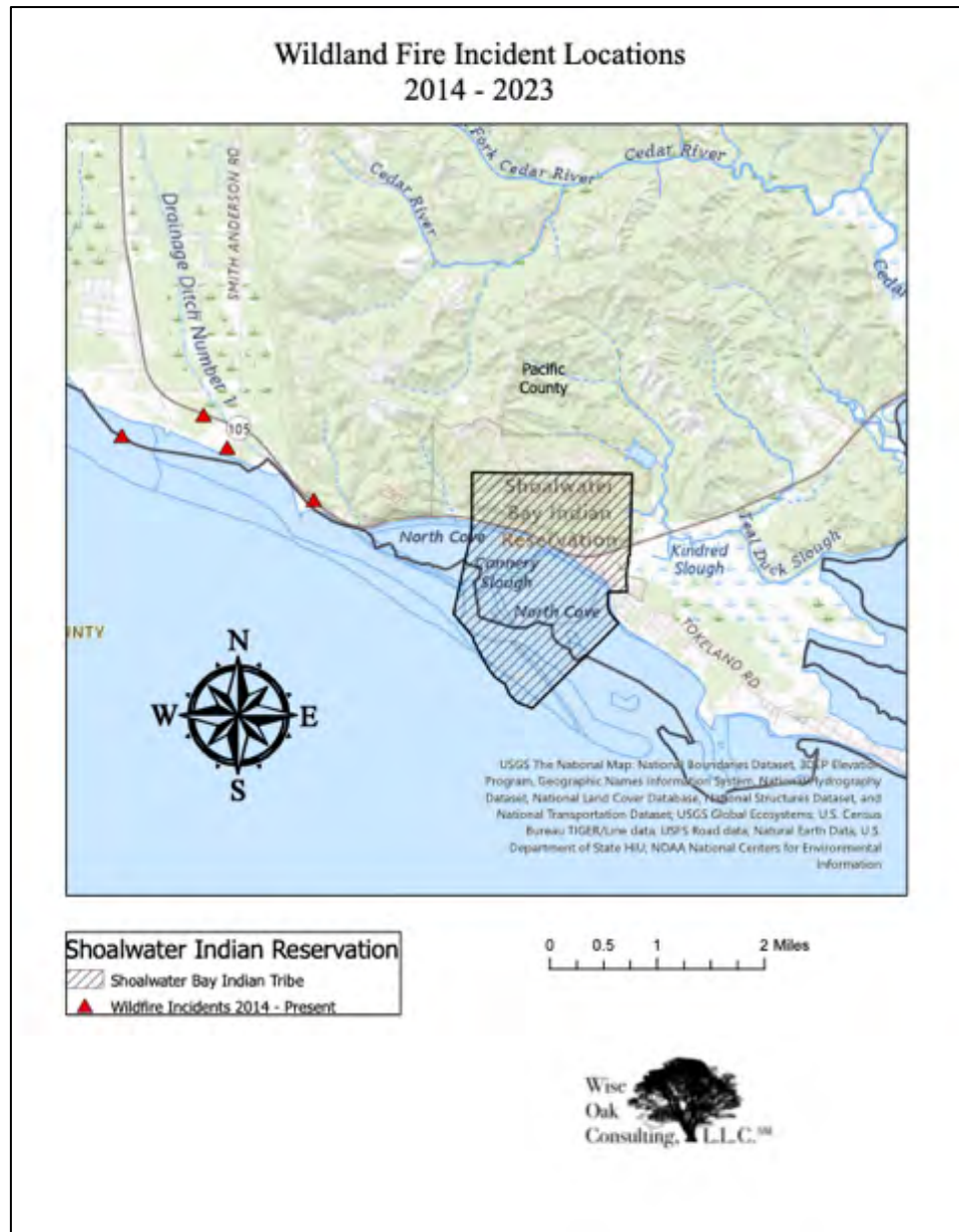
There have been 60 events since 1970. There have been 11 events since 2008. The largest fire in the study area occurred May 24, 1982, which burned 140 acres on the hill east of the Cedar River.

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The most recent large event was the Independence Fire, which burned 110 acres just west of North River.

There have been 6 past events on Tribal properties, all on timberlands. There have been no past fires on the Reservation or tribal trust lands.

Figure 74 depicts the four local wildland fires that are recorded in the National Interagency Fire Center database that was started in 2014. The fires range from .1 – 3 acres. Two (2) of the fires were human-caused and the causes of the other two (2) have not been determined as of the writing of this plan.



**Figure 74. Wildland Fire Locations 2014-2023.**

## **5. Probability of Future Events on SBIT:**

Almost all fires in the area are caused by humans, primarily by logging related debris burns, as well as by campers and other recreational activities. Based on the historical events from 2014-2024, there are an average of .4 wildfires per year in the local area with an average of 1.23 acres per fire. As the Tribe relocates into the heavily forested Willapa Hills, more fires are likely. In its 2021 hazard mitigation plan, Pacific County reported 68 wildfires that burned a total of 321.14 acres of land between 2014 and 2021. Based on the historical average, the County assumes that wildfires will occur at an average rate of 8.5 per year and burn an average of 40.1425 acres per year. **Impact on SBIT:**

Impacts to the Tribe's assets are considered minor to moderate. A wildfire event would be small and most likely affect one or two structures before suppression. Larger structures, such as the Casino and Tribal Center are well protected and have fire suppression systems in place to minimize risk of spread. The tribe estimates that worst case, a fire could cause \$500,000 in damage.

There is also concern of fires affecting the Tribe's natural resource areas, such as the salt marshes and beaches. Fires could damage and destroy critical native plants and habitats and speed up erosion.

## **6. Vulnerability of SBIT:**

FEMA's National Risk Index predicts an annualized frequency of 0.0013 wildfire events per year with an expected annual loss of less than \$400,000 for the census tract that includes the Reservation.

The vulnerability is shifting as the Tribe relocates into the Willapa Hills. Once the relocation is complete, 100% of the infrastructure will be at a risk at a value to be determined.

The current potential for a large wildfire on the Shoalwater Bay Reservation is extremely low. Improved fire spotting techniques, better equipment, and trained personnel are major factors, as are the Reservation's wet climate and normally low fire fuel conditions.

Nonetheless, the Reservation is served by a small volunteer fire department which may take longer to deploy and fight the fire. Outside resources would also take a long time. The vegetation in the area is composed of thick forests and logging debris or beach grasses and driftwood, both of which are potential fuel sources for wildfires.

Tribal members and staff are concerned with wildfires starting in the densely wooded hills behind the Reservation and spreading to nearby Tribal homes along SR 105. Staff also noted concerns with beach fires spreading onto tribal lands.

The main vulnerability is careless campers and hunters who could start fires that spread uncontrolled onto the Reservation, as well as errant or careless use of fireworks during the 4th of July holiday season.

#### **7. Impact of Climate Change:**

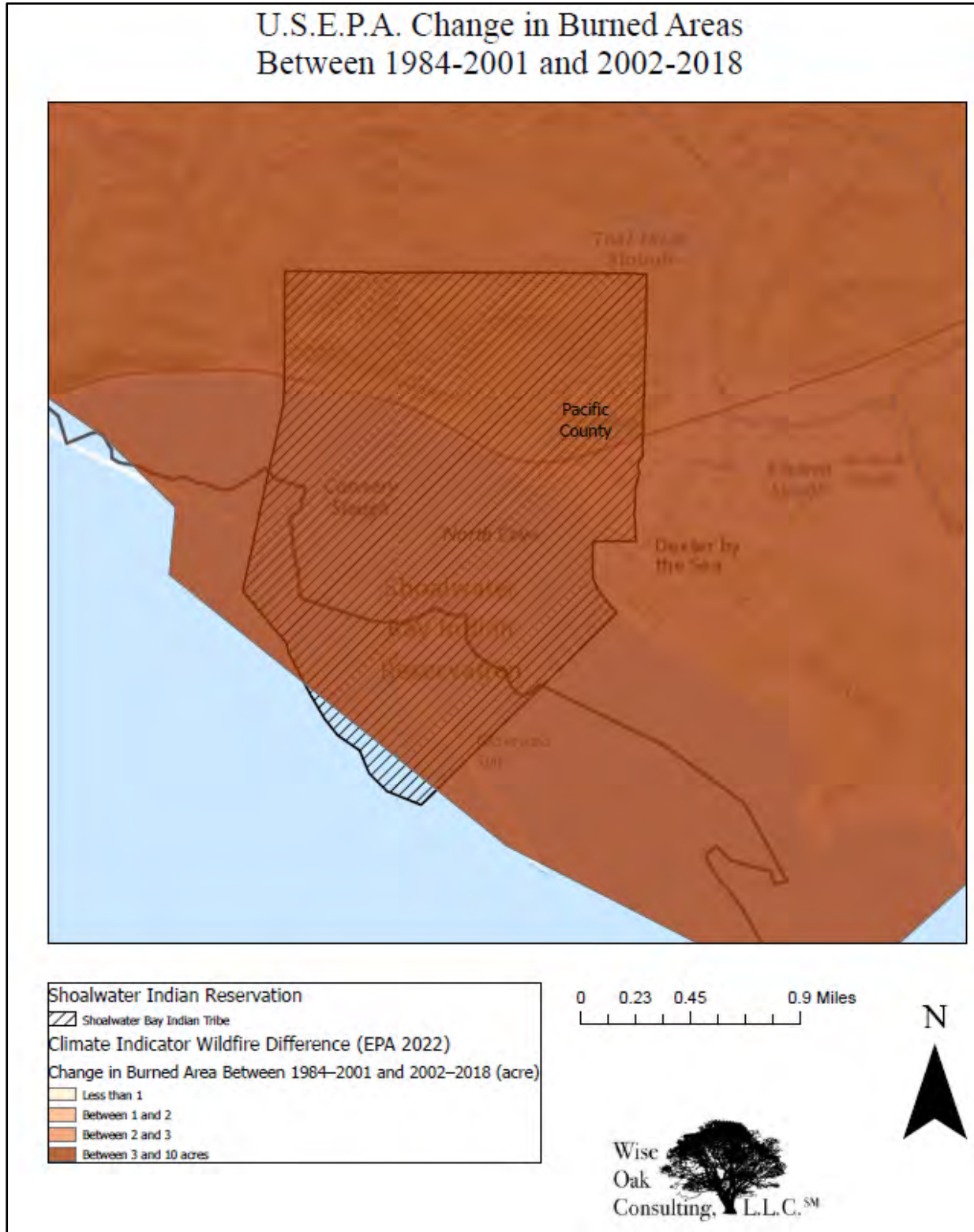
Climate change is expected to bring hotter, drier summers (as well as wetter winters) to the Shoalwater Bay area. This could increase the fuels and conditions for increased number and sizes of wildfires.

The tribe's future development is vulnerable to these increased impacts from wildfire. Most new tribal development will be located in the hills above the current areas of coastal development. These hills are former timberlands, which will surround any new development and structures.

Mitigation actions will be identified and implemented by the Shoalwater Bay in order to reduce the risk of wildfires impacting these future developments.

By 2069, the amount of "Extreme Fire Dangers" days in the area could increase by 6 days to 17 days per year, and the amount of "Very High Fire Danger" days could increase by 12 days to 47 days per year.

With the expected increase in temperatures, decrease in summer precipitation and streamflow and change in vegetation, the U.S.E.P.A. assessed an increase in acres burned of between 3-10 acres between the timeframes of 1984-2001 and 2002-2018 (Figure 75). With expected rising temperatures and less summertime water for vegetation, the Tribe can expect an increase in future wildfires.



**Figure 75. U.S. EPA Climate Indicator for Wildfire.**

**C. Technological Hazard Analysis**

Technological Hazards - accidents or the failures of systems and structures

- i. Hazardous materials (HAZMAT) release
- ii. Utility disruption
- iii. Structure fire

While technological hazards are optional and not evaluated by FEMA as a part of Hazard Mitigation Planning reviews, Trinidad Rancheria is including the Tribe’s basic assessment of them in its Hazard Mitigation Plan to better integrate the HMP with all elements of the National Preparedness System. Technological Hazards are fully assessed in Trinidad Rancheria’s 2018 Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR). The same process for identifying and assessing natural hazards was used for technical hazards. The results are in Table 29.

*Table 29: Shoalwater Bay Indian Tribe’s Technological Hazards of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Utility Disruption</b>	Extensive	Critical	Highly Likely	Very High	272	1
<b>HAZMAT Release</b>	Moderate	Critical	Unlikely	Moderate	247	2
<b>Structure Fire</b>	Moderate	Critical	Possibly	Moderate	194	3

Note that Marine Oil Spill is addressed in this plan but is not included in technological hazard calculations because it was identified as a concern during departmental interviews following the threat and hazard assessment process.



## **1. HAZMAT Release**

*“Releases may be small and easily handled with local response resources or rise to catastrophic levels with long-term consequences that require representatives of federal, state and local governments to be present at the scene with each level consisting of personnel from between five and 15 different agencies.” (Washington Emergency Management Division 2024)*

### **1. General hazard description as it relates to SBIT:**

Hazardous materials are substances that pose a significant risk to life or to the environment. Environment includes surface water, groundwater, drinking water supply, land surface, subsurface strata, ambient air, dry gullies and storm sewers that discharge to surface waters. Hazardous materials are substances that may be toxic, reactive/oxidizing, corrosive, flammable/combustible, radioactive, or explosive. Incidents involving hazardous materials can result in the evacuation of a few people to entire communities. Costs associated with hazardous material releases can easily run into millions of dollars for damages and cleanup.

One of the most devastating HAZMAT rail accidents in recent history occurred in East Palestine, Ohio, on February 3, 2023. Thirty-eight (38) tanker cars - 11 with hazardous materials - derailed, caught fire, and exploded.

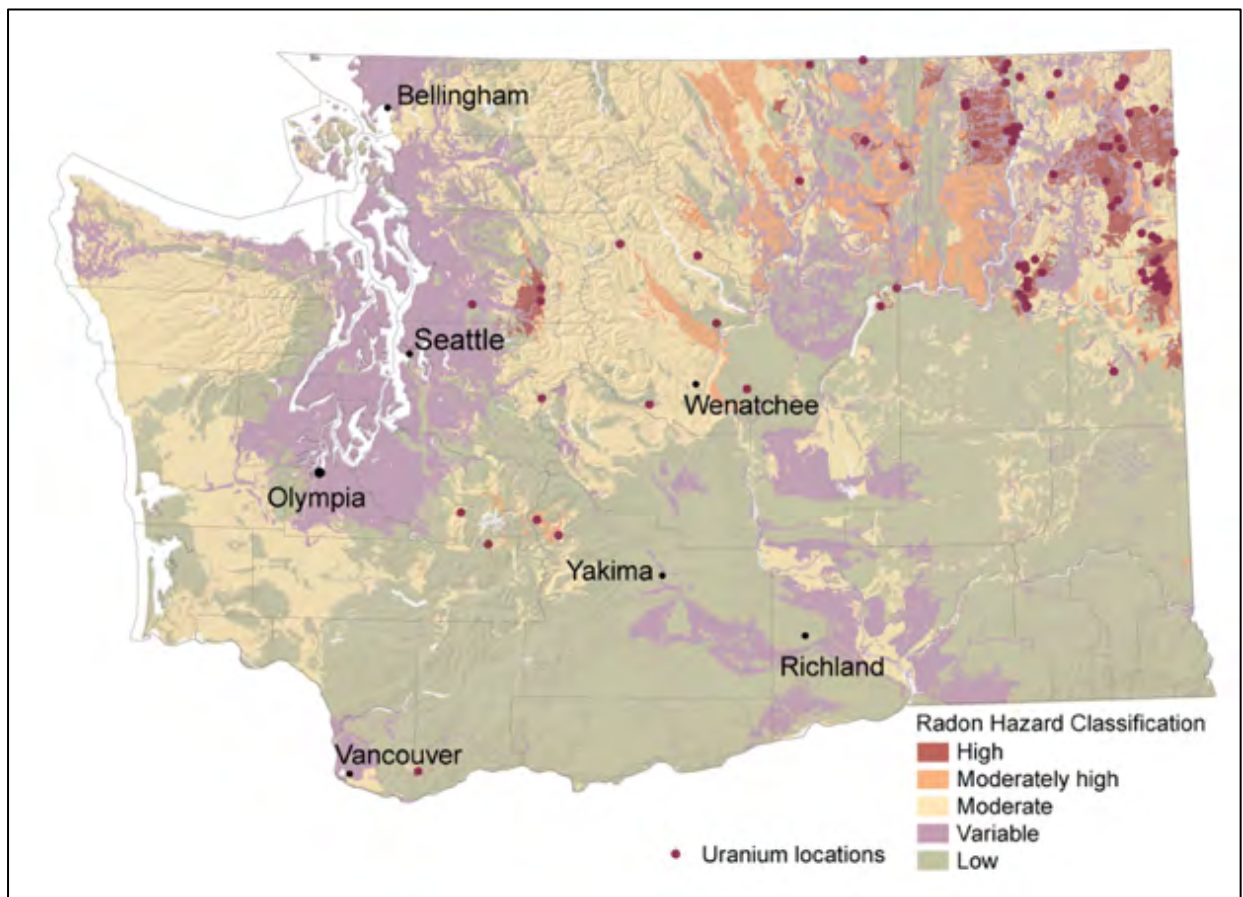
### **2. Location:**

Hazardous materials are regulated, monitored and inspected regularly by various entities in the State of Nevada. The following list provides information regarding identification of hazardous materials releases:

1. Fixed site facilities such as, but not limited to, chemical plants, storage facilities, manufacturing facilities, warehouses, mine sites, water and wastewater treatment plants, swimming pools, dry cleaners, automotive sales/repair sites, and gas stations exist throughout the State.
2. All transportation including highway, rail and air is monitored for hazardous material releases by DOT.
3. Pipeline transit of liquid petroleum, natural gas, or other chemicals is monitored for releases by DOT.
4. Non-terrorist related intentional or accidental acts that result in the release of a hazardous material by private persons or groups include clandestine methamphetamine laboratories and hazardous materials released in private and public settings.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

5. Terrorist-related acts resulting in the release of chemical, biological, radiological, nuclear, or explosive materials (CBRNE).
6. Historic release sites.
7. Naturally occurring geological formations containing potentially hazardous substances exist within the state. The four main natural hazardous material of concern in Washington are:
  8. Asbestos – not a local hazard.
  9. Mercury – not a local hazard.
  10. Arsenic – not a local hazard.
  11. Uranium and Radon – low local risk hazard (Figure 76).



**Figure 76. Natural Uranium and Radon Risk.**

The greatest concern on land is a transportation accident along State Highway 105 or on Tokeland Road as

Of greater concern is a maritime hazardous material spill that impacts the natural resources the Tribe monitors and protects – including the oyster farm



### **3. Extent:**

The Tribe's context statement from its 2023 THIRA is:

“During the height of crabbing season, a severe winter storm with severe winds causes several boats break free from their docks/moorings and crash against each other and the shore. One, 43-foot fishing boat sinks resulting in 200 gallons of fuel leaking along the shoreline. Approximately 100 birds, 10 sea mammals, and countless fish are affected. The region immediately loses all of its fishing business for two weeks during cleanup. However, the oyster beds are contaminated and must be completely rebuilt - resulting in 3 years and millions of dollars in lost revenue. Four jurisdictions and three partner organizations are affected - include non-profit, volunteer, and private sector organizations.”

### **4. Previous Occurrences on SBIT:**

To date, the Tribe has had minor HAZMAT spills that have been easily contained and cleaned up. There have been boating accidents, including collisions in the local waters that resulted in small spills.

### **5. Probability of Future Events on SBIT:**

The U.S. Department of Transportation has recorded more than 900 water HAZMAT incidents and more than 480,000 highway HAZMAT incidents since 1975. The incidents were responsible for more than 380 highway fatalities and three (3) water fatalities. The highway incidents resulted in more than \$1.4 billion in property damages and the water incidents resulted in more than 12.8 million in property damages. (Bureau of Transportation Statistics 2019)

The use of chemicals for such functions as wastewater treatment presents a risk of small-scale HAZMAT incidents. Transportation of HAZMAT trucks on State Highway 105 presents a risk of a major HAZMAT accident. Accidents are a part of life so a HAZMAT spill is almost certain – it is a matter of how big and where. At the height of fishing/crabbing seasons, the number boats in a small area increases greatly, resulting in a higher probability of an accident.

In short, while the probability of a catastrophic HAZMAT-related accident is relatively low, lesser accidents occur more often.

### **6. Impact on SBIT:**

A small spill that breaks up quickly in rough water may present a very small impact. However, a larger spill, especially if it is persistent can kill both aquatic plants and animals. As the oyster farm grows, the impact on the Tribe's financial health grows accordingly.

**7. Vulnerability of SBIT:**

With respect to native natural and cultural resources, a marine oil spill first threatens traditional fishing, hunting, and gathering. Populations can be severely impacted or destroyed. Plants that are lost that protect the sand dunes or are integral to the marshes can result in second order impacts such as loss of the sand dunes due to greater erosion. Wetlands protect many species and act as a buffer between the ocean and human development. Their loss can lead to greater coastal erosion, coastal flooding, more severe storm impacts, etc. With two (2) million oysters in seed/nursery/farm, and growing to 10 million total, a loss of the oyster farm would represent a \$3 million to \$30 million loss.

**8. Impact of Climate Change:**

Climate change is not a significant factor.

## **2. *Utility Disruption***

### **1. General hazard description as it relates to SBIT:**

Due to its remote location and absence of redundant infrastructure systems, SBIT is susceptible to utility disruptions from several causes. Natural hazards such as severe storms can result in power failure due to blown down power lines. Weather associated with excessive heat can also lead to power disruption at the very time when it is needed most.

### **2. Location:**

The greatest concern are Reservation-wide power failures such as those caused by the severe storms of 2007. Of course, localized failures can also occur due to such events transformer failures.

### **3. Extent:**

The Tribe's context statement from its 2023 THIRA is:

Coastal erosion and sea level rise cause ongoing minor flooding. During February, heavy winds and heavy rains batter the coast for a week. The saturated ground and strong winds result in trees and power poles being blown over. There is widespread utility failure due to the damage. In addition, multiple homes and tribal facilities are damaged by falling trees, flying debris, and windblown roof damage. The saturated ground also results in landslides that cut Highway 105 in multiple locations. As with the storms of 2007, the tribe is isolated without utilities for a week. The water tank and other structures in the hills are threatened by landslides as well. Low lying areas are all flooded with cars stalled in multiple locations. Six people require rescue. With just 30 minutes of warning prior to a slide a flash flood, 50 people in the casino are stranded for seven days. Local enterprises are closed but the tribe must provide mass care services for the stranded people. The flooding affected both water and wastewater services. Four jurisdictions and three parent organizations are affected. All told, 220 people are affected by the event. Of the 220 affected, 55 are minors, 15 are more than 65 years of age, 17 have access and functional needs, and 22 have limited English proficiency. Fifteen (15) animals require care.

### **4. Previous Occurrences on SBIT:**

While more limited power failures have occurred, one of the most noteworthy events was an extended power failure due to severe storms in 2007.

**5. Probability of Future Events on SBIT:**

Utility failures are a certainty. Due to the lack of redundancy and age of many systems, SBIT and its members are at risk of utility loss at any time of year, especially in during high winds and severe storms. Of note, there is a relatively high percentage of residents who are at risk – those under 5 years of age, over 65 years of age, people with access and functional needs, economically disadvantaged, and many who speak English as a second language. Due to the increase of utility provider pre-emptive safety power shutdown programs, the probability of utility failure is increasing.

**6. Impact on SBIT:**

The immediate and most important impact is that some vulnerable tribal members may need immediate assistance with emergency power, water, food, or other commodities. Critical facilities such as IT infrastructure, the Wellness Center, Police Department, and Emergency Management Department require uninterrupted power to fully function.

**7. Vulnerability of SBIT:**

As highlighted in the THIRA context statement, the lack of redundancy places vulnerable populations at risk. The Tribe must keep a roster of those who require immediate assistance with the loss of utilities. On the financial front, every hour that the enterprises are without utilities is lost revenue. The most vulnerable enterprise is the oyster farm. The enterprise requires cold storage and wet storage to preserve the oysters during processing as well as to protect them if they are pulled from the water due avoid extreme weather. A loss of power can mean a loss of millions of dollars of inventory.

**8. Impact of Climate Change:**

The impact of climate change is indirect but significant. As the climate changes, it results in more frequent and more severe storms that can destroy infrastructure through downed power lines, slides, etc. This is of particular concern during the winter storm season. As the wildfire risk increases, utility providers increasing conduct pre-emptive safety power shutoffs when conditions reach dangerous levels. As the impact of climate change increases in the coming decades, the need for even more redundancy will grow.

### **3. *Structure Fire***

#### **1. General hazard description as it relates to SBIT:**

“Simple” structure fires can occur at any time. Fires in homes are most often caused by cooking accidents, smoking or unsafe use of woodstoves or space heaters. In 2023, the State of Washington saw one firefighter fatality and 22 home fire fatalities. (U.S. Fire Administration 2024) Of particular note, Washington saw 1.8 deaths and 4.3 injuries per 1,000 fires in all fires in 2022 but 7.9 deaths and 19.1 injuries per 1,000 fires in residential structures. (U.S. Fire Administration 2024) The upshot is that structure fires are an ongoing concern year around and are essentially four (4) times as lethal in home fires than structure fires in general.

#### **2. Location:**

While every structure is at risk, different types of structures have different causes:

- General enterprises / tribal critical infrastructure – electrical equipment, faulty wiring, overloaded circuits are a leading cause of fires.
- Georgetown Station – multiple fire hazards from the fueling operations to the kitchen.
- Tribal Center and Casino – general electrical equipment and commercial kitchen.
- Tradewinds on the Bay - general electrical equipment and in-room kitchenettes.
- Tribal homes – cooking is the leading cause of home fires.
- All facilities – arson.

#### **3. Extent:**

While any structure is at risk of fire, the tribe will increase its risk with its relocation into the Willapa Hills as it “creates” a wildland urban interface (WUI). Structures will be more at risk to wildland fire, but structures will also present a greater fire hazard due to being in close proximity to more fuels.

#### **4. Previous Occurrences on SBIT:**

Fortunately, structure fires have been few and far between. However, a massive fire at the nearby Ilwaco crab-landing facility on January 22, 2024, demonstrates how a structure fire could strike anywhere at any time.

### **5. Probability of Future Events on SBIT:**

According to the Washington State Department of Natural Resources, “The wildland urban interface (WUI) is the area where homes are built near or among lands prone to wildland fire. These areas have become more popular for homeowners for their privacy, natural beauty, recreational opportunities and affordable living. Developers and communities are accommodating this desire by building neighborhoods inside these areas. As a result, rural fire districts are more often having to fight fire and protect homes and property within these wildland urban interface areas.” (Washington State Department of Natural Resources 2024)

In addition to the historical causes of structure fires such as electrical malfunctions and cooking, the additional fuels surrounding structures as the tribe relocates into the Willapa Hills will increase the structure fire risk.

### **6. Impact on SBIT:**

The impact of ever structure fire is significant. While single home fire in the City of Seattle may go unnoticed by many, with only 33 homes, every loss due to fire (or any reason) is a significant impact on the housing stock. Similarly, the Tribe does not have a tax base like a city would. It relies upon revenue generated by its enterprises. Beyond the cost of rebuilding, every day that an enterprise does not function is a loss of revenue. As mentioned previously, a loss of the oyster farm’s wet or cold storage represents not only millions of dollars of loss but also many years of cultivation.

### **7. Vulnerability of SBIT:**

The Shoalwater Bay Indian Tribe has a small population on a small reservation. Again, every loss is significant – even more so for irreplaceable cultural artifacts. The Tribe’s museum is housed in a commercial building with the library. A fire that destroys the artifacts would be devastating. As the Tribe relocates into the Willapa Hills, it also exposes itself to the potential for a total loss due to structure fires. While structure fires are typically limited in scope, event such as the Camp Fire in Paradise, California, demonstrate that whole communities can be lost when the cause is wildfire.

Again, the limited enterprise resources mean the loss of any is a significant cost and loss of income.

Most importantly, the small Reservation population (approximately 94 per the U.S. Census) means the loss of anybody due to structure fire or otherwise is significant.

**8. Impact of Climate Change:**

With its traditional relatively mild climate, facilities did not have to draw as much electricity for environmental control of buildings such as HVAC. As the weather becomes more extreme, the draw on power increases and increases the vulnerability.

***D. Human-Caused Threat Analysis***

Human-caused Risks - intentional actions of an adversary

- i. Cyberattack on data – ransomware
- ii. Cyberattack on infrastructure – system controls
- iii. Active shooter
- iv. Civil unrest & terrorism

While human-caused threats are optional and not evaluated by FEMA as a part of Hazard Mitigation Planning reviews, Trinidad Rancheria is including them in its Hazard Mitigation Plan to better integrate the HMP with all elements of the National Preparedness System. Human-caused risks are fully assessed in Trinidad Rancheria’s 2018 Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR). The same process for identifying and assessing natural hazards was used for technical hazards. The results are in Table 30.

*Table 30: Shoalwater Bay Indian Tribe’s Human-Caused Threats of Greatest Concern.*

<b>Hazard</b>	<b>Location</b>	<b>Extent</b>	<b>Probability</b>	<b>Concern</b>	<b>Total Score</b>	<b>Rank</b>
<b>Cyberattack (data)</b>	Moderate	Limited	Highly Likely	Very High	206	1
<b>Cyberattack (Infrastructure)</b>	Moderate	Limited	Likely	Moderate	201	2
<b>Active Shooter</b>	Limited	Critical	Possibly	Very High	194	3
<b>Civil Unrest &amp; Terrorism</b>	Limited	Limited	Possibly	Low	134	4



## **1. *Cyberattack***

### **1. General hazard description as it relates to SBIT:**

The two main cyberattack scenarios of concern for SBIT are cyberattacks against infrastructure to affect utilities and ransomware attacks on information. According to the Department of Homeland Security, Russia has engaged in cyberattacks on U.S. critical infrastructure since 2014. (Lindsey 2019) More recently, the Department of Justice reported on its disruption of the People's Republic of China botnets used to hack U.S. critical infrastructure. (U.S. Department of Justice 2024) With respect to ransomware attacks, the Cybersecurity and Infrastructure Security Agency (CISA) reports that Multiple tribes have suffered ransomware and cyber-attacks, which impacted network and email access, communications and social services infrastructure, and economic enterprises. In some cases, these attacks have caused millions of dollars in losses. (CISA 2022) The majority of ransomware attacks cost the jurisdiction/organization \$500,00 or more. (CISCO 2024)

### **2. Location:**

For a network attack such as the 2021 ransomware attack on the Colonial Pipeline, the entire Reservation and region could be impacted by a loss of utilities. Ransomware attacks could be localized as being against a single tribal member, to attacks against an enterprise such as the casino, to a Reservation-wide attack that takes down the tribal government.

### **3. Extent:**

Cyberattacks may be anywhere from an inconvenience to causing a total shutdown of the government and loss of revenue by enterprises.

### **4. Previous Occurrences on SBIT:**

Due to security concerns, previous occurrences will not be presented here.

### **5. Probability of Future Events on SBIT:**

Future cyberattacks are a certainty. The IT Department continuously scans for and block intrusions.

### **6. Impact on SBIT:**

Again, cyberattacks may be anywhere from an inconvenience to causing a total shutdown of the government and loss of revenue by enterprises.

**7. Vulnerability of SBIT:**

Any and every device connected to the internet exposes the Tribe to a cyberattack. In 2024, the number three (3) target for ransomware is central/Federal government. (Irei 2024) As with any government/population, the entirety of the Tribe and its members are vulnerable to cyberattack.

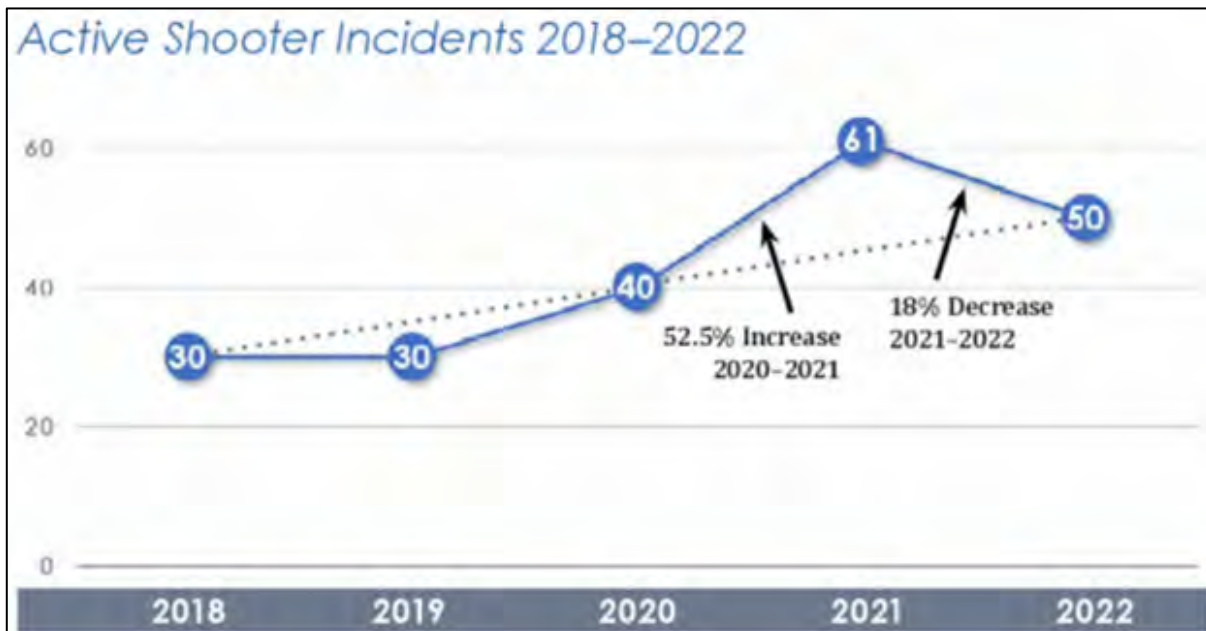
**8. Impact of Climate Change:**

Climate change is not a significant factor.

## 2. *Active Shooter*

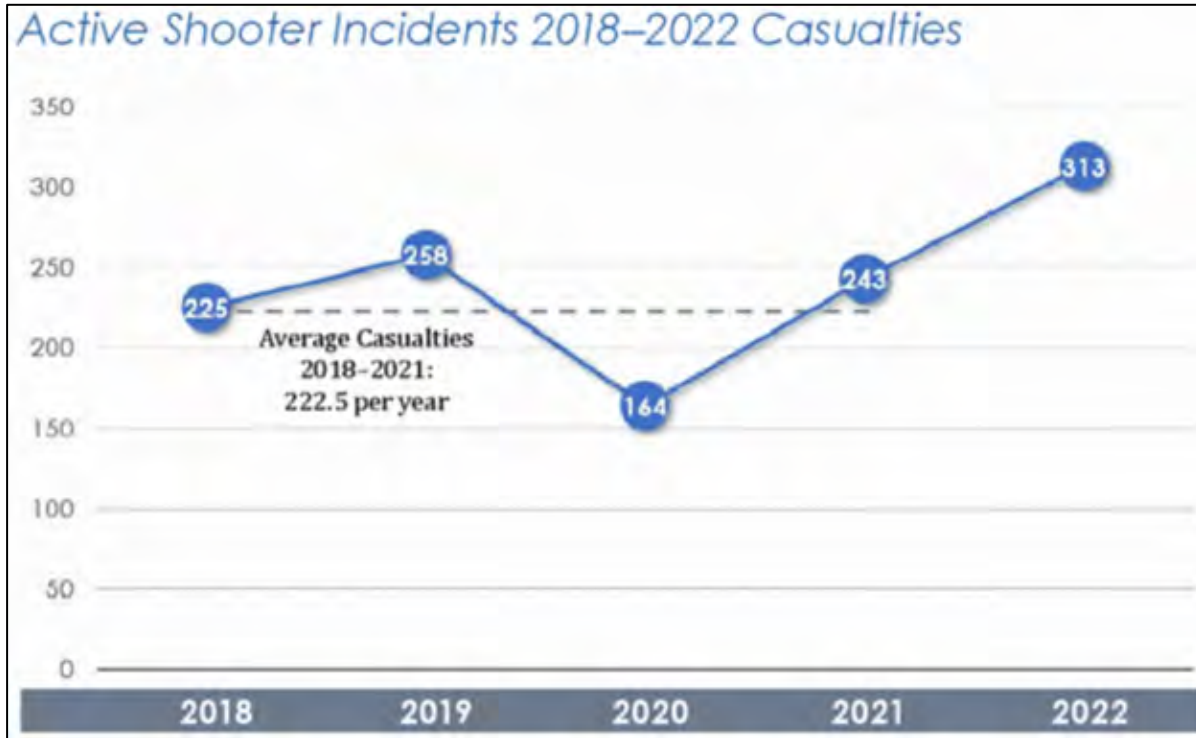
### 1. General hazard description as it relates to SBIT:

An active shooter is an individual actively engaged in killing or attempting to kill people in a populated area. The FBI defines a "mass shooting" as any incident in which at least four people are murdered with a gun. The number of active shooter incidents as well as casualties has risen dramatically since 2000. Figure 77 shows the general trend between in 2018 and 2022 are up nationally but dropped between 2021 and 2022. In 2022, there were 50 active shooter incidents and 313 casualties. (Federal Bureau of Investigation 2023)



**Figure 77. Active Shooter Incidents 2018-2022. (Federal Bureau of Investigation 2023)**

Although, the number of active shooter incidents decreased in 2022, the number of casualties increased from 2022-2023 (Figure 78).



*Figure 78. Active Shooter Incidents 2018-2022 Casualties. (Federal Bureau of Investigation 2023)*

**2. Location:**

As is evident in Table 29, that the Tribe sees active shooter events as localized. While a shooting spree could happen, the general concern is a shooting at a specific facility.

**3. Extent:**

Due to the lack of local trauma care, any shooting is a major event. The worst case would be a mass shooting – four (4) or more people. The Tribe and local healthcare would be immediately overwhelmed.

**4. Previous Occurrences on SBIT:**

Fortunately, SBIT has not had an active shooter event. However, SBIT law enforcement does encounter potentially violent people.

**5. Probability of Future Events on SBIT:**

While the probability of an active shooter event cannot be determined due to lack of statistics, they occur in rural communities throughout the nation.

**6. Impact on SBIT:**

With just 94 members (U.S. Census My Tribal Area), SBIT is a small and tightknit community. Any shooting would be a traumatic event for the Tribe.

**7. Vulnerability of SBIT:**

The closest hospital to the Reservation has only a Level V trauma unit, meaning it provides initial evaluation, stabilization and diagnostic capabilities and prepares patients for transfer to higher levels of care. The Level III trauma Center in Aberdeen has demonstrated an ability to provide prompt assessment, resuscitation, surgery, intensive care and stabilization of injured patients and emergency operations. However, Aberdeen is more than a 40-minute drive from the Reservation.

**8. Impact of Climate Change:**

Climate change is not a significant factor.

### 3. *Civil Unrest*

#### 1. General hazard description as it relates to SBIT:

While Civil Unrest ranked well below the other human-caused threats, it is not uncommon across the U.S. Furthermore, the potential may increase as the Tribe relocates people from their current homes on the ocean into the Willapa Hills. The threat could also come externally as the Tribe exerts its lawful rights.

The term "civil disorder" means any public disturbance involving acts of violence by assemblages of three or more persons, which causes an immediate danger of or results in damage or injury to the property or person of any other individual. (U.S. House of Representatives 2024)

USC Chapter 12 §231. Civil disorders, states:

(a)(1) Whoever teaches or demonstrates to any other person the use, application, or making of any firearm or explosive or incendiary device, or technique capable of causing injury or death to persons, knowing or having reason to know or intending that the same will be unlawfully employed **for use in, or in furtherance of, a civil disorder which may in any way or degree obstruct, delay, or adversely affect commerce or the movement of any article or commodity in commerce or the conduct or performance of any federally protected function**; or

(2) Whoever transports or manufactures for transportation in commerce any firearm, or explosive or incendiary device, knowing or having reason to know or intending that the same will be used unlawfully in furtherance of a civil disorder; or

(3) **Whoever commits or attempts to commit any act to obstruct, impede, or interfere with any fireman or law enforcement officer lawfully engaged in the lawful performance of his official duties** incident to and during the commission of a civil disorder which in any way or degree **obstructs, delays, or adversely affects commerce or the movement of any article or commodity in commerce or the conduct or performance of any federally protected function**—

Shall be fined under this title or imprisoned not more than five years, or both.

(b) Nothing contained in this section shall make unlawful any act of any law enforcement officer which is performed in the lawful performance of his official duties.

(Added [Pub. L. 90–284, title X, §1002\(a\), Apr. 11, 1968, 82 Stat. 90](#); amended [Pub. L. 103–322, title XXXIII, §330016\(1\)\(L\), Sept. 13, 1994, 108 Stat. 2147](#).)

Furthermore, the United Nations Office for Disaster Risk Reduction states, “Civil unrest is generally understood to include violent and non-violent group acts such as riots, protest, isolated

and sporadic acts of violence (Braha, 2012; Lawand, 2012; Basedau et al., 2018). The perceived or actual motivation for the act is often emphasized when describing collective action as civil unrest, alongside a clash with authority (Ramakrishnan et al., 2014). Frequently cited explanations include tension or dissatisfaction over political, economic or social changes/conditions (Kalyvas, 2000). According to Basedau et al. (2018:5) ‘One can conceptualize civil unrest as a special form of collective action and people need to be motivated and able to exert it.’ Braha (2012) defined civil unrest as a ‘form of collective human dynamics, which has led to major transitions of societies in modern history’, while Oncevay et al. (2020) defined it as ‘public manifestations, where people demonstrate their position for different causes’.”

**2. Location:**

In general, the Tribe expects disturbances to be localized and focused on a facility such as Tribal Center and based on a specific issue, a civil disturbance that closes Highway 105 or Tokeland Road could turn the event into a Reservation-wide incident.

**3. Extent:**

In the worsts case, the civil disturbance would lead to violence either by the demonstrators or counterdemonstrators.

**4. Previous Occurrences on SBIT:**

Fortunately, SBIT has not had a civil disturbance event.

**5. Probability of Future Events on SBIT:**

While the probability of a civil disturbance event cannot be determined due to lack of statistics, the probability will likely increase as the Tribe relocates people from their current homes on the ocean into the Willapa Hills.

**6. Impact on SBIT:**

The greatest impact would be violence that leads to sever injuries or fatalities. In addition, a civil disturbance could shut down either tribal government functions or enterprises.

**7. Vulnerability of SBIT:**

Due to its limited law enforcement staffing, essentially any location on the Reservation is vulnerable to a spontaneous, or covertly planned civil disturbance. The Tribal Police Department would need to seek mutual aid form external partners. A civil disturbance could range from an inconvenience to causing a total shutdown of the government and loss of revenue by enterprises.

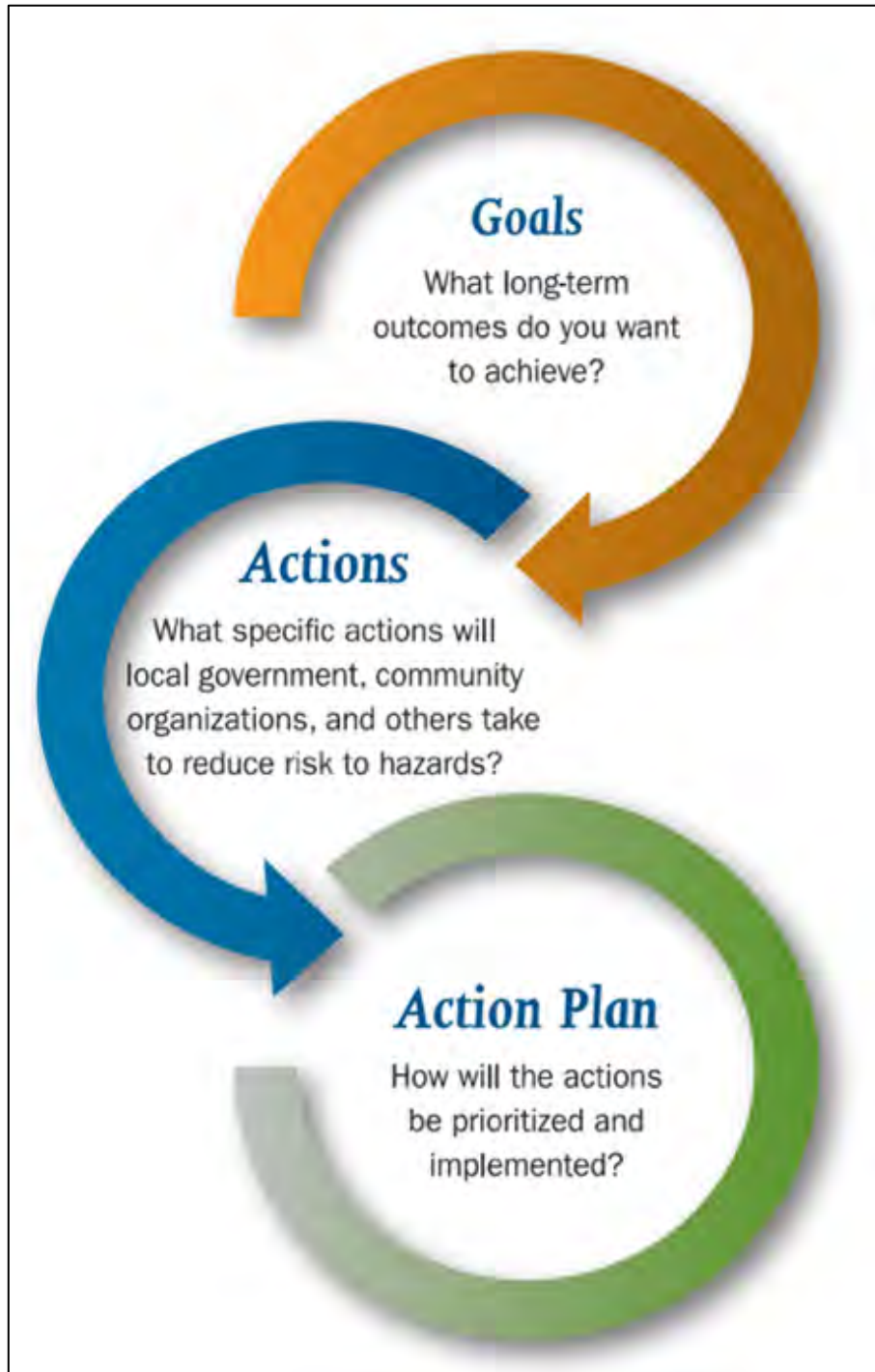
At one extreme, a civil disturbance could also lead to irreparable harm to natural resources or even a loss of irreplaceable cultural artifacts.

**8. Impact of Climate Change:**

Climate change is not a significant factor.



## II. *Mitigation Strategy*



*Figure 79. “The FEMA Mitigation Strategy: Goals, Actions, Action Plan.” (Federal Emergency Management Agency 2013)*

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

A formal capability assessment provides information that is helpful to assessing the SBIT's ability to mitigate against hazards. The Planning Team reviewed and evaluated the SBIT's resources, capabilities, and "gaps" and mitigation opportunities in the following areas:

- **Planning and Regulatory Capabilities**
  - Planning – Table 30
  - Regulatory (Building Codes) – Table 31
- **Legal/Regulatory, Codes, and Ordinances, and Plans**
  - Administrative – Table 32
  - Staff – Table 33
  - Technical – Table 34
- **Financial Capabilities**
  - Table 35
- **Education and Outreach Capabilities**
  - Table 36
- **NFIP**
  - Table 37

**A. Hazard Management Policies, Programs, and Capabilities**

Element	Requirements
<p><b>C1. Does the plan include a discussion of the tribal government's pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including an evaluation of tribal laws and regulations related to hazard mitigation as well as to development in hazard-prone areas?</b></p> <p>44 CFR §§ 201.7(c)(3) and 201.7(c)(3)(iv)</p> <p><i><b>Intent:</b> To ensure that the tribal government evaluates its capabilities to accomplish hazard mitigation actions through existing tribal planning tools, programs, and other resources.</i></p>	<p>a. The plan shall describe the tribal government's existing capabilities to mitigate hazards in the tribal planning area, including pre-disaster and post-disaster hazard management policies and programs.</p> <p><i>Pre-disaster mitigation capabilities may include laws and regulations related to development in hazard-prone areas, such as natural or cultural resource conservation plans, floodplain management ordinances (including the tribal government's existing capabilities to participate in or administer the NFIP), and building codes. Post-disaster mitigation capabilities may include grants management staff and long-term recovery plans, policies, and procedures.</i></p> <p>b. The plan shall include an evaluation of the tribal laws, regulations, policies, programs, and resources related to hazard mitigation and development in hazard-prone areas. The evaluation shall address the opportunities, as well as the challenges, of existing capabilities.</p>

In general, SBIT complies with local, state, Federal, and international standards rather than create unique, hazard mitigation-related guidance such as the International Building Code (IBC). Located in a rural, remote area of Washington State, the Tribe has a small land base and population that limits the ability to increase its capabilities. Tribal laws, regulations, and policies only cover tribal trust and reservation areas, thus limiting potential effectiveness. For its fee lands (private property), the tribe must adhere to Pacific County, Washington land use regulations and policies. In general, tribal funding comes from its business enterprises, primarily the Shoalwater Bay Casino, as well as from federal grants and programs. To a lesser extent, the tribe also receives funds from various State of Washington Agencies such as the Department of Ecology, Department of Health, and the Emergency Management Department. Despite the limitations, the Shoalwater Bay Indian Tribe has garnered national and international attention for such projects as its tsunami tower. The Tribe's success come through leveraging partnerships with local, state, and Federal partners. This section of the Plan highlights the Tribe's pre- and post-disaster hazard mitigation capabilities.

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

The Tribe has chosen to limit the number of formal laws and regulations it adopts due to limited jurisdiction (Reservation and trust lands only), as well as limited resources to implement and enforce.

The Tribe's main opportunities lie in its status as sovereign tribal nation within the United States, and its ability and agility to manage its efforts directly in mitigation and resiliency.

- Nation to status –direct grant and funding partnership with state and federal agencies.
- Economic development – The tribe has the ability for economic development to generate revenue for the government.

The main challenges are in limited resources such as staffing and funding. In addition, the Tribe can only directly control activity on trust and reservation lands.

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

**1. Planning and Regulatory Capabilities**

The Tribe’s Planning capabilities are summarized in table 30. The tribe has regulations, policies, programs, and resources related to hazard mitigation and development in hazard-prone areas.

*Table 30. Planning Capabilities.*

<b>Plans</b>	<b>Yes / No Year</b>	<b>Question</b>	<b>Explain:</b>
<b>Comprehensive/Master Plan</b>	Yes ongoing - end 2025	Is safety explicitly included in the plan’s growth and development policies?	This plan is in development and focuses on the safety and security of the Tribe as it relocates out of tsunami and sea level rise hazard zones.
<b>Capital Improvements Plan</b>	No	Are mitigation related structure and infrastructure projects included in the plan?	N/A
<b>Economic Development Plan</b>	Yes	Are there plans for economic development in high hazard areas and are there mitigation strategies to implement it?	Not formally adopted. However, Tribal enterprises were specifically engaged in this HMP development process to avoid high hazard areas and/or mitigate the impact of hazards.
<b>Emergency Operations Plan</b>	Yes (2019)	Are evacuation routes in high hazard areas?	Yes, the tribe has both land routes and a tsunami evacuation tower that are included in the plan.
<b>Transportation Plan</b>	Yes (2021)	Are major transportation routes in high hazard	Yes, State Highway 105, the only land access, is

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 30. Planning Capabilities.*

Plans	Yes / No Year	Question	Explain:
		areas?	in high hazard areas. The Tribe is mitigating the hazards by developing alternate routes through the Willapa Hills.
<b>Housing Plan</b>	Yes Ongoing	Is any housing in high hazard areas? Are any units planned for high hazard areas?	Yes – all current housing is the in high hazard area for tsunami and sea level rise. The current relocation plan moves all homes out of these hazard areas.
<b>Other Plans</b>	Yes	Are there any particular cultural practices or beliefs that relate or translate into actions for development or non-development in high hazard areas?	Title 23, waste management (recycle, etc.), land use, relocation master plan – in development, tribal strategic plan.  Through the museum, Natural Resources Department, and OES, multiple efforts are proceeding to re-invigorate traditional, sustainable practices.

SBIT’s existing pre and post disaster hazard mitigation-related regulatory capabilities are summarized in Table 31. Tribal laws and ordinances may be found on the Shoalwater Bay Tribal Court website: <https://www.shoalwaterbay-nsn.gov/tribal-court/shoalwater-bay-tribal-court/>.

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 31. SBIT Building Code Capabilities.*

<b>Land Use Planning and Ordinances or Practices</b>	<b>Yes / No</b>	<b>Question</b>	<b>Yes / No</b>	<b>Explain:</b>
<b>Zoning Ordinances or Practices</b>	Yes	Are there any laws (e.g., not building in the floodplain, crop rotation, etc.) that preclude building in areas that are hazardous, and do you have the staff to enforce them?	Yes	Title 8: Zoning
<b>Subdivision Ordinance Or Practices</b>	No	Does the ordinance include considerations for reducing hazard impacts?	No	
<b>Building Codes</b>	Yes	Does the building code include considerations for reducing hazard impacts?	Yes	Title 9: Building Tribe adopted the International Building Code (IBC)
<b>Natural Hazard Specific Ordinance Or Practices (Stormwater, Steep Slopes, Wildfire)</b>	No	Are there laws to discourage development in high hazard and environmentally sensitive areas?	No	Title 8: Zoning Title 9: Building (IBC)
<b>Acquisition Of Land For Open Space And Public Recreation Uses</b>	No	Is there a funding source and policy in place for preservation of open spaces in high hazard areas?	No	The Tribe requires language that speaks to buy back / acquisition of lands that, once vacated upon relocation out of hazard zones, sets up the Tribe for funding

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 31. SBIT Building Code Capabilities.*

Land Use Planning and Ordinances or Practices	Yes / No	Question	Yes / No	Explain:
				opportunities once we reach this stage. **Is likely to occur within this next 5-year cycle.**
<p><b>Maintenance Programs To Reduce Risk, E.G., Tree Trimming, Clearing Drainage Systems</b></p>	<p><b>Yes</b></p>	<p><b>Do these programs receive consistent funding?</b></p>	<p><b>Yes</b></p>	<p>While funding exists for this, it is performed inconsistently.</p>



**2. Administrative and Technical Capabilities**

Administrative and technical capabilities are summarized in Table 32 and Table 33.

*Table 32. SBIT Administration Capabilities.*

<b>Administrative Resource</b>	<b>Yes / No</b>	<b>Does Coordination Need to be Improved? Yes / No</b>	<b>Notes</b>
<b>Tribal Council/ Governing Body</b>	Yes	Yes	Five (5) person elected body, Chair, Vice Chair, Treasurer, Member at Large, Secretary
<b>Tribal Administrator</b>	Yes	Yes	Tribal Admin answers to Tribal Council.
<b>Mitigation Planning Committee</b>	Yes	No	Convenes every 3 years for updates.
<b>Business Committees</b>	Yes	Yes	Willapa Bay Enterprises (WBE) board is an elected body that oversees business enterprises.
<b>Mutual Aid Agreements</b>	Yes	Yes	<ul style="list-style-type: none"> <li>• South Beach Regional Fire Authority (SBRFA)</li> <li>• Pacific County Sheriff's Office (PCSO) Pacific County Emergency Management Agency (PCEMA),</li> <li>• State of Washington EMD Region 3</li> <li>• (West Port City Water – need MA agreement)</li> </ul>

*Table 33. SBIT Staff Capabilities.*

<b>Staff Resources</b>	<b>Is this a Permanent Position? Yes / No</b>	<b>Is Staffing Adequate to Enforce Regulations? Yes / No</b>	<b>Is this Staff Trained on Hazards and Mitigation? Yes / No</b>	<b>Is Additional Staff (Outside Resources) Needed to Implement Actions? Yes / No</b>
<b>Code Inspector</b>	Yes	Yes	Yes	No
<b>Environmental/Natural Resources Specialist</b>	Yes	Yes	Yes	No
<b>Emergency Manager</b>	Yes	Yes	Yes	Yes – occasionally outsource for specialties
<b>Community Planner</b>	Yes	Yes	Yes	Yes
<b>Housing Specialist</b>	Yes	Yes	Yes	Yes
<b>Engineer</b>	No	n/a	Yes	No – we engage Red Plains Engineering / Consulting for engineering services
<b>Historian/Cultural Advisor</b>	Yes	Yes	No	Yes – it depends on the topic
<b>Financial Or Grants Specialist</b>	Yes	Yes	Yes	Yes – this position is embedded in the Planning Department

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 33. SBIT Staff Capabilities.*

<b>Staff Resources</b>	<b>Is this a Permanent Position? Yes / No</b>	<b>Is Staffing Adequate to Enforce Regulations? Yes / No</b>	<b>Is this Staff Trained on Hazards and Mitigation? Yes / No</b>	<b>Is Additional Staff (Outside Resources) Needed to Implement Actions? Yes / No</b>
<b>Administrative Staff Person</b>	Yes	Yes	Yes	Yes – Tribal Administration will have an assistant, however, that will be short lived as the CEO will train the assistant to take over and then retire.
<b>Other (Biologist, Public Health Specialist)</b>	No	No	No	No

Closely related to staffing capabilities are technical capabilities. Table 34 has a summary of the Tribe’s technical capabilities.

*Table 34. SBIT Technical Capabilities.*

<b>Technical Resource</b>	<b>Yes / No</b>	<b>Question</b>	<b>Yes / No</b>	<b>Notes</b>
<b>Warning Systems/ Services (Reverse 911, Outdoor Warning Signals)</b>	Yes	Is the level of technical capability and training of your staff adequate?	Yes	Pacific County EMA – Reverse 911. SBIT – Rave warning

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 34. SBIT Technical Capabilities.*

<b>Technical Resource</b>	<b>Yes / No</b>	<b>Question</b>	<b>Yes / No</b>	<b>Notes</b>
				System.  Washington State EMD – All Hazards Broadcast Alert (AHAB)
<b>Hazard Data And Information</b>	Yes	Is your staff trained to do hazard mitigation or do they need more training?	Yes	Emergency Management, Police, Natural Resources, Planning Dept, Land Mngt, and IT are well versed.
<b>Grant Writing</b>	Yes	Is the level of technical writing capability of your staff adequate?	Yes	Yes – This position is embedded in the Planning Department.
<b>Geographic Information Systems Analysis</b>	Yes	Is your staff trained in Geographic Information Systems mapping?	Yes	This is ad hoc. There are folks in Planning and Natural Resources with GIS skills, but no single person dedicated to this skill set.
<b>Other</b>	Yes	What technical assistance is needed for your Tribe to implement actions?	Yes	Consultants and Academia in pursuit of Uphill Development

**B. Financial Capabilities**

Element	Requirements
<p><b>C2. Does the plan include a discussion of tribal funding sources for hazard mitigation projects and identify current and potential sources of Federal, tribal or private funding to implement mitigation activities?</b></p> <p>44 CFR §§ 201.7(c)(3)(iv) and 201.7(c)(3)(v)</p> <p><i><b>Intent:</b> To demonstrate that the tribal government is aware of viable funding sources to support the implementation of mitigation actions and/or projects.</i></p>	<p>a. The plan shall describe the tribal government’s existing funding sources for hazard mitigation actions and/or projects, including:</p> <ol style="list-style-type: none"> <li>1. A general discussion of how the tribal government has used non-FEMA (tribal, private or other federal) funds for hazard mitigation projects; and</li> <li>2. A general discussion of how the tribal government has used FEMA mitigation funding, including HMGP, PDM, FMA, PA (C-G), and FMAG.</li> </ol> <p>b. The plan shall identify potential sources of funding to implement mitigation actions and/or projects. These shall include federal, tribal, and private sources.</p>

The Shoalwater Bay Indian Tribe’s greatest restraint is its financial resources. In general, the SBIT has used both FEMA and non-FEMA funds for mitigation-related actions. Current financial sources available to the SBIT for hazard mitigation planning and projects include potential disaster and mitigation funds through FEMA (Public Assistance, HMGP, and PDM funds), programs established through the Self Determination Act (Public Law 93-638), casino revenues, and various departmental operation budgets. Other potential sources of funds may include the U.S. Department of Interior (Bureau of Reclamation, Bureau of Indian Affairs, U.S. Geological Survey, Bureau of Land Management), U.S. Army Corps of Engineers, U.S. Housing and Urban Development, U.S. Department of Health and Human Services (Indian Health Service), and the U.S. Department of Agriculture (U.S. Forest Service, Natural Resources Conservation Service). Once approved and adopted, this plan will form the foundation for requesting these funds. In addition, SBIT intends to seek Tribal Homeland Security Grant Program funds to accomplish other disaster preparedness actions. A summary of financial capabilities is in Table 35 followed by a summary of significant mitigation projects by funding source.

*Table 35. SBIT Financial Capabilities.*

<b>Funding Resource</b>	<b>Access Eligibility / Yes/No</b>	<b>Notes</b>
<b>Capital Improvements Project Funding</b>	Yes	Directors can request Tribal funds or seek grant funds, which also pass through the Tribal Admin (CEO), CFO, and Tribal Council for approval.
<b>Gaming Revenue, Enterprise Revenues</b>	Yes	These funds go directly from Willapa Bay Enterprises (WBE) to SBIT via a taxation type of process. Enterprises include the Oyster Farm, Dispensary, Gas Station Casino, and Hotel.
<b>Fees For Water, Sewer, Gas, Or Electric Services</b>	Yes	Utilities board – specific to water and sewer only. Grays Harbor PUD handles Electrical services.
<b>Fees From Festivals, Campsites, And Recreational Areas</b>	No	
<b>Permits And Other Fees</b>	Yes	Fireworks stands require a fee. Hunting, hookups for water/sewer and other Tribal services do not have associated costs.
<b>Contract Services</b>	No	
<b>Other - What sources of revenue does the Tribe have? How does the Tribe envision making its matches or cost-share in its Federal grant funding (e.g. in-kind or cash match or a combination)?</b>	Yes	Typically match funds are based upon the overall budget of the Director making the request.

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

**1. FEMA-Funded Hazard Mitigation Efforts**

The Shoalwater Bay Indian Tribe has applied for and used numerous FEMA grants to supports its mitigation efforts. Table 36 summarizes Shoalwater Bay Tribal applications through pre-disaster hazard mitigation grant programs from 2016-2022 (2023 and 2024 awards have not been published at the time of the writing of this Plan):

*Table 36. Tribal Mitigation Grant Applications.*

<b>Fiscal Year</b>	<b>Project</b>	<b>Federal cost-share</b>	<b>Status</b>
<b>FY 2021</b>	Management cost	N/A – not awarded	Not Selected – did not meet HMA requirements
<b>FY 2021</b>	Project scoping	N/A – not awarded	Not Selected – did not meet HMA requirements
<b>FY 2021</b>	Project	N/A – not awarded	Not Selected – did not meet HMA requirements
<b>FY 2021</b>	Project scoping	N/A – not awarded	Not Selected – did not meet HMA requirements
<b>FY 2021</b>	Management cost	N/A – not awarded	Not Selected – did not meet HMA requirements
<b>FY 2018</b>	Water Tower Retrofit	\$37,464	Did Not Meet HMA Requirements
<b>FY 2018</b>	Generator Backup Systems Final	\$361,386	Did Not Meet HMA Requirements
<b>FY 2017</b>	Vertical Evacuation Tower	\$2,281,860	Awarded
<b>FY 20217</b>	Defensible Spaces Project	\$69,200	Identified for Further Review
<b>FY 2017</b>	Generator Backup Systems	\$143,430	Identified for Further Review

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

### **a) Eagle hill road slope stabilization, road-widening and multipurpose building construction project – 2012**

The tribe received a \$1.4 million HSGP grant to widen and stabilize the Tribe's tsunami evacuation route, Eagle Hill Road, and construct a multipurpose building and evacuation staging area at an elevation of 55 feet - out of the tsunami inundation zone. The Department of Housing and Urban Development (HUD) contributed \$481,000 towards construction of the multipurpose building. The rest of the funding came from the FY 2011 Homeland Security Grant Program.

### **b) Tsunami vertical evacuation tower - 2018**

The Shoalwater Bay Tribe was awarded a PDM grant in 2018 for \$2.2 million, a 90% federal match for the estimated \$2.5 million project to build a tsunami vertical evacuation tower adjacent to tribal housing on Toke Point. The safe refuge platforms will be built above the predicted tsunami wave crest height.

With a total useable area of 3,400 square feet, it accommodates approximately 386 people. The proposed site provides a safe evacuation place for not just Shoalwater Bay Indian Tribal members, but also residents in the surrounding community. The project is designed in conformance with the 2012 FEMA P- 646 Guidelines for Design of Structures for Vertical Evacuation from Tsunamis. This also fulfills Mitigation Action S-14 from the 2014 Plan update, which addresses tsunami vertical evacuation.

### **c) Other FEMA Funding**

The Hazard Mitigation Grant program (HMGP) assists in implementing long-term hazard mitigation planning and projects following a Presidential Major Disaster Declaration. The Tribe has not applied for HMGP grants related to disaster declarations in the Pacific County area. Since the previous plan update in 2019, the Tribe has been designated for two Federally declared disasters:

- 2020 DR-4481\_WA Washington COVID-19 Pandemic
- 2022 DR-5650 WA Washington Severe Winter Storms, Snowstorms, Straight-line Winds, Flooding

There is no record of the Tribe receiving other FEMA funding, such as FMA, PA (C-G), and FMAG.



## **2. U.S. Army Corps of Engineers (USACE) Projects**

The USACE has provided funding to protect the Shoalwater Bay Tribe from coastal erosion, storm surge and storm debris. Below is a list of existing efforts.

- **2001 – 1,700-foot flood berm**
  - Winter storms in 1998-1999 caused two breaches to form in the barrier dune, resulting in storm wave run-up and flooding of shoreline areas where tribal development is concentrated. To provide partial protection to the Tribal Center, a 1,700-foot-long shoreline flood berm was constructed in 2001 by the USACE.
- **December 2007 – 300-foot extension of the flood berm was a constructed by the Corps.**
- **2009 – USACE releases report on Shoalwater Bay Shoreline Erosion (U.S. Army Corps of Engineers 2009)**
  - Six of the twelve extreme water levels recorded since 1973 have occurred since 1999. Coastal storms that coincided with these extreme water levels in March 1999, December 2001, February 2006, and December 2007 resulted in significant erosion and storm wave overtopping of the barrier dune, some erosion of the shoreline, and flooding of tribal uplands.
  - These events created a growing sense of urgency on the part of the Shoalwater Tribe for implementation of long-term coastal erosion protection and storm damage reduction measures.
  - Barrier dune restoration (Alternative 6 in the report) was considered the most appropriate long-term solution to the coastal erosion and resulting storm damage problems affecting the Shoalwater Reservation. It was estimated to cost \$25 million and consisted of building a 12,500 berm like dune along the outer edge of Graveyard Spit.
- **October 2013 – initial project to restore barrier dunes on Graveyard Spit completed.**
- **2018 – Barrier dune repair project (U.S. Army Corps of Engineers 2018)**
  - After initial construction in 2013, the Corps estimated that it would maintain the barrier roughly every five years by dredging material to place on existing dune.
  - During the winter of 2015/2016 the dune was severely damaged by the strongest El Niño year in the El Niño-Southern Oscillation (ENSO) cycle since 1997/1998. These storms generally caused greater coastal erosion than observed during the 1997/1998 El Niño. Events in March 2016 and October 2016 significantly eroded the northern 3,200 feet of dune resulting in over- wash and deposition of sand in the North Cove embayment.
  - Without the proposed project repair, the limited wave protection currently afforded by the eroded barrier dune would continue to decrease, and flooding of the Shoalwater Reservation and adjoining lands would occur at increasingly frequent intervals.
  - The proposed project repair consists of emergency restoration of the deteriorated barrier dune system to protect the Shoalwater Reservation. The \$19.9 M project was completed in the summer of 2018.

### **3. Non-FEMA Funding Sources**

The Shoalwater Tribe generally utilizes tribal funding and funding from various federal agencies to support its hazard mitigation efforts. In addition, the Tribe utilizes technical support from various federal and state agencies that assists in its hazard mitigation efforts. This includes wider regional projects that overlap or affect the Tribe's Reservation and properties, and thus contribute to the Tribe's mitigation efforts. Recent examples include:

#### **a) Eagle Hill Road Slope Stabilization, Road-Widening and Multipurpose Building Construction Project, 2012**

The U.S. Housing and Urban Development (HUD) awarded \$481,000 for construction of the multipurpose building. More detail of the project is discussed in FEMA-funded mitigation efforts.

#### **b) SR 105 - North Cove Vicinity - Erosion Protection 2017 - WA Dept. of Transportation**

This \$3.6 million project updated previous repair work done in the area in 2015. High tides and several harsh winter storm events brought debris and water onto the roadway, causing damage and eroding sections of the shoreline and rock wall. This project, which occurred on the embankment alongside State Route 105, between mileposts 19.57 and 20.58, just north of the Reservation, replaced damaged sections of roadway by adding a revetment and debris berm.

This project benefits the tribe by stabilizing SR 105 and minimizing road closures in a section subject to severe coastal erosion and damage. This is the only road that allows access to points north from the Reservation, including Westport.

#### **c) Shoalwater Bay Berm Monitoring Report, WA Dept. of Ecology, August 2017**

*“Over a period of two years, from September 2014 to September 2016, the WA State Dept. of Ecology Coastal Monitoring & Analysis Program (CMAP) performed a series of five surveys to collect continuous, high-resolution nearshore bathymetry and beach topography data of the Shoalwater Bay/North Cove area. The purpose of these surveys was to monitor a 2.5 km long berm constructed in 2012 by the U.S. Army Corps of Engineers (USACE) along Empire Spit and quantify morphological changes along the shoreline extending from the SR 105 groin to Toke Point as part of the Shoalwater Bay Shoreline Erosion Project.” (State of Washington Department of Ecology 2017)*

As outlined by the U.S. Army Corps of Engineers (USACE) in the Cooperative Agreement, this monitoring program is needed to:

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- Provide the data necessary to quantify the level of protection provided by the Shoalwater dune restoration project. The restored dune provides coastal storm damage reduction for the Shoalwater Indian Reservation and requires periodic re-nourishment to maintain the designed level of protection. These monitoring data will be critical in determining the rate of erosion and quantities required for the next planned nourishment.
- Monitor the morphology of Graveyard Spit over time to comply with prior agreements with U.S. Fish and Wildlife Service regarding habitat provided to listed Endangered Species Act species Western Snowy Plover.
- Provide data necessary to refine the sediment budget for the Willapa Bay inlet which includes the rapidly eroding shoreline adjacent to SR 105.

### **d) Tsunami Vertical Evacuation Tower, 2018**

The Tribe was awarded a FEMA PDM project grant in 2018 to construct a 50' high tsunami vertical evacuation tower. In addition, in-kind planning, grant, and design assistance was provided by numerous agencies, including WA EMD, and WSDOT's Visual Engineering Resource Group.

## **4. Potential Funding Sources**

### **a) Federal Funding Sources**

Some common Federal funding sources include:

- **Hazard Mitigation Assistance Grant Program (HMGP)**, which provides post-disaster \ funds for hazard reduction projects (e.g., elevation, relocation, or buyout of structures) , is administered by FEMA;
- **Building Resilient Infrastructure and Communities (BRIC)**, which helps communities reduce risks from future disasters and natural hazards, is administered by FEMA;
- **Flood Mitigation Assistance (FMA) Program**, which provides funds for NFIP-insured buildings to reduce the risk of flood damage, is administered by FEMA;
- **HMGP Post-Fire Assistance**, which provides funds to make communities more resilient after a wildfire, is administered by FEMA;
- **Pre-Disaster Mitigation Program**, which provides funds to develop mitigation plans and implement mitigation projects, is administered by FEMA and the State of Washington;
- **Flood Control Assistance Account Program**, which provides funds for developing flood hazard management plans, for flood damage reduction projects and studies, and for emergency flood projects (e.g., repair of levees), is administered by the Washington State Department of Ecology (Ecology);
- **Department of Homeland Security funding**, in addition to FEMA programs;

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- **Department of Justice**, which provides law enforcement funds;
- **U.S. Fire Administration**, which provides wildfire program funds;
- **Environmental Protection Agency**, which could provide funds for projects with dual hazard mitigation and environmental protection goals as well as updates to this HMP and related planning efforts such as spill prevention and response planning;
- **Indian Health Service**, which could provide funds for hazard mitigation projects that address public health and safety;
- **Rural Development Agency, USDA**, which provides loan and grant funds for housing assistance, business assistance, community development, and emergency community water and wastewater assistance in areas covered by a federal disaster declaration;
- **Community Development Block Grant**, which provides funds for a variety of community development projects, is administered by the Department of Housing and Urban Development;
- **Small Business Administration Loans**, which help businesses recover from disaster damages, is administered by the Small Business Administration;
- **Bureau of Indian Affairs**, which provides funds to support tribal activities; and
- **U.S. Army Corps of Engineers**, which provides funding for coastal and waterway projects.

### **b) Tribal Funding Sources**

The Shoalwater Bay Tribe is fully committed to the public safety and welfare of its residents and tribal members and to the goals of the Shoalwater Bay Tribal Hazard Mitigation Plan. The Tribe has only limited resources though to devote to mitigation planning. Nonetheless the Tribe may be willing to match grant funding, either through direct monies or through the allocation of resources, such as labor and expertise, in order to implement the actions discussed in this plan.

### **c) State and Local Funding Sources**

In some cases, funding may be available from the State of Washington and/or Pacific County, especially on mitigation actions that overlap jurisdictions, such as road and flood mitigation projects. The main resource for funding opportunities from the State of Washington is from the Washington State Emergency Management Division, which helps fund mitigation projects. The Shoalwater Bay Tribe is continually building relationships with the State of Washington, Pacific County, Grays Harbor County as well as local communities such as Tokeland, in order to develop partnerships to implement mitigation measures that are regional in scope.

### **d) Private Sources**

No potential funding from the private sector is currently identified. Nonetheless local businesses and residents will be encouraged to participate and contribute to the mitigation effort.

**C. Education and Outreach Capabilities**

Table 37 highlights several opportunities that SBIT uses to conduct education and outreach that could be used to implement mitigation activities and communicate hazard-related information.

*Table 37. SBIT Education and Outreach Capabilities.*

<b>Program/Organization</b>	<b>Yes / No</b>	<b>Question</b>	<b>Notes</b>
<b>Gatherings, Festivals, Celebrations and/or Meetings</b>	Yes	What have been some shortcomings or issues with outreach efforts? How do you plan to resolve them?	Partnership gatherings, General Council, Health Board, Education centers holiday gatherings.
<b>Natural Disaster Or Safety-Related School Programs</b>	Yes	Is there a gap in your outreach efforts? If yes, what steps do you intend taking to address this?	EM provides basic preparedness information during the summer months, particularly during the July Yellow Brick Road Health and Safety Fair in which preparedness is aimed at tribal youth and adults. SBIT participates in the Great Shake Out.
<b>Fire Safety Programs</b>	No	Is there a gap in your outreach efforts? If yes, what steps do you intend taking to address this?	Fire Extinguisher Training and basic fire safety awareness annually.
<b>Other Programs</b>	Yes	Are there any new or additional outreach efforts that may be considered by your Tribe?	Crime Watch, Yellow Brick Road, Great Shakeout, National Night Out (COPS program). Cultural events.

***D. NFIP Compliance***

The Shoalwater Bay Tribe is in the NFIP and in good standing. Flood hazard maps were updated in 2015 and included for this plan update. The tribe does not have any repetitive or severe repetitive loss structures.

- CID: 530341A
- Pacific County, WA
- Initial FIRM Identified: 05/18//2025
- Current Effective Map Date: 05/18/2015
- Reg-Emer Date: 01/04/02

*Table 38. NFIP Compliance.*

NFIP Topic	Potential Source of Information	Response
<b>Insurance Summary</b>		
<p><b>How many NFIP policies are in your Tribal planning area? What is the total premium and coverage?</b></p>	<p>FEMA NFIP Specialist</p>	<p>The Tribal Finance Department maintains the NFIP insurance policy.</p> <p>The Tribe currently has NFIP insurance for most of its buildings. There has not been a claim through NFIP for any property that the Tribe owns.</p> <p>The Tribe obtained flood insurance when it was within a mapped flood zone.</p> <p>Since the policy was issued, mitigation projects have resulted being outside of a flood zone since 2015.</p> <p>The Tribe has continued with the NFIP insurance but was recently unable to purchase new insurance for additional buildings due to the coverage being too expensive. The existing plans and</p>

*Table 38. NFIP Compliance.*

NFIP Topic	Potential Source of Information	Response
		grandfathered in at affordable rates.
<b>How many claims have been paid out within the Tribe? What is the total amount of paid claims? How many of the claims were for substantial damage?</b>	FEMA NFIP or Insurance Specialist	None
<b>How many structures are exposed to flood risk within the Tribal planning area?</b>	Floodplain Administrator	None
<b>How many structures are exposed to flood risk within the Tribal planning area?</b>	Floodplain Administrator	None
<b>Describe any areas of flood risk with limited NFIP policy coverage.</b>	Floodplain Administrator and FEMA Insurance Specialist	None
<b>Staff resources</b>		
<b>Is the Tribal Floodplain Administrator or NFIP Coordinator certified?</b>	Floodplain Administrator	No, the Tribe currently lacks a dedicated Floodplain Administrator.
<b>Is floodplain management an auxiliary function?</b>		Yes.
<b>Provide an explanation of NFIP administration services (e.g.,</b>		Due to being outside of a flood zone, the administration largely

*Table 38. NFIP Compliance.*

NFIP Topic	Potential Source of Information	Response
permit review, mapping, education or outreach, inspections, engineering capability)		revolves around maintaining insurance coverage.
Floodplain Administrator		
<b>Compliance History</b>		
Is the Tribe in good standing with the NFIP?	FEMA NFIP Specialist, Floodplain Administrator, Community Records	Yes
Are there any outstanding compliance issues (i.e., current violations)?		No
When was the most recent Community Assistance Visit or Community Assistance Contact?		Unknown
Is a Community Assistance Visit or Community Assistance Contact scheduled or needed?		The Tribe would like a visit to re-energize its program.
<b>Regulation</b>		
When did the Tribe enter the NFIP?	Community Status Book	1/4/2002
Are the Flood Insurance Rate Maps digital or paper?	Floodplain Administrator, Map Service Center	Digital



*Table 38. NFIP Compliance.*

NFIP Topic	Potential Source of Information	Response
<b>Do your floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?</b>	Floodplain Administrator, Code Enforcement	Yes, the Tribe follows state, national, and international codes.
<b>Provide an explanation of the permitting process.</b>	Floodplain Administrator, NFIP Flood Insurance Manual	As the office responsible for insurance, the Accounting Department reviews planned development for compliance.
<b>Community Rating System</b>		
<b>Does the Tribe participate in the Community Rating System?</b>	Floodplain Administrator, FEMA NFIP Specialist	No
<b>What is the Tribe’s Community Rating System Class?</b>	Floodplain Administrator, NFIP website	N/A
<b>What categories and activities provide Community Rating System points and how can the class be improved?</b>	Floodplain Administrator	N/A
<b>Does the plan include Community Rating System planning requirements?</b>	<b>Mitigation Planning Team, Mitigation Planning and the Community Rating System Key Topics Bulletin Manual</b>	N/A

### ***E. Capability Summary***

The Shoalwater Bay Indian Tribe currently has in place several regulatory mechanisms that could be used to mitigate of hazard, with most being directed at new construction and development through adopting and maintaining building codes. Staff resources and/or consultants are available for the identification, development, and implementation of mitigation measures with some overlap of expertise in the various categories. Financially, the Tribe relies upon grants and revenue from enterprises to conduct mitigation activities.

Staff resources in several SBIT departments and programs, working under the auspices of the Tribal Council; collectively provide hazard mitigation for the SBIT. The SBIT does hire consultants to conduct the necessary technical studies and analyses to determine both risk and mitigation alternatives.

An evaluation of the capabilities listed in Tables 30 through 38 was performed by the SBIT, and the following mitigation related gaps and opportunities were identified:

- Lack of a SBIT Comprehensive Plan
  - Gap – good, regular coordination between departments could be improved.
  - Opportunity – when the tribal comprehensive plan is complete in 2026, it will provide a foundation for a coordinated development effort.
  - Opportunity – development of reservation-wide or Area Land Use plans
- Development of a single, one-stop repository for digital (GIS and CAD) base mapping and hazard profile mapping
  - Gap – there is sufficient GIS capability, but it is uncoordinated (inefficient).
  - Opportunity - a designated GIS coordinator could better support departments in an efficient manner.
- Use of multiple funding sources to enhance capabilities.
  - Gap – many departments rely solely on SBIT general fund distribution.
  - Opportunity – capitalize on Federal grant opportunities.
    - Annual Tribal Homeland Security Grants
    - Annual Pre-Disaster Hazard Mitigation Grants
    - Annual Assistance to Firefighter Grants
    - Annual Department of Justice Grants
    - Situational disaster-related Hazard Mitigation Grants

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- Environmental grants – the Environmental Department is very aggressive in pursuing grant opportunities.
  - Opportunity – aggressively seek and apply for other grant programs.
- Cross-departmental coordination
  - Gap – coordination between departments is often ad-hoc.
  - Opportunity – a standing planning/emergency services committee could facilitate improved coordination between departments on an ongoing basis.
  - Opportunity – a standing OEM committee could provide oversight and ensure coordination between disparate efforts.

Upon receipt of a presidential disaster declaration, SBIT will work with FEMA to develop two post-disaster hazard management tools:

- Public Assistance Administration Plan
- Hazard Mitigation Grant Program Administration Plan

Both plans will be used by SBIT to identify the roles and responsibilities of the Tribe in administering the FEMA Public Assistance (PA) and Hazard Mitigation Grant Programs (HMGP). In addition, the administrative plan(s) outline staffing requirements and the policies and procedures to be used. A result of developing these plans, as well as preparing this Multi-Hazard Mitigation Plan, will be to further focus Tribal resources on the importance of hazard management and mitigation planning.

**F. Goals and Objectives**

Element	Requirements
<p><b>C3. Does the Mitigation Strategy include goals to reduce or avoid long- term vulnerabilities to the identified hazards?</b></p> <p>44 CFR § 201.7(c)(3)(i)</p> <p><i><b>Intent:</b> To guide the development and implementation of hazard mitigation actions and/or projects.</i></p>	<p>a. The plan shall include hazard mitigation goals that represent what the tribal government seeks to accomplish to reduce or avoid the vulnerabilities identified in the risk assessment.</p> <p><i><b>Goals</b> are broad policy statements that explain what is to be achieved. Goals guide the development and implementation of supporting actions.</i></p> <p>b. The goals shall be consistent with the risk assessment.</p>
<p><b>C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?</b></p> <p>44 CFR § 201.7(c)(3)(ii)</p> <p><i><b>Intent:</b> To ensure the hazard mitigation actions are based on identified vulnerabilities and that they are focused on reducing or avoiding future losses. This is the heart of the mitigation plan and is essential for risk reduction.</i></p>	<p>a. The plan shall include a mitigation strategy that 1) analyzes actions and/or projects that the tribal government considered to reduce the impacts of hazards identified in the risk assessment, and 2) identifies the actions and/or projects that the tribal government intends to implement.</p> <p><i><b>Mitigation actions and projects</b> means a hazard mitigation action, activity, or process that is designed to reduce or eliminate the vulnerabilities identified in the risk assessment. Examples include elevating structures, adopting a building code and taking steps to improve the tribal government’s mitigation capabilities.</i></p> <p><i>A <b>comprehensive range</b> consists of different mitigation alternatives to address the vulnerabilities identified in the risk assessment (for example, restoring the natural floodplain versus restricting flooding with a structural solution).</i></p> <p>b. The plan shall include actions and/or projects that reduce risk to existing buildings and infrastructure as well as to new buildings and infrastructure.</p>

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The SBIT community identified the following five goals to reduce or avoid long-term vulnerabilities to the identified hazards. These goals are interdependent and not listed in order of priority:

- **Goal #1:** Promote Sustainable Living
- **Goal #2:** Protect Lives and Property
- **Goal #3:** Increase Public Awareness of Local Hazards
- **Goal #4:** Partnerships and Implementation
- **Goal #5:** Strengthen Emergency Services Capability

Each of the five goals has one or more objectives that support it. Furthermore, each objective has one or more specific actions items to achieve the objective. While some actions may be accomplished immediately, others involve long-term projects that address such slowly developing hazards as the effects due to climate change.

The following goals, objectives, and actions represent a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with emphasis on new and existing buildings and infrastructure.

### **1. Goal #1: Promote Sustainable Living**

- **Goal Description:** Promote development in a sustainable manner.
- **Objective #1.1:** Incorporate hazard mitigation into long-range planning and development activities.
  - **Action 1.1.1:** Develop a plan that identifies alternative sources and needed infrastructure for potable water systems that adequately meet Tribe's future needs and address impacts from drought and sea level rise.
  - **Action 1.1.2:** Increase capacity of water storage facilities; obtain alternate sources (wells) and increase capacity to enable ability to utilize fire hydrants without damaging existing infrastructure and reducing capacity for residents.
  - **Action 1.1.3:** Identify potential mitigation actions to reduce impact of natural hazards to inventoried cultural resources and sites, such as historic camps and villages.
- **Objective #1.2:** Pursue relocation and future development outside hazard zones (Existing strategy).
  - **Action 1.2.1:** Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.

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- **Objective #1.3:** Promote beneficial use of hazardous areas while expanding enterprise, open space, and recreational opportunities.
  - **Action 1.3.1:** Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.
  - **Action 1.3.2:** Complete the Tribal Master Plan (2025) in order to capture sustainable living in the long-term strategic plan.
  - **Action 1.3.3:** Incorporate Business Enterprises in mitigation planning efforts in order to protect revenue generation and long-term sustainability.
- **Objective #1.4:** Use regulatory approaches to prevent creation of future hazards to life and property.
  - **Action 1.4.1:** Evaluate and adopt tribal policies and codes that increase resiliency to natural hazards, such as stronger building codes, stormwater and potable water management plans, wildfire management programs, and land use & development policies.
- **Objective #1.5:** Promote activities that protect tribal cultural resources and expand tribal sovereignty through sustainable living practices.
  - **Action 1.5.1:** Implement sustainable food sovereignty programs that include agriculture, aquaculture, hunting, fishing, etc.
  - **Action 1.5.2:** Implement sustainable general living sovereignty programs that skills such as food preservation, soap making, traditional basketry, etc.

### **2. Goal #2: Protection of Lives and Property**

- **Goal Description:** Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.
- **Objective #2.1:** Advise public about health and safety precautions to protect from injury and loss.
  - **Action 2.1.1:** Develop a semi-annual emergency preparedness program such as National Preparedness Month.
  - **Action 2.1.2:** Conduct semi-annual tsunami drills.
  - **Action 2.1.3:** Educate and train members on primitive/sustainable skills such as canning, drying, making soap, etc.
- **Objective #2.2:** Reduce damage to enhance protection of dangerous areas during hazardous events.
  - **Action 2.2.1:** Institute various mitigation measures not specifically defined elsewhere in this plan.

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- **Objective #2.3:** Ensure continuity of critical economic and public facilities and infrastructure (Existing goal).
  - **Action 2.3.1:** Secure funding to acquire additional generators to maintain critical infrastructure on reservation, including for water systems, especially for new facilities being constructed or older facilities being renovated that do not already have generators.
- **Objective #2.4:** Harden existing facilities, infrastructure, and homes as needed (Existing strategy).
  - **Action 2.4.1:** Seismically retrofit water towers and water storage structures utilizing grant support.
  - **Action 2.4.2:** Build a tornado and severe weather evacuation shelter and/or saferooms. These shelter locations shall include, at a minimum, back-up power generators, communications, water and heating systems, and kitchen, shower/bathroom facilities. The shelters should meet the access and functional needs of all individuals.
  - **Action 2.4.3:** Expand cold storage for the oyster farm enterprise to protect stock during disasters such as extreme heat.
  - **Action 2.4.4:** Expand wet storage for the oyster farm enterprise to protect stock during disasters such as extreme heat.
  - **Action 2.4.5:** Install and/or build “museum quality” facilities to protect and preserve irreplaceable artifacts and resources.
  - **Action 2.4.6:** Install and/or build non-water-based fire suppression systems for critical areas such as the museum, IT server room, etc.
- **Objective #2.5:** Continue development and expansion of evacuation routes and emergency facilities (Existing strategy).
  - **Action 2.5.1:** Work with local and federal partners to improve existing tsunami vertical evacuation structure; assess need for additional structures.
- **Objective #2.6:** Reduce increased threat from wildfires (Existing strategy may be an action under Objective #2.2).
  - **Action 2.6.1:** Develop a forest fuels management program that includes a fuels reduction strategy and promotes forest health, such as the planting of native fire-resistant plants.
- **Objective #2.7:** Reduce continued threat from coastal erosion (Existing strategy may be an action under Objective #2.2).
  - **Action 2.7.1:** Continue to actively monitor coastal erosion at North Cove/Graveyard Spit shoreline and work with local, state, and federal partners to develop long-term mitigation solutions.

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- **Action 2.7.2:** Work with federal legislators to fund continued Army Corps of Engineers' monitoring and on-going maintenance, enhancement and expansion of barrier dune and related erosion control projects at North Cove/Graveyard Spit beach.
- **Action 2.7.3:** Refurbish the berm.
- **Action 2.7.4:** Conduct Dune restoration.
- **Objective #2.8:** Reduce the threat from landslides and erosion.
  - **Action 2.8.1:** Identify and implement hillside stabilization projects where needed to reduce current and future impacts from landslides and erosion, utilizing low impact natural systems.
- **Objective #2.9:** Protect the water quality and indigenous species.
  - **Action 2.9.2:** Replace and assess hydrological function at tidal gates (2).

### 3. **Goal #3: Increase Public Awareness of Local Hazards**

- **Description:** Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.
- **Objective #3.1:** Increase public awareness and understanding, support, and demand for hazard mitigation.
  - **Action 3.1.2:** Inform the public about hazards.
- **Objective #3.2:** Heighten public awareness of the full range of hazards they may face.
  - **Action 3.2.1: Update the whole community on mitigation plans and projects.**
- **Objective #3.3:** Publicize and encourage the adoption of appropriate hazard mitigation measures.
  - **Action 3.3.1:** Maintain and expand a public outreach strategy of on-going programs providing multiple messages that support all phases of emergency management, including the maintenance of a 7-day supply of food and water. This should include CERT training. Training program should also include an outreach program for elders and sensitive populations to provide assistance as needed.

### 4. **Goal #4: Partnerships and Implementation**

- **Goal Description:** Build and support local partnerships to continuously become less vulnerable to hazards. Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.
- **Objective #4.1:** Build and support local partnerships with stakeholders in the community.



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- **Action 4.1.1:** Work with local utility service providers to harden and/or install underground utility lines (power, phone, internet) and add additional repeaters and network capacity, which will provide higher quality and less disrupted services.
- **Action 4.1.2:** Work with local, federal, and private partners to install and maintain additional early warning and updated communication systems community-wide to provide enhanced coverage and redundancy. This includes additional towers, repeaters, and support equipment.
- **Objective #4.2:** Build a team of committed volunteers to safeguard the community before, during, and after a disaster.
  - **Action 4.2.1:** Build a CERT or CERT-like team to assist with preparedness, mitigation, response, and recovery.
- **Objective #4.3:** Build hazard mitigation concerns into the Tribal planning and budgeting process.
  - **Action 4.3.1:** Develop a review procedure to ensure mitigation is incorporated into applicable plans and budgets.

### 5. **Goal #5: Strengthen Emergency Services Capability**

- **Goal Description:** Establish policies and procedures to ensure mitigation projects for critical facilities, services, and infrastructure.
- **Objective #5.1:** Provide training to Tribal departments and non-Tribal entities on mitigation programs and techniques that could be incorporated into a variety of projects.
  - **Action 5.1.1:** Work with local partners, including WSDOT and Pacific County, to reduce vulnerability and impacts from landslides and washouts along SR 105 outside of the Tribe's jurisdiction.
- **Objective #5.2:** Continue to expand and improve emergency management preparedness and response capabilities (existing strategy).
  - **Action 5.2.1:** Develop (and update as required) a post-disaster action plan for all hazards of concern that addresses debris management, cultural/historical data gathering, substantial damage assessment, and grant management. This plan would be an appendix to the Tribe's Comprehensive Emergency Management Plan.
  - **Action 5.2.2:** Continue to update as required and needed, emergency plans including: FEMA Hazard Mitigation Plan, Comprehensive Emergency Management Plan, Continuity of Operations Plan, Disaster Recovery Plan, Debris Management Plan, Individual Households & Special Needs Assistance Plan.

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- **Action 5.2.3:** Continue participation and renewal in National Weather Service's StormReady and TsunamiReady community program.
- **Action 5.2.4:** Seek grant funding to construct a public safety facility to include a police and fire station, courthouse, meeting facility and EOC on the Reservation, and acquire personnel and equipment that can also accommodate the expansion to include wildland fire services on the Reservation.
- **Action 5.2.5:** Build a HAZMAT containment capability to quickly control spills in order to protect natural, cultural, and economic resources.
- **Action 5.2.6:** Medical Center - Seek funds develop capacity for mass care (triage, mobility to continue care in event of facility failure/loss – alt facility, training, ability to move care out of hazard zone)
- **Action 5.2.7:** Medical – Decontamination – also applies to **HAZMAT** (oil spill) CBRN, contaminated patient.
- **Action 5.2.8:** Helipad for emergency evacuation and other emergent issues (to be part of uphill development)

**G. Action Plan:**

Element	Requirements
<p><b>C5. Does the plan contain an action plan that describes how the actions identified will be prioritized, implemented, and administered by the tribal government?</b></p> <p>44 CFR § 201.7(c)(3)(iii)</p> <p><i>Intent: To identify how the plan will directly lead to implementation of the hazard mitigation actions.</i></p>	<p>a. The plan shall describe the criteria used for prioritizing implementation of the actions.</p> <p>b. The plan shall identify the position, office, department, or agency responsible for implementing and administering each action.</p>

Actions support a wide array of goals, from public awareness to the physical strengthening of buildings, drainage, roads, and other infrastructure. Using the results of the vulnerability analysis, the capability assessment, and the goals and objectives, the Planning Team formulated a list of actions for mitigation of the prioritized hazards within SBIT.

Once the full list actions were completed to the satisfaction of the Planning Team, the team then developed the prioritization as described in “Action Plan Assessment” (below). The action plan first summarizes the SBIT Planning Team’s assessment of each action according to the methodology presented in FEMA’s Tribal Mitigation Planning Handbook according to 4 criteria across four action types:

- Local Plans and Regulations
- Structures and Infrastructure Projects
- Natural Systems Protection
- Education and Awareness

In the execution phase, each action will be assigned to a point of contact (POC) who will be responsible for the completion of the action. The action accomplishment will be reviewed at regular Planning Team meetings and reported semi-annually to Tribal leadership. Adjustment to the action plan will be made as required at the major milestones. The status of the actions will be publicly reviewed annually.

**1. Action Plan Assessment**

Identified Mitigation Actions were prioritized by the SBIT Planning Team during the workshops held on April 2<sup>nd</sup>-3<sup>rd</sup>, 2024 (Tables 39-43). The Planning Team and Tribal Council deliberately chose not to prioritize the goals because of their interdependencies. However, actions are prioritized in a two-step process. First, they are assessed based on the four action types and four (4) criteria described in Table 39. The total score is then used to place actions in priority groups based on equivalent scores (Table 45).

The Mitigation Action Evaluation Worksheets below were finalized during these workshops using a ranking system (per FEMA Tribal Mitigation Planning Handbook) for each criterion as outlined in Table 39:

*Table 39. Action Plan Assessment Criteria.*

Criteria	Points	High	Points	Medium	Points	Low
<b>Life / Safety Impact</b>	10	Significant impact on public safety for businesses, residents, properties	6	Direct impact on businesses, residents, properties	2	Minimal/negligible impact on businesses, residents, properties
<b>Administrative / Technical Assistance</b>	5	No additional staff or technical support needed to implement	3	Some administrative and technical support needed to implement	1	Significant administrative and technical support needed to implement
<b>Project Cost</b>	5	Low cost (<\$25,000)	3	Moderate cost (\$25,000-\$100,000)	1	High cost to implement (>\$100,000)
<b>Other Considerations</b>	5	Strongly supports/ advances other Tribal objectives	3	Supports other Tribal objectives to an extent	1	Does not support other Tribal objectives or policies

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*a) Local Plans and Regulations*

*Table 40. Local Plans and Regulations Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
<b>Action 1.1.1:</b> Develop a plan that identifies alternative sources and needed infrastructure for potable water systems that adequately meet Tribe's future needs and address impacts from drought and sea level rise.	10	3	1	5	19
<b>Action 1.1.3:</b> Identify potential mitigation actions to reduce impact of natural hazards to inventoried cultural resources and sites, such as historic camps and villages.	6	3	3	5	17
<b>Action 1.4.1:</b> Evaluate and adopt tribal policies and codes that increase resiliency to natural hazards, such as stronger building codes, stormwater and potable water management plans, wildfire management programs, and land use & development policies.	6	2	1	5	14
<b>Action 2.6.1:</b> Develop a forest fuels management program that includes a fuels reduction strategy and promotes forest health, such as the planting of native fire-resistant plants.	8	3	3	3	17
<b>Action 4.3.1:</b> Develop a review procedure to ensure mitigation is	7	5	5	5	22

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*Table 40. Local Plans and Regulations Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
incorporated into applicable plans and budgets.					
<b>Action 5.2.1:</b> Develop (and update as required) a post-disaster action plan for all hazards of concern that addresses debris management, cultural/historical data gathering, substantial damage assessment, and grant management. This plan would be an appendix to the Tribe’s Comprehensive Emergency Management Plan.	5	4	1	3	13
<b>Action 5.2.2:</b> Continue to update as required and needed, emergency plans including: FEMA Hazard Mitigation Plan, Comprehensive Emergency Management Plan, Continuity of Operations Plan, Disaster Recovery Plan, Debris Management Plan, Individual Households & Special Needs Assistance Plan.	10	1	1	5	17
<b>Action 1.3.2:</b> Complete the Tribal Master Plan (2025) in order to capture sustainable living in the long-term strategic plan.	10	1	1	5	17
<b>Action 1.3.3:</b> Incorporate Business Enterprises in mitigation planning efforts in order to protect revenue	10	1	1	5	17

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*Table 40. Local Plans and Regulations Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
generation and long-term sustainability.					

*b) Structure and Infrastructure Projects*

*Table 41. Structure and Infrastructure Projects Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
<b>Action 1.2.1:</b> (Future) Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.	10	1	1	5	17
<b>Action 1.1.2:</b> Increase capacity of water storage facilities; obtain alternate sources (wells) and increase capacity to enable ability to utilize fire hydrants without damaging existing infrastructure and reducing capacity for residents.	10	1	1	5	17
<b>Action 1.2.1:</b> Focus all new development, including critical facilities, infrastructure, and housing, outside of tsunami inundation & high velocity areas as well as other high hazard areas. (Master Plan)	10	1	1	5	17
<b>Action 1.3.1: (Current)</b> Identify and implement stormwater management	7	1	1	5	14

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*Table 41. Structure and Infrastructure Projects Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
actions for current and future development that mitigate localized flooding and storm surge.					
<b>Action 2.2.1:</b> Institute various mitigation measures not specifically defined elsewhere in this plan.	10	1	1	5	17
<b>Action 2.3.1:</b> Secure funding to acquire additional emergency power to maintain critical infrastructure on reservation, including for water systems, especially for new facilities being constructed or older facilities being renovated that do not already have generators.	9	1	1	5	16
<b>Action 2.4.1:</b> Seismically retrofit water towers and water storage structures utilizing grant support.	10	1	1	5	17
<b>Action 2.4.2:</b> Build a survival evacuation shelter and/or saferooms. These shelter locations shall include, at a minimum, back-up power generators, communications, water and heating systems, and kitchen, shower/bathroom facilities. The shelters should meet the access and functional needs of all individuals.	10	1	1	5	17
<b>Action 2.5.1:</b> Work with local and federal partners to improve existing	6	3	1	3	13



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*Table 41. Structure and Infrastructure Projects Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
tsunami vertical evacuation structure; assess need for additional structures.					
<b>Action 2.8.1:</b> Identify and implement hillside stabilization projects where needed to reduce current and future impacts from landslides and erosion, utilizing low impact natural systems.	10	1	1	5	17
<b>Action 4.1.1:</b> Work with local utility service providers to harden and/or install underground utility lines (power, phone, internet) and add additional repeaters and network capacity, which will provide higher quality and less disrupted services.	10	1	1	5	17
<b>Action 4.1.2:</b> Work with local, federal, and private partners to install and maintain additional early warning/fire & security surveillance and updated communication systems community-wide to provide enhanced coverage and redundancy. This includes additional towers, repeaters, and support equipment.	10	1	1	5	17
<b>Action 5.1.1:</b> Work with local partners, including WSDOT and Pacific County, to reduce vulnerability and impacts from landslides and washouts along SR 105 outside of the Tribe's jurisdiction. If	10	1	1	5	17

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*Table 41. Structure and Infrastructure Projects Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
the Tribe is able to incorporate portions of the highway into the Tribe’s jurisdiction under usual and accustomed areas for a slide response, will be able to do so.					
<b>Action 5.2.3:</b> Continue participation and renewal in National Weather Service’s StormReady and TsunamiReady community program.	6	5	5	5	21
<b>Action 5.2.4:</b> Seek grant funding to construct a public safety facility to include a police and fire station, courthouse, meeting facility and EOC on the Reservation, and acquire personnel and equipment that can also accommodate the expansion to include wildland fire services on the Reservation.	6	1	1	5	13
<b>Action 5.2.6: Medical Center</b> - Seek funds develop capacity for mass care (triage, mobility to continue care in event of facility failure/loss – alt facility, training, ability to move care out of hazard zone)	10	1	1	5	17
<b>Action 5.2.7:</b> Medical – Decontamination – also applies to HAZMAT (oil spill) CBRN, contaminated patient.	7	1	3	4	15

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*Table 41. Structure and Infrastructure Projects Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
<b>Action 5.2.8:</b> Helipad for emergency evacuation and other emergent issues (to be part of uphill development)	8	1	4	4	17
<b>Action 2.4.3:</b> Expand the oyster cold storage to protect up to 10 million oysters form such events as extreme heat.	6	5	1	3	15
<b>Action 2.4.4:</b> Expand the oyster wet storage to protect up to 10 million oysters form such events as extreme heat.	6	5	1	3	15
<b>Action 2.4.5:</b> Install and/or build “museum quality” facilities to protect and preserve irreplaceable artifacts and resources.	6	1	1	5	12
<b>Action 2.4.6:</b> Install and/or build non-water-based fire suppression systems for critical areas such as the museum, IT server room, etc.	6	1	1	5	12

*c) Natural Systems Protection*

*Table 42. Natural Systems Protection Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
<b>Action 2.7.1:</b> Continue to actively monitor coastal erosion at North Cove/Graveyard Spit shoreline and work with local, state, and federal partners, academic institutions to develop long-term mitigation solutions.	7	1	1	3	12
<b>Action 2.7.2:</b> Work with federal legislators to fund continued Army Corps of Engineers' monitoring and on-going maintenance, enhancement and expansion of barrier dune and related erosion control projects at North Cove/Graveyard Spit/Empire Spit.	5	1	1	5	12
<b>Action 2.7.3:</b> Refurbish the berm.	6	1	1	5	13
<b>Action 2.7.4:</b> Conduct Dune restoration.	6	3	1	3	13
<b>Action 2.9.1:</b> Conduct water quality monitoring-ground/ocean.	5	5	3	4	17
<b>Action 2.9.2:</b> Replace and assess hydrological function at tidal gates (2).	5	1	1	4	11
<b>Action 5.2.5:</b> Build a HAZMAT containment capability to quickly control spills in order to protect	10	1	1	3	15

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*Table 42. Natural Systems Protection Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
natural, cultural, and economic resources.					

*d) Education and Awareness Programs*

*Table 43. Education and Awareness Programs Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
<b>Action 3.3.1:</b> Maintain and expand a public outreach strategy of on-going programs providing multiple messages that support all phases of emergency management, including the maintenance of a 7-day supply of food and water. This should include CERT training. Training program should also include an outreach program for elders and sensitive populations to provide assistance as needed.	7	3	3	5	18
<b>Action 2.1.1:</b> Develop a semi-annual emergency preparedness program such as National Preparedness Month.	5	3	5	5	18
<b>Action 2.1.2:</b> Conduct semi-annual tsunami drills.	10	5	5	5	25
<b>Action 2.1.3:</b> Educate and train members on primitive/sustainable skills such as canning, drying, making soap, etc.	6	5	3	5	19
<b>Action 3.1.2:</b> Inform the public about hazards.	5	5	5	5	20
<b>Action 3.2.1:</b> Update the whole community on mitigation plans and projects.	5	5	5	5	20

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*Table 43. Education and Awareness Programs Assessment.*

Mitigation Project	Life Safety	Administrative / Technical Assistance	Project Cost	Other Considerations	Total Score
<b>Action 4.2.1:</b> Build/expand a CERT or CERT-like team to assist with preparedness, mitigation, response, and recovery.	6	3	5	5	19
<b>Action 1.5.1:</b> Implement sustainable food sovereignty programs that include agriculture, aquiculture, hunting, fishing, etc.	5	3	3	5	16
<b>Action 1.5.2:</b> Implement sustainable general living sovereignty programs that skills such as food preservation, soap making, traditional basketry, etc.	5	3	3	5	16

**2. Action Plan Implementation**

Current pre- and post-disaster hazard management is accomplished through several SBIT departments with assistance from some federal agencies. Table 44 summarizes SBIT departments and programs involved in either pre- or post-disaster hazard management.

*Table 44. Departmental Hazard Mitigation Responsibilities.*

Department or Agency	Hazard Mitigation Management Activities
<b>Tribal Council</b>	<ul style="list-style-type: none"> <li>• Ultimate authority for all SBIT hazard management and mitigation activities and funding.</li> </ul>
<b>Administration</b>	<ul style="list-style-type: none"> <li>• Lead tribe to become self-sufficient and provide for the spiritual, social, economic and health of tribal members, while honoring traditions of the past and leaving a responsible legacy for future generations.</li> <li>• Hosts meetings and events for Tribal Members and the greater Tokeland community.</li> <li>• We look out for the wellbeing of the people in our area.</li> <li>• Act as great stewards to the land around us to preserve our Shoalwater Bay ways of living.</li> <li>• Conduct avenues for the community to provide feedback to better equip our departmental services.</li> </ul>
<b>Community Development / Managed Retreat</b>	<ul style="list-style-type: none"> <li>• Relocate the population to higher ground.                             <ul style="list-style-type: none"> <li>○ Road</li> <li>○ Infrastructure</li> <li>○ Homes</li> </ul> </li> <li>• Government services</li> </ul>
<b>Culture &amp; Heritage</b>	<ul style="list-style-type: none"> <li>• Preserve, protect, and promote heritage and history through the traditional arts and lifeways of the ancestors of the Shoalwater Bay Indian Tribe.</li> <li>• Hosts Annual Cultural Fairs, manage cultural site protection, Language preservation through archiving artifacts, historic documents, recordings, and photographs.</li> <li>• Provides educational and Cultural services to individuals, schools, institutions, and Governments.</li> </ul>
<b>Education</b>	<ul style="list-style-type: none"> <li>• Provides our members with the highest quality educational opportunities possible.</li> <li>• Hosts After School Program, a Summer Youth Program and have various holiday and community events geared towards our youth.</li> </ul>
<b>Emergency Management</b>	<ul style="list-style-type: none"> <li>• Provided full services EM department which including preparedness, mitigation, response, and recovery actions to increase tribal resilience.</li> </ul>



*Table 44. Departmental Hazard Mitigation Responsibilities.*

Department or Agency	Hazard Mitigation Management Activities
	<ul style="list-style-type: none"> <li>• Hazard mitigation planning</li> <li>• Incident Management and resource coordination</li> <li>• Emergency response</li> <li>• Management and update responsibility for the Tribal Emergency Response Plan</li> </ul>
<b>Facilities and Ground Maintenance</b>	<ul style="list-style-type: none"> <li>• Ensures of the cleanliness and safety of employees and visitors at tribal facilities                             <ul style="list-style-type: none"> <li>○ Generators</li> <li>○ HVAC</li> <li>○ Cleaning</li> </ul> </li> <li>• Repairs</li> </ul>
<b>Housing</b>	<ul style="list-style-type: none"> <li>• Provide safe, sanitary, and affordable housing to low and medium income eligible Native American families.</li> <li>• Monitors and maintain 34 homes located on Tribally owned land.</li> <li>• Pursues and advocates for funding and resources for tribal members.</li> <li>• Provides financial expertise for potential homebuyers.</li> <li>• Provides information for tenants and others on housing related issues.</li> </ul>
<b>Information Technology</b>	<ul style="list-style-type: none"> <li>• Full service 24/7-365 IT enterprise support for tribal government (enterprises and tribal members on their own)</li> <li>• The IT department has 7 areas of responsibility                             <ul style="list-style-type: none"> <li>○ Phones</li> <li>○ Servers &amp; storage</li> <li>○ Cybersecurity &amp; physical security</li> <li>○ Tech. support</li> <li>○ Networking</li> <li>○ Cell service contracts</li> <li>○ Application support</li> </ul> </li> <li>• Administrative support for efforts like grants</li> </ul>
<b>Land Management</b>	<ul style="list-style-type: none"> <li>• Land Management maintains records and the status of the acquisitions</li> </ul>
<b>Law Enforcement</b>	<ul style="list-style-type: none"> <li>• Provides protection for the life and property of the inhabitants and visitors of the through law enforcement of tribal, state and federal laws/ordinances.</li> <li>• Emergency response</li> <li>• Community policing/crime prevention</li> </ul>
<b>Library / Museum</b>	<ul style="list-style-type: none"> <li>• Provides a source of education for tribal members and the external community.                             <ul style="list-style-type: none"> <li>○ Programs</li> </ul> </li> </ul>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 44. Departmental Hazard Mitigation Responsibilities.*

Department or Agency	Hazard Mitigation Management Activities
	<ul style="list-style-type: none"> <li>○ Classes</li> <li>○ Households</li> <li>● Provides cultural presentations and revitalization of               <ul style="list-style-type: none"> <li>○ Language</li> <li>○ Food sovereignty</li> </ul> </li> <li>● Provides library services</li> </ul>
<b>Natural Resources</b>	<ul style="list-style-type: none"> <li>● Natural Resources manages the Tribe’s natural resources – land, water, timber, berms, etc.</li> <li>● Environmental compliance – Federal, State, County, Tribal environmental codes</li> <li>● Responsible for associated data</li> </ul>
<b>Planning</b>	<ul style="list-style-type: none"> <li>● Provides the Tribal community with the services necessary to achieve the Tribe’ vision for Reservation lands while protecting public health, safety and general welfare while asserting tribal authority over the Reservation to include land use, prepare, update, and implement long-range plans.</li> <li>● Monitors and responds to development proposals and proposed plans and regulations affecting the Reservation that are initiated under the jurisdiction of state, local and federal agencies.</li> <li>● Prepares long-range planning documents, and ensure that capital programs, zoning, and other activities are consistent with the goals and policies of the Tribe’s strategic plan.</li> </ul>
<b>Social Services</b>	<ul style="list-style-type: none"> <li>● Provides proactive services to strengthen the family unity; promote self-sufficiency, assist Tribal members returning to their home Tribe</li> <li>● Responds to emergent needs and protection of the community.</li> <li>● Provides the full complement of social services – child protection, crime victim, elder/elder protection, food distribution, pre-school, violence prevention, etc.</li> </ul>
<b>Utilities</b>	<ul style="list-style-type: none"> <li>● Samples and monitor multiple sites throughout the reservation for various water quality.</li> <li>● Supports drinking and wastewater services for the Tribe and Tribal Businesses               <ul style="list-style-type: none"> <li>○ Weekly monitoring and sampling of all Tribal systems.</li> </ul> </li> </ul>
<b>Wellness Center</b>	<ul style="list-style-type: none"> <li>● Monday-Friday 8:30-4:30</li> <li>● Primary Care</li> <li>● Medial</li> <li>● Dental</li> <li>● Behavioral</li> <li>● Case management</li> </ul>

*Table 44. Departmental Hazard Mitigation Responsibilities.*

Department or Agency	Hazard Mitigation Management Activities
	<ul style="list-style-type: none"> <li>• Assists with shelter and mass care.</li> <li>• Public information and warning – patients.</li> <li>• External – Grey’s Harbor EMT – South Beach Regional Fire Authority</li> </ul>
<p><b>Willapa Bay Enterprises (WBE)</b></p>	<ul style="list-style-type: none"> <li>• Provided jobs and income for the community.</li> <li>• Supports preparedness, response, and recovery via:                             <ul style="list-style-type: none"> <li>○ Tradewinds on the Bay Motel – Mass Care</li> <li>○ Daycare – Mass Care</li> <li>○ Georgetown station – fuel, food, supply chain management</li> </ul> </li> <li>• Willapa Bay Oyster Company – waterborne resources</li> </ul>

The actions were sorted by total score to place them in priority groups. As can be seen in Table 39, the scoring methodology from FEMA’s Mitigation Planning Handbook favors projects that impact life/safety, require little external support, are lower in cost and strongly support other tribal priorities. The Planning Team also favored projects with a shorter timeline to implement. Essentially, the prioritization largely favors “low hanging fruit” and ranks projects higher that are easier to begin. Table 45 has the prioritized actions grouped in three categories – high, medium, and low. The sorting factors, in order of priority are:

- Overall project score – high to low (Tables 40-43)
- Project cost – low to high
- Timeline to implement – short to long

The Planning Team will oversee the implementation of actions and report progress to the Tribal Council semi-annually, and the Tribal members annually as a minimum. Implementation of the actions will be the responsibility of assigned departments/programs. The respective Departments of Responsibility / Points of Contact (POC) will use the Mitigation Action Implementation Worksheets in Appendix E to manage the actions, report the progress, and close out the actions.

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 2.1.2: Conduct semi-annual tsunami drills.</b>	Tsunami	Emergency Management	<\$25,000	FEMA, tribal funds	1 year (on-going)	High
<b>Action 4.3.1: Develop a review procedure to ensure mitigation is incorporated into applicable plans and budgets.</b>	All Hazards	Administrator, Tribal Council	<\$25,000	Tribal funds	1-3 years	High
<b>Action 5.2.3: Continue participation and renewal in National Weather Service’s StormReady and TsunamiReady community program.</b>	Tsunami / Severe Weather	Emergency Management	<\$25,000	NOAA, FEMA, tribal funds	1 year (on-going)	High
<b>Action 3.1.2: Inform the public about hazards.</b>	All Hazards	Emergency Management	<\$25,000	FEMA, tribal funds	1 year (on-going)	High
<b>Action 3.2.1: Update the whole community on mitigation plans and projects.</b>	All Hazards	Emergency Management	<\$25,000	FEMA, tribal funds	1 year (on-going)	High
<b>Action 1.1.1: Develop a plan that identifies alternative sources and needed infrastructure for potable water systems that adequately meet Tribe's future needs and address impacts from drought and sea level rise.</b>	Drought / Sea Level Rise	Planning	>\$100,000	Tribal funds, EPA, FEMA	3-5 years	High

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*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 2.1.3: Educate and train members on primitive/sustainable skills such as canning, drying, making soap, etc.</b>	All Hazards	Cultural & Heritage	\$25,000-\$100,000	Tribal funds, FEMA	1-3 years	High
<b>Action 4.2.1: Build/expand a CERT or CERT-like team to assist with preparedness, mitigation, response, and recovery.</b>	All Hazards	Emergency Management	<\$25,000	FEMA, tribal funds	1 year (on-going)	High
<b>Action 3.3.1: Maintain and expand a public outreach strategy of on-going programs providing multiple messages that support all phases of emergency management, including the maintenance of a 7-day supply of food and water. This should include CERT training. Training program should also include an outreach program for elders and sensitive populations to provide assistance as needed.</b>	All Hazards	Emergency Management, Wellness Center	\$25,000-\$100,000	FEMA, tribal funds	1 year (on-going)	High
<b>Action 2.1.1: Develop a semi-annual emergency preparedness program such as National Preparedness Month.</b>	All Hazards	Emergency Management	<\$25,000	FEMA, tribal funds	1 year (on-going)	High

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*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 1.3.2: Complete the Tribal Master Plan (2025) in order to capture sustainable living in the long-term strategic plan.</b>	All Hazards	Tribal Council	>\$100,000	Tribal funds	1 year (on-going)	Medium
<b>Action 2.8.1: Identify and implement hillside stabilization projects where needed to reduce current and future impacts from landslides and erosion, utilizing low impact natural systems.</b>	Landslide	Natural Resources	>\$100,000	Tribal funds, FEMA	1 year (on-going)	Medium
<b>Action 4.1.1: Work with local utility service providers to harden and/or install underground utility lines (power, phone, internet) and add additional repeaters and network capacity, which will provide higher quality and less disrupted services.</b>	Utility Disruption	Tribal Administrator, Tribal Council	>\$100,000	Private sector, tribal funds	1 year (on-going)	Medium
<b>Action 4.1.2: Work with local, federal, and private partners to install and maintain additional early warning/fire &amp; security surveillance and updated communication systems community-wide to provide enhanced coverage and redundancy. This includes additional towers, repeaters, and support equipment.</b>	Tsunami / Wildland Fire	Emergency Management	>\$100,000	FEMA, WA EMD, tribal funds	1 year (on-going)	Medium

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 5.1.1: Work with local partners, including WSDOT and Pacific County, to reduce vulnerability and impacts from landslides and washouts along SR 105 outside of the Tribe's jurisdiction. If the Tribe is able to incorporate portions of the highway into the Tribe's jurisdiction under usual and accustomed areas for a slide response, will be able to do so.</b>	Landslide	Emergency Management	>\$100,000	WSDOT, WA EMD	1 year (on-going)	Medium
<b>Action 5.2.2: Continue to update as required and needed, emergency plans including: FEMA Hazard Mitigation Plan, Comprehensive Emergency Management Plan, Continuity of Operations Plan, Disaster Recovery Plan, Debris Management Plan, Individual Households &amp; Special Needs Assistance Plan.</b>	All Hazards	Emergency Management	>\$100,000	FEMA, tribal funds	1 year (on-going)	Medium
<b>Action 1.3.3: Incorporate Business Enterprises in mitigation planning efforts in order to protect revenue generation and long-term sustainability.</b>	All Hazards	Emergency Management, WBE	>\$100,000	FEMA, tribal funds, WBE	1-3 years	Medium

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*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 1.1.2: Increase capacity of water storage facilities; obtain alternate sources (wells) and increase capacity to enable ability to utilize fire hydrants without damaging existing infrastructure and reducing capacity for residents.</b>	Drought	Facility and Ground Maintenance, Tribal Council	>\$100,000	Tribal funds, BIA, HUD	3-5 years	Medium
<b>Action 2.2.1: Institute various mitigation measures not specifically defined elsewhere in this plan.</b>	All Hazards	Emergency Management	>\$100,000	Tribal funds, FEMA	3-5 years	Medium
<b>Action 2.4.1: Seismically retrofit water towers and water storage structures utilizing grant support.</b>	Earthquake	Emergency Management	>\$100,000	FEMA, tribal funds	3-5 years	Medium
<b>Action 2.4.2: Build a survival evacuation shelter and/or saferooms. These shelter locations shall include, at a minimum, back-up power generators, communications, water and heating systems, and kitchen, shower/bathroom facilities. The shelters should meet the access and functional needs of all individuals.</b>	All hazards	Emergency Management	>\$100,000	FEMA, BIA, tribal funds	3-5 years	Medium



Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 1.2.1: (Future) Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.</b>	Flood / Severe Weather	Natural Resources, Planning	>\$100,000	Tribal funds, EPA, FEMA	5+ years	Medium
<b>Action 5.2.8: Helipad for emergency evacuation and other emergent issues (to be part of uphill development)</b>	Tsunami / Sea Level Rise	Wellness Center, Emergency Management	>\$100,000	Grants TBD	5+ years	Medium
<b>Action 5.2.6: Medical Center - Seek funds develop capacity for mass care (triage, mobility to continue care in event of facility failure/loss – alt facility, training, ability to move care out of hazard zone)</b>	All Hazards	Wellness Center, Emergency Management	>\$100,000	FEMA, IHS	5+ years	Medium
<b>Action 1.2.1: Focus all new development, including critical facilities, infrastructure, and housing, outside of tsunami inundation &amp; high velocity areas as well as other high hazard areas. (Master Plan)</b>	Tsunami / Sea Level Rise	Tribal Council	>\$100,000	Tribal funds, EPA, FEMA		Medium

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 2.9.1: Conduct water quality monitoring-ground/ocean.</b>	Climate Change	Utilities, Natural Resources	\$25,000-\$100,000	Tribal Funds, FEMA	1 year (on-going)	Medium
<b>Action 2.6.1: Develop a forest fuels management program that includes a fuels reduction strategy and promotes forest health, such as the planting of native fire-resistant plants.</b>	Wildland Fire	Natural Resources	\$25,000-\$100,000	FEMA, tribal funds	1-3 years	Medium
<b>Action 1.1.3: Identify potential mitigation actions to reduce impact of natural hazards to inventoried cultural resources and sites, such as historic camps and villages.</b>	All Hazards	Education; Cultural & Heritage	\$25,000-\$100,000	Tribal Funds, FEMA	3-5 years	Medium
<b>Action 2.3.1: Secure funding to acquire additional emergency power to maintain critical infrastructure on reservation, including for water systems, especially for new facilities being constructed or older facilities being renovated that do not already have generators.</b>	Utility Disruption	Emergency Management	>\$100,000	FEMA, tribal funds	1 year (on-going)	Low

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 45. SBIT Action Implementation Plan.*

<b>Action</b>	<b>Hazard Addressed</b>	<b>Responsible Department / Program</b>	<b>Potential Cost</b>	<b>Funding Sources</b>	<b>Timeline to Implement</b>	<b>Project Priority</b>
<b>Action 1.5.1: Implement sustainable food sovereignty programs that include agriculture, aquiculture, hunting, fishing, etc.</b>	All Hazards	Cultural & Heritage	\$25,000-\$100,000	Tribal funds, FEMA	1 year (on-going)	Low
<b>Action 1.5.2: Implement sustainable general living sovereignty programs that skills such as food preservation, soap making, traditional basketry, etc.</b>	All Hazards	Cultural & Heritage	\$25,000-\$100,000	Tribal funds, FEMA	1-3 years	Low
<b>Action 5.2.5: Build a HAZMAT containment capability to quickly control spills in order to protect natural, cultural, and economic resources.</b>	HAZMAT	Natural Resources, Emergency Management, WBE	>\$100,000	FEMA, EPA, WBE, tribal funds	3-5 years	Low
<b>Action 2.4.3: Expand the oyster cold storage to protect up to 10 million oysters form such events as extreme heat.</b>	Climate Change	WBE, Emergency Management	>\$100,000	WBE, Tribal funds, FEMA	5+ years	Low
<b>Action 2.4.4: Expand the oyster wet storage to protect up to 10 million oysters form such events as extreme heat.</b>	Climate Change	WBE, Emergency Management	>\$100,000	WBE, Tribal	5+ years	Low

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*Table 45. SBIT Action Implementation Plan.*

Action	Hazard Addressed	Responsible Department / Program	Potential Cost	Funding Sources	Timeline to Implement	Project Priority
				funds, FEMA		
<b>Action 5.2.7: Medical – Decontamination – also applies to HAZMAT (oil spill) CBRN, contaminated patient</b>	HAZMAT	Wellness Center, Emergency Management	\$25,000-\$100,000	FEMA, IHS, EPA	5+ years	Low
<b>Action 1.4.1: Evaluate and adopt tribal policies and codes that increase resiliency to natural hazards, such as stronger building codes, stormwater and potable water management plans, wildfire management programs, and land use &amp; development policies.</b>	All Hazards	Tribal Council	>\$100,000	Tribal funds	1 year (on-going)	Low
<b>Action 1.3.1: (Current) Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.</b>	Flood / Severe Weather	Natural Resources, Planning	>\$100,000	Tribal funds, BIA, HUD	5+ years	Low
<b>Action 2.5.1: Work with local and federal partners to improve existing tsunami vertical evacuation structure; assess need for additional structures.</b>	Tsunami	Emergency Management	>\$100,000	FEMA, tribal funds	1 year (on-going)	Low

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*Table 45. SBIT Action Implementation Plan.*

Action	Hazard Addressed	Responsible Department / Program	Potential Cost	Funding Sources	Timeline to Implement	Project Priority
<b>Action 2.7.3: Refurbish the berm.</b>	Coastal Erosion / Severe Weather / Sea Level Rise	Natural Resources, Emergency Management	>\$100,000	FEMA, tribal funds	1-3 years	Low
<b>Action 2.7.4: Conduct Dune restoration.</b>	Coastal Erosion / Severe Weather / Sea Level Rise	Natural Resources, Emergency Management	>\$100,000	FEMA, tribal funds	1-3 years	Low
<b>Action 5.2.1: Develop (and update as required) a post-disaster action plan for all hazards of concern that addresses debris management, cultural/historical data gathering, substantial damage assessment, and grant management. This plan would be an appendix to the Tribe's Comprehensive Emergency Management Plan.</b>	All Hazards	Emergency Management	>\$100,000	FEMA, tribal funds	1-3 years	Low

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*Table 45. SBIT Action Implementation Plan.*

Action	Hazard Addressed	Responsible Department / Program	Potential Cost	Funding Sources	Timeline to Implement	Project Priority
<b>Action 5.2.4: Seek grant funding to construct a public safety facility to include a police and fire station, courthouse, meeting facility and EOC on the Reservation, and acquire personnel and equipment that can also accommodate the expansion to include wildland fire services on the Reservation.</b>	Tsunami / Sea Level Rise	Emergency Management, Tribal Council	>\$100,000	Tribal funds, grant funds	3-5 years	Low
<b>Action 2.7.1: Continue to actively monitor coastal erosion at North Cove/Graveyard Spit shoreline and work with local, state, and federal partners, academic institutions to develop long-term mitigation solutions.</b>	Coastal Erosion	Natural Resources, Emergency Management	>\$100,000	U.S.A.C.E., WA Dept. of Ecology, FEMA, tribal funds	1 year (on-going)	Low
<b>Action 2.7.2: Work with federal legislators to fund continued Army Corps of Engineers' monitoring and on-going maintenance, enhancement and expansion of barrier dune and related erosion control projects at North Cove/Graveyard Spit/Empire Spit.</b>	Coastal Erosion / Severe Weather / Sea Level Rise	Tribal Council	>\$100,000	FEMA, tribal funds	1 year (on-going)	Low

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*Table 45. SBIT Action Implementation Plan.*

Action	Hazard Addressed	Responsible Department / Program	Potential Cost	Funding Sources	Timeline to Implement	Project Priority
<b>Action 2.4.6: Install and/or build non-water-based fire suppression systems for critical areas such as the museum, IT server room, etc.</b>	Structure Fire	IT, Emergency Management	>\$100,000	FEMA, tribal funds	3-5 years	Low
<b>Action 2.4.5: Install and/or build “museum quality” facilities to protect and preserve irreplaceable artifacts and resources.</b>	Flood / Severe Weather / Structure Fire	Museum, Emergency Management	>\$100,000	Tribal funds, NEH, FEMA	5+ years	Low
<b>Action 2.9.2: Replace and assess hydrological function at tidal gates (2).</b>	Flood / Sea Level Rise	Natural Resources, Emergency Management	>\$100,000	FEMA, tribal funds	3-5 years	Low

***H. Incorporation of the Hazard Mitigation Plan Into Other Planning Mechanisms***

Element	Requirements
<p>C6. Does the plan describe a process by which the tribal government will incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate?</p> <p>44 CFR § 201.7(c)(4)(iii)</p> <p><b><i>Intent:</i></b> To assist tribal governments in leveraging all available planning mechanisms that would allow the tribe to accomplish hazard mitigation and reduce risk.</p>	<p>a. The plan shall describe the process the tribal government will use to incorporate the data, information, and hazard mitigation goals and/or actions from the mitigation plan into other planning mechanisms.</p> <p><b><i>Planning mechanism</i></b> means a governance structure used to manage land use, development, and other tribal government decision-making, such as a tribal master plan, a capital improvement plan, an emergency operations plan, or other long-range plans.</p>

The Shoalwater Bay Indian Tribe’s “Managed Retreat” relocation project is the overriding effort that is defining the future of the Tribe and is a mitigation project itself. Due this effort and others, hazard mitigation is fundamental to virtually all current and future planning efforts. Goal #1 (repeated here) is focused on incorporating hazard mitigation into the very culture of the Tribe.

**Goal #1: Promote Sustainable Living**

- **Goal Description:** Promote development in a sustainable manner.
- **Objective #1.1:** Incorporate hazard mitigation into long-range planning and development activities.
  - **Action 1.1.1:** Develop a plan that identifies alternative sources and needed infrastructure for potable water systems that adequately meet Tribe's future needs and address impacts from drought and sea level rise.
  - **Action 1.1.2:** Increase capacity of water storage facilities; obtain alternate sources (wells) and increase capacity to enable ability to utilize fire hydrants without damaging existing infrastructure and reducing capacity for residents.
  - **Action 1.1.3:** Identify potential mitigation actions to reduce impact of natural hazards to inventoried cultural resources and sites, such as historic camps and villages.



## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

- **Objective #1.2:** Pursue relocation and future development outside hazard zones (Existing strategy).
  - **Action 1.2.1:** Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.
- **Objective #1.3:** Promote beneficial use of hazardous areas while expanding enterprise, open space, and recreational opportunities.
  - **Action 1.3.1:** Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.
  - **Action 1.3.2:** Complete the Tribal Master Plan (2025) in order to capture sustainable living in the long-term strategic plan.
  - **Action 1.3.3:** Incorporate Business Enterprises in mitigation planning efforts in order to protect revenue generation and long-term sustainability.
- **Objective #1.4:** Use regulatory approaches to prevent creation of future hazards to life and property.
  - **Action 1.4.1:** Evaluate and adopt tribal policies and codes that increase resiliency to natural hazards, such as stronger building codes, stormwater and potable water management plans, wildfire management programs, and land use & development policies.
- **Objective #1.5:** Promote activities that protect tribal cultural resources and expand tribal sovereignty through sustainable living practices.
  - **Action 1.5.1:** Implement sustainable food sovereignty programs that include agriculture, aquaculture, hunting, fishing, etc.
  - **Action 1.5.2:** Implement sustainable general living sovereignty programs that skills such as food preservation, soap making, traditional basketry, etc.

Table 46 highlights the Goal #1 actions and the responsible departments / programs. Perhaps the most noteworthy objective with respect to incorporating hazard mitigation into other planning mechanisms is Objective #1.4 which involves establishing regulations to ensure hazard mitigation is embedding all future development. Associated Action 1.4.1 is under the responsibility of the Tribal Council which strengthens the objective. This is the overall concept for how SBIT will incorporate hazard mitigation into other planning mechanisms.

*Table 46. Actions Integrated Into Other Planning Mechanisms.*

<b>Action</b>	<b>Responsible Department / Program</b>
<b>Action 1.1.1: Develop a plan that identifies alternative sources and needed infrastructure for potable water systems that adequately meet Tribe's future needs and address impacts from drought and sea level rise.</b>	Planning
<b>Action 1.1.2: Increase capacity of water storage facilities; obtain alternate sources (wells) and increase capacity to enable ability to utilize fire hydrants without damaging existing infrastructure and reducing capacity for residents.</b>	Facility and Ground Maintenance, Tribal Council
<b>Action 1.1.3: Identify potential mitigation actions to reduce impact of natural hazards to inventoried cultural resources and sites, such as historic camps and villages.</b>	Education; Cultural & Heritage
<b>Action 1.2.1: (Future) Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.</b>	Natural Resources, Planning
<b>Action 1.2.1: Focus all new development, including critical facilities, infrastructure, and housing, outside of tsunami inundation &amp; high velocity areas as well as other high hazard areas. (Master Plan)</b>	Tribal Council
<b>Action 1.3.1: (Current) Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.</b>	Natural Resources, Planning
<b>Action 1.3.2: Complete the Tribal Master Plan (2025) in order to capture sustainable living in the long-term strategic plan.</b>	Tribal Council
<b>Action 1.3.3: Incorporate Business Enterprises in mitigation planning efforts in order to protect revenue generation and long-term sustainability.</b>	Emergency Management, WBE

*Table 46. Actions Integrated Into Other Planning Mechanisms.*

<b>Action</b>	<b>Responsible Department / Program</b>
<b>Action 1.4.1: Evaluate and adopt tribal policies and codes that increase resiliency to natural hazards, such as stronger building codes, stormwater and potable water management plans, wildfire management programs, and land use &amp; development policies.</b>	Tribal Council
<b>Action 1.5.1: Implement sustainable food sovereignty programs that include agriculture, aquiculture, hunting, fishing, etc.</b>	Cultural & Heritage
<b>Action 1.5.2: Implement sustainable general living sovereignty programs that skills such as food preservation, soap making, traditional basketry, etc.</b>	Cultural & Heritage

The effort to achieve the objective to, “Incorporate hazard mitigation into long-range planning and development activities” has begun with this hazard mitigation plan update with capability assessments:

- Tables 30-31 contains a Planning and Regulatory Assessment that identifies plans that can be used to implement mitigation actions.
- Tables 32-34 contains an Administrative and Technical Capability Assessment that identifies when the technical capabilities have been used in the past to assess/mitigate risks.
- Tables 35-36 contains a Financial Capability Assessment that identifies funding sources that could be used to fund future mitigation actions.
- Table 37 contains an Education and Outreach Capability Assessment that identifies programs that could be used to implement mitigation activities.

As part of the MHMP maintenance strategy, the Planning Team will meet regularly to ensure hazard mitigation is integrated into its future planning activities. The Tribe will work to incorporate, where applicable, this MHMP into the planning and regulatory mechanisms identified previously identified as well as others as appropriate.

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Throughout the MHMP maintenance cycle, the hazard mitigation goals and actions will, as appropriate, be referenced or included in the general operations of the Tribe. The Tribe will work with other agencies to identify opportunities as outlined below:

- Update work plans, policies, or procedures to include hazard mitigation concepts;
- Establish mitigation funding into operational and other types of Tribal budgets;
- Issue plans, policies, regulations, or other directives to carry out mitigation actions;
- Add hazard mitigation elements to redevelopment plans.

The MHMP will function as a stand-alone document subject to its own review and update schedule and will serve as a reference for other mitigation planning needs of the Tribe. Whenever possible, the Tribe will endeavor to incorporate mitigation actions and projects identified in the MHMP into existing Tribe's planning mechanisms, as they become available, including but not limited to:

- Development of future land-use plans;
- Future programming of capital improvement projects.

### ***1. Continued Member and Stakeholder Outreach/Involvement***

The Tribe is committed to keeping the public and stakeholders informed about hazards and mitigation planning efforts, actions, and projects. For the Tribe, one of the most effective ways to engage the public and stakeholders and disseminate information is through the Tribal Council.

The Director of Emergency Management shall ensure the Tribal Council leaders, public and stakeholders are kept current MHMP updates and are provided the opportunity to participate in the update process to the appropriate degree. The Plan's annual review and evaluation will be announced to the local media through a variety of outlets.

In order to continually engage the public and stakeholders, the Tribe shall pursue the following opportunities whenever possible and appropriate, but not limited to:

- Present an annual report summarizing the MHMP evaluation and mitigation action progress to the Tribal Council.
- Participate in Pacific and Grays Harbor Counties' hazard mitigation and disaster preparedness efforts.
- Provide a copy of the MHMP to the community library for public review.
- Post the MHMP on the community website.

**2. Education and Outreach Capabilities**

This plan has several specific education and awareness actions going forward to support outreach. The SBIT will incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate, including the following capabilities. Specific venues are highlighted in Table 47 (Repeat of Table 37).

*Table 47. SBIT Education and Outreach Capabilities.*

<b>Program/Organization</b>	<b>Yes / No</b>	<b>Question</b>	<b>Notes</b>
<b>Gatherings, Festivals, Celebrations and/or Meetings</b>	Yes	What have been some shortcomings or issues with outreach efforts? How do you plan to resolve them?	Partnership gatherings, General Council, Health Board, Education centers holiday gatherings.
<b>Natural Disaster Or Safety-Related School Programs</b>	Yes	Is there a gap in your outreach efforts? If yes, what steps do you intend taking to address this?	EM provides basic preparedness information during the summer months, particularly during the July Yellow Brick Road Health and Safety Fair in which preparedness is aimed at tribal youth and adults. SBIT participates in the Great Shake Out.
<b>Fire Safety Programs</b>	Yes	Is there a gap in your outreach efforts? If yes, what steps do you intend taking to address this?	Fire Extinguisher Training and basic fire safety awareness annually.
<b>Other Programs</b>	Yes	Are there any new or additional outreach efforts that may be considered by your Tribe?	Crime Watch, Yellow Brick Road, Great Shakeout, National Night Out (COPS program). Cultural events.

### 3. Integration with the National Preparedness System

The Tribe developed this MHMP in conjunction with its 2023 Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR). This represents a new effort in integrating the MHMP with other planning mechanisms. The Shoalwater Bay Indian Tribe has adopted FEMA’s National Preparedness System (NPS) as a framework for expanding its emergency management program (Figure 79).



**Figure 79. National Preparedness System.**

After linking MHMP risks and capabilities with its THIRA and SPR respectively, SBIT will follow up with developing its family of plans such as updating its Emergency Operations Plan (EOP) and Continuity of Operations (COOP) Plan using those same risks and capabilities. Future NPS elements such as “Building and Sustaining Capabilities” grant applications are enabled through the THIRA/SPR and MHMP work. Exercise will follow in “Validating Capabilities,” and the NPS cycle will begin again after “Reviewing and Updating.”

**I. Progress Review**

Element	Requirements
<p><b>C7. Does the plan describe a system for reviewing progress on achieving goals as well as activities and projects identified in the mitigation strategy, including monitoring implementation of mitigation measures and project closeouts?</b></p> <p><b>44 CFR §§ 201.7(c)(4)(ii) and 201.7 (c)(4)(v)</b></p> <p><i><b>Intent:</b> To establish a standardized system to review activities and projects and follow through on project implementation and completion.</i></p>	<p>a. The plan shall describe the system for tracking the implementation of the mitigation activities and projects identified in the mitigation strategy. This includes all mitigation activities, not just those funded by FEMA.</p> <p>b. The system shall include the following:</p> <ol style="list-style-type: none"> <li>1. A schedule;</li> <li>2. Tribal department or tribal office responsible for coordination (or non-tribal entity or agency, if the tribe allows);</li> <li>3. Role of the agencies/offices identified in the mitigation strategy as responsible for implementation of actions; and</li> <li>4. Project closeout procedures.</li> </ol> <p><i>An example of a system could include submittal of periodic reports, site visits, and invoices submitted by tribal offices responsible for implementing mitigation actions and/or project closeouts.</i></p>

The Shoalwater Bay Indian Tribe intends to proactively manage implementation of the actions as it strives to reach its goals and objectives. The Planning Team and Director of Emergency Management are responsible for tracking the implementation of mitigation activities, including monitoring implementation of mitigation measures and project closeouts.

The tracking system will include a schedule, identify the tribal department/office responsible for coordination, describe the role of the agencies/offices identified in the mitigation strategy and include project closeout procedures.

While Table 45 has the overall schedule for implementing the actions, the most significant recurring milestones for reviewing the implementation of the MHMP is in Table 48.

*Table 48. Plan Monitoring, Evaluating, and Updating Schedule.*

Plan Monitoring	Point of Contact	Timeline
<p><b>Planning Team action item accomplishment review</b></p>	<p>The respective POC responsible for each action item</p>	<p>Quarterly Planning Team meetings</p>

*Table 48. Plan Monitoring, Evaluating, and Updating Schedule.*

<b>Plan Monitoring</b>	<b>Point of Contact</b>	<b>Timeline</b>
<b>Tribal Council action item accomplishment report</b>	Planning Team	Semi-annual Tribal Council progress report
<b>Public action item accomplishment review</b>	Planning Team	Annual public progress report
<b>Ad hoc plan updates</b>	Planning Team	As required to ensure the plan is relevant
<b>FEMA-required five-year update</b>	Planning Team	Every five years

The roles of the various departments and a macro-level monitoring schedule are in Table 49. The worksheet in Appendix C will be used by the respective POCs to manage and report on the completion and closeout of their actions.

*Table 49. Roles and Responsibilities for Hazard Mitigation Action Implementation.*

<b>Department / Office</b>	<b>Mitigation Responsibility</b>	<b>Activity</b>
<b>Tribal Council</b>	Overall Tribal authority	Approve activities as required by Tribal laws and policies
<b>Administration</b>	Monitor actions	<ul style="list-style-type: none"> <li>• Provide a vehicle for the Planning Team to deliver its semi-annual progress updates.</li> <li>• Provide a forum for direct community feedback.</li> </ul>
<b>Director of Emergency Management</b>	Planning Team coordination	<ul style="list-style-type: none"> <li>• Provide guidance to the Planning Team</li> <li>• Chair Planning Team meetings</li> </ul>
<b>Planning Team</b>	Mitigation action coordination	<ul style="list-style-type: none"> <li>• Monitor, track, coordinate, and make recommendations on MHMP / action updates.</li> <li>• Hold quarterly coordination meetings.</li> </ul>



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*Table 49. Roles and Responsibilities for Hazard Mitigation Action Implementation.*

<b>Department / Office</b>	<b>Mitigation Responsibility</b>	<b>Activity</b>
<b>Assigned Departments / Programs</b>	Support action Points of Contact in complement assigned actions	<ul style="list-style-type: none"> <li>• Implement assigned actions and report on their progress through closeout.</li> <li>• Report on the action implementation progress to the Planning Team.</li> <li>• Support actions according to day-to-day responsibilities – finance, facilities, operations, housing, etc.</li> </ul>
<b>Action Points of Contact</b>	Implement assigned actions	<ul style="list-style-type: none"> <li>• Implement assigned actions.</li> <li>• Track the progress of the action implementation via the worksheet in Appendix C</li> <li>• Report on the action implementation progress through their respective departments to the Planning Team</li> </ul>

### III. Plan Updates

#### A. Changes in Development

Element	Requirements
<p><b>D1. Was the plan revised to reflect changes in development?</b></p> <p>44 CFR § 201.7(d)(3)</p> <p><i><b>Intent:</b> To ensure that the mitigation strategy continues to address the risk and vulnerabilities to existing and potential development.</i></p>	<p>The plan shall describe changes in development that have occurred in hazard prone areas since the last plan was approved.</p> <p>Not all development will affect a tribal government’s vulnerability. If no changes are identified, plan updates shall validate the information in the previously approved plan.</p> <p><i><b>Changes in development</b> means recent development (for example, construction completed since the last plan was approved), potential development (for example, development planned or under consideration by the tribal government) or conditions that may affect the risks and vulnerabilities of the tribal planning area (for example, climate variability and/or declining populations or projected increases), and new data regarding the type, location, occurrence, and extent of hazards that has become available since the last plan was developed or as a result of disaster events.</i></p>

SBIT has had little new development in hazard prone areas since the last update. As described throughout this Plan, the “Managed Retreat” relocation project is the driving force for development. New development is focused on the future location of tribal homes and infrastructure in the Willapa Hills – outside of the tsunami zone, coastal erosion, and sea level rise region. However, the relocation exposes the tribe to greater risk due to wildfire and landslides. In addition, Willapa Bay Enterprises has established an oyster business that seeks re-establish native Olympia oysters in the region. The oyster farm is clearly within existing hazard zones and also impacted by weather changes due to climate change – especially warmer sea and air. In addition to the oyster farm, the Reservation includes natural and cultural resources within this hazard zone that cannot be moved. Willapa Bay Enterprises also has several businesses that cannot be moved in the short term (casino, gas station, motel). The following actions address these challenges:

- Action 1.4.1: Evaluate and adopt tribal policies and codes that increase resiliency to natural hazards, such as stronger building codes, stormwater and potable water management plans, wildfire management programs, and land use & development policies.
- Action 2.6.1: Develop a forest fuels management program that includes a fuels reduction strategy and promotes forest health, such as the planting of native fire-resistant plants.

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- Action 4.1.2: Work with local, federal, and private partners to install and maintain additional early warning/fire & security surveillance and updated communication systems community-wide to provide enhanced coverage and redundancy. This includes additional towers, repeaters, and support equipment.
- Action 5.2.4: Seek grant funding to construct a public safety facility to include a police and fire station, courthouse, meeting facility and EOC on the Reservation, and acquire personnel and equipment that can also accommodate the expansion to include wildland fire services on the Reservation.
- Action 2.8.1: Identify and implement hillside stabilization projects where needed to reduce current and future impacts from landslides and erosion, utilizing low impact natural systems.
- Action 5.1.1: Work with local partners, including WSDOT and Pacific County, to reduce vulnerability and impacts from landslides and washouts along SR 105 outside of the Tribe's jurisdiction. If the Tribe is able to incorporate portions of the highway into the Tribe's jurisdiction under usual and accustomed areas for a slide response, will be able to do so.
- Action 2.4.3: Expand the oyster cold storage to protect up to 10 million oysters from such events as extreme heat.
- Action 2.4.4: Expand the oyster wet storage to protect up to 10 million oysters from such events as extreme heat.
- Action 2.9.2: Replace and assess hydrological function at tidal gates (2).
- Action 1.2.1: (Future) Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.
- Action 1.3.1: (Current) Identify and implement stormwater management actions for current and future development that mitigate localized flooding and storm surge.
- Action 2.7.1: Continue to actively monitor coastal erosion at North Cove/Graveyard Spit shoreline and work with local, state, and federal partners, academic institutions to develop long-term mitigation solutions.
- Action 2.7.2: Work with federal legislators to fund continued Army Corps of Engineers' monitoring and on-going maintenance, enhancement and expansion of barrier dune and related erosion control projects at North Cove/Graveyard Spit/Empire Spit.
- Action 2.9.1: Conduct water quality monitoring-ground/ocean.

***B. Progress in Tribal Mitigation Efforts***

Element	Requirements
<p><b>D2. Was the plan revised to reflect progress in tribal mitigation efforts?</b></p> <p>44 CFR §§ 201.7(d)(3) and 201.7(c)(4)(iii)</p> <p><i>Intent: To evaluate and demonstrate progress made in the past 5 years in achieving goals and implementing actions outlined in the mitigation strategy.</i></p>	<p>a. The plan shall describe the status of each mitigation action and/or project identified in the previous plan. For those actions not completed, the plan shall provide a narrative describing the status (for example, a description of why the action is no longer relevant).</p> <p>b. The plan shall describe how the tribal government incorporated the previous mitigation plan into other planning mechanisms, as applicable.</p>

Of note, the Tribe has already acted upon a new, sovereignty-based objective identified in this planning process:

**Objective #1.5:** Promote activities that protect tribal cultural resources and expand tribal sovereignty through sustainable living practices.

Based on a whole community workshop discussion, the Tribe began dehydrating great quantities of food with expiring shelf lives. While this is just one action, it demonstrates the Tribe’s sincerity in accomplishing mitigation actions.

The Shoalwater Bay Indian Tribe actively seeks to integrate mitigation actions in all of its infrastructure efforts and built this Plan on the previous one. Table 50 provides a status of the projects identified in the previous plan. As with this current Plan, there are a number of enduring actions that are identified as “on going.” These are at the forefront of routine operations.

*Table 50. Status of Previously Identified Mitigation Actions.*

Action #	Action Description	Timeframe	Status
1.1	Develop plan that identifies alternative sources and needed infrastructure for <b>potable water systems</b> that adequately meet Tribe's future needs and address impacts from drought and sea level rise.	3-5 years	In progress under “Managed Retreat” for relocation area.

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*Table 50. Status of Previously Identified Mitigation Actions.*

Action #	Action Description	Timeframe	Status
1.2	Identify and implement <b>stormwater management actions</b> for current and future development that mitigate localized flooding and storm surge.	3-5 years	In progress under Managed Retreat for relocation area.
1.3	Seek grant funding to construct a <b>public safety facility</b> to include a police and fire station, courthouse, meeting facility and EOC on the Reservation, and acquire personnel and equipment that can also accommodate the expansion to include wildland fire services on the Reservation.	3-5 years	Ongoing – there were insufficient funds in the previous project. The basic EOC and OEM office are complete.
1.4	Focus all <b>new development</b> , including critical facilities, infrastructure, and housing, outside of tsunami inundation & high velocity areas as well as other high hazard areas.	long-term	Ongoing. The Managed Retreat project has \$25M in funding to begin the relocation.
2.1	Identify and implement <b>hillside stabilization projects</b> where needed to reduce current and future impacts from landslides and erosion, utilizing low impact natural systems.	on-going	Ongoing. As the Managed Retreat planning and actual construction continues, stabilization projects are being identified. To date, the Willapa Hills have not been profiled for landslide potential by WA-DNR.
	Secure funding to <b>acquire additional generators</b> to maintain critical infrastructure on reservation, including for water systems, especially for new	on-going	While a base set of generators have been acquired, the Tribe is seeking to ensure there is

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*Table 50. Status of Previously Identified Mitigation Actions.*

<b>Action #</b>	<b>Action Description</b>	<b>Timeframe</b>	<b>Status</b>
2.2	facilities being constructed or older facilities being renovated that do not already have generators.		emergency power at all critical facilities.
2.3	<b>Work with local partners</b> , including WSDOT and Pacific County, to reduce vulnerability and impacts from landslides and washouts along SR 105 outside of the Tribe's jurisdiction.	on-going	The Tribe regularly coordinates with WSDOT.
2.4	<b>Seismically retrofit</b> water towers and water storage structures utilizing grant support.	3-5 years	Not started. The Tribe will seek funding (likely BRIC) for the project.
2.5	Enhance and expand <b>existing water systems</b> on Reservation to increase capacity of water storage facilities; obtain alternate sources (wells) and increase capacity to enable ability to utilize fire hydrants without damaging existing infrastructure and reducing capacity for residents.	3-5 years	In progress under “Managed Retreat” for relocation area.
2.6	Identify potential mitigation actions to reduce impact of natural hazards to inventoried <b>cultural resources and sites</b> , such as historic camps and villages.	1-3 years	Beginning – during this planning process, the Planning Team shared information with the museum to energize this effort.
2.7	Work with local utility service providers to harden and/or install <b>underground utility lines</b> (power, phone, internet) and add <b>additional repeaters and network capacity</b> , which will provide higher quality and less disrupted services.	on-going	Ongoing – the Tribe regularly coordinates with utility providers.

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*Table 50. Status of Previously Identified Mitigation Actions.*

Action #	Action Description	Timeframe	Status
3.1	Work with local and federal partners to improve existing <b>tsunami vertical evacuation structure</b> ; assess need for additional structures.	3-5 years	Ongoing – the Tribe has made annual investments in improvements in such projects as weather protection, communications, supplies, and accessibility.
3.2	Continue to improve <b>evacuation routes and signage</b> as needed. Work with local partners outside of tribal jurisdiction to enhance evacuation routes and signage.	on-going	Ongoing – the Tribe coordinates with WA-EMD and local partners on evacuation signage.
3.3	Enhance <b>existing shelters</b> as needed to have back-up generators, communications systems as well as kitchen, shower/bathroom, and heating systems.	on-going	Seeking funds to expand the current OEM building to support mass care.  Seeking project ideas for a full shelter facility in the Willapa Hills.
3.4	Build a tornado and severe <b>weather evacuation shelter and/or saferooms</b> . These shelter locations shall include, at a minimum, back-up power generators, communications, water and heating systems, and kitchen, shower/bathroom facilities. The shelters should meet the access and functional needs of all individuals.	3-5 years	Not started – seeking project ideas.
4.1	Develop a <b>forest fuels management program</b> that includes a fuels reduction strategy and promotes forest health, such	1-3 years	Ongoing – while Natural Resources actively manages fuels in current occupied areas, the

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*Table 50. Status of Previously Identified Mitigation Actions.*

Action #	Action Description	Timeframe	Status
	as the planting of native fire-resistant plants.		program needs to expand during the Managed Retreat relocation.
4.2	Working with South Beach Regional Fire Authority, <b>secure grant</b> to purchase a <b>mobile "Fire Prevention Safety Trailer."</b>	1-3 years	Complete.
5.1	Continue to actively <b>monitor coastal erosion</b> at North Cove/Graveyard Spit shoreline and work with local, state and federal partners to develop long-term mitigation solutions.	on-going	Ongoing.
5.2	Work with federal legislators to fund continued Army Corps of Engineers' monitoring and on-going maintenance, enhancement and expansion of <b>barrier dune and related erosion control projects</b> at North Cove/Graveyard Spit beach.	on-going	Ongoing.
6.1	Develop (and update as required) a <b>post-disaster action plan</b> for all hazards of concern that addresses debris management, cultural / historical data gathering, substantial damage assessment, and grant management. This plan would be an appendix to the Tribe's Comprehensive Emergency Management Plan.	1-3 years	Seeking funding.
6.2	Evaluate and adopt <b>tribal policies and codes</b> that increase resiliency to natural hazards, such as stronger building codes,	on-going	Ongoing.



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*Table 50. Status of Previously Identified Mitigation Actions.*

Action #	Action Description	Timeframe	Status
	stormwater and potable water management plans, wildfire management programs, and land use & development policies.		
6.3	Maintain and expand a <b>public outreach strategy</b> of on-going programs providing multiple messages that support all phases of emergency management, including the maintenance of a 7-day supply of food and water. This should include CERT training. Training program should also include an outreach program for elders and sensitive populations to provide assistance as needed.	on-going	Ongoing.
6.4	Continue to update as required and needed, <b>emergency plans</b> including FEMA Hazard Mitigation Plan, Comprehensive Emergency Management Plan, Continuity of Operations Plan, Disaster Recovery Plan, Debris Management Plan, Individual Households & Special Needs Assistance Plan.	on-going	Seeking funds for the family of plans.
6.5	Continue <b>participation and renewal</b> in National Weather Service’s StormReady and TsunamiReady community program.	on-going	Ongoing.
6.6	Work with local, federal and private partners to install and maintain <b>additional early warning and updated communication systems</b> community-wide	on-going	Ongoing.

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*Table 50. Status of Previously Identified Mitigation Actions.*

<b>Action #</b>	<b>Action Description</b>	<b>Timeframe</b>	<b>Status</b>
	to provide enhanced coverage and redundancy. This includes additional towers, repeaters and support equipment.		

**C. Plan Revision Reflecting Changing Priorities**

Element	Requirements
<p><b>D3. Was the plan revised to reflect changes in priorities?</b></p> <p>44 CFR § 201.7(d)(3)</p> <p><i><b>Intent:</b> To ensure the plan reflects current conditions, including financial, legal, and political realities as well as post-disaster conditions.</i></p>	<p>The plan shall describe if and how any priorities changed (for example, due to disaster events or changes in leadership) since the plan was previously approved.</p> <p>If no changes in priorities are necessary, plan updates shall validate the information in the previously approved plan.</p>

This MHMP represents a shift in SBIT emergency management strategies and priorities. First, the focus on the Managed Retreat relocation to the Willapa Hills represents a shift in an overall Risk Management Strategy from Control (mitigate within the hazard area) to Avoidance (relocate outside of the hazard area) with respect to tsunamis, sea level rise, and coastal erosion. Second, the Tribe has embraced developing an emergency management program around FEMA’s National Preparedness System strengthens the integration of the MHMP with other NPS elements. For example, technical hazards and human-caused risks were evaluated in the MHMP development process and a THIRA/SPR was developed concurrently. This integrated approach ensures this MHMP effort is more than “simply updating a plan.” The NPS framework helps ensure there is follow-up with the action items.

The changing priorities resulted in a shift in the Plan’s goals and strategies/objectives as highlighted in this section. This Plan did not disregard the previous work. Rather, it built upon the previous plan and added more fidelity. Legacy strategies and actions that are still relevant have been reorganized into the new structure. There is also a change in terminology. The previous plan was organized in terms of goals and strategies while this Plan is organized around goals and objectives. While the terminology changed, the intent remains the same.

The most significant change is the addition of a new priority – **Promote Sustainable Living**. This priority fully encompasses the Tribe’s long-term intent as it takes such actions such as relocating into the Willapa Hills. The Tribe also added a new goal for working with external partners – **Build Partnerships and Implementation**.

## 1. *Legacy Goals*

The 2019 MHMP has 4 goals:

- Goal 1. Protect people, property and the natural environment
- Goal 2. Ensure continuity of critical economic and public facilities and infrastructure
- Goal 3. Promote and protect Tribal sovereignty and identity
- Goal 4. Increase public awareness of natural hazards and involvement in hazards planning

## 2. *Legacy Strategies*

The 2019 MHMP has 6 strategies:

- Pursue relocation and future development outside hazard zones
- Harden existing facilities, infrastructure, and homes as needed
- Continue development and expansion of evacuation routes and emergency facilities
- Reduce increased threat from wildfires
- Reduce continued threat from coastal erosion
- Continue to expand and improve emergency management preparedness and response capabilities

## 3. *New Goals and Objectives*

While the goals remain relevant, in light of the repeated and increasing impacts from climate change as well as tribal relocation efforts, the following goals and objectives are new for the 2024 MHMP update:

- **Goal #1: Promote Sustainable Living (New goal with existing strategy)**
  - **Goal Description:** Promote development in a sustainable manner.
  - **Objective #1.1:** Incorporate hazard mitigation into long-range planning and development activities.
  - **Objective #1.2:** Pursue relocation and future development outside hazard zones (Existing strategy).
  - **Objective #1.3:** Promote beneficial use of hazardous areas while expanding enterprise, open space, and recreational opportunities.
  - **Objective #1.4:** Use regulatory approaches to prevent creation of future hazards to life and property.

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- **Objective #1.5:** Promote activities that protect tribal cultural resources and expand tribal sovereignty through sustainable living practices.
- **Goal #2: Protect Lives, Property, and the Natural Environment (Existing goal)**
  - **Description:** Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.
  - **Objective #2.1:** Advise public about health and safety precautions to protect from injury and loss.
  - **Objective #2.2:** Reduce damage to enhance protection of dangerous areas during hazardous events.
  - **Objective #2.3:** Ensure continuity of critical economic and public facilities and infrastructure (Existing goal).
  - **Objective #2.4:** Harden existing facilities, infrastructure, and homes as needed (Existing strategy).
  - **Objective #2.5:** Continue development and expansion of evacuation routes and emergency facilities (Existing strategy).
  - **Objective #2.6:** Reduce increased threat from wildfires (Existing strategy may be an action under Objective #2.2).
  - **Objective #2.7:** (Reduce continued threat from coastal erosion (Existing strategy may be an action under Objective #2.2).
  - **Objective #2.8:** Reduce the threat from landslides and erosion.
  - **Objective #2.9:** Protect the water quality and indigenous species.
- **Goal #3: Increase public awareness of local hazards and involvement in hazards planning (Modified existing goal)**
  - **Description:** Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to hazards.
  - **Objective #3.1:** Increase public awareness and understanding, support, and demand for hazard mitigation.
  - **Objective #3.2:** Heighten public awareness of the full range of hazards they may face.
  - **Objective #3.3:** Publicize and encourage the adoption of appropriate hazard mitigation measures.
- **Goal #4: Build Partnerships and Implementation (New Goal)**

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- **Description:** Build and support local partnerships to continuously become less vulnerable to hazards. Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.
  - **Objective #4.1:** Build and support local partnerships with stakeholders in the community.
  - **Objective #4.2:** Build a team of committed volunteers to safeguard the community before, during, and after a disaster.
  - **Objective #4.3:** Build hazard mitigation concerns into the Tribal planning and budgeting process.
- **Goal #5:** Strengthen Emergency Services Capability (New goal but current strategy)
    - **Description:** Establish policies and procedures to ensure mitigation projects for critical facilities, services and infrastructure.
    - **Objective #5.1:** Provide training to Tribal departments and non-Tribal entities on mitigation programs and techniques that could be incorporated into a variety of projects.
    - **Objective #5.2:** Continue to expand and improve emergency management preparedness and response capabilities (existing strategy).

**IV. Assurances and Plan Adoption**

**A. Assurance of Federal Guidance Compliance and Required Amendments**

Element	Requirements
<p><b>E1. Does the plan include assurances that the tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including 2 CFR Parts 200 and 3002, and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes?</b></p> <p>44 CFR § 201.7(c)(6)</p>	<p>The plan shall include assurances which state that the tribal government will comply with all applicable federal statutes and regulations in effect with respect to the periods for which it receives grant funding including 2 CFR Parts 200 and 3002. The tribal government will amend its mitigation plan whenever necessary to reflect changes in tribal or federal laws and statutes.</p>

The Tribal Council of the Shoalwater Bay Indian Tribe assures that SBIT will comply with all applicable Federal statutes and regulations in the monitoring, evaluation, and updating of this plan (Table 51). Furthermore, SBIT will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including DMA2K requirements (CFR 201.7(c)(6)), and 2 CFR Parts 200 and 3002, and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes.

**B. Adoption by SBIT**

The adoption resolution is in Appendix A.

*Table 51. SBIT MHMP Adoption.*

Internal Approval and Tribal Adoption of the Multi-Hazard Mitigation Plan		
<b>SBIT Planning Team</b>	The amended SBIT MHMP was approved by the SBIT Planning Team on August 2, 2024. The resources and information cited in the mitigation plan provide a strong local perspective and help identify strategies and activities to make the Tribe and Tribal members of SBIT more disaster resilient.	
<b>SBIT Tribal Council</b>	The amended MHMP was adopted by the Shoalwater Bay Indian Tribe Tribal Council on October 1, 2024.	Resolution 10-01-24-37

## *Appendix A: Multi-Hazard Mitigation Plan Adoption*



### SHOALWATER BAY INDIAN TRIBE

P.O. Box 130 • Tokeland, Washington 98590  
Telephone (360) 267-6766 • FAX (360) 267-6778

Shoalwater Bay Indian Tribe  
Resolution 10-01-24-37

Shoalwater Bay Indian Tribe (SBIT) Multi-Hazard Mitigation Plan, June 2024

WHEREAS the Shoalwater Bay Indian Tribal Council recognizes the threat that natural hazards pose to people and property within the Shoalwater Bay Indian Tribe;

WHEREAS the Shoalwater Bay Indian Tribe has prepared a multi-hazard mitigation plan in accordance with the Disaster Mitigation Act of 2000 and the requirements in Title 44 Code of Federal Regulations Section 201.7;

WHEREAS the Plan specifically addresses hazard mitigation strategies and plan maintenance procedures for the Shoalwater Bay Indian Tribe;

WHEREAS the Plan recommends several hazard mitigation actions and projects that will provide mitigation for specific natural hazards that impact the Shoalwater Bay Indian Tribe with the effect of protecting people and property from loss associated with those hazards;

WHEREAS, adoption of this plan will make the Shoalwater Bay Indian Tribe eligible for funding to alleviate the impacts of future hazards on the Reservation,

NOW THEREFORE BE IT RESOLVED by the Shoalwater Bay Tribal Council of the Shoalwater Bay Indian Tribe that:

1. The Plan is hereby adopted as an official plan of the Shoalwater Bay Indian Tribe.
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them.
3. Future revisions and plan maintenance required by 44 CFR 201.7 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.



*Appendix B: SBIT Risk and Capability Survey*

# *Shoalwater Bay Indian Tribe Risk and Capability Survey*

## *Overview*

Thank you for helping put the Shoalwater Bay Indian Tribe (SBIT) on the path to be one of the most resilient tribes in the United States. Right now, we are focused on developing a risk and capability assessment that will both inform our emergency plans and fulfill a Tribal Homeland Security Grant Program (THSGP) requirement. We would like to know what threats and hazards are of most concern specifically to the Shoalwater Bay Indian Tribe. For example, a utility failure may cause us to find alternate power sources but a tsunami may require an evacuation.

This risk survey uses the SBIT’s 2020 hazard mitigation plan and its 2022 Threat and Hazard Identification and Risk Assessment as a baseline for identifying risks and includes additional threat and hazards that may be of concern. At this point you may be thinking, “I can’t help; I don’t know anything about this.” Fear not, that puts you in with a big club of 99+% of the population. The very fact that you are a member, staff, or partner of the SBIT makes you important in the risk management process. Chances are that your unique experience and suggestion may provide insight that nobody else has thought of.



## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

The SBIT has contracted with Wise Oak Consulting, L.L.C.(SM), to help us with this process.

This survey only has 18 questions. However, it involves completing a matrix that will help us put together the puzzle that is the SBIT's risks. It should take 15-20 minutes to complete. Don't worry about answering all of the questions – just answer those you feel comfortable with. You may have some highly-specialized experience that is specific to just one area of the assessment – excellent; just work on that.

**Privacy Notice**

This survey collects no personally identifiable information and individual answers will not be shared outside of the Shoalwater Bay Indian Tribe. The demographic questions are designed to simply make sure we are involving the whole community and determining how you got your insight.

<b>Name</b>	
<b>Email Address</b>	
<b>Organization</b>	
<b>Title/Position</b>	

Either place a check next to where you live or write in an answer.

On Reservation	<input type="checkbox"/>
Off Reservation, Pacific County, WA	<input type="checkbox"/>
Elsewhere in Washington	<input type="checkbox"/>
Elsewhere in the U.S.	<input type="checkbox"/>

Other: \_\_\_\_\_

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

*What is your occupational background and/or education? Circle all that apply.*

Agriculture	Firefighting	Information	Public Works
Construction	Fishing	Law Enforcement	Real Estate renting and leasing
Education - College	Forestry / Land Management	Leisure and Hospitality	Retail trade
Education K-12	Government - city	Manufacturing	Science
Construction	Government - county	Natural Resources and Mining	Transportation and warehousing
Emergency Management	Government - Federal	Non-profit Organization	Tribal Member
Emergency Medical Services	Government - state	Non-tribal member residing or working on tribal land/businesses	Utilities
Facility Maintenance	Government – tribal nation	Parks and Recreation	Volunteer Organization
Faith-based community	Healthcare and social services	Planning	Other services
Financial Activities	Hunting	Professional and Business Services	

Other: \_\_\_\_\_

Do you work with people with disabilities and others with access and functional needs? (Circle one answer) **Yes / No**

Do you identify as a person with disabilities or others with access and functional needs? (Circle one answer) **Yes / No / Prefer not to answer**

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

***Describe Hazards***

We want to identify the hazards of concern for the Shoalwater Bay Indian Tribe. We will begin by describing the threats and hazards in terms of location, extent, and probability of future occurrence. The areas of concern for the region vary in both geographic location, elevation, and topography. Therefore, consider the general region of the SBIT in your assessment, not just where you might live, work, or visit.

You will be asked to evaluate a number of hazards based on their location (how much land is affected), extent (how big the hazard is), and probability of occurrence per the guidelines below.

***Natural Hazards***

Location – check the box (Extensive, Moderate, Limited) that corresponds to your estimate for how much of the SBIT is affected by each hazard based on the "Location" definitions below.

<b>Location Definitions</b>	
<b>Extensive</b>	Extensive: 50% or more of the SBIT land/assets affected
<b>Moderate</b>	Moderate: 25%-50% of the SBIT land/assets affected
<b>Limited</b>	Limited: 25% or less of the SBIT land/assets affected

<b>Natural Hazards Location</b>			
<b>Hazard</b>	<b>Your Estimate</b>		
	<b>Extensive</b>	<b>Moderate</b>	<b>Limited</b>
<b>Coastal Erosion</b>			
<b>Earthquake</b>			
<b>Epidemic</b>			
<b>Flood</b>			
<b>Landslide</b>			
<b>Severe Weather</b>			
<b>Tsunami</b>			

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

<b>Natural Hazards Location</b>			
<b>Hazard</b>	<b>Your Estimate</b>		
	<b>Extensive</b>	<b>Moderate</b>	<b>Limited</b>
<b>Wildland Fire</b>			

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

***Extent***

Hazard Extent – the magnitude of the hazard (Richter Scale, tsunami height, etc.). Please check the box (Catastrophic, Critical, Limited, Negligible) that corresponds to your estimate for how bad you believe the hazard is for the SBIT based on the "Extent" definitions below.

<b>Extent Definitions</b>	
<b>Catastrophic</b>	<ul style="list-style-type: none"> <li>• Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses result in permanent disability and multiple deaths.</li> <li>• Overwhelming damage requires Federal assistance and requires months to years to recover.</li> </ul>
<b>Critical</b>	<ul style="list-style-type: none"> <li>• Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses result in permanent disability and at least one death.</li> <li>• Shut down of critical facilities for more than 1 week and less than 1 month.</li> </ul>
<b>Limited</b>	<ul style="list-style-type: none"> <li>• Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses do not result in permanent disability and there are no deaths.</li> <li>• Moderate quality of life lost.</li> <li>• Shut down of critical facilities for more than 1 day and less than 1 week.</li> </ul>
<b>Negligible</b>	<ul style="list-style-type: none"> <li>• Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths.</li> <li>• Negligible quality of life lost. Shut down of critical facilities for less than 24 hours.</li> </ul>

<b>Natural Hazards Extent</b>				
<b>Hazard</b>	<b>Your Estimate</b>			
	<b>Catastrophic</b>	<b>Critical</b>	<b>Limited</b>	<b>Negligible</b>
<b>Coastal Erosion</b>				
<b>Earthquake</b>				
<b>Epidemic</b>				
<b>Flood</b>				
<b>Landslide</b>				

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

<b>Natural Hazards Extent</b>				
<b>Hazard</b>	<b>Your Estimate</b>			
	<b>Catastrophic</b>	<b>Critical</b>	<b>Limited</b>	<b>Negligible</b>
<b>Severe Weather</b>				
<b>Tsunami</b>				
<b>Wildland Fire</b>				



Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

***Probability of Occurrence***

Please check the box (Highly Likely, Likely, Possibly, Unlikely) that corresponds to your estimate for how likely you believe the hazard is for the SBIT based on the "Probability" definitions below.

<b>Probability Definitions</b>	
<b>Highly Likely</b>	Frequent events with a well-documented history of occurrence. Annual probability that is greater than 10%.
<b>Likely</b>	Between Occasional occurrences with at least two or more documented historic events. Annual probability that is between 10% and 1%.
<b>Possibly</b>	Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 1% and .1%.
<b>Unlikely</b>	Extremely rare with no documented history of occurrences or events. Annual probability of less than .1%.

<b>Natural Hazards Probability of Occurrence</b>				
<b>Hazard</b>	<b>Your Estimate</b>			
	<b>Highly Likely</b>	<b>Likely</b>	<b>Possibly</b>	<b>Unlikely</b>
<b>Coastal Erosion</b>				
<b>Earthquake</b>				
<b>Epidemic</b>				
<b>Flood</b>				
<b>Landslide</b>				
<b>Severe Weather</b>				
<b>Tsunami</b>				
<b>Wildland Fire</b>				

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

***Natural Hazards of Most Concern***

On a scale of 1 to 5, select how concerned you are about each hazard. 1 - you are not really worried about this hazard; 5 - this is the hazard that concerns you most.

<b>Natural Hazards of Most Concern</b>					
<b>Hazard</b>	<b>Not Concerned</b>		<b>Concerned, but not the worst hazard</b>		<b>Very Concerned</b>
	1	2	3	4	5
<b>Coastal Erosion</b>					
<b>Earthquake</b>					
<b>Epidemic</b>					
<b>Flood</b>					
<b>Landslide</b>					
<b>Severe Weather</b>					
<b>Tsunami</b>					
<b>Wildland Fire</b>					

***Technological Hazards***

This step is the same as for natural hazards, only you will accomplish it for technological hazards. Technological hazards are accidents such as oil spills or other hazardous materials (HAZMAT) spills; utility failures, dam failures, etc.

You will be asked to evaluate a number of hazards based on their location (how much of the SBIT is affected), extent (how big the hazard is), and probability of occurrence.

***Location***

Please check the box (Extensive, Moderate, Limited) that corresponds to your estimate for how much of the SBIT is affected by each hazard based on the "Location" definitions below.

<b>Location Definitions</b>	
<b>Extensive</b>	Extensive: 50% or more of the SBIT land/assets affected
<b>Moderate</b>	Moderate: 25%-50% of the SBIT land/assets affected
<b>Limited</b>	Limited: 25% or less of the SBIT land/assets affected

<b>Technical Hazards Location</b>			
<b>Hazard</b>	<b>Your Estimate</b>		
	<b>Extensive</b>	<b>Moderate</b>	<b>Limited</b>
<b>Hazardous Materials Release - Land</b>			
<b>Hazardous Materials Release - Marine</b>			
<b>Structure Fire</b>			
<b>Utility Disruption</b>			

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

***Extent***

Hazard Extent – the magnitude of the hazard (Richter Scale, tsunami height, etc.). Please check the box (Catastrophic, Critical, Limited, Negligible) that corresponds to your estimate for how bad you believe the hazard is for the SBIT based on the "Extent" definitions below.

<b>Extent Definitions</b>	
<b>Catastrophic</b>	<ul style="list-style-type: none"> <li>• Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses result in permanent disability and multiple deaths.</li> <li>• Overwhelming damage requires Federal assistance and requires months to years to recover.</li> </ul>
<b>Critical</b>	<ul style="list-style-type: none"> <li>• Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses result in permanent disability and at least one death.</li> <li>• Shut down of critical facilities for more than 1 week and less than 1 month.</li> </ul>
<b>Limited</b>	<ul style="list-style-type: none"> <li>• Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses do not result in permanent disability and there are no deaths.</li> <li>• Moderate quality of life lost.</li> <li>• Shut down of critical facilities for more than 1 day and less than 1 week.</li> </ul>
<b>Negligible</b>	<ul style="list-style-type: none"> <li>• Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths.</li> <li>• Negligible quality of life lost. Shut down of critical facilities for less than 24 hours.</li> </ul>

<b>Technological Hazards Extent</b>				
<b>Hazard</b>	<b>Your Estimate</b>			
	<b>Catastrophic</b>	<b>Critical</b>	<b>Limited</b>	<b>Negligible</b>
<b>Hazardous Materials Release - Land</b>				
<b>Hazardous Materials Release - Marine</b>				
<b>Structure Fire</b>				

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

<b>Technological Hazards Extent</b>				
<b>Hazard</b>	<b>Your Estimate</b>			
	<b>Catastrophic</b>	<b>Critical</b>	<b>Limited</b>	<b>Negligible</b>
<b>Utility Disruption</b>				

***Probability of Occurrence***

Please check the box (Highly Likely, Likely, Possibly, Unlikely) that corresponds to your estimate for how likely you believe the hazard is for the SBIT based on the "Probability" definitions below.

<b>Probability Definitions</b>	
<b>Highly Likely</b>	Frequent events with a well-documented history of occurrence. Annual probability that is greater than 10%.
<b>Likely</b>	Between Occasional occurrences with at least two or more documented historic events. Annual probability that is between 10% and 1%.
<b>Possibly</b>	Possibly: Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 1% and .1%.
<b>Unlikely</b>	Extremely rare with no documented history of occurrences or events. Annual probability of less than .1%.

<b>Technological Hazards Probability of Occurrence</b>				
<b>Hazard</b>	<b>Your Estimate</b>			
	<b>Highly Likely</b>	<b>Likely</b>	<b>Possibly</b>	<b>Unlikely</b>
<b>Hazardous Materials Release - Land</b>				
<b>Hazardous Materials Release - Marine</b>				
<b>Structure Fire</b>				
<b>Utility Disruption</b>				

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

### Technical Hazards of Most Concern

On a scale of 1 to 5, select how concerned you are about each hazard. 1 - you are not really worried about this hazard; 5 - this is the hazard that concerns you most.

<b>Technological Hazards of Most Concern</b>					
<b>Hazard</b>	<b>Not Concerned</b>		<b>Concerned, but not the worst hazard</b>		<b>Very Concerned</b>
	1	2	3	4	5
<b>Hazardous Materials Release - Land</b>					
<b>Hazardous Materials Release - Marine</b>					
<b>Structure Fire</b>					
<b>Utility Disruption</b>					

## Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

### Human-caused Threats

This step is the same as for natural and technological hazards, only you will accomplish it for human-caused threats that will cause the SBIT to be overwhelmed and need to build capabilities to fully respond to – the “worst most likely.” Human-caused threats can be thought of as deliberate attacks such as cyberattacks or mass shootings.

### *Location*

Please check the box (Extensive, Moderate, Limited) that corresponds to your estimate for how much of the SBIT Nation is affected by each threat based on the "Location" definitions below.

<b>Location Definitions</b>	
<b>Extensive</b>	Extensive: 50% or more of the SBIT land/assets affected
<b>Moderate</b>	Moderate: 25%-50% of the SBIT land/assets affected
<b>Limited</b>	Limited: 25% or less of the SBIT land/assets affected

<b>Human-caused Threats Location</b>			
<b>Threat</b>	<b>Your Estimate</b>		
	<b>Extensive</b>	<b>Moderate</b>	<b>Limited</b>
<b>Active Shooter</b>			
<b>Cyber-attack against data</b>			
<b>Cyber-attack against infrastructure (ex. power grid)</b>			



Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

***Extent***

Threat Extent – the magnitude of the hazard (Richter Scale, tsunami height, etc.). Please check the box (Catastrophic, Critical, Limited, Negligible) that corresponds to your estimate for how bad you believe the threat is for the SBIT based on the "Extent" definitions below.

<b>Extent Definitions</b>	
<b>Catastrophic</b>	<ul style="list-style-type: none"> <li>• Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses result in permanent disability and multiple deaths.</li> <li>• Overwhelming damage requires Federal assistance and requires months to years to recover.</li> </ul>
<b>Critical</b>	<ul style="list-style-type: none"> <li>• Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses result in permanent disability and at least one death.</li> <li>• Shut down of critical facilities for more than 1 week and less than 1 month.</li> </ul>
<b>Limited</b>	<ul style="list-style-type: none"> <li>• Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure).</li> <li>• Injuries or illnesses do not result in permanent disability and there are no deaths.</li> <li>• Moderate quality of life lost.</li> <li>• Shut down of critical facilities for more than 1 day and less than 1 week.</li> </ul>
<b>Negligible</b>	<ul style="list-style-type: none"> <li>• Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths.</li> <li>• Negligible quality of life lost. Shut down of critical facilities for less than 24 hours.</li> </ul>

<b>Human-caused Threats Extent</b>				
<b>Threat</b>	<b>Your Estimate</b>			
	<b>Catastrophic</b>	<b>Critical</b>	<b>Limited</b>	<b>Negligible</b>
<b>Active Shooter</b>				
<b>Cyber-attack against data</b>				
<b>Cyber-attack against infrastructure (ex. power grid)</b>				

***Probability of Occurrence***

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Please check the box (Highly Likely, Likely, Possibly, Unlikely) that corresponds to your estimate for how likely you believe the threat is for the SBIT based on the "Probability" definitions below.

<b>Probability Definitions</b>	
<b>Highly Likely</b>	Frequent events with a well-documented history of occurrence. Annual probability that is greater than 10%.
<b>Likely</b>	Between Occasional occurrences with at least two or more documented historic events. Annual probability that is between 10% and 1%.
<b>Possibly</b>	Possibly: Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 1% and .1%.
<b>Unlikely</b>	Extremely rare with no documented history of occurrences or events. Annual probability of less than .1%.

<b>Human-caused Threats Probability of Occurrence</b>				
<b>Threat</b>	<b>Your Estimate</b>			
	<b>Highly Likely</b>	<b>Likely</b>	<b>Occasional</b>	<b>Unlikely</b>
<b>Active Shooter</b>				
<b>Cyber-attack against data</b>				
<b>Cyber-attack against infrastructure (ex. power grid)</b>				

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

***Human-caused Threats of Most Concern***

On a scale of 1 to 5, select how concerned you are about each hazard. 1 - you are not really worried about this hazard; 5 - this is the hazard that concerns you most.

<b>Human-caused Threats of Most Concern</b>					
<b>Hazard</b>	<b>Not Concerned</b>		<b>Concerned, but not the worst hazard</b>		<b>Very Concerned</b>
	1	2	3	4	5
<b>Active Shooter</b>					
<b>Cyber-attack against data</b>					
<b>Cyber-attack against infrastructure (ex. power grid)</b>					

***Thank You***

Your assistance in identifying the Shoalwater Bay Indian Tribe’s most significant threats and hazards is greatly appreciated.

### ***Appendix C: Interview Worksheets***

This review of each program/department has two sections. The first part has an overview of each mission essential function (programs/sections). The second section provides details about each program’s/section’s greatest threat/hazard concerns; what assets they have to respond; what essential items are at risk; and what they need to reduce the risk.

<u>Organization MEF Data Sheet</u>	
<u>Date:</u>	
1.	<u>Mission Essential Function Description (Example:” Police Department provides 24/7 law enforcement services with 5 officers”</u> •
2.	<u>Mission Essential Functions (Legal requirements and include deliverables. Example: “EF #1 – Law Enforcement”):</u> •
3.	<u>Impacts if not conducted (Inconvenience vs. safety? Example: “If the Police Department is shutdown, members will not have law enforcement services – endangering their safety.”):</u> •
4.	Recovery time objective (how quickly must the mission be restored – 15 minutes, 1 hour, 3 days, etc. Example: “The Police Department must be operational 24/7”): •
5.	<u>Partnerships/Interdependencies (Patients, other departments, external partners, etc., that provide critical input, goods, services, data, etc.):</u> • Tribal Council • Other Tribal Departments • Federal Partners ○ BIA ○ State ○ FEMA ○
7.	<u>Point of Contact:</u>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

Checklist Item	Notes
<p>What are your threats and hazards of concern that specifically affect your division?</p> <p>For example, power failure may shut you down or flood might make you evacuate.</p>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p>What size (extent) of a threat or hazard concerns you?</p> <p>For example, is it a 5-foot tsunami, 5.0 earthquake, etc.</p>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p>What specific areas/facilities concern you? What are the impacts that concern you?</p> <p>For example, does your threat or hazard of concern damage your facility, cut it off from access, etc.</p>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p>What emergency response-related capabilities do you have to address threats and hazards?</p> <p>For example, do you have people or equipment that could be used to help evacuate people?</p>	<ul style="list-style-type: none"> <li>•</li> </ul>
<p>What disaster response-related capabilities are put at risk due to threats and hazards?</p>	<ul style="list-style-type: none"> <li>•</li> </ul>

Shoalwater Bay Indian Tribe Multi-Hazard Mitigation Plan

<b>Checklist Item</b>	<b>Notes</b>
For example, do you have equipment or facilities in a tsunami zone, a slide area, etc.	
What disaster response-related needs do you have for vulnerability reduction?  For example, do you need an elevated generator or data center?	•

## *Appendix D: Public Outreach Agendas*



### **Day 1: Tribal Council brief, Planning Team Meetings / Public Workshop**

#### **9:00 AM – 9:30 AM: Tribal Council briefing**

- Introduce Hazard Mitigation planning
- Present initial findings from research

#### **9:30 AM – 1:00 PM: Kick-off meeting with planning team / Department Directors –**

##### **Location: Tribal Office Cafeteria**

- Planning overview
- Review Goals
- Review current plan action items' progress
- Identify assets and capabilities
- Review departmental checklists

#### **1:00 PM – 3:00 PM: Risk & capability assessment with planning team / departments**

- Identify threats & hazards
- Identify core capability targets
- Identify core capability capabilities

#### **5:00 PM – 7:00 PM: Public Risk & capability public workshop – Location: TBD**

- Identify Threats & Hazards
- Identify assets/capabilities
- Identify goals/actions

### **Day 2: Site visits, Department Interviews**

#### **9:00 AM – 4:00 PM: Department Interviews – Location: Emergency Management Office /**

##### **Department Director's Office**

- Identify risks to the department
- Identify essential functions
- Identify capabilities

#### **Day 3: Site visits, Department Interviews – Location: Emergency Management Office /**

##### **Department Director's Office**

#### **9:00 AM – 3:00 PM: Department Interviews**

- Identify risks to the department
- Identify essential functions
- Identify capabilities



**Objective: Complete Steps 3-5 of the mitigation planning process – Explain impacts to the Community, Review Your Current Capabilities, and Develop the Strategy.**

**Dates: Tuesday, April 2<sup>nd</sup> – Thursday, April 4<sup>th</sup>, 2024**

**Point of Contact: Ken Ufkin, [kufkin@shoalwaterbay-nsn.gov](mailto:kufkin@shoalwaterbay-nsn.gov); Office (360) 267-8120; Cell (360) 580-9697**

**Day 1 (April 2<sup>nd</sup>)**

Morning Session (Internal Staff): 8:30 AM - 11:30 AM

- **Hazard and Objective Workshops**
  - Hazard profiles presentation: 8:30 AM - 10:00 AM
  - Prospective goals and objectives discussion: 10:00 AM - 10:30 AM
  - Break: 10:30 AM - 10:45 AM
  - Open Discussion/Feedback: 10:45 AM - 11:30 AM

Afternoon Session (Internal Staff): 1:00 PM - 4:00 PM

- **Develop Actions Workshop**
  - Review old actions and their status: 1:00 PM - 1:30 PM
  - Develop new actions (e.g., protecting new oyster beds): 1:30 PM - 2:00 PM
  - Break: 2:00 PM - 2:15 PM
  - Develop capabilities to address actions: 2:15 PM - 2:45 PM
  - Prioritize actions: 2:45 PM - 3:15 PM
  - Wrap-Up and Q&A: 3:15 PM - 4:00 PM

**Day 2 (April 3<sup>rd</sup>)**

Morning Session (Internal Staff): 8:30 AM - 11:30 AM

- Repeat of Day 1's morning session for a different group of staff

Afternoon Session (Internal Staff): 1:00 PM - 4:00 PM

- Repeat of Day 1's afternoon session for a different group of staff

Evening Session (Members): 5:00 PM - 7:00 PM

- **Hazard and Objective Workshops (for Members)**
  - Hazard profiles presentation: 5:00 PM - 6:30 PM
  - Prospective goals and objectives discussion: 6:30 PM - 7:00 PM

**Additional Time (4<sup>th</sup> or Later)**

- **Additional Site Visits and/or Interviews**
  - To be scheduled as needed, within staff availability



***Appendix E: Mitigation Action Worksheet and Progress Report***

<b>Jurisdiction:</b>	<b>Shoalwater Bay Indian Tribe</b>
<b>Mitigation Action/Project Title:</b>	
<b>Background/Issue:</b>	
<b>Ideas for Integration:</b>	
<b>Responsible Agency:</b>	
<b>Partners:</b>	
<b>Potential Funding:</b>	
<b>Cost Estimate:</b>	
<b>Benefits: (Losses Avoided)</b>	
<b>Timeline:</b>	
<b>Priority:</b>	
<b>Worksheet Completed by:</b>	

## Mitigation Action Progress Report Form

Progress Report Period	From Date:	To Date:
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	<input type="checkbox"/> Project completed <input type="checkbox"/> Project canceled <input type="checkbox"/> Project on schedule <input type="checkbox"/> Anticipated completiondate: _____ <input type="checkbox"/> Project delayed Explain _____	

### Summary of Project Progress for this ReportPeriod

What was accomplished for this project this reporting period?
What obstacles, problems, or delays did the project encounter?
If uncompleted, is the project still relevant? Should the project be changed or revised?
Other comments

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