Tulalip Tribes
Hazard Mitigation Plan
2010 Update

Tulalip Tribes Hazard Mitigation Plan 2010 Update

Prepared for
The Tulalip Tribes of Washington

Funded by
Federal Emergency Management Agency
Emergency Management Performance Grant
&
The Tulalip Tribes

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August, 2010

Special Thanks to:
Chief J.A. Goss, Jr.
Tulalip Tribal Police

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Table of Contents

List of Maps

List of Tables

List of Figures

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SECTION I

INTRODUCTION

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Introduction

The purpose of this Tulalip Tribes Tribal-level Hazard Mitigation Plan (HMP) is to guide efforts to efficiently mitigate natural hazards on the Tulalip Indian Reservation, and to work with other agencies to mitigate and respond to natural hazards that cross Reservation boundaries.

This HMP establishes mitigation goals, lists objectives necessary to achieve those goals, and identifies policies, tools, and actions that will help meet the objectives. These short- and long-term actions will reduce the potential for financial and personal losses on the Reservation. In short, this plan is intended to help create a disaster-resistant community by reducing the threat of natural hazards to life, property, economy, and infrastructure, while encouraging the protection and restoration of natural and cultural resources.

The natural hazards that have affected the Reservation in the past and will affect the Reservation in the future include floods, earthquakes, severe storms, wildfires, landslides and tsunamis.

To protect the welfare of the Tulalip Tribes, its members, and all persons present on the Reservation, it is important for the Tulalip Tribes to minimize threats from future hazard events. In developing a policy response, it is important to recognize that floods, earthquakes, severe storms and other similar events are naturally occurring processes that will present occasional disruption to the lives of Reservation residents. Any policy must also recognize that there are many private and public structures that have been constructed without regard to potential natural hazards. Fortunately, there are many options to reduce future risk and loss through structural and non-structural projects, as well as regulatory actions.

This HMP is one action to reduce future risk and losses; it evaluates risks, identifies mitigation actions, and also will qualify the Tulalip Tribes for funding under the Pre-Disaster Mitigation Program (PDM) that is administered by the Federal

Emergency Management Agency (FEMA). This program provides funding for hazard mitigation planning and for mitigation projects that are implemented before a disaster.

This plan may also help the Tulalip Tribes acquire funding under other programs, including the Hazard Mitigation Grant Program (HMGP), which provides post-disaster funds for hazard reduction projects (e.g., elevation, relocation, or buyout of structures).

With this eligibility for grant programs, there is an opportunity to look to the future and work cooperatively and creatively to mitigate future damages and threats to public health and safety. This Hazard Mitigation Plan addresses the primary natural hazards that threaten the Reservation. Although many of the specific recommendations in the plan are directed at the Reservation, many will be most effective if implemented on a watershed-wide basis. It is therefore intended that this plan provides solutions that other jurisdictions can use and benefit from and that can be cooperatively implemented.

2010 Mitigation Goals and Objectives

1. Protect people, property and the natural environment
   a. Purchase hazard-prone areas for conservation and risk reduction
   b. Buy-out or relocate structures located in high-risk hazard areas
   c. Encourage low impact development through land-use regulations
   d. Consider hazard vulnerability when siting and planning new critical facilities
2. Ensure continuity of critical economic and public facilities and infrastructure
   a. Support redundancy of critical government functions
   b. Retrofit or build to highest standards, critical facilities and infrastructure
   c. Support emergency access and redundant evacuation routes
3. Promote resiliency to protect Tribal sovereignty and identity
   a. Increase mitigation and emergency management capabilities for the Tulalip Tribes and Quil Ceda Village
   b. Enable the Tulalip Tribes to be self-sufficient for at least 7 days after a disaster
4. Increase public awareness of natural hazards and involvement in hazards planning
   a. Encourage organizations, businesses, and local governmental agencies within community and region to develop partnerships
   b. Implement hazard awareness, preparedness and reduction programs

This HMP provides detailed recommendations and an action plan designed to meet each objective and, ultimately, the goals of the plan.

Document Format

The Tulalip Tribes HMP is divided into five sections:

- Section 1 is this introduction and how the HMP was prepared.
- Section 2 describes the land use, socioeconomic conditions, and physical characteristics of the Reservation.
- Section 3 presents an assessment of hazard risks on the Reservation.
- Section 4 presents the Tulalip Tribes mitigation strategy.
- Section 5 describes the plan implementation and maintenance process.

Appendix A includes the members of the Mitigation Planning Team and the agendas, handouts and minutes for the meetings that took place during the update process. Appendix B includes the public survey and its results. Appendix C details the buildings identified as Critical Facilities due to either their importance to the Tribe or the local economy. Appendices D through G include the Resolution to Adopt the Plan, FEMA Pre-Adoption Letter, Sources of Funding and References.

Planning Process

This section will discuss the planning process used to update the Tulalip tribal-level Hazard Mitigation Plan.

The planning process is an extremely important aspect in the development of a hazard mitigation plan. It is crucial for the success of the plan to have the public ask questions and comment on the plan. Also, by involving the public in the planning process, it increases the public's awareness of the hazards on the Tulalip Reservation and informs them about the importance of hazard mitigation planning. Having public involvement in the planning process also allows for the plan to reflect the public's views and opinions.

The previous HMP was approved in August of 2006. Due to staffing changes the plan update process was not begun in time to update the plan to meet the 3-year update timeline. Emergency Coordinator Rochelle James began the update process in the summer of 2009. In order to facilitate the completion of the plan in a timely manner the Office of Emergency Management applied for a grant to hire a private consultant, Wendy Buffett. The update process was expected to require less time than an original plan and thus the timeline was to have the plan completed between October of 2009 and July of 2010.

Preparation of the Plan

The 2006 Plan was completed with the help of several Tribal departments, but the extent of the participation of many departments and the individuals involved are not detailed in the document. Between October and December of 2009 the Emergency Management Coordinator and consultant reviewed Hazard Mitigation Plans from other jurisdictions to determine the most common departments to include in the process and the most effective methods of public involvement. Combined with guidance documents published by FEMA and the departments involved in the 2006 process, Rochelle James compiled an initial list of departments and individuals to invite to the "kickoff meeting", held on Tuesday, January 19th, 2010. At this short introductory meeting, attendees suggested additional groups to include in the process. The majority of those invited did not attend; however a core group of interested individuals from relevant departments provided sufficient guidance to continue with the process. This Mitigation Planning Team met monthly from February through May to discuss the progress of the plan update, learn about the findings of the risk assessment, and contribute their knowledge to the decisions made by the Emergency Manager and Mitigation Consultant.

Agendas and notes from each meeting, as well as a list of all those contacted and those who attended each meeting, is provided in Appendix A.

Public Process

The Mitigation Planning Team (MPT) agreed on the most effective methods for including the public in the planning process based on research from similar plans. An online questionnaire, free using Google's Documents service, was approved by the MPT and went live on March 10th, 2010. Every employee of the Tulalip Tribes received the link to the survey in their e-mail and were encouraged to forward the link to friends and family. The Emergency Coordinator placed printed copies at the Tribal Health Clinic and Administration Building Lobby, in addition to distributing them at a Census Party in the Tribal Gym, a Women's Health Day at the Health

Clinic, a County Health Rally in Marysville, and public information sessions on the results of the Risk Assessment. In total, over 150 individuals who live, work, or visit the Tulalip Reservation responded to the survey either by internet or print between March 10th and June 30th. The full questionnaire and the results are located in Appendix B.

Following the completion of the Risk Assessment, the Emergency Coordinator and Mitigation Consultant displayed maps showing the areas where hazards would most likely strike at the Administration Building Lobby on May 19th for six hours. A slide on the local public access information channel, provided free of charge by the MPT representative from the Communications Department, advertised the event during the week prior.

At the public events, including the Census Party and while displaying the Risk Maps, information about disaster preparedness and other public education documents were made available to the public. At the Census Party, survey respondents entered into a raffle to win a 3-day, 5-person disaster kit estimated at a $150 value. There were 57 entrants to the raffle and many of those received preparedness information or examined the Risk Maps.

The MPT used the results of the questionnaire and other public comments when updating the goals and objectives for the plan, and while ranking hazards and action items at the end of the process.

Plan Completion and Approval

After editing and approval by the MPT, the public was invited to comment on the plan between Monday, August 9th and Tuesday, August 31st. A PDF copy was made available on the website and a printed copy was placed at the Administration Building Lobby. An e-mail sent out to all Tribal employees with a notification of these options was sent on Monday, August 9th and a sign advertising the plan, along with comment forms, was next to the copy at the Administration Building. The plan will remain available on the website until the next update.

The Tribal Council adopted the final HMP update at the monthly meeting on _____, 2010. FEMA approved the plan on ____, 2010.

Changes from 2006 Plan

Each section and chapter of the 2010 Update has been altered from the 2006 plan. Although much of the original phrasing is the same, nearly every paragraph has been edited for clarity and brevity.

Section I

Planning process section replaced with new planning process. Goals and Objectives were slightly altered as per the Mitigation Planning Team. The document format has been condensed from 8 parts to 5, althoug the sections remain in the same order. No section or chapter was removed.

Section II

The history section was edited for clarity and brevity. Community Profile section includes updates of some new data, including Tribal Member ages, population count and location of elders and youth. Census data is unchanged. The Land Ownership Map, Future Land Use

Map and Zoning Maps have all been updated to reflect the most recent data available. The vulnerable population map is new, using 2010 data. Information about new buildings and other changes since 2006 is incorporated in the Economy and Industry sections.

Section III

Heat Wave, Drought and Pandemic have been discussed in this plan but are not addressed at the same level of detail, as there are not currently mitigation actions specifically attached to them and are more emerging threats in need of additional study. The list of previous disasters has been updated with events occuring since the 2006 plan.

Each hazard section has updated information regarding more recent events, both local and worldwide. Data used in map creation includes the newest GIS layers available, including tax assessor's data, Tribal Member Enrollment Data and LiDAR. Other updated information used in the risk assessment includes scientific reports regarding earthquake faults and predicted wave heights for tsunamis.

The loss estimations are based on 2009 Snohomish County Tax Assessment data and the Critical Infrastructure layers maintained by the Tulalip Data Services' GIS department.

Risk rankings were changed based on input from the 2010 Mitigation Planning Team and results from the public survey conducted between May and June of 2010.

Section IV

The progress of each Mitigation Action from 2006 has been noted, including what roadblocks have been identified. The MPT reprioritized the Action Items, which were further sorted based on funding availability, political factors and staffing.

Section V

Information regarding plans that have been created or revised since 2006 has been included in the Capabilities Assessment. Due to staff changes since the previous plan the section regarding a Hazard Mitigation Plan for Quil Ceda Village is unchanged but remains a priority. The Plan Maintenance process has increased the frequency of action item review session to at least twice per year, more often for short-term projects. The Mitigation Planning Team members will be involved in these updates to increase buy-in and consistency.

The update requirement for Tribal plans approved after October 1, 2008 is now every five years, rather than three.

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SECTION II

COMMUNITY PROFILE

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Community Profile

Disclaimer: The Tulalip Tribes Tribal/State Hazard Mitigation Plan covers all the people, property, infrastructure and natural environment within the exterior boundaries of the Tulalip Reservation as established by the Point Elliott Treaty of January 22, 1855 and by Executive Order of December 23, 1873, as well as any property owned by the Tulalip Tribes outside of this area. Furthermore the Plan covers the Tulalip Tribes Usual and Accustom Fishing areas (U&A) as determined by Judge Walter E. Craig in United States of America et. al., plaintiffs v. State of Washington et. al., defendant, Civil 9213 Phase I, Sub Proceeding 80-1, "In Re: Tulalip Tribes' Request for Determination of Usual and Accustom Fishing Places." This planning scope does not limit in any way the Tulalip Tribes' hazard mitigation and emergency management planning concerns or influence.

This section will provide detailed information on the history, geography, climate, land use, population and economy of the Tulalip Tribes and its Reservation.

Tulalip Reservation History

Archaeologists and historians estimate that Native Americans arrived from Siberia via the Bering Sea land bridge beginning 17,000 to 11,000 years ago in a series of migratory waves during the end of the last Ice Age. Indians in the region share a similar cultural heritage based on a life focused on the bays and rivers of Puget Sound. Throughout the Puget Sound region, there were numerous small tribes that subsisted on salmon, halibut, shellfish, and whales. While seafood was a mainstay of the native diet, cedar trees were the most important building material. Cedar was used to build both longhouses and large canoes.

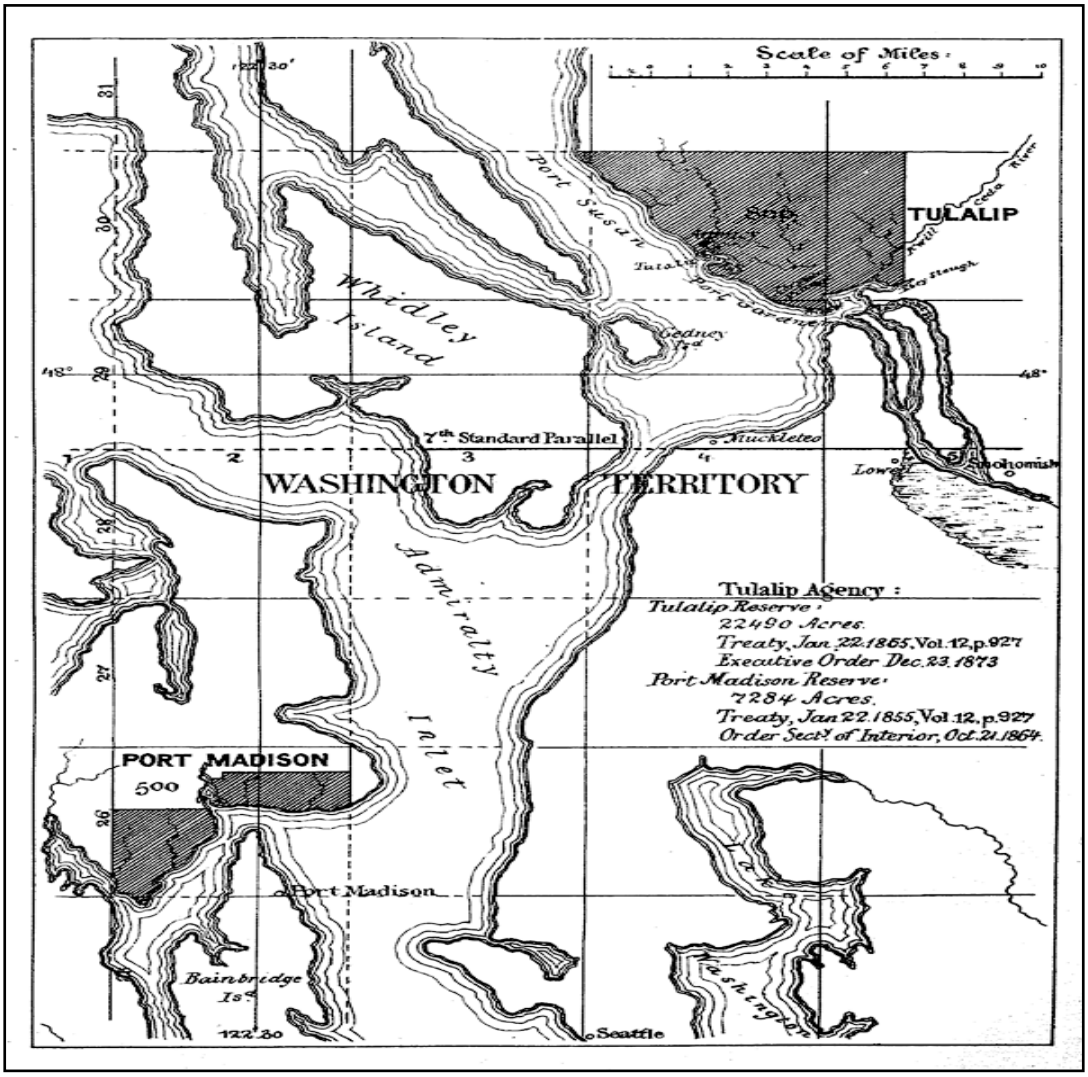
The natural abundance of the region allowed many tribes to develop complex cultures. The tribal groups in the area shared a common language, known generally as Salish or more precisely as Puget Salish or Lushootseed. Some of the major tribes in the area of the present Tulalip Reservation include the Snohomish, Snoqualmie, Stillaguamish, Skagit, Suiattle, Swinomish and Duwamish (and whose homelands can be located by the rivers that bear their tribal names).

The area now known as Snohomish County was home to at least 40 villages in 1800, including at least 5 on the present site of the Tulalip Reservation. The Snohomish or Sdoh-doh-hohbsh Tribe occupied the immediate Tulalip area, including Possession Sound and the river and estuary that bears their name.

Increasing pressure from European-American settlers exacerbated the problems faced by a native population already decimated by diseases such as smallpox and tuberculosis, which culminated in the signing of treaties in 1854 and 1855.

The Tulalip Reservation was established by the Point Elliott Treaty of January 22, 1855 and by Executive Order of December 23, 1873. It was established to provide a permanent home for the Snohomish, Snoqualmie, Skykomish, Skagit, Suiattle, Samish and Stillaguamish Tribes

and allied bands living in the region. **Map 1** shows the Tulalip Reservation in 1879. Catholic Missionaries moved into the area, and soon established a missionary school and church.



Map 1: Tulalip Reservation, 1879

The natives on the Reservation did not adapt to agriculture, as the federal government had hoped, and many either returned to a sustenance lifestyle based on fishing and gathering, or moved off the Reservation to find employment to support their families. The allotment of land to tribal members and families began in 1883 and ended in 1909.

The modern Tribal government was organized under the Indian Reorganization Act of 1934. Since there were many different tribes living on the reservation, they chose to adopt the name Tulalip Tribes, after the Bay.

Tulalip's Constitution and Bylaws were approved January 24, 1936 and a Charter ratified October 3, 1936. The governing body is the seven-member Board of Directors. The Tulalip tribal government is responsible for administering lands, leasing, loans, education, social

services, health, land use planning, environmental protection, police, criminal and civil courts, enrollment, water resources and roads, hunting and fishing and recreation.

Presently, the Tribe has incorporated a tribal municipality, Quil Ceda Village, to provide city services and infrastructure to help facilitate development of a major business park along the I-5 corridor. Businesses located within Quil Ceda Village include the Seattle Premium Outlets shopping mall (with over 100 shops) and retail chains Wal-Mart and Home Depot. The Tribe has also developed its own businesses, including two new casinos, a bingo facility and two liquor stores. These actions have resulted in increased revenue for the Tribe, which have led in turn to the development and expansion of tribal government services and facilities, such as the Tulalip Health Clinic.

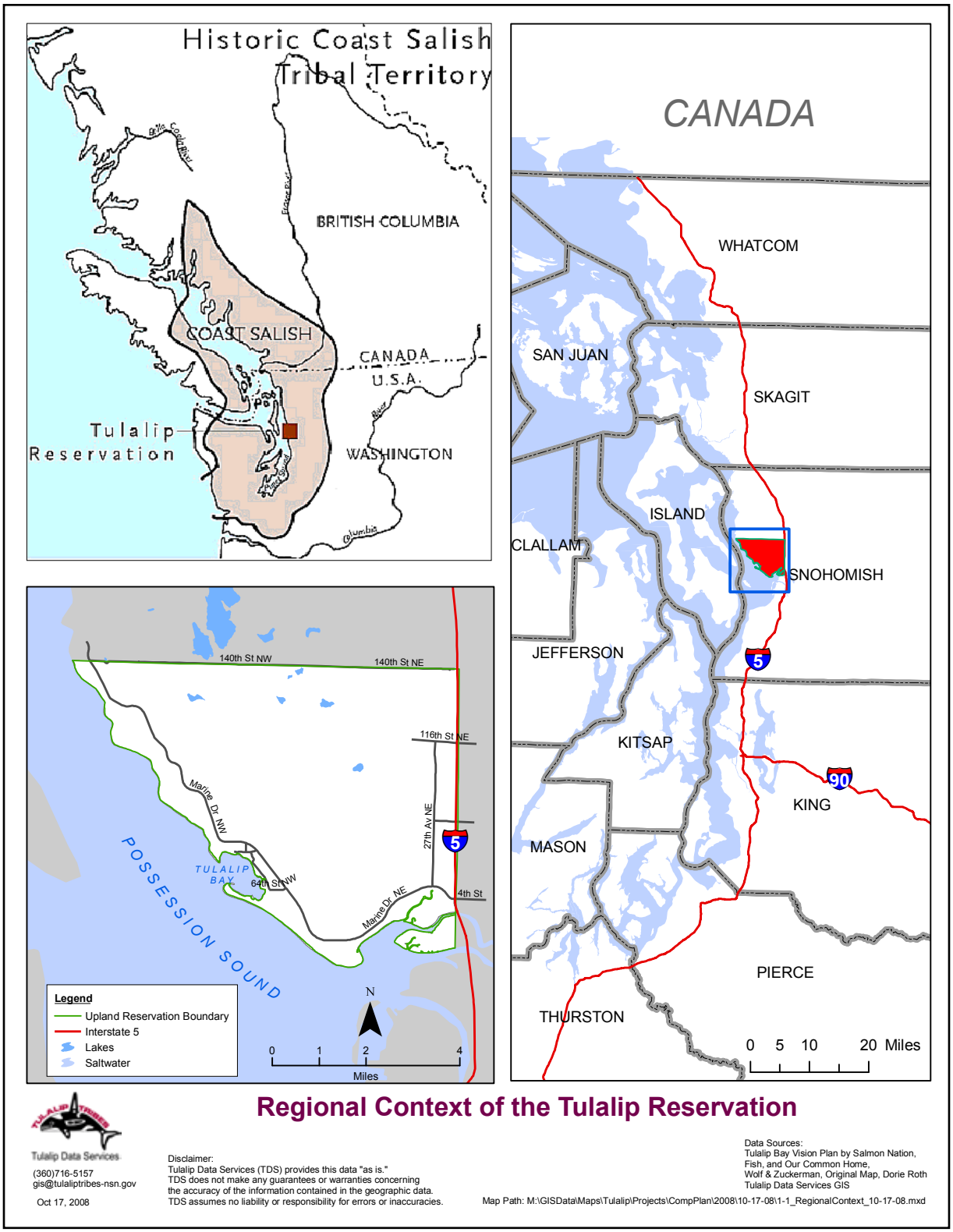
Geographic Setting

The Tulalip Reservation is located in Snohomish County about 35 miles north of downtown Seattle, Washington, and just north of Everett, Washington. It encompasses a land area of about 22,000 acres or about 35 square miles. It is located on the north side of the mouth of the Snohomish River, and along Possession Sound. Major development is located along Tulalip Bay, and along Interstate 5, which serves as its eastern border. The City of Marysville is adjacent to the reservation across I-5. **Map 2** shows the general location of the Tulalip Reservation in relationship to Seattle and the Puget Sound region as well as the Usual and Accustom fishing areas.

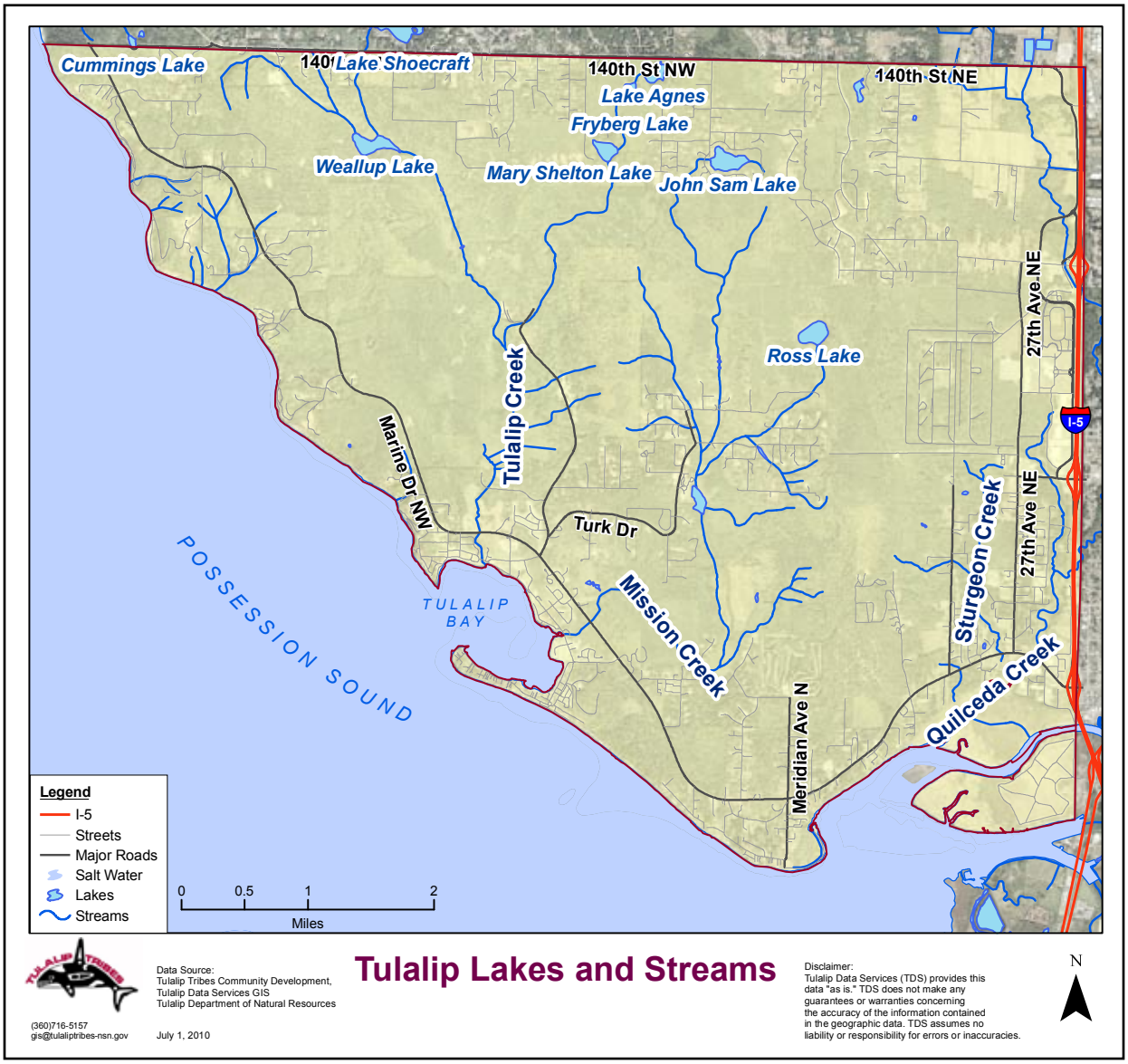
Lakes, Rivers and Streams

The Snohomish River's delta forms the southern boundary of the Reservation along Steamboat Slough. The Snohomish River is a major producer of several species of salmon, including steelhead. Development is limited in this area due to the debris and sediment load of the Snohomish River. The Reservation is located in two sub-basins, the Tulalip and Quil Ceda basins, although a very small portion in the northwest is drained by the Stillaguamish coastal basin. The Tulalip sub-basin, located in the western two-thirds of the reservation, is drained by Tulalip Creek and Battle (Mission) Creek. The Quil Ceda sub-basin, in the low eastern part of the reservation, is drained by Sturgeon and Quil Ceda Creeks. Quil Ceda Creek, which is currently suffering from the effects of pollution and urban waste run-off, is the largest stream on the Reservation, and was once the location of large runs of salmon.

The reservation also contains several ponds and lakes, notably, Weallup Lake, Ross Lake, John Sam Lake, Mary Shelton Lake, Lake Agnes, and Fryberg Lake. There is also a fish hatchery located on Upper Tulalip Creek Pond, which is formed by a dam. **Map 3** shows the location of the major water bodies on the Tulalip Reservation



Map 2: Regional Context of the Tulalip Reservation



Map 3: Tulalip Lakes and Streams

Hills and Mountains

The western two-thirds of the Reservation is comprised of three generally parallel, rolling ridges from 400 to 600 feet high drained by Tulalip and Battle Creeks. These ridges are the southern end of what is known as the Tulalip Plateau, an elongated mound surrounded by the waters of Port Susan to the west and the low-lying and flat Marysville Trough to the east. This plateau ends abruptly as steep sea cliffs which drop as much as 300 feet at the coast.

Soils and Geology

About 14,000 years ago the Vashon Glacier covered the Tulalip Reservation with 3,000 feet of ice. The glacier carved out a large, deep trough; when it melted the sea level rose 300 feet, filling the trough and creating Puget Sound. The top layer is Vashon till and can be found to depths up to 30 feet. Vashon till is a stable mix of rocks, dirt, clay and sand that has the consistency of concrete. Below Vashon till is Esperance sand and then Lawton clay. Esperance sand is a permeable mixture of sand and gravel. Lawton clay is an impermeable layer of clay, which is made up of fine sediments and large boulders. See **Figure 1** for a cross section of the soils that make up the coastal geology of the Tulalip Reservation.

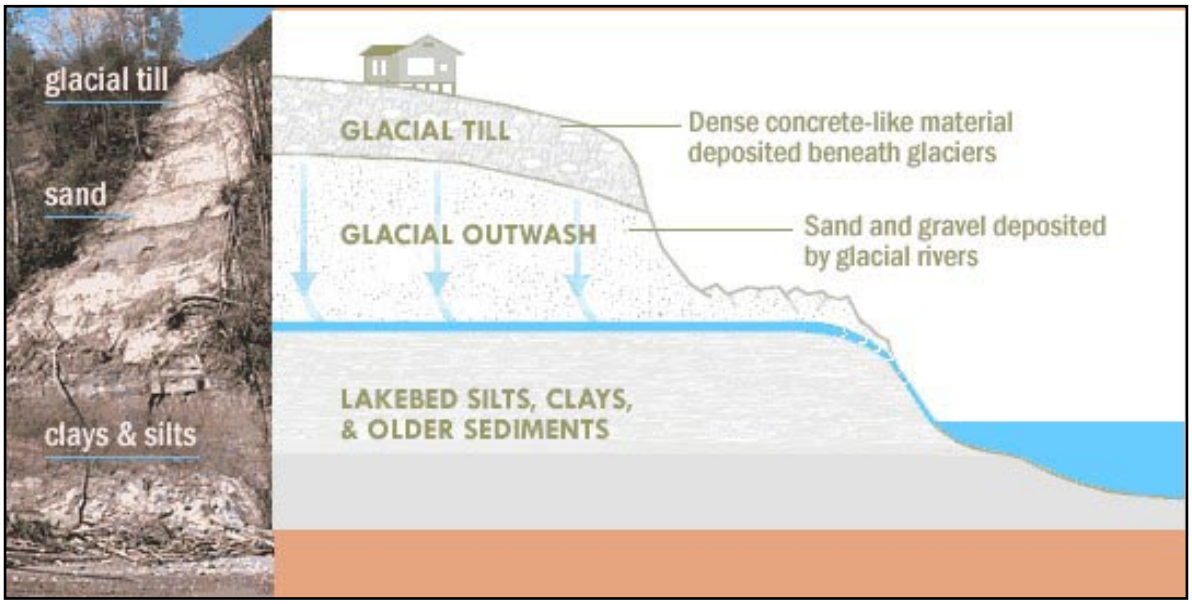


Figure 1: Soil Characteristics of the Tulalip Reservation

Climate

The Tulalip Reservation has the temperate climate typical of the Puget Sound coastal lowlands. Summers are dry with mild temperatures, and winters are rainy with occasional snow. On the Tulalip Reservation, the average temperature for January is 38° F and 63° F for July. Summer highs can be in the high 90s, while winter lows can reach 0°. Average annual rainfall is 35 inches. Winter winds average 25 mph with gusts up to 50 mph not uncommon. Air inversions and periods of stagnation occur for short periods during the winter, resulting in regional burn bans and other pollution control measures. Fog may occur in low lying areas such as Tulalip Bay and the Snohomish River delta.

Land Use and Ownership

The Tulalip Reservation has a unique land ownership and land use system compared to other jurisdictions in Washington State. This is because the Tulalip Reservation is a sovereign nation within Washington State and held in Trust for its native inhabitants, namely Tulalip tribal members, by the United States Federal government. Federal policy and relations between

Native Americans and non-native Americans has led to nearly half of the land area being alienated or owned by non-natives. This land is referred to as Fee Land. With greater economic independence in recent years, the Tribe has been buying back alienated land. As of 2009, the Tribe and members now own over 60% of the Reservation land base.

The Treaty of Point Elliot or Muckl-te-oh of 1855 established the Reservation, to be reserved "for exclusive use " by all the native inhabitants of the region. Article 3 defines the location and eventual use of the Reservation:

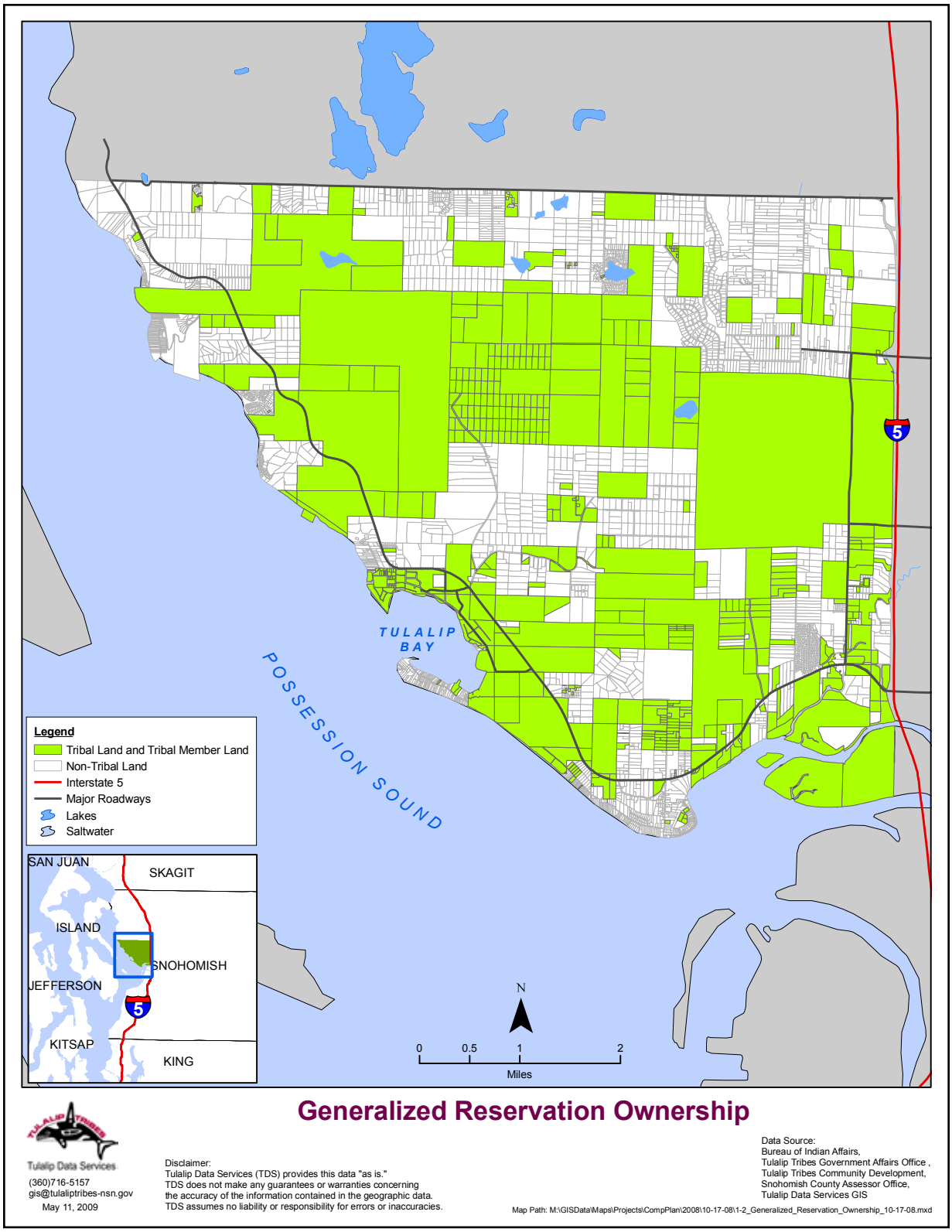
There is also reserved from out the lands hereby ceded the amount of thirty-six sections, or one township of land, on the northeastern shore of Port Gardner, and north of the mouth of Snohomish River, including Tulalip Bay and the before-mentioned Kwilt-seh-da Creek [Quil Ceda Creek], for the purpose of establishing thereon an agricultural and industrial school, as hereinafter mentioned and agreed, and with a view of ultimately drawing thereto and settling thereon all the Indians living west of the Cascade Mountains in said Territory. Provided, however, That the President may establish the central agency and general reservation at such other point as he may deem for the benefit of the Indians.

From 1883 to 1909, land was allotted to tribal members and family. After several years, Tribal members were free to sell their land to non-tribal members, and thus began the alienation process.

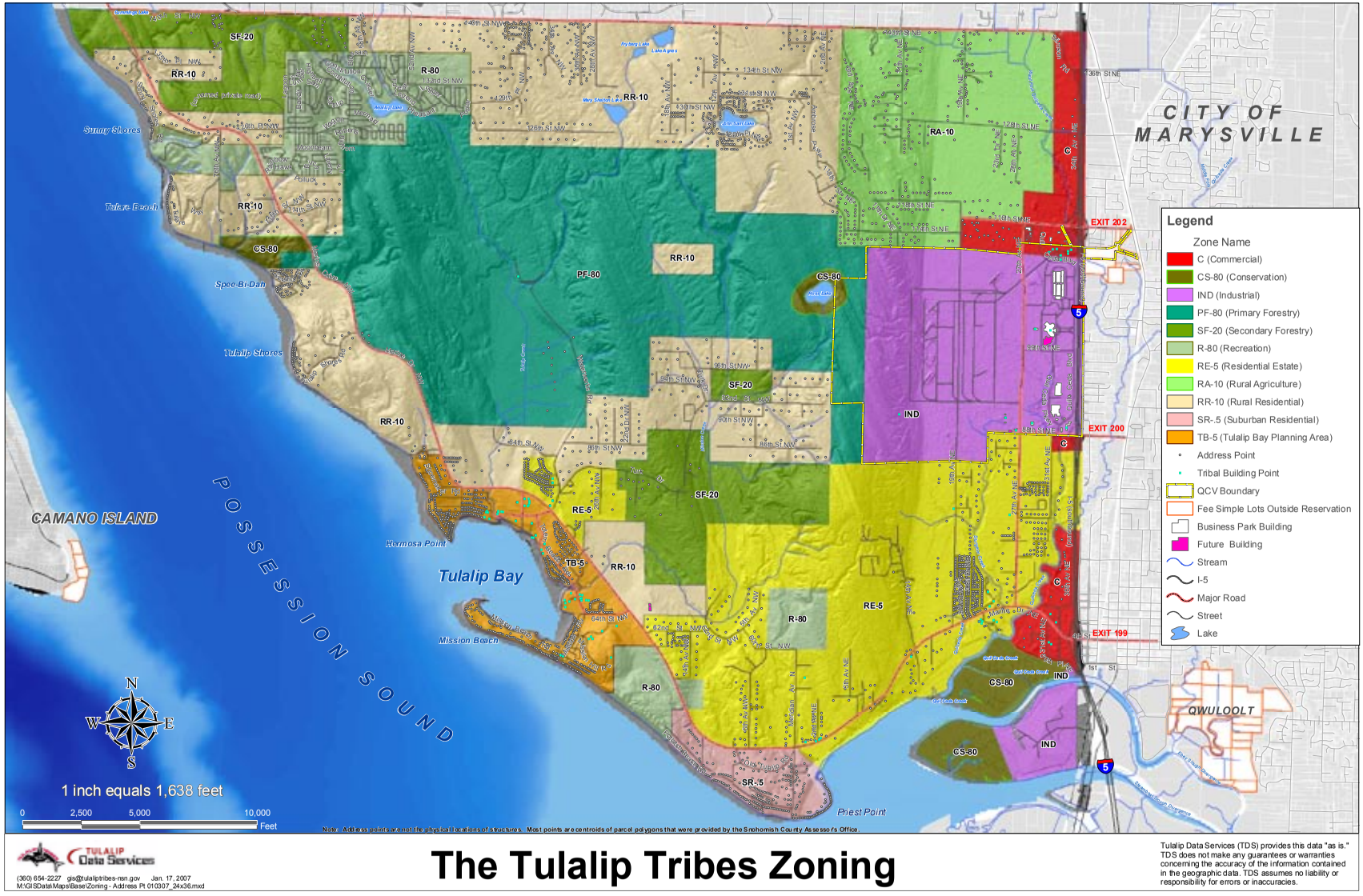
More recently about 300 acres of land was acquired in the Snohomish River delta near Marysville called Qwuloolt which is to be restored to tidal marshland. **Map 4** shows the current land ownership of the Reservation.

Zoning and Future Land Use

Map 5 shows the current zoning of the land of the Tulalip Reservation. **Map 6** shows the proposed future land use of the Tulalip Reservation. Note that Tribal Trust lands located along the steep landslide-prone bluffs are now designated as Conservation.

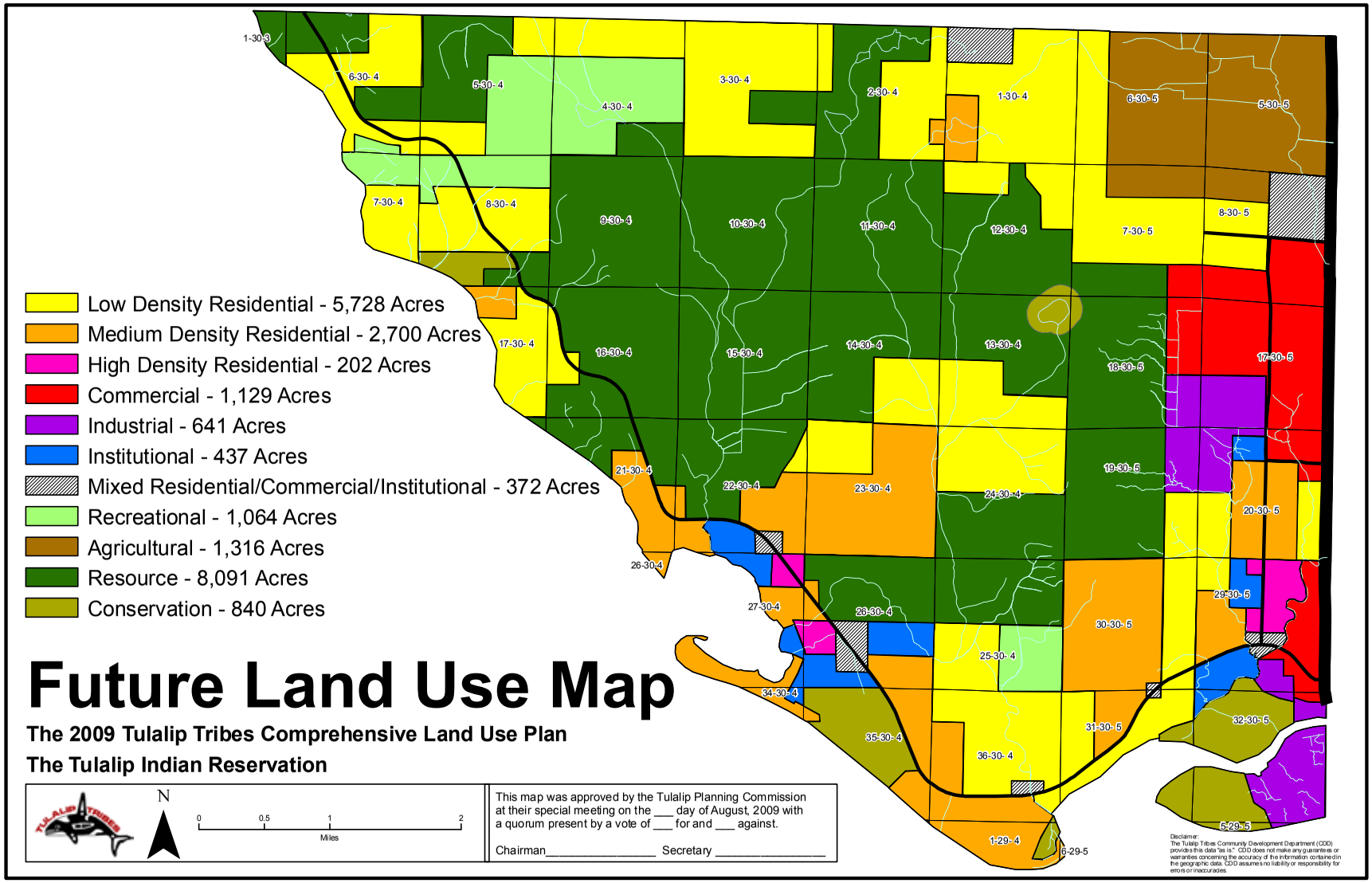


Map 4: Land Ownership (from 2009 Comprehensive Land Use Plan)



The Tulalip Tribes Zoning

Map 5: 2007 Zoning Map



Map 6: Future Land Use (from 2009 Comprehensive Land Use Plan)

Demographics

This section will discuss the population characteristics of the Tulalip Reservation, especially in terms of vulnerable populations. In general this section will discuss population characteristics of the Reservation as a whole and the Native American population in particular. Particular focus will be on the Tulalip Tribal members living on the Reservation. Many of the non-Tribal members on the Reservation are middle or upper-class, and often their primary homes are elsewhere. In contrast, Tribal members are below the national averages for education and income and generally are more vulnerable after a disaster event.

The demographic information for the Tulalip Reservation is based on the 2000 United States Census data and from information supplied by the State of Washington Office of Financial Management (OFM), as well as more current Tribal Enrollment Data collected by the Tribe. The 2010 Census is currently underway and thus much of the data is 10 years old and unchanged from the 2006 plan.

Why Consider Demographics in Hazard Mitigation Plans?

Research has shown that people living near or below the poverty line, the elderly, the disabled, women, children, ethnic minorities and renters have all been shown to experience more severe effects from disasters than the general population. Vulnerable populations may vary from the general population in how they perceive risk perception, how they access information about a hazard event, and their access to resources for post-disaster recovery.

While this plan covers the entire Reservation and everyone living on it, including non-tribal members, Tribal Members have typically relied more on the support and resources of the Tribe. Non-tribal members, during previous disaster events, have sought support and assistance outside the Tribe from Marysville and Snohomish County. Therefore more emphasis is intentionally focused on providing sufficient assistance to vulnerable Tribal members, even though the entire population is considered in the planning process.

Tulalip Reservation General Population Characteristics

The U.S. Census Bureau reported that 9,246 people of all races lived on the Tulalip Reservation in 2000, compared to 7,103 in 1990, and 5,046 in 1980. Compared to other reservations across the United States, the Tulalip Reservation has experienced some of the highest growth, as shown in the following **Figure 2.**

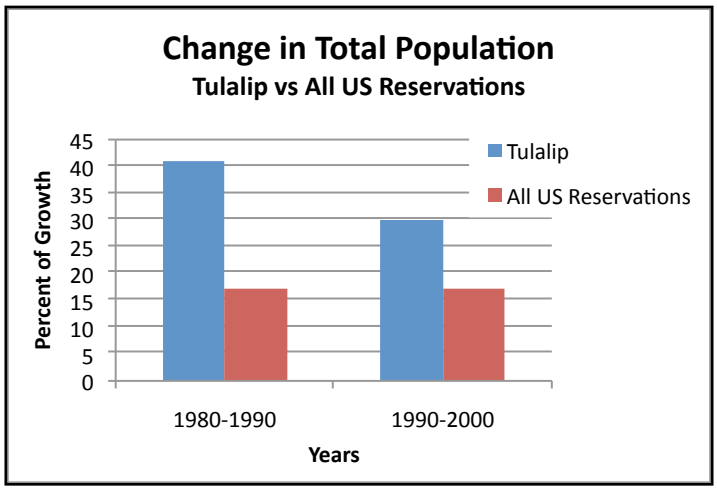


Figure 2: Tulalip's Growth Compared to All U.S. Reservations

Native Americans, including tribal members, make up about 22% of the population. Whites make up the largest ethnic group, with 72.1%. Of those who reported being of mixed descent, 25% listed American Indian and almost 75% White as one of their ethnic groups. As of 2010, The Tulalip Tribes Enrollment lists 2,208 members living on reservation.

The Tulalip Reservation has 3,314 households, averaging 2.79 persons per household. The average family size is 3.17 persons. For Native Americans, the average household size is 3.38 persons, while average family size is 3.62 persons.

In 2000 the Tulalip Reservation had 3,638 housing units, 91.1% of which are occupied. Of all occupied housing on the Reservation, 82.1% of housing is owner occupied, while 17.9% is renter occupied. Native Americans occupy 590 housing units, 47.8% by owners and 52.2% by renters.

Income

In the United States, individual households are expected to use personal resources to prepare for, respond to, and recover from disasters to some extent. Impoverished people are therefore more adversely impacted from disasters than members of the general population. Additionally, the poor typically occupy the more poorly built and inadequately maintained housing of any given community, which are more likely to be damaged or destroyed during a hazard event.

The 2000 per capita income on the Tulalip Reservation was $19,858, while the median household income was $47,453. The incomes for Native Americans were significantly lower. Native American per capita income was $10,282, while median household income was $20,911. **Table 1** shows the comparison of income and poverty for the Native American population, the Reservation and Washington State. About 10% of Tulalip Reservation residents are below the poverty line. Among Native Americans it is 25.4%.

	Median Household Income	Percent of total population below poverty line	Percent of children (18 & under) below poverty line	Percent of elderly (65 & older) below poverty line
Native American Population	$33,214	25.4	21.5	41.5
Tulalip Reservation	$47,453	10.1	13.2	6.3
Washington State	$45,776	10.6	13.2	7.5

Table 1: Population Living Beneath the Poverty Line as of Census 2000

Age Distribution

The vulnerability of elderly populations can vary significantly based on health, age, and economic security. However, as a group, the elderly are more apt to lack the physical and economic resources necessary for response, and are more likely to suffer health-related consequences making recovery slower.

According to 2000 US Census Bureau data, 10.3% or 953 of Tulalip Reservation's population is 65 or older. This is less than the state average of 11.2%. Of this, 350, or 36.3% of elderly persons, have disabilities of some kind. For Native Americans, only 3.8% of the population is 65 or older, but 64.6% have a disability. Children under 18 can also be more vulnerable during a disaster, as they often require assistance during and after an event. If roads are inaccessible during school or working hours, families can be separated and sheltering-in-place may be ignored in favor of reuniting with children. If an adult in a home is injured or otherwise disabled, children in that home may not know how to get help.

Figure 3 shows the distribution of age in Tulalip Reservation as a whole, while **Figure 4** shows the age distribution of Tulalip Tribal members living on the Reservation in 2010.

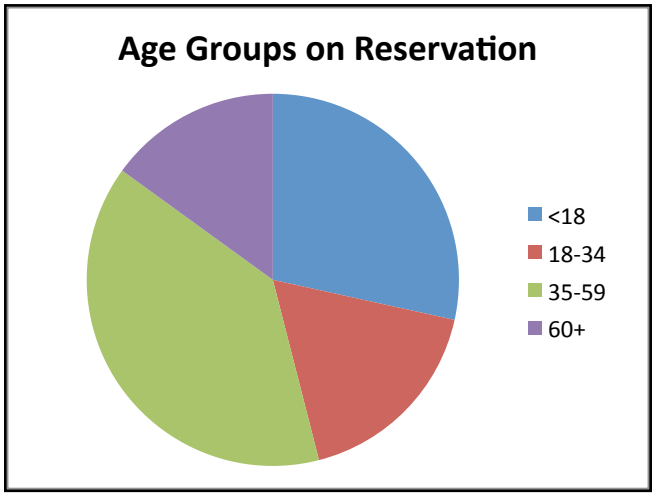


Figure 3: Age Groups of All Tulalip Residents as of 2000 Census

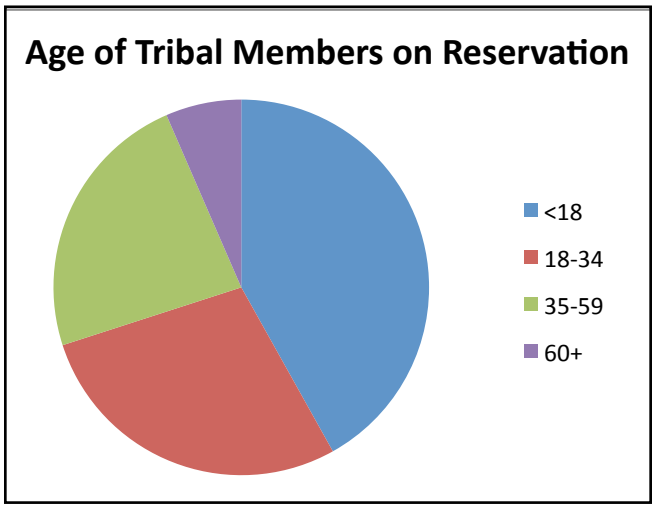
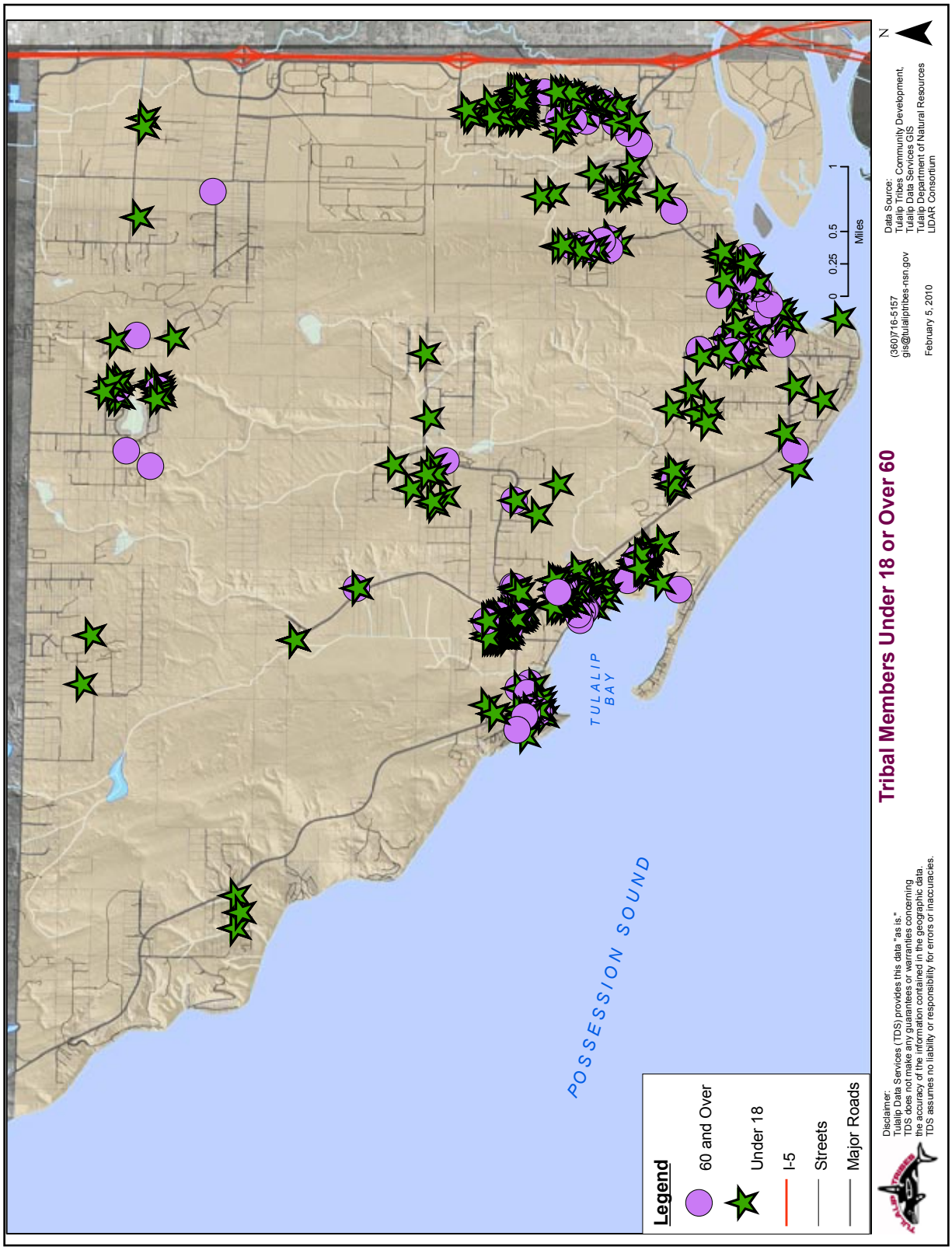


Figure 4: Percentages by Age Group of All Tulalip Residents as of 2000 Census

Census information does not provide exact locations of elderly persons; Tulalip Tribal Enrollment does keep records linking age and address. Vulnerable populations were identified to be those under 18 and those over 60. While elderly populations will vary in their physical and mental capabilities, generally isolated elders will need additional assistance. **Map 7** shows the general location of vulnerable Tribal members.



Map 7: Tribal Members Under 18 or Over 60

Race, Ethnicity and Language

Racially, Tulalip Reservation is a generally homogenous area, with Native American tribal members and Whites being the largest ethnic groups. **Figure 5** shows the racial distribution of Tulalip Reservation.

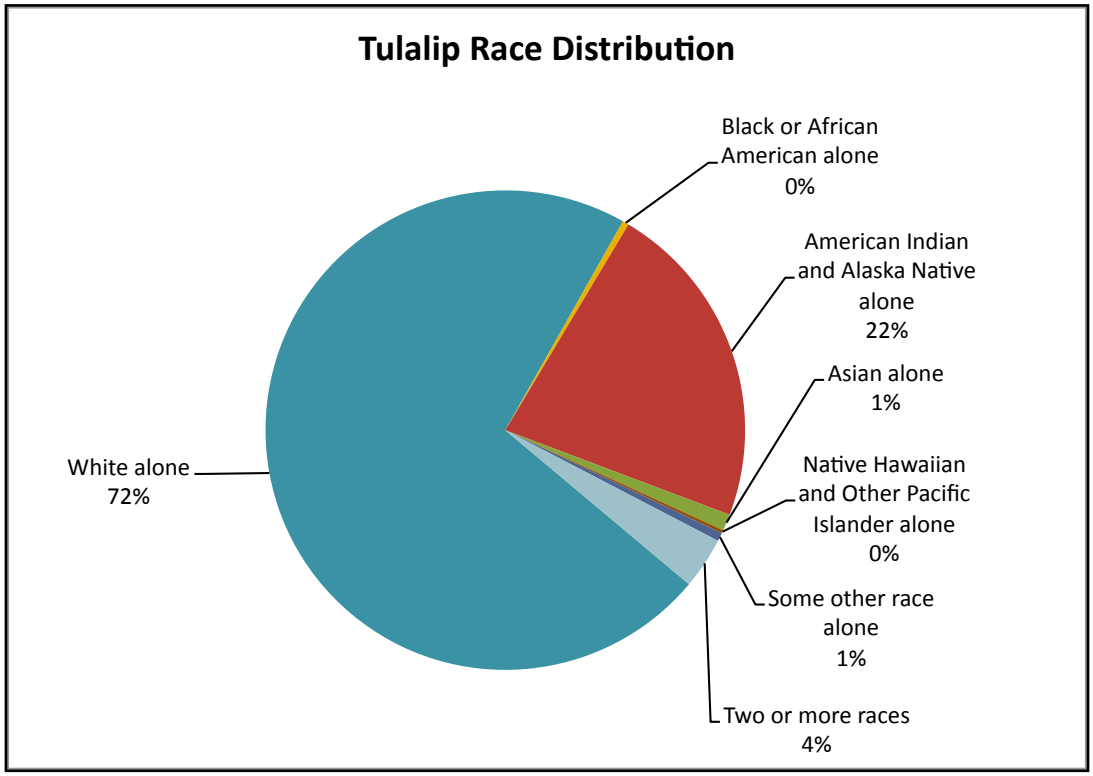


Figure 5: Tulalip Racial Distribution as of 2000 Census

Most Tribal members are poorer than their white counterparts who live on the Reservation, and are more likely to be less educated. Furthermore, 2.4% of Native-American housing lacks complete plumbing facilities, 2.5% lack complete kitchen facilities and 10.8% do not have telephone service.

Approximately 1.8% or 152 of Tulalip Reservation's residents reported speaking English "less than 'very well' " in the 2000 Census.

Disabled Populations

The Tulalip Reservation has generally the same percentage as the rest of Washington State of young people who are disabled, while a slightly higher percentage of adults 21-64 years old. THE Reservation has a lower percentage of elderly who are disabled. For Native Americans, once again, the percentages are much higher (see **Table 2**).

Disability Status of Non-Institutionalized Population				
Age	Number on Tulalip Reservation	Percent of Age Group, Reservation	Percent of Age Group, Native Americans	Percent of Age Group, State
5-20 yrs	171	7.2	10	7.7
21-64 yrs	1,105	20.9	24.2	17.8
65+ yrs	350	36.3	64.6	42.8

Table 2: Disability Status of Non-Institutionalized Population

Economy

Development Trends

The 2000 Census reported that the 60% of the Tulalip Reservation over the age of 16 were employed, similar to the state average of 61.4%. Unemployment statistics compiled by the Bureau of Indian Affairs found that in 2005, 20% of Tulalip Tribal membership living on-reservation were unemployed.

Industry

The Tulalip Tribes is the single largest employer on the Reservation, and the 4th largest in Snohomish County, with more than 3,000 jobs. Shopping and entertainment options in the Quil Ceda Village area include the Tulalip Casino and Resort, which draws visitors from around the region, and the Seattle Premium Outlets. Some high-end specialty stores, Wal-Mart and other retail shops are located in the Village and the surrounding area, which is located along I-5 on the Reservation's eastern border.

A handful of manufacturing and office buildings are located on the southeastern border, along I-5 and near the mouth of the Snohomish River. More retail options, restaurants and entertainment are located in this area, including the Bingo Hall and the smaller Quil Ceda Creek Casino. Further westward along Marine Drive NE/Tulalip Road, the Hibulb Cultural Center and Museum is preparing to open in 2011. The Tulalip Fish Hatchery provides income to fishermen and the Tribe and employs several specialized staff. The area around the Marina is host to cultural and public events throughout the year. There is no major manufacturing center or other industry; many non-Tribal residents live on or visit the Reservation for retirement, long-term camping or vacation housing.

Occupation

The Tulalip Reservation's residents are employed in a diverse field of occupations. For the residents of the Tulalip Reservation, the top three occupations are Management, Professional, and Related Occupations; Sales and Office Occupations; and Production, Transportation, and Material Moving Occupations. **Figure 6** shows percentages for occupations of all residents on the Tulalip Reservation.

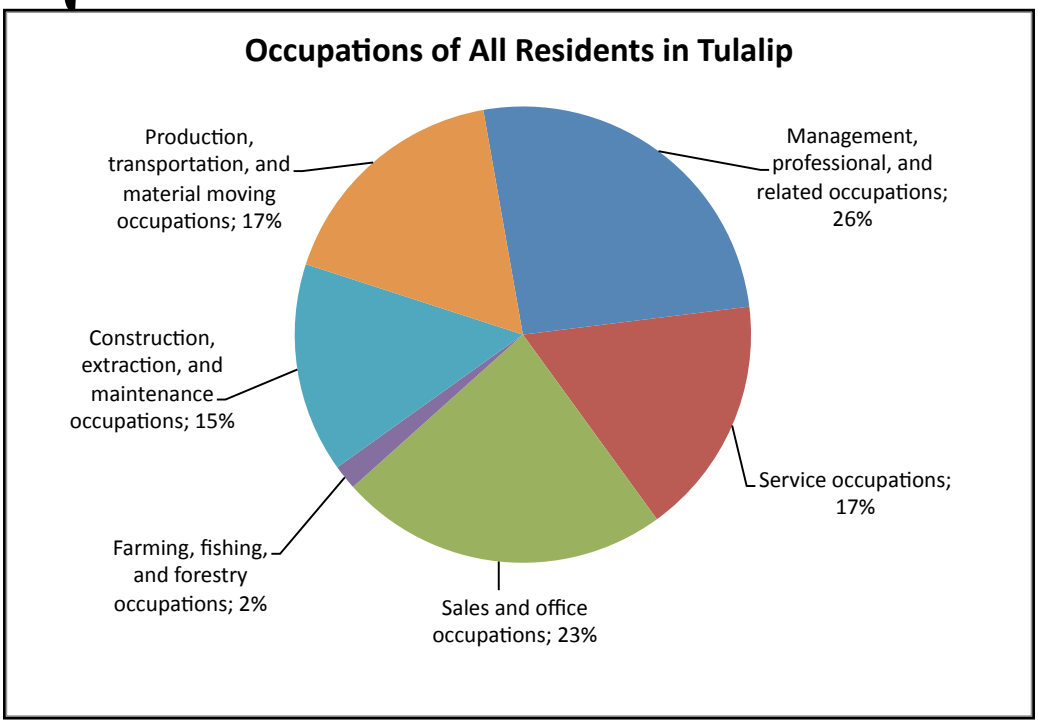


Figure 6: Occupations of All Residents in Tulalip, as of Census 2000

Fishing is listed as an occupation of 8.8% of Native American residents, and is a very important industry for many Tribal members, many of whom rely on the food for sustenance and supplemental income. **Figure 7** shows the occupations of Tulalip's Native American population in 2000. More than a third are employed in service-based jobs.

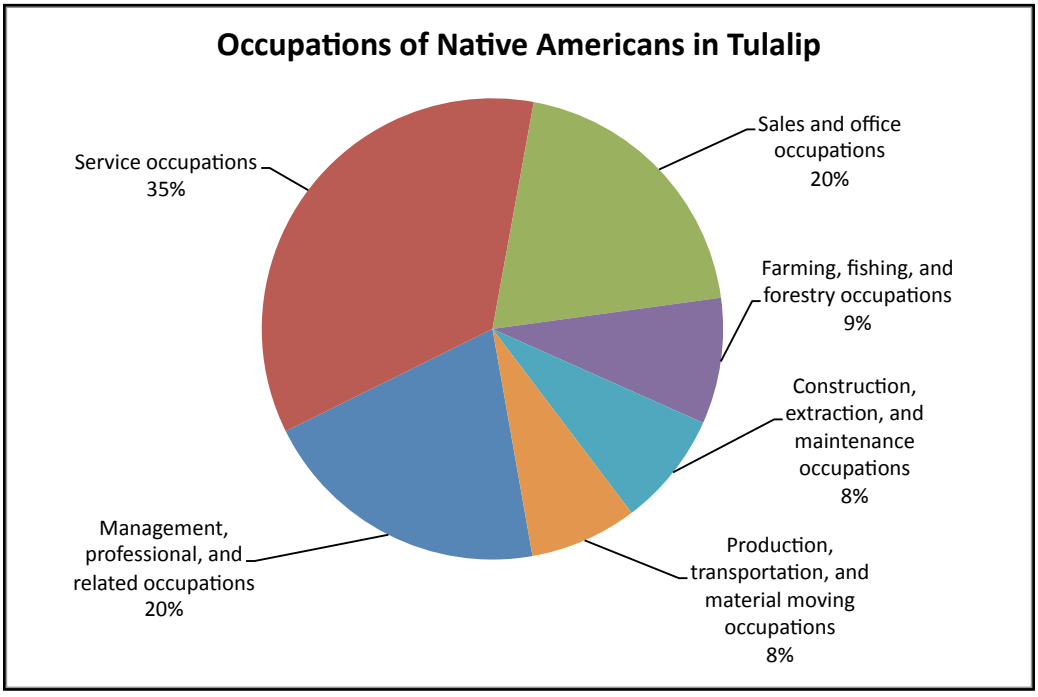


Figure 7: Occupations of Native Americans in Tulalip, as of Census 2000

SECTION III

RISK ANALYSIS

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Risk Assessment

Introduction

This chapter will look at the potential hazards that could affect the Tulalip Reservation, and then determine the vulnerabilities of people, property and the environment.

An inventory of Tribally-owned property, critical facilities and infrastructure on the Tulalip Reservation was used to determine loss estimations. In addition, one section will review the hazards that could affect Tulalip's Usual and Accustomed fishing areas (U&A), which are located elsewhere in the region and are not under the land management or jurisdiction of the Tribe.

The format of the chapter will be as follows:

- Introduction and overview, including methodology and summary of findings
- Detailed profiles of natural hazards affecting Tulalip, including loss estimations
- Additional hazards: Pandemic, Heat Wave, Drought and Hazardous Materials
- Usual and Accustom fishing area, including vulnerabilities
- Critical Facilities and Infrastructure assessments
- Hazard Risk Rating

Hazards Profiled

The first step in preparing a risk assessment for the Tulalip Reservation is to identify which natural hazards affect the Reservation. The 2006 Hazard Mitigation Plan identified the hazards that have previously affected the reservation:

- Earthquakes
- Floods
- Landslides/Mass Movements
- Severe Weather
- Tsunamis/Seiches
- Wildfires

Due to the 2009 H1N1 influenza pandemic, the 2010 Mitigation Planning Team chose to include Pandemic as a natural hazard to facilitate distribution of medication and supplies, and to ensure continuity of operations during a mass casualty event. Recent events such as the record high temperatures during the summer of 2009 and the concern stated in the Tulalip Comprehensive Plan of maintaining sufficient water availability led to the Mitigation Update Committee adding heat wave and drought as hazards to be considered. The Committee agreed that integrating the predicted effects of climate change into the updated plan is important; increased frequency and severity of Heat Wave and Drought are one of the predicted consequences of climate change in this area.

Avalanches and volcanic eruptions were excluded from the hazards studied. The Tulalip Reservation is located along the coast, and does not have the steep rugged mountains or snow cover needed to experience avalanches. The Tulalip Reservation is west of a volcano, Glacier Peak, but is not considered a risk to the Reservation due to river drainage courses and prevailing winds. Most ash and smoke (tephra) would blow east, particularly with the strong

winds of the Convergence Zone. Lava and mudflows (lahars) would not flow through any watersheds that drain the Reservation. These hazards could affect the Usual and Accustomed Fishing Areas. A volcanic eruption would have severe effects on the natural environment and would disrupt fisheries that the Tulalip Tribes depend on.

Summary of Vulnerability and Losses

Overall the Tulalip Reservation and the Puget Sound estuary, of which the Tulalip Tribes' Usual and Accustomed fishing area is part, are extremely vulnerable to natural hazards. The Tulalip Reservation lies within one of the most seismically and volcanically active regions on Earth. In particular 2-3 crustal faults, of which little is known, run just north and south of the Reservation. Every year brutal winter storms batter the coast, flooding low lying areas and damaging property. The most recent event was the record snowstorm of 2009, during which many roads in the Puget Sound area were impassable. Furthermore the Reservation is walled by imposing unstable cliffs carved by recent glaciations that reach up to 300 feet high and can collapse at any time and without warning onto properties below.

Presidential Declared Disasters

Presidential Declared Disasters are typically events that cause more damage than state, tribal and local governments/resources can handle without the assistance of the federal government. Generally there is not a specific dollar loss threshold that must be met. A Presidential Major Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, and designed to help disaster victims, businesses, and public entities.

Historically, Snohomish County has had 23 Presidential Declared Disasters with the frequency increasing over the past ten years. The most recent declaration occurred March 2nd, 2009 for the major snowstorms that shut down the region for several days. Five disasters have been declared for major winter storms in the last four years. The winter of 2009-2010 was mild due to El Nino, but it is likely that winter storms will continue to occur regularly in the Tulalip area.

Presidential declarations are listed in Table 3. It is not known at this time how much damage the Tulalip Reservation received from these disasters, nor how much financial assistance was given to Tribal members and residents of the Reservation. It has been noted by Tribal staff during meetings that the Tulalip Tribes had difficulty getting assistance after the Nisqually earthquake in 2001. For future events, it is essential that the Tulalip Tribes apply directly to FEMA for disaster assistance rather than through Snohomish County. Not only will a better assessment be made of damages, but more financial assistance is possible.

Disaster #	Type of Event	Date
137	Flood, Wind	October 1962
185	Flood	December 1964
196	Earthquake	May 1965
492	Flood	December 1975
545	Flood, Landslide	December 1977
612	Flood	December 1979
623	Volcano	May 1980
784	Flood	November 1986
883	Flood	November 1990
896	Flood	December 1990
981	Wind	January 1993
1079	Flood	November-December 1995
1100	Flood	January-February 1996
1159	Ice, Wind, Snow, Landslide, Flood	December 1996-February 1997
1172	Flood, Landslide	March 1997
1361	Earthquake	February 2001
1499	Severe Storm, Flooding	November 2003
1641	Severe Storms, Flooding, Tidal Surge, Landslides, and Mudslides	May 17th, 2006 (for storm Jan. 27th- Feb 4th, 2006)
1671	Severe Storms, Flooding, Landslides, and Mudslides	Dec 12, 2006 (for storms Nov 2-11th, 2006)
1682	Severe Winter Storm, Landslides, and Mudslides	Feb 14, 2007 (for storm Dec 14-15th, 2006)
1734	Severe Storms, Flooding, Landslides, and Mudslides	Dec 8th, 2007
1817	Severe Winter Storm, Landslides, Mudslides, and Flooding	Jan 30th, 2009
1825	Severe Winter Storm and Record and Near Record Snow	Mar 2nd, 2009 (for storms Dec 12th-Jan 5th, 2009)

Table 3: Presidential Declared Disasters

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Earthquakes

Hazard Profile

Earthquakes are caused by the fracture and sliding of rock within the Earth's crust. The Earth's crust is divided into eight major pieces (or plates) and many minor plates. These plates are constantly moving, very slowly, over the surface of the globe. As these plates move, stresses are built up in areas where the plates come into contact with each other. Within seconds, an earthquake releases stress that has slowly accumulated within the rock, in some instances over hundreds of years. Sometimes the release occurs near the surface, and sometimes it comes from deep within the crust.

The Puget Sound region has hundreds of earthquakes occurring each year, most of them so small that only sensitive instruments can detect them. There have been at least 20 damaging earthquakes in Western Washington over the past 125 years. Large quakes in 1946, 1949, 1965 and 2001 killed 16 people and caused more than $3.59 billion (2004 dollars) in property damage.

Scientists generally agree that three source zones exist for Puget Sound quakes: a shallow (crustal) zone; the Cascadia Subduction zone; and a deep or intraplate ("Benioff") zone. More than 90% of all Pacific Northwest earthquakes occur along the crustal plate boundary between the Juan de Fuca plate and the North American plate.

Part of assessing how much of a risk earthquakes are to an area is estimating what the ground motion would be during an earthquake of a certain magnitude. A scenario is usually the most useful way to estimate possible damages. The factors that must be identified in order to estimate ground motions are earthquake magnitude, type of faulting, distance of the site from the epicenter, and local site conditions (hard rock, soft soil, etc).

For instance, the scenario used for this plan was a 7.4 magnitude earthquake on the crustal South Whidbey Island fault. Based on the distance from that epicenter, approximately half of the reservation is at risk of experiencing moderate to severe damage, while the remainder is at risk of slight to moderate damage. In some areas the risk is higher due to soft soils that are at higher risk of liquefaction during certain types of earthquakes.

A major element involved in earthquake hazard assessment is predicting the type and severity of ground motion that could happen during a quake. The most commonly mapped ground motion factors are the horizontal and vertical peak ground accelerations (PGA) for a given site classification (soil or rock type). Maps of PGA values now form the basis of seismic zone maps that are included in building codes, including the U.S. Uniform Building Code (UBC). Building seismic codes specify the lateral forces that a building should be able to withstand during an earthquake. PGA values are directly related to these lateral forces that could damage "short period structures" (i.e. single-family dwellings, the most common structures in the county). Maps may also need to be developed to determine the lateral forces that damage larger structures (apartment buildings, factories, high-rises, bridges).

The impact of any earthquake event is largely a combination of ground shaking, liquefaction and distance from the source of the quake. Liquefaction usually occurs only in soft, loose soils. A program called the National Earthquake Hazard Reduction Program (NEHRP) creates

maps based on soil characteristics to identify areas potentially subject to liquefaction. **Table 4** provides a description of the NEHRP soil classification.

NEHRP Soil Classification System	
NEHRP Soil Type	**Description**
A	Hard Rock
B	Firm to Hard Rock
C	Dense soil, soft rock
D	Stiff Soil
E	Soft clays
F	Special study soils (liquefiable soils, sensitive clays, organic soils, soft clays > 36 m thick)

Table 4: NEHRP Soil Classification System

Richter Scale

The Richter magnitude scale is probably the most familiar earthquake rating system for the average person. It compares the size of earthquakes, calculated using waves recorded by seismographs. On the Richter Scale, each whole number (e.g. 5.5 to 6.5) increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy.

Great earthquakes, such as the 1964 Good Friday earthquake in Alaska, have magnitudes of 8.0 or higher. On the average, one earthquake of such size occurs somewhere in the world each year. Although the Richter Scale has no upper limit, the largest known shocks have had magnitudes in the 8.8 to 8.9 range.

The Richter Scale is not used to express damage. An earthquake in a densely populated area which results in many deaths and considerable damage may have the same magnitude as a shock in a remote area that does nothing more than frighten the wildlife. **Table 5** shows a description of Richter scale magnitudes.

Richter Scale			
Descriptor	**Richter magnitudes**	**Earthquake Effects**	**Frequency of Occurrence (worldwide)**
Micro	Less than 2.0	Micro-earthquakes, not felt.	About 8,000 per day
Very minor	2.0-2.9	Generally not felt, but recorded.	About 1,000 per day
Minor	3.0-3.9	Often felt, but rarely causes damage.	49,000 per year (est.)
Light	4.0-4.9	Noticeable shaking of indoor items, rattling noises. Significant damage unlikely.	6,200 per year (est.)
Moderate	5.0-5.9	Can cause major damage to poorly constructed buildings over small regions. At most slight damage to well-designed buildings.	800 per year
Strong	6.0-6.9	Can be destructive in areas up to about 100 miles across in populated areas.	120 per year
Major	7.0-7.9	Can cause serious damage over larger areas.	18 per year
Great	8.0-8.9	Can cause serious damage in areas several hundred miles across.	1 per year
Rare great	9.0 or greater	Devastating in areas several thousand miles across.	

Table 5: Richter Scale

Modified Mercalli Scale

The degree of ground shaking, and therefore damage, caused by an earthquake is assigned a Roman Numeral between I and XII on the Modified Mercalli (MM) Scale and is referred to as intensity. This helps to assess and understand the physical affects of the earthquake. **Table 6** provides a comparison of Peak Ground Acceleration to the MM Intensity scale. Unreinforced masonry (URM) buildings are particularly vulnerable during earthquakes due to how they are constructed. Usually older, brick buildings, historically these have caused the most damage, injury and death due to collapse during major earthquakes. The 2005 Sichuan Earthquake, for instance, occurred in an area where nearly all housing structures were unreinforced masonry buildings, causing widespread devastation.

Mercalli Scale and Peak Ground Acceleration Comparison		
MM	**Potential Damage**	**PGA**
I	None	< .017
II – III	None	.017
IV	None	.014 - .039
V	Very Light	.039 - .092
VI	None to Slight	.02-05
	Unreinforced Masonry: Stair-step cracks Damage to chimneys Minimum threshold of any damage	.04-.08 .06 - .07 .06 - .13 .092 - .18
VII	Slight – Moderate	.05.-10
	Unreinforced Masonry: Significant cracking of parapets masonry may fall Minimum threshold of structural damage	.08-.16 .10 - .15 .1 .18-.34
VIII	Moderate – Extensive	.10 - .20
	Unreinforced Masonry: Fall of parapets and gable ends Extensive cracking	.16 - .32 .25 - .30 .13 - .26 .2 .35 - .65
IX	Extensive – Complete	.20 - .50
	Unreinforced Masonry: Structural collapse of some buildings Walls out of plane Damage to seismically designed structures	.32 - .55 .50 - .55 .26 - .44 .3 .65 – 1.24
X	Complete	.50 – 1.00
	Unreinforced Masonry: Structural collapse of most buildings Notable damage to seismically designed structure Ground Failures	.55 - .80 >.6 .44 - .64 > 1.24

Table 6: Mercalli Scale and PGA Comparison

Past Events

There have been several earthquakes in the past that have affected the Puget Sound Region and more specifically the Tulalip Reservation. The actual effect of these earthquakes on the Tulalip Reservation has been less severe that in other areas within the region, but nonetheless significant damage has occurred to the older and dilapidated structures on the reservation. **Table 7** is a summary of large earthquakes that have occurred in the Puget Sound Region.

Large Earthquakes in the Puget Sound Region			
Date	**Location**	**Magnitude**	**Type**
1872	**North Cascades**	**7.4**	**Crustal Zone**
75 miles NE of Everett, near Mount Baker and just east of the Cascade crest (largest recorded earthquake in Washington). No record of any fatalities in Snohomish County.			
1882	Olympic Area	6.0	Benioff Zone
1909	Puget Sound	6.0	Benioff Zone
1915	North Cascades	5.6	--
1918	Vancouver Island	7.0	--
1920	Puget Sound	5.5	--
1932	Central Cascades	5.2	Crustal Zone
1939	Puget Sound	5.8	Benioff Zone
1945	North Bend	5.5	Crustal Zone
1946	Puget Sound	6.3	Benioff Zone
1946	Vancouver Island	7.3	Benioff Zone
1949	**Olympia**	**7.1**	**Benioff Zone**
Nisqually Delta Area: Effects included fallen chimneys and building cornices; cracked plaster; broken water and gas mains; damaged docks, bridges, and water storage tanks; cracked ground and pavement; and landslides, mudflows and debris slides.			
1965	Puget Sound	6.5	Benioff 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**	**--**
Duvall: Near the epicenter, merchandise fell off of shelves and at least one chimney cracked. In Snohomish County, 16,000 residents were without power for several hours.			
2001	**Nisqually\Puget Sound**	**6.8**	**Benioff Zone**
Nisqually Delta Area North of Olympia: Damages between $2 million and $3 million in Snohomish County, 13 minor injuries. A few unreinforced masonry structures suffered significant damage, but there were no building collapses. The greatest shaking was in cities or towns built along the rivers. Tulalip also experienced significant damage to its structures. It is estimated that at least 80% of Tribal housing had some damage from the quake.			

Table 7: Large Earthquakes in the Puget Sound Region

Location

The Tulalip Reservation is located in one of the most earthquake prone regions of the United States. This section will detail the different types of earthquakes that can affect the Reservation.

In Western Washington, the primary plates of interest are the Juan De Fuca and North American plates. The Juan De Fuca plate moves northeastward with respect to the North American plate at a rate of about 4cm/yr. The boundary where these two plates converge, the

Cascadia Subduction Zone, lies approximately 50 miles offshore of the coastline and extends from the middle of Vancouver Island in British Columbia to northern California. As it collides with the North American plate, the Juan De Fuca plate subducts beneath the continent, sinking into the earth's mantle.

The three source zones that exist for Puget Sound quakes are a shallow or crustal zone; the Cascadia Subduction zone; and a deep, intraplate, or Benioff zone, as shown in **Figure 8**.

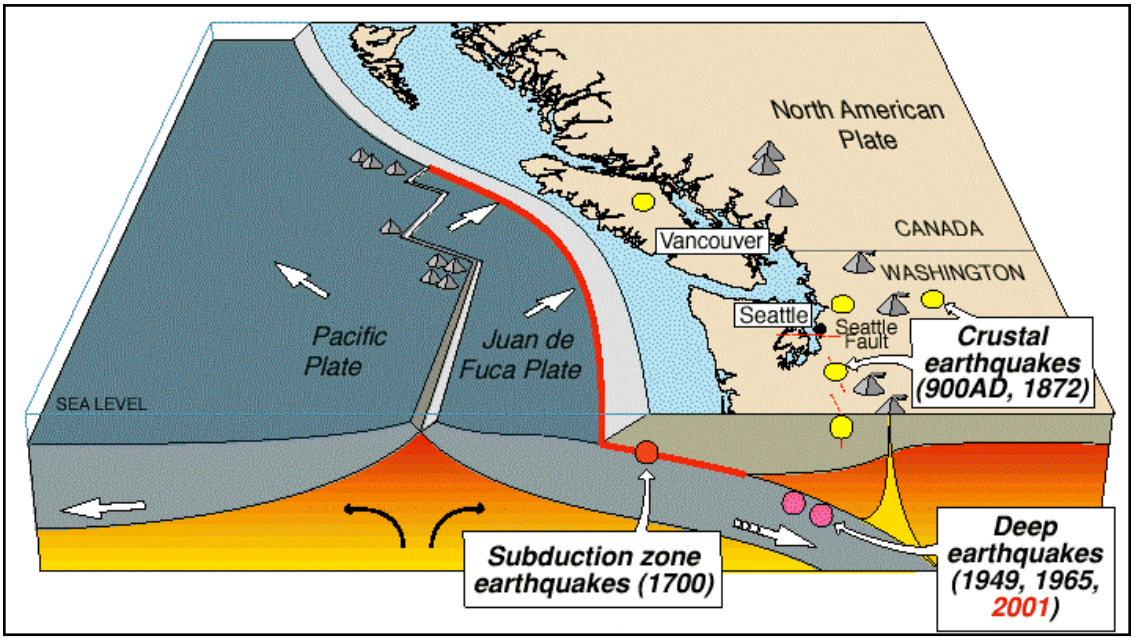


Figure 8: Earthquake Types in Western Washington

Cascadia Subduction Zone

Subduction Zone earthquakes are the world's greatest earthquakes and are observed at subduction zone boundaries. A Cascadia subduction earthquake would be centered off the coast of Washington or Oregon where the plates converge. There would typically be a minute or more of strong ground shaking. These magnitude 8 to 9.5 Richter scale thrust-type subduction earthquakes occur from time to time as two converging plates slide past one another. There are no reports of such earthquakes in the Cascadia Subduction Zone off the Oregon/Washington coast since the first written records of permanent occupation by Europeans in 1833. However, paleoseismic evidence suggests that there may have been as many as five of these devastating energy releases in the past 2000 years, with a very irregular recurrence interval of 150 to 1100 years. Written tsunami records from Japan, correlated with studies of partially submerged forests in coastal Washington and Oregon, give a probable date for the most recent of these huge quakes as January 26, 1700.

Since the installation in 1969 of a multi-station seismograph network in Washington, there has been no evidence of even small subduction-type earthquakes in the Cascadia region, indicating the plates are locked. However, parts of subduction zones in Japan and Chile also appear to have had very low levels of seismicity prior to experiencing great earthquakes. Recent shallow geodetic strain measurements near Seattle indicate that significant compressional

strain is accumulating parallel to the direction of convergence between the Juan de Fuca and North America plates, as would be expected prior to a great thrust earthquake off the coast of Oregon, Washington and British Columbia. Usually, these types of earthquakes are immediately followed by damaging tsunamis and numerous large aftershocks.

Benioff (Deep) Zone

Western Washington is most likely to experience intraplate or "deep" earthquakes of magnitude 6 to 7.4 on the Richter scale. This occurs within the subducting Juan de Fuca plate at depths of 50 - 70 km (30 - 45 miles). As the Juan de Fuca plate subducts beneath North America, it becomes denser than the surrounding mantle rocks and breaks apart under its own weight, causing Benioff zone earthquakes. The Juan de Fuca plate begins to bend even more steeply downward, forming a 'knee'. It is at this knee where the largest Benioff zone earthquakes occur.

The largest of these events recorded in modern times were the 7.1 magnitude Olympia earthquake in 1949 and the 6.8 magnitude Nisqually earthquake in 2001. Strong shaking during the Olympia earthquake lasted about 20 seconds. For the Nisqually quake, duration of shaking in Snohomish County varied from about 30 seconds to more than 2 minutes. Scientists estimate this type of quake will occur once every 30 - 40 years for magnitude 6.5, and once every 50 - 70 years for magnitude 7.0. Because of their depth, intraplate earthquakes are least likely to produce significant aftershocks.

Crustal Zone

The third source zone of earthquakes is the crust of the North American plate, known as shallow earthquakes. Of the three source zones, this is the least understood. The Puget Lowland area is currently shortening north-south at a rate of about 0.5 cm (one-fifth of an inch) per year. Shallow earthquakes of magnitude up to 7.0 or more on the Richter scale can happen anywhere in the Puget Sound region. Such earthquakes have the potential to cause greater loss of life and property on the Tulalip Reservation than any other kind of disaster. Fortunately, great crustal quakes do not seem to happen very often: perhaps no more than once every 1000 years.

In addition to the 1872 Mount Baker earthquake, seismologists have found evidence that a devastating crustal quake occurred on a fault near Seattle approximately 1100 years ago. Several major fault zones cross Whidbey Island and run east to southeast into Snohomish County. Seismologists have recently identified a near-surface fault zone in the northeast corner of Snohomish County near the Town of Darrington. This fault, the Darrington Seismic Zone Devil's Mountain Fault - North Whidbey Fault complex, is estimated to be capable of generating at least a 6-7 magnitude crustal earthquake on the Richter scale. The Duvall Fault near Lake Margaret on the King - Snohomish County border has produced two (magnitude 5.2 and 5.6) earthquakes in the past 70 years (1932 and 1996).

Crustal earthquakes are the most likely to be followed by significant aftershocks. Following a great crustal earthquake of magnitude 7.0 or more, one of the greatest dangers to human life is that buildings or other structures damaged in the initial shock but still in use and believed safe could collapse in a strong aftershock.

Geologists and geophysicists are studying the South Whidbey Island fault and the Olympia fault for evidence of recent earthquakes. A potential Everett fault has been identified and is currently being researched. Recently, there has been a study of earthquake activity in the Snohomish River Delta region. In particular, the scientists have found two crustal events from around 900-950 AD and 1450-1620 AD.

The Tulalip Reservation is located in a basin of softer soils, known as the Everett Basin, which can intensify the effect of an earthquake. The Reservation is also located between the two recently identified crustal faults mentioned above known as the Devil's Mountain Fault and the South Whidbey Fault. **Figure 9** shows these faults and the location of the Reservation in yellow.

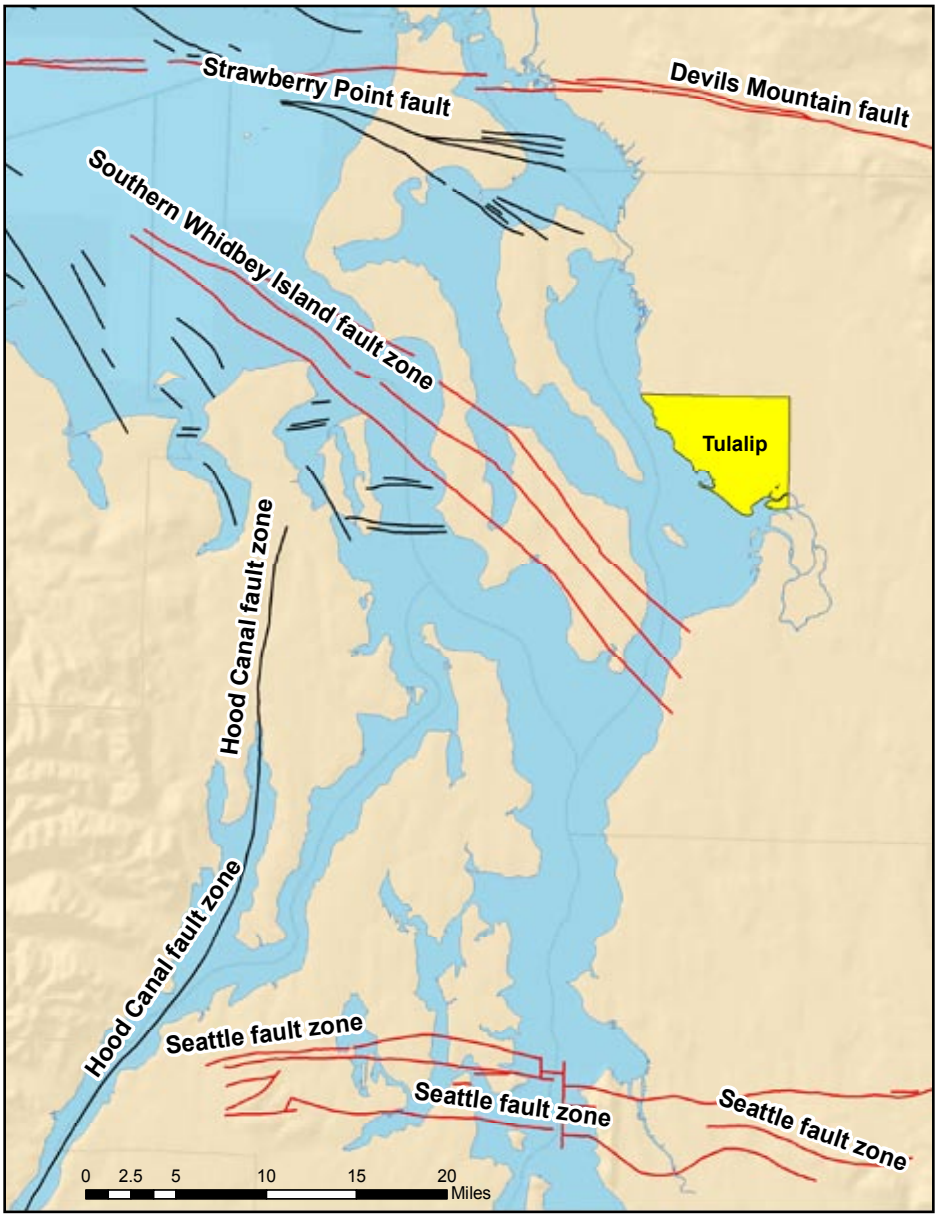


Figure 9: Faults near Tulalip Reservation

National Earthquake Hazard Reduction Program (NEHRP)

The soil makeup of the Reservation further determines the areas that will be more affected by an earthquake event. The NEHRP classification system identifies which types of soil are at greater risk during an earthquake. The areas that will be most affected by ground shaking are located in NEHRP soils D, E and F. In general these areas will also be most susceptible to liquefaction, a secondary effect of an earthquake where soils can temporarily act like quicksand, leading to sudden drops in land level and damage to roads, buildings and utility lines. The NEHRP Liquefaction Risk for the Tulalip Reservation are shown **Map 8**.

Frequency

The USGS has created a probabilistic hazard map based on peak ground acceleration that takes into account information on several fault zones. The Puget Sound area, including the Tulalip Reservation, is in a higher risk area from a Subduction Zone event.

Dr. Art Frankel of the USGS estimated that a Cascadia Subduction zone earthquake has a 10% to 15% probability of occurrence in 50 years. A crustal zone earthquake in general has a recurrence interval of about 500 to 600 years. A Benioff zone earthquake has an 85% probability of occurrence in 50 years, the most likely to occur of all types of earthquake events. The South Whidbey and Seattle faults have a 2% probability of an earthquake occurring in 50 years. The Devil's Mountain Fault - North Whidbey Fault complex does not yet have enough information to determine the probability of occurrence of this event. The probability of an earthquake greater than Magnitude 6.0 occuring in the next 50 years is graphed in **Figure 10.**

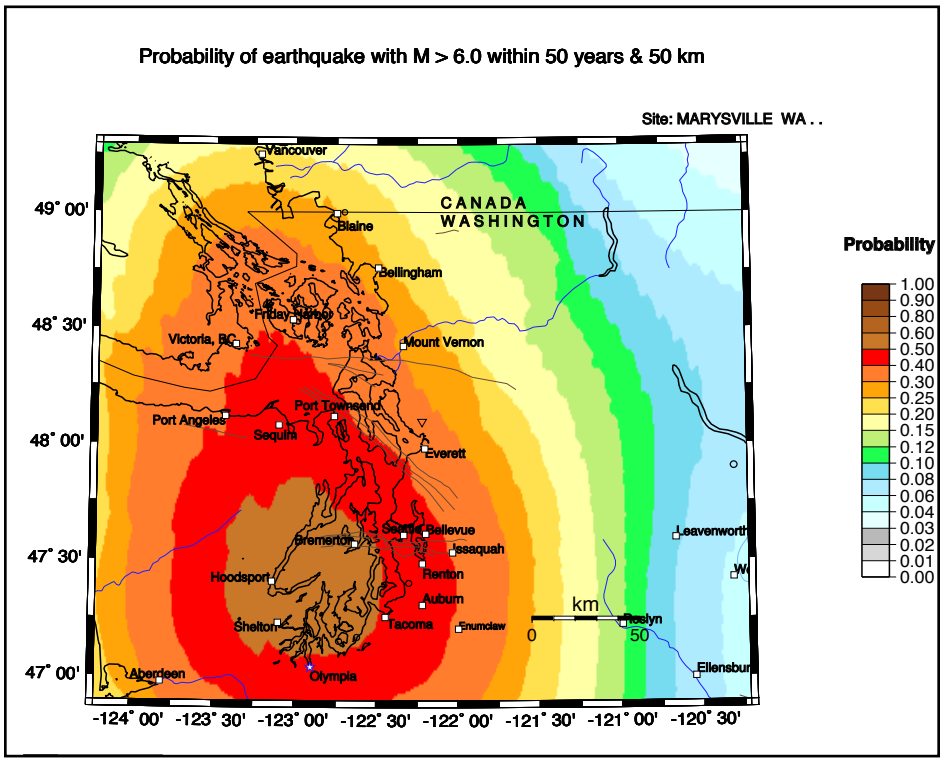


Figure 10: Probabilistic Hazard Map

Severity

A subduction zone earthquake could produce an earthquake with a magnitude 8.5 Richter scale on the Reservation. Benioff zone earthquakes as large as magnitude 7.1 are expected everywhere west of the eastern shores of Puget Sound. A crustal zone earthquake could produce a 7.1 magnitude earthquake affecting the Reservation. **Table 8** provides a description of the expected severity of the earthquakes.

Type of Earthquake	Expected Magnitude
Cascadia Subduction Zone	9.0 for approximately 4 minutes with aftershocks
Benioff	7.1 with no aftershocks
Crustal *(North Whidbey Devil's Peak Complex; South Whidbey; Everett Fault)*	7.1 with some aftershocks

Table 8: Severity of Tulalip Reservation Earthquakes

Warning Time

There is no current way to predict what day or month an earthquake will occur at any given location.

Secondary Hazards

There are several secondary effects of earthquakes. Earthquakes can cause large and sometimes disastrous landslides and mudslides, including debris flows from volcanoes (lahars) not directly associated with eruptions. Soil liquefaction occurs when water-saturated sands, silts or gravelly soils are shaken so violently that the individual grains lose contact with one another and "float" freely in the water, turning the ground into a pudding-like liquid. Building and road foundations lose load-bearing strength and may actually sink, quicksand-like, into what was previously solid ground. Lastly, unless properly secured, hazardous materials releases can cause significant damage to the surrounding environment and people.

Tsunamis and seiches are also a major secondary hazard caused by earthquakes. These can be caused directly by the earthquake, or by an earthquake-induced landslide into Puget Sound or other bodies of water.

Exposure Inventory

Earthquakes were profiled for The Tulalip Reservation by using two methodologies: using GIS data to determine the location of earthquakes, particularly the NEHRP soils that can exaggerate the effects of an earthquake; and by using Hazus-MH, which was used to model the potential severity of different types of earthquakes, and how the Reservations' assets could be affected.

This section will detail the Tulalip Reservation's inventory of people, property, and infrastructure exposed to earthquakes. 2009 Snohomish County Assessor's data and the Tulalip Tribes' GIS database of buildings and critical facilities were used to identify property listed in this inventory.

Loss Estimation

FEMA has developed a detailed methodology using HAZUS-MH software to estimate damages from earthquakes based on the strength and location of an earthquake and also the characteristics of Tulalip structures, such as year built, foundation and building materials, such as wood-frame, tilt-up or steel frame. Unfortunately, at this time it is not possible to conduct a detailed inventory of all structures on the Tulalip Reservation to come up with an accurate loss estimate.

All of its assets are exposed to the different kinds of earthquakes that can occur in the Puget Sound area. The inventory and damage functions to all population, critical infrastructure and parcels is detailed as Earthquake: PGA (Peak Ground Acceleration).

The parcels, critical infrastructure and population located on NEHRP rated medium or high liquefaction risk areas are detailed as Earthquake: Liquefaction.

For this estimate, general values were used. The values used in this loss estimation are a hypothetical estimate of all potential damage.

Vulnerability

Older structures, such as housing built before seismic codes were introduced in the 1980s, are vulnerable to earthquakes. Homes located on, above or below steep slopes are vulnerable due to the secondary hazards associated with earthquakes, such as landslides.

Most vulnerable are the older critical and historic Tribal structures that were not built to current earthquake standards and have already experienced earthquakes. This includes many structures located in Tulalip Bay, such as St. Anne's Church and the Tribal Center. Other vulnerabilities include tribal housing, most of which were built below earthquake codes and were already damaged by the Nisqually quake.

Assumptions

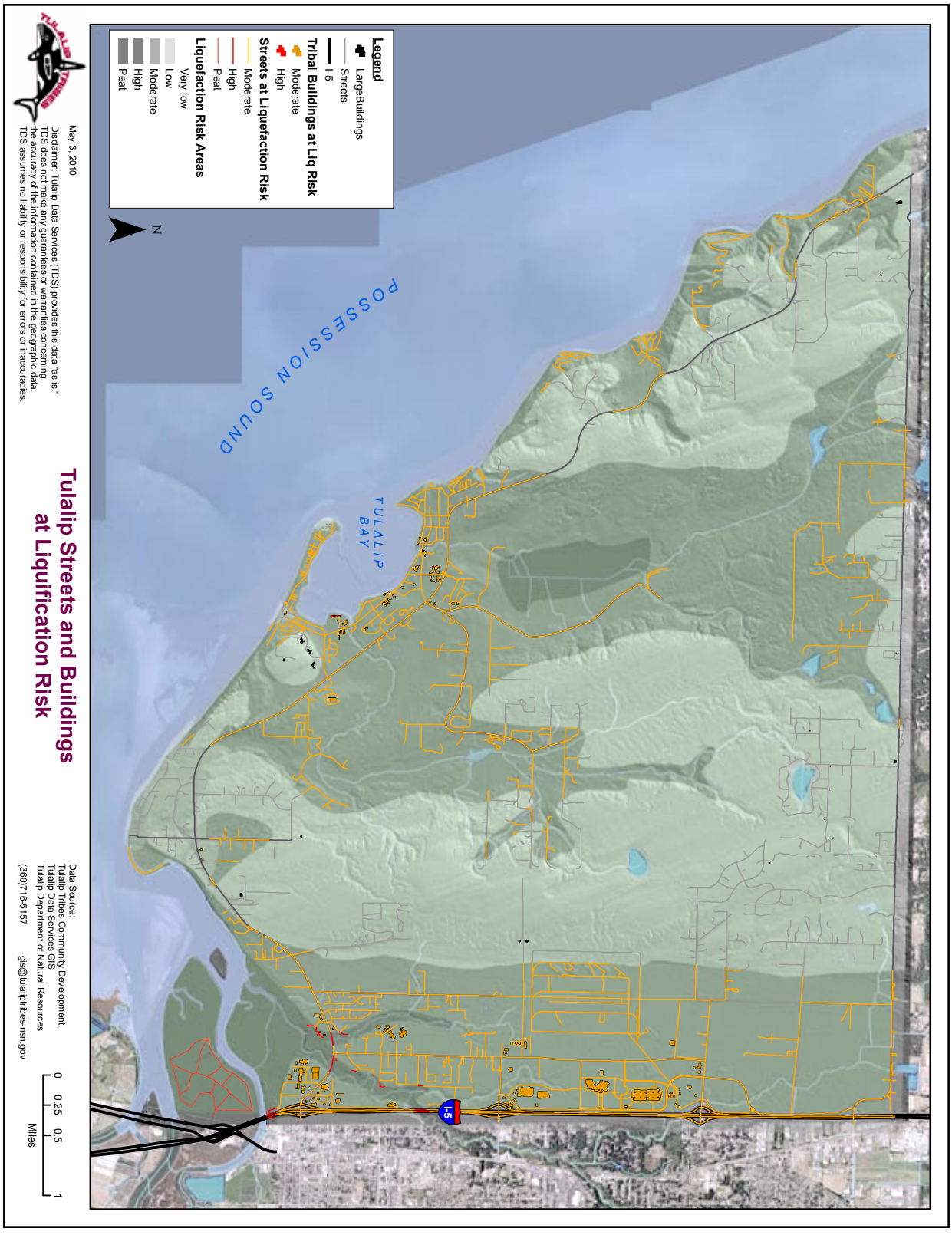
- PGA value used for this estimate is 0.4%.
- The estimated damage to wood frame structures (which most Tulalip buildings are, built pre-code, is 16.7% of improvement value
- FEMA suggests that damage to content value be estimated as ½ of the damage to improvements, or 8.35%

Earthquake: PGA	Improvements			Land / Buildings		Contents			Daily Sales	
	Exposed		Damage	Exposed		Exposed		Damage		
Parcels	$490.9 M	100%	$24.5 M	$736.0 M	100%	$245.4 M	100%	$24.5 M		
Critical Buildings	$335.5 M	100%	$16.8 M	157	100%	$354.1 M	100%	$35.4 M	$882 K	100%

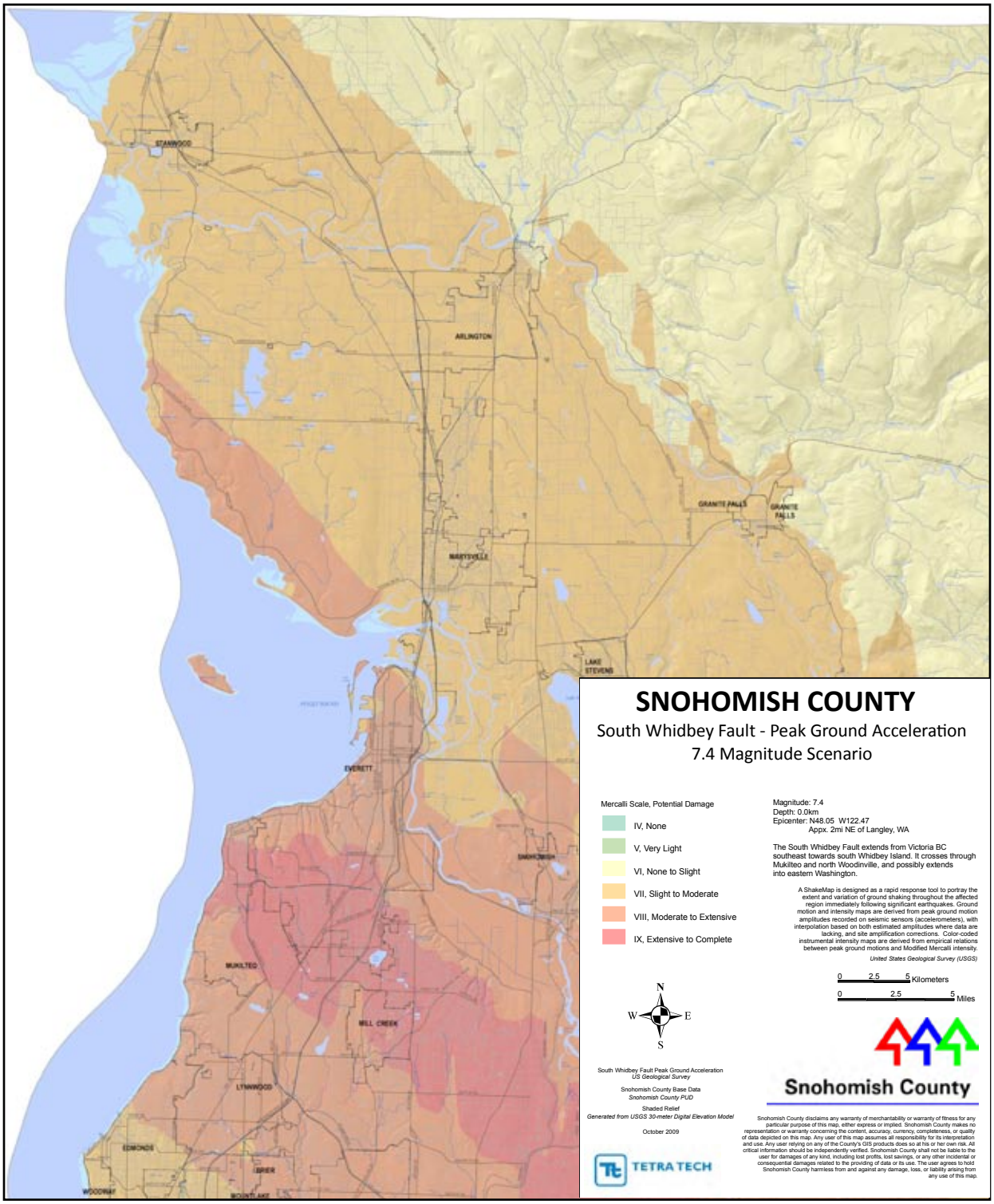
Earthquake: PGA	At Risk	% of Total
Population	9246	100%
Vulnerable Population	1069	100%

Earthquake: Liquefaction	Improvements			Land / Buildings		Contents			Daily Sales	
	Exposed		Damage	Exposed		Exposed		Damage		
Parcels	$212.4 M	43%	$35.5 M	$402.0 M	55%	$106.2 M	43%	$17.7 M		
Critical Buildings	$214.4 M	64%	$35.8 M	104	66%	$223.1 M	63%	$17.9 M	$328 K	37%

Earthquake: Liquefaction	At Risk	% of Total
Population	5710	62%
Vulnerable Population	735	69%



Map 8: NEHRP Liquefaction Risk Zones



Map 9: South Whidbey Island Fault 7.4 Scenario Shakemap

(Courtesy of Snohomish County Emergency Management and Tetra Tech)

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Severe Storms

Hazard Profile

Tulalip's location on the Puget Sound, between the Cascade and Olympic Mountain Ranges, gives it a predominantly marine-type climate with heavy rainfall during the winter months and mild summers. While measurable rainfall occurs between 150-190 days each year, there are typically only about a dozen thunderstorms per year. The rainy season is characterized by light to moderate continuous rainfall, rather than brief heavy downpours. Wind velocities reach 40 to 50 mph every winter, and on rare occasions gust between 75 to 90 mph. Extreme wind velocities can be expected to reach 50 mph at least once in two years; 60 to 70 mph once in 50 years; and 80 mph once in 100 years.

During the coldest months there can be freezing drizzle and snow accumulation in low elevations every few years, although in the mountains several inches to feet of snow is standard, in some cases nearly year-round. Chinook winds from the Pacific can bring a rapid increase in temperatures over the Cascades, causing rapid snow melt and flooding.

Severe weather in the area regularly consists of heavy rains and windstorms, with occasional snow and ice storms. Tornados are possible but rare. Tulalip is located at the northern edge of the Puget Sound Convergence Zone, where the jet stream re-converges after being split around the Olympic Mountains. In this area, the air currents rise and cause precipitation and high winds, creating more extreme weather than that typically found outside of the Convergence Zone, which stretches south to Seattle.

Past Events

Snohomish County has had a severe weather event nearly every year for the past three decades. While information about damages on the Tulalip Reservation in particular are not available for the majority of events, potential types of damage and the frequency of occurrence can be extrapolated from information about the general area. For past events of flooding refer to the later section on Flooding. **Table 9** outlines the major severe weather events that have affected Tulalip and Snohomish County in the past 60 years.

Date	Event Type	Notes
January 13, 1950	Snowstorm	Nearly 2' of snow in Seattle
November 1961	Snowstorm	
October 12, 1962	Windstorm	Hurricane force winds, widespread destruction
January 1969	Snowstorm	
1970	Tornado	Marysville
1971	Tornado	Lake Roesinger
January 1980	Snowstorm	
November 1981	Windstorm	Record high winds
December 1990	Snowstorm	Federal Disaster #896
January 1991	Snowstorm	
January 20, 1993	Windstorm	Federal Disaster #981
December 1995	Windstorm	California Express Windstorm
December 1996-January 1997	Snowstorm	Federal Disaster #1159
January 2, 1997	Tornado	Granite Falls
May 31, 1997	Tornado	Lake Stevens
June 8, 1997	Tornado	Darrington
July 6, 1997	Tornado	Snohomish
December 8, 1997	Tornado	Snohomish
September 1, 1998	Tornado	Monroe
January - March 1999	Windstorm	La Nina Winter Windstorms
April 22, 2000	Tornado	Stanwood
Winter 2000	Snowstorm	Black ice on hills, power lines down in Tulalip. Est app 100 car accidents.
January 2006	Severe Storm	Federal Disaster #1641. Roads blocked, lines down in Tulalip. Flooding at Priest Point.
November 2006	Severe Storm	Federal Disaster #1671
December 2006	Severe Storm	Federal Disaster #1682
December 2007	Severe storm	Federal Disaster #1734
December 12 - January 5, 2009	Snowstorm	Federal Disaster #1825. Record snowfall, roads and businesses closed for 2+ weeks.
January 30, 2009	Severe Storm	Federal Disaster #1817

Table 9: Severe Storm Events in Snohomish County, 1950-2010

Location

A severe storm would impact the entire region and all of Tulalip Reservation. Since utility and transportation systems are often the most vulnerable, power and telephone outages are a frequent result of storms and ingress and egress may be limited. Consequently, the more isolated areas of the Reservation may experience greater effects from storms. Severe local storms significantly impact driving conditions on roads, and downed power lines can cause isolation. They can also hinder police, fire, and medical responses to urgent calls.

Frequency

History shows Snohomish County and the Tulalip Reservation will encounter an average of one major snowstorm every ten years. The frequency of a major snowstorm is variable and is not predictable on a seasonal basis. 2009 was the most recent major snowstorm. Windstorms occur infrequently, but can be predicted more accurately than other storms. The Tulalip

Reservation can expect to experience at least one windstorm each year. **Table 10** describes the likelihood of recurrence for different types of severe storms in Snohomish County.

Snohomish County Frequency of Severe Storms	
Type	**Recurrence/Year (>100% - At least 1 occurrence per year)**
High Winds	175%
Winter Storms	57.5%
Tornado	10%
Coastal Flooding	7.5%

Table 10: Frequency of Severe Storms in Snohomish County

Severity

The effects upon Tulalip Reservation of a strong thunderstorm, tornado, windstorm or ice storm are likely to be similar: fallen trees, downed power lines and interruption of transportation lifelines, damaged homes and public buildings. Fatalities are uncommon in western Washington, but they can occur.

While tornados are rare and localized, they are potentially the most dangerous. Should one strike a populated area, damage could be widespread and fatalities could occur. In the case of extremely high winds some buildings may be damaged or destroyed.

The effects of an ice storm or snowstorm are downed power lines and trees and a large increase in traffic accidents. While over 85% of ice storm deaths are caused by traffic accidents, storms can also cause death by exposure, heart failure due to shoveling or other strenuous activity, and carbon monoxide poisoning. Other concerns include roof collapses due to heavy snow loads and frozen pipes.

Although windstorms are not a frequent problem on the Tulalip Reservation, they have been known to cause substantial damage.

Warning Time

A meteorologist can often predict the likelihood of an onset of a severe storm. This can give several days of warning time, however, meteorologists cannot predict the exact time of onset or the severity of the storm. Some storms may come on more quickly and have only a few hours of warning time.

Secondary Hazards

The most significant secondary hazards to severe local storms are floods, landslides and electrical hazards (fires) from downed power lines. Rapidly melting snow combined with heavy rain can overwhelm both natural and man-made drainage systems, causing overflow and property destruction. Landslides occur when the soil on slopes becomes oversaturated and fail.

Exposure Inventory

Loss Estimation

Currently there are no standards in place to estimate losses from severe weather. Severe weather has the potential to affect all people, property and infrastructure, but in most cases, it is infrastructure, such as power lines, that suffer the most damage from severe weather, such as high winds and ice. The values used in this loss estimation are a hypothetical estimate of all potential damage.

Vulnerability

Marine Drive is most vulnerable to severe weather. It is that main road on the Reservation and critical for emergency responders to use. It is also prone to downed trees and black ice, which cause numerous accidents.

Also vulnerable are the many homes located on narrow, dirt paved and usually one-laned roads, some of which pass through steep slopes known to experience landslides or washouts. This isolation can prevent ingress or egress, and may prevent emergency responders from accessing many homes.

Assumptions

- Damage to improvements of a parcel (that is, the building) is estimated to be 5%
- Content loss is 10% of half of the improvement value.

Severe Storms	Improvements			Land / Buildings		Contents			Daily Sales	
	Exposed		Damage	Exposed		Exposed		Damage		
Parcels	$490.9 M	100%	$24.5 M	$736.0 M	100%	$245.4 M	100%	$24.5 M		
Critical Buildings	$335.5 M	100%	$16.8 M	157	100%	$354.1 M	100%	$35.4 M	$882 K	100%

Severe Storms	At Risk	% of Total
Population	9246	100%
Vulnerable Population	1069	100%

Landslide

Hazard Profile

Landslides, mudslides and other debris flows can occur when a number of factors combine to create a specific set of conditions. Steep slopes alone do not indicate a landslide risk, although slides are unlikely to happen in an area with a slope less than 15 degrees or a 30% angle. The way in which the soil on the slope is stratified, or layered, and in what order those layers exist is the largest factor. If layers of loose soil, gravel, or other non-compact materials lay atop an impermeable surface such as clay or solid rock, those top layers are at risk of sliding due to a tremor, erosion, or during a heavy storm when they become saturated with water.

Because the Tulalip Reservation was once covered by glaciers that advanced and retreated many times during the various ice ages, many areas have stratified soil that creates a landslide risk. When the angle of a hillside or cliff edge coincides with the angle that the soil is layered, there is an extremely high risk of a slide. This may change drastically within a short distance, and thus landslide areas are often isolated pockets, rather than a continuous swath.

A hillside that was previously stable can become a landslide risk if the vegetation on it is removed, since root systems can act as a natural support. If the land around or above the slope is altered in such a way that stormwater runoff is increased, that can also add to landslide risks since the soil can become fully saturated in even a small rainstorm. Heavier water flows can also speed up erosion that changes the angle of the slope.

The most likely time for a landslide to occur is when the ground is almost or fully saturated, perhaps after steady rainfall for several weeks. In addition, an unstable slope can suddenly slide due to an earthquake, tsunami, or other major force or impact (e.g. the shockwave from an explosion).

Past Events

Landslides and mudflows in Snohomish County have previously occurred in conjunction with major storm systems. Heavy rains often overwhelm drainage systems, saturating soil and increasing runoff on steep slopes. One particular slide in January 1997 gave an idea of what a major slide on the Tulalip Reservation might look like, due to the similarity in slope and soil conditions. Fifty-feet of a cliffside property in Woodway gave way with enough force to knock a passing freight train into Puget Sound.

Location

There are four different types of landslides that can occur in the Puget Sound area:

- **High Bluff Peeloff**: Blocks of soil fall from high bluffs (commonly along the near-vertical cliffs of Puget Sound).
- **Groundwater Blowout**: Groundwater bursts out between the layers of permeable and impermeable soils.
- **Deep-Seated Landslides**: Deep sliding and slumping caused by groundwater pressures within a hillside.
- **Shallow Colluvial (Skin) Slides**: Shallow sliding of the surface of a hillside slope.

The shallow colluvial slide is the most common type of slide in the Puget Sound, which occurs in response to intense, short-duration storms. The largest and most destructive are deep-seated slides, although they are the least common. Most landslides occur in January, after rain during November and December has saturated the soil. Water is involved in nearly all cases; human influence was also identified in more than 80% of the reported slides.

Locations that experienced slides in the distant future are still considered potential hazard zones, because they can be reactivated by earthquakes or wet weather. Also, these dormant sites are more vulnerable to construction-triggered sliding because the ground has already been disturbed at some point in the past.

Recently the Tulalip Department of Natural Resources has mapped landslides and potentially unstable slopes along the coast from the northern reservation border down to Priest Point. To date this is the best available data regarding landslide hazards on Tulalip.

Frequency

The frequency of a landslide is related to the frequency of earthquakes, heavy rain, floods, and wildfires. On the Tulalip Reservation, landslides typically occur during and after major storms. The velocity of movement may range from a slow creep of centimeters per year to many meters per second, depending on slope angle, material and water content.

Severity

Landslides destroy property, infrastructure, transportation systems, and can take the lives of people. Slope failures in the United States result in an average of 25 lives lost per year and an annual cost to society of about $1.5 billion.

Landslides, mudslides and debris flows during the 1996 Holiday Blast storm caused about $30-35 million in damage throughout Snohomish County, or half of all damage caused by the storm. The landslides also caused tens of millions of dollars of damage to road infrastructure. The actual amount of damage that occurred on the Tulalip Reservation is not known, but there were road washouts caused by landslides on Tulare Beach Road and on the unnamed cliffside private road that leads to Sunny Shores.

Warning Time

Mass movements can occur either very suddenly or slowly. It is possible to determine what areas are at risk within a certain timespan (e.g. areas at risk of slide in the next 10 years). The geology, vegetation, and amount of predicted precipitation for a given area inform these predictions. If these factors change significantly, for instance after a wildfire or major construction project, a reassessment of landslide zones may be required.

Secondary Hazards

Landslides can have many types of secondary effects. Landslides often block egress and ingress on roads, which can potentially isolate residents and businesses. Roadway blockages caused by landslides can affect commercial, public and private transportation, resulting in economic losses for businesses and the Tribe.

Other potential problems resulting from landslides are power and communication failures. Telephone or electrical poles near a slope that fails can be knocked over, breaking the lines. Landslides also have the potential of destabilizing the foundation of structures that may be costly to repair.

It is possible for landslides to affect environmental processes. Landslides can damage rivers or streams, potentially harming water quality, fisheries and spawning habitat.

A major secondary hazard caused by landslides, especially along the coast or large lakes, is tsunamis. When debris from a landslide falls into a water body, such as Possession Sound, it creates a sloshing effect that generates a tsunami that can cause more damage than the landslide itself. One well-known incident was the landslide that occurred on Camano Head in the early 1800s. It killed nearly a hundred people, mostly women and children, and sent a tsunami southeast towards Hat Island, destroyed a village and killing others there. A similar event could affect the Tulalip Reservation, particularly Tulalip Bay and Priest Point.

Exposure Inventory

The Tulalip Reservation's main areas of exposure and vulnerability to landslides are to the homes located along the bluffs along Port Susan and Possession Sound. Using GIS, 2010 Snohomish County Assessor's parcel data was overlain onto the landslide hazard zones determined by the DNR and DCD studies, and a 50-foot buffer created around these zones.

There were no critical facilities identified in these zones; however, several residential parcels and portions of some roads fall within the hazard zone. If the roads are inaccessible after a slide, it may significantly hinder rescue and evacuation efforts, as these roads are the only route to these areas.

Vulnerability

The Tulalip Zoning Ordinance (Ordinance number 80) defines bluffs and steep slopes as Environmentally Sensitive Lands, where development should be regulated. These steep slopes are defined as "Slopes over 15% or otherwise subject to slope instability, potential landslide or significant erosion ".

For this study, the Tulalip Department of Natural Resources has mapped landslides and potentially unstable slopes along the coast from the northern border down to Mission Beach. Furthermore, the Tulalip Department of Community Development commissioned a study of unstable slopes above and below homes along Mission Beach. To date this is the best available data regarding landslide hazards on Tulalip.

The properties most vulnerable to landslides as of April 2006 are the houses located along the cliff at Hermosa Point, examples of which is shown in **Figures 11, 12 and 13**. Some are hanging over the edge of the rapidly eroding landslide-prone bluff. The ideal mitigation action would be to relocate or destroy the vulnerable homes.

Figure 11: Vulnerable Homes on Hermosa Point

Figure 12: Vulnerable Homes on Hermosa Point

Figure 13: Vulnerable Homes on Hermosa Point

Homes located along the bluffs on Potlatch Beach Road and Priest Point Drive are vulnerable to landslides.

The communities of Tulalip Shores, Tulare Beach, and Sunny Shores are extremely vulnerable to landslides. All three communities, but especially Tulare Beach and Sunny Shores, can become isolated by landslides blocking or washing out roads. These roads are Tulare Way, Port Susan Beach Road and Tulalip Shores Road. Much of Sunny Shore is located on a steep, winding private road that sees frequent landslides. Many homes here are perched on precariously steep slopes and are extremely vulnerable to landslides.

Mission Beach and Mission Beach Heights Road homes above and below the bluff are extremely vulnerable to landslides, as seen in **Figure 14.** In 2004, Tulalip Department of Community Development commissioned a study to assess the slopes at Mission Beach Heights, which found that:

> "…based on field observations, we have concluded that portions of the slope have a high risk of future landsliding. We encountered slide debris at several accessible locations at the toe of the slope. Exposed landslide scarps varying in heights were observed along most of the slope within the project area."

Figure 14: Mission Beach Heights

Loss Estimation

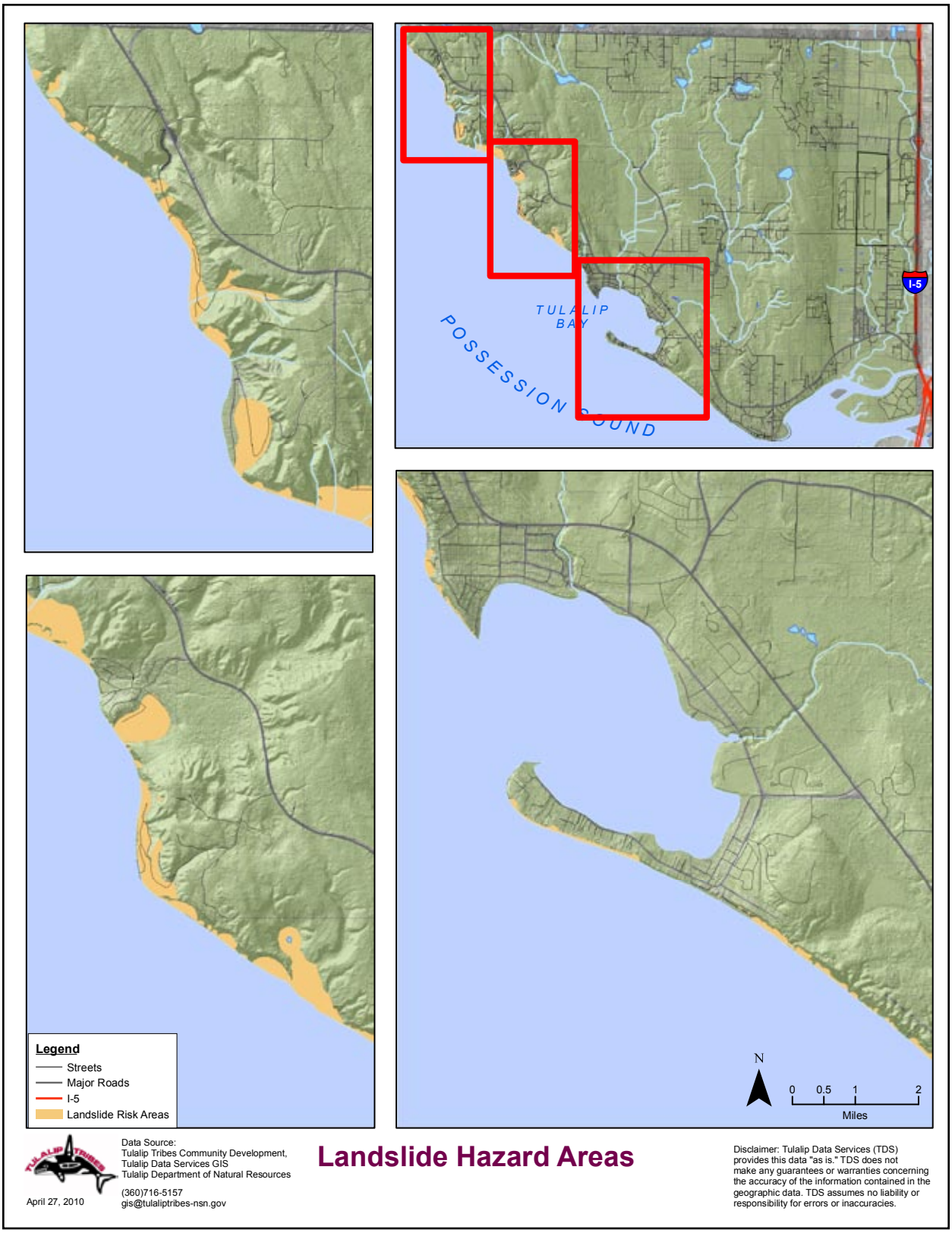
Currently there are no standards in place to estimate losses from landslides. Large landslides occur infrequently and tend to be very localized, damaging only one or a few homes. Nonetheless the damages can be high, and frequently homes are condemned after experiencing a landslide. The values used in this loss estimation are a hypothetical estimate of all potential damage. Its purpose is to come up with a value that can be used to compare with other hazards, in order to prioritize and focus mitigation efforts.

Assumptions

- Damage to buildings is estimated to be 55% of their value.
- Content loss is 10% of half the building value. Landslides typically destroy the structural integrity of the building, leading to condemnation, but hardly ever destroy the contents (clothes, televisions etc.) or injure people.

Landslide	Improvements			Land / Buildings		Contents			Daily Sales	
	Exposed		Damage	Exposed		Exposed		Damage		
Parcels	$54.6 M	11%	$30.0 M	$95.6 M	13%	$27.3 M	11%	$2.7 M		
Critical Buildings	0	0%	0	0	0%	0	0%	0	0	0%

Landslide	At Risk	% of Total
Population	4305	47%
Vulnerable Population	0	0%



Map 10: Landslide Hazard Areas

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Tsunami/Seiche

Hazard Profile

A tsunami is a series of high-energy waves of water that radiate outward from the epicenter of an earthquake like ripples on a pond. It is not a single large wave; the first wave will be followed a few minutes or a few hours later by several more waves, generally increasing in size over time. Tsunamis can travel at more than 600 miles per hour in the open ocean, traversing the entire Pacific Ocean in 20 to 25 hours. The 2004 Indian Ocean earthquake, also known as the Sumatra-Andaman earthquake, triggered a series of lethal tsunamis up to 100 feet high, killing over 200,000 people and devastating coastal communities in several countries.

Seiche: *A seiche is a standing wave in an enclosed or partly enclosed body of water normally caused by earthquake activity. These events usually don't occur in proximity to the epicenter of a quake, but possibly hundreds of miles away due to the fact that the shock waves a distance away is of a lower frequency.*

The most recent disastrous tsunami occurred after the 2010 Chile subduction-zone earthquake, which caused localized destruction on the nearby coast and islands. Unusually high waves were recorded in Hawaii, Japan and the Puget Sound but caused no damage outside of South America.

Past Events

Within Puget Sound, no written records exist of damaging waves. However, verbal accounts among the Snohomish Tribe reported by Colin Tweddell in 1953 describe a great landslide-induced wave caused by the collapse of Camano Head at the south end of Camano Island sometime during the 1820s or 1830s. The slide itself buried a small village, and the resulting tsunami drowned "men and women, and some of the children" who may have been clamming on Hat (Gedney) Island, two miles to the south. Bathymetry between Camano Head and Hat Island could have contributed to the size and destructive power of the wave. The Tulalip Tribes consider this event a very tragic moment in their history and accordingly consider tsunami a major hazard.

Geologic evidence of tsunamis has been found at Cultus Bay on Whidbey Island and at West Point in Seattle. There was also a past event on Possession Beach on Whidbey Island that caused sloughing and a tsunami. Researchers believe these tsunami deposits are evidence of earthquake activity along the Seattle Fault or other shallow crustal Puget Sound faults. Research indicates that a tsunami affected the Snohomish River delta, possibly associated by a Seattle fault earthquake before 800 AD.

Puget Sound has experienced seiches in historical times. In 1891, an earthquake near Port Angeles caused an eight-foot seiche in Lake Washington. Seiches generated by the 1949 Queen Charlotte Islands earthquake were reported on Lake Union and Lake Washington. The 1964 Alaska earthquake created seiches on 14 inland bodies of water in Washington, including Lake Union.

Location

Tsunamis affecting Washington State may be caused by landslides or earthquakes of local origin, or by earthquakes at a considerable distance, such as from Alaska, South America or even Japan.

For the Tulalip Reservation, a tsunami will most likely be caused by a local earthquake or by a landslide along the bluffs or below the water surface. While a 70-foot wave was predicted in the 2004 plan, geologic records and the Washington State Geologist support a maximum wave height closer to thirty feet or less. This height is considered a worst-case scenario, such as a magnitude 9.1 Whidbey earthquake or a very large landslide. In most cases, a tsunami or seiche would be between 3-10 feet in height. The 30-foot tsunami height also takes into account the potential tsunami run up on shore. It was recently observed that the Indian Ocean and Chilean tsunamis traveled miles inland and to elevations above the actual wave height.

A 30-foot tsunami would affect low lying areas and communities on the Reservation, such as the Quil Ceda Creek watershed, Priest Point, Mission Beach, Tulalip Bay, Tulalip Shores, Spee-Bi-Dah, Tulare Beach, and Sunny Shores. The heaviest damage would be seen in those areas directly across open water, such as Mission Beach and Priest Point (see **Figure 15**). During an earthquake, seiches could also occur in the Reservation's lakes and ponds.

Figure 15: Priest Point

Frequency

Great earthquakes in the North Pacific or along the Pacific coast of South America that generate tsunamis occur at a rate of about six every 100 years. Local earthquakes and landslides that generate tsunamis occur more frequently, although a specific rate of occurrence has not been calculated yet.

Severity

Historically, tsunamis originating in the northern Pacific and along the west coast of South America have caused more damage on the west coast of the United States than tsunamis originating in Japan and the Southwest Pacific. For example, the 1960 Chile Earthquake generated a Pacific-wide tsunami that caused widespread death and destruction in Chile, Hawaii, and other areas in the Pacific. In contrast, the tsunami generated by the 1883 eruption

of Krakatau Volcano in Indonesia and the 1886 tsunami on the Sunriku coast of Japan were not destructive outside their immediate locales.

Closer to the Northwest, a tsunami hit the Washington coast after the great 1964 Alaska earthquake; in places wave heights reached 15 feet. No deaths were reported in Washington but it caused $115,000 in damage. This same tsunami killed 11 people and caused $7.4 million damage in Crescent City, California.

Warning Time

Typical signs of a tsunami hazard are earthquakes and/or a sudden and unexpected rise or fall in coastal water. The large waves are often preceded by coastal flooding and followed by a quick recession of the water. Tsunamis are difficult to detect in the open ocean, with waves only one or two feet high. The tsunami's size and speed, as well as the coastal area's form and depth are factors that affect the impact of a tsunami; wave heights of fifty feet are not uncommon.

In general, scientists believe it requires an earthquake of at least a magnitude 7 to produce a tsunami. Seiches are usually earthquake-induced but typically do not occur close to the epicenter of an earthquake, but hundreds of miles away.

Tsunamis generated near Japan and Chile may take hours to reach Washington, while those generated off the Oregon/Washington coast may reach shore within 3 to 30 minutes. People in the way of a tsunami or seiche generated in Puget Sound may only have minutes to seconds to evacuate.

Secondary Hazards

Aside from the tremendous hydraulic force of the tsunami waves themselves, floating debris carried by a tsunami can endanger human lives and batter inland structures. Ships moored at piers and in harbors often are swamped and sunk or are left battered and stranded high on the shore. Breakwaters and piers collapse, sometimes because of scouring actions that sweep away their foundation material and sometimes because of the impact of the waves. Railroad yards and oil tanks situated near the waterfront are particularly vulnerable. Oil fires frequently result and are spread by the waves.

Fishing fleets and public utilities frequently receive the most severe damage, creating a major economic disruption and slowing the disaster recovery process.

Seiches create a "sloshing" effect on bodies of water. This primary effect can cause damage to moored boats, piers and facilities close to the water. Secondary problems, including landslides and floods, are related to accelerated water movements and elevated water levels. Damage to the Tulalip Bay Marina could have a serious effect on the Tulalip Tribes' economy.

Exposure Inventory

An inventory was made of all structures, population and critical facilities and infrastructure that are potentially exposed to the effects of a tsunami. Although past events indicate that a tsunami or seiche typically reach maximum heights of 10 feet, a 30-foot inundation zone was shown as a worst-case scenario. This elevation takes into account the run-up onto land caused by the force of the waves. Even if a tsunami or seiche does not reach this elevation, this area still serves as a critical location for evacuation and other planning purposes.

Major roads, such as Marine Drive and Interstate 5 (I-5) could be affected. Most property affected would be residential buildings and undeveloped parcels.

Population

The Elder Housing Center is located on the edge of Tulalip Bay in the tsunami risk area. Evacuation of this population would prove particularly difficult given the higher rates of disability and need for assistance. If a tsunami is generated locally, in the Puget Sound or off the coast, the short amount of evacuation time is a particular concern for this area. There are also several Tribal-owned buildings in the tsunami risk zone that are used for large events or have high visitor populations, such as the Quil Ceda Creek Casino, the Longhouse, the Boys and Girls Club and the Tribal Gym.

Vulnerability

The main vulnerability to tsunamis are areas, structures and people who live or work along low-lying areas along the coast. These include properties along Priest Point, Mission Beach, Tulalip Bay, Tulalip Shores, Spee-Bi-Dah (see **Figure 16)**, Tulare Beach, and Sunny Shores.

Figure 16: Spee-Bi-Dah

Many of the Tulalip Tribes' critical facilities, such as the health clinic, marina, tribal center and elder housing are located along Tulalip Bay, and are extremely vulnerable. Structures located along the I-5 corridor and Quil Ceda Creek watershed may experience some flooding, but are less vulnerable.

Loss Estimation

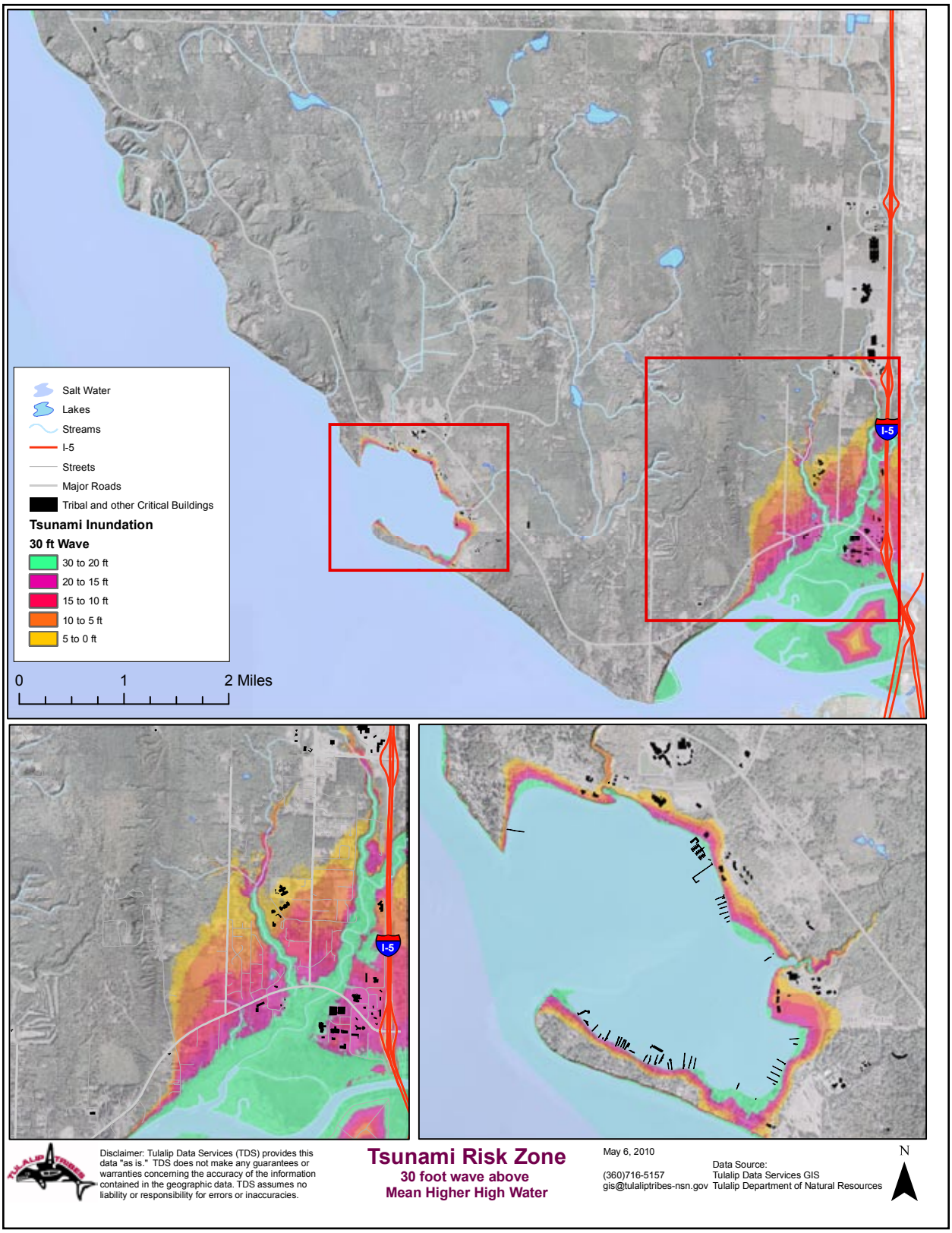
Currently there are no standards in place to estimate losses from tsunamis. In order to be able to compare the risks posed by all hazards, the values used in this loss estimation are a hypothetical estimate of *all* potential damage.

Assumptions

- Damage to buildings is estimated to be 50%
- Content loss is 50% of half the improvement value.

Tsunami	Improvements			Land / Buildings		Contents			Daily Sales	
	Exposed		Damage	Exposed		Exposed		Damage		
Parcels	$81.2 M	17%	$40.6 M	$216.1 M	29%	$40.6 M	17%	$20.3 M		
Critical Buildings	$122.2 M	36%	$61.1 M	50	32%	$136.5 M	39%	$68.2 M	$179 K	20%

Tsunami	At Risk	% of Total
Population	2180	24%
Vulnerable Population	138	13%



Map 11: Tsunami Hazard Area, 30 Foot Wave above Mean Higher High Water

Flood

Hazard Profile

The Tulalip Reservation does not experience the exposure to or severity of flooding typically found in the region or the rest of Snohomish County. While the Reservation is located along the coast and at the mouth of the Snohomish River, it is less exposed because the majority of the land is elevated on hills and bluffs above the floodplain.

The Reservation is drained by some small creeks that occasionally overflow, causing minor flooding. The Reservation can also experience coastal flooding from storm surges during severe weather. Some of the major infrastructure and critical facilities are located along the coast or on hydric soils in the low-lying flat areas along Quil Ceda Creek.

Past Events

The Tulalip Reservation does not have a well-documented history of flooding. This is due primarily to the fact that the Reservation is drained by small coastal creeks and does not have any significant development adjacent to the creeks.

The Upper Tulalip Creek Pond, used by the Tulalip Salmon Hatchery, is protected by a 70 year old dam that overtopped during the New Year's Day Storm of 1997. Approximately 400,000 Coho rearing in the pond were lost when the flood carried them over the dam and Totem Beach Road.

In 2000, blocked drainages caused significant street flooding. Firetrail Road flooded in three locations, from the overtopping of Cummings Lake and two washouts by small creeks crossing under the road.

Properties located along Priest Point have experienced 2-3 feet of flooding caused by the overflow of the Snohomish River and/or a strong storm surge. During the Super Bowl Storm of 2006, the Point was inundated by a combination of high tides and a strong storm surge, shown in **Figure 17**.

Figure 17: Priest Point Flooding, Super Bowl Storm, 2006

Location

There are three types of flooding that could affect the Tulalip Reservation: riverine flooding, storm surges and flash/surface flooding. The Tulalip Reservation does not yet participate in the National Flood Insurance Program, and therefore was excluded for study during the creation of FEMA Flood Insurance Rate Maps (FIRM), so 100- and 500- year floodplains are not defined. No flood maps have yet been created by Natural Resources or any other agency.

Riverine Flooding

Flood season begins in mid-November and continues to mid-February. Riverine flooding is usually preceded by a heavy, fresh snow in the mountains. If warm winds and heavy rainfall follows before the snow solidifies, a flood potential exists. It is rare for rain to cause flooding without these other elements being present.

High tides may prevent the usual discharge of river runoff into Puget Sound. The Reservation is least exposed to this type of flooding, as it is generally located above the floodplain of the Snohomish River. However, the marshy delta islands located near Ebey Slough and Steamboat Slough known as Big Flats can flood, as well as some of the marshy wetlands near the mouth of Quil Ceda Creek. Priest Point can be affected when heavy floods on the Snohomish River carry large amounts of silt and debris. The discharging flood can deposit this debris and silt along Priest Point, damaging bulkheads and property adjacent to the river mouth.

Storm Surges

Storm surges can affect a number of beachfront areas within the Tulalip Reservation. Generally, storm surges are caused by a combination of low atmospheric pressure and high winds. The effects of a storm surge include saltwater inundation and debris battering beachhead property. Property most often damaged by storm surge includes beachfront homes and businesses, bulkheads, marinas, docks and ferry terminals. The Super Bowl Storm of 2006 that damaged Priest Point is an example of this type of flooding.

Predicted sea level rise may make storm surge flooding more frequent or severe. The more intense storms predicted to occur due to global warming may cause increased damage or inundate higher elevations.

Flash Flooding and Surface Flooding

Flash floods occur within a few minutes to a few hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice or log jam. Most flood deaths are due to flash floods.

Flash flooding can occur on the small creeks located on the Reservation. These creeks include Tulalip Creek, Mission Creek and the Quil Ceda River. Creeks feeding Weallup Lake and Lake Agnes are known to overflow and sometimes washout Firetrail Road. The dam overtopping of Upper Tulalip Creek Lake in 1997 can be described as a flash flood.

In addition, urban flooding occurred during the Holiday Blast storm of December 1996 to January 1997 as a result of drainage systems that were incapable of carrying exceptional volumes of snowmelt and heavy rain runoff. As more of the Reservation's natural watershed is converted to human habitation and transportation systems, the urban flooding potential will

continue to grow. In addition, sea level rise has prevented some of the existing outfalls from discharging stormwater during heavy rains. Sewer backups and urban flooding will become more common and severe as the tide level rises.

Frequency

The frequency of flooding on the Tulalip Reservation is similar to Snohomish County. Minor flooding can be experienced at least every year, especially during the fall and winter, while damaging flooding is experienced at least every 5 years.

Severity

While flooding in other areas of Snohomish County can be severe, flooding in Tulalip is generally minor. Roads can be made impassable or even washed-out by blocked culverts. Homes located on low-lying areas along the coast, such as Tulare Beach and Priest Point, can be damaged by storm surge and/or flooding from the Snohomish River.

During past events, 5 homes have made claims for damage from flooding. These claims totaled $37,000 for damage to buildings and $12,000 for damage to contents of buildings. The Tulalip Salmon Hatchery risks losing millions of dollars in fishing revenue if salmon fry are washed away.

Warning Time

The Tulalip Reservation is located at the mouth of the Snohomish River and would have several days advance warning of a riverine flood. Storm surges are harder to predict. Tulalip's location at the northern edge of the Convergence Zone creates the potential for unpredictable winds and severe weather to cause a massive storm surge that could damage low-lying waterfront properties.

Secondary Hazards

The major secondary hazards caused by flooding are landslides and erosion. Severe weather and flooding can saturate the soil, making it more susceptible to landslides. Flash flooding can cause erosion along streams, while storm surges can cause coastal erosion. Debris from flooding, such as logs, can also cause damage. Hazardous materials can also be transported by floodwaters.

National Flood Insurance Policies and Claims

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA) and is intended to provide insurance to flood-prone properties. The Tulalip Tribes does not participate in the program, but Snohomish County does, and thus the Tulalip Reservation is covered. NFIP policies and claims serve as a good indicator of flood-prone properties and locations. Most people who take out a flood insurance policy have experienced flooding in the past. The Tulalip Reservation has 23 NFIP policies. During past flood events, 5 policyholders filed claims for flood damage.

Exposure Inventory

The Tulalip Reservation's main vulnerability to flooding is to properties located along the coast and the along mouth of the Snohomish River. For this exposure inventory, all properties located within 50 feet of the shore were inventoried. In addition, parcels and infrastructure within 50 feet of water bodies, such as streams, rivers and wetlands, and within 50 feet of hydric soils were included in the exposure inventory.

Some backup of water drainage during high tide, exacerbated by sea-level rise, has been reported by utilities managers. Waterlogging and basement seepage is also a possible risk for areas on hydric soils during the rainy season. These areas were included in the proximity map in order to identify those areas that may need special attention to storm drain clearance or encouragement to purchase flood insurance. While there is less estimated damage from these types of flooding, they are more likely to occur frequently in Tulalip than major riverine or coastal flooding.

Some parcels, whose property lines extend to the shore, may not necessarily have structures located along the shore.

Vulnerability

Properties located along the shore, especially low lying areas, are most vulnerable to coastal flooding. These include residential properties along Tulalip Bay, Tulare Beach and Priest Point. Due to low elevations, homes located along Tulare Beach and Priest Point are most vulnerable.

The Tulalip Salmon Hatchery is vulnerable to flooding. Any losses at the hatchery can have a negative impact on the fishing industry for the Tulalip Tribes and other fishermen.

Vulnerable roads include Firetrail Road, which has seen past washouts, and other main arterials whose drainages can get clogged. These roads include Quil Ceda Boulevard, Totem Beach Road and the intersection of 31st Ave and Marine Drive.

Loss Estimation

Flood loss estimates are based on damage curves developed by FEMA. These numbers do not represent the total estimated value a flood may cost, but rather a hypothetical estimate of all potential damage. Its purpose is to come up with a value that can be used to compare with other hazards, in order to prioritize and focus mitigation efforts.

Assumptions

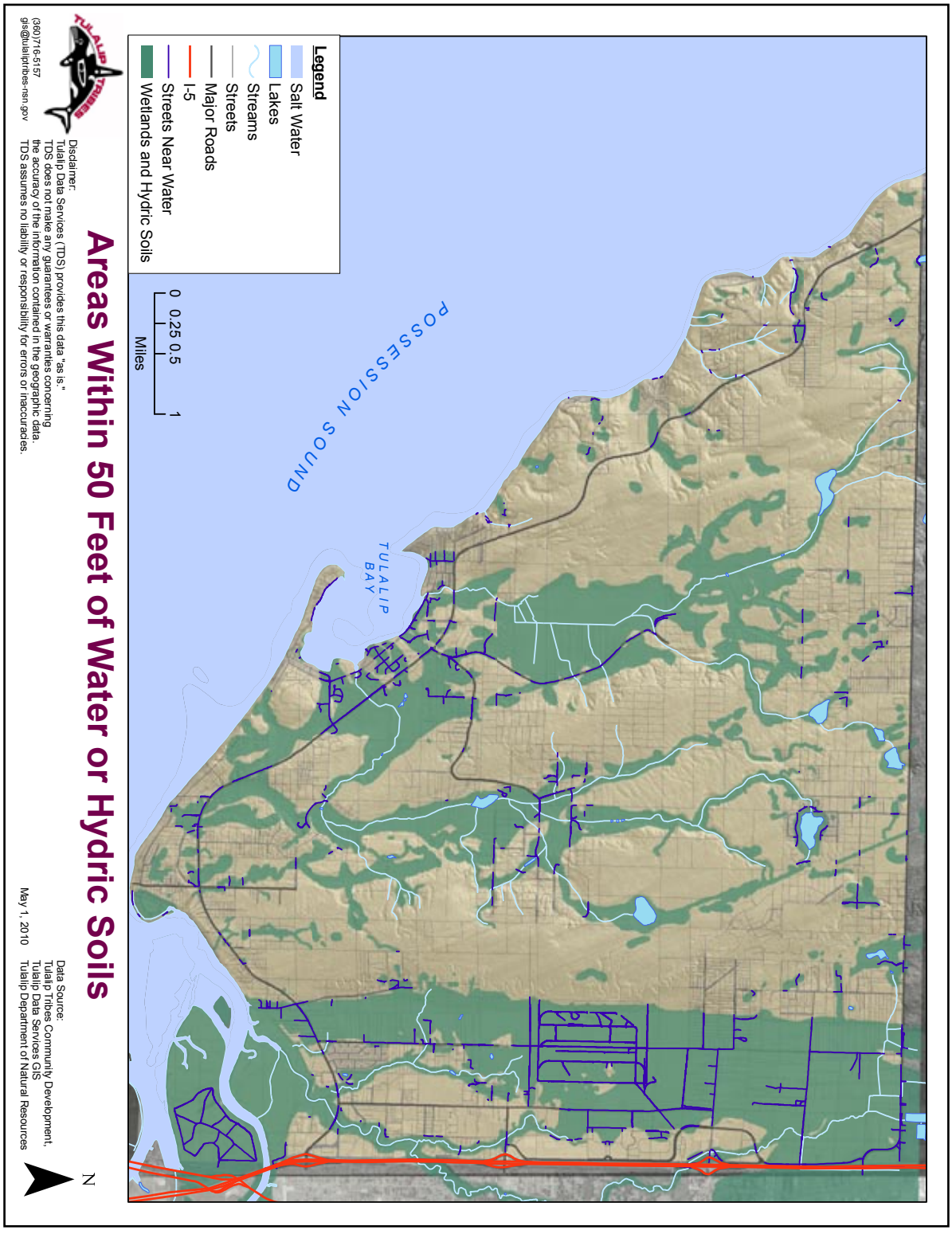
Flooding can reach depths of 3 feet. Exposed structures are assumed to be 1 story, no basement structures. Analysis of assessor's data found that 66% of structures exposed are 1 story, while 73% of structures have no improved basements.

Building damage estimates for these assumptions are 27% of improvement value. Building content damage estimates are 40.5% of half of the improvement value.

If flooding closed all access to Critical Buildings, the economic impact would result in a loss of $715,199 per day, or 81% of the estimated daily revenue of the Tribe.

Flood	Improvements			Land / Buildings		Contents			Daily Sales	
	Exposed		Damage	Exposed		Exposed		Damage		
Parcels	$59.3 M	12%	$16.0 M	$118.9 M	16%	$29.6 M	12%	$12.0 M		
Critical Buildings	$141.7 M	42%	$38.3 M	46	29%	$153.9 M	43%	$62.3 M	$715 K	81%

Flood	At Risk	% of Total
Population	2063	22%
Vulnerable Population	315	29%



Map 12: Areas Within 50 ft of Water or Hydric Soils

Wildland Fire

Wildland fires are fires caused by nature or humans that result in the uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property in non-urban areas.

Major, large-scale wildland fires are common east of the Cascades. In the Tulalip area, wildland fires are typically smaller due to the milder temperatures and heavy precipitation. There is some risk of a wildland fire starting in the heavily forested, sparsely populated inland area that could spread over a large area before being discovered. In addition, smaller wildland fires risk becoming interface fires, leaving some housing developments and critical buildings vulnerable. In some cases these areas are only accessible via a single road; if that road becomes impassable during a fire, evacuation may be difficult.

Hazard Profile

The wildland fire season in Washington usually begins in early July and typically culminates in late September; however, wildland fires have occurred in every month of the year. Drought, depth of snow pack, and local weather conditions can expand the length of the fire season.

People start most wildland fires; major causes include arson, recreational fires that get out of control, smokers' carelessness, debris burning, and children playing with fire.

Wildland fires usually are extinguished while less than one acre. A number of federal, state, county, city, and private agencies and private timber companies provide fire protection and firefighting services in Washington.

Factors that Influence Wildland Fire

A fire needs three elements in the right combination to start and grow – a heat source, fuel, and oxygen. How a fire behaves primarily depends on the characteristics of available fuel, weather conditions, and terrain.

Fuel

Lighter fuels such as grasses, leaves, and needles quickly expel moisture and burn rapidly, while heavier fuels such as tree branches, logs and trunks take longer to warm and ignite.

Weather

West of the Cascades, strong, dry east winds in late summer and early fall produce fire conditions. East wind events can persist up to 48 hours with wind speed reaching 60 miles per hour; these winds generally reach peak velocities during the night and early morning hours. These winds can be even stronger in the Convergence Zone, where the Tulalip Reservation is located.

Terrain

Topography influences the impact of weather conditions such as temperature, wind speed and direction; any potential barriers to fire spread, such as highways and lakes; and elevation and slope of land forms (i.e., fire spreads more easily as it moves uphill than downhill).

Past Events

Since 1970, the earliest year for which Department of Natural Resource (DNR) records are available, there have been 37 wildfires recorded on the Tulalip Reservation. These fires were all small, and it is not known at this time whether these fires caused any damage to property or infrastructure.

Location

Using the map of past events as an indicator, most wildfires could occur in the heavily forested areas and undeveloped lands near the bluffs in the northwest part of the Reservation. Many wildfires also have occurred in the undeveloped and heavily forested lands of the interior, particular in the hilly areas east of Marine Drive.

Frequency

Past events indicate that the Tulalip Reservation can expect usually at least one wildfire every year, although there were no fires in 2009. These will be small in size, and most likely will cause no or minor damage. Nonetheless the potential does exist for significant damage to structures and natural resources, such as timber, located in areas susceptible to fires, such as undeveloped timberlands and steep slopes.

Severity

As mentioned above, past events indicate that wildfires would not be severe on the Tulalip Reservation. In a worst-case scenario, a wildfire spread by heavy winds may damage residential structures and developments, particularly those located in the dense, heavily forested areas of the interior. On the other hand, ingress and egress to the interior lands is difficult, with only few maze-like trails accessing the timberlands.

Warning Time

After a wildfire is detected, it would only take minutes to at worst, hours to respond to a fire. Unless accompanied by very heavy winds, perhaps contributed by the weather conditions created in the Convergence Zone, sufficient time should be available to protect property and/or evacuate.

Secondary Hazards

Wildland fires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Fires can cause direct economic losses in the reduction of harvestable timber. Wildland fires destroy transmission lines and contribute to flooding. Landslides can be a significant secondary hazard of wildfires. Wildfires strip slopes of vegetation, exposing them to greater amounts of rain and run-off. This in turn can weaken soils and cause failures on slopes. Major landslides can occur several years after a wildfire.

In addition to landslides, the following secondary effects are possible. Rehabilitation efforts after a fire occurs can reduce but cannot eliminate them:

- **Damaged Fisheries**: Critical trout fisheries throughout the west and salmon and steelhead fisheries in the Pacific Northwest can suffer from increased water temperatures, sedimentation, and changes in water quality and chemistry.

- **Soil Erosion**: The protective covering provided by foliage and dead organic matter is removed, leaving the soil fully exposed to wind and water erosion. Accelerated soil erosion occurs, causing landslides and threatening aquatic habitats.
- **Spread of Invasive Plant Species**: Non-native woody plant species frequently invade burned areas. When weeds become established, they can dominate the plant cover over broad landscapes, and become difficult and costly to control.
- **Disease and Insect Infestations**: Unless diseased or insect-infested trees are swiftly removed, infestations and disease can spread to healthy forests and private lands. Timely active management actions are needed to remove diseased or infested trees.
- **Destroyed Endangered Species Habitat**: Catastrophic fires can have devastating consequences for endangered species.
- **Soil Sterilization**: Topsoil exposed to extreme heat can become water repellent, and soil nutrients may be lost. It can take decades or even centuries for ecosystems to recover from a fire. Some fires burn so hot that they can sterilize the soil.

Exposure Inventory

Past events have shown that most fires occur in uninhabited areas. Furthermore, many of the lands where these wildfires occurred are Tribal Trust lands, and are used primarily for forestry or are maintained as Conservation lands. In order to come up with a general inventory to be used for planning purposes and the Loss Estimation, parcels within a 500-foot buffer of a past wildfire occurrence are considered more vulnerable.

Loss Estimation

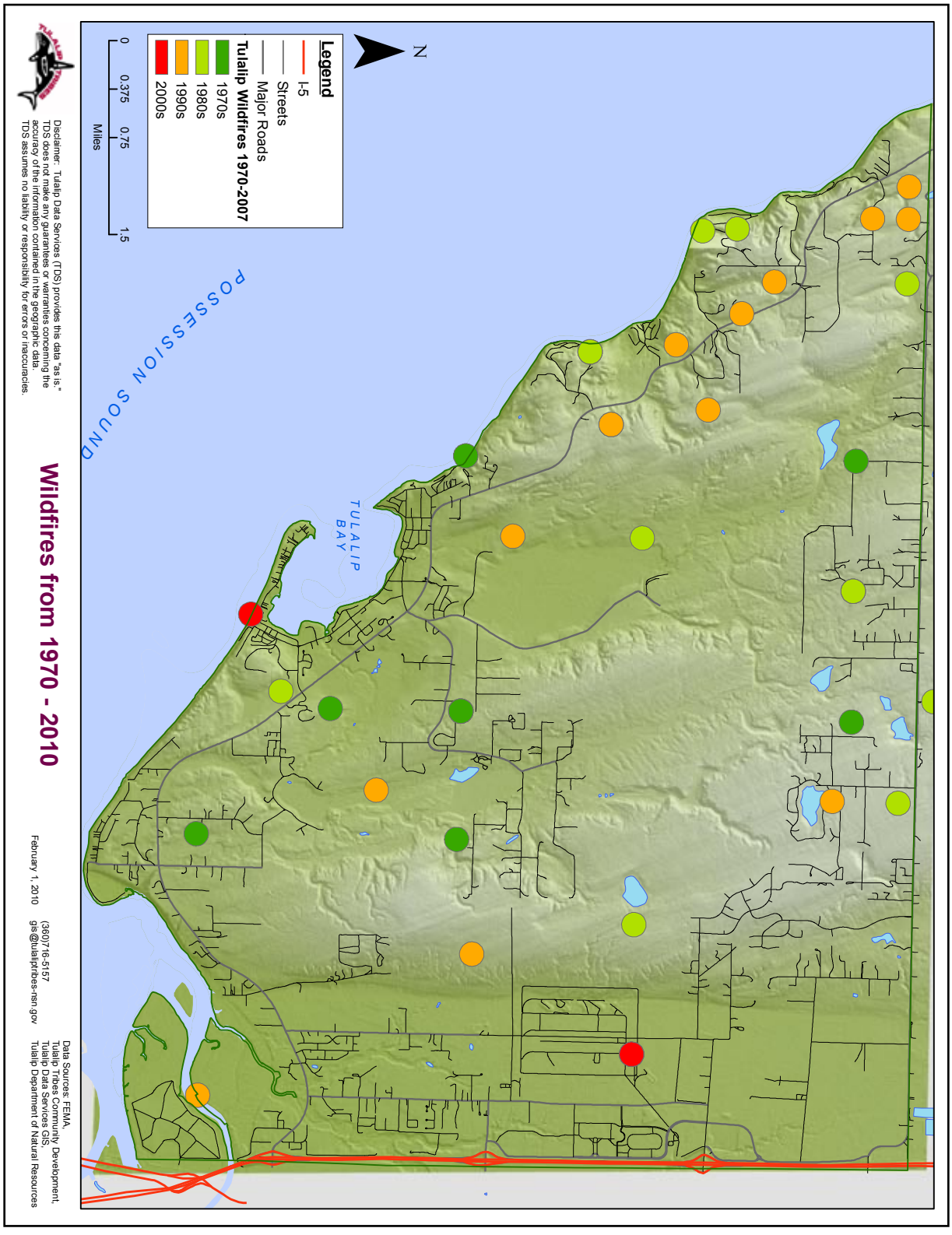
Wildfire loss estimates were based largely on the effects past wildfire events have had in the Puget Sound area. An estimate was based on projected damages that do not represent the total estimated value a wildfire may cost, but rather a hypothetical estimate of all potential damage.

Assumptions

- Wildfires will cause 10% damage to improvements and 5% damage to contents (which is estimated as half of improvement value)
- Wildfires will cause 10% damage to land

Wildfire	Improvements			Land / Buildings		Contents			Daily Sales	
	Exposed		Damage	Exposed		Exposed		Damage		
Parcels	$41.7 M	9%	$4.2 M	$162.0 M	22%	$20.9 M	9%	$1.0 M		
Critical Buildings	$5.0 M	2%	$503 K	4	3%	$5.0 M	1%	$252 K	0	0%

Wildfire	At Risk	% of Total
Population	1129	29%
Vulnerable Population	2	.2%



Map 13: Tulalip Wildfires since 1970

Additional Hazards

Heat Wave

While heat waves are fairly rare in the Pacific Northwest, the typically mild summers leave the residents particularly unprepared for extreme temperatures. Air conditioners are rare for most homes and businesses, leaving vulnerable populations at a higher risk of health complications or even death than in most areas of the country. The heat wave during the summer of 2009 lasted from July 26 to August 2, where the daily high temperatures ranged from 89 to 103 degrees Fahrenheit. July 29 was the hottest day in the Pacific Northwest since record keeping began in 1894.

Stores continuously sold out of fans, often within a few minutes of a shipment arriving. The elderly and those with breathing problems are typically the most at risk during a heat wave, and many elders in Tulalip live unaided in remote locations, sometimes without electricity or running water. Many are also low-income and cannot afford to purchase cooling units or air conditioning.

Heat waves are expected to become more common and more severe over time due to the effects of global warming. Mass shelters with air conditioning, food and water supplies may have to be activated during future heat waves to protect vulnerable populations.

Drought

While the Pacific Northwest, including Tulalip, are renowned for heavy precipitation and abundant water bodies, drought is a growing concern for planners and public utility operators. The summer months have significantly lower rainfall than the period between October and May. Occurring simultaneously with the 2009 heat wave, the Puget Sound area experienced its lowest rainfall in recorded history, with less than a quarter inch falling between May 20th to August 2nd (typical for this time period is nearly 3 inches).

A growing population, coupled with development that infringes on the aquifer's ability to recharge, could lead to water shortages in the near future. Many smaller municipalities purchase large quantities of drinking water from larger cities, risking increased rates or decreased supply as major cities continue to grow.

Higher overall temperatures and changing weather patterns are predicted impacts of climate change, and droughts are expected to become more common in the future. The Tulalip Tribes Comprehensive Land Use Plan has emphasized the use of Low-Impact Development (LID) in future development and mapped aquifer recharge locations for protection.

Pandemic

While the 2009-2010 H1N1 influenza pandemic never reached the levels of severity that some media outlets warned of, it was nonetheless a widespread, highly contagious illness that affected millions of Americans. Even those who were not hospitalized spent several days home sick from school or work, and costing businesses billions of dollars. In addition, it caused the deaths of 18,311 people worldwide, many of them children, pregnant women or those under 30.

While H1N1 had a lower death rate than regular seasonal influenza, the high rate of infection due to the delay in creation and distribution of vaccines compounded the annual flu season, overwhelming some hospitals and health clinics. During the first widespread phase, some schools were closed entirely to prevent the spread of infection and local colleges had clusters of over 2,000 cases within the first two weeks of classes.

Native American populations, similar to other minority groups, had higher rates of infection, hospitalization, and death than white populations. Although this mimics previous disease outbreaks, Tribal health clinics and officials who requested to be placed higher on the list to receive vaccines were denied, and supplies were distributed based solely on population size.

Future pandemic outbreaks may similarly strain Tribal resources and affect the economic vitality of the Tulalip Tribes. Educating the public about how to protect themselves from disease, prevent spreading the flu virus to others, and the steps to receive vaccination will be included in future educational outreach efforts by the Office of Emergency Management. Should the Health Clinic seek to establish a defined relationship with local hospitals to share resources during outbreaks and other mass casualty events, the OEM will support their efforts.

Hazardous Materials

Although not a natural hazard, hazardous materials can cause widespread damage to people, property, and the environment. Hazardous materials can be released by a hazard event, such as an earthquake, flood, or even by severe weather (for instance, a truck accident during an icy winter storm). Hazardous material spills may be the most deadly and dangerous secondary effect of natural hazards. That is why it is essential to identify all potential locations where hazardous materials may be spilled and what locations store hazardous materials on-site.

Initial review of Tier II facilities in Snohomish County (facilities and businesses that reported they contain hazardous materials) found the Tulalip Reservation did not have any. However, after discussions with Tribal officials, it was found that the Reservation had 5 major locations where hazardous materials are stored or sold:

- Home Depot
- Wal-Mart
- Suburban Propane
- Donna's Travel Plaza at the intersection of 116th and Interstate 5. This is the largest truck stop along the I-5 corridor located between Seattle and the Canadian border and routinely houses dozens of trucks containing hazardous materials. Any hazardous material spill could drain into the Quil Ceda Creek watershed.
- Tulalip Tribes Chevron Gas Station was recently opened a few blocks east of the Travel Plaza at 116th and 27th Ave NE. If underground storage tanks were somehow ruptured, a spill could enter the watershed and have negative environmental impacts. In addition, a gasoline spill may lead to an explosion or dangerous fire.

Additional vulnerabilities

- Interstate 5, the main thoroughfare between Canada and Mexico, makes up the eastern border of the Tulalip Reservation. Thousands of trucks containing hazardous materials travel this road along and through the Reservation every day, many of which stop at the truck stop mentioned above. The 2005 Hazardous Materials Commodity Flow

Assessment identified that at least 7% of all trucks traveling the corridor transport hazardous materials.

- The Tulalip Marina can also serve as a source for hazardous materials spills, particularly from diesel or gas used to fuel fishing and other boats.
- The Snohomish River, Possession Sound and Puget Sound can be a source for oil and other hazmat spills. See Section 4.9 Tulalip U&A.
- BNSF Railroad tracks that run north-south through Marysville, adjacent to Tulalip.
- The Backup Ammunition Storage Depot/ Boeing Test Site was located west of Quil Ceda Village and was used during World War II to store Mustard gas, tear gas, hydrogen cyanide and other materials. These chemical and conventional weapons were also used in training exercises at the site. It is not believed that any major stores of ammunition are to be found, but the Army Corps of Engineers is working with Tulalip Department of Special Projects to identify and clean up any hazardous materials that may be found.

Tulalip Usual and Accustomed Fishing Areas

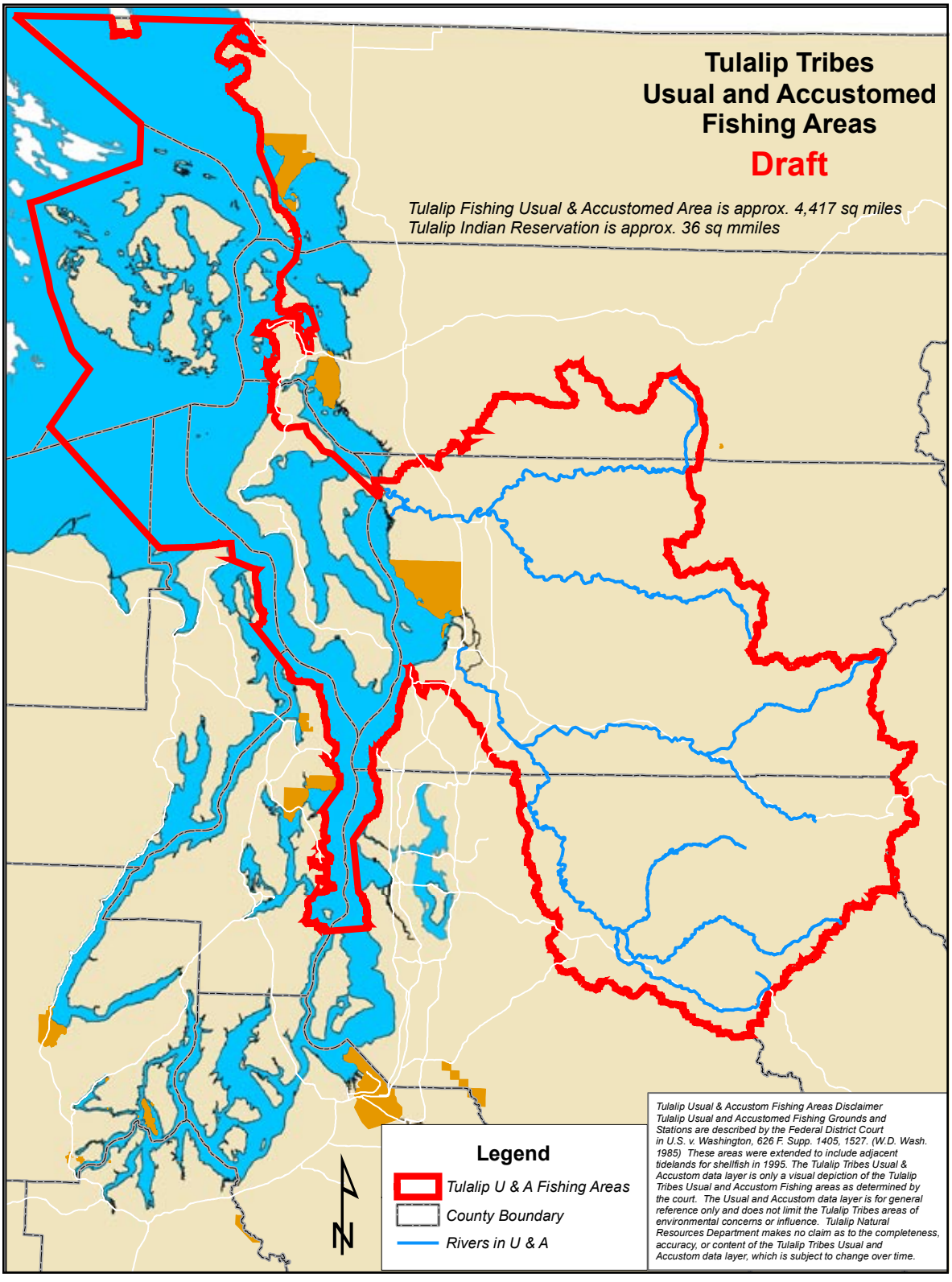
The Tulalip Tribes' Usual and Accustomed Fishing Areas (U&A) comprises approximately 4,417 square miles of Puget Sound and the Snoqualmie and Snohomish watersheds, as shown in **Map 14**. This U&A extends from the Canadian border south to the northern edge of Vashon Island.

Natural hazards can disrupt fisheries and can cause secondary hazards that can have far worse consequences that the natural hazard itself. Because the U&A is part of an ecosystem, an event anywhere within the ecosystem can have consequences downstream and/or many miles away.

Wildfires in the Cascade Mountains can increase vulnerability to landslides and mudflows that can disrupt fisheries and salmon spawning. The same can be said for flooding. Earthquakes can also cause landslides that can eventually disrupt fisheries. Flooding typically sends massive jams of logs downstream and eventually to the Snohomish River delta and other river deltas. These logjams then settle on to kelp beds and other salmon food habitats, eventually ruining their food source.

The main threat to the U&A is human-caused. Puget Sound is home to some of the largest ports on the West Coast and to numerous oil refineries. Numerous towns, ports and marinas line the coast. The potential for a major oil or other hazardous material spill is high. Whether spills are caused by human error, terrorism or by earthquakes, tsunamis or other natural hazard events, the effects are the same: severe pollution that kills plankton and eventually up the whole food chain to eagles, orcas and even humans. The economic effects to fisheries can be cataclysmic, especially to the Tulalip Tribes, who rely heavily on fishing as a way of life.

The Tulalip Tribes need to be a major partner in the effort to mitigate the effects of disasters on Puget Sound and in the watersheds.



Map 14: Usual and Accustomed Fishing Areas

Tribal Buildings, Critical Facilities and Infrastructure

Tulalip Data Services GIS department maintains a shapefile of large buildings on the Tulalip Reservation, including both Tribally-owned and private structures. It includes footprint data, building height, address, name and owner. The shapefile is currently being updated with information about each buildings capacity to serve as shelter-in-place, including whether or not there is a shower, kitchen or generator present. The next step is to add information regarding construction year and type, as well as other relevant information, to bring the data into compliance with HAZUS-MH software.

Shapefiles of water and sewer infrastructure are available as point and line data but do not include other attributes such as type of piping (e.g. brittle or ductile) needed for HAZUS-MH analysis. Adding this information to the shapefiles is another task for TDS, Utilities and Emergency Management.

Tribal Buildings

The shapefile identified the Tribe as owning 65 buildings. The Tribe maintain 41 buildings, including the Boys and Girls Club, which is leased by the Tribe from the Boys and Girls Club of America.

Critical Facilities and Infrastructure

Critical facilities and infrastructure are those that are critical to the health and welfare of the population. These become especially important after any hazard event occurs.

Critical facilities included for the Tulalip Reservation Hazard Mitigation Plan are as follows: police and fire stations, schools, and all tribal buildings including government buildings and housing. Essential facilities include buildings and businesses that are essential to the community's economy and/or safety after an event. These include the Tulalip Casino, Wal-Mart, Home Depot and other businesses that supply essential goods such as food and equipment. The contents of the Critical Buildings shapefile, including the square footage used to estimate replcement costs, contents and daily sales, is included in Appendix C.

Critical infrastructure includes the roads and bridges that provide ingress and egress and allow emergency vehicles access to those in need and the utilities that provide water, sewerage, electricity and communication services to the community.

Critical and essential facilities and infrastructure were identified through GIS analysis, and from interviews with Tribal officials.

Hazard Risk Rating

A risk rating has been completed for each of the major hazards described in this plan, and was based on the exposure inventory and loss estimation. For the purposes of this plan, the risk rating is a function of two factors. The first factor describes the probability that a hazard event will occur. The second factor describes the impact of the event. This is typically considered both in number of people affected and amount of dollar loss caused by the hazard event.

Community members were asked about their perception of risk of each hazard in the public survey. Those answers, in addition to details about the exposure and impact of each hazard, were presented to the Mitigation Planning Team, who then ranked each hazard depending on their perception of risk. Those rankings were then used by the team to rate the priority of Action Items that addressed each hazard.

Probability of Occurrence

The probability of occurrence of a hazard event provides an estimation of how often the event occurs. This is generally based on the past hazard events that have occurred in the area and the forecast of the event occurring in the future. **Table 11** shows how each hazard is then assigned a probability factor, which is based on yearly values of occurrence.

These are allotted as follows:

- High: Hazard event is likely to occur within 5 years
- Medium: Hazard event is likely to occur within 50 years
- Low: Hazard event is not likely to occur within 50 years

Probability of Hazards	
Hazard Event	**Probability**
Earthquake	Medium
Severe Weather	High
Landslides	Medium
Flooding	Medium
Wildland Fire	High
Tsunami/Seiche	Low

Table 11: Hazard Probability

Impact

The impact of each hazard was categorized by estimated exposure of large buildings, percentage of total water and sewer infrastructure located in the hazard zone, population and housing units at risk, and vulnerable population at risk. The totals of each were presented at the Mitigation Planning Team Hazard Ranking Meeting on April 14, 2010, in the following worksheet in **Figure 18.** As Heat Wave, Drought, Major Storm and Pandemic could potentially impact the entire reservation, their values were left blank. The results are summarized in **Table 12.**

Hazard Ranking Worksheet Tulalip Hazard Mitigation Plan Update 4/14/10

Name:

Hazard	% of Public	Occurrence	Amount at Risk							Ranking
	Worried/Very	*Frequency*	*% Buildings*	*% Street*	*% Pipe*	*% Utility*	*% Res*	*Population*	*% Vul Pop*	*High/Med/Low*
Drought	22%	Low								
Earthquake	69%	Medium	**68%**	**77%**	**74%**	**74%**	**62%**	**5710**	**69%**	
Flood	22%	Medium	**29%**	**30%**	**67%**	**26%**	**22%**	**2063**	**29%**	
Heat Wave	34%	Low								
Fire	43%	High								
Landslide	16%	Medium	**0%**	**1%**	**0%**	**0%**	**47%**	**4305**	**0%**	
Major Storm	63%	High								
Pandemic	36%	Low								
Tsunami	37%	Low	**34%**	**14%**	**12%**	**11%**	**24%**	**2180**	**13%**	

Figure 18: Hazard Ranking Worksheet

Hazard Ranking	Planning Team		Public	
	Rank	Votes	Rank	Votes
Major Storm	1	14	2	63%
Earthquake	2	13	1	69%
Pandemic	3	12	5	36%
Landslide	4	10	9	16%
Tsunami	5	8	4	37%
Flood	6	8	7	22%
Wildland Fire	7	8	3	43%
Heatwave	8	7	6	34%
Drought	9	6	7	22%

Table 12: Hazard Ranking Results

Although pandemic ranked in the top five for both the public and Mitigation Planning Team, no specific action items were identified to mitigate this hazard, other than including it in the Public Education Campaign. The Emergency Management Coordinator and Health Clinic will work together before the next update to identify any possible projects, based on the H1N1 experience and lessons learned in other locations.

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Section IV

Mitigation Actions

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Mitigation Strategy

This section provides the blueprint for the Tulalip Tribes to reduce potential losses from the natural hazards identified in the Risk Assessment in Part III.

Goals and Objectives

This section defines the general outcomes that can be expected as a result of successful implementation of this plan. Plan goals are broad statements describing the principles that guide the actions suggested in this document. Plan objectives are more targeted statements that define strategies and implementation steps to attain the goals. The plan goals and objectives below were developed during the previous planning process and updated by the 2010 Mitigation Planning Team.

2010 Goals and Objectives

1. Protect people, property and the natural environment
    a. Purchase hazard-prone areas for conservation and risk reduction
    b. Buy-out or relocate structures located in high-risk hazard areas
    c. Encourage low impact development through land-use regulations
    d. Consider hazard vulnerability when siting and planning new critical facilities
2. Ensure continuity of critical economic and public facilities and infrastructure
    a. Support redundancy of critical government functions
    b. Retrofit or build to highest standards, critical facilities and infrastructure
    c. Support emergency access and redundant evacuation routes
3. Promote resiliency to protect Tribal sovereignty and identity
    a. Increase mitigation and emergency management capabilities for the Tulalip Tribes and Quil Ceda Village
    b. Enable the Tulalip Tribes to be self-sufficient for at least 7 days after a disaster
4. Increase public awareness of natural hazards and involvement in hazards planning
    a. Encourage organizations, businesses, and local governmental agencies within community and region to develop partnerships
    b. Implement hazard awareness, preparedness and reduction programs

Mitigation Actions and Activities

This section details the mitigation actions and activities that have been chosen by the Mitigation Planning Team to address the issues discovered during the Risk Analysis. They have been prioritized by the type of hazards they address, effectiveness, cost and likelihood of implementation.

Many of the action items from 2004 and 2006 were designed to be ongoing and are included as action items for 2010. Other short-term and long-term action items have had little to no progress; however, the Mitigation Planning Team agreed that they remain worthwhile and should also be included in the updated plan. The MPT has altered and re-prioritized the activities based on new information, changes in public concern over hazards, recent events, political willpower and funding opportunities. In addition, barriers to many of the action items have been identified and solutions to overcoming these barriers are included in the explanation of each action item.

Action items were prioritized based on the input of the Mitigation Planning Team, each of whom were given 6 stickers with which to rank the action items they felt were of greatest importance. Each item received between 5 and 1 votes and was grouped accordingly from highest to lowest. Within each grouping, items with smaller funding requirements, greater impact, fewer political barriers or shorter timeframes to completion were ranked higher.

The action items were previously labeled as M-2 through M-11 to denote those identified in 2004, and T-1 through T-10 for 2006 items. As of this update they are relabeled to reflect their reprioritization. Action item M-1, hire a full-time Emergency Management Coordinator, was completed. **Table 13** identifies the old and new labels.

New ID	Old ID	Description
1	M-6	Assure that the public is informed of the necessity of maintaining a 7-day supply of food and water, along with basic first aid and medical supplies.
2	M-2	Create a community wide comprehensive education program to educate the public, private and business sectors about hazards and hazard mitigation.
3	M-5	Identify critical community facilities and infrastructure that are without back up power generators.
4	T-1	Develop a local Hazard Mitigation Plan for Quil Ceda Village
5	M-9	Institute low impact development regulations for new developments as well as re-development projects.
6	T-9	Implement higher regulatory standards for hazard prone and environmentally sensitive areas using best available science
7	T-4	Buy-out of landslide, flood and tsunami prone properties at Priest Point, and other coastal locations
8	T-7	Have Tulalip become a TsunamiReady community
9	M-11	Utilize Geographic Information Systems (GIS) in decision-making processes.
10	M-10	Assess the Tulalip Tribes evacuation and primary response routes.
11	M-3	Create and maintain partnerships with all entities that impact the Tulalip Tribes to ensure that critical facilities and infrastructure are retrofitted or built to standards that make them less vulnerable in a hazard event.
12	M-7	Improve\expand storm water drainage, dams, detention and retention system capabilities.
13	T-8	Have Tulalip become a Firewise community
14	T-6	Have Tulalip become a StormReady community
15	T-2	Assessments and mapping of critical facilities and infrastructure
16	M-8	Promote use of new technology in hazard mitigation and emergency preparedness
17	T-3	Seismically retrofit and install back-up generators for the Tribal Center, Kenny Moses Building and the Quil Ceda Casino
18	T-5	Relocate homes located on the bluff at Hermosa Point
19	M-4	Create and maintain partnerships with all entities that impact the Tulalip Tribes to implement non-structural retrofitting in Tribal households, facilities and businesses.
20	T-10	Join the National Flood Insurance Program (NFIP)
n/a	M-1	Create a full time position in the Tulalip Tribes for an Emergency Management Coordinator. Completed.

Table 13: Mitigation Action Items with New and Old Prioritization

1: Assure that the public is informed of the necessity of maintaining a 7-day supply of food and water, along with basic first aid and medical supplies.

Problem/Opportunity

During and after a hazard event, emergency responders may be either overwhelmed with emergency calls or unable to access some residents. It is important that individual households are prepared for a period of self-sufficiency while responders deal with more immediate and life-threatening situations. Assuring that the public is informed of the necessity of maintaining a 7-day supply is a preparedness measure that must be implemented until mitigation measures can be implemented that appropriately address the issue of isolation.

Status

Ongoing. More than half (54%) of the public survey respondents stated that they already had a 3-day supply of food and water, while 50% stated they kept a first-aid kit and extra medicine. Based on previous events, FEMA is changing its recommendations and stating that a three day supply may be insufficient. The Mitigation Planning Team agreed the new goal will be a 7-day supply.

Implementation Strategy

Educate the public about the necessity of maintaining a 7-day supply for emergencies. Work with local businesses, such as Wal-Mart and grocers, to provide information about how to stock a supply kit, and offer discounts, coupons or other buying programs to assist low-income residents. The Emergency Management Coordinator could implement this strategy.

Lead Agency

Tulalip OEM

Funding Options

Tulalip Operating Budget, Emergency Management Performance Grant (EMPG)

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	All	1, 2, 3, 4

2: Create a community wide comprehensive education program to educate the public, private and business sectors about hazards and hazard mitigation.

Problem/Opportunity

The general public is often unaware of the risk of hazards and what actions to take during a disaster event. During and after a hazard event, emergency responders may be either overwhelmed with emergency calls or unable to access some residents. It is important that individual households and local businesses are prepared for an event and have the ability to support themselves for a period of time while emergency responders deal with more immediate and life-threatening situations.

Status

Ongoing. This activity is one of the main duties of the Emergency Management Coordinator.

Implementation Strategy

The education program should be an ongoing program that is devoted to increasing the public's awareness of what hazards affect Tulalip and what can be done to mitigate these hazards and their effects. Following a disaster event, there should be extra efforts to provide the public with information about disaster preparedness and mitigation measures. The Emergency Management Coordinator could implement this strategy.

Lead Agency

Tulalip OEM

Funding Options

Tulalip Operating Budget, Emergency Management Performance Grant (EMPG), Hazards Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program

Cost	Timeline	Hazards	Goals
$50,000, +$20,000/annum	Ongoing	All	1, 2, 3, 4

3: Identify critical community facilities and infrastructure that are without back up power generators.

Problem/Opportunity

Hazard events frequently cause power outages and create disruptions to the operation of important community facilities. In past cases, the Tulalip Tribe's operations have been disrupted or unable to function as necessary. It is especially important that facilities designated as emergency shelters have back up power generators. Back up power generators supply the needed resources to maintain operations until the power supply is restored.

Status

Ongoing. The GIS department has begun gathering this information and adding it to the Critical Buildings layer.

Implementation Strategy

The Emergency Management Coordinator could implement this strategy.

- Identify critical Tulalip Tribes facilities that currently do not have back up power capacity.
- Prioritize the list of critical Tulalip Tribes facilities that do not have back up power capacity by which facilities are most important in maintaining the critical functions of Tulalip.
- Acquire a source of back up power sufficient to maintain necessary operations for these Tulalip Tribes facilities using the prioritization list.
- Provide information on the importance of a back up power source.
- Work with utility providers as a possible funding source.

Lead Agency

Tulalip Utilities Department, GIS

Funding Options

Tulalip Operating Budget, PDM grants

Cost	Timeline	Hazards	Goals
Staff time, Cost of generators	Ongoing	All	2

4: Develop a local Hazard Mitigation Plan for Quil Ceda Village

Problem/Opportunity

Quil Ceda Village is a corporate municipality within the Tulalip Reservation. It is also the heart of the Tulalip's economy and part of the basic economy of the region, employing residents from surrounding communities and financing Tribal and county programs and initiatives. In the event of disaster, losing these businesses, even for a few hours or days, would cause an economic domino effect that would ultimately affect the Tulalip's well-being and safety as well as the region's. Continuity of the area's basic economy is essential to the Tribe's ability to responds and recover from a hazard event, natural or otherwise. Thus it is imperative that the Quil Ceda Village develop a hazard mitigation plan so to minimize potential losses to and disruptions of the local economy, and to protect the well-being of those who work, live and patronize the Village.

Implementation Strategy

A PDM planning grant will be prepared in order to hire a consultant/staff person to prepare the plan. The Tulalip Tribes will supply staff time for meetings, coordination and administration of the grant and planning process as part of its cost share.

Status

Not implemented at this time. Quil Ceda Village does not have an Emergency Coordinator; the Environmental Health and Safety Coordinator was unable to attend planning meetings. The Emergency Coordinator will continue to work with the Quil Ceda Representatives to secure a planning grant for a private consultant to complete the plan, and support the process.

Lead Agency

The Tulalip Office of Emergency Management will be the lead agency in preparing the grant. The Tulalip OEM and the Quil Ceda OEM will share the lead in developing the plan.

Funding Options

Pre-Disaster Mitigation Program planning grant funds will be used to hire a consultant with expertise in Tribal mitigation plan. The Tribe's cost share will come from the Tulalip Operating Budget.

Cost	Timeline	Hazards	Goals
$46,000	Short-Term	All	1, 2, 3, 4

5: Institute low impact development regulations for new developments as well as re-development projects.

Problem/Opportunity

Impervious surfaces, such as sidewalks, driveways, or foundations, do not allow water to filter through the ground but instead drain it quickly into storm water conveyance systems. This situation increases the risk of flooding and adds sediment and toxins to runoff. Low impact development has the potential to alleviate these adverse impacts through the creation of appropriately placed green space, landscaping, grading, streetscapes, roads and parking lots. Low impact development can achieve multi-functional objectives and help to reduce storm water impacts and provide and maintain the beneficial hydrologic functions of a natural drainage system.

Status

This project has been partially implemented by Community Development. The new housing project in the Quil Ceda Creek area, currently in the planning stage, has been approved by the EPA for a matching funds grant to be a Low-Impact Development (LID) project. It is located on low-lying land on hydric soils and is also in the tsunami hazard zone; while it is not ideal to install a large housing development in a hazard zone, LID construction will help offset any related stormwater disposal or flood risk issues.

Implementation Strategy

Develop Tribal regulations and guidelines that implement low impact development objectives to:

- Minimize impacts to the extent practicable by reducing imperviousness, conserving natural resources and ecosystems, maintaining natural drainage courses, reducing the use of pipes and minimizing clearing/grading.
- Recreate detention and retention storage so that water is dispersed and evenly distributed throughout a site. This can be done with the use of open swales, gentler slopes, depressions, storage rain gardens (bio-retention), water use (rain barrels) and others.
- Strategically route water flows to maintain pre-development drainage times.
- Provide effective public education and socioeconomic incentives to ensure property owners use effective pollution prevention measures and maintain water management measures.

Lead Agency

Tulalip Community Development

Funding Options

Tulalip Operating Budget, Tulalip Capital Improvement Budget

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	Flooding, Severe Weather	1, 2, 3, 4

6: Implement higher regulatory standards for hazard prone and environmentally sensitive areas using best available science

Problem/Opportunity

Due to complicated and contradictory jurisdictional issues, the area of the Tulalip Reservation has lacked adequate regulations in order to prevent development in hazard-prone areas and protect environmentally and culturally sensitive areas. Thus as a mitigation action, it is necessary that the Tulalip Tribes implement higher regulatory standards in order to protect sensitive habit and protect life and property.

Status

The Draft Comprehensive Land Use Plan rates Land Development Suitability by down-rating properties in landslide areas, within 100 feet of high-value wetlands, 50 feet of moderate-value wetlands and Class 2 streams, and within 200 feet of Class-1 streams and critical-value wetlands. In addition, it discourages development in areas with slopes above 15%, aquifer recharge areas, timberlands, critical habitat and wildlife areas. It encourages development near roadways, existing developed areas and those with sewer and water capacity.

Implementation Strategy

Tulalip Community Development will work with Tulalip and Quil Ceda OEMs in order to develop higher regulatory standards that can be offered for approval by the Tulalip Planning Commission.

Lead Agency

Tulalip Community Development

Funding Options

Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	All	1, 2, 3, 4

7: Buyout of landslide, flood and tsunami prone properties at Priest Point, and other coastal locations

Problem/Opportunity

The topography of Tulalip creates an extremely dangerous situation for many residents living along the coast. Unregulated development has led to many small communities being created along the small edge of land between Possession Sound and the steep landslide-prone bluffs that may reach up to 300 feet in height. In order to protect from landslides or the onslaught of waves generated by severe storms, many residents have taken it upon themselves to protect their property by building bulkheads or shoring up steep slopes.

Nonetheless these measures typically are only short term in effect and can disastrously affect the natural ecosystem, especially salmon habitat. Destruction of salmon habitat can mean the loss of livelihood and cultural identity for the Tulalip Tribes, many of whose members rely on fishing as a way of life.

Buy-out of hazard-prone properties along the Tulalip coast is the prime long-term focus of Tulalip hazard mitigation efforts. Not only will buy-out eliminate the potential loss of life and property, as well as the need for federal and local recovery aid, but it will also help protect and restore the natural environment.

Status

Stalled; a ranking system to prioritize properties with the highest Cost Benefit Ratio must be developed to appropriately channel the energies and funds of the Tribe. Housing, Leasing, Natural Resources and Emergency Management will work together to help determine the best properties to purchase.

Some properties are approaching the end of their long-term leases and will return to Tribal ownership in the next few years. These properties will be mapped to determine which should be relegated to conservation purposes, rather than re-inhabited or developed.

Implementation Strategy

Close collaboration amongst the Tulalip agencies and local homeowners will identify which properties to prioritize for buy-out. The Tulalip OEM will prepare project grants, if applicable, each year in order to purchase property.

Lead Agency

Tulalip OEM, Tulalip Natural Resources, Tulalip Community Development

Funding Options

FEMA PDM grant funding is expected to provide much of the financing.

Cost	Timeline	Hazards	Goals
$2,000,000+	Ongoing	Landslides, Tsunamis, Severe Weather, Flooding, Earthquakes	1, 4

8: Have Tulalip become a TsunamiReady community

Problem/Opportunity

NOAA's TsunamiReady program is part of its StormReady program and is a great opportunity to make Tulalip safer and more prepared from the effects of tsunamis, which although extremely rare, can have disastrous effects. TsunamiReady communities are better prepared to save lives from the onslaught of tsunamis through better planning, education, and awareness.

One section of the program includes devising an evacuation plan, identifying evacuation routes and installing signs to alert the public, and creating warning systems. Given the short amount of warning time before a tsunami strikes the Tulalip area, depending on the source, beach sirens were suggested multiple times during the planning process both by MPT members and the public. Practice drills to determine carrying capacity of evacuation routes and educate the public about steps to take after the sirens sound can help improve the response plan.

Status

Not implemented at this time.

Implementation Strategy

Detailed information on joining the program can be found at NOAA's website:

http://www.stormready.noaa.gov/tsunamiready/index.htm.

Lead Agency

Tulalip and Quil Ceda OEM

Funding Options

Tulalip Operating Budget, other grants

Cost	Timeline	Hazards	Goals
Staff time	Short-term, ongoing	Severe Weather, Flooding, Tsunamis	1, 2, 3, 4

9: Utilize Geographic Information Systems (GIS) in decision-making processes.

Problem/Opportunity

GIS offers a quick and comprehensive tool to identify problems and opportunities.

Status

Ongoing. The Tulalip OEM has been working closely with Tulalip Data Services and Tulalip GIS to assess critical facilities and to map hazards.

Implementation Strategy

Utilize GIS software to aid in reducing risk from hazard. This would include educating decision makers about how hazards can be analyzed using GIS. Using FEMA standards for encoding building and infrastructure data will help coordinate planning efforts with HAZUS software and increase the speed and accuracy of damage reporting after an event.

Lead Agency

Tulalip Community Development, Tulalip Data Services, Tulalip OEM

Funding Options

Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	All	1, 2, 4

10: Assess the Tulalip Tribes evacuation and primary response routes.

Problem/Opportunity

The Tulalip Tribes Comprehensive Emergency Management Plan (CEMP) identifies evacuation and primary response routes. Some of the same roads are used and may cause problems in the event of a disaster. An analysis of other potential routes is needed to ensure that traffic congestion does not impede response efforts during or after a disaster. Additional work may need to be done to roads so that they can serve as an evacuation or primary response route.

Status

This action has not been implemented at this time. An alternate route to connect the I-5/Quil Ceda Village area to the Administration Building and Tulalip Bay area, bypassing Marine Drive, has been proposed for evacuation, traffic and economic reasons. It is as yet undecided if this route will be constructed.

Implementation Strategy

- Reassess the Tulalip Tribes evacuation and primary response routes.
- Develop new routes where necessary.

Lead Agency

Tulalip Police Department, Emergency Management

Funding Options

Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
Staff time	Short-term	All	2

11: Ensure that critical facilities and infrastructure are retrofitted or built to standards that make them less vulnerable in a hazard event.

Problem/Opportunity

Critical facilities and infrastructure in Tulalip may be at risk to failure during or after an event. There are methods of retrofitting or building to a certain standard that will reduce the risk of failure.

Status

Ongoing. More work needs to be done to involve private businesses and forge partnerships with other communities.

Implementation Strategy

The Emergency Management Coordinator could implement this strategy.

- Develop a contact at each of the agencies that impact the Tulalip Tribes so that the Tulalip Tribes can stay updated about what is being done to reduce risk.
- Jointly analyze high-risk areas and develop mitigation strategies that address the risk. Initial focus should be given to critical facilities and infrastructure in NEHRP D and E soils.
- Maintain contact and work with agencies to ensure that the critical facilities and infrastructure are retrofitted or built to standards that make them less vulnerable in a hazard event.

Lead Agency

Tulalip Office of Emergency Management

Funding Options

Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	All	1, 2, 4

12: Improve & expand storm water drainage, dams, detention and retention system capabilities.

Problem/Opportunity

Flooding in Tulalip is related to inadequate capacity in the water system and the large amount of impervious surfaces in the highly developed areas. During and after heavy rains there has been flooding of roadways, yards and driveways and several structures.

Status

The Utilities Department commissioned studies from a private engineering firm to study the water supply and disposal issues. Long-term planning has been funded and is underway.

Implementation Strategy

- Analyze reports of flooding from past years and determine problem areas.
- Determine if drainage, dams, detention and retention system capabilities are adequate in these areas.
- Prioritize areas that need the drainage, dams, detention and retention system capabilities expanded.
- Begin expanding the drainage, dams, detention and retention system capabilities in the order of prioritization.

Lead Agency

Tulalip Utilities Department

Funding Options

Tulalip Capital Improvement Budget, Hazards Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program

Cost	Timeline	Hazards	Goals
Staff time for analysis	Long-term	Flooding, Severe Weather	1, 2

13: Have Tulalip become a Firewise community

Problem/Opportunity

The mitigation planning effort has identified that much of the interior of the Tulalip Reservation is undeveloped forest. During dry conditions, especially during the summer, a wildfire can develop, either from storms or by careless human behavior. Due to limited access into the forest areas, a small fire can easily grow and spread unchecked into the residential developments surrounding the interior Tulalip area. Joining Firewise can make the community more aware of the potential hazard and to develop and implement mitigation efforts to reduce risk.

Areas near critical facilities and housing developments, in particular, should be checked for possible fuel sources. Public information regarding debris burning and fireworks in these areas may further decrease the risk.

Status

Not implemented at this time.

Implementation Strategy

A staff person from the Tulalip OEM and/or Community Development will be responsible for reviewing material on Firewise.org and working with the local fire department and community to implement mitigation measures.

Lead Agency

Tulalip OEM, Community Development and Tulalip Fire Dept.

Funding Options

Tulalip Operating Budget, other grants as they become available

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	Wildfire	1, 2, 3, 4

14: Have Tulalip become a StormReady community

Problem/Opportunity

NOAA's StormReady program is a great opportunity to make Tulalip safer from severe storms while also making the community more aware of the effects storms can have on property and lives. StormReady communities are better prepared to save lives from the onslaught of severe weather through better planning, education, and awareness.

Status

Not implemented at this time.

Implementation Strategy

Detailed information on joining the program can be found at NOAA's website:

http://www.stormready.noaa.gov/

Lead Agency

Tulalip and Quil Ceda OEM

Funding Options

Tulalip Operating Budget, other grants

Cost	Timeline	Hazards	Goals
Staff time	Short-term, ongoing	Severe Weather, Flooding, Tsunamis	1, 2, 3, 4

15: Assessments and mapping of critical facilities and infrastructure

Problem/Opportunity

Better mapping and assessments of critical facilities and infrastructure, especially those that have cultural and economic value, are needed for the Tulalip Tribes. This effort has been on-going, but more needs to be done. The Tulalip Tribes envision making the Tulalip Reservation a national leader in the mapping and assessment of critical facilities and infrastructure and plan to do so through continued planning efforts, such as the Quil Ceda Village Hazard Mitigation Plan.

Status

Ongoing. The GIS team created a shapefile with footprints of major buildings, whether they are tribal or non-tribal, their height, purpose and if they contain showers, kitchens or generators. This shapefile will be further expanded to include data such as typical number of persons, building construction type and year, and other information to enable accurate modeling using FEMA's HAZUS software. Water and sewer infrastructure is mapped but also requires more information to be compatible with HAZUS.

Implementation Strategy

A PDM planning grant for the Quil Ceda Village as well as future grants for plan updates will be used to implement this. Also Tulalip Data Services and Tulalip Community Development will be part of this effort and will contribute on-going staff time.

Lead Agency

Tulalip OEM and Quil Ceda OEM with Tulalip Data Services/GIS

Funding Options

PDM grants, Homeland Security grants, Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
$6,000 for QCV	Short-term, ongoing	All	1, 2, 3, 4

16: Promote use of new technology in hazard mitigation and emergency preparedness

Problem/Opportunity

One of the most important elements to mitigation and emergency preparedness is awareness. The general public, as well as critical operations personnel, are often unaware of the risk of hazards and what actions to take during a disaster event. Public awareness programs can provide information about mitigation measures for different hazards as well as preparedness, response and recovery measures after a disaster event. The use of current technologies can help with the distribution of crucial information in a more organized and expeditious manner.

Status

Ongoing

Implementation Strategy

The Emergency Management Coordinator could implement this strategy.

- Develop a partnership with the Tulalip Data Services for the purpose of distributing crucial information on the Tulalip Tribes website.
- Develop and promote the use of the Internet and video technologies for providing training opportunities to the community, as well as critical operations personnel.

Lead Agency

Tulalip Data Services, Tulalip OEM

Funding Options

Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	All	1, 3

17: Seismically retrofit and install back-up generators for the Tribal Center, Kenny Moses Building and the Quil Ceda Casino

Problem/Opportunity

Many of Tribe's most critical facilities lack the structural integrity to withstand a major event, particularly an earthquake. Furthermore they do not have the ability to maintain operations after an event. The loss of power can occur easily in a rural area like the Tulalip Reservation. Thus it is essential that these facilities are seismically retrofitted and have back-up power to withstand and continue operations after a major event. So far 3 facilities have been identified and prioritized as needing seismic retrofitting and back-up generators: the Kenny Moses Building, the Tribal Center, and the Quil Ceda Casino, all older structures built before building codes were in place.

Status

Back-up generators have been installed at the Administration Building and both Casinos. Seismic retrofitting has not been completed at this time.

Implementation Strategy

An estimate will be made of the costs to implement this strategy. A benefit-cost analysis will be conducted for feasibility. Then a PDM project grant will be applied for to FEMA in order to help secure funding.

Lead Agency

Tulalip OEM, Tulalip Building Maintenance

Funding Options

PDM Grant Funding, Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
n/a	Ongoing, as funds are available	All	1, 2

18: Relocate homes located on the bluff at Hermosa Point

Problem/Opportunity

Many homes on Hermosa Point are located at the top edge of a steep and rapidly eroding bluff. These homes are owned by tribal members who depend on the lease income these homes generate. Removal of the homes would mean loss of income for tribal members. Thus the best alternative would be to relocate the vulnerable homes away from cliff, either onto safer locations on the same property or to nearby, undeveloped lots.

Status

Ongoing. Prioritization and mapping are needed, similar to the buyout proposed in Action Item 7.

Implementation Strategy

Close collaboration amongst the Tulalip agencies and local homeowners will identify which properties to prioritize for relocation. The Tulalip OEM will prepare project grants, if applicable, each year in order to relocate homes.

Lead Agency

Tulalip OEM, Tulalip Natural Resources, Tulalip Community Development

Funding Options

FEMA PDM grant funding is expected to provide much of the financing.

Cost	Timeline	Hazards	Goals
$200,000+	Ongoing	Landslides, Earthquakes	1, 4

19: Create and maintain partnerships with all agencies that impact the Tulalip Tribes to implement non-structural retrofitting in Tribal households, facilities and businesses.

Problem/Opportunity

Most injury and business loss is due to non-structural damage such as toppling shelves and hazardous material spills. These are largely preventable through relatively simple, non-structural measures.

Status

Ongoing.

Implementation Strategy

Provide information and\or training about how to implement non-structural retrofitting. The Emergency Management Coordinator could implement this strategy.

- Coordinate assessments of non-structural hazards for Tribal facilities.
- Prioritize the order by which Tribal facilities should be non-structurally retrofitted.
- Provide education and training about non-structural hazards and non-structural retrofitting for critical facilities, schools, health care facilities, residences and businesses. Initial focus should be given to facilities on NEHRP D and E Soils.
- Apply for grants that could provide funding for non-structural retrofitting.

Lead Agency

Tulalip OEM, Tulalip Utilities Department, Tulalip Buildings Maintenance

Funding Options

Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
$25,000	Ongoing	Earthquakes	2, 4

20: Join the National Flood Insurance Program (NFIP)

Problem/Opportunity

The Tulalip Tribes currently does not have Flood Insurance Rate Maps (FIRMs) prepared for its Reservation, so there is no clear understanding of how flooding could affect the Reservation. Past events have shown however that Tulalip Creek and well as some of the lakes/ponds have a tendency to overtop during severe conditions. Furthermore severe storms cause damage every year to low-lying structures along the coast. Thus the Tulalip Tribes find it imperative that these vulnerable areas are definitively identified so appropriate actions can be taken to protect vulnerable structures and facilities.

Status

Not implemented at this time. Joining the NFIP requires a more significant investment than stated in the previous plan, including having a Certified Floodplain Manager on staff.

These mitigation activities were ranked and prioritized through meetings with Tribal officials and staff. They were ranked by need and technical and fiscal feasibility.

Implementation Strategy

As FIRMs are prepared for Tulalip and Snohomish County, the Tulalip Tribes will focus on implementing NFIP requirements in order to join the program.

Lead Agency

The Tulalip Office of Emergency Management as well as the Office of Community Development will take a lead in implementing this measure.

Funding Options

Tulalip Operating Budget

Cost	Timeline	Hazards	Goals
Staff time	Ongoing	Flooding, Severe Weather	1, 2, 3, 4

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Section V

Implementation and Maintenance

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Capability Assessment

This section will discuss the pre- and post-disaster hazard management policies, programs, and mitigation capabilities of the Tulalip Tribes. This discussion will include an evaluation of Tulalip Tribal laws, regulations, policies, and programs that are related to hazard mitigation and to development activity in hazard-prone areas. Funding capabilities for hazard mitigation projects are also discussed. The local capability assessment includes a general description of the capabilities of Tulalip's local jurisdiction, Quil Ceda Village.

Tribal Capabilities

Planning

Tulalip Tribes Comprehensive Land Use Plan, 2010

The 2010 Tulalip Tribes Comprehensive Land Use Plan discusses Environment, including sensitive areas, hazard zones and wetlands in Chapter 4. As the draft was completed prior to the Hazard Mitigation Plan update, the findings of this plan (such as tsunami hazard areas) are not referenced in the Land Use Plan. Currently the Comprehensive Land Use Plan is awaiting approval by the Tribal Council.

Tulalip Tribes Comprehensive Emergency Management Plan

The Tulalip Tribal government has the responsibility for protecting life, property and environment threatened by natural or manmade disasters. Tribal emergency responders provide services such as rescue and medical treatment of the injured, evacuation of Tribal members at risk, initial isolation of an area, and identification of hazard. Tribal responders also notify other local, state, Tribal, and Federal agencies per applicable laws, regulations, plans and mutual aid agreements.

The current Comprehensive Emergency Management Plan is outdated; the update process will begin before the end of this year.

2005 Hazardous Materials Commodity Flow Assessment

This study was conducted by Washington State University's Department of Political Science & Criminal Justice. It was a joint project with the Lummi Nation. Its purpose was to identify hazardous materials located on the Tulalip Reservation and haz-mat that is transported to and through the Reservation.

Regulations

Tulalip Zoning Ordinance, Ordinance No. 80

The Tulalip Zoning Ordinance, Ordinance No. 80, Section 23 regulates development in environmentally sensitive lands. These regulations include buffers around streams and wetlands to protect the environment and prevent damage to property. Steep slopes are also regulated. Section 25.2 discusses regulations in regards to hydraulic projects. Section 4.3, Conformity with Uniform Codes, mandates that all structures on the Tulalip Indian Reservation

shall be built consistent with the most recent editions of the Uniform Building Code (UBC), Uniform Fire Code, and the Uniform Plumbing Code.

Tulalip Tidelands Management Policies, Ordinance No. 129

The Tulalip Reservation includes all tidelands within its borders. Tribal people have depended on the shoreline to such an extent that the tidelands, together with all of Tulalip Bay, are reserved for the use and benefit of the Tribe.

A staff team representing the Community Development, Legal, Environmental, Fisheries, Fish and Wildlife Enforcement, Leasing, and Forestry Departments prepared Tidelands Management Policies. The purpose of the policies is to establish management requirements for the development regulation, and leasing of that portion of tribally owned tidelands included within the definition of "Tidelands" in Part IV of these policies. The policies lay the groundwork for legislative and policy reform on issues affecting Tribal tidelands. The "implementation measures" included with the policies will guide future modifications to land use controls, leasing practices, intergovernmental coordination, and the regulation, enforcement, protection and conservation of Tribal tidelands. Ultimately, the Tribe will also prepare a more detailed, comprehensive shoreline management plan, regulating the use and development of the Reservation shorelines, as called for in the future implementation measures.

Agencies and programs

Tulalip Office of Emergency Management

The purpose of the Tulalip Tribes Office of Emergency Management is to provide:

- A leadership role in facilitating and coordinating a regional approach to emergency planning and response on the Tulalip Reservation and surrounding communities.
- Guidance and coordination in the planning, mitigation, response, and recovery efforts of the Tulalip Reservation before, during, and after an emergency or disaster.
- Acquire, allocate and coordinate the appropriate resources in response to emergencies of disasters.

Tulalip OEM assists with environmental and hazards planning, Department of Homeland Security and FEMA grant writing, disaster relief training and NIMS compliance training. The Tulalip OEM also is a leading partner in the Northwest Tribal Emergency Management Council.

Tulalip Police Department

It is the mission of the Tribal Police services is to support, through our words, deeds and actions the visions of the Tulalip Tribes, the tribal constitution, the tribal council, the tribal members, the tribal elders, the tribal youth, and honor the customs and heritage of the tribe and to support the treaties and sovereignty of the tribe.

Tulalip Fire Department (Snohomish County Fire District 15)

This facility is located at 7812 Waterworks Road near Tulalip Bay and is responsible for providing protection to the western part of the Tulalip Reservation. Although not a Tribal department, the Tulalip Fire Department provides critical capabilities for Tribal Emergency services.

Marysville Fire District (Snohomish County Fire District 12)

This district is headquartered at 1635 Grove Street in Marysville, Washington and provides services to Quil Ceda Village and the eastern part of the Tulalip Reservation.

Tulalip Health Clinic

The Tulalip Health Clinic opened in August 2003 and offers state-of-the-art health services to tribal members.

The mission of the Health and Social Services Department is to provide a premier integrated healthcare delivery system that is culturally relevant and addresses the physical, mental, spiritual, and emotional needs of all Tulalip Tribal Members.

The Health Clinic will be able to provide immediate assistance to those injured immediately following a natural disaster.

Tulalip Office of Community Development

The Tulalip Office of Community Development is responsible for developing land use and zoning regulations for the Tulalip Tribes. They also play a critical role in developing regulations related to hazards mitigation, such as critical areas ordinances and regulations, such as the newly adopted Tidelands Management Policy.

see-yaht-sub/Communications

The See-yaht-sub is the Tulalip Tribes community newspaper. They can provide information on natural hazards including awareness and preparedness. The Tulalip Tribes also own and operates a cable TV service and can provide emergency/disaster information.

Tulalip Natural Resources

The Tribe, along with the State of Washington, have comanagement responsibility and authority over fish and wildlife resources. The mission of the Tulalip Natural Resources program is to carry out the Tribe's comanagement responsibilities in a manner consistent with treaty rights as well as protection and perpetuation of the resources upon which the people have depended for over ten thousand years.

Northwest Tribal Emergency Management Council

Led by efforts of the Tulalip Tribes, the eight tribes of Washington State Homeland Security Region 1 (a region composing Snohomish, Skagit, Whatcom, Island and San Juan Counties) formed the Northwest Tribal Emergency Management Council (NWTEMC) to address homeland security and emergency management issues each tribe faces.

The development of the Northwest Tribal Emergency Management Council not only better prepares Tribal entities for emergency incidents, but will also provide more opportunities for the tribes to work collaboratively to assist one another in meeting the mandates of related emergency management programs and foster partnerships with their neighboring counties and municipalities. The Department of Homeland Security's guidance identifies tribal entities as key stakeholders in partnerships with state, local and private sectors.

Disaster Relief Training

Sponsored by Tulalip Office of Emergency Management and Tulalip TERO (Tribal Employment Rights Office), this program will allow tribal members to be able to assist in disaster relief efforts for the Tulalip Tribes and at any disaster location nationally.

National Incident Management System (NIMS) compliance training

The Tulalip Office of Emergency Management is coordinating the training of all tribal police officers, department heads, Board members and relevant staff in the National Incident Management System so they are compliant with NIMS.

Local Capabilities (Quil Ceda Village)

The tribal capabilities discussed in the previous section also apply to Quil Ceda Village. At this time, Quil Ceda Village does not have any specific capabilities that relate to hazard management, although there are plans in place to implement local capabilities. The first steps to implementing local capabilities will be to establish a Quil Ceda Village Office of Emergency Management and to prepare a local level hazard mitigation plan for the Village.

Current and Potential Funding Sources

This section identifies current and potential sources of federal, tribal, state, local and private funding to implement mitigation actions and activities. Due to the Tulalip's situation as a sovereign Indian reservation with a limited revenue base, most funding to implement mitigation measures will come from the federal government through grant programs. Limited funding is also possible from the State of Washington and Snohomish County as well as matching funds for grants from the Tulalip Tribes.

Federal

Below are listed the primary federal programs and agencies that can potentially fund mitigation actions and planning. Additional programs and agencies can also be found in the capability assessment and in Appendix F, Sources of Funding.

- Pre-Disaster Mitigation Program, which provides funds to develop mitigation plans and implement mitigation projects, is administered by FEMA (by submitting a state level plan, the Tulalip Tribes will qualify as a direct grantee);
- Hazard Mitigation Grant Program, which provides post-disaster funds for hazard reduction projects (e.g., elevation, relocation, or buyout of structures), is administered by FEMA and the Washington State Emergency Management Division;
- 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 is administered by the Washington State Department of Ecology (Ecology);
- Flood Mitigation Assistance Program, which provides funds for flood mitigation on buildings that carry flood insurance and have been damaged by floods, is administered by FEMA;
- Department of Homeland Security funding, in addition to FEMA programs;
- 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; and
- Bureau of Indian Affairs, which provides funds to support tribal activities.

Tribal

The Tulalip Tribes is fully committed to the public safety and welfare of its residents and tribal members and to the goals of the Tulalip Hazard Mitigation Plan. The Tribe has only limited resources to devote to mitigation planning. Tribal Funding sources generally come from the revenue generated by tribally owned businesses, such as the Quil Ceda and Tulalip Casinos, the Tulalip bingo hall, and from the leasing of trust land to businesses and home owners.

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.

State/Local

In some cases, funding may be available from the State of Washington and/or Snohomish 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 Tulalip Tribes is currently building relationships with the state of Washington, its departments and Snohomish County, as well as local communities, in order to develop partnerships to implement mitigation measures that are regional in scale.

Private

No potential funding from the private sector is currently identified. Nonetheless local businesses and residents located within the Tulalip Reservation will be encouraged to participate and contribute to the mitigation effort.

Coordination of Local Mitigation Planning

The consolidated borough of Quil Ceda Village is the only local jurisdiction within the Tulalip Reservation. Nonetheless the Tulalip Tribes will work with other local agencies and jurisdictions, such as the Marysville School District and the Tulalip Fire Department in helping to implement the mitigation actions described in Section 5 and in preparing and coordinating their own mitigation planning activities. The following sections will describe how the Tulalip Tribes will support the development of the Quil Ceda Village Hazard Mitigation Plan, and other local mitigation plans, if applicable. Furthermore the process to integrate the local plan and evaluate and prioritize local mitigation actions using a FEMA approved benefit-cost analysis will be described.

Local Funding and Technical Assistance

The Tulalip Office of Emergency Management (OEM) will be the lead agency in the coordination of developing mitigation planning for the Quil Ceda Village (QCV) and other local agencies within the Tulalip Reservation.

The Tulalip Office of Emergency Management can provide various types of assistance to local agencies, businesses, or individuals that are trying to identify appropriate mitigation measures for their facilities and homes. These include providing current hazard vulnerability estimates and technical information, improving communications between local organizations and hazard-related agencies, and coordinating hazard mitigation training. In addition, the Tulalip OEM can provide public education materials or presentations to organizations or residents on the Reservation. The Tulalip OEM will proactively identify appropriate mitigation measures and present them to local agencies, businesses, and/or individuals.

The Tulalip Tribes currently has limited funds to provide direct funding of mitigation measures to local agencies and jurisdictions. However, the Tulalip Tribes Board of Directors, through the Tulalip OEM, can apply for and pass on funds from outside sources to local entities and/or implement activities that directly or indirectly help local organizations, businesses, and/or individuals implement mitigation measures.

With adoption and approval of the Tulalip Tribal-level Hazard Mitigation Plan, the Tulalip OEM will apply for a pre-disaster mitigation grant in order for the Quil Ceda Village OEM to develop its own local mitigation plan.

Local Plan Integration Process

The Tulalip Office of Emergency Management will work closely with the Quil Ceda Village OEM to ensure that the QCV Hazard Mitigation Plan is consistent with the goals of the Tulalip Tribes Tribal-level Hazard mitigation and that local mitigation actions and strategies do not contradict those of the Tribal-level plan. The Tulalip OEM will also ensure that the QCV HMP fulfills all FEMA requirements for successful approval. Efforts to ensure that integration of local planning is successful will include:

- Frequent meetings between the Tulalip and QCV OEMs, especially during the planning process.
- The Tulalip OEM will share all available resources to the QCV OEM, such as staff assistance, technical assistance and expertise and the use of computers, printers and software that will lead to the successful adoption and implementation of the local mitigation plan.
- The Tulalip OEM will share all available hazard data, plans, and maps and will coordinate with other agencies, including those outside the Reservation in order to collect and disseminate relevant information.
- The Tulalip OEM will work closely with the QCV OEM in order to better map and develop risk assessments for critical facilities and infrastructure.
- The Tulalip OEM will help review the QCV mitigation plan at least once a year as part of the implementation and monitoring process.
- The Tulalip OEM will assist the QCV OEM at least once every five years in order to update the local plan.

Local Assistance Prioritization Criteria

With only one local jurisdiction, the Tulalip Tribes will not have to prioritize among local jurisdictions' grant applications for planning and projects. However, in order to use its limited resources and funding most efficiently and effectively, the Tulalip Tribes will require that the Quil Ceda Village prioritize areas and critical facilities and infrastructure most vulnerable to hazards and the projects that are most appropriate and effective in mitigating those hazards.

In general, the following criteria will be used to prioritize mitigation actions and to seek potential funding for projects:

- Projects that provide the greatest enhancement to public health and safety;
- Projects in which the benefits are maximized according to a benefit-cost review of proposed projects and their associated costs;
- Agencies and facilities with or projects that address the highest risks of hazard damage;
- Projects that involve repetitive loss properties; and
- Projects that address the most intense development pressures.

The Tulalip OEM will develop a ranking system that weights various factors and provides a relative score that reflects the importance of a project to the Tulalip Tribes and the residents of the Reservation. The Tulalip OEM and QCV OEM will use these scores to rank proposed mitigation projects and to prioritize mitigation activities for action. The ranking system will include the following criteria:

- Reduction of threats to public health and safety;
- Reduction of potential structural damages;
- Reduction of potential economic losses;
- Effects on environmental and cultural resources;
- Degree of support for the Tulalip Tribes goals and objectives; and
- The benefit/cost ratio of the project.

Since most hazard mitigation funding from federal and state sources requires a benefit/cost ratio greater than one, this ratio will be an important factor in the assessment of projects. Unless a project involves overriding public health and safety or cultural factors, the Tulalip OEM will only consider projects in which project benefits at least exceed project costs. In seeking to maximize public benefits, the Tulalip OEM and/or the QCV OEM will acquire the information and/or assistance necessary to determine the best possible benefit-cost ratio for high priority projects before submitting applications for these projects to funding agencies. Projects that are recommended for funding will be those that best document their ability to reduce future impacts of natural disasters as well as demonstrate cost effectiveness through a benefit-cost review.

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Plan Maintenance Process

The Federal hazard mitigation planning regulations (44 CFR 201.4) have been updated to state that all Tribal plans to meet the new Tribal Mitigation Plan requirements, and that these plans be reviewed, revised, and submitted for approval to the FEMA Regional Director every five years. The regulations require a plan maintenance process that includes an established method and schedule for monitoring, evaluating, and updating the plan; a system for monitoring implementation of mitigation measures and project closeouts; and a system for reviewing progress on achieving goals as well as specific activities and projects identified in the mitigation plan.

The Tulalip Tribes Tribal-level Hazard Mitigation Plan is a living document that is intended to provide a guide for hazard mitigation to the Tulalip Tribes. The Plan can be revised more frequently than five years if the conditions under which it was developed change significantly (e.g., a major disaster occurs or funding availability changes). This section details the Tulalip Tribes' method and schedule for monitoring, evaluating, and updating the HMP and for monitoring the progress of mitigation actions.

Responsibility for Plan Maintenance

The Tulalip Board of Directors has final authority and responsibility over the Tulalip Hazard Mitigation Plan. Responsibility for plan maintenance and coordinating implementation of mitigation measures will be delegated to the Tulalip Office of Emergency Management. The Tulalip OEM will also be responsible for annual progress reports to the Tulalip Board of Directors and for the five-year update to be submitted to the Board and subsequently to FEMA for approval.

Monitoring, Evaluating and Updating the Plan

The Tulalip OEM will review this HMP annually and will update the HMP every five years. Semi-annual reviews with the Mitigation Planning Team will identify progress made on the implementation of mitigation measures and projects. These reviews will also assess the impacts of disasters in the Reservation region to determine whether the HMP should be revised based on the new information. The semi-annual review will occur during the second and last quarter of each calendar year to coincide with the tribal fiscal year and to prepare for PDM grant deadlines.

The effectiveness of projects and other actions will be evaluated at appropriate, project specific intervals or, at a minimum, when the HMP is updated every five years as required for Tribal plans submitted directly to FEMA. The process of updating the HMP will include a review of hazard assessments, vulnerability assessments, potential losses, tribal capability, and coordination with other planning efforts, funding sources, and recommended and potential new mitigation measures. In support of the five-year update, the Tulalip OEM will:

- Examine and revise the Hazard Risk Assessment as necessary to ensure that it describes the current understanding of hazard risks;
- Examine progress on and determine the effectiveness of the mitigation actions and projects recommended in this HMP;
- Identify implementation problems (technical, political, legal, and financial) and develop recommendations to overcome them;
- Recommend ways to increase participation by Tulalip Tribes departments and to improve coordination with other jurisdictions and agencies; and
- Review and, if desirable, revise the Tulalip HMP Action Plan.

The updated HMP will be presented to the Tulalip Board of Directors for approval and adoption before it is submitted to FEMA for re-approval.

Monitoring Progress of Mitigation Actions

The Tulalip Tribes Office of Emergency will frequently review progress on the implementation of mitigation actions. The Tulalip OEM will also meet with representatives from Tribal Departments, as the Mitigation Planning Team, to discuss progress of mitigation activities. The implementation of all short-term mitigation actions will be monitored by the Tulalip OEM on an ongoing basis until implementation is complete. Long-term actions being actively implemented will be monitored on an ongoing basis, or at least annually as needed. Long-term actions planned for the future will be reviewed during plan updates every five years.

The system for reviewing progress on achieving goals, objectives, and specific actions included in the mitigation strategy will be based on a checklist of all objectives and actions. This checklist will be reviewed annually by the Tulalip OEM. As described in the previous section, progress on mitigation actions will be described in an annual report to Tulalip Board of Directors and in the five-year update of the Hazard Mitigation Plan.

In addition to the work products described in approved work plans for projects funded by the Pre-Disaster Mitigation Program, the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, or other grant programs, quarterly or semi-annual (depending on reporting requirements of funding agencies) performance reports that identify

accomplishments toward completing the work plan commitments, a discussion of the work performed for all work plan components, a discussion of any existing or potential problem areas that could affect project completion, budget status, and planned activities for the subsequent quarter will be submitted to the funding agency by the assigned Tulalip Project Officer. The agency-specific final grant closeout documents will also be prepared by the Tulalip Project Officer at the conclusion of the performance period and submitted to the funding agency.

The previous plan's mitigation strategy would have been more effective had there not been major staffing changes within the Office of Emergency Management that began almost immediately after the completion of the previous plan. With consistent staffing and the inclusion of the Mitigation Planning Team as an oversight body, these methods should be more effective over the next five years.

Ongoing Public Participation

The plan will be available on the Office of Emergency Management website for download, along with an e-mail address inviting comment. A physical copy will be available at the OEM Office and at the Administration Building with the Community Development Department. During outreach activities designed to educate the public about safety and natural hazards, information regarding the plan and how to obtain a copy will be made available at public events and on literature created by the OEM.

Ongoing Mitigation Planning Team meetings will be open to the public and planning team members will be asked to suggest interested members of the public who should be invited to the meetings. When a schedule is confirmed for these meetings, information will be available via the OEM website.

Future update processes will strive to include public input whenever possible, including surveys and opportunities to review new data created for the plan.

Compliance with Federal Statutes

The Tulalip Tribes will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 13.11(c) of 44 CFR 201.7. The Tulalip Tribes will amend this plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44 CFR 201.7(d).

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APPENDICES

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Appendix A: Mitigation Planning Team

Initial invitation sent via e-mail on Friday, January 8th for a Kickoff Meeting on January 19th. Additional Planning Team Meetings were held on February 10th, March 10th, April 10th, and May 12th. Reminder e-mails were sent two days or more in advance with time and location.

	Name	Department	1st E-mail	Kickoff	Feb	Mar	Apr	May
Martin	Napeahi	Administration	x					
Mytyl	Hernandez	Administration/PIO	x			x		x
Ronni	Arbuckle	Asset Management	x					
Cherie	Ross	beda?chelh	x	x		x		
Diane	Prouty	Boys & Girls club	x	x	x	x		
Chuck	Thatcher	Boys & Girls Club		x				
Niki	Cleary	Communications	x	x				
Roger	Vater	Communications/KANU TV				x	x	
Michelle	Caldwell	Community Development						x
Krong-Thip	SangKapreecha	Community Development	x		x		x	
Elizabeth	Williams	Community Development	x					
Rochelle	James	Emergency Management	x	x	x	x	x	x
Pam	Blount	Finance	x					
Jason	Gobin	Forestry	x					
Steve	Young	Hatchery	x					
Lise	Alexander	Health Clinic	x					
Verna	Hill	Health Clinic	x			x		
Vince	Henry	Housing	x		x			
Tisha	McLean	Leasing / TTHAPS			x	x		x
Wendy	Buffett	Mitigation Consultant	x	x	x	x	x	x
Danny	Simpson	Natural Resources	x					
Todd	Zackey	Natural Resources						x
Margaret	Goodman	Pharmacy	x					
Carlos	Echeverria	Police	x	x		x		
J.A.	Goss	Police	x	x				
Debra	Meuier	Police	x					
Vince	Cooke	Quil Ceda Village	x					
Dean	Henry	Safety	x					
Jason	Biermann	Snohomish DEM	x				x	
Randall	Fay	Snohomish Search & Rescue	x		x	x	x	
Jennifer	Foster	State Dept of Health			x			
Maria	Gardipee	State Dept of Health	x		x			
Justin	Jimicum	TDS	x			x		
Eiko	Toguchi	TDS	x	x	x	x	x	x
Mike	Alva	TTHAPS / Construction	x		x			
Shawneen	Zachuse	TTHAPS / Construction	x		x	x		
Carlee	Jones	Utilities	x					
Rob	Larson	Utilities						x
Melody	Dumont	Youth Services	x					

The following documents are copies of the Agendas, Handouts and Minutes of those meetings.

Kickoff Meeting Agenda

Tuesday, January 19th, 2010
2 pm - 2:30 pm
Training Room 162, Administration Building

1. Sign-in sheet, handouts
2. Introductions (5 min)
3. What is hazard mitigation planning (5 min)
4. Benefits of the process and goals (2 min)
5. Process steps & timeline (5 min)
6. Define roles & responsibilities (5 min)
7. Determine schedule for meetings, select next meeting time (3 min)
8. Who else to invite (5 min)
9. Questions

Meeting Schedule

Meeting 1: Hazard assessment
What are the risks and where are they? Choose public input strategy. Tasks: verify hazard information

Meeting 2: Impact assessment
Wrap up hazard assessment, get information for the impact assessment. Tasks: provide information for vulnerability analysis

Meeting 3: Prioritize risks
Prioritize the biggest risks to the community. Choose mitigation goals. Tasks: Start coming up with a list of possible mitigation options.

Meeting 4: Mitigation options
Review mitigation options and come up with more.

Meeting 5: Choose strategies
Choose the mitigation options that will be emphasized in the plan and table the rest. Prioritize what gets funding and support first.

Meeting 6: Confirmation & review
Review the final plan and confirm the choices made. Departments know their roles in making the projects happen.

Kickoff Meeting Minutes

Attendees:

Niki	Cleary	Communications
Diane	Prouty	Boys & Girls club
Cherie	Ross	beda?chelh
Eiko	Toguchi	TDS
Chuck	Thatcher	Boys & Girls Club
Carlos	Echeverria	Police
J.A.	Goss	Police

Offered future meeting times of the second Wednesday or Thursday of the month, selected Wednesday afternoons; 2pm agreed to be a good meeting time. Next meeting February 10th at 2pm.

Groups to invite:

1. Snohomish County Search & Rescue - personal contact with group member, will invite
2. Fire District 15
3. Quil Ceda Village - staff was invited but also bring in management

Public options

1. Community meetings are open to the public and rebroadcast on local channel 99
2. Review emergency preparedness
    a. Requests for personal visits at different departments
    b. Visit to the school
    c. Visit to the Boys & Girl's club which has been listed as an emergency shelter but lacks certain provisions (e.g. generator). Red cross training for shelter managers is currently being organized.

Tulalip HMP Update Risk Assessment Meeting

2 pm, Wednesday, February 10, 2010

Agenda

1. Sign-in sheet, coffee, snacks - 5 mins
2. Introductions - 2 mins
3. Brief overview of process schedule - 2 mins
4. Risk assessment explanation - 5 mins
    a. List of natural hazards
    b. Update of previous plan
    c. New information since then
    d. Verify our data - add new, changes, ask questions!
    e. Use thumbtacks, markers, post-it notes, voice
5. 15 minutes to review & comment on maps
6. Re-convene - will now take this info and update maps
7. Public information process - 10 mins
    a. different options
    b. which ones are preferred?
    c. questionnaire - take home to review and confirm
    d. other ideas, volunteers to help spread word, do programs
8. Infrastructure assessment - 10 mins
    a. Brief overview
    b. Confirm or change definition
    c. Will review data at next meeting
9. Next meeting Wednesday, March 10 at 2pm
10. More time to review maps or adjourn

Critical Facilities definition

2006 Plan:

> Critical facilities and infrastructure are those that are critical to the health and welfare of the population. These become especially important after any hazard event occurs.
>
> Critical facilities included for the Tulalip Reservation Hazard Mitigation Plan are as follows: police and fire stations, schools, and all tribal buildings including government buildings and housing. Essential facilities include buildings and businesses that are essential to the community's economy and/or safety after an event. These include the Tulalip Casino, Wal-Mart, Home Depot and other businesses that supply essential goods such as food and equipment.

Public Process Options

Public outreach is a required part of the Hazard Mitigation Planning process. While FEMA does not specify the methods or the number of comments, they require that reasonable efforts were made.

Options used by other planning groups

Includes state, county, multi-jurisdictional, local and tribal:

1) Plan on website
   a) *Not advertised yet*
2) Community Meeting
   a) *Usually at least one early and one late*
3) Council meetings discussing plan
   a) *Attendance is the same as other council meetings*
4) Copy of plan at library, admin building and/or emergency management office
   a) *For those not online*
5) Newspaper articles
   a) *Press release to feature article*
6) E-mail/fax/mailing to key stakeholders
   a) *Bringing key players to meetings*
7) Newsletters posted
   a) *Information about hazards and planning process*
8) Mailed/online surveys
   a) *Online is cheap, becoming more common*
9) Public workshops
   a) *'How-to's, free kits, scenarios*
10) Guest speeches at local orgs
   a) *Chamber of commerce, charities, schools*
11) Raffle with prizes
   a) *Combined with public event or community meeting*
12) Disaster Drill
   a) *Gets news coverage*
13) Faxes to media of meeting notices
   a) *If meetings are open to the public*
14) Interviews with individuals working with special populations or at-risk areas
   a) *Those who cannot attend planning meetings*
15) Booth at local fair/event
   a) *Can distribute information and request comments*
16) TV report/program
   a) *King County had a small feature on public access TV*
17) Conference

Minutes from Risk Assessment Meeting, Feb 10, 2010 2pm

Attendees:

Diane	Prouty	Boys & Girls club
Eiko	Toguchi	TDS
Vince	Henry	Housing
Shawneen	Zachuse	TTHAPS / Construction
Maria	Gardipee	State Dept of Health
Randall	Fay	Snohomish Search & Rescue
Mike	Alva	TTHAPS / Construction
Krong-Thip	SangKapreecha	Community Development
Jennifer	Foster	State Dept of Health
Tisha	McLean	Leasing / TTHAPS

Wendy and Rochelle reviewed the planning process; the risk assessment is part of Phase 2.

Wendy explained the hazards that affect the Reservation lands and the maps showing the location of those hazards (some, like heat waves, drought, winter storms etc. affect the whole area and were not mapped). The following comments were made before the break:

Hazard Assessment & Maps

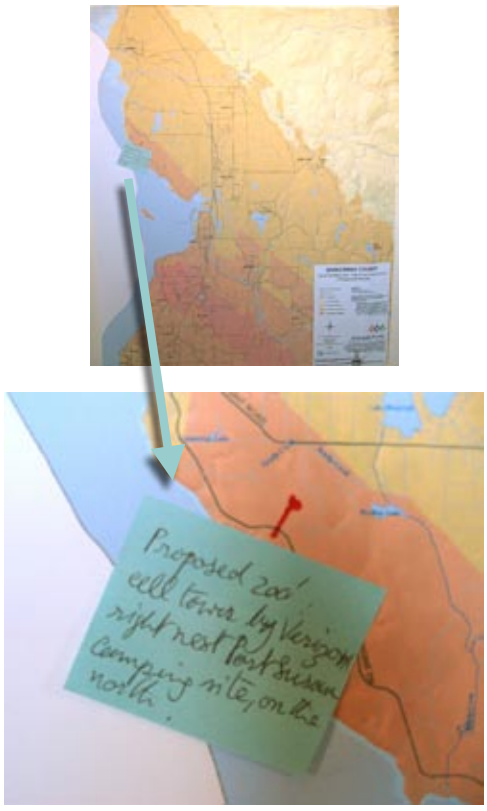
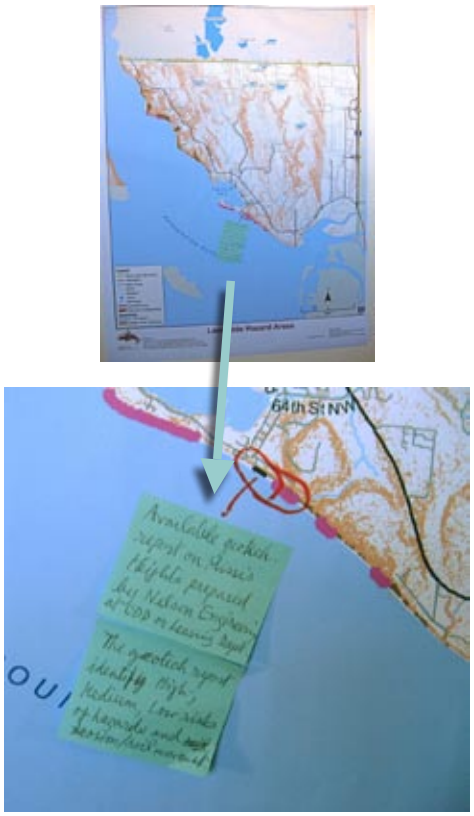
- Randy Faye from Search & Rescue says a study conducted after the Sri Lanka/ Sumatra tsunami looked at a subduction-zone caused tsunami on the Washington coast. It predicted waves of over 80 feet that completely wash over Whidbey Island.
- Jennifer Foster from the State Dept of Health talked about floods and public health, as seen in the Chelan area floods. Bodies of livestock, which rot in the floodwaters, spread disease and contaminate drinking water. In extreme cases, such as the recent earthquake in Haiti, the bodies of those killed during the disaster can also cause public health concerns for the survivors. Large numbers of dead that need to be buried quickly for health purposes may cause a conflict with burial practices. This may be a topic for the elders who do burial ceremonies.
- Flood map (empty) and the tsunami map (everything under 70 feet that connects to the coast), during the last planning process in 2004-06 there were more detailed maps. Rochelle & Wendy will look for these and also meet with Glenn Coil, the previous consultant on the project, who may have knowledge of where the data is.
- Adding pandemics to the hazards plan update: representatives from the State Dept of Public Health, the Tulalip Health Clinic and Emergency Management agreed that a pandemic section in the mitigation plan can help through scenario drills, community education, ensuring access to vaccination clinics. No protest to including pandemic in plan update.

- Adding sea-level rise and climate change to the plan: representative from TTAHPS notes that high tides are beginning to cover the 16" manhole outflows, blocking stormwater from emptying into the Bay and causing backups and flooding in inland areas. General agreement that climate change and its effects should be included, either in a discussion of each hazard, or as a hazard of its own.

- Concerns about lifelines following an earthquake, particularly access to medical centers. If there are signficiant injuries following a South Whidbey Fault or other quake and the I-5 and 99 corridors south are not available, and/or if medical centers in Everett are overwhelmed, trauma victims and overflow from the medical clinic will have to be treated somewhere north or east. A Memorandum of Understanding with area hospitals to treat victims from Tulalip in the event of a disaster or mass casualty event would help prevent blockages to treatment and assist in management of funds during recovery.

Break - review and comments on maps

Of the 6 maps (Flood, Wildfire, Liquefaction Zones, Tsunami, South Whidbey Groundshaking and Landslide) available, comments were written on 2:

South Whidbey Groundshaking	*Landslide*
	

Public Outreach

- A meeting or presentation at the Elder Breakfast is a good way to get the elders involved in the process and obtain feedback about disasters and hazard mitigation.
- A safety fair at Lowe's home improvement store includes booths by the Fire Department, Search & Rescue and CERT
- A walkthrough drill in the Earthquake hazard zone, going door to door to 'red tag' homes that would be inhabitable after an earthquake, raises signficiant public awareness
- Wal-Mart or Lowe's could provide a list of items to create a 72 hour emergency kit that would be discounted, or arrange coupons for items to purchase for a kit - Karen Zigler (sp) can be contacted for this program

Critical Facilities

- Inclusion of critical routes to facilities and evacuation should be included in the definition
- Cell towers should be essential facilities, also the shortwave tower
- Regarding evacuation routes and access to utility structures, there may be an alternate route roundtable that Rochelle will look into

Maps and the draft survey questions will be sent out for review before the next meeting.

Next meeting is March 10th at 2pm, probably in the same room in the old Housing building: 3107 Rueben Shelton Dr., Tulalip, WA.

Vulnerability Assessment Agenda

2pm March 10, 2010

Snacks, sign-in

Introductions (2 mins)

Overview of stage in process (2 mins)

Review of updated maps (5 mins)

Presentation of vulnerability maps (5-10 mins)

Break, view maps, comment & edit (10 mins)

Review of survey & public process plans (10 mins)

Next step is checking up on progress of action items in 2006 plan (5 mins)

Event planning / sign up for spots (5 mins)

Next meeting time & place

Hazard Ranking Meeting Minutes

2pm April 14, 2010

Attendees:

Eiko Toguchi, TDS GIS
Krongthip Sangkapreecha, Tulalip Community Development
Roger Vater, Tulalip Communications
Tisha McLean, Tulalip Leasing / Construction
Randy Fay, Snohomish DEM/ Search & Rescue
Jason Biermann, Snohomish DEM
Rochelle James, Tulalip OEM
Wendy Buffett, Hazard Mitigation Consultant

1. **Introductions**
2. **Review of progress and process timeline**

   Completed risk analysis, now ranking hazards and confirming mitigation goals & objectives. Next step is determining mitigation projects, ranking those projects, and writing the plan.

3. **Survey update: 150+ responses**

   71 % Tribal members
   61% experienced major storm
   52% feel unprepared for disaster
   72% trained in first aid/cpr
   80% do not have flood insurance
   69% do not have earthquake insurance
   44% would spend $500-$10,000 to protect home
   72% female

4. **Presentation of Vulnerability Maps**

   New tsunami map
   Wetlands map - NOT flooding
   includes all land within 50 feet of wetlands, streams, water bodies, and hydric soils (if high rain could have backups/seepage)

5. **Vulnerability numbers (possible loss estimates)**

   Where hazards overlap tribal buildings, streets, water/sewer lines and locations, residential addresses, approximate population, exact tribal vulnerable populations (summarized on hazard ranking form)

6. **Time to review maps and rank hazards / break**

- Use hazard ranking form to rate each hazard as high, medium or low concern.
- Consider the impact to your department, you personally, and the total community.
- Use the public concern and estimated impact along with hazard maps to make your decisions.
- All rankings will be totaled and hazards ranked; mitigation projects that address hazards of high concern will get higher staff & funding priority.

7. **Review of Mitigation Goals from 2006 plan**

8. **Approve, edit or add to existing goals**

Recommended edits:

- Add "Placement of Critical Facilities" to the objectives under Goal 1 to integrate with land-use planning
- Add "Support emergency access and evacuation routes" under Goal 2 to support redudancy (Having more than one option so that if during a disaster the one route or office is inaccessable, response can still happen effectively)
- Add "resiliency" to clarify Goal 3 (Would read: "Promote resiliency in order to protect Tribal sovereignty and identity.")
- Change 72 hours to 7 days under Goal 3
- Related comments: possibly identify helipad landing areas for emergency evacuation, additional access roads in case roads along coast are inaccessable (e.g. Marine Dr.)

9. **Next steps: mitigation actions, presentation to public**

- Coming up with mitigation actions.
- Based off of risk assessment, which actions can we take, generally or in your department. Discuss with others if possible.
- Also consider what other projects are currently underway and which could be approved if funding was available. How much manpower/funding could your department contribute to each project, and how much would it need? How long would it take to complete? Ongoing projects are also okay.
- Presentation to public will be maps & data to elders & public.
- Final mitigation actions will be presented along with the final plan for public comment; can happen same time as approval process.

10. **Next meeting time & place**

Wed May 12, 2pm, location TBA

Action Items Ranking Agenda

2pm May 12, 2010

1. Introductions (5 min)
2. Review of progress and process timeline (5 min)
   - 4 step process, we are in step 4
   - Plan should be written by the end of June
   - This meeting is intended to take all of the information to date and come up with solutions to the issues we've identified
3. Review of Action Items Status and Discussion (15 min)
   - Which have progressed, which have been abandoned, which should be discarded or altered (write on big sheet)
   - New action items! Write on big sheet - match to goals/hazards
4. Voting for Action Items / break (20 min)
   - Use stickers; more on important. Items that have no stickers will likely be discarded.
5. Public Outreach Schedule (Admin Building, Elder Breakfast) (5 min)
   - Posters will be up in the administration building lobby next Wednesday, May 19 from 9-3 for public review and comment.
   - We will also have copies of the questionnaire. Please stop by and encourage friends & co-workers. Roger Vader is helping us advertise the event; other ways to advertise?
6. Next steps: capability assessment and plan completion (5 min)
   - The capability assessment will be looking at all of the funding and enforcement options we have to complete these projects.
   - Incorporating public comments, hazard ranking, this meeting, and cost-benefit analysis will further help us prioritize the action items we discuss today.
7. Next meeting time & place
   - Next meeting will be at 2pm on Wednesday, June 9.
   - At this meeting we will agree on maintenance and implementation (for instance meeting every few months to check up on the status of the projects in this plan and bring up new issues).

Appendix B: Public Survey Questions and Results

Tulalip HMP Update Survey

The Tulalip Hazard Mitigation Plan is being updated by a committee of Tribal representatives from many departments. We need your help to find out what we should focus on and what we can do to make Tulalip a safer, more prepared community. Please answer the following questions as best you can.

Feel free to write any additional comments or questions on the back of the paper.

If you would like more information or want to be involved in this planning process, please contact Rochelle James at the Office of Emergency Management at rochellejames@tulaliptribes-nsn.gov or (360) 716-5945.

For more information on the Tulalip Hazard Mitigation Plan 2010 Update, please visit the Office of Emergency Management website - google tulalip emergency

Thank you for taking the time to help us!

1. Do you live or work on the Tulalip Tribal Lands?
   - ○ Live
   - ○ Work
   - ○ Both
   - ○ Neither

2. Where do you live?
   - ○ Near the marina/Tulalip Bay
   - ○ Near Quil Ceda Village
   - ○ Somewhere else on the tribal lands
   - ○ Near the Hermosa Point bluffs
   - ○ I don't live in the Tulalip area

3. Are you a Tribal member?
   - ○ Yes
   - ○ No

4. Which of these natural hazards has affected you or someone in your household in the last 20 years, in the Tulalip area? *Choose all that apply*
   - ☐ Dam Break
   - ☐ Drought
   - ☐ Earthquake
   - ☐ Flood
   - ☐ Heat wave
   - ☐ House fire
   - ☐ Landslide
   - ☐ Major storm (wind, rain, snow)
   - ☐ Pandemic (widespread illness)
   - ☐ Tsunami (tidal wave)
   - ☐ None
   - ☐ Other: _____

5. How worried are you about each disaster putting you, your job or your home in danger? *Please choose one answer for each hazard*

	Very worried	Worried	A little worried	Not too worried	Feel totally safe
Dam break	○	○	○	○	○
Drought	○	○	○	○	○
Earthquake	○	○	○	○	○
Flood	○	○	○	○	○
Heat wave	○	○	○	○	○
House fire	○	○	○	○	○
Landslide	○	○	○	○	○
Major storm	○	○	○	○	○
Pandemic	○	○	○	○	○
Tsunami	○	○	○	○	○
Other:	○	○	○	○	○

6. How well do you think that you or your household are prepared to get through a disaster?

Well prepared	○	○	○	○	○	Not at all prepared

7. Which of these has someone in your home done to prepare for a disaster? (If you do not live in Tulalip, which has been done at your work?) *Check all that apply*

- ☐ Trained in first aid/CPR
- ☐ Made a fire escape plan
- ☐ Chosen a place to meet outside
- ☐ Know where to shut off the gas, water, electricity, etc.
- ☐ Made an emergency kit
- ☐ Put smoke detectors on every floor
- ☐ Keep extra food and water to last 3 days
- ☐ Keep flashlights and batteries handy
- ☐ Keep a battery-powered or hand crank radio
- ☐ Keep a fire extinguisher

- ☐ Have a first-aid kit and extra medicine
- ☐ Know who is checking on older relatives who live alone
- ☐ CERT (Community Emergency Response Training)
- ☐ Other:

8. Where did you learn about how to be ready for a natural disaster? *Check all that apply*
   - ☐ Government source (speech, flyer, handout, etc.)
   - ☐ CERT (Community Emergency Response Training)
   - ☐ School
   - ☐ Meetings about disasters or safety
   - ☐ Local TV, Radio, newspaper
   - ☐ Lived through one
   - ☐ Internet
   - ☐ Other:

9. What would be the best ways to get information to your friends and family about how to prepare for a disaster? *Check all that apply*
   - ☐ Newspaper ads
   - ☐ Newspaper articles
   - ☐ TV ads
   - ☐ TV articles or news
   - ☐ Radio ads
   - ☐ Radio articles or news
   - ☐ Internet website
   - ☐ School
   - ☐ Church
   - ☐ Library
   - ☐ Public meetings
   - ☐ Billboards
   - ☐ Books
   - ☐ Brochures
   - ☐ Newsletters
   - ☐ Clubs and groups
   - ☐ Mail
   - ☐ Telephone book
   - ☐ Businesses
   - ☐ Fire & police department
   - ☐ Red cross
   - ☐ At work
   - ☐ Workshops
   - ☐ Fairs and events
   - ☐ Training classes
   - ☐ Other:

10. Do you have flood insurance?
    ○ Yes ○ No ○ I don't know

11. Do you have earthquake insurance?
    ○ Yes ○ No ○ I don't know

12. Have you had a problem getting insurance because of a natural hazard?
    ○ Yes - Which hazard? _____
    ○ No

13. When you moved into your home, did you think about how a natural hazard might put you or your home in danger?
    ○ Yes ○ No ○ Doesn't apply / I don't live here / Always lived here

14. Did your landlord or the person who sold you the house tell you about any natural hazards that might put your home in danger? Did they say you were in an area that flooded, or that landslides happen nearby?
    ○ Yes ○ No ○ Doesn't apply / I don't live here / Always lived here

15. How much would you spend to make your home safer from a natural disaster?
    This could mean anything from raising your home above a high water line, to strapping things down in case of an earthquake.
    ○ More than $10,000 ○ More than $500 but less than $10,000
    ○ Less than $500 ○ Nothing

16. What would help you spend more on making your home safer?
    Check all that might apply
    ☐ Lower or no fees on the building permit
    ☐ Lower insurance rates
    ☐ Lower mortgage payments
    ☐ Lower property taxes, or a one-time tax refund
    ☐ Low interest loan
    ☐ Apply for a free grant to pay for the project
    ☐ Nothing
    ☐ Other: _____

17. If your home was damaged many times or was at a high risk of being damaged (edge of a landslide area), would you agree to the Tribal government buying out your home?

○ Yes ○ No ○ Doesn't apply / don't own my home / don't live here

18. Do you agree with this sentence: "It is the government's (Tribal, state or federal) job to teach people about disasters and help them make their homes and jobs safer from natural hazards. "

Disagree	○	○	○	○	○	Agree

19. What is the main language spoken most often in your home?

○ English
○ Lushootseed or other tribal language
○ Spanish
○ Asian / Pacific Island language
○ Other Indo-European language (Russian, Italian, etc.)
○ African language
○ Other:

20. What is your age?

○ Under 18 ○ 18-35 ○ 36-59 ○ 60 or older

21. What is your gender?

○ Male ○ Female

22. What is your level of education? *If homeschooled, please choose the closest level*

○ 8th grade or less ○ Some high school
○ High school graduate / GED ○ Some college or trade school
○ College degree ○ Post-graduate degree
○ Other:

23. How long have you lived or worked on the Tulalip lands?

○ Less than 1 year ○ One to five years
○ Six to ten years ○ Eleven to twenty years
○ More than twenty years

24. Do you own or rent your home?

- ○ Own
- ○ Rent
- ○ I don't live here / doesn't apply

25. Are you on Tribal-owned land or fee land?

- ○ Tribal
- ○ Fee
- ○ Not sure
- ○ I don't live here / doesn't apply

26. What is the income of your household before taxes?

- ○ Less than $20,000
- ○ $20,000 - $50,000
- ○ $50,001 - 100,000
- ○ More than $100,000

27. Do you have regular access to the Internet? *Please check all that apply*

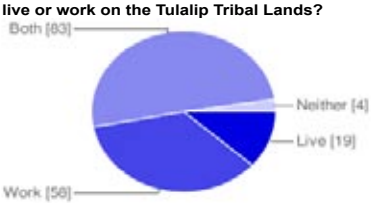
- ☐ At home
- ☐ At work
- ☐ On my mobile phone
- ☐ At the library or coffee shops
- ☐ Never
- ☐ At a friend or family member's house

Thank you for your participation!

158 responses

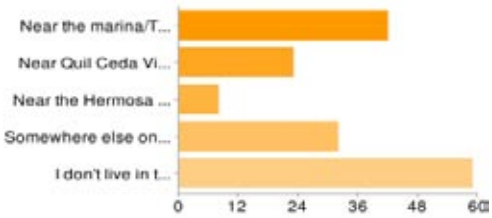
Summary See complete responses

Do you live or work on the Tulalip Tribal Lands?



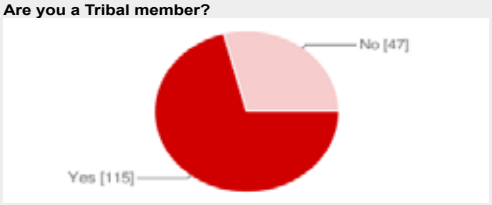
Live	**19**	12%
Work	**58**	35%
Both	**83**	51%
Neither	**4**	2%

Where do you live?



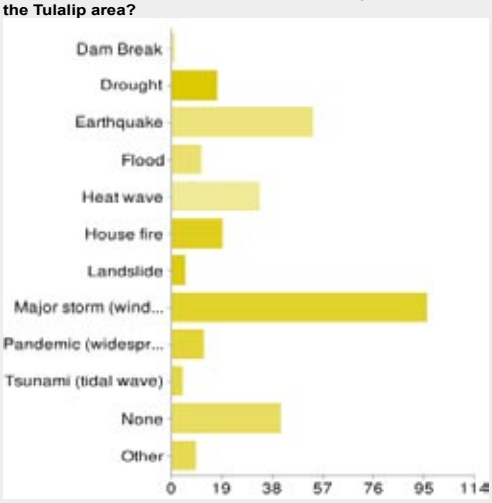
Near the marina/Tulalip Bay	**42**	26%
Near Quil Ceda Village	**23**	14%
Near the Hermosa Point bluffs	**8**	5%
Somewhere else on the tribal lands	**32**	20%
I don't live in the Tulalip area	**59**	36%

Are you a Tribal member?



Yes	**115**	71%
No	**47**	29%

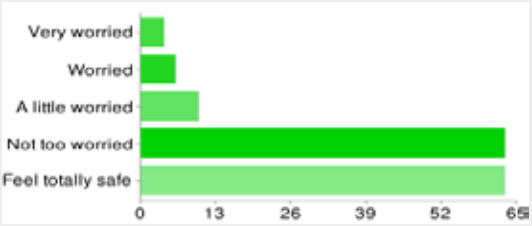
Which of these natural hazards has affected you or someone in your household in the last 20 years, in the Tulalip area?



Dam Break	**1**	1%
Drought	**17**	11%
Earthquake	**53**	33%
Flood	**11**	7%
Heat wave	**33**	21%
House fire	**19**	12%
Landslide	**5**	3%
Major storm (wind, rain, snow)	**96**	60%
Pandemic (widespread illness)	**12**	8%
Tsunami (tidal wave)	**4**	3%
None	**41**	26%
Other	**9**	6%

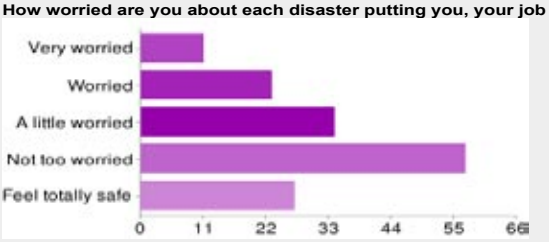
People may select more than one checkbox, so percentages may add up to more than 100%.

How worried are you about each disaster putting you, your job or your home in danger? - Dam break



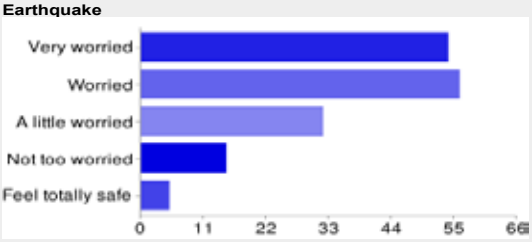
Very worried	**4**	3%
Worried	**6**	4%
A little worried	**10**	7%
Not too worried	**63**	43%
Feel totally safe	**63**	43%

How worried are you about each disaster putting you, your job or your home in danger? - Drought



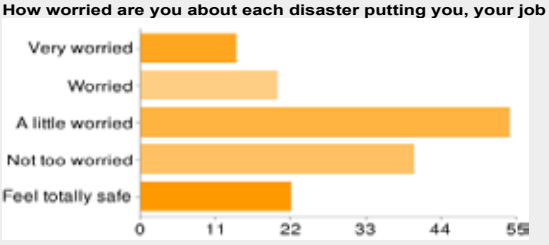
Very worried	**11**	7%
Worried	**23**	15%
A little worried	**34**	22%
Not too worried	**57**	38%
Feel totally safe	**27**	18%

How worried are you about each disaster putting you, your job or your home in danger? - Earthquake



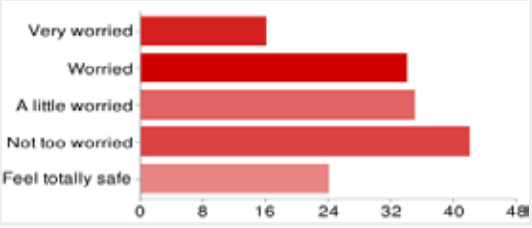
Very worried	**54**	33%
Worried	**56**	35%
A little worried	**32**	20%
Not too worried	**15**	9%
Feel totally safe	**5**	3%

How worried are you about each disaster putting you, your job or your home in danger? - Flood



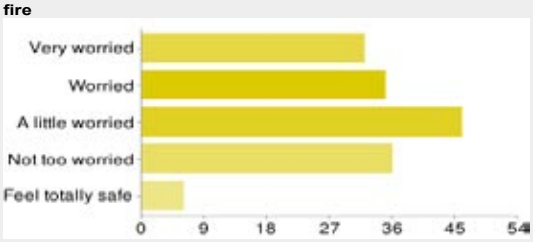
Very worried	**14**	9%
Worried	**20**	13%
A little worried	**54**	36%
Not too worried	**40**	27%
Feel totally safe	**22**	15%

How worried are you about each disaster putting you, your job or your home in danger? - Heat wave



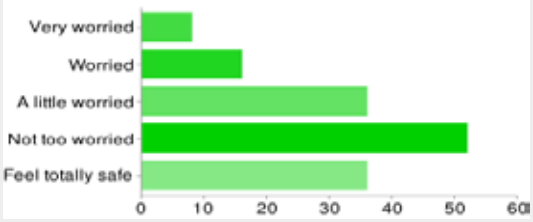
Very worried	**16**	11%
Worried	**34**	23%
A little worried	**35**	23%
Not too worried	**42**	28%
Feel totally safe	**24**	16%

How worried are you about each disaster putting you, your job or your home in danger? - House fire



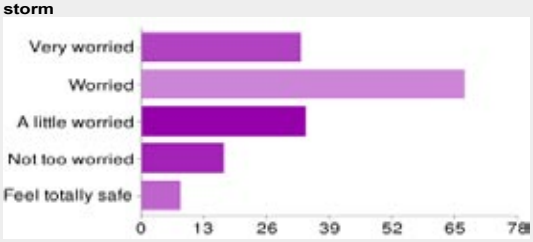
Very worried	**32**	21%
Worried	**35**	23%
A little worried	**46**	30%
Not too worried	**36**	23%
Feel totally safe	**6**	4%

How worried are you about each disaster putting you, your job or your home in danger? - Landslide



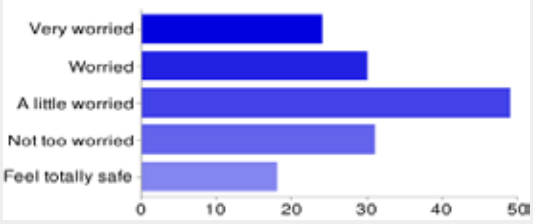
Very worried	**8**	5%
Worried	**16**	11%
A little worried	**36**	24%
Not too worried	**52**	35%
Feel totally safe	**36**	24%

How worried are you about each disaster putting you, your job or your home in danger? - Major storm



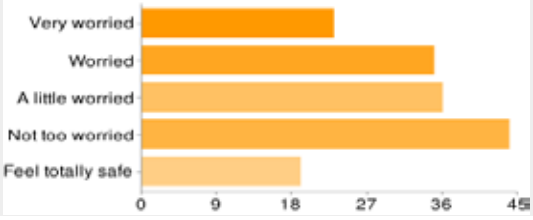
Very worried	**33**	21%
Worried	**67**	42%
A little worried	**34**	21%
Not too worried	**17**	11%
Feel totally safe	**8**	5%

How worried are you about each disaster putting you, your job or your home in danger? - Pandemic



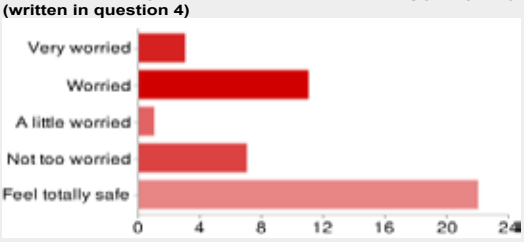
Very worried	**24**	16%
Worried	**30**	20%
A little worried	**49**	32%
Not too worried	**31**	20%
Feel totally safe	**18**	12%

How worried are you about each disaster putting you, your job or your home in danger? - Tsunami



Very worried	**23**	15%
Worried	**35**	22%
A little worried	**36**	23%
Not too worried	**44**	28%
Feel totally safe	**19**	12%

How worried are you about each disaster putting you, your job or your home in danger? - Other (written in question 4)

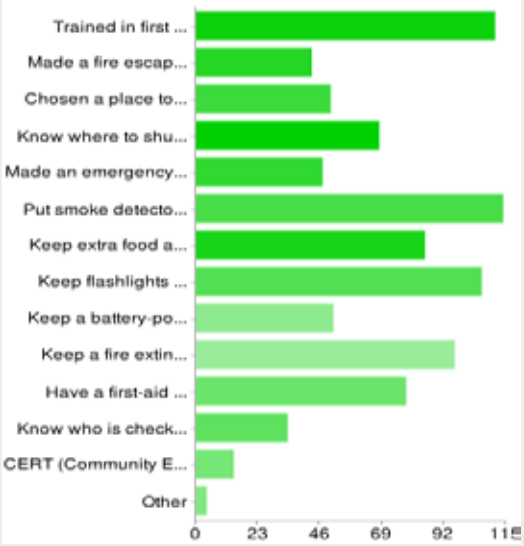


Very worried	**3**	7%
Worried	**11**	25%
A little worried	**1**	2%
Not too worried	**7**	16%
Feel totally safe	**22**	50%

How well do you think that you or your household are prepared to get through a disaster?

1 - Well prepared	**6**	4%
2	**17**	11%
3	**55**	34%
4	**41**	25%
5 - Not at all prepared	**42**	26%

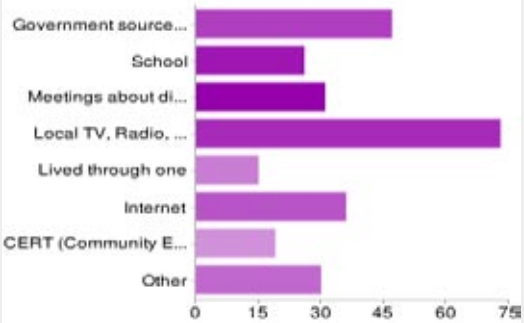
Which of these has someone in your home done to prepare for a disaster?



Trained in first aid/CPR	**111**	72%
Made a fire escape plan	**43**	28%
Chosen a place to meet outside	**50**	32%
Know where to shut off the gas, water, electricity, etc.	**68**	44%
Made an emergency kit	**47**	30%
Put smoke detectors on every floor	**114**	74%
Keep extra food and water to last 3 days	**85**	55%
Keep flashlights and batteries handy	**106**	68%
Keep a battery-powered or hand crank radio	**51**	33%
Keep a fire extinguisher	**96**	62%
Have a first-aid kit and extra medicine	**78**	50%
Know who is checking on older relatives who live alone	**34**	22%
CERT (Community Emergency Response Training)	**14**	9%
Other	**4**	3%

People may select more than one checkbox, so percentages may add up to more than 100%.

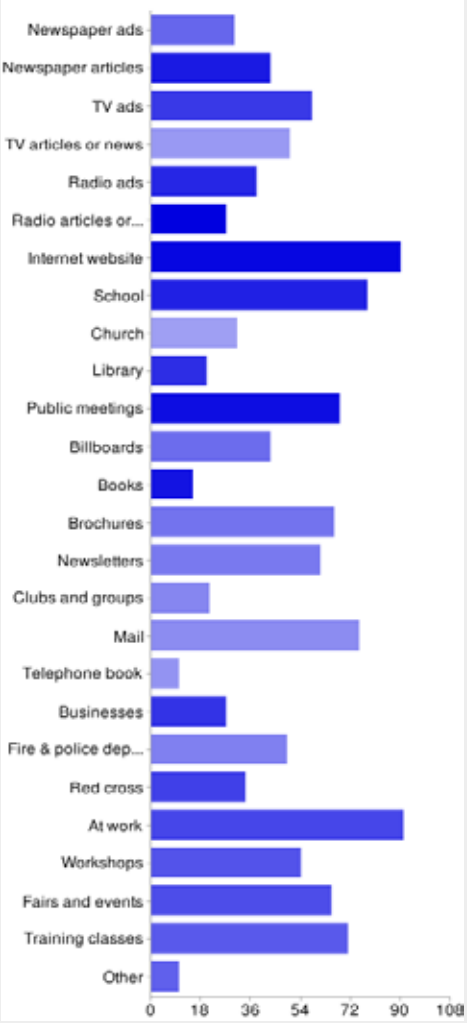
Where did you learn about how to be ready for a natural disaster?



Government source (speech, flyer, handout, etc.)	**47**	32%
School	**26**	17%
Meetings about disasters or safety	**31**	21%
Local TV, Radio, newspaper	**73**	49%
Lived through one	**15**	10%
Internet	**36**	24%
CERT (Community Emergency Response Training)	**19**	13%
Other	**30**	20%

People may select more than one checkbox, so percentages may add up to more than 100%.

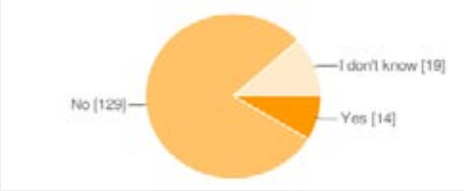
What would be the best ways to get information to your friends and family about how to prepare for a disaster?



Newspaper ads	**30**	19%
Newspaper articles	**43**	27%
TV ads	**58**	37%
TV articles or news	**50**	32%
Radio ads	**38**	24%
Radio articles or news	**27**	17%
Internet website	**90**	57%
School	**78**	49%
Church	**31**	20%
Library	**20**	13%
Public meetings	**68**	43%
Billboards	**43**	27%
Books	**15**	9%
Brochures	**66**	42%
Newsletters	**61**	39%
Clubs and groups	**21**	13%
Mail	**75**	47%
Telephone book	**10**	6%
Businesses	**27**	17%
Fire & police department	**49**	31%
Red cross	**34**	22%
At work	**91**	58%
Workshops	**54**	34%
Fairs and events	**65**	41%
Training classes	**71**	45%
Other	**10**	6%

People may select more than one checkbox, so percentages may add up to more than 100%.

Do you have flood insurance?

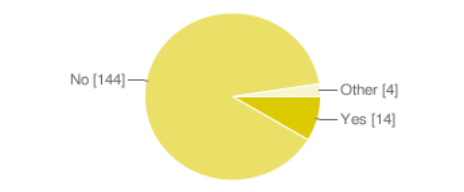


Yes	**14**	9%
No	**129**	80%
I don't know	**19**	12%

Do you have earthquake insurance?

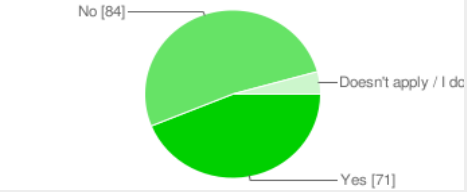
Yes	**23**	14%
No	**113**	70%
I don't know	**26**	16%

Have you had a problem getting insurance because of a natural hazard?



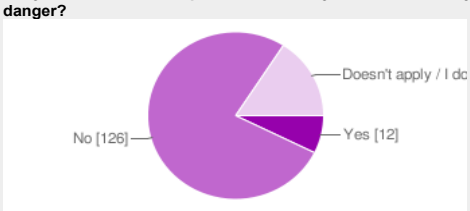
Yes	**14**	9%
No	**144**	89%
Other	**4**	2%

When you moved into your home, did you think about how a natural hazard might put you or your home in danger?



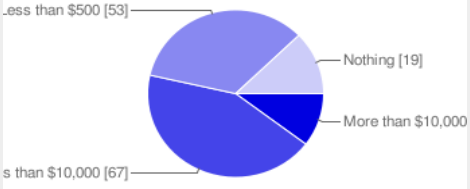
Yes	**71**	44%
No	**84**	52%
Doesn't apply / I don't live here / I've always lived here	**7**	4%

Did your landlord or the person who sold you the house tell you about any natural hazards that might put your home in danger?



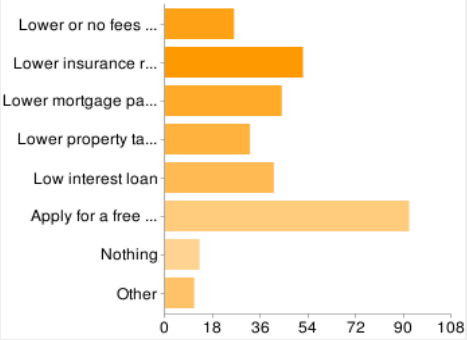
Yes	**12**	7%
No	**126**	77%
Doesn't apply / I don't live here / Always lived here	**26**	16%

How much would you spend to make your home safer from a natural disaster?



More than $10,000	**16**	10%
More than $500 but less than $10,000	**67**	43%
Less than $500	**53**	34%
Nothing	**19**	12%

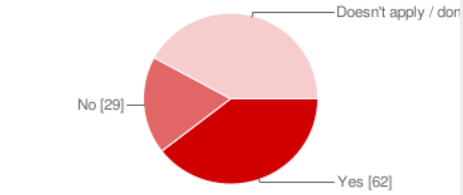
What would help you spend more on making your home safer?



Lower or no fees on the building permit	**26**	17%
Lower insurance rates	**52**	34%
Lower mortgage payments	**44**	29%
Lower property taxes, or a one-time tax refund	**32**	21%
Low interest loan	**41**	27%
Apply for a free grant to pay for the project	**92**	60%
Nothing	**13**	8%
Other	**11**	7%

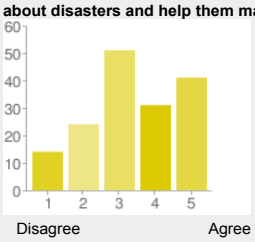
People may select more than one checkbox, so percentages may add up to more than 100%.

If your home was damaged many times or was at a high risk of being damaged (edge of a landslide area), would you agree to the Tribal government buying out your home?



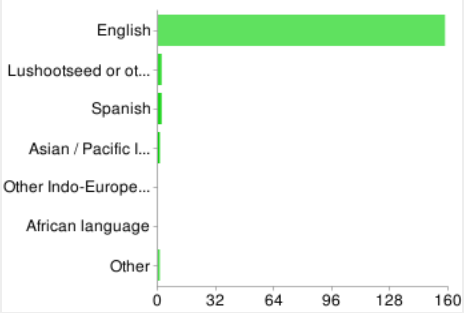
Yes	**62**	39%
No	**29**	18%
Doesn't apply / don't own my home / don't live here	**66**	42%

Do you agree with this sentence: "It is the government's (Tribal, state or federal) job to teach people about disasters and help them make their homes and jobs safer from natural hazards.



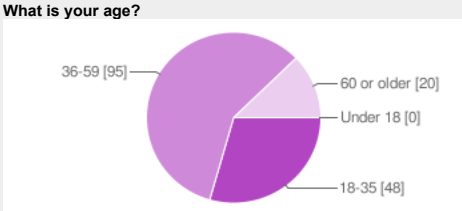
1 -	Disagree	**14**	9%
2		**24**	15%
3		**51**	32%
4		**31**	19%
5 -	Agree	**41**	25%

What is the main language spoken most often in your home?



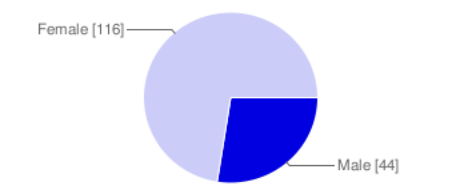
English	**158**	96%
Lushootseed or other tribal language	**2**	1%
Spanish	**2**	1%
Asian / Pacific Island language	**1**	1%
Other Indo-European language (Russian, Italian, etc.)	**0**	0%
African language	**0**	0%
Other	**1**	1%

What is your age?



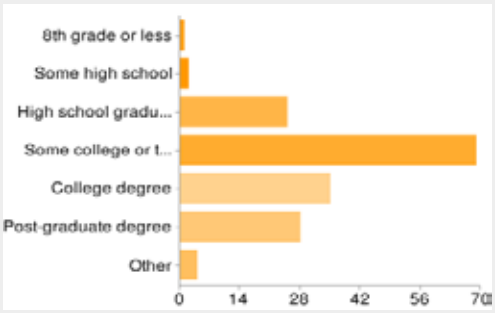
Under 18	**0**	0%
18-35	**48**	29%
36-59	**95**	58%
60 or older	**20**	12%

What is your gender?



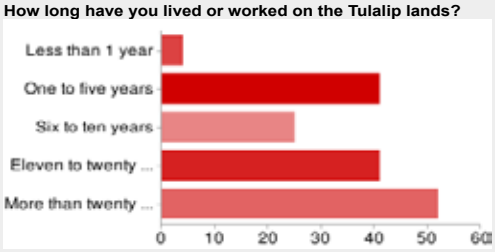
Male	**44**	28%
Female	**116**	73%

What is your level of education?



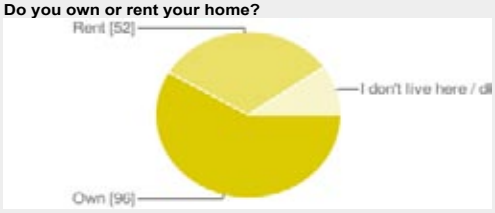
8th grade or less	**1**	1%
Some high school	**2**	1%
High school graduate / GED	**25**	15%
Some college or trade school	**69**	42%
College degree	**35**	21%
Post-graduate degree	**28**	17%
Other	**4**	2%

How long have you lived or worked on the Tulalip lands?



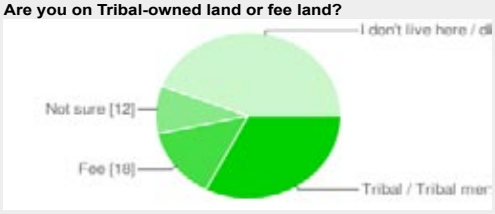
Less than 1 year	**4**	2%
One to five years	**41**	25%
Six to ten years	**25**	15%
Eleven to twenty years	**41**	25%
More than twenty years	**52**	32%

Do you own or rent your home?



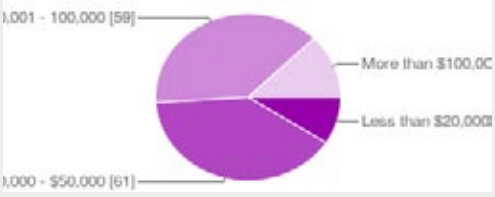
Own	**96**	59%
Rent	**52**	32%
I don't live here / doesn't apply	**16**	10%

Are you on Tribal-owned land or fee land?



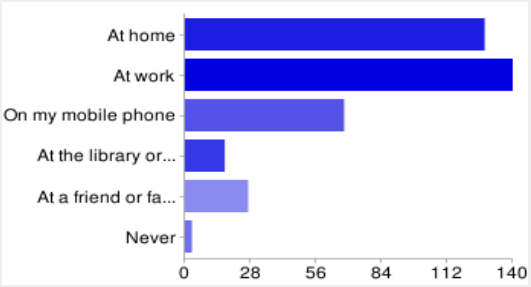
Tribal / Tribal member on trust land	**42**	26%
Fee	**18**	11%
Not sure	**12**	7%
I don't live here / doesn't apply	**57**	35%

What is the income of your household before taxes?



Less than $20,000	**14**	9%
$20,000 - $50,000	**61**	40%
$50,001 - 100,000	**59**	39%
More than $100,000	**19**	12%

Do you have regular access to the Internet?



At home	**128**	78%
At work	**140**	85%
On my mobile phone	**68**	41%
At the library or coffee shops	**17**	10%
At a friend or family member's house	**27**	16%
Never	**3**	2%

People may select more than one checkbox, so percentages may add up to more than 100%.

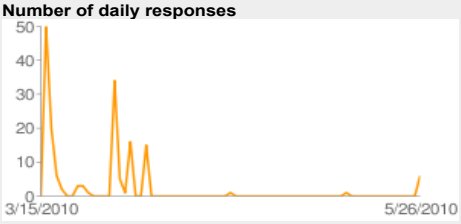
Please use this space for questions, comments, or any more information related to natural hazards and disaster planning.

Question: Are you on Tribal-owned land or fee land? My land is in trust, which I own not the Tribe so this question would not apply. I do not wish to disclose my income I would like to know the probability of earthquakes in our area, but for the most part I am glad Tulalip is looking into assistance. Wish insurance was cheaper... adding earthquake insurance nearly doubled the price... had it for awhile, but had to cancel it after a while becasue of the economy. The risk of unnatural hazards seems to be out pasing the natural ones. We either need to create a department to handle it -which I ...

Thank you for your participation!

For more information on the Tulalip Hazard Mitigation Plan 2010 Update, please visit the Office of Emergency Management website at http://www.tulaliptribes-nsn.gov/Home/Government/Departments/OfficeofEmergencyManagement.aspx

Number of daily responses



Write-in Comments

- "I would like to know the probability of earthquakes in our area, but for the most part I am glad Tulalip is looking into assistance."
- "Wish insurance was cheaper... adding earthquake insurance nearly doubled the price... had it for awhile, but had to cancel it after a while becasue of the economy."
- "The risk of unnatural hazards seems to be out pasing the natural ones. We either need to create a department to handle it -which I would gladly organize. Or, we can simply ad that to your plate. What do you think?"
- "I do believe the tribe should also have a plan set aside for families in need during a disaster. Clothing vouchers, hot meals, and even buy cots' for families to sleep on in the gym when lights go out, snow storms, etc. There are many homeless individuals who have no family they can count on during these down times. Having a open gym with hot meals, water and a place to rest is a great plan. I am more than happy to be a volunteer during those times. I am a single mother of three and one on the way so money wise, I can not contribute but as far as cooking, keeping children occupied, etc. I am more than happy to be counted on! Thank you! {SM}"
- "Tribal Forester was responsible for large equipment during disaster. He retired since the old plan was drawen up. Someone from Housing would be more in line to deploy Contractors in an emergencey."
- "Climate change and how it might affect those living in the shoreline area is an important natural hazard. Increases in ocean levels of 24 inches as is expected, when combined with tides and storm surges could cause significant damage and loss of tribal property. Citizens need to be prepared and the tribe should have a plan to address the hazards to avoid hardening all of the shorelines which is bad for traditional fish and shellfish harvest. Salmonid smolts, smelt and sand lance use the areas that can be cut off by resorting to excessive buttressing, rip rap and retaining walls which cut off natural processes."
- "Economic deaster was not included.my wife and kids do not live on tulalip but are members.if and when there is a crisis we as tulalip people will look upon the tribe for help, the united states government will not be here for indian people. Tulalip must be prepared for the amount of people in need. This issue I very important to me, because I know that the tribe is not prepared for anything catastrophic for its indian people."
- "we live in washington and we know that there is always some kind of crazy weather change, ranging from a snow storm (2008) to record breaking heat(2009). I think we need to know what meteorologists have to say about our extreme weather and why it's been so unpredictable? Why? Whats happening now? What will happen then? We are human beings and I believe if this information is stated our cognitive mind will retain it! Even if that person doesn't do anything about it then, a light bulb will go on when they here it the second time, third time and so forth. You could also discuss what the disadvantages are from not being prepared. How long can a family of five live with this much water/food? People will listen if you instill fear, becuase people fear what they do not know.....have a good one"
- "What if we live by trees and a few could fall with heavy winds on to a house? Could we call Tribal Natural Resourses for help with removeable?"
- "A community meeting to inform us of how important it is to be prepared for disaster. On-site home visits to all the housing sites to show homeowners where the shut off is for gas,water, electricity, etc. How much food, water and medication/personal items is required for an emergency and have a community shelter available. Have an emergency response team drive through the reservation to check each development in a disaster situation to see if there are any life-threatening emergencies, especially the Elders and Seniors."
- "Need more CPR training amongst tribal residents and workers."
- "I'm very glad to see this survey. It is very important for our community to know what we need to do in case of an earthquake and/or tsunami. When the earthquake in Chile happened, why

wasn't our community notifed of the tsunami. we need to have the Tulalip Police dept. notify our community and we also need tsunami warning sirens."

- "think there should be an organized boat plan that if bridges were damaged between here & everett, they could cross the bay to take people to higher level of care if needed"
- "I do believe that our tribe needs to get our tribal people prepared for Earthquake & or Tsunami. It is a major problem in other areas and it seems to be getting closer to us."
- "Thank you for this survey!"
- "We really need to make sure the tribe has a disaster plan and everyone knows where to meet. And have someone deligated to check elders and disabled people and a bus for everyone that does not have a car. I i am preparing my home getting food water and such. I have really been worried something big is going to happen and soon. I have been talking to everyone that they need to be ready. Thanks for your work you do."
- "The most significant threat is a major earthquake whereby the entire Marysville Trough becomes fluidized. This would destroy all but the most recently built-to-code buildings. It would also take out businesses upon which people in the area rely upon for income and shopping. A risk assessment should be done (if one does not already exist) and make it known to the community through news releases that address how people can best prepare."
- "see if the tribe could work out a deal so the tribal people could afford fire, food, earthquake insurance. and have community meetings to share with the tribal members who should we contact if help is needed, or to check on our families."
- "Presentations about the ""3 Days 3 Ways"" emergency preparedness would be great!"
- "I work at the Tulalip Health Clinic. Would be nice if we could get grant/funds to help prepare little first aid kits to distribute to patients."
- "no questions at this time."
- "Neighborhood meetings and plans should be implemented. Everyone should have an emergency kit with essential supplies - one at home, one at work and one in the car. They are easy to put together and inexpensive compared to NOT having one"
- "Thanks for your interest!"
- "I feel the Tribal Government should be training the departments or a designee to have there department ready for a disaster. Help with emergency kits prepare for situations at work when it does happen."
- "I am a Tulalip tribal member who lives in Marysville. My job requires me to work closely w/ Tulalip Tribes. I own tribal land and plan to build on it in the near future."
- "I would like more information on what my family would need in case of an earthquake...or somewhere we can all meet up and be safe...we are hearing of so many earthquakes and tsnamis taking place around the world...it only makes me worry about when/if we will have a tragedy... god forbid."
- "I really would like to know what to do in case of a earthquake/tsunami and would like to educate rest of my family. needs and quickest exit out of hermosa when disaster accures."
- "I think there is a lot more people could do to prepare for disasters. It is easy to not prepare because disasters are so infrequent. I have lived through earthquakes in Seattle and in Alaska, but none has been serious enough to have required a disaster preparedness kit. When The Big One hits, there will be many people unprepared, and I can be counted among them."
- "For Tulalip, it would be great to know emergency evacuation routes. If Marine Drive becomes impassable is there an alternative route? If not, as I expect, people should be informed what to do in case they cannot evacuate."
- "The public should be better-informed about the risk for Tsunamis, especially after an earthquake. I've seen Tsunami maps that show potentially flooding up The Quil (27th Avenue Northeast), but I don't think this is widely disseminated information. If a Tsunami happens, is there a siren

system in place or would we just hear a wall of rushing water? It would be good to know what to expect and tips on what to do in the event of a Tsunami."

- "Thank you for the opportunity to comment."
- "Because of the fact that Tulalip is built with only two main access road to the lower res area, plans on what to do in an emergency as far as access would be good to develop. Developing plans for particular types of major emergency such as Tsunami or earthquake would be very desireable since waiting till it happens would be a little late. We encounter medium storms on a regular basis so working out those problems would help in the other plans. We have never really had a major storm such as hurricane or anything like that. Many people probably think that the health center would be a good logical place for emergency plans. The problem with that is they are not planning on being part of disaster plans. They are just barely above the waterline and might not be a good location for that kind of thing. More likely now is the new admin building but it has an issue with access. Work on some things along those lines for major disasters. "
- "Thank you for raising awareness about the need to be prepared! It's so important ... I believe we only think about being prepared AFTER we see a natural diaster strike somewhere in the world. It hits home that I am NOT prepared for a natural diaster ... I want to be! I will work on being prepared and speak with my family about being prepared. Thank you again. "
- "I think major earthquake preparedness is most important "
- "concerns of the children who run around with no supervision, never know when something can happen and children are out playing or just not going home."
- "Many I work with do not read the paper, even the See-Yaht-Sub. But they go to community functions, an excellent place to get disaster info out. I have found people are more worried about things that probably will not happen to them disaster-wise, than things more likely (flood, quake)"
- "Recommend to provide information, demonstration, and training about natural & man-made disaster and emergency preparedness & response on TV, school, workplace, shopping mall, and public places."
- "Just myself & my wife nowadays. When we owned a house on the Rez and were raising 4 children here I always kept 12-36 gal. of drinking water. 20-30 gal. of untreated water for wash, etc. approx 30 days of non-perishable food, enough to make lg. reg. meals w/dessert & snacks for 6-8 people (we usually had 1 or 2 extra kids staying with us) a month of extra meds. a 1st aid kit w/Lidocaine needles, scalpels, reg & dissolving stitch kits, rotated antibiotics, mass bandages & tape, peroxide, alcohol, eye wash, ear drops etc..., also 50+ 5 gal bucket bleach and a back-up 7 day (for six people) food-water-meds, just in case, knives, hatchets, axes, a .22 rifle w/extra box of ammo, parkas, insulated bibs, insulated snow boots, wool socks & sweaters w/caps. Always rotated items whenever possible. We kept this up for 13 of the 14 1/2 years we lived out here in our house. Lots of family & friends thought we were paranoid (watched too many 'end of the world' movies). We just thought of it as being prepared to take care of our children. "
- "Any way that the information can get to people is the major solution, whether it be TV, radio, flyer in the mailbox, it doesn't matter so long as the word gets out in a timely manner. In Florida we had hurricane preparedness beaten into us from May thru December in all medias."
- "I stay in a homeless shelter"

Appendix C: Critical Facilities

Tulalip Hazard Mitigation Plan 2010 Update Page 1 Critical Buildings

OBJECTID	F_CODE	HEIGHT	SQ FT	TRIBAL	RESTROOMS	KITCHEN	SHOWER	GENERATOR	BLDG_NAME
1	RESTAURANT	9	5964	NO	YES	YES	NO		MCDONALDS
2	RESTAURANT	18	3915	NO	YES	YES	NO		ARBYS
3	OFFICES	28	11350	YES	YES	NO	NO	YES	HIBULB CULTURAL CENTER
4	RESTAURANT	19	3253	NO	YES	YES	NO		WENDYS
5	HOTEL	42	14492	NO	YES	YES	YES		HOLIDAY INN
6	SCHOOL	13	42929	YES	YES	UNKNOWN	UNKNOWN		ART AND TECHNOLOGY
7	SCHOOL	13	62868	YES	YES	UNKNOWN	UNKNOWN		QUIL CEDA ELEM SCHOOL
8	SCHOOL	24	10417	YES	YES	UNKNOWN	YES		ADMINISTRATION AND GYMNASIUM
9	SCHOOL	28	13626	YES	YES	UNKNOWN	UNKNOWN		HERITAGE HIGH SCHOOL
10	OFFICES	30	13211	YES	YES	YES			TULALIP DATA SERVICES
11	LIBRARY	26	39459	NO	YES	NO	NO		SNOHOMISH COUNTY LIBRARY
12	RETAIL STORE	8	135401	NO	YES	UNKNOWN	UNKNOWN		HOME DEPOT
13	RETAIL STORE	25	238464	NO	YES	YES	UNKNOWN		WAL*MART
14	CASINO	13	215327	YES	YES	YES	UNKNOWN		TULALIP CASINO
15	INDUSTRIAL	8	131043	NO	YES	NO	UNKNOWN		B/E AEROSPACE
16	INDUSTRIAL	6	5946	NO	YES	NO	UNKNOWN		H.D. FOWLER
17	INDUSTRIAL	17	48931	NO	YES	NO	UNKNOWN		NATIONAL BARRICADE
18	INDUSTRIAL	32	26884	NO	YES	NO	UNKNOWN		H.D. FOWLER
19	INDUSTRIAL	29	9461	NO	YES	NO	UNKNOWN		H.D. FOWLER
20	OFFICES	13	3050	YES	YES	NO	NO		
21	OFFICES	18	19530	YES	YES	NO	NO	YES	SOUTH LOT
22	HOTEL	35	27697	NO	YES	YES	YES		BEST WESTERN
23	RESTAURANT	19	4145	NO	YES	YES	NO		TACO TIME
24	RETAIL STORE	29	5086	YES	YES	NO	UNKNOWN		LIQUOR STORE & SMOKE SHOP
25	RETAIL STORE	21	25410	NO	YES	UNKNOWN	NO		
26	RETAIL STORE	22	16975	NO	YES	UNKNOWN	NO		
27	OFFICES	14	7955	YES	YES	NO	NO		QUIL CEDA VILLAGE ADMIN
28	UTILITY - SEWER	28	5128	YES	NO	NO	NO		
29	RESTAURANT	28	7170	NO	YES	YES	NO		BOBS BURGER
30	RETAIL - RESTAURANTS	34	42745	NO	YES	YES	NO		RETAIL CENTER
31	BANK	25	6245	NO	YES	YES	NO		KEY BANK
32	RETAIL - RESTAURANTS	15	500550	NO	YES	YES	UNKNOWN		SEATTLE PREMIUM OUTLETS
33	STORAGE	17	1937	YES	UNKNOWN	NO	NO		QCV MAINTENANCE
34	STORAGE	23	2706	YES	UNKNOWN	NO	NO		QCV MAINTENANCE
35	GAS STATION	24	6389	NO	YES	NO	NO		
36	OFFICES	30	4579	YES	YES	NO	NO		GRAPHIC DESIGN
37	SCHOOL	24	6870	YES	YES	UNKNOWN	UNKNOWN		MONTESSORI SCHOOL
38	SCHOOL	28	5082	YES	YES	UNKNOWN	UNKNOWN		MONTESSORI SCHOOL
39	SPIRITUAL PLACE	26	5765	YES	NO	NO	NO		LONGHOUSE
40	OFFICES	19	4855	YES	YES	NO	UNKNOWN		OLD DAY CARE
41	HEALTH CLINIC	31	28062	YES	YES	YES	UNKNOWN	YES	HEALTH CLINIC
42	OFFICES	22	6356	YES	YES	NO	NO		MARINA BUILDING
43	STORAGE	16	1884	YES	UNKNOWN	NO	NO		
44	STORAGE	24	1949	YES	UNKNOWN	NO	NO		
45	OFFICES	18	8409	YES	YES	NO	NO		
46	STORAGE	13	1308	YES	UNKNOWN	NO	NO		
47	OFFICES	27	4052	YES	YES	NO	NO		OLD COMMUNICATIONS BLDG
48	OFFICES	16	5579	YES	YES	NO	NO		OLD TANF BLDG
49	OFFICES	14	5552	YES	YES	NO	UNKNOWN		NATURAL RESOURCES
50	OFFICES	17	4895	NO	YES	NO	UNKNOWN		
51	OFFICES	20	6426	NO	YES	NO	UNKNOWN		CHILD SUPPORT ENFORCEMENT
52	PUBLIC HOUSING	15	970	YES	YES	YES	YES		SOCIAL SVCS HOMELESS SHELTER
53	PUBLIC HOUSING	17	766	YES	YES	YES	YES		SOCIAL SVCS HOMELESS SHELTER
54	PUBLIC HOUSING	15	946	YES	YES	YES	YES		SOCIAL SVCS HOMELESS SHELTER

OBJECTID	F_CODE	HEIGHT	SQ FT	TRIBAL	RESTROOMS	KITCHEN	SHOWER	GENERATOR	BLDG_NAME
55	PUBLIC HOUSING	17	780	YES	YES	YES	YES		SOCIAL SVCS HOMELESS SHELTER
56	PUBLIC HOUSING	13	976	YES	YES	YES	YES		SOCIAL SVCS HOMELESS SHELTER
57	PUBLIC HOUSING	13	788	YES	YES	YES	YES		SOCIAL SVCS HOMELESS SHELTER
58	OFFICES	17	4160	YES	YES	NO	UNKNOWN		TRANSITIONAL HOUSE
59	OFFICES	21	5264	YES	YES	NO	UNKNOWN		FAMILY AND YOUTH SERVICES
60	OFFICES	23	2201	YES	YES	NO	YES		SOCIAL SVCS HOMELESS SHELTER
61	OFFICES	27	13253	YES	YES	NO	UNKNOWN		BEDA?CHELH
62	COMMUNITY & SPIRITUAL	22	6761	YES	YES	NO	NO		ECEAP PRESCHOOL
63	OFFICES	13	1161	YES	YES	NO	NO		
64	OFFICES	13	1077	YES	YES	NO	NO		
65	OFFICES	17	5113	YES	YES	NO	UNKNOWN		FAMILY AND YOUTH SERVICES
66	OFFICES	13	1330	YES	YES	NO	NO		
67	OFFICES	10	932	YES	YES	NO	NO		
68	UTILITY - SEWER	30	3371	YES	NO	NO	NO		
69	INDUSTRIAL	17	24223	NO	YES	NO	UNKNOWN		NATIONAL BARRICADE
70	OFFICES	18	1603	YES	YES	NO	NO		
71	UTILITY - SEWER	8	121	YES	NO	NO	NO		
72	BINGO PARLOR	37	20952	YES	YES	YES	NO	YES	TULALIP BINGO
73	GAS STATION	17	1062	NO	YES	NO	NO		76
74	RETAIL STORE	17	2737	NO	YES	NO	NO		76
75	RETAIL STORE	22	5252	NO	YES	UNKNOWN	NO		
76	RETAIL STORE	23	4402	NO	YES	UNKNOWN	UNKNOWN		
77	BANK	18	6503	NO	YES	NO	NO		BANK OF AMERICA
78	GAS STATION	18	5915	NO	YES	NO	NO		MIRASTAR
79	TRUCK STOP	28	14752	NO	YES	UNKNOWN	UNKNOWN		DONNAS TRUCK STOP
80	OFFICES	12	2377	YES	YES	NO	UNKNOWN		TANF
81	STORAGE	24	12079	YES		UNKNOWN	UNKNOWN		QCV MAINTENANCE
82	STORAGE	19	1784	YES	UNKNOWN	NO	NO		QCV MAINTENANCE
83	STORAGE	21	1106	YES	UNKNOWN	NO	NO		QCV MAINTENANCE
84	STORAGE	17	4103	YES	UNKNOWN	NO	NO		QCV MAINTENANCE
85	RESTAURANT	19	3953	NO	YES	YES	NO		MCDONALDS
86	STORAGE	26	16181	YES	UNKNOWN	NO	NO		CASINO MAINTENANCE
87	POLICE STATION	20	5668	NO	YES	NO	UNKNOWN		WASHINGTON STATE PATROL
88	SCHOOL	0	15383	YES	YES	UNKNOWN	UNKNOWN		10TH STREET MIDDLE SCHOOL
89	CHURCH	30	15499	NO	YES	UNKNOWN	UNKNOWN		MORMON CHURCH
90	RECREATIONAL	13	3126	NO	YES	UNKNOWN	UNKNOWN		
91	CHURCH	26	3612	NO	YES	UNKNOWN	UNKNOWN		TULALIP CHURCH OF GOD
92	SCHOOL	19	5906	YES	YES	UNKNOWN	UNKNOWN		TULALIP DAY CARE CENTER
93	RETAIL STORE	24	3826	NO	YES	YES	NO		PREIST POINT GROCERY
94	RETAIL STORE	13	4493	NO	YES	UNKNOWN	NO		TOTEM GROCERY
95	GAS STATION	17	1021	NO	YES	NO	NO		
96	WATER TANK	52	2112	YES	NO	NO	NO		
97	WATER TANK	62	541	YES	NO	NO	NO		
98	OFFICES	19	4735	YES	YES	NO	NO		
99	OFFICES	13	1559	YES	YES	NO	NO		
100	OFFICES	18	1319	YES	YES	NO	NO		
101	SENIOR CENTER	15	6349	YES	YES	UNKNOWN	UNKNOWN		ELDERS / SENIOR SERVICES
102	SENIOR CENTER	21	8051	YES	YES	UNKNOWN	UNKNOWN		ELDERS / SENIOR SERVICES
103	CHURCH	31	4579	YES	YES	NO	NO		ST ANNES CATHOLIC CHURCH
104	PUBLIC HOUSING	26	7346	YES	YES	YES	YES		SENIOR HOUSING
105	PUBLIC HOUSING	14	2446	YES	YES	YES	YES		SENIOR HOUSING
106	PUBLIC HOUSING	14	2485	YES	YES	YES	YES		SENIOR HOUSING
107	PUBLIC HOUSING	14	2489	YES	YES	YES	YES		SENIOR HOUSING
108	PUBLIC HOUSING	13	2479	YES	YES	YES	YES		SENIOR HOUSING

Tulalip Hazard Mitigation Plan 2010 Update Page 3 Critical Buildings

OBJECTID	F_CODE	HEIGHT	SQ FT	TRIBAL	RESTROOMS	KITCHEN	SHOWER	GENERATOR	BLDG_NAME
109	PUBLIC HOUSING	18	2592	YES	YES	YES	YES		SENIOR HOUSING
110	PUBLIC HOUSING	25	2832	YES	YES	YES	YES		
111	PUBLIC HOUSING	13	4381	YES	YES	YES	YES		
112	HORSE BARN	32	22650	NO	NO	NO	NO		
113	CHURCH	22	5904	NO	YES	UNKNOWN	UNKNOWN		
114	WATER TANK	20	361	NO	NO	NO	NO		
115	WATER TANK	19	304	NO	NO	NO	NO		
116	UTILITY - WATER	9	733	NO	NO	NO	NO		
117	UTILITY - WATER	10	313	NO	NO	NO	NO		
118	UTILITY - WATER	0	451	NO	NO	NO	NO		
119	UTILITY - WATER	7	280	NO	NO	NO	NO		
120	UTILITY - WATER	0	205	NO	NO	NO	NO		
121	UTILITY - WATER	18	263	NO	NO	NO	NO		
122	UTILITY - WATER	0	288	NO	NO	NO	NO		
123	WATER TANK	0	359	NO	NO	NO	NO		
124	WATER TANK	0	717	NO	NO	NO	NO		
125	WATER TANK	0	5023	YES	NO	NO	NO		
126	WATER TANK	0	7416	YES	NO	NO	NO		
127	GAS STATION	0	9617	YES	YES	NO	NO		TULALIP GAS STATION
128	STORAGE - OFFICES	0	20413	YES	YES	NO	NO		
129	UTILITY - SEWER	0	4522	YES	NO	NO	NO		
130	HOTEL	13	112080	YES	YES	YES	YES	YES	TULALIP RESORT
131	MUSEUM	0	21985	YES	YES	UNKNOWN	UNKNOWN	YES	TULALIP MUSEUM
132	UTILITY - ELECTRIC	0	35617	NO	NO	NO	NO		ELECTRICAL SUBSTATION
133	OFFICES	0	38673	YES	YES	YES	YES	YES	TULALIP ADMINISTRATION BLDG
134	OFFICES	14	2031	YES	YES	NO	NO		OLD FINANCE BLDG
135	OFFICES	10	4295	YES	YES	NO	UNKNOWN		RECYCLING / BLDG MAINTENANCE
136	OFFICES	10	2480	YES	YES	NO	NO		AUTO MAINTENANCE
137	OFFICES - GYMNASIUM	14	22544	YES	YES	YES	YES		OLD ADMIN BLDG AND GYM
138	YOUTH CENTER	22	4120	YES	YES	UNKNOWN	NO		YOUTH SERVICES
139	POLICE STATION	13	3107	YES	YES	NO	UNKNOWN	YES	TULALIP POLICE
140	FIRE STATION	8	7962	NO	YES	UNKNOWN	UNKNOWN		SNOHOMISH COUNTY FIRE STATION
141	SCHOOL	20	54343	YES	YES	UNKNOWN	UNKNOWN		TULALIP ELEMENTARY
142	INDUSTRIAL	27	52114	NO	YES	NO	UNKNOWN		NATIONAL BARRICADE
143	WATER TANK	27	265	NO	YES	NO	NO		NATIONAL BARRICADE
144	WATER TANK	27	271	NO	YES	NO	NO		NATIONAL BARRICADE
145	CASINO	9	57486	YES	YES	YES	UNKNOWN	YES	QUIL CEDA CREEK CASINO
146	POLICE STATION	26	22538	NO	YES	NO	UNKNOWN		WASHINGTON STATE PATROL
147	SCHOOL	15	21339	YES	YES	UNKNOWN	UNKNOWN		BOYS AND GIRLS CLUB
148	SCHOOL	15	6940	YES	YES	UNKNOWN	UNKNOWN		HERITAGE SCHOOL
149	SCHOOL	15	12684	YES	YES	UNKNOWN	UNKNOWN		ADULT EDUCATION CENTER
150	SCHOOL	15	12684	YES	YES	UNKNOWN	UNKNOWN		ADULT EDUCATION CENTER
151	SCHOOL	15	12684	YES	YES	UNKNOWN	UNKNOWN		ADULT EDUCATION CENTER
152	SCHOOL	15	12684	YES	YES	UNKNOWN	UNKNOWN		ADULT EDUCATION CENTER
153	SCHOOL	15	12684	YES	YES	UNKNOWN	UNKNOWN		ADULT EDUCATION CENTER
154	SCHOOL	15	12684	YES	YES	UNKNOWN	UNKNOWN		ADULT EDUCATION CENTER
155	SCHOOL	15	12684	YES	YES	UNKNOWN	UNKNOWN		ADULT EDUCATION CENTER
156	OFFICES	18	8409	YES	YES	NO	NO		

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Appendix D: Resolution Adopting Plan

Note: this is to be considered an example of what the resolution will be like, once it has been formally approved by Tribal Council. This is a copy of the Resolution adopting the 2006 plan. It will be updated with the new resolution once approved.

THE TULALIP TRIBES
Resolution No. 2006- 221

WHEREAS the Board of Directors is the governing body of the Tulalip Tribes under the Constitution and Bylaws of the Tribe approved by the United States Commissioners of Indian Affairs and the Secretary of Interior on January 24, 1936, Pursuant to the Act of June 18, 1934 (48 Stat. 984, 25 U.S.C & 476); and

WHEREAS, the Tulalip Tribes has a duty to create a "Tulalip Tribes Hazard Mitigation Plan" as required by Federal Disaster Mitigation Act (DMA) of 2000 (Public Law 106-390) commonly known as the "2000 Stafford Act" which was approved by Congress on October 10, 2000; and

WHEREAS, the Tulalip Tribes has the need to permanently eliminate or reduce the long-term risk to human life and property from natural and human caused hazards; and

WHEREAS, the Tulalip Tribes Hazard Mitigation Plan falls under the jurisdiction of the Tulalip Tribes Board of Directors. The Tulalip Tribes Board of Directors will provide oversight to emergency management activities and those ordinances, resolutions, contracts, rules and regulations that are necessary for emergency management (The Tulalip Tribes Comprehensive Emergency Management Plan 2005).

NOW THEREFORE BE IT ENACTED by the Board of Directors of the Tulalip Tribes, to support the request for the adoption of the "The Tulalip Tribes State-Level Hazard Mitigation Plan" as written.

ADOPTED by the Board of Directors of the Tulalip Tribes of Washington at a regular meeting assembled on the 11 of August, 2006, with a quorum present by a vote of 5 for and 0 against.

THE TULALIP TRIBES OF WASHINGTON

Stanley G. Jones Sr., Chairman

ATTEST:

Marie Zackuse

Marie Zackuse, Secretary

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Appendix E: Pre-Adoption Letter from FEMA

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Appendix F: Sources of Funding

Catalog of Federal Disaster Assistance (CFDA) numbers are provided to help you find additional information on the CFDA website.

Disaster-Specific Assistance Programs

- Community Disaster Loan Program
  (CDFA Number: 97.03)
  Provides funds to any eligible jurisdiction in a designated disaster area that has suffered a substantial loss of tax and other revenue.
  (Localities)

- Fire Management Assistance Grant Program
  (CDFA Number: 97.046)
  Assistance for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands, which threaten such destruction as would constitute a major disaster.
  (States, local and tribal governments)

- Hazard Mitigation Grant Program
  (CDFA Number: 97.039)
  Provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration.
  (States, localities and tribal governments; certain private-nonprofit organizations or institutions; authorized tribal organizations; and Alaska native villages or organizations via states)

- Public Assistance Grant Program
  (CDFA Number: 97.036)
  Provides assistance to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President.
  (States, localities, tribal governments and private-nonprofit organizations via states)

- Reimbursement for Firefighting on Federal Property
  (CDFA Number: 97.016)
  Provides reimbursement only for direct costs and losses over and above normal operating costs.
  (States, localities, tribal governments and fire departments)

Hazard-Related Grants and Assistance Programs

- Community Assistance Program, State Support Services Element (CAP-SSSE)
  (CDFA Number: 97.023)
  Provides funding to States to provide technical assistance to communities in the National Flood Insurance Program (NFIP) and to evaluate community performance in implementing NFIP floodplain management activities.
  (States)

- Flood Mitigation Assistance Program
  (CDFA Number: 97.029)
  Provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP.
  (States and localities)

- National Dam Safety Program
  (CDFA Number: 97.041)
  Provides financial assistance to the states for strengthening their dam safety programs.
  (States)

- National Earthquake Hazards Reduction Program (NEHRP)
  (CDFA Number: 97.082)
  Provides financial assistance to the states for strengthening their dam safety programs.
  (States)

- National Flood Insurance Program
  (CDFA Number: 97.022)
  Enables property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages.
  (States, localities, and individuals)

- Pre-Disaster Mitigation Program
  (CDFA Numbers: 97.017)
  Provides funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.
  (States, localities and tribal governments)

- Repetitive Flood Claims Program
  (CDFA Number: 97.092)
  Provides funding to States and communities to reduce or eliminate the long-term risk of flood damage to structures insured under the NFIP that have had one or more claims for flood damages, and that can not meet the requirements of the Flood Mitigation Assistance (FMA) program for either cost share or capacity to manage the activities.
  (States and localities)

Non-Disaster Programs

- Chemical Stockpile Emergency Preparedness Program
  (CDFA Number: 97.040)
  Improves preparedness to protect the people of certain communities in the unlikely event of an accident involving this country's stockpiles of obsolete chemical munitions.
  (States, localities and tribal governments)

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
  (CDFA Numbers: 97.02, 97.021)
  Supports programs designed to improve capabilities associated with oil and hazardous materials emergency planning and exercising.
  (States, localities and tribal governments, U.S. territories, state emergency response committee's (SERCs) and LEPCs)

- Cooperating Technical Partners
  (CDFA Number: 97.045)
  Provides technical assistance, training, and/or data to support flood hazard data development activities.
  (States, localities, tribal governments)

- Emergency Food and Shelter Program
  (CDFA Number: 97.024)
  Supplements the work of local social service organizations within the United States, both private and governmental, to help people in need of emergency assistance.
  (Private-Nonprofit community and government organizations)

- Map Modernization Management Support
  (CDFA Number: 97.070)
  Provides funding to supplement, not supplant, ongoing flood hazard mapping management efforts by the local, regional, or State agencies.
  (States and localities)

- Superfund Amendments and Reauthorization Act
  Provides funding for training in emergency planning, preparedness, mitigation, response, and recovery capabilities associated with hazardous chemicals.
  (Public officials, fire and police personnel, medical personnel, first responders, and other tribal response and planning personnel.

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Appendix G: References

Snohomish County Community Transit, Tulalip bus routes 221 & 222. http://www.commtrans.org/

Tulalip Tribes web site. http://www.tulaliptribes-nsn.gov/

Tulalip Tribes 2009 Comprehensive Land Use Plan (draft). Provided by Tulalip Data Services.

USGS streamflow data for Washington, as of 2004. http://wa.water.usgs.gov/data/realtime/adr/2004/

Washington State Hazard Mitigation Plan, 2004. http://emd.wa.gov/6-mrr/mit-rec/mit/mit-pubs-forms/hazmit-plan/hazmit-plan-idx.htm

"Water Resources of the Tulalip Indian Reservation and Adjacent Area, Snohomish County, Washington, 2001-03" . Prepared in cooperation with the Tulalip Tribes. By Lonna M. Frans and David L. Kresch, U.S. GEOLOGICAL SURVEY. Scientific Investigations Report 2004-5166. http://pubs.usgs.gov/sir/2004/5166/