

Jamestown S’Klallam Tribe

Adaptation Plan Addendum: Two additional Key Areas of Concern



Jamestown S’Klallam Tribe



September 2013

Acknowledgements

Thank You

This project would not have been successful without the combined efforts of all the individuals listed below. The collaborative approach taken by the Jamestown S’Klallam Tribe, Adaptation International, and Washington Sea Grant proved invaluable in identifying the key areas of concern, evaluating potential climate impacts, and developing a suite of adaptation strategies to help the Tribe begin preparing for climate change. With this project, the Jamestown S’Klallam Tribe has created a foundation for on-going climate action and made a crucial step towards becoming climate resilient.

Cover Image: Irv Mortensen, 2013

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Table of Contents

A.	THE PROCESS	6
B.	JAMESTOWN BEACH	7
1.	<i>Why Jamestown Beach is Important</i>	7
2.	<i>Potential Impacts</i>	7
3.	<i>Actions to Increase Resilience</i>	10
C.	RIVERS END TO JAMESTOWN BEACH SHORELINE	11
1.	<i>Why the Rivers End to Jamestown Beach Shoreline is Important</i>	11
2.	<i>Potential Impacts</i>	11
3.	<i>Actions to Increase Resilience</i>	14
D.	REFERENCES	15

List of Figures

Figure 1: Vulnerability for each key area of concern.....	6
Figure 2: Grays Marsh shoreline locations 1870-2001	8
Figure 3: Jamestown Beach high severity sea level rise map.....	9
Figure 4: Shoreline change near Rivers End 1855-2003	12
Figure 5: Rivers End to Jamestown Beach high severity sea level rise map	13

List of Tables

Table 1: Key Area of Concern Priority	6
Table 2: Resilience strategies for Jamestown Beach.....	10
Table 3: Resilience strategies for the Rivers End to Jamestown Beach Shoreline.	14

A. The Process

While discussing the final report of the Jamestown S’Klallam Tribe’s Climate Change Adaptation project¹, members of the climate change working group decided that it would be valuable to develop summaries for two additional key areas of concern. They determined that in order to begin to implement adaptation actions and involve other stakeholders outside the Tribe, it was important to consider the potential impacts of sea level rise and storm surge on two key areas: 1) Jamestown Beach; and 2) the shoreline West of Jamestown Beach to Rivers End. The working group members and project managers felt that effective engagement with land owners in those areas as well as Clallam County Officials would be furthered by explicit consideration of the climate change impacts to these areas.

On August 14th, a sub-group of the climate change committee met to discuss these additional key areas of concern. They followed a similar process to identify the exposure, sensitivity, adaptive capacity, and vulnerability of these areas (Figure 1). The group also determined the priority of each area of concern (Figure 2). See the full report for more detail on this process².

Vulnerability Ranking Table					
Potential Opportunity					
Low Vulnerability					
Medium-Low Vulnerability					
Medium Vulnerability					
Medium-High Vulnerability					
High Vulnerability					

		Sensitivity: Low → High				
		S0	S1	S2	S3	S4
Adaptive Capacity: Low ↓ High	AC0					
	AC1					
	AC2				JB	RE → JB
	AC3					
	AC4					

Figure 1: Vulnerability for each key area of concern. The vulnerability is based on assessed sensitivity and adaptive capacity. Jamestown Beach (JB) has a medium vulnerability where the Rivers End to Jamestown Beach Shoreline (RE – JB) has medium – high vulnerability.

Table 1: Key Area of Concern Priority. Jamestown Beach is considered a Very High Priority (30 points) and the Shoreline from Rivers End to Jamestown Beach is a High Priority (28 points).

Exercise 3: Prioritizing Key Vulnerabilities								
Vulnerability Identified	Magnitude of Impact	Timing of Impact	Persistence and Reversibility of Impacts	Likelihood of Impacts and Vulnerabilities	Importance of the System at Risk	Distributional Nature of Impacts and Vulnerabilities	Potential for Adaptation	Total Score
<i>Jamestown Beach</i>	5	3	4	5	5	5	3	30
<i>Shoreline from Rivers End to Jamestown Beach</i>	4	4	3	5	5	3	4	28

B. Jamestown Beach

Medium Vulnerability**Very High Priority**

1. Why Jamestown Beach is Important

In 1874, Jamestown Tribal citizens pooled their money and purchased 210 acres of land at Jamestown Beach. They did this in part to avoid being moved with other tribes to the Skokomish reservation. The land was divided into long strips in order to provide each family with beach access for launching and landing their canoes and for shellfish harvesting. The size of the each lot was determined by the funds the family contributed towards the purchase. This land became the original settlement and physical center of Jamestown S’Klallam Tribe. The first schoolhouse in Sequim was built on Jamestown Beach in 1878 and also doubled as a church. Today, much of the property is still owned by Jamestown S’Klallam Tribe or tribal families, and the beach is the landing site for the canoe journey.

For many Tribal Citizens, Jamestown Beach is still the cultural center of the Tribe. Even after receiving Federal Recognition in 1981, the majority of the tribal government operations have moved to the tribal campus in Bly, Jamestown Beach still represents the heart of the Tribe. Many tribal elders grew up on the beach and even for those not living on the beach maintaining the Tribe’s connection to the area is very important. The continued support and recognition of the Tribe’s cultural heritage represented by Jamestown Beach is behind the Tribe’s efforts to purchase additional parcels of land in the area as well as the ultimate “Very High Priority” ranking for this area of concern by members of the climate change working group.

2. Potential Impacts

The Jamestown Beach shoreline is part of an ever changing and dynamic coastal environment that includes sediment erosion, sediment accretion, and human based land use changes that all impact the shoreline. Sea levels are rising, and will continue to rise, adding higher water levels into this complicated mix of factors affecting the shoreline.

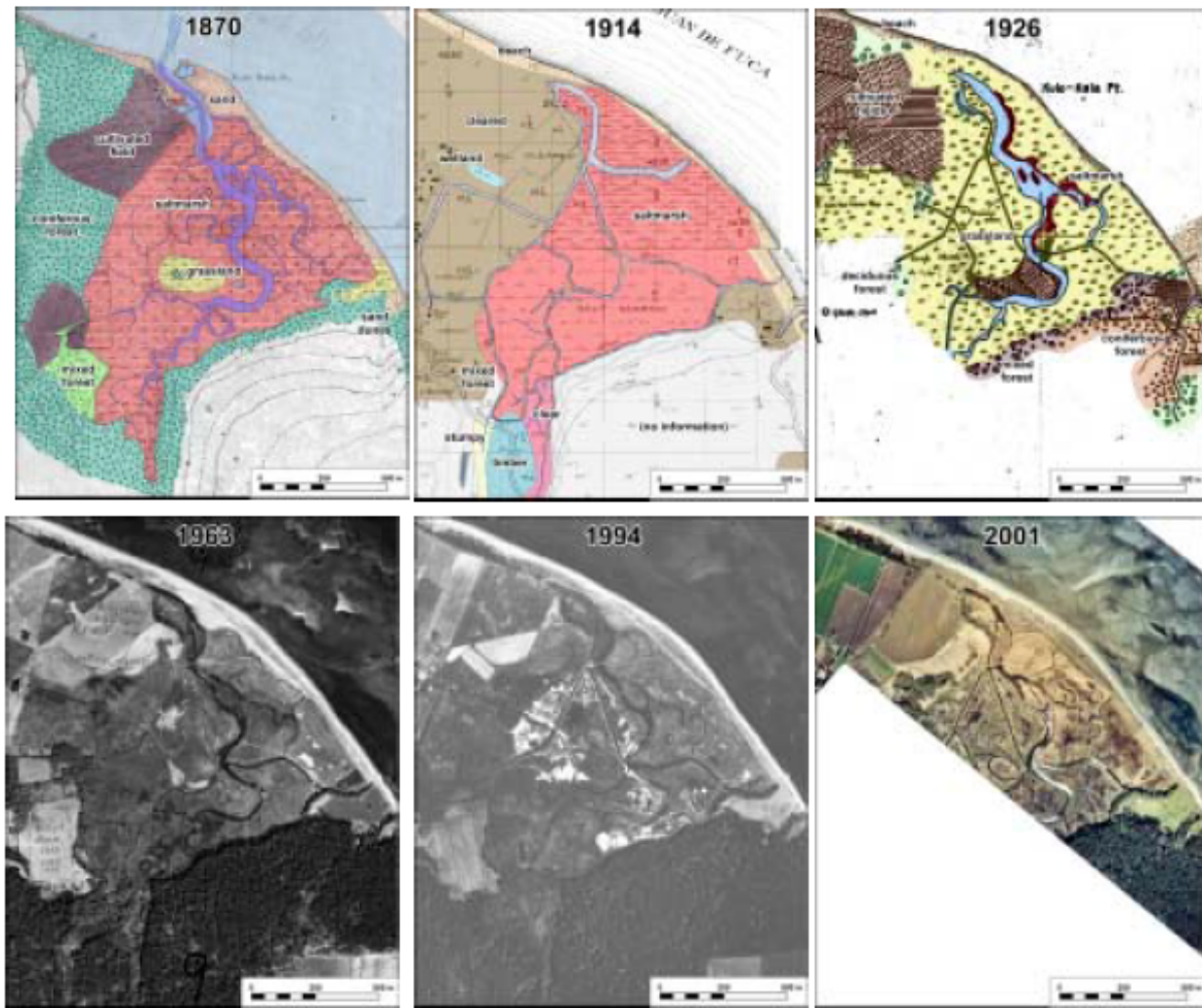


Figure 2: Grays Marsh shoreline locations 1870-2001. The shoreline locations near Grays Marsh (just East of Jamestown Beach) highlight the variable shoreline environment near Jamestown Beach (Collins, 2005, Figure 25³). Many of these changes were driven by land use change in addition to natural shoreline dynamics.

As the coastal water elevation increases, it creates a new baseline for high tides, storm surge, and may cause more severe flooding from storms. The residents of Jamestown Beach are afforded some protection from storm surge by the beach berm, road, and elevation of their lots. However, by mid-century many of the houses along Jamestown Beach Road will be at-risk of flooding from storm surge during severe storm events. This flooding could range from minor water damage to substantial coastal debris in the first floor of the houses.

By 2100, the risk of flooding to residences will be high, and homes could be flooded during annual king tides. Sea level rise may elevate the groundwater table and storm surge could inundate septic systems causing local water quality problems from the release of raw sewage. Flooding may also temporarily close Jamestown Road, preventing emergency services access or decreasing the ability for residents to find shelter during storm events.

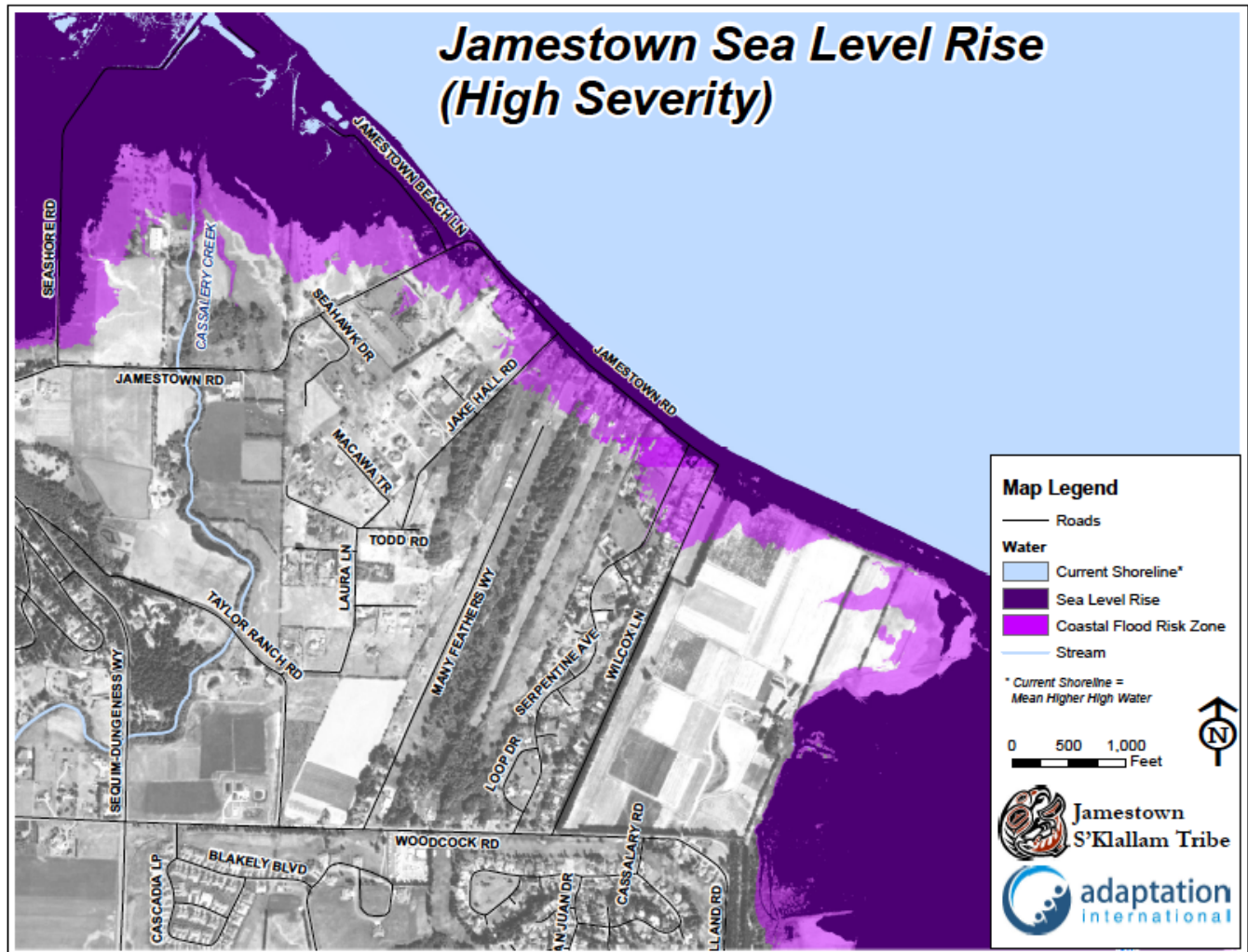


Figure 3: Jamestown Beach high severity sea level rise map. This map shows the potential inundation during high tides (dark purple) and the corresponding coastal flood risk zone (light pink) for Jamestown Beach under the high severity sea level rise scenario projected to occur near the end of the century.

It will take time for sea level rise to occur and the high severity scenario shown here is not projected to occur until the end of the century. However, this map does not incorporate estimates of dynamic shoreline processes such as the potential for increased erosion or the potential for a higher water table to disrupt drain fields for septic systems. Nor does this map include projections of changes in wave dynamics or storm orientations that could create wave pileup on the beaches. These unmapped processes have the potential to increase the extent and magnitude of coastal flooding well in advance of what the sea level rise maps project.

3. Actions to Increase Resilience

Monitoring the shoreline will help the Tribe and the Jamestown Beach residents determine how the beach is responding to changing sea levels and identify the areas that are most at risk from flooding in the near term. Longer-term options for protecting or relocating buildings should be discussed. To limit the short-term and long-term impacts of sea level rise on Jamestown Beach, the Jamestown S’Klallam Tribe should consider, to the extent appropriate, the following strategies.

Table 2: Resilience strategies for Jamestown Beach. This table provides a select list of key actions to increase resilience and number of criteria to be used in the evaluation, prioritization, and selection of strategies.

	Cost	Ease of Implementation	Political/Community Support	Timing of Action	Partnerships Required
Jamestown Beach Shoreline¹					
Fund a shoreline erosion study and aerial photo surveys to monitor shoreline erosion/accretion over time.	Medium	Easy	Medium	Immediate	No on Tribal land, Yes on private or County land
Organize a landowner group to share information, monitor change, and plan future actions.	Low	Easy	Unknown	Immediate	County & Conservation District
Work with Clallam County Commissioners to change zoning and prevent, or limit, construction in the high severity coastal flood risk zone.	Low	Hard	Unknown	Short-term	Landowners & County
Fund a soft bank armoring feasibility study.	Low – Medium	Easy	High	Short-term	Landowners & County
Determine whether the repair and replacement of existing septic systems or regional alternatives to on-site septic systems could substantially increase water quality and decrease contamination in the area.	High	Medium	Unknown	Medium-term	Landowners & County
Consider “managed retreat” from high risk coastal flood zones so that as homes are renovated or replaced they are moved out of these areas.	Medium	Medium	Medium	Medium-term	Landowners & County
Create alternative access routes or move shoreline roads out of the high severity coastal flood risk zone.	High	Hard	Unknown	Medium-term to Long-term	Landowners & County
Consider whether the Tribe should set aside funds to acquire at risk properties or assist Tribal Citizens in moving their homes beyond the high severity coastal flood risk zones.	High	Hard	Unknown	Medium – term to Long-term	Landowners & County

¹ Qualitative metrics are as follows: Cost (Low, Medium, High); Ease of Implementation (Easy, Moderate, Hard); Political/Community Support (Low, Medium, High); Timing of Action (Immediate, Medium-Term, Long-Term); Required Partnerships (Yes, No).

C. Rivers End to Jamestown Beach Shoreline

**Medium - High
Vulnerability**

High Priority

1. Why the Rivers End to Jamestown Beach Shoreline is Important

Historically, this shoreline was mudflats, beach, and saltmarsh. Now, the shoreline along 3 Crabs Road, Seashore Lane, and Jamestown Beach Lane includes extensive development of family residences with high property values. Annual storm events already flood some coastal areas and affect landscaping and buildings.

The Tribe has invested significant resources in this area for habitat restoration to enhance the survivability of salmon and other marine species. Functional and vibrant habitat at the mouth of the Dungeness River plays a critical role in the long-term success of other in-river restoration efforts and the success of salmon. Pressure from homeowners to increase shoreline armoring and protection for residences has the potential to jeopardize or decrease the effectiveness of these restoration efforts.

2. Potential Impacts

Shoreline change is not a new phenomena in this region. The area is “... *within a very dynamic zone of ‘rapid longshore transport’*. Thus, the shoreline area is subject o frequent and rapid changes, including sediment accretion and erosion (Clallam Conservation District, 2009, pg. 8)⁴”. Flooding annually during king tide events already occurs in some areas. Access roads and residential buildings are all at very low elevations. Impacts from winter storm events as sea level rise could range from minor water damage to substantial sedimentation and debris in the first floor of houses in the area. Flooding may temporarily close roads, slow emergency service access, or limit resident’s ability to leave and find shelter. Sea level rise will also elevate the water table and may flood septic systems, causing local water quality problems.

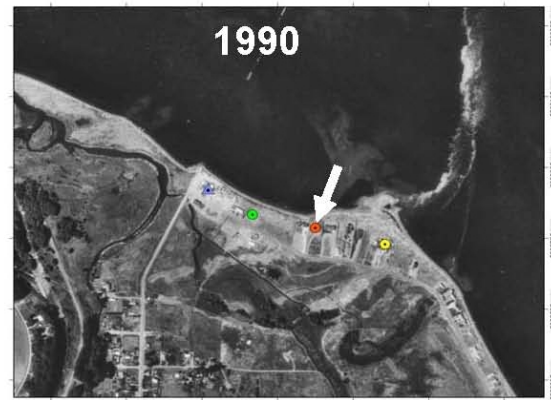
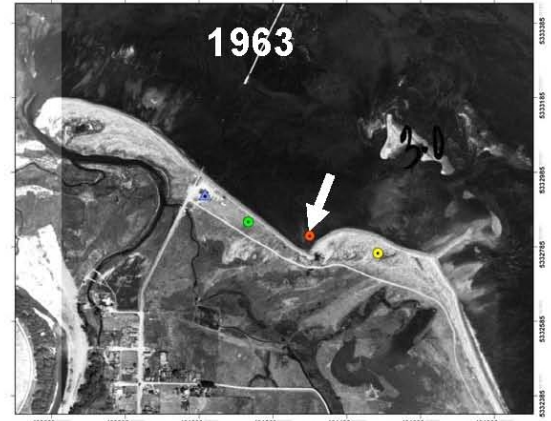
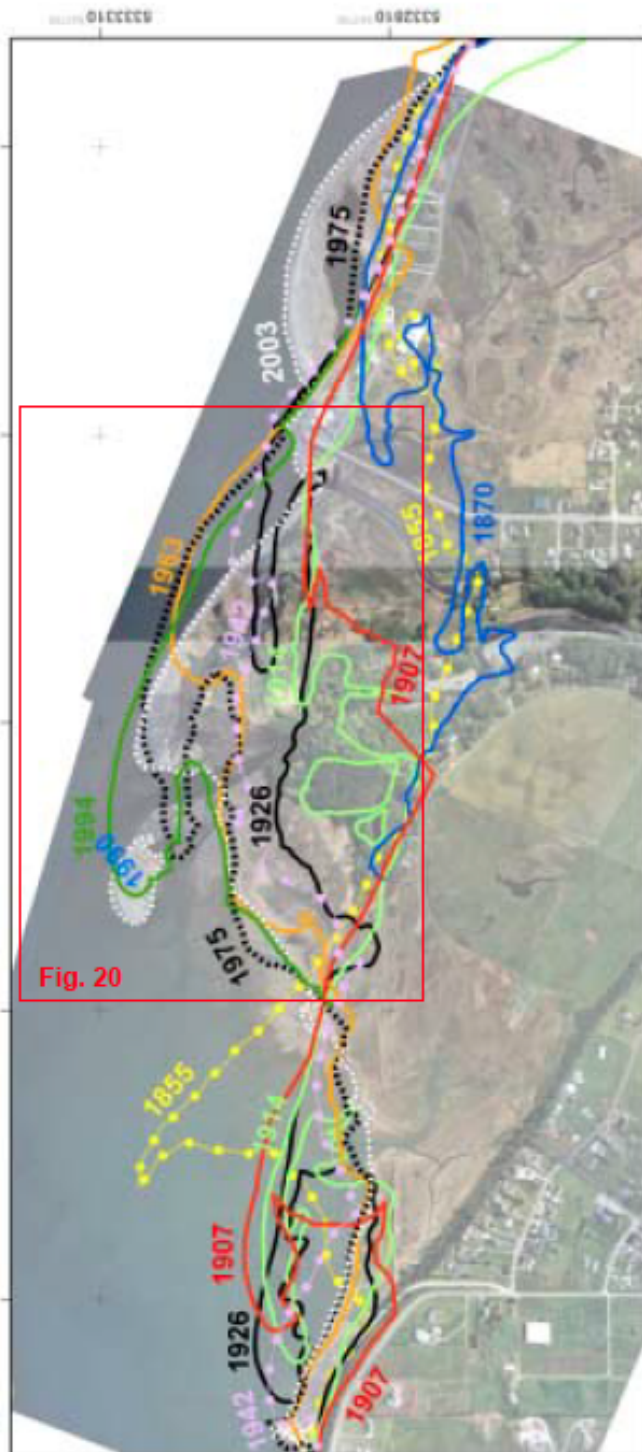


Figure 7 - Shoreline development along Three Crabs Road (source: Collins, 2006).

Figure 4: Shoreline change near Rivers End 1855-2003. These maps (Collins, 2005⁵ -- left; and Clallam Conservation District, 2009⁶ – Right) highlight the dynamic shoreline environment near the mouth of the Dungeness River. The figure on the left shows changes to the shoreline over time with different colored lines highlight the shoreline at that year. The aerial photos on the right show shoreline changes in the 3 Crabs Road area relative to three homes (green, red, and yellow dots) over 40 years.

Looking at historical shoreline change (much of which is based on changing land use patterns) is not a projection of how the shoreline will change in the future. It is used merely to highlight the dynamic nature of the coastal environment. It is realistic for landowners in the area, the County, and the Tribe to expect and begin to prepare for additional changes in the future.

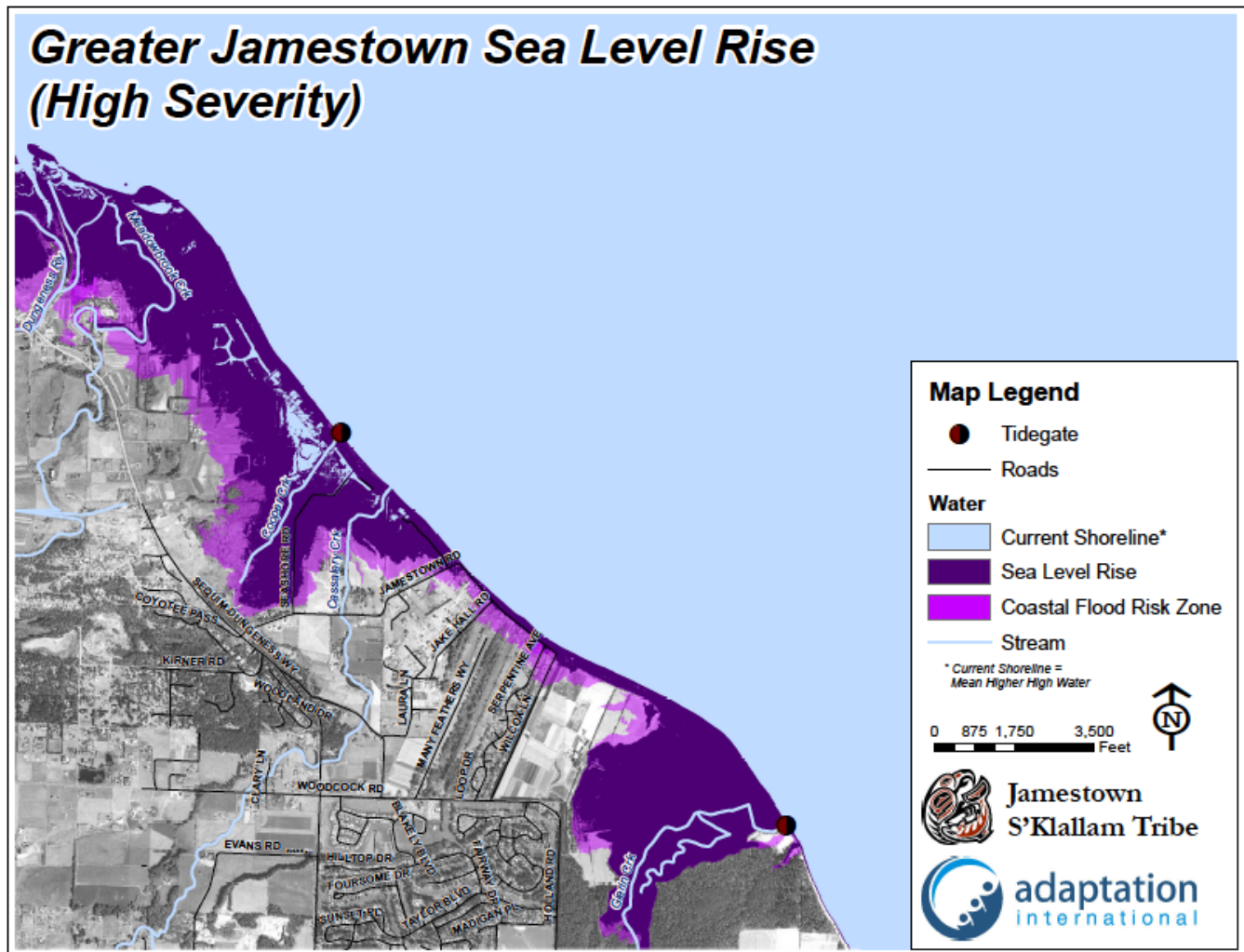


Figure 5: Rivers End to Jamestown Beach high severity sea level rise map. Potential high tide inundation (dark purple) and coastal flood risk zone (light pink) for the shoreline from Rivers End to Jamestown Beach under the high severity sea level rise scenario projected to occur near the end of the century.

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3. Actions to Increase Resilience

Effective partnerships with Clallam County, landowners, natural resource managers, and others will help reduce the short-term and long-term impacts of sea level rise in the area. The Clallam Conservation District Report⁷ makes recommendations to address the key issues of 1) protecting water quality, 2) limiting flooding, and 3) supporting fish and wildlife. Some of the recommendations below build upon the recommendations included in that report such as: encouraging alternatives to hard beach armoring and updating land use codes to reflect projections of climate change. When evaluating the feasibility of these recommendations and moving toward implementation, it is important not to think of this climate impact study in isolation, but, where appropriate, build on previous work such as that of Collins (2005) and the Clallam County Conservation District (2009).

Table 3: Resilience strategies for the Rivers End to Jamestown Beach Shoreline. This table provides a select list of key actions to increase resilience and number of criteria to be used in the evaluation, prioritization, and selection of strategies.

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D. References

- ¹ Jamestown S’Klallam Tribe. 2013. *Climate Change Vulnerability Assessment and Adaptation Plan*. Petersen, S., Bell, J., (eds.) A collaboration of the Jamestown S’Klallam Tribe and Adaptation International.
- ² Jamestown S’Klallam Tribe. 2013. *Climate Change Vulnerability Assessment and Adaptation Plan*. Petersen, S., Bell, J., (eds.) A collaboration of the Jamestown S’Klallam Tribe and Adaptation International.
- ³ Collins, B., 2005. *Historical geomorphology and ecology of the Dungeness River delta and nearshore environments from the Dungeness Spit to Washington Harbor*. A report prepared for the Jamestown S’Klallam Tribe, Natural Resources Department. http://www.jamestowntribe.org/programs/nrs/9-screen_dungeness_080505.pdf
- ⁴ Clallam Conservation District. 2009. “Three Crabs” Area Assessment: An assessment of water quality, flooding, fish and wildlife habitat issues and recommended actions for the “Three Crabs” area between Dungeness River, and Cassalery Creek, Washington. Dungeness Comprehensive Water Quality Study. Washington State Department of Ecology grant. #G0600181.
- ⁵ Collins, B., 2005
- ⁶ Clallam Conservation District 2009
- ⁷ Clallam Conservation District 2009