Jamestown S'Klallam Tribe
Climate Adaptation Plan 2013

Key Area of Concern
Salmon

VULNERABILITY	Low	Low-Med	Med	Med-High	**HIGH**	Very High
PRIORITY	Low	Low-Med	Med	Med-High	High	**VERY HIGH**

IMPORTANCE

- Culture
- Diet
- Economy

POTENTIAL IMPACTS

- Rising Temperatures
- Disease
- Excess Mortality
- Economic Losses
- Health and Wellness

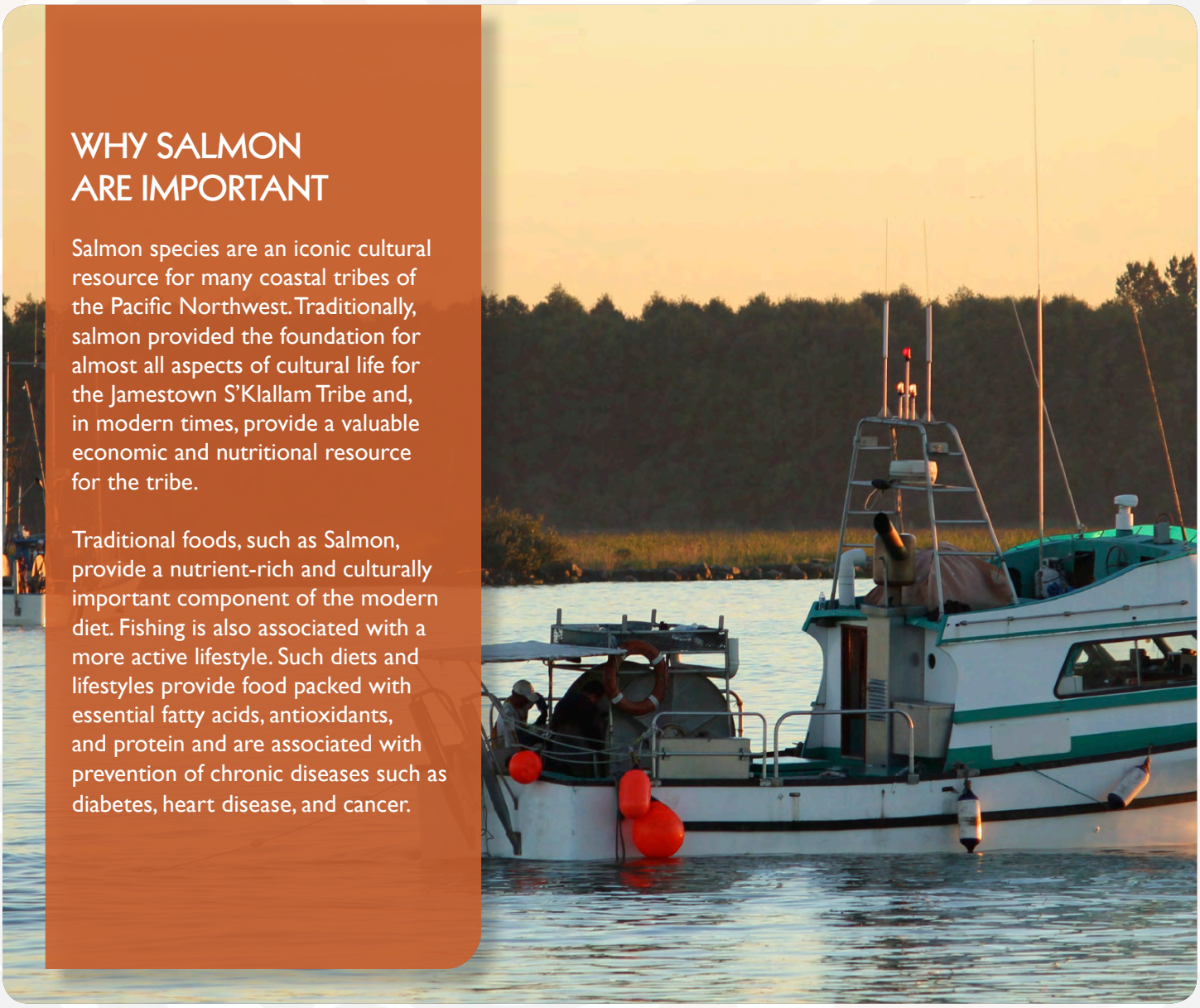
ACTIONS

- Decrease Pollution
- Restore Habitat
- Ensure Sustainable Harvest
- Manage Hatcheries

WHY SALMON ARE IMPORTANT

Salmon species are an iconic cultural resource for many coastal tribes of the Pacific Northwest. Traditionally, salmon provided the foundation for almost all aspects of cultural life for the Jamestown S'Klallam Tribe and, in modern times, provide a valuable economic and nutritional resource for the tribe.

Traditional foods, such as Salmon, provide a nutrient-rich and culturally important component of the modern diet. Fishing is also associated with a more active lifestyle. Such diets and lifestyles provide food packed with essential fatty acids, antioxidants, and protein and are associated with prevention of chronic diseases such as diabetes, heart disease, and cancer.



For more information about the Jamestown S'Klallam Tribe Climate Adaptation Plan, contact:
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POTENTIAL IMPACTS OF CLIMATE CHANGE

Climate change is altering the Dungeness River and similar rivers in the region to more "transient" (mixed winter rain with snow) watersheds. Winter rains with less snow will affect salmon through; disturbed timing of river flow and winter flood events with streambed scouring. With less snowpack, there will be smaller summer flows for salmon returning to spawn. Higher air temperatures will generally increase heat stress on salmon in the rivers and potentially increase competition for water by increasing demand for water to irrigate crops.

- Winter Rains and Flooding
- Streambed Scouring
- Lower Summer Flows
- Higher Water Temperatures
- Less Summer Water

ACTIONS TO INCREASE RESILIENCE

The Jamestown S'Klallam Tribe is already active in many protective strategies for salmon; though climate change may threaten the effectiveness of these programs. Continued leadership and collaboration with stakeholders on these issues will help salmon be more resilient to a changing climate.

NEXT STEPS

- Restore connections to flood plains by setting back dikes.
- Plant native streamside trees and control invasive species.
- Filter or eliminate storm water input into streams.
- Protect and restore wetlands.
- Restore in stream habitat to enhance survivability.
- Ensure sustainable harvesting of salmon.
- Managing hatchery programs to minimize harm done to wild stocks.

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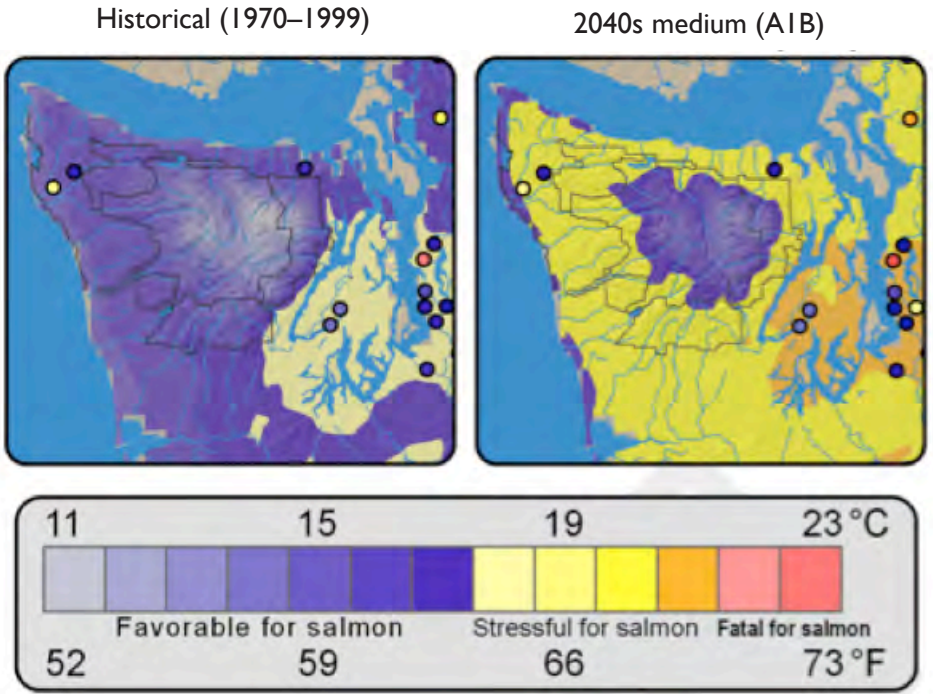
FUTURE TEMPERATURES AND SALMON

In spite of probable altered timing of river flow and winter flooding events, the Dungeness River should remain cool (see blue dot in right panel, upper right) even as land temperatures increase. This is due to the high altitude snowpack and steep decent of the river (Mantua et al., 2010). Average weekly August air temp (shading) and river water temperatures (dots) for historic conditions, 1970-1999 (left panel) and future projections, 2040s (high emissions scenario—right panel).



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Jamestown S'Klallam Tribe
Climate Adaptation Plan 2013

Key Area of Concern
Clams & Oysters

VULNERABILITY	Low	Low-Med	Med	Med-High	**HIGH**	Very High
PRIORITY	Low	Low-Med	Med	Med-High	High	**VERY HIGH**

IMPORTANCE
- Culture
- Diet
- Economy

POTENTIAL IMPACTS
- Higher Water Temperatures
- Ocean Acidification
- Shellfish Poisoning
- Health and Wellness
- Economic Losses

ACTIONS
- Restore Habitat
- Decrease Pollution
- Diversify Species
- Enhance Monitoring
- Expand Outreach

WHY CLAMS & OYSTERS ARE IMPORTANT

Clams and oysters have been an integral part of tribal life for the Jamestown S'Klallam People throughout their history. Tribal Citizens continue to participate in subsistence and commercial harvest of shellfish that are culturally, economically, and nutritionally important for the Tribe.

Clams and oysters are readily available and provide high quality sources of protein and nutrients that are associated with prevention and mitigation of chronic diseases such as diabetes, heart disease, and cancer. Shellfish harvesting contributes to an active lifestyle and intimately connects Tribal Citizens to their cultural heritage.

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POTENTIAL IMPACTS OF CLIMATE CHANGE

Warming water temperatures will increase thermal stress, affect burrowing activity, and favor more heat tolerant species. Ocean acidification will make it more difficult for clams and oysters to build and maintain their shells. A recent upwelling event of acidic ocean water killed many young oysters in Washington's commercial hatcheries.

Under the right conditions, some algae produce potent natural toxins that accumulate in shellfish and can harm humans. Harmful algal blooms that can lead to paralytic shellfish poisoning occur more when water temperatures are above 55.4°F. Climate change will likely increase the number of days annually that water temperatures in Puget Sound are above that threshold.

- Higher Water Temperatures
- Decreased Growth
- Ocean Acidification
- Shellfish Mortality
- Increased Risk of Shellfish Poisoning

SEA SURFACE TEMPERATURE

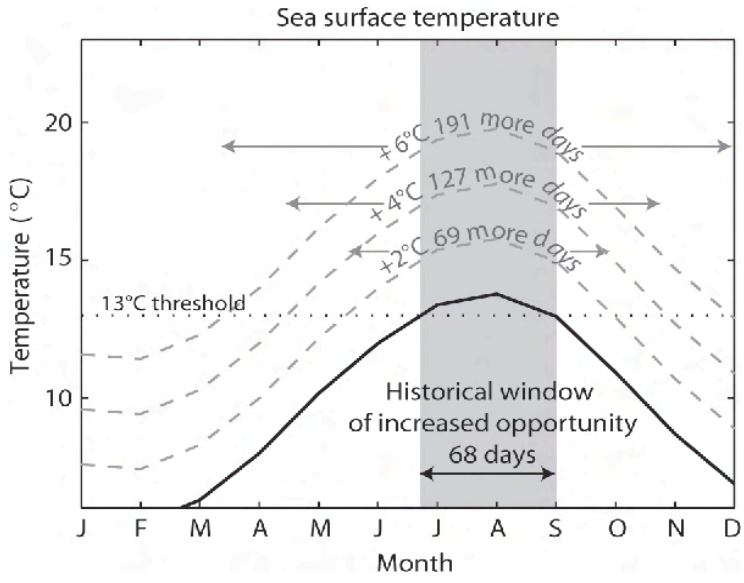
A 3.4°F (2°C) increase in ocean temperature has the potential to double the number of days annually (from 68 days currently to 137 days) when the waters of Puget Sound are above the 55.4°F (13°C) threshold where paralytic shellfish poisoning occurs more frequently. The dark black line and shaded region indicate current conditions (Moore et. al., 2008).

ACTIONS TO INCREASE RESILIENCE

Efforts to help clams and oysters adapt to climate change focus on increasing the health of the existing clam and oyster populations. Other actions include improving awareness and communication of human health threats such as shellfish poisoning.

NEXT STEPS

- Decrease pollution and improve local water quality.
- Ensure sustainable harvesting of clams and oysters.
- Natural population growth or hatchery propagation and restocking of populations where native species are limited.
- Transplanting adult shellfish into areas where they are more likely to be successful.
- Develop cultural center and traditional Longhouse around harvest beach in Blyn to enhance understanding of shellfish heritage and engage more Trial Citizens in the harvest of clams and oysters.
- Work to identify or develop environmental predictors of harmful algal blooms.
- Enhance public health engagement around beach closures and response to biotoxin events.



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Jamestown S'Klallam Tribe
Climate Adaptation Plan 2013

Key Area of Concern
Wildfire

VULNERABILITY	Low	**LOW-MED**	Med	Med-High	High	Very High
PRIORITY	Low	Low-Med	Med	Med-High	High	**VERY HIGH**

IMPORTANCE
- Culture
- Natural Resources
- Economy

POTENTIAL IMPACTS
- Habitat Destruction
- Infrasturcutre Damage
- Wellness and Safety

ACTIONS
- Monitor Changes
- Manage Forest
- Fire Resistant Buildings
- Emergency Plans

WHY WILDFIRE IS IMPORTANT

Forests are an integral part of traditional culture on the Olympic Peninsula; providing resources ranging from cedar trees, berries, and medicinal plants, to large animals such as deer and bear. Large wildfires can alter the ecological structure of a forested area, create sediment susceptible to slides and erosion, and cause respiratory and cardiovascular distress and infection through exposure to smoke.

Much of the Jamestown S'Klallam tribal land is located in the rain shadow of the Olympic Mountains, one of the driest areas in Washington State west of the Cascades. Wildfire impacts to tribal residences, rental property, tribal infrastructure, and traditional use areas are a key concern for the Tribe.

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POTENTIAL IMPACTS OF CLIMATE CHANGE

Increasing average temperatures, heat waves, and decreased summer precipitation will likely contribute to an overall drying of the northeast Olympic Peninsula, leading to increased wildfire risk. Climate change has already amplified the number and extent of wildfires in the past half century. By mid century, the annual likelihood of a very large fire in the Pacific Northwest will increase from a 5% chance of occurrence to a 50% chance of occurrence. Though fire on the Olympic Peninsula has historically played an important role in the forest ecosystem, an increasingly dry and fire prone forest is less resilient and more susceptible to disease and insect attack.

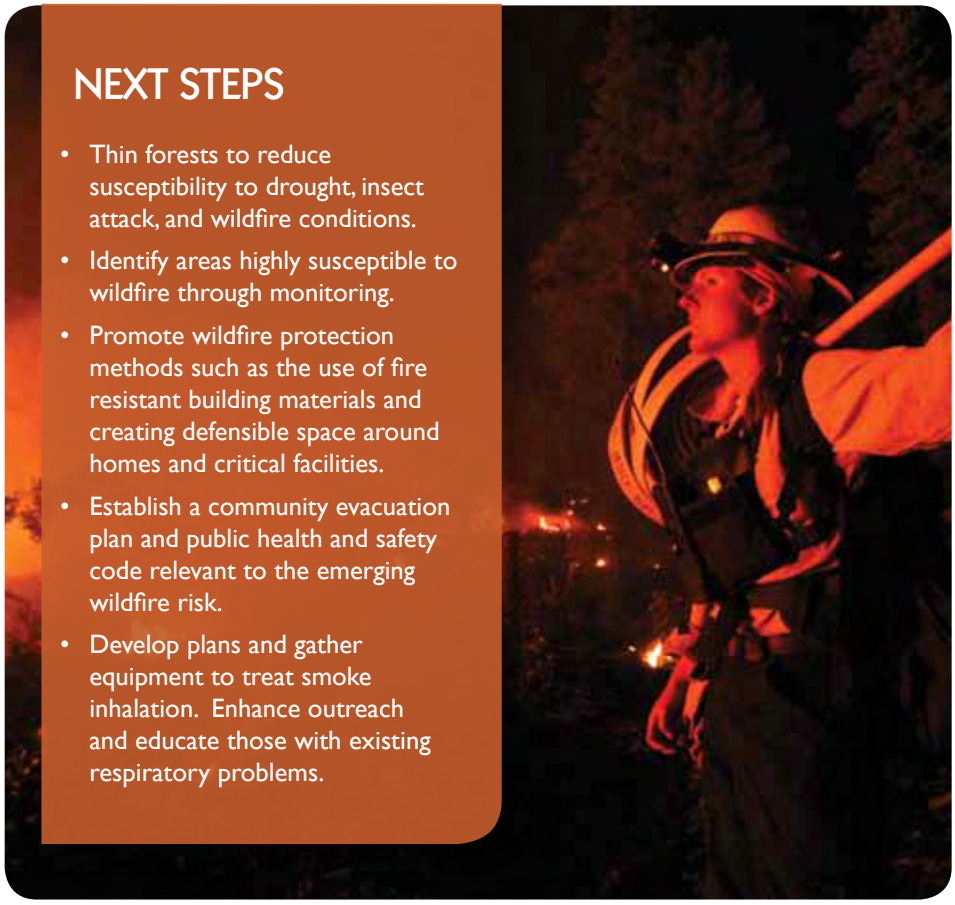
- Higher Wildfire Risk
- Potential for Larger Fires
- Decreased Overall Forest Health
- Damage to Tribal Infrastructure

ACTIONS TO INCREASE RESILIENCE

The avoidance of wildfire impacts depends on both prevention efforts and rapid response to fires.

NEXT STEPS

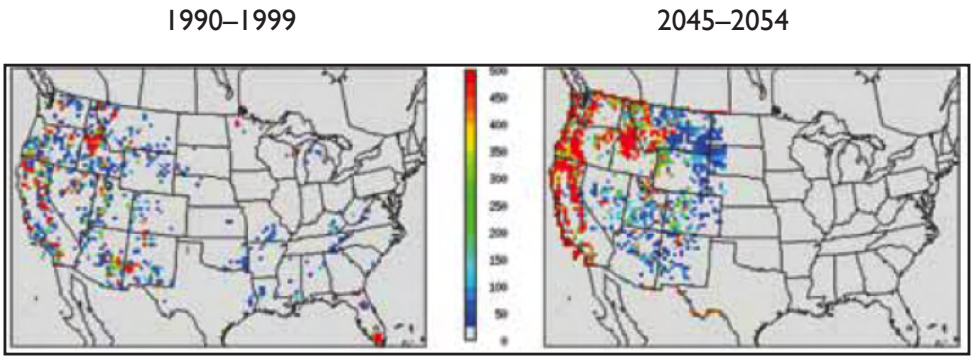
- Thin forests to reduce susceptibility to drought, insect attack, and wildfire conditions.
- Identify areas highly susceptible to wildfire through monitoring.
- Promote wildfire protection methods such as the use of fire resistant building materials and creating defensible space around homes and critical facilities.
- Establish a community evacuation plan and public health and safety code relevant to the emerging wildfire risk.
- Develop plans and gather equipment to treat smoke inhalation. Enhance outreach and educate those with existing respiratory problems.



© Aaron Black-Schmidt 2008

INCREASED WILDFIRE POLLUTION

Map shows the projection of increased emissions of wildfire smoke (tons of $PM_{2.5}$) in the American West in the decade 2045–2054 (right panel) compared to the 1990s (left panel) (McKenzie, 2010). Wildfire smoke is harmful to human health.



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Jamestown S'Klallam Tribe
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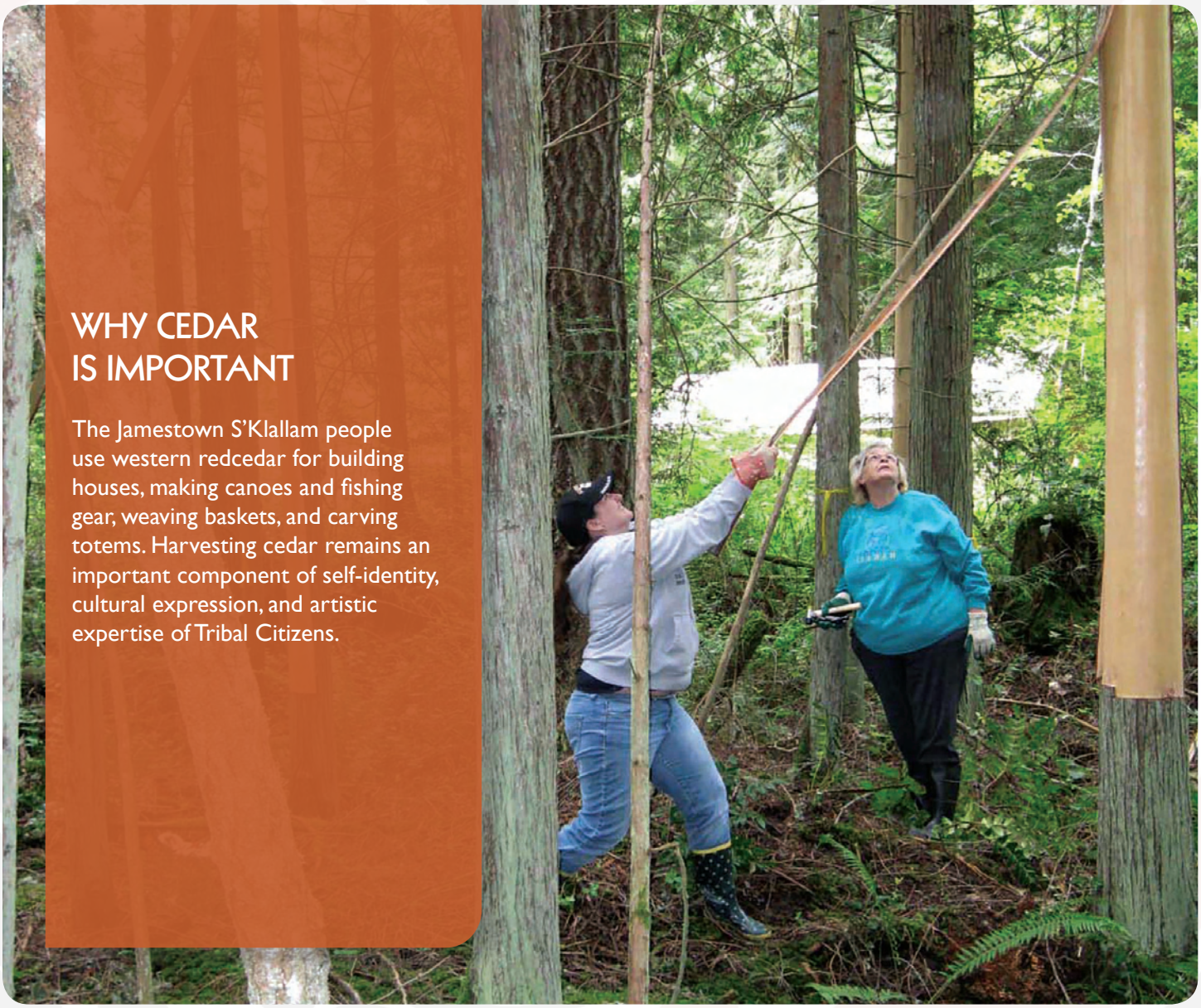
Key Area of Concern
Cedar Harvest

VULNERABILITY	Low	Low-Med	**MED**	Med-High	High	Very High
PRIORITY	Low	Low-Med	Med	Med-High	High	**VERY HIGH**

IMPORTANCE	POTENTIAL IMPACTS	ACTIONS
• Culture	• More Drought Stress • Fewer Western Redcedar • Altered Bark Harvest Times	• Increased Planting • Assisted Migration • Monitoring and Evaluation



WHY CEDAR IS IMPORTANT

The Jamestown S'Klallam people use western redcedar for building houses, making canoes and fishing gear, weaving baskets, and carving totems. Harvesting cedar remains an important component of self-identity, cultural expression, and artistic expertise of Tribal Citizens.

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POTENTIAL IMPACTS OF CLIMATE CHANGE

Increasing average temperatures and declining summer precipitation will increase drought stress in the northeastern portion of the Olympic Peninsula. Drought stress is correlated with increased insect attack, tree mortality, and higher wildfire risk. Western redcedar populations in these areas are projected to decline, interfering with successful harvest by Tribal Citizens.

Ideal harvesting for cedar bark, used in basket-making, occurs in the spring when temperature and precipitation conditions allow for easy removal of large bark strips with minimal harm to the tree. Tribal basket weavers have already noticed a shift in the optimal timing of these harvests to earlier in the year. Changing climate conditions are expected to continue to alter this timing.

- Increased Drought Stress
- Fewer Western Redcedar
- Shifting Harvest Times
- Increased Insect Attack, Tree Death, Wildfire

SHIFTING VEGETATION ZONES

Current vegetation distribution is shown (Halofsky et al. 2011). Climate change driven forest drying in the Northeast Olympic Peninsula could decrease abundance of western hemlock and western redcedar and promote growth of Douglas-fir and lodgepole pine.

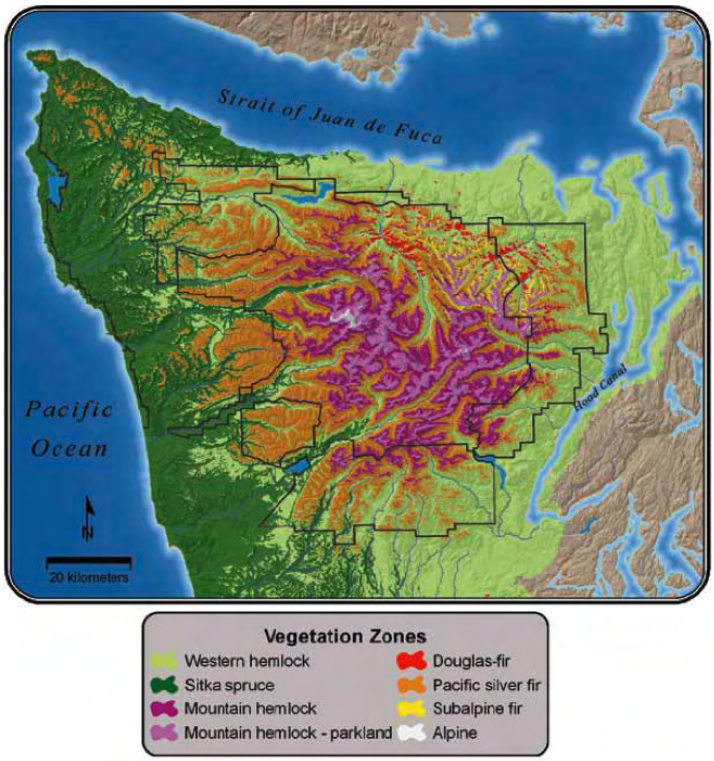
ACTIONS TO INCREASE RESILIENCE

The promotion of cedar health and continued survival in the region will require adaptive management techniques and continued support of its cultural importance. Effective partnerships with other forest managers will ensure these efforts to increase resilience do not occur in isolation.

NEXT STEPS

- Ensure that future plantings occur in areas that are protected and have high soil moisture content.
- Consider assisted migration, or helping cedar trees grow in regions where they have not historically been located, but where they are likely to survive given changing climate conditions.
- Create a monitoring and reporting system to track how redcedar abundance and yields are changing. Partner with traditional harvesters to gather on-the-ground observations.

Jamestown S'Klallam Tribe Artifact Collection Large Cedar Basket



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Jamestown S'Klallam Tribe
Climate Adaptation Plan 2013

Key Area of Concern
Jamestown Beach

VULNERABILITY	Low	Low-Med	**MED**	Med-High	High	Very High
PRIORITY	Low	Low-Med	Med	Med-High	High	**VERY HIGH**

IMPORTANCE
- Culture
- Tribal homes
- Emergency Management

POTENTIAL IMPACTS
- Flooding
- Salt Water Intrusion
- Damage to Homes

ACTIONS
- Shoreline Monitoring
- Consider Flood Risks
- Manage Retreat

WHY JAMESTOWN BEACH IS IMPORTANT

In 1874, Jamestown Tribal Citizens pooled their money and purchased 210 acres of land at Jamestown Beach. This original settlement is the cultural center of Jamestown S'Klallam Tribe.

The long lots provided each family with beach access for landing canoes and harvesting shellfish. The first schoolhouse in Sequim (which also doubled as a church) was built on Jamestown Beach in 1878. Today, much of the property is still owned by the Jamestown S'Klallam Tribe or tribal families and the beach is the landing site for the canoe journey.

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POTENTIAL IMPACTS OF CLIMATE CHANGE

By mid-century, many of the houses along Jamestown Beach Road will be at-risk of flooding from during severe storms events. The flooding could range from minor water damage to substantial sediment and debris in the first floor of the houses. Sea level rise may elevate the water table and flood septic systems, causing local water quality problems from the release of untreated sewage. Flooding may also temporarily close Jamestown Road, preventing emergency service access or limiting the resident's ability to leave and find shelter.

- Flooding
- Saltwater intrusion
- Damage to homes
- Temporary loss of access
- Impaired emergency services

SEA LEVEL RISE

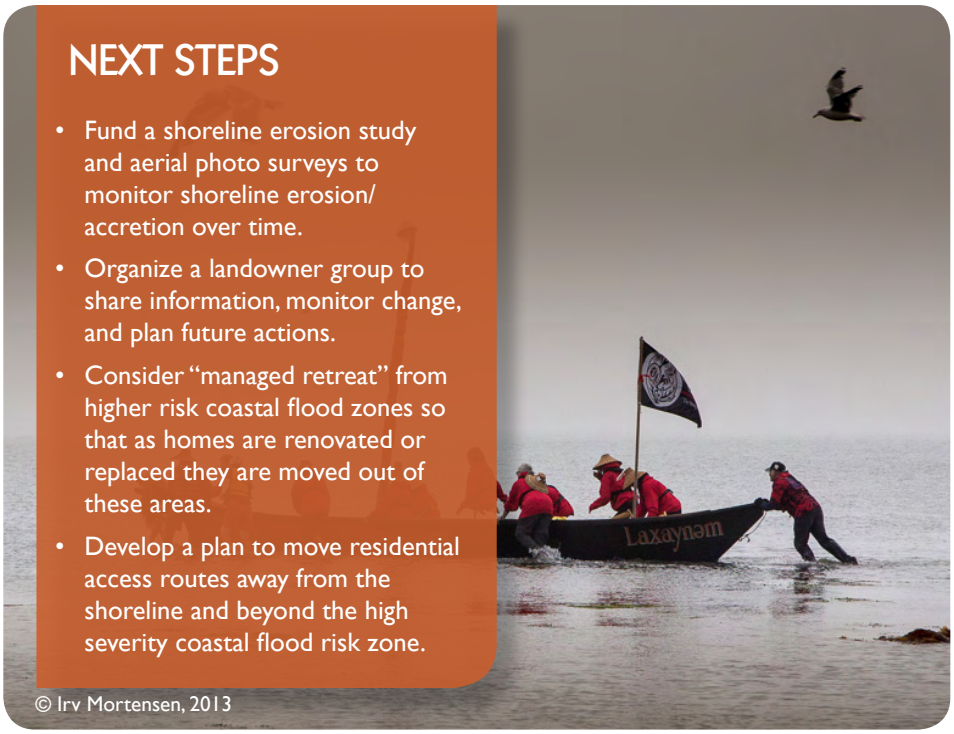
This map shows potential inundation during high tides (dark purple) and the coastal flood risk zone (light pink) for Jamestown Beach under the high severity sea level rise scenario projected to occur near the end of the century.

ACTIONS TO INCREASE RESILIENCE

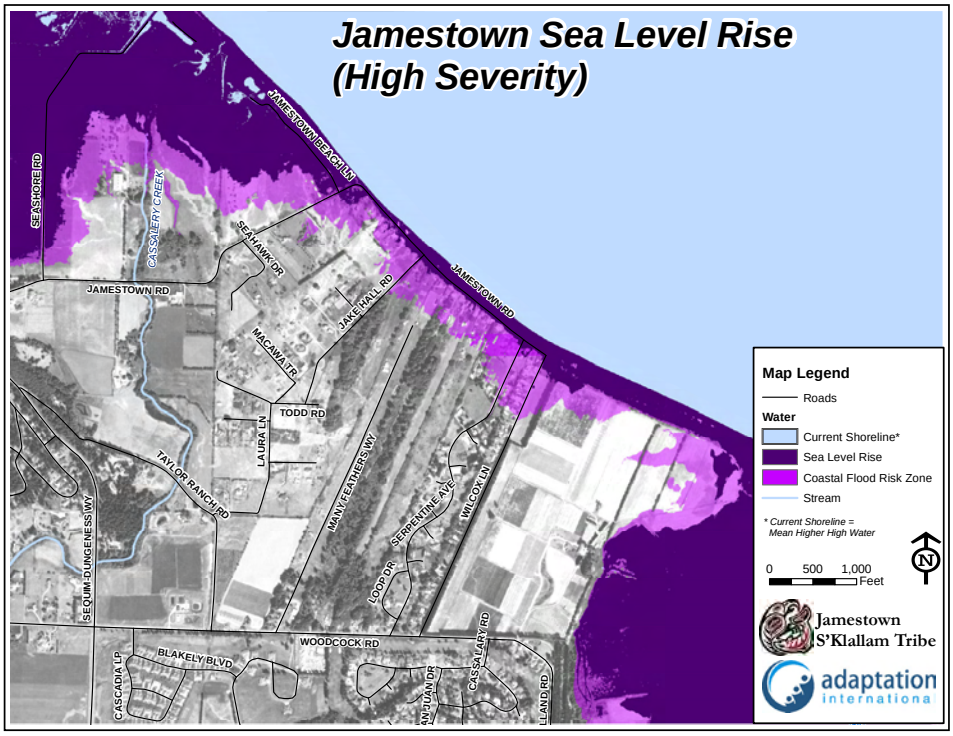
Monitoring of the shoreline will help the Tribe and Jamestown Beach residents determine how the shoreline is responding to changing sea levels and identify the areas most at risk for flooding. Longer-term options for protecting or relocating buildings should be discussed.

NEXT STEPS

- Fund a shoreline erosion study and aerial photo surveys to monitor shoreline erosion/ accretion over time.
- Organize a landowner group to share information, monitor change, and plan future actions.
- Consider "managed retreat" from higher risk coastal flood zones so that as homes are renovated or replaced they are moved out of these areas.
- Develop a plan to move residential access routes away from the shoreline and beyond the high severity coastal flood risk zone.



© Irv Mortensen, 2013



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Jamestown S'Klallam Tribe
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Key Area of Concern
Rivers End to Jamestown Beach Shoreline

VULNERABILITY	Low	Low-Med	Med	**MED-HIGH**	High	Very High
PRIORITY	Low	Low-Med	Med	Med-High	**HIGH**	Very High

IMPORTANCE
- Residential Property
- Emergency Management
- Habitat

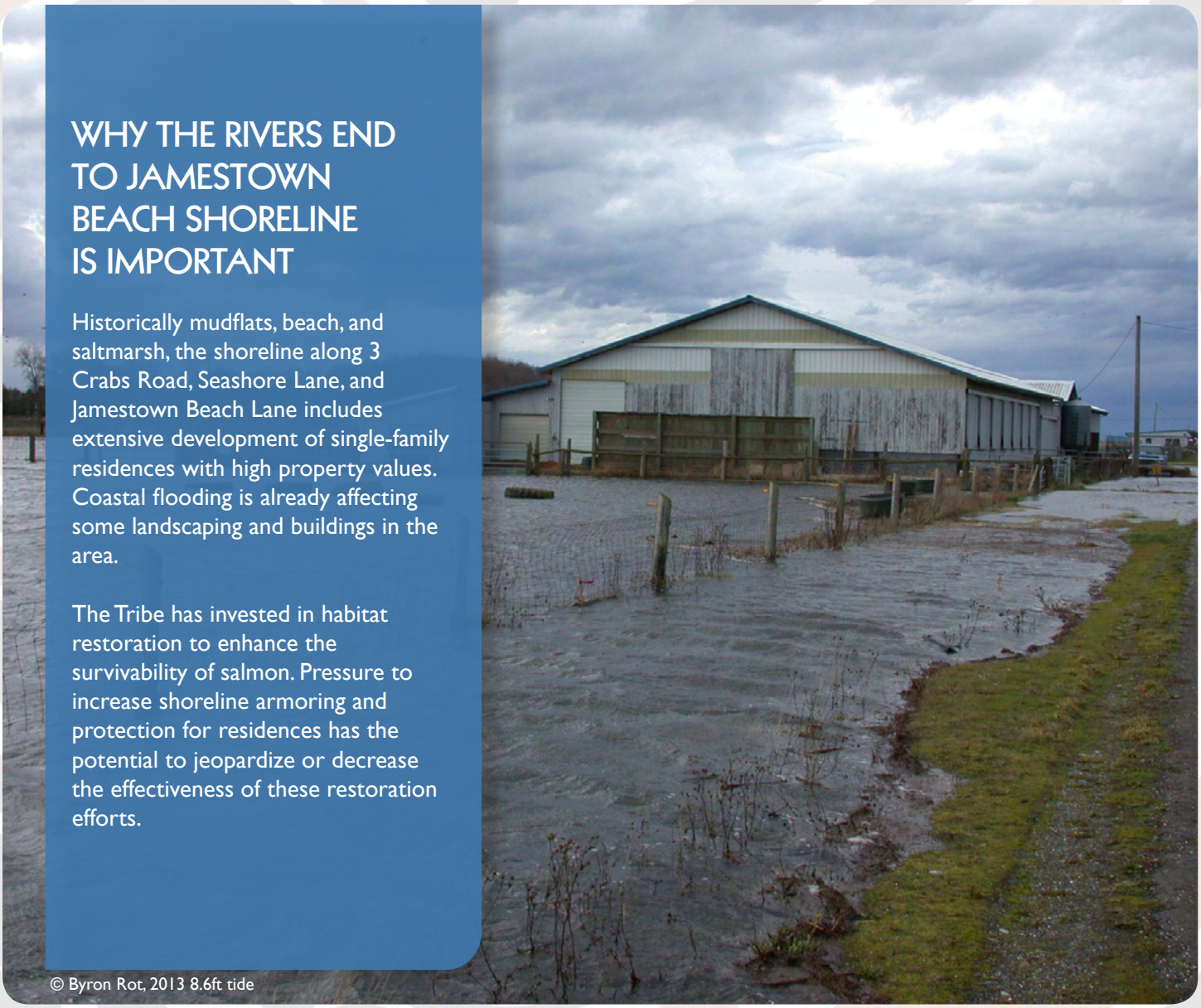
POTENTIAL IMPACTS
- Flooding
- Damage to Infrastructure
- Habitat Loss

ACTIONS
- Shoreline Monitoring
- Consider Flood Risks
- Manage Retreat

WHY THE RIVERS END TO JAMESTOWN BEACH SHORELINE IS IMPORTANT

Historically mudflats, beach, and saltmarsh, the shoreline along 3 Crabs Road, Seashore Lane, and Jamestown Beach Lane includes extensive development of single-family residences with high property values. Coastal flooding is already affecting some landscaping and buildings in the area.

The Tribe has invested in habitat restoration to enhance the survivability of salmon. Pressure to increase shoreline armoring and protection for residences has the potential to jeopardize or decrease the effectiveness of these restoration efforts.



© Byron Rot, 2013 8.6ft tide

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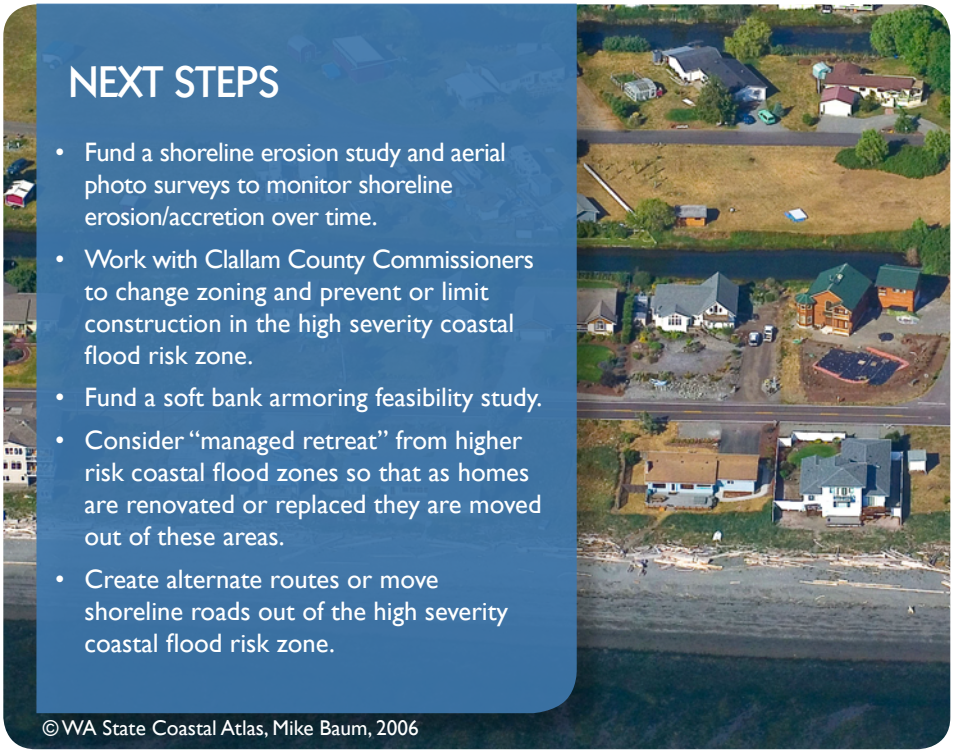
POTENTIAL IMPACTS OF CLIMATE CHANGE

Flooding annually during King Tide events already occurs in some areas, affecting access roads and residential buildings. By mid-century, many homes will face an increased risk of flooding during winter storm events. Impacts from these events could range from minor water damage to substantial sediment and debris in the first floor of the houses. Flooding may temporarily close roads, slow emergency service access, or limit resident's ability to leave and find shelter. Sea level rise will raise the water table and may flood septic systems, causing local water quality problems.

- Flooding
- Saltwater inundation
- Damage to infrastructure
- Temporary loss of access

ACTIONS TO INCREASE RESILIENCE

Effective partnerships with Clallam County, landowners, natural resource managers, and others will help reduce the impacts of sea level rise in the area.

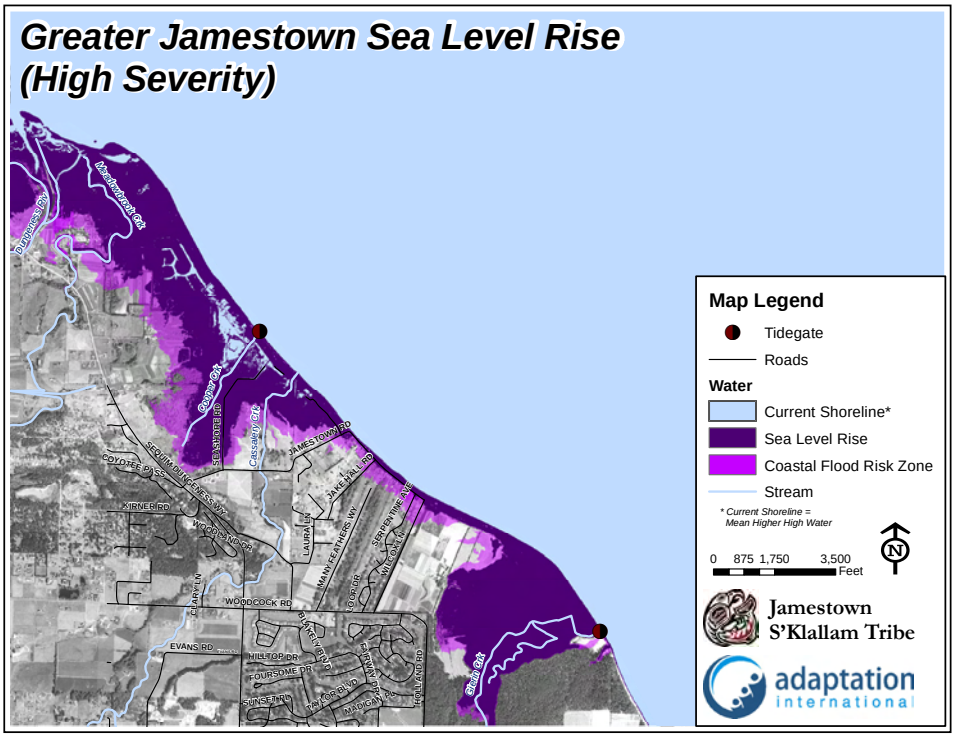


NEXT STEPS

- Fund a shoreline erosion study and aerial photo surveys to monitor shoreline erosion/accretion over time.
- Work with Clallam County Commissioners to change zoning and prevent or limit construction in the high severity coastal flood risk zone.
- Fund a soft bank armoring feasibility study.
- Consider "managed retreat" from higher risk coastal flood zones so that as homes are renovated or replaced they are moved out of these areas.
- Create alternate routes or move shoreline roads out of the high severity coastal flood risk zone.

SEA LEVEL RISE

This map shows potential inundation during high tides (dark purple) and the coastal flood risk zone (light pink) for the Rivers End to Jamestown Beach shoreline under the high severity sea level rise scenario projected to occur near the end of the century.



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Jamestown S'Klallam Tribe
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Key Area of Concern
Casino & Longhouse Market

VULNERABILITY	Low	Low-Med	**MED**	Med-High	High	Very High
PRIORITY	Low	Low-Med	Med	Med-High	**HIGH**	Very High

IMPORTANCE
- Economy
- Employment
- Tribal Programs & Services

POTENTIAL IMPACTS
- Flooding
- Wastewater Treatment
- Higher Temperatures
- Wildfire

ACTIONS
- Relocate Critical Systems
- Flood Proof Buildings
- Permeable Pavement
- Elevate New Construction

WHY THE CASINO & LONGHOUSE MARKET ARE IMPORTANT

The 7 Cedars Casino and the Longhouse Market are large revenue sources for the Tribe. Employment statistics for recent years suggest that the Casino, Longhouse Market, and Dungeness Golf Course are major employers for local Tribal Citizens.

Revenue from these businesses also provide direct funding for the Tribal Government and associated tribal programs, including the Tribe's health care program and natural resource protection efforts.

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POTENTIAL IMPACTS OF CLIMATE CHANGE

The Casino and Longhouse Market are *not* projected to be directly inundated by sea level rise or storm surge. Heavy rainfall combined with sea level rise and an extremely high tide may cause flooding of transportation corridors and adjacent land. This may also decrease the feasibility and effectiveness of a septic field for the Casino, an important concern when planning additional facilities as part of the Casino Resort complex.

- Flooding
- Wastewater Treatment
- Landscaping

ACTIONS TO INCREASE RESILIENCE

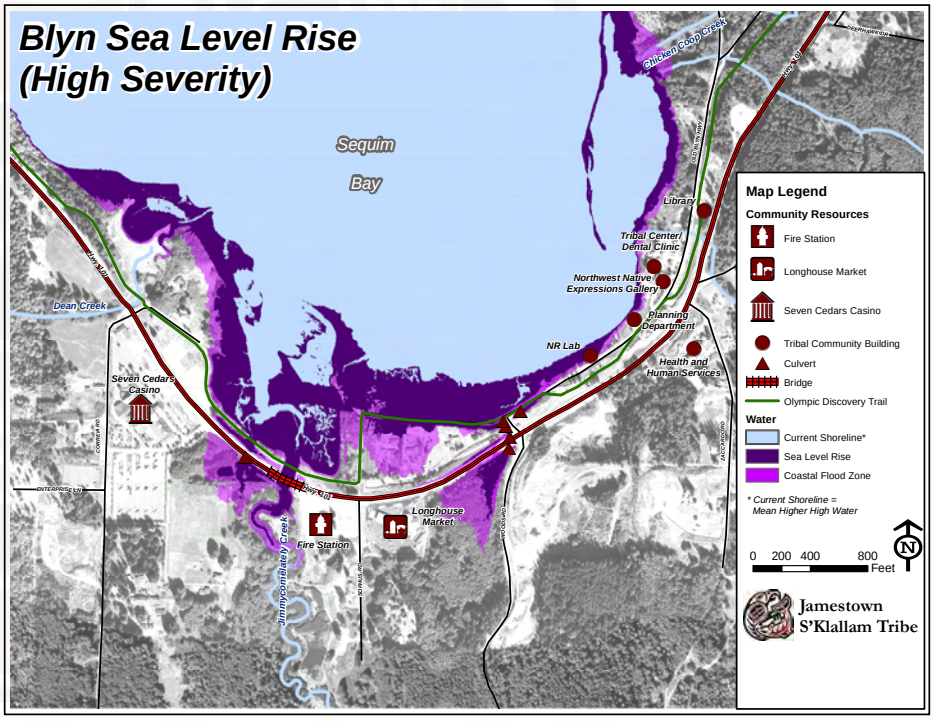
There are many actions that can help ensure the long-term success of the Casino and Longhouse Market and their continued support of vital Tribal services.

NEXT STEPS

- Flood proof the buildings by increasing ground floor elevation or building protective barriers.
- Provide multiple points of entry & exit to the facilities, including a route that is less vulnerable to flooding and wildfire.
- Move critical systems above ground floor.
- Consider protective green infrastructure in front of the facilities to create a natural buffer to storm surge and flooding.
- Ensure that any future buildings associated with the Casino and/or Longhouse Market (e.g., parking lots, hotels) are built at higher elevation and outside the projected flood risk zones.
- Use permeable paving to manage stormwater water.

BLYN SEA LEVEL RISE

The map to the right depicts the potential high tide inundation zone (dark purple) and the coastal flood risk zone (light pink) in the Tribal Campus area for a high severity sea level rise scenario projected to occur near the end of the century.



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Jamestown S'Klallam Tribe
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Key Area of Concern
Highway 101

VULNERABILITY	Low	Low-Med	Med	Med-High	HIGH	VERY HIGH
PRIORITY	Low	Low-Med	Med	Med-High	HIGH	VERY HIGH

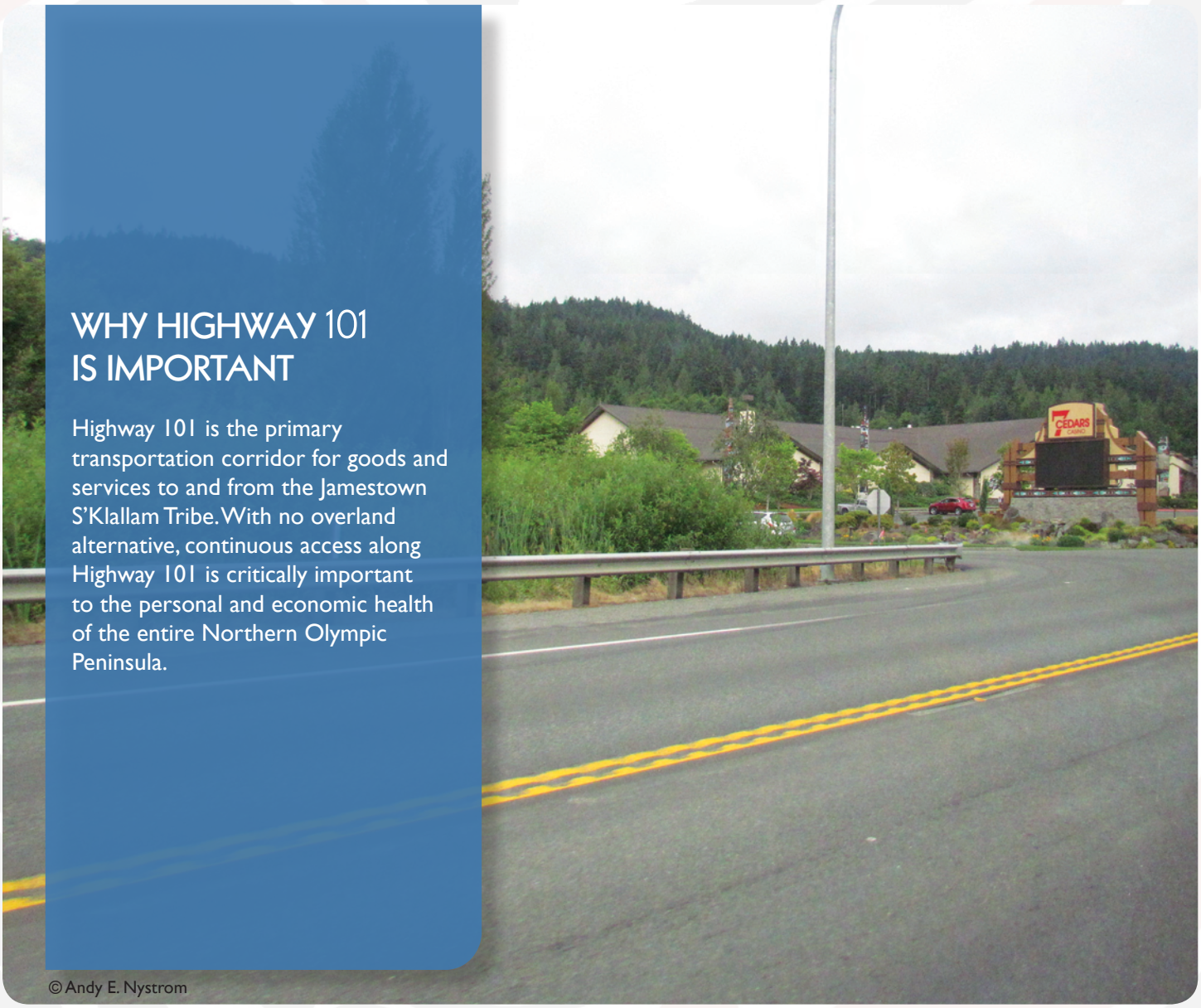
IMPORTANCE
- Access to Goods & Services
- Emergency Response

POTENTIAL IMPACTS
- Flooding
- Temporary Loss of Access

ACTIONS
- Emergency Kits
- Evacuation Routes
- Natural Flood Plains
- Elevate Roads

WHY HIGHWAY 101 IS IMPORTANT

Highway 101 is the primary transportation corridor for goods and services to and from the Jamestown S'Klallam Tribe. With no overland alternative, continuous access along Highway 101 is critically important to the personal and economic health of the entire Northern Olympic Peninsula.



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POTENTIAL IMPACTS OF CLIMATE CHANGE

Sea level rise projections suggest that an extreme marine storm event has the potential to flood Highway 101 at the head of Discovery Bay in the near future and in the Tribal Campus over the long-term. Flooding could result in the inability to use Highway 101 during and immediately following extreme storms. In an emergency situation, a degraded transportation system would prevent or delay responders reaching victims or victims reaching shelters and emergency care centers.

- Temporary loss of regional access
- Impaired emergency services
- Flooding of primary transportation route

SEA LEVEL RISE IN DISCOVERY BAY

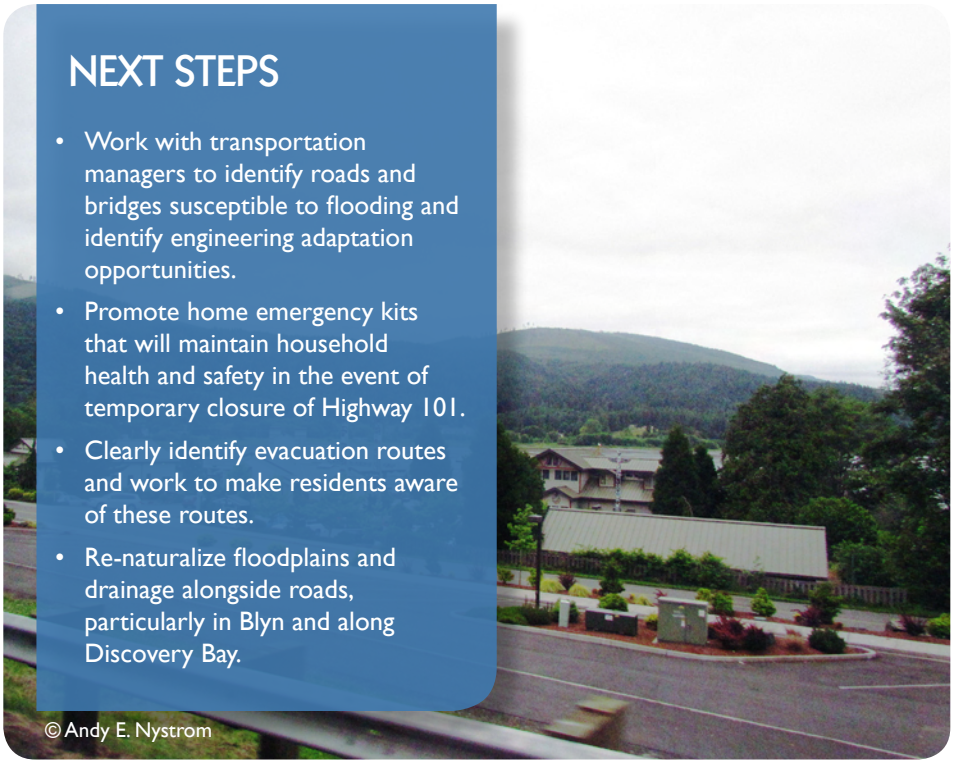
This map shows the potential inundation of Highway101 at the head of Discovery Bay under the medium severity sea level rise scenario, projected to occur between 2055-2090. Dark purple areas would be covered under high tides and light pink areas would be inundated during 50-year storm events.

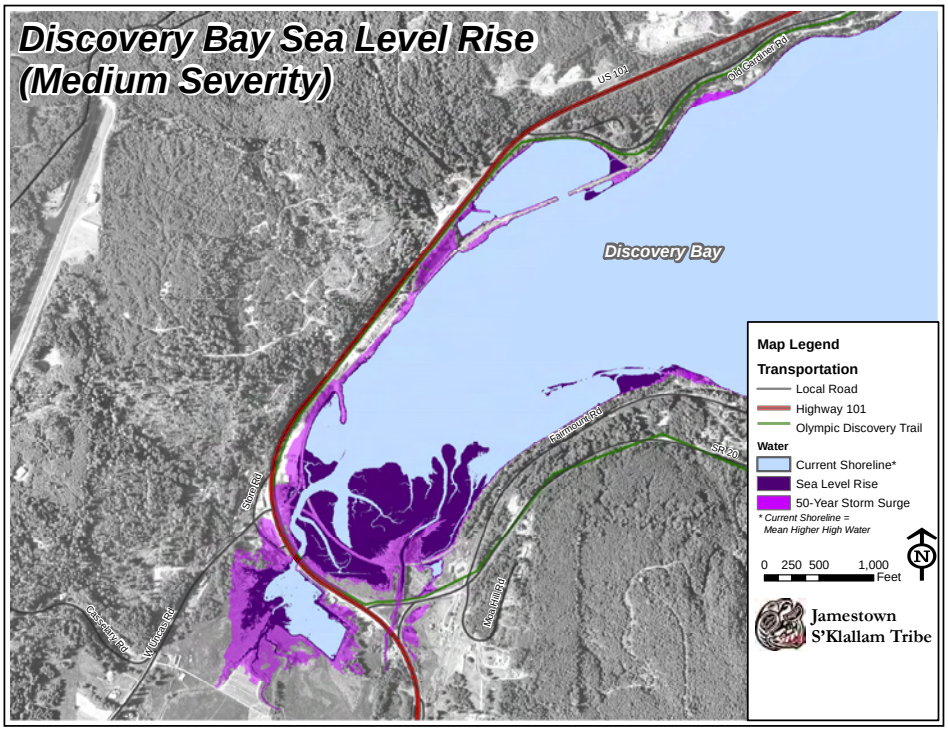
ACTIONS TO INCREASE RESILIENCE

The following actions will help limit potential climate change influenced disruption to transportation along Highway 101 in the Northern Olympic Peninsula.

NEXT STEPS

- Work with transportation managers to identify roads and bridges susceptible to flooding and identify engineering adaptation opportunities.
- Promote home emergency kits that will maintain household health and safety in the event of temporary closure of Highway 101.
- Clearly identify evacuation routes and work to make residents aware of these routes.
- Re-naturalize floodplains and drainage alongside roads, particularly in Blyn and along Discovery Bay.





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Jamestown S'Klallam Tribe
Climate Adaptation Plan 2013

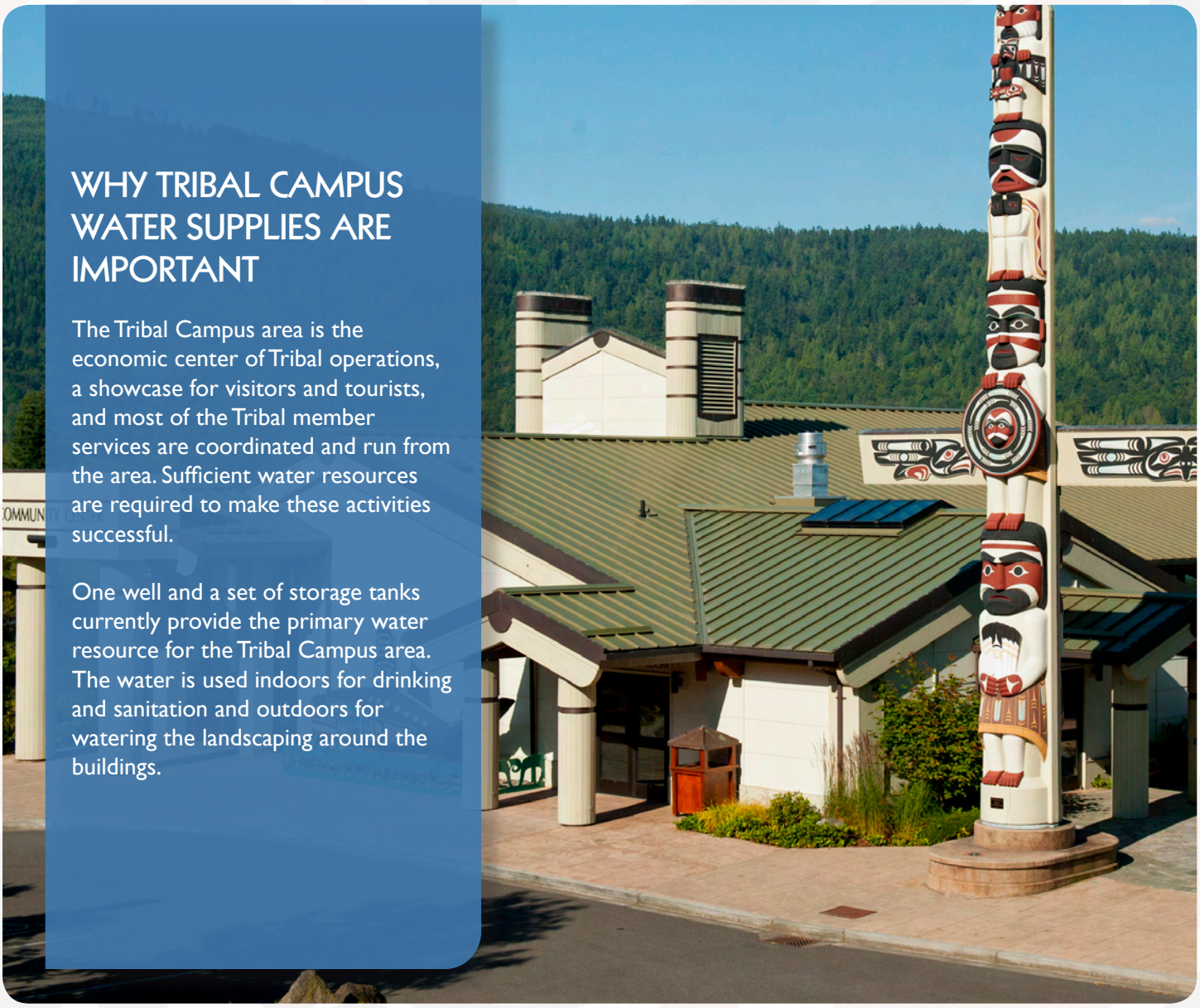
Key Area of Concern
Campus Water Supply

VULNERABILITY	Low	Low-Med	Med	**MED-HIGH**	High	Very High
PRIORITY	Low	Low-Med	Med	Med-High	**HIGH**	Very High

IMPORTANCE
- Economy
- Health and Welfare
- Tribal Services

POTENTIAL IMPACTS
- Changing Precipitation Patterns
- Shifts in Groundwater Availability

ACTIONS
- Water Conservation
- Rainwater Capture
- Drought Tolerant Landscaping
- Well Relocations



WHY TRIBAL CAMPUS WATER SUPPLIES ARE IMPORTANT

The Tribal Campus area is the economic center of Tribal operations, a showcase for visitors and tourists, and most of the Tribal member services are coordinated and run from the area. Sufficient water resources are required to make these activities successful.

One well and a set of storage tanks currently provide the primary water resource for the Tribal Campus area. The water is used indoors for drinking and sanitation and outdoors for watering the landscaping around the buildings.

For more information about the Jamestown S'Klallam Tribe Climate Adaptation Plan, contact:
Hansi Hals | hhals@jamestowntribe.org | 360.681.4601

POTENTIAL IMPACTS OF CLIMATE CHANGE

Changing precipitation patterns, flooding events, and smaller snowpack have the potential to decrease local groundwater supplies or create seasonal shifts in availability. Higher temperatures will also increase water loss from plants and surface water sources at the campus and increase water use. In the event of water loss at the Tribal Campus, immediate outside water provision would be necessary to maintain a safe and comfortable work environment. The current campus storage tanks are sufficient to maintain critical water service for a few days (not including landscaping).

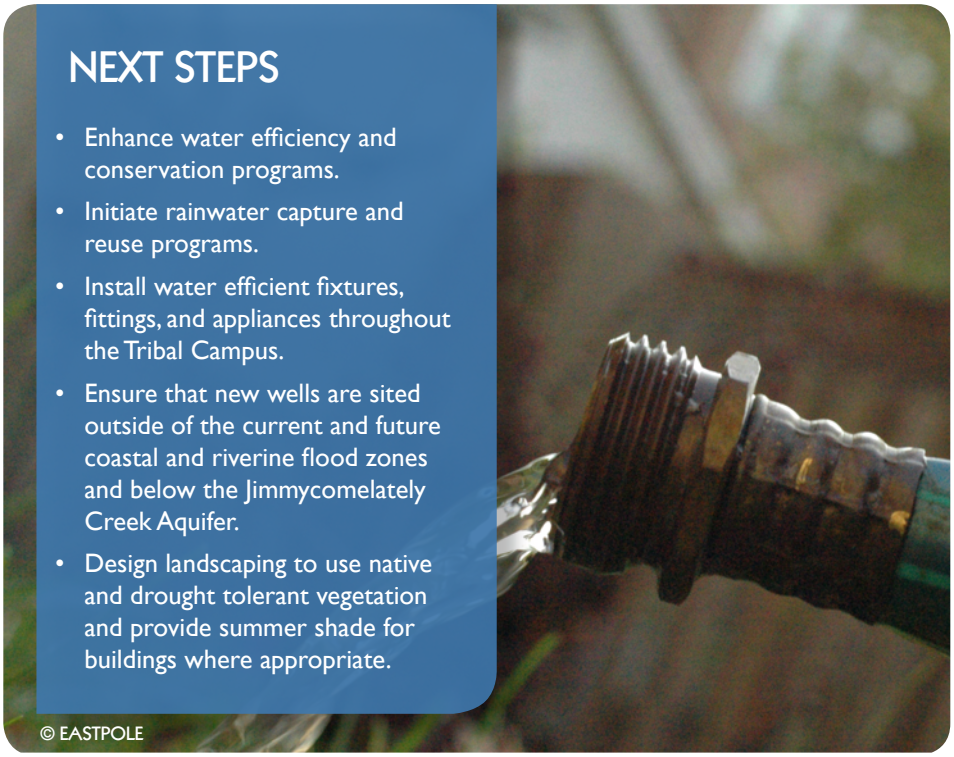
- Changing Groundwater Availability
- Higher temperatures
- Increased Water Usage

ACTIONS TO INCREASE RESILIENCE

There is an ongoing effort to expand and diversify the water supply resources for the Tribal Campus area. Additional wells are in development and designed to supplement existing water supplies. An immediate and low cost method of extending water supplies is to increase water conservation through modification of behaviors and use of more efficient appliances.

NEXT STEPS

- Enhance water efficiency and conservation programs.
- Initiate rainwater capture and reuse programs.
- Install water efficient fixtures, fittings, and appliances throughout the Tribal Campus.
- Ensure that new wells are sited outside of the current and future coastal and riverine flood zones and below the Jimmycomelately Creek Aquifer.
- Design landscaping to use native and drought tolerant vegetation and provide summer shade for buildings where appropriate.



Jamestown S'Klallam Tribe
Climate Adaptation Plan 2013

Key Area of Concern
Jamestown Beach Water Supply

VULNERABILITY	Low	Low-Med	**MED**	Med-High	Very High	Very High
PRIORITY	Low	Low-Med	**MED**	Med-High	High	Very High

IMPORTANCE
- Water Availability

POTENTIAL IMPACTS
- Flooding
- Salt Water Intrusion
- Health and Wellness

ACTIONS
- Relocate Well
- Second Water Source
- Study Groundwater
- Monitoring & Testing

WHY THE JAMESTOWN BEACH WATER SUPPLY IS IMPORTANT

The homes located along Jamestown Beach Road, as well as many of the homes inland, all receive their water from a nearby artesian well that was constructed in the 1960s.

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POTENTIAL IMPACTS OF CLIMATE CHANGE

The well is located very close to the beach and is within the projected storm surge zone under the medium severity sea level rise scenario and completely inundated at high tide under the high severity sea level rise scenario. Flooding of the land immediately above or surrounding the well has the potential to contaminate the water source.

- Flooding
- Saltwater Intrusion
- Damage to Well or Pipes
- Temporary Loss of Drinking Water

ACTIONS TO INCREASE RESILIENCE

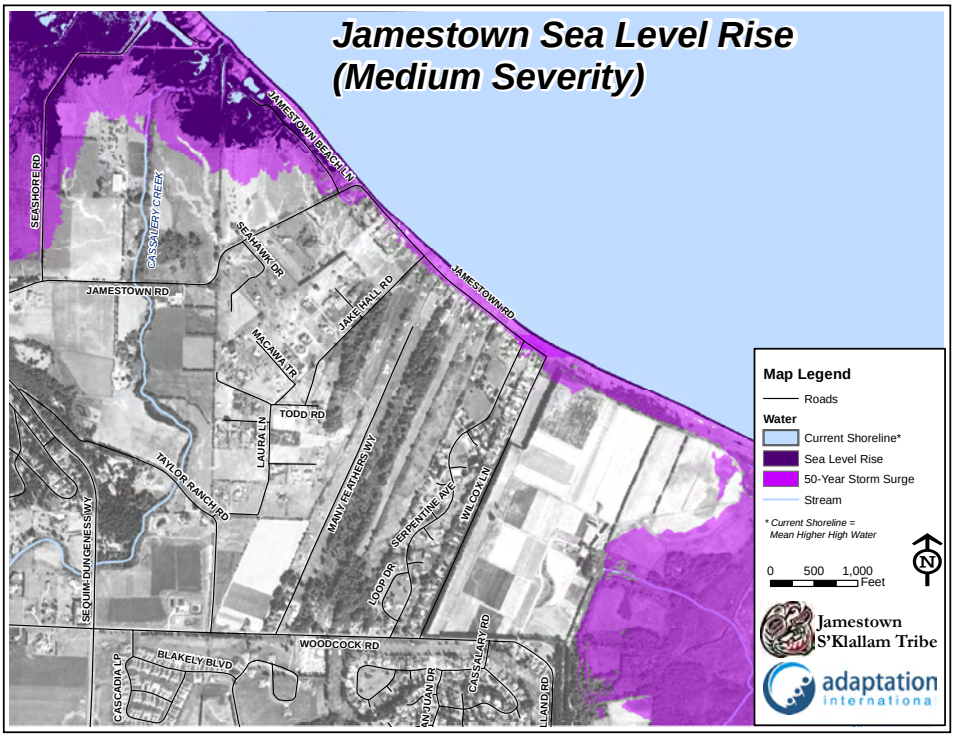
The well and pump are ageing and in need of replacement. The most cost effective time to decrease the vulnerability of the well to coastal flooding to make improvements is in conjunction with other repairs or replacement.

NEXT STEPS

- Conduct a groundwater assessment to evaluate the potential for saltwater intrusion with an elevated water table as sea levels rise.
- Evaluate the potential for connecting the residences in the area to a secondary water supply.
- Ensure that any new well(s) are located outside of coastal flood zones.
- Following any major flood event, conduct well water sampling to ensure water safety standards are being met.

JAMESTOWN SEA LEVEL RISE

This maps shows the potential high tide inundation (dark purple) and coastal flood risk zone (light pink) for the Jamestown Beach Area under the medium severity sea level rise scenario projected to occur between 2055-2090.



Jamestown S'Klallam Tribe
Climate Adaptation Plan 2013

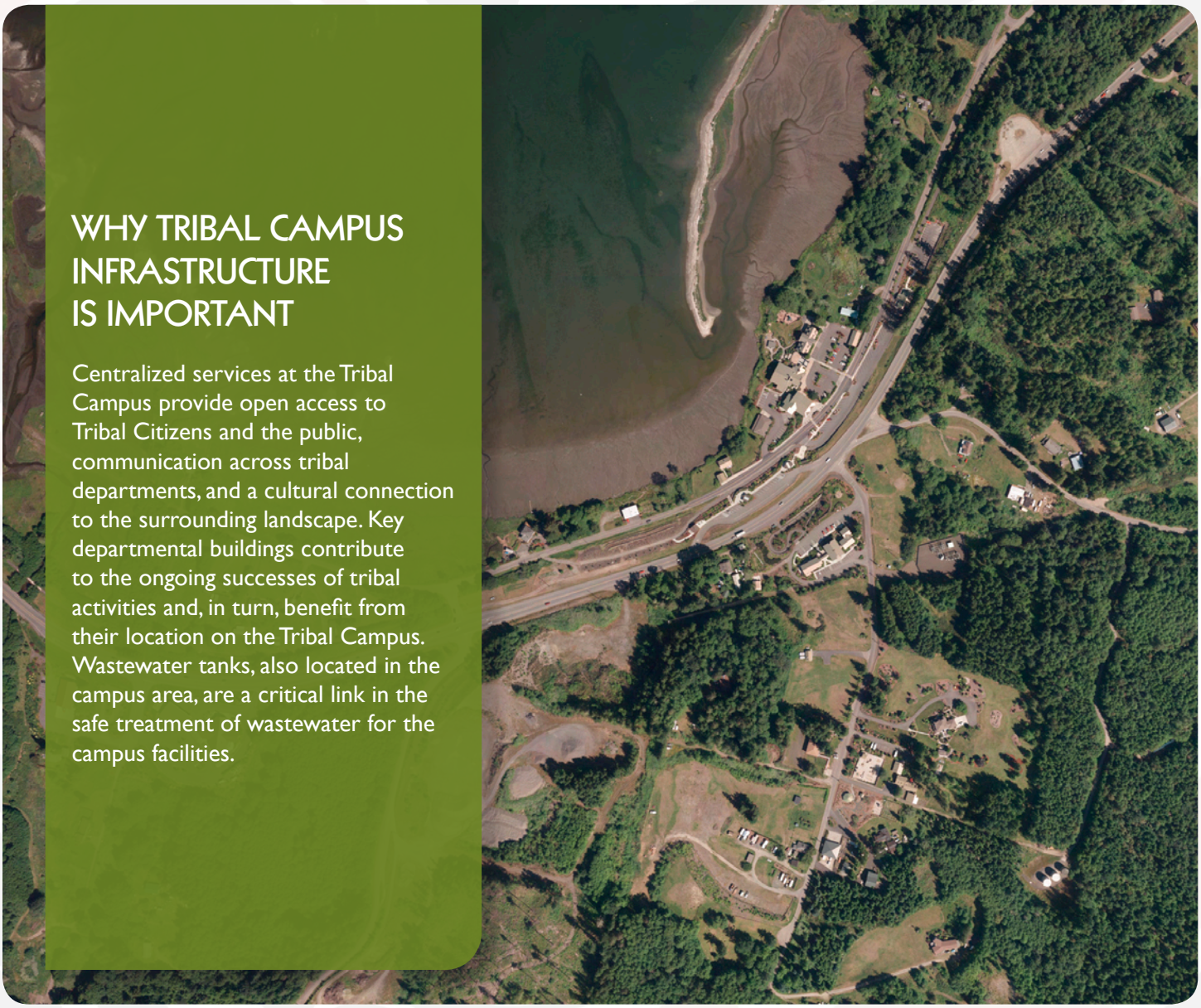
Key Area of Concern
Campus Infrastructure

VULNERABILITY	Low	**LOW-MED**	Med	Med-High	High	Very High
PRIORITY	Low	Low-Med	**MED**	Med-High	High	Very High

IMPORTANCE	POTENTIAL IMPACTS	ACTIONS
• Health and Wellness	• Flood Damage	• Consider Flood Risk
• Organizational Culture	• Loss of Use	• Relocate Buildings
• Economy	• Erosion	• Manage Retreat

WHY TRIBAL CAMPUS INFRASTRUCTURE IS IMPORTANT

Centralized services at the Tribal Campus provide open access to Tribal Citizens and the public, communication across tribal departments, and a cultural connection to the surrounding landscape. Key departmental buildings contribute to the ongoing successes of tribal activities and, in turn, benefit from their location on the Tribal Campus. Wastewater tanks, also located in the campus area, are a critical link in the safe treatment of wastewater for the campus facilities.



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POTENTIAL IMPACTS OF CLIMATE CHANGE

On the Tribal Campus, the Natural Resources Lab and Planning Department buildings are the most vulnerable to sea-level rise in the near future. The foundation of the Natural Resources Lab in particular may be subject to flooding during storm events. Office staff would require relocation during and immediately after an inundation event. Coastal flooding could also inundate the campus wastewater collection tank area, disrupting safe transfer of wastewater to the processing facilities. Over the longer term, continued flooding and sea-level rise could erode and destabilize the area around the wastewater tanks and the buildings.

ACTIONS TO INCREASE RESILIENCE

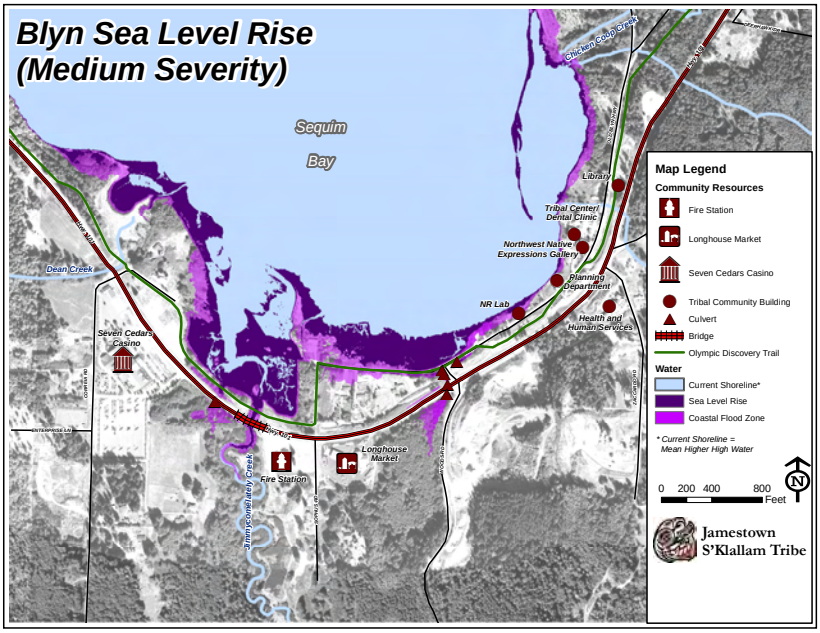
These buildings and the wastewater tanks are aging and will require replacement or substantial upgrades within the next 10 years. It will be cost effective to incorporate actions to increase resilience at that time.

NEXT STEPS

- Develop a relocation and business continuity plan in the event that campus buildings and infrastructure are unable to be used during a flood event.
- Consider "managed retreat" from higher risk coastal flood zones so as buildings are renovated or replaced, they are moved out of future flood risk zones.
- Incorporate consideration of current and future coastal flood risk zones into any building, utility, or wastewater master plan.

SEA LEVEL RISE IN BLYN

This map show the potential inundation during high tides (dark purple) and coastal flood risk zone (light pink) for the Tribal Campus Area for the medium severity sea level rise scenario projected to occur between 2055-2090.



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