



SQUAXIN ISLAND TRIBE

RESOLUTION NO. 04-13

of the

SQUAXIN ISLAND TRIBAL COUNCIL

WHEREAS, the Squaxin Island Tribal Council is the Governing Body of the Squaxin island Tribe, its members, its lands, its enterprises and its agencies by the authority of the Constitution and Bylaws of the Squaxin Island Tribe, as approved and adopted by the General Body and the Secretary of the Interior on July 8, 1965; **and**

WHEREAS, under the Constitution, Bylaws and inherent sovereignty of the Tribe, the Squaxin island Tribal Council is charged with the duty of protecting the health, security, education and general welfare of the tribal members, and with protecting and managing the lands and treaty resources and rights of the Tribe; **and**

WHEREAS, the Squaxin Island Tribal Council has been entrusted with the creation of ordinances and resolutions in order to fulfill their duty of protecting the health, security, education, and general welfare of tribal members, and of protecting and managing the lands and treaty resources of the Tribe; **and**

WHEREAS, the Squaxin Island Tribal Council has identified the enhancement of Squaxin emergency management and community preparedness as a top priority; **and**

WHEREAS, the Squaxin Island Tribal Council is aware of a U.S. Department of Homeland Security opportunity to develop a Hazard Identification Vulnerability Analysis (HIVA) for the Squaxin Island Tribe as a federal requirement for funding and collaboration; **and**

WHEREAS, the Squaxin Island Tribal Council is aware that an initial Squaxin HIVA has been developed as a collaborative effort that includes the Squaxin Departments of Planning, Community Development, Public Safety & Justice, Cultural Resources, Natural Resources, and Health and Human Services, and the U.S. Department of Homeland Security, Region 3 that includes six tribes, five counties, and five cities; **and**

WHEREAS, the Squaxin Island Tribal Council is aware that there has been sufficient community input in the development of an initial Squaxin HIVA.

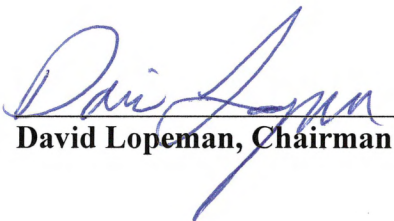
Page Two

Resolution #04 - 13

NOW THEREFORE BE IT RESOLVED, that the Squaxin Island Tribal Council does hereby approve the submittal of an initial Squaxin HIVA to the U.S. Department of Homeland Security for the purpose of enhancing Squaxin emergency management and community preparedness programs.

CERTIFICATION

The Squaxin Island Tribal Council does hereby certify that the foregoing Resolution was adopted at the regular meeting of the Squaxin Island Tribal Council, held on this 11th day of March 2004, at which time a quorum was present and was passed by a vote of 5 for and 0 against with 0 abstentions.



David Lopeman, Chairman

Attested by: 

Vince Henry Sr., Secretary



Andy Whitener, Vice Chairman

Hazard Identification Vulnerability Analysis (HIVA) for the Squaxin Island Tribe

I. INTRODUCTION

The Hazard Identification Vulnerability Analysis (HIVA) is an element of an all-hazard mitigation effort allowing emergency managers to set goals according to the public need for protection. This document enhances public and private agency understanding and awareness, influencing the adoption of hazard mitigation programs. The findings revealed in the HIVA also serve as a basis for community preparedness as well as influencing effective response and recovery programs.

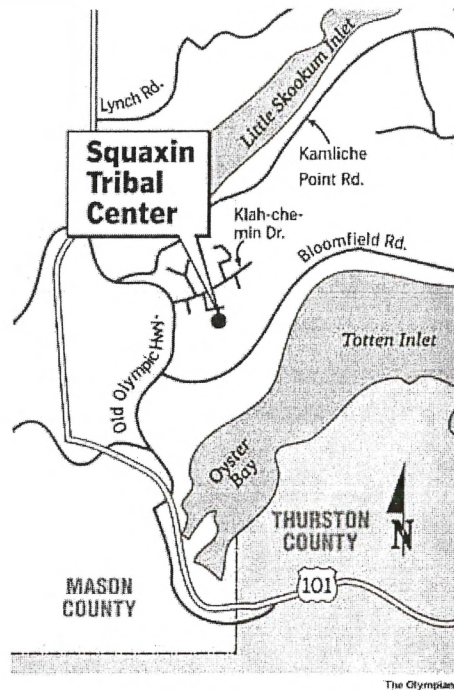
This analysis covers hazards most threatening to The Squaxin Island Tribe (a.k.a. the Tribe) as determined by history, geologic projections, and social and technological trends.

“We envision a culturally and economically strong community of self-governing, resilient people, united by shared values and traditions.”

- Squaxin Island Tribe vision statement

For as long as can be remembered, the ancestors of those who became recognized as the Squaxin Island Tribe were known as the “People of the Water.” The Medicine Creek Treaty in 1854 moved the autonomous Salish bands living along the shores of the southern Puget Sound to a small 1,500-acre island that became known as Squaxin Island. The population quickly dwindled, first from diseases carried by settlers, but subsequently from people returning to the mainland for jobs and to escape the island that had no drinking water.

In 1965, the U.S. Department of the Interior granted federal recognition to the Squaxin Island Tribe, thus authorizing formation of the tribal government. This People, who had maintained a sense of who they were for more than 100 years by conveying their heritage through oral tradition and by individual families reserving those artifacts not plundered or lost, finally could begin the process of recovering their culture and heritage. The Tribe began to build a new reservation land base in Kamilche, an area between Olympia and Shelton between Little Skookum and Totten Inlets.



The Tribe has a track record of successfully administering projects and programs. In 1981 the first homes were built on the reservation and were connected to community sewer and water systems. In 1994 the Northwest Indian Treatment Center in Elma opened, followed by the Health Center and the Little Creek Casino in 1995. In 1996 a community-based strategic plan was completed, setting the stage for further development and in 1997 the first of three Ta Ha'Buts Cultural Center buildings opened, the Elders/Childcare Intergenerational Center. In 2000 the Little Creek Casino was expanded under budget and ahead of schedule. In 2002 the second Ta Ha'Buts Cultural Center building opened – the Squaxin Museum Library and Research Center – and the Slocum Ridge Phase I housing development was completed on time and with zero change orders. Currently, there are 103 homes on the reservation that now totals about 2,300 acres. A wide range of culturally appropriate programs and services are developed to serve the needs of the Squaxin community. Visit www.squaxinland.org for more information.

Currently, a number of capital development projects are in process with completion expected in 2003-2005 including Slocum Ridge Phase II development (18 houses and duplexes), the Administration Building (under construction, the third and last of the Ta Ha'Buts Cultural Center complex), Tribal Center conversion into a Youth Center, Health Clinic expansion, Intertribal Professional Center, fire station, Child Development Center (under construction), Little Creek Casino hotel and parking garage, as well as road, water system, and telecommunications improvements.

As per the tribal constitution, a General Council of all enrolled tribal members ages 18 and above elects a seven-member Tribal Council in staggered three-year terms to oversee all tribal

government and enterprise. Tribal Council meetings are held at least twice a month, and are open to all enrolled Tribal members. During these meetings, the Tribal Council establishes all laws, rules and regulations governing the Squaxin Island Reservation. They also make decisions and negotiate with other governmental agencies and organizations for the benefit of all Tribal members.

Squaxin's Executive Director and Deputy Executive Director ensure that all departments perform their duties in accordance with the wishes of the Tribal Council and the General Body. These departments include Community Development, Natural Resources, Cultural Resources, Health and Human Services, Information Systems, Tu Ha' Buts Learning Center, Public Safety and Justice, Northwest Indian Treatment Center, as well as Human Resources, Legal, Planning, Finance, and Executive Services. One director guides each department, and staff work under the direct supervision of program managers (see org chart).

The Tribe has a comprehensive administration infrastructure with finance, legal, and compliance functions, with professionals on staff who are capable of administering and managing projects. The Tribe conducts its business and accounting practice in compliance with federal and state regulations, including the U.S. Office of Management's Budget Circular A-87 and A-133. The financial statements of the Squaxin Island Tribe have been prepared in conformity with Generally Accepted Accounting Principles (GAAP) as applied to government units. The Tribe has annual audits by CPAs Baker, Overby & Moore, Inc., P.S. and is in good standing as described in annual audit reports. FY03 revenue for the Squaxin Island Tribe totaled over \$11 million.

The Tribe contracts with Mason County Fire District 4 for fire protection, operates a Public Safety and Justice Department to handle police matters, and addresses emergency management through an interdepartmental team led by the Department of Community Development. The Tribe operates a transit system that provides a public transportation linkage between the Reservation and the Mason and Thurston County public transportation hubs.

II. GEOGRAPHIC CHARACTERISTICS

A. GEOGRAPHY

As mentioned above, the Squaxin Island Tribe is located in western Washington near Puget Sound in southern Mason County. The Tribe's land base consists of multiple properties with a combined area of almost 2,300 acres. The land base includes the original Squaxin Island between Peale Passage and Squaxin Passage in Puget Sound, and the Squaxin Island Indian Community, near Kamilche, Washington; these lands are located in Mason and Thurston Counties. There are no permanent residents on Squaxin Island, so the Indian community near Kamilche is most commonly referred to as the Reservation. The nearest emergency medical facility is the Mason County General Hospital in Shelton, Washington, approximately four miles from the reservation. Based on this geographical makeup, floods, slides, liquefaction, and/or severe storms could isolate portions of the county for several days.

B. TOPOGRAPHY

The total area the Squaxin Island Tribe is comprised of varied types of land status and service area. The lands include community and economic development, saltwater, freshwater, groundwater, varied elevations, varied native vegetations, and varied soil conditions.

C. CLIMATE

The Squaxin Island reservation lies in the western part of the state where ocean currents bring in an average rainfall of about 65 inches. The climate is predominantly a marine type, with cool summers and mild but rainy winters. The average annual high temperate is 77.6 degrees Fahrenheit and the average low temperate at 31.7 degrees Fahrenheit. Winter rainfall is usually light to moderate. However, an intense winter storm with rainfall/snowfall lasting for several hours may create flooding and/or power outages - the Tribe's recent local disasters.

III. DEMOGRAPHIC CHARACTERISTICS

As of December 9, 2003 the Squaxin Island Tribe has an enrolled tribal member population of 761, an on-reservation population of about 400 (about 250 are youth under age 21, and a service area population of 2,498 (118 are elders over age 64, 794 are youth under age 16). The service area population is the number of enrolled Tribal members and their families who are living in the BIA recognized multi-county region and are served by the Tribe in a variety of ways. The Squaxin Island Tribe is a low-income community with a 35% unemployment rate, a growth rate of about 10% per year, and a Mason County \$40,166 median income. Data sources: 2002 BIA Labor Force Report, 2000 U.S. Census, current Squaxin enrollment records.

Most Squaxin population growth takes place in the Kamilche area where Squaxin housing and other goods, services, and opportunities attract many newcomers. The Kamilche area also serves as a bedroom community with many Indian and Non-Indian residents commuting to Bremerton, Olympia, Tacoma, and even the Seattle area. Its population increases during the summer months as retirees and recreation enthusiasts visit and stay in the area and during the last quarter of the calendar year when seasonal workers find employment in the Christmas trees and greens industries.

IV. ECONOMY

Overall the fourth largest employer in Mason County, the Squaxin Island Tribe employs 445 casino employees and 150 tribal government employees. The Tribe is developing a diversified economic base of gaming, natural resources, community service enterprises, and other ventures to support the interests of the Tribe and the region. Island Enterprises, Inc. is the Tribe's enterprise arm that guides economic development through coordination with Tribal departments and outside agencies to develop tribal enterprises and support tribal member enterprise initiatives.

V. TRANSPORTATION

There are about 75 miles of roads in Squaxin's BIA Indian Reservation Roads inventory. The main North/South road serving Squaxin is Washington State Highway 101 and the main East/West road is Mason County Old Olympic Highway/Highway 108 (West of Highway 101). Highway 101 is a part of the Pacific Coast Scenic Byway meant to attract tourists and route travelers around the Olympic Peninsula. Tribal transportation projects include the Old Olympic Highway improvements (bridge, road and shoulder widening, grading, infrastructure).

Marine access in the Kamilche area is through numerous small marinas and boat launches, including the Arcadia Point boat launch that is owned, operated, and maintained by the Tribe.

Air access in the Kamilche area is Sanderson Air Field located just north of the Shelton city limits. This airfield provides services primarily to the private aviation community.

Rail lines owned by private parties run through the Squaxin Island Reservation and adjacent Kamilche areas, primarily serving the Simpson Timber Company.

High voltage power lines belonging to the Bonneville Power Administration (BPA) run through the Squaxin Island Reservation on the Western side of the reservation land in the Kamilche Valley.

There is a Northwest Pipeline Corporation natural gas pipeline that parallels Highway 101 as it enters the Tribal area from Thurston County. A feeder line branches from this pipeline just southwest of Shelton and then crosses and parallels State Highway 3 into Kitsap County.

VI. HAZARDS

Due to its location and geological features, the Squaxin Island Tribe is vulnerable to the damaging effects of major natural and technological hazards. Events may occur at any time and may create varying degrees of damage and economic hardship to individuals, businesses, and the governmental departments in the Squaxin Island Tribe.

Potential hazards for the Tribe are arranged in two categories - natural hazards and technological (or man-made) hazards. The hazards below are listed alphabetically under each category, therefore, no inference should be made as to severity or probability of occurrence.

Natural Hazards:

- A. Drought
- B. Earthquakes
- C. Epidemics
- D. Floods
- E. Forest Fires/Wildfires

- F. Heat Waves
- G. Landslides
- H. Severe Storms
- I. Tsunami, High Tides, Seiches
- J. Volcanoes

Man-Made Hazards:

- A. Civil Disorders
- B. Dam Failure
- C. Hazardous Materials Incidents
- D. Terrorism
- E. Nuclear Incidents

NATURAL HAZARDS

A. DROUGHT

A *drought* is defined as a period of abnormally dry weather sufficiently prolonged and severe enough to reduce soil moisture, water, and snow levels to drop below the minimum levels necessary to sustain animal, plant, and economic systems.

IMPACT

Western Washington has been affected during 11 drought periods since 1902. Three of these were during extended dry periods: April 1934-March 1937, October 1976-September 1977, and October 1991-September 1994. This indicates an interval of occurrence of less than 10 years.

The possibility of drought exists in the Squaxin Island Tribe. Normally, yearly rainfall is about 66 inches in the lower elevations while it may be 200 inches or more in the higher elevations of the Olympic Forest. Several consecutive, hot, dry summer months can create parched and tinder dry conditions.

During periods of drought, municipal systems and private wells experience reduced water availability. This is mostly the result of declining aquifer levels. Water tables also experience noticeable decline. Residents are then notified to conserve. Brown lawns, water rationing, and having to ask for water in restaurants have increased awareness of the potential for drought in this state and particular area.

Potential impacts include decreased ability to provide hydroelectric power; negative impact upon fish resources; shutdown and loss in the timber industry; increased potential for wildfires; and closures of recreational areas. Problems are created for municipal and private water supplies.

VULNERABILITY

The Squaxin Island Tribe has a high probability of experiencing drought conditions. An extended period of drought for the area is low due to the marine climate. Actual drought conditions have been limited even during extended dry spells. However, as the Tribe continues to grow and the natural resources are more heavily impacted there may be an increase in vulnerability. Squaxin Island Tribe is at moderate risk to experience drought conditions for an extended period of time.

B. EARTHQUAKES

Earthquakes are one of nature's most damaging hazards. An *earthquake* is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of Earth's tectonic plates. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. Earthquakes usually occur without warning and after just a few seconds can cause massive damage and extensive amount of casualties.

Each year, since 1980, the Pacific Northwest Seismograph Network has recorded an average of more than a thousand earthquakes in the Pacific Northwest.

The three most damaging earthquakes in Washington State occurred in 1949 a 7.1 magnitude quake near Olympia; 1965 a magnitude 6.5 quake between Seattle and Tacoma, which killed 15 people and caused more than \$200 million in damage in several counties; and 2001 a magnitude 6.5 quake northeast of Olympia, which caused an estimated to be in excess of \$1 billion.

There is a possibility of three different types of earthquake threats to the Squaxin Island Tribe. A number of earthquakes have occurred within the downward thrusting Juan de Fuca Plate. Many are located beneath Puget Sound and seismologists speculate that an earthquake within this plate could be as large as magnitude 7.5. There are also shallow earthquakes under the Puget Sound basin within the overlying North American Plate. Historically, the most damaging events occur at depths of 15 to 60 miles in the subduction plates. These are the least likely to occur but they could reach magnitude 9+. An earthquake of this magnitude would probably be located off the coast and has the potential of causing considerable damage hundreds of miles away from the epicenter.

Earthquakes cause damage by strong ground shaking and by the secondary effects of ground failures and tsunamis. The strength of ground shaking generally decreases with the distance from the earthquake source. Shaking can be much higher when earthquake waves are intensified by bedrock and then pass through softer earth materials such as sediment. Olympia is a good example of this amplification occurring and the ground shaking was much stronger there than in other areas.

Ground failure caused by earthquakes includes fault rupture, ground cracking, landslides, rockfalls, liquefaction and uplift. Faults do not often rupture through to the surface. Unstable

ground is mostly at risk of the other effects. Any of these failures will affect structures above or below them.

IMPACT

The damage could range from minimal to catastrophic, depending on the magnitude of the earthquake and the degree of preparedness. Damage could range from minimal structural damage to extreme loss of life and destruction of property.

VULNERABILITY

The Squaxin Island Tribe has a high probability to experience another damaging earthquake within the next 25 years. Since 1870 there have been six earthquakes which have been magnitude 6.0 or greater. Population and development have increased and without mitigation efforts we can expect higher loss due to greater exposure. The Squaxin Island Tribe is at high risk for earthquake damage.

Washington State Significant Earthquakes				
Date	Time (PST)	Location	Depth (Km)	Magnitude
December 14, 1872	2140	North Cascades	Shallow	7.4
December 12, 1880	2040	Puget Sound		5.5
April 30, 1882	2248	Olympia area	Deep	6.0
November 29, 1891	1521	Puget Sound		5.0
March 6, 1893	1703	Southeast Washington	Shallow	4.9
January 3, 1896	2215	Puget Sound		5.7
March 16, 1904	2020	Olympics, Eastside		5.3
January 11, 1909	1549	Puget Sound	Deep	6.0
August 18, 1915	0605	North Cascades		5.6
January 23, 1920	2309	Puget Sound		5.5
July 17, 1932	2201	Central Cascades	Shallow	5.2
July 15, 1936	2308	Southeast Washington	Shallow	5.7
November 12, 1939	2346	Puget Sound	Deep	5.7
April 29, 1945	1216	Central Cascades		5.5
February 14, 1946	1914	Puget Sound	40	6.3
April 13, 1949	1155	Puget Sound	54	7.1
August 5, 1959	1944	Northwest Cascades	35	
April 29, 1965	0728	Puget Sound	63	6.5
February 13, 1981	2209	South Cascades	7	5.5
April 13, 1990	2133	Deming	5	5.0

January 28, 1995	1911	17.6 km NNE of Tacoma	16	5.0
May 2, 1996	2104	10.2 km ENE of Duvall	7	5.3
June 23, 1997	1113	5.5 km NE of Bremerton	7.4	4.9
July 2, 1999	1743	8.2 km N of Satsop	41	5.1
February 28, 2001	1054	17.6 km NE of Olympia	52.4	6.8

SEISMIC ZONE MAP

C. EPIDEMICS

Epidemics are outbreaks of disease that affect, or threaten to affect, a significant portion of a population in a relatively short period of time. Although usually referring to human contagious disease, epidemics can also affect domestic and wild animals and crops. Epidemic diseases are usually introduced into an area from remote regions and inflict devastation because there is no natural or induced immunity.

There have been no epidemics reported in the Squaxin Island Tribe. This is probably due to our environment, which is not favorable to many of the world's most contagious diseases; our low population density; clean water and food supplies; effective sanitation; availability of inoculations and monitoring provided by public health officials. This does not make the Tribe immune to the potential for a disease outbreak, however.

IMPACT

During the influenza epidemic in 1918-1919, an estimated 20 million people died. The polio epidemic in 1946 killed approximately 25,000 people in the United States. The Legionnaire's Disease outbreak in Philadelphia claimed 30 lives. Due to our mobile society and the threat of terrorism there is growing concern that no one will be safe from the spread of diseases.

VULNERABILITY

Everyone is vulnerable to an epidemic. There could be short or long term impact and massive loss of life. Devastating impact of the economy and on essential public safety and health services would be an issue.

The Squaxin Island Tribe is a tourist destination, part of a gateway tourist area to the South Puget Sound and Olympic Peninsula. There is a low probability of a major outbreak, but because the potential loss is so great, there is a moderate risk for an epidemic.

D. FLOODS

Heavy, prolonged rain in the Fall, Winter or Spring months often results in saturated ground and

high stream flows. Unusually warm temperatures may cause the snow pack to melt quickly, running off to overflow and fill streambeds. The Squaxin Island Tribe flooding areas which can cause the most problem are the Little Skookum Creek, Skookum Creek, and Kennedy Creek.

Some floods are termed "flash floods" as they build quickly, move swiftly and carry debris in a raging torrent. The Skokomish River is now considered to be a "flash flood" river due to the build up of debris and silt in the riverbed.

Tidal flooding is also possible along the inland water. Extremely high tides accompanied by low atmospheric pressure, runoff, or wind can cause tidal flooding along Hood Canal.

Groundwater flooding occurs when the water table is high and there is persistent heavy rain. Water collects in any natural depression when the soil can no longer absorb the water.

IMPACT

Floods may result in loss of life as well as damage to residences, business establishments, public buildings, roads and bridges, utilities, agricultural land, fish and shellfish habitats, stream banks and flood control structures.

Gravel and silt build-up from logging activities and natural causes increase the possibility of flooding as the streams fill with silt and debris that divert their course.

The U.S. Army Corps of Engineers indicated after the 1996-1997 winter storm (the first widespread groundwater-flooding event since 1972) that the frequency of a groundwater flood disaster is approximately every 25 years.

Flooding impacts creeks and rivers in the Squaxin Island Reservation area and the areas around the Skokomish River where some Tribal members live, limiting their ability to reach home and work related activities.

VULNERABILITY

Flood vulnerability is the likelihood of something to be damaged by a flood. Generally, it is measured by how much something will be damaged as a percentage of its replacement value. There are two things that determine vulnerability to a flood. The first is the tendency of physical things to get damaged. The second is the potential loss of function from losing certain elements of a community because of a flood.

The Squaxin Island Tribe has a low probability to experience significant flooding within the next 25 years. Tribal members living in the areas around the Skokomish River have a high level of flood vulnerability. Flooding could impact their ability to reach employment, school, medical, etc. Because people choose to live along water bodies and the population continues to grow, the

tribe is exposed to more impact due to this category of disaster.

E. FOREST FIRES/WILDFIRES

A *forest fire* is any uncontrolled burning within a forested area, and within a grassland, brush, or woodland, any uncontrolled and hard to extinguish burning.

Fires are most likely to occur during the local dry season, which is normally from mid-May through October or any time during prolonged dry seasons. The impact from these fires is dependent upon weather, fuel, and ignition factors. They are usually extinguished while still small, but can spread to over 100,000 acres and require thousands of fire personnel several weeks to extinguish.

Wildland fires responded to by city and county fire departments are most often started by humans. Form of ignition is usually cigarettes, fireworks, and outdoor burning. Wildland fires started by heat spark ember caused the largest dollar loss, followed by debris burning and cigarettes. Loss per incident for debris fires is three times higher than any other fire cause.

IMPACT

The Squaxin Island Tribe Reservation on the mainland is surrounded by significant timber company forestland susceptible to fire. Squaxin Island, part of the Reservation has no source of pressurized potable water and a high fire potential and lacks effective fire fighting without the aid of aircraft a low probability of effective fire fighting without the aid of aircraft.

All areas of the Squaxin Island Tribe would be impacted by forest fires. The impact of a major fire would be significantly increased by the loss of vegetation that helps prevent landslides, runoff, and flooding. There would be loss to property owners, the logging industry, wildlife, wildlife habitat, watersheds, and the community infrastructure. There would be an immediate impact upon the economy due to loss of jobs reduction of tax revenue.

VULNERABILITY

The Squaxin Island Reservation mainland and island areas have a moderate to high risk for a forest fire occurring. The increase in population, increased recreational activities, large amounts of public and private forestland, and the changing climate all increase the potential for a forest fire/wildfire.

The Squaxin Island Reservation on the mainland is surrounded by significant timber company forestland that is susceptible to fire. Squaxin Island itself has no source of pressurized potable water and a high fire potential and lacks effective fire fighting without the aid of aircraft a low probability of effective fire fighting without the aid of aircraft.

F. HEAT WAVES

A *heat wave* is characterized by five or more consecutive days of unusually hot weather. The National Weather Service considers hot weather for the Squaxin Island Tribe to be 90 degrees or higher.

There has not been a heat wave on the Squaxin Island Reservation of significance to the people of the Squaxin Island Tribe. The unpredictable weather of recent history and the possibility of global warming suggest the possibility in the near future. The heat waves that hit the Chicago area during July of 1995 were responsible for more than 450 deaths and numerous heat-related injuries. Several extra refrigeration facilities had to be rented by hospitals in the area whose morgues were full due to the fatalities.

IMPACT

Most residences in the Squaxin Island Tribe do not have air conditioning because of the mild marine climate. Senior citizens, infants, and those who are ill would be most susceptible to heat and its effects. Those living alone without a caregiver would be even more susceptible.

VULNERABILITY

Due to the mild marine climate there is a low probability for or risk of a heat wave affecting the Squaxin Island Tribe.

G. LANDSLIDES/EROSION

A *landslide* is the downward movement of a slope and masses of rock, soil, or other debris under the force of gravity. Slides range in size from thin masses of soil a few yards wide to deep-seated bedrock slides. The form of initial failure commonly categorizes slides, but they may travel in a variety of forms along their paths. This travel rate may range in velocity from a few inches per month to many feet per second, depending largely on slope, material and water content.

Landslides are influenced by human activity (mining and construction of buildings and highways) and natural factors (geology, precipitation, and topography).

The identification of dormant slide areas is important as earthquakes or unusually wet winters can reactivate them. High land movement areas can be identified on or at the base of slopes; in or at the base of minor drainage hollows; at the base or top of an old fill slope; at the base or top of a steep cut slope.

Erosion is the gradual removal of soil through wind or water action. Erosion may be induced or increased by failure to use ground covers to protect soil from wind or drainage systems to allow good dispersal of storm water. Slopes on waterfront can also be severely undercut by normal

water flow, wave action or large waves produced by storms.

IMPACT

The Squaxin Island Tribe area experiences landslides and soil erosion every year with most of them causing much less damage than others. Areas that typically have landslides are along Old Olympic Highway running through the Reservation. Areas that typically experience erosion are along hillsides and bluffs with exposed, disturbed, and/or weakened soil.

Severe slides may affect travel routes to the extent that economic loss results. This loss can be particularly severe on tourists and businesses dependent upon recreational type activities. Uncontrolled water flow frequently causes erosion, which in turn can cause landslides. The effects of erosion are usually much less dramatic than landslides, but the final results may be more costly.

The Squaxin Island Tribe continues to be impacted by landslides and soil erosion issues with each new winter storm. The most significant effects of landslides are the disruption of transportation and the destruction of property.

VULNERABILITY

The Squaxin Island Tribe has a medium to *low* probability for or risk of a significant landslide or erosion event due to the impact of wind, water, and flooding at all times of the year.

H. SEVERE STORMS

Destructive storms come in several forms: wind, rain, ice, snow and a combination. Any winter storm can pack high winds and heavy rain causing widespread damage. High winds of short duration, such as tornadoes and strong gusts from thunderstorms, can also be destructive though generally not as widespread.

Nearly all destructive local storms occur from November through April when the jet stream is over the United States West Coast and Pacific low pressure systems are more frequent. The path of these lows determines their effect locally. The more Southerly ones bring heavy rains while the Northerly ones bring cold air and the potential for snow and ice. Any winter storm, regardless of its trajectory, can create high winds. Winds above 30 miles per hour can cause widespread damage and those above 50 miles per hour can be devastating.

High winds can cause widespread damage to trees and power lines and interrupt transportation, communications, and power distribution. Prolonged heavy rains cause ground saturation, rivers and streams to rise, and result in flooding and landslides.

Ice storms occur when rain falls out of a warm atmospheric layer into a cold one near the ground.

The rain freezes on contact with cold objects including the ground, trees, structures, and power lines, causing buildings to collapse and power lines to snap.

IMPACT

High winds and severe storms have caused extensive damage through the Reservation in past years. Since 1972 the Squaxin Island Tribe has experienced fifteen severe storms. Twelve led to Federal Disaster Declarations. Most of these events were a combination of wind, heavy rain, snow or ice, and the accompanying flooding.

The most noted storm was the "Columbus Day" (hurricane type) storm of 1962. Severe winds also occurred during the Inauguration Day storm of 1993. Some rural residences were without power for over two weeks during the ice storm of 1996. The most recent event that impacted all of the Squaxin Island Tribe was the ice and wind storm of December 1996.

The Squaxin Island Tribe has many facilities including households, commercial, community, and government buildings that are impacted by high winds and severe storms. Isolated facilities without power are more likely to be impacted due to power outages and the time it takes to restore power.

VULNERABILITY

The Squaxin Island Tribe has a *high probability* for or risk of significant damage due to severe storms, particularly during the winter season.

All Squaxin Island Tribal areas are vulnerable to the effects of a severe storm, particularly in developed areas used/accessed by Squaxin community residents, workers, clients, and/or visitors. Squaxin Natural Resource areas are also highly vulnerable to damage as a result of severe storms.

I. TSUNAMI / HIGH TIDES / SEICHES

A *tsunami* is a single or series of giant sea waves generated by seismic activity, underwater volcanic eruptions, meteor impacts, or landslides. The action of a tsunami is similar to sitting in a partially full tub of water, rocking back and forth, and "growing" the waves until they overflow the bathtub. A *seiche* is a resonant oscillation of water generated by the same types of events. The action of a seiche is similar to sitting in a partially full tub of water, jolting the water one time, and observing the waves as they overflow the bathtub.

A tsunami or seiche can impact and cause damage to any enclosed body of water including bodies of water adjacent to natural resources and/or community development such as southern Puget Sound, lakes, ponds, and/or reservoirs.

During the Northridge earthquake of 1994, swimming pools all over Southern California

overflowed. During the Anchorage earthquake in 1964, swimming pools as far away as Puerto Rico were set into oscillation. This quake also caused a serious tsunami along the Washington Coast, resulting in \$105,000 in damage, which is based on 1964 dollar value. In 1994, a tsunami warning was issued for the Washington coast due to a magnitude 8.1 earthquake off Russia's Kuril Islands.

Large Pacific Ocean tsunamis have wave crest to wave crest distances of 60 miles and apart and can travel at speeds of 450 to 600 miles per hour in the open ocean. As the waves reach the shallow water of the shoreline, the waves are slowed which forces the water to form walls of water 30 feet or more in height. Debris can be deposited up to 1000 feet inland. A large tsunami can cross the entire Pacific in 24 hours.

There is some debate as to whether or not a tsunami could be generated in the Puget Sound by a local or off-shore earthquake.

High waves, usually caused by wind and storm activity, have battered the Puget Sound in the past and must also be considered a hazard to the Squaxin Island Tribe.

IMPACT

Much of the Squaxin Island Tribe is surrounded by water. Although there is no record of tsunami activity in the South Puget Sound area, the Pacific Coast has been several times. A strong earthquake below either Puget Sound or Hood Canal could cause damaging waves that could impact residences built along the shorelines. The most significant damage would be similar to those created during abnormally high tides in the region.

VULNERABILITY

The Squaxin Island Tribe has *low* probability for or risk of significant damage as a result of a tsunami, high tide, or seiche event.

J. VOLCANOS/ASH FALL

Mount Rainier is the most dangerous volcano in the Cascade Range because of the large population and the huge area and volume of ice and snow on its slopes that could melt to generate debris flows during a catastrophic eruption. Each of the five major rivers – the Carbon, White Cowlitz, Nisqually and the Puyallup – flows Westerly. Each, with the exception of the Cowlitz, empties into Puget Sound near Tacoma. The Cowlitz flows into the Columbia River and then into the Pacific Ocean. Much of the lowland to the east of Tacoma and the south of Seattle is formed of pre-historic debris from Mount Rainier.

Volcanic eruptions can cause damage in the Squaxin Island Tribe primarily by ash fall. The probability of ash fall depends on wind direction and the volcanic source of the eruption causing

the ash fall. Most of the dangers are to persons in the near vicinity of the volcano. Other dangers, such as mudflows and ash fall, may exist miles downstream and down wind. The most recent was the 1980 volcanic eruption of Mount St. Helens in the Cascade Mountain Range. This eruption claimed 57 lives and cost approximately one billion dollars in damage.

In the last 515 years, Mount St Helens is known to have produced four major explosive eruptions (each with at least one cubic kilometer of eruption deposits) and dozens of lesser eruptions. In the past 200 years the Mount St Helens volcano has erupted three times. Prior to its latest eruption, there were more than 10,000 earthquakes in the vicinity, hundreds of small steam-blast explosions, and the outward growth of the volcano's entire northern flank by more than 80 meters. A magnitude 5.1 earthquake struck beneath the volcano at 8:32 am on May 18, setting in motion the devastating eruption. Within seconds of the earthquake, the volcano's North flank slid away in the largest landslide in recorded history. The explosion swept across the landscape as fast as 1,100 kilometers per hour. Temperatures were as high as 300 degrees Celsius within the blast. A gigantic plume of ash reached 19 kilometers into the sky and approximately 490 tons of ash was carried across 57,000 square kilometers of the Western United States.

IMPACT

The Squaxin Island Tribe has experienced some ash fall but no reported loss from volcanic eruptions. The Squaxin Island Tribe impact of the ash fall from the 1980 eruption of Mount St. Helens was non-existent to light and did not cause any significant damage. It is unknown if an eruption of Mount Rainier would have a direct impact upon the Tribe, but it could cause a major disruption to transportation of supplies if the main corridors of transportation were affected.

VULNERABILITY

The Squaxin Island Tribe has *low* probability for or risk of significant damage as a result of a volcanic eruption.

MAN-MADE HAZARDS

A. CIVIL DISORDERS

Civil disorder, disturbance, or unrest is the result of individuals or groups within the population feeling their needs or "rights" are not being met by society, a segment of it, or the current political system. Civil unrest spans a variety of actions including labor unrest, strikes, civil disobedience, demonstrations, riots, and rebellion. Events that could trigger these actions include racial tension, unemployment, unpopular political actions, and a decrease in the supply of essential goods or services.

While the Squaxin Island Tribe has not experienced civil disorder, organized non-violent group and/or individual protest has occurred in the past and is, in fact, encouraged by the Squaxin Island Tribal Council as a healthy engagement of civil rights within the Squaxin community and beyond.

IMPACT

There is little likelihood of significant impact on the Squaxin Island Tribe as a result of civil disorder.

VULNERABILITY

The Squaxin Island Tribe has *low* probability for or risk of significant damage as a result of civil disorder.

B. DAM FAILURE

Dam failure may be caused by flooding, earthquakes, poor construction, lack of maintenance and repair, improper operation, or acts of vandalism or terrorism. Dam failure could result in loss of life and damage to property including structures, transportation routes, utilities, agriculture, and aquaculture. Depending on location, dam failure could also result in a lowered tax base, lack of power profits, or other significant economic loss

IMPACT

While the Squaxin Island Tribe does not manage any dams, the Tribe is impacted by dams within its “usual and accustomed” area, such as those operated and maintained by Mason County (see the list below). Most of the dams are small, however, they have a fairly high impact on a wetland area and are managed as fish blockages.

The Lake Cushman Dam, however, is a large dam on the Skokomish River located north of the Squaxin Island Reservation and Shelton, Washington. Its failure would impact the ability of Squaxin tribal members living north of the dam and result in extensive property and natural resource damage. Tacoma City Light, the owners and operators of the dam and hydroelectric project, carefully monitor the dam and maintain updated emergency plans as well as hold emergency exercises. Local authorities are responsible for warning and evacuation should a breach occur.

VULNERABILITY

The Squaxin Island Tribe resources are vulnerable to dam failure. To assure dam safety, the State Department of Ecology inspects all dams and requires safety plans from the owner of each dam. The failure of a high hazard dam, such as the Lake Cushman Dam, would threaten

important segments of the Tribe suggesting moderate vulnerability. But because major dams are well maintained and operated, there is no reason to anticipate a compromise in the structural integrity other than from a major natural disaster or from terrorist actions; therefore, there is a low risk assigned to this threat.

Mason County Dams

1. Anderson Lake Dam
2. Bennettsen Lake Dam
3. Buck Lake Dam
4. Christine Lake Dam
5. Cranberry Lake Storm water Detention Dam
6. Cushman Dam #1
7. Cushman Dam #1 – Spillway Head works
8. Cushman Dam #2
9. Fawn Lake Dam
10. Haven Lake Dam
11. Lakeland Village Pond No. 1
12. Leprechaun Lake Dam
13. Lake Limerick Dam
14. Little Twin Lakes Dam
15. Melbourne Lake Dam
16. Rosand Dam
17. Timberlake Dam
18. Trask Lake Dam
19. Uddenberg Dam
20. West Lake Dam

C. HAZARDOUS MATERIALS INCIDENTS

Chemical hazards are created when there is a release of toxic agents into the atmosphere and environment that can harm population, animals, and food supplies.

Hazardous chemicals are used for a variety of purposes and are regularly transported through the Squaxin Island Tribe. Ammonia is used as a refrigerant, in agriculture, and in wastewater treatment. Chlorine is used in wastewater treatment, water systems, swimming pools, and in the paper industry. Propane is widely used as a fuel. Washington State Highway 101 is the major transportation corridor for the transportation of hazardous materials to the rest of the Olympic Peninsula. Washington State Highway 3, Washington State Highway 101 and private railroads serving local interests provide transportation routes for to and from Kitsap County.

Hazardous materials include those used in manufacturing, household chemical, crude oil, petroleum products, pesticides, paints, medical waste, fertilizers, etc.

IMPACT

Major spills and accumulations from minor spills or unsafe disposal could cause long term damage to resources such as water, forests, or beaches. Spills could cause population evacuation, unsafe working or living conditions, unemployment, or economic impact.

VULNERABILITY

The Squaxin Island Tribe has *moderate* probability for or risk of significant damage as a result of a hazardous material or chemical spill event.

Virtually every Squaxin household and business stores and uses varied amounts and kinds of hazardous chemicals. Hazardous chemical shipments, bulk users, wholesalers, and retailers are managed in accordance with applicable laws. Jurisdictions and other responsible parties submit annual Tier II reports as to type of hazardous materials on their premises.

Chemical spills, primarily oil and fuel spills, occur infrequently on the Squaxin Island Reservation on both land and water.

Hazardous material spills also occur infrequently on the Squaxin Island Reservation. The smaller spills are most often petroleum products or illegally disposed of household materials. The increase in the number of methamphetamine related incidents on the Squaxin Island Reservation indicates an increase in this activity and an increase in the threat posed to emergency responders, the community, and the environment.

Small amounts of non-regulated chemicals usually in the form of household materials are routinely disposed of by dumping them into the environment through waste collection systems or directly into the ground or water.

The potential for a catastrophic spill of bulk hazardous chemicals exists. Due to the lack of a Class A Hazardous Materials Response Team, the Tribe is placed at moderate risk in the event of a major spill.

D. TERRORISM

Terrorism is defined as the use of force or violence against persons or property violating the criminal laws of the United States for purposes of intimidation, coercion, or ransom. Terrorists often use threats to create fear among the public; try to convince citizens that their government is powerless to prevent terrorism; and try to get publicity for their causes.

A terrorist attack can take several forms depending on the technological means available to the terrorist, the nature of the political issue motivating the attack, and the points of weakness of the terrorist targets. Bombings are the most frequently used terrorist method in the United States.

Other possibilities include attacks upon transportation facilities, utilities or other public services, or incidents involving chemical or biological agents. The Federal Bureau of Investigation categorizes terrorism in the United States as one of two types: domestic or international terrorism.

Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction, such as the Oklahoma City bombings and the series of domestic attacks and bank robberies in 1995 in Spokane by a militia group.

International terrorism involves groups or individuals whose terrorist activities are foreign based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries, such as the attack on the World Trade Center in 1993, and the attack on New York's Twin Towers and on the Pentagon in 2001.

IMPACT

The impact of terrorism can vary significantly from massive loss of life and property damage to nuisance service interruptions. Threatened services include power, water supply, public transportation, communications, and public safety.

VULNERABILITY

The Squaxin Island Tribe has a *low* probability for or risk of significant damage as a result of a terrorism event.

The type of terrorist act would determine vulnerability. This could include a large portion of the population or infrastructure with the destruction of a major power distribution line, a pipeline, or the contamination of a municipal well, or a small segment with a bomb threat to a business or government agency.

The Squaxin Island Tribe rarely receives bomb threats at tribal facilities and is at low risk for a terrorist attack.

E. NUCLEAR INCIDENTS

Puget Sound Naval Shipyard and the Naval Submarine Base at Bangor, Washington are both located in Kitsap County. Puget Sound Naval Shipyard stores spent fuel rods and decommissioned nuclear submarines. The Submarine Base at Bangor is the home of the Trident submarine, a nuclear powered, ballistic missile submarine.

IMPACT

The Squaxin Island Tribe impact would be immeasurable. The devastation caused by a nuclear

incident would totally impact all life and economy of the Squaxin Island Tribe. The Tribe is totally unprepared to handle a nuclear incident and has no ability to evaluate the potential impact of such an event.

VULNERABILITY

The Squaxin Island Tribe has a *high* probability for or risk of significant damage as a result of a nuclear incident.

The Squaxin Island Tribe is as vulnerable as any city or military facility. Given the Squaxin Island Tribe is in close proximity to the fixed nuclear site located in Bangor, Washington, the possibility of some type of nuclear exchange does exist.

There are no fall-out shelters and little indoor space to place refugees. Mitigation efforts on the local level would involve having written material available on fall-out shelters and have individuals trained in radiological monitoring.

Nuclear accidents/incidents involving the transportation of nuclear materials through Squaxin Island Reservation via truck or railroad cargo do exist. Incidents involving nuclear transport would have a devastating impact on the Squaxin community.