

Sea Level Rise in the City of Langley SMP

Introduction

In 2018 at a UN General Assembly meeting the Secretary-General António Guterres declared “Climate change is moving faster than we are – and its speed has provoked a sonic boom SOS across our world.” He continues by noting the World Meteorological Organization (WMO) data shows that the past two decades have included eighteen of the twenty warmest years since record-keeping started in 1850.

The most recent Intergovernmental Panel on Climate Change (IPCC) IPCC report¹ published in 2018 shows that recent trends in emissions and the level of international “ambition” is not going to have any effect on keeping global temperatures well below 2°C. The report states that the average global temperature has risen about 1°C (1.8°F) since pre-industrial times. If the current rate of warming continues, this number is expected to nearly double in a relatively short time, reaching 1.5°C (2.7°F) between 2030 and 2052. Without increased and urgent mitigation ambition, leading to a sharp decline in greenhouse gas, we will experience irreversible loss of the most fragile ecosystems, and crisis after crisis for the most vulnerable people and societies.

One of the direct implications of increasing and unmitigated greenhouse gas emissions is sea level rise. While some coastal communities in Washington have been preparing and implementing adaption actions in response to this threat for many years, for example Olympia, King County, Swinomish Tribes, and Quinault Tribes. Many coastal communities are just beginning this process. The City of Langley’s Comprehensive Plan identifies the existential threat of climate change and its related impacts and goals and policies have been adopted to direct the City to begin adaptation and mitigation planning.

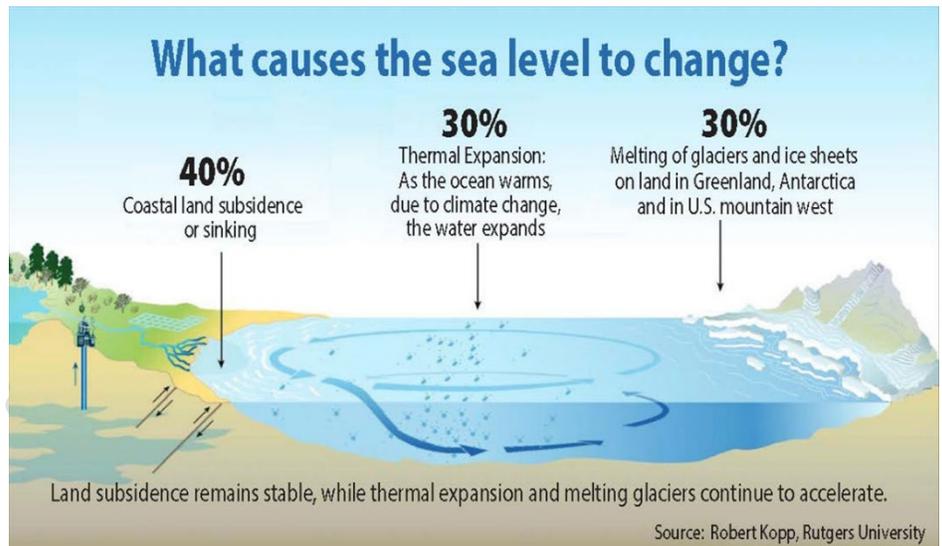
This report does not discuss the mitigation side of climate change planning. That is how we as a community can work on actions to reduce our individual and community greenhouse gas emissions. These efforts will be addressed through other projects and initiatives.

This strategy recognizes that adapting to climate change and mitigating to reduce greenhouse gas emissions is multi-dimensional. Sea level rise and increased frequency and magnitude of extreme storm events are significant implications of climate change. The SMP is one tool that

¹ This Special Report on Global Warming of 1.5°C, an IPCC Special Report on the impacts of global warming of 1.5°C above pre- industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, is the first publication in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6).

we can use to begin planning around sea level rise and its concomitant impacts. While Shoreline Master Program (SMP) guidelines do not require local governments to undertake planning related to this threat. DOE has prepared “Addressing Sea Level Rise in Shoreline Master Programs” publication no 11-06-010 rev 12/17 and Appendix A to the SMP Handbook to provide guidance to local governments who want to begin addressing sea level rise in their SMP updates.

Many variables contribute to the rate of sea level rise and we cannot predict how high and when our shorelines will be affected. We do know that higher seas will increase the flooding risks particularly at lower elevations if we don't take any action. A recent study prepared for the University of Washington's Coastal Resilience Project projects that Island County will likely experience sea level rise of 1-3 feet by the year 2100 (Miller et al., 2018). Adaption actions require collaboration between different City departments, private businesses and property owners, County and State agencies as well as other community stakeholders.



There are a number of imperatives as to why the City of Langley should begin to act and plan on climate change related impacts and sea level rise in particular:

- Physical imperative – Langley contains 1.48 miles of shoreline that is built out. The majority is comprised of high bluff properties but there are also areas of low bluff. The uses along Langley's shoreline include a mix of single-family residences, private businesses, public parks, and the Marina.
- Policy imperative – While the State does not require cities and counties to plan for climate change impacts, City Council recognizes the threats associated with climate change. The recently adopted Comprehensive Plan gives direction to the City to begin acting. In addition, the SMP update is on an eight-year cycle. By prolonging action to begin to identify risks and possible actions the City is postponing the inevitable.
- Economic imperative – Key pieces of Langley's infrastructure are located in areas that will be impacted by sea level rise. Also, Langley's downtown is located on the bluff above low bank properties that will be impacted. Being proactive and working towards and implementing adaption actions is far less expensive than having to react when we are faced with emergencies.

Background

Langley is a small historic city that was platted in 1890 and incorporated in 1913. It was a strategic location on the north west side of Whidbey Island that attracted the White settlers. In the early years the City could only be accessed from the water. A 999-foot long dock to accommodate the marine traffic but it was located in an exposed area and was destroyed before the town was incorporated.

Langley is very small city with one square mile in area. It has 1.73 miles of shoreline making up only 1% of Island County's shoreline. Langley is one of three incorporated jurisdictions in the county and where the Growth Management Act directs higher density development and a greater range of land uses. Langley has full community services – sewer, water, stormwater, public transportation and is a compact walkable community with many attributes making it a desirable place to live, work and recreate. Langley and south Whidbey Island is a cultural hub for artists of all genres. It is one of the main service centers in south Whidbey.

The three - block historic downtown is located on 50-foot bluffs overlooking Saratoga Passage. At the toe of this bluff running the length of downtown (approximately .5 mile) is made up of private residential property, public parks, Nichols Brothers Boat Builders satellite dock, the Port of South Whidbey's Langley marina and public infrastructure including two sewer lift stations, sewer line and outfalls.

Detailed Shoreline Descriptions

Three shoreline reaches – Langley West, Central and East are inventoried in the Cumulative Impact Assessment (2013) (CIA) prepared for the SMP update in 2013. Below is a brief

characterization of each reach taken from the CIA.



Langley West is located west of downtown Langley and is .45 miles in length. The reach is made up of approximately half feeder bluff shore type ranging from moderately to well-vegetated with mixed forest and shrub communities. Some evidence of sloughing is apparent. The other half

of this reach has been modified with a bulkhead that supports three single family residences.

Langley Central extends .48 miles from point east of Park Avenue through Langley's downtown and the harbor area to the east end of Wharf Street. The riparian vegetation is generally lacking as a result of shoreline armoring and modification. The shoreline is completely armored (and backfilled) through Seawall Park. This reach accommodates much of the City's water-dependent uses and public access to the shore.

Langley East measures .8 miles in length and is primarily high bank with two small areas that have been modified. The shoreline slopes are steep and mostly well vegetated with mixed forest and shrub communities on the face and toe of the slopes. There is evidence of recent sloughing. Shoreline uses here are large lot residences. Some of the residences are located in close proximity to the bluff's edge and most of these properties have been cleared of vegetation.

Extensive vegetation clearing along the shorelines has been done and continues in order to accommodate the upland residential, commercial and recreational development. Along Langley's waterfront bulkheads have been constructed to protect development from coastal erosion. In addition to this shoreline armoring, development has resulted in the loss of marine riparian vegetation, a lowered capacity to slow and filter run off and increased over water coverage. These factors have reduced the functioning of nearshore habitats.

The risk to shoreline functions from redevelopment is higher than new development as most Langley's waterfront properties are already developed. As the impacts of sea level rise become increasingly apparent property owners wanting to redevelop their properties and protect their long-term investment will need to factor sea level rise into their plans. This can take the form of a different actions, for example increasing base flood elevations for buildings and structures, raising bulkhead heights.

Science of Sea Level Rise

Sea level rise occurs as a result of an increase in the world's oceans levels due to the effects of global warming. This is caused by burning fossil fuels that releases carbon dioxide and other heat-trapping gasses into the atmosphere. The oceans then absorb the majority of this heat and as water becomes warmer, it expands resulting in ocean levels rising worldwide.

Land-based ice, such as glaciers and ice sheets located in Greenland and Antarctica, is also affected by global warming. Typically, they melt during the warmer months of the year and the ice is replenished in colder months. With the average year-round global temperatures rising, however, ice caps and glaciers are experiencing a disproportionate amount of melting at an accelerated rate.

Sea level rise poses a serious threat to coastal life around the world. Consequences include increased intensity of storm surges, flooding, and damage to coastal areas. These areas are home to large populations, in addition to fragile wildlife habitats. We are already seeing communities move their homes and critical infrastructure further inland to protect themselves. Rising seas can also contaminate soil and groundwater with salt impacting peopling living further inland is threatened because.

Predicting how high the sea levels will rise is difficult. However, a considerable amount of research has been done globally and locally. In this state, different organizations and the University of Washington have been undertaking scientific research related to climate change and sea level rise for a number of years. Recent research undertaken by the Washington Coastal Resilience Project has produced some critical study about sea-level rise in Washington. The report “Projected Sea-Level Rise for Washington” Miller et al. (2018), is an important contribution to our local understanding about sea-level rise in Washington. This study provides sea-level rise projections that are probabilistic, localized to a community scale and incorporates new science. The previous Washington based assessment was completed in 2012.

Future scenarios are based upon assumed levels of greenhouse gas emissions. This assessment assumes a “low” emission scenario and a high emissions scenario; RCP² 4.5 and RCP 8.5 respectively. The “high” scenario was selected for Langley’s planning purposes for a few reasons. Globally we continue to see no downward trend of greenhouse gas emissions. As noted above the most recent IPCC states our global climate will increase by another 1.5°C (2.7°F) between 2030 and 2052, threatening our global sustainability. Societally we are doing little to change our habitats and reduce our individual and collective emissions.

The projections are probabilistic such that a set of probabilities describe the likelihood that sea level rise will meet or exceed a particular elevation. For the different scenarios there is a range of projections. This range reflects the uncertainty in the observed and modelled response of sea level rise to climate change. The probabilities consider the unpredictability of various factors such as the rate and magnitude of ice melt from Antarctica and Greenland, for example. The probabilities in Table No. 1 do not take into account storm surge which is currently estimated at an additional 3.0 feet.

Past studies established ‘absolute’ levels of sea level rise without considering the localized tectonic activity in our environment. The projections in Table no. 1 are relative in that they account for the localized vertical movement of the lands surface. For example, on the northwest Olympic Peninsula the land is uplifting rapidly and in the central Puget Sound we are experiencing subsidence.

² Representative Concentration Pathway

Island County has completed detailed work related to sea level rise. Sea level rise of 1-3 feet is projected as likely for coastal areas of Island County, Washington by the year 2100 (Miller et al., 2018)

Table No. 1

	Very Likely 95% probability	Likely 50% probability	Unlikely 1% probability
2050	0.3	0.8	1.5
2070	0.6	1.3	2.6
2100	1.0	2.2	5.0

Table no. 1 RCP 8.5 Sea-level Rise Projections Averaged for Island County in feet based on Miller et al projection, as outlined in Island County Shoreline Master Program and Sea-level Rise Workshop, March 19, 2019.

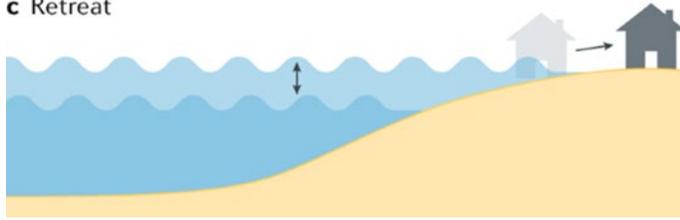
All projections are given relative to the average sea level for 1991 – 2009

Adaptation Measures

Adaptation measures are generally broken down into three categories:

1. **Protect** – is a reactive strategy to protect property and infrastructure from SLR. This is often the first response. But it can be expensive and can have limited long term effectiveness in highly vulnerable locations. These measures can be hard or soft barriers to reduce the impacts that are constructed or installed, for example bulkheads or ‘naturalizing the shoreline’.
2. **Accommodate** – has to do with changes to human activities or infrastructure to adapt to SLR. Actions include retrofitting an existing building to increase the flood construction elevation to allow the natural systems to continue while human use is modified to minimize the impacts. Typical measures include elevating structures or floodproofing
3. **Retreat** – is a strategic decision to relocate or abandon private or public assets at risk. This involves physically moving away from the hazard and is a long-term strategy that allows natural systems to occur without human intervention.

c Retreat



<https://doi.org/10.1038/s43017-019-0002-9>

Of course, another response is to do nothing. However, this 'non-response' can result in costly reactive actions.

Image Source: Hauer, M.E., Fussell, E., Mueller, V. *et al.* Sea-level rise and human migration. *Nat Rev Earth Environ* 1, 28–39 (2020).

Municipal Regulation and Policy

Due to the uncertainty, complexity and inter-related nature of climate change impacts, adaptation strategies and actions need to be able to be modified to achieve better performance as our knowledge improves and the risks becomes more obvious. These strategies need to work well across the range of possible futures in order to that the City can be resilient over the long term. The City's Shoreline Master Plan is one guiding document.

The City has adopted other long-range plans that guide City Council and staff decision-making annual budgeting. These plans are implemented through the adoption of new regulation or amendments to the existing regulations, programs and strategies. The regulations also guide how the City and private property can develop and establish standards which must be met. Some of the long-range plans specifically identify the existential threats of climate change but there are no binding requirements for any development taking place in an area at high risk to flooding from sea level rise.

General Provisions Ch. 15.01 - Construction standards for public and private roadways and utilities. Originally adopted in 1997 with subsequent minor amendments.

Flood Hazard Ch. 15.24 was updated in 2017 to be consistent with the minimum National Flood Insurance Program (NFIP) regulation for jurisdictions located within the 100-year, or 1% annual chance floodplain. This updated the development regulations used the Federal Emergency Management Agency (FEMA) flood Insurance Rate Maps (FIRMs) as the basis for structural ground floor elevations and flood protections within established floodplains. However, FEMA flood maps are based on historical flooding and do not account for tidal surge, extreme high tides or projected sea level rise. Freeboard of 1 foot is added to the base flood elevations to provide a factor for safety and to account for uncertainties. But there is no accounting for sea level rise.

Resource Lands and Environmentally Sensitive (Critical) Areas Management Ch. 16.20 – Are the standards and regulations to preserve and protect resource lands and critical areas and to protect persons and property from impacts caused by hazards including steep slope failures and flooding. This chapter was originally adopted in 1992 with subsequent minor amendments. An

update of this title is tentatively scheduled to begin in Q1, 2022 in anticipation of the next Comprehensive Plan periodic update.

Long Range Plans

Langley's community Comprehensive Plan was updated and adopted in 2018. The next periodic update must be completed by 2025. This plan articulates a series of goals, objectives, policies, actions, and standards that are intended to guide the day-to-day decisions of elected officials and local government staff around planning and land use. The Land Use element of the Comprehensive Plan (pg 6) includes a brief narrative about climate change and how it will impact the City, with specific reference to sea level rise. The Sustainability element (pg 3) also includes a narrative and policies that encourage the City to begin adaptation and mitigation planning to ensure Langley can be more resilient to the impacts of climate change and also to undertake planning efforts that encourage reduced reliance on fossil fuels.

Appendix No. 1 outlines the specific Comprehensive Plan policies regarding adaptation and mitigation planning related to climate change. The policies focus on the need to reduce our collective greenhouse gas emissions to mitigate for increasing climate change impacts. Given the size of Langley and its walkability, the City is well suited to continue to implement sustainable measures that encourage walkability, cycling and public transit, reduce the use of fossil fuels for heating/cooling, increase residential densities, and permit a mix of land uses.

Each utility has its own plan and they are briefly described below. These plans are relevant for this discussion because as they are updated the City can begin to identify and analyze the climate change impacts and possible actions and strategies that might be incorporated to ensure these utilities are more resilient.

Langley Water System Plan (2018) guides future planning and operation of the water system. Specific actions and recommendations are detailed and these form the annual work plans for the Department of Public Works and utilities. The RCWs required cities update these on a six year cycle but this was recently changed to 10 years. The City is in the process of finalizing the Water Comprehensive Plan.

Langley Sewer Comprehensive Plan (2015) guides future planning and operation of the sewer system. The State does not require periodic updates to this utility plan. Industry best practice is six to ten years. The Public Works Department has tentatively determined this would be updated in 2025.

Langley Stormwater Comprehensive Plan (2009) guides future planning of the City's limited stormwater system. This is due to be updated in 2024. As outlined below sewer and storm system infrastructure is located in areas that are at high risk to sea level rise.

In addition to City adopted long range plans there are different plans and policies that will be affected by climate change and that have implications for the City, for example Island County Hazard Mitigation Plan and Island County Water Resource Management Plan.

Incorporating SLR into Langley's SMP Update

Use of Current Technical Information

The SMP Guidelines [WAC 173-26-201(2)(a)] require local governments to use “the most current accurate and complete scientific and technical information available.” The research used in this analysis is being used by multiple jurisdictions along Washington States coastline to undertake adaption planning strategies and actions. For example, Island County, City of Olympia, XXXX

Per WAC 173-26-201(2)(a) must be supported by “the most current, accurate, and complete scientific and technical information available”

- Considerable research by WA Sea Grant and Island County and UW Climate Impacts Group
- Commerce recommends Comp Plan revisions to more specifically incorporate climate change and SLR adaptation

Vulnerability to Sea-Level Rise

What is vulnerable to sea level rise is a function of exposure and sensitivity to the hazard or environmental change. Low level areas will be more vulnerable to losses from erosion, storms, or flooding. High bluff properties will also be impacted due to increased coastal erosion at the toe of the bluff. As upland flooding increases due to changing precipitation events Reduced drainage capacity, risk of damage to infrastructure, loss of habitat and biodiversity, saltwater intrusion

Vulnerability can be lowered by implementing adaptation measures that reduce the risk of the hazard. However, this is an ongoing process to prioritize risks and opportunities. The section below details a brief inventory of the assets located in the shoreline plan area. For many of these (private) assets we are unsure of their age and condition. A detailed inventory is therefore necessary.

Residential Uses

Residences on the high bluff properties along the “Langley East” reach are being remodeled from small cottages to larger single-family homes. Some of these homes are located within 10 feet of the top of the bluff. Many of these high bluff properties are not served by sewer and therefore use septic fields. Some of the residential stormwater is not being mitigated and recent incidents of slope failure have been caused by un- or poorly managed upland drainage.

There are 10 residences located on low bank properties. With the exception of two properties east of Wharf St they all have bulkheads or seawalls but these are all of different vintages and condition. Most of these bulkheads were installed over twenty years ago and we can anticipate the need for these to be repaired or replaced. The City can assume that property owners will seek to 'upgrade' these structures to maintain the flood protection.

Vegetation management is an ongoing issue along the shoreline. As residents and visitors want to maintain the view of Saratoga Passage and the mainland. Most shoreline properties, high or low bluff, have limited vegetation at the top of the bluff and these areas consist primarily of lawns.

Public Infrastructure

The low bank area along Shoreline Reach: Centre contains significant private and public property and infrastructure including the Port of South Whidbey marina; several residences; Nichols Bros Boat Building satellite dock; two sewer lift stations; a water main; City's Seawall Park; six stormwater outfalls including Brookhaven Creek, Saratoga Creek.

1. Seawall Park

Is Langley's most revered community park. It is a linear 1.44-acre park that was built in 1975 to provide erosion control, bank stabilization, public access, future public park and future site for secondary treatment facilities. City records show the upland was filled in approximately 1947. The construction was permitted under an emergency declaration³ due to the rate and extent of erosion at the toe of the bluff. The bulkhead was constructed with rip rap at the toe and backfilled. Upland property owners granted quit-claim deeds for portions of their property to enable the construction of the seawall. At the top of the seawall a strip of land ranging in width from 24 to 56 feet of public and private property making the park appear larger than its actual size. that forms the park.

The park offers 1,140 feet of saltwater beach access; views of Saratoga Passage, Camano Island, and the Cascade Mountains; and amenities such as totem poles, a walking trail, benches and picnic tables.

Since its construction a few minor repairs have been made. In 2012, the east stairs were repaired due to rebar being exposed. In 2014 some minor improvements were made to add park structures such as installing lighting, capping the posts, installing a bench. In 2016 Council established the Seawall Park Ad-Hoc Committee to provide recommendations as to how the park could be improved. And a survey was completed in 2018.

³ Ordinance 254

City Council recognizes that the seawall is in need of a detailed assessment to confirm its long term stability. Therefore, the City's Capital Facilities Improvement Plan allocates a budget of \$75,000 to complete an assessment in 2023.

2. Phil Simon Park

Is a 0.46-acre community park that was acquired by the City of Langley in 1975 and transferred to the Port of South Whidbey in 2009. The park is located south east of the marina. It contains benches and picnic tables surrounding by shoreline vegetation. A small low elevation bulkhead is located here. This is a place where residents and visitors can enjoy the views of the Saratoga Passage.

Both of these parks and therefore public access to the shoreline will be affected by sea level rise in the long term.

3. Port of South Whidbey at Langley

In January 2009, the City of Langley transferred ownership of the Langley Marina to the Port of South Whidbey. Marina upgrades were done in 2014. The marina is an important The small boat harbor consists of 41 slips and 330 feet of linear moorage that can accommodate vessels up to 190 feet. Upland facilities include restrooms and showers, water and 110v 20, 30, 50 and 100 amp power at the docks, a floating pump out station, and a boat launch. The marina provides transient and permanent moorage. The boat launch is used by many recreational boaters. Remnants from an old commercial pier remain on site.

The Port of South Whidbey prepared a Comprehensive Plan for all their properties that was adopted in 2013. The plan contains policies to maintain and protect waterfront public access and recreational opportunities at the marina in Langley.

4. Nichols Brothers Boat Building

This operation is one of the top ten largest employer in Island County building and repairing ferries, fishing vessels, yachts, and other large vessels. Nichols Bros main facilities are located in Freeland, 10 miles north of Langley but they have a satellite operation in Langley. The facilities in Langley are significant because it enables work to be undertaken to vessels on the water and sea trials can be performed. The facilities here consist of a large warehouse building, seawall, docks, and vacant lot used for parking and marshalling. In 2017 the facility received some upgrades to include a new seawall and decking repairs.

5. Sewer infrastructure

Some key sewer infrastructure is located in the low bank area. Pump station no. 1 is located at the toe of Anthes Ave and the Sunrise Beach Pump Station is located further east to Sunrise Lane at the base of Wharf St. There is a permanent generator installed in Lift Station no. 1 to be able to operate during power outages. All of the pump stations are wet well types with submersible pumps and are located below ground except for the control panels that are mounted above ground.

The City's wastewater effluent is discharged through a 12" ductile iron effluent pipe that extends 6,200 feet northward from toe of Anthes Ave.

A 1,600 feet of forced sewer main 4" runs parallel to the shoreline between the two lift stations. **at what elevation?**

Upgrades to both pump stations are identified in the 2015 Sewer System Comp Plan. Sunrise pump Station was identified as an immediate project to be undertaken in the current 6-year planning window. The project was slated for 2020, but COVID and demands of the Langley Infrastructure Project, staff delayed the project until 2022 unless emergency dictates action.

Lift Station #1 was identified as a long term project and upgrades are scheduled for 2034. However, in 2016 due to a pump failure a portion of this project was moved forward as an emergency.

6. Stormwater

The City has four stormwater outfalls in addition to Noble and Saratoga Creek that discharge into Puget Sound. All stormwater run off within the central part of town is routed to the Anthes Avenue storm drain system which receives flows from Brookhaven Creek and the Park Avenue storm drain system.

Saratoga Creek discharges directly onto the beach through a 24-inch RCP culvert. There is no additional man-made drainage conveyance systems.

The 2009 Comprehensive Stormwater Management Plan identifies the need to upgrade some of the outfalls as they are undersized. **Do we know the elevations of these outfalls?** Backflow preventors may need to be installed to prevent the intrusion of sea water.

Public Consultation

The SMP update began in July 2019 when Council adopted the scope of work and request for proposal for consulting services to prepare the plan update. In this initial staff report staff identified sea level rise as a significant issue that required consideration through this process. The scope of work for the SMP update and the contract identified the intent to discuss in substantive terms SLR in the SMP. This was reviewed by PAB at its 2/5/2020 meeting and approved by Council. A dedicated web page was created for the SMP update at the beginning of the process.

On October 3rd, 2020 we held a community engagement (virtual) event to introduce the SMP update and to talk about sea level rise and what it means for the City. Forty-eight people participated.

The event was interactive and included presentations from:

- Derek Hoshiko is a facilitator, speaker, and organizer based in south Whidbey. He heads [Rapid and Just Climate Action](#), a bold project organizing with communities in Washington State to stop global warming by 2030.
- Swinomish Tribes Shelly Vendiola and Todd Mitchell to hear about the Swinomish community's climate change planning efforts. **XXXX**

- Dr. Ian Miller, Coastal Hazard Specialist with Washington Sea Grant, is a scientist, and science communicator. Dr. Ian Miller is Washington Sea Grant's coastal hazards specialist, working out of Peninsula College in Port Angeles and the University of Washington's Olympic Natural Resources Center in Forks. Ian led the development of Washington State's most recent sea level rise assessment. He has authored and co-authored other related publications.
- [Nicole Faghin](#) is a Coastal Management Specialist with Washington Sea Grant at the University of Washington. Nicole engages in education, outreach and research focused on social, economic and environmental shoreline issues including coastal adaptation. She manages the planning efforts of a NOAA Coastal Resilience Grant. Nicole holds a master's in city planning and a law degree. Nicole was one of the main event organizers.
- Five local high school youth facilitated the small group sessions where attendees discussed the future flooding potential in the vulnerable areas along the City's shoreline based upon Ian Miller's sea level rise projections for 2050 and 2100. Two of the youth also gave brief presentations on their own projects

Attendees were asked to respond to a poll as to whether the City should begin taking adaptation actions for sea level rise impacts. All participants agreed that the City must begin adaptation planning for sea level rise.

The event was widely advertised by directly mailing shoreline property owners; sending an e-newsletter to the Mayor's email list that is made up of over 390 people; and placing posters in community meeting places.

The results of the event video and audio recordings as well as a comprehensive resource list from the presenters and attendees is posted on the SMP update web page.

At its regular meeting on December 2nd the PAB reviewed and confirmed the draft Gap Analysis and Ian Miller's projections and probabilities and confirmed that the City should be basing its planning on the high (RCP 8.5) GHG emissions scenario, the 50% probability,

At its regular meeting on December 2, 2020, the Planning Advisory Board (PAB) reviewed and discussed the greenhouse gas scenarios, probabilities and SLR elevations outlined in the [Sea Level Rise In Washington State – A 2018 Assessment](#) and in particular the specific work completed for Island County as shown on Table no. 1. The PAB recommended the City base its adaptation planning on the scenario of high emissions and likely or 50% probability to meet or exceed the elevations shown in table no. 2 below. Map No. 1 shows the 2100 projections.

City of Langley
Sea Level Rise 2100 Projection Map

RCP 8.5 - 2100
No Storm Surges Added

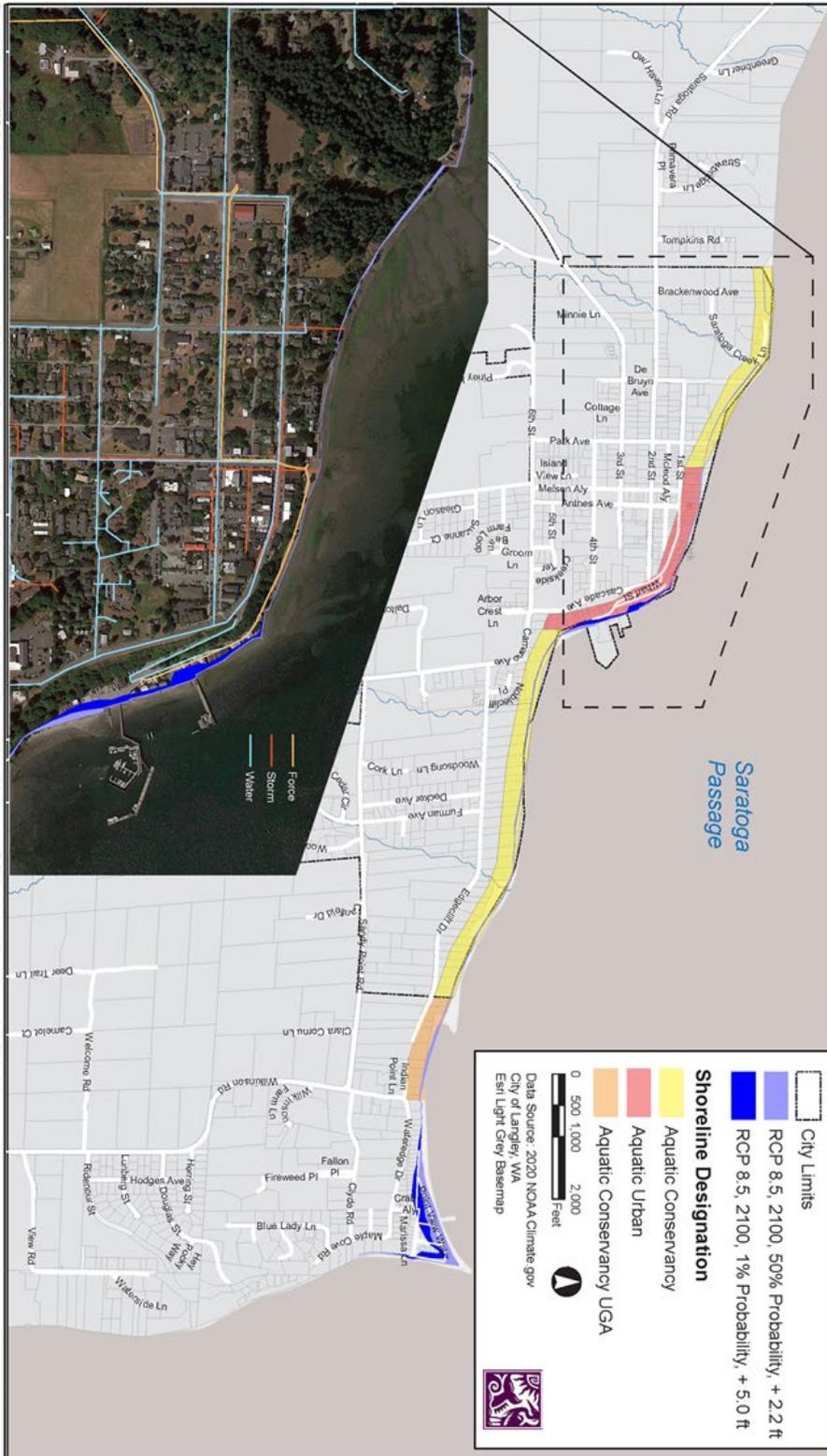


Table No. 2 Langley's Sea Level Rise Projections

	Likely 50% probability
2050	0.8
2070	1.3
2100	2.2

The draft SMP including this document will receive community review as part of the joint public review process. Once a schedule has been confirmed advertising of the review process timeline will be widely advertised and shoreline property owners will be directly notified.

Based upon the analysis provided in this report staff has drafted recommended amendments to the SMP as outlined in Appendix No. 2.

Conclusion

The City of Langley, as with all other coastal communities around the globe, is being impacted by sea level rise caused by the unmitigated burning of fossil fuels and resultant greenhouse gas emissions. The City's Comprehensive Plan identifies the need to begin adaption planning. Including sea level rise into Langley's Shoreline Master Plan periodic update is an important starting place given the vulnerabilities outlined in this report. Island County and the City can expect to see between 9 inches and over two feet of sea level rise in the next 80 years. This does not include storm surge which is an estimated additional three feet.

Resources

DRAFT