CHAPTER 12

CLIMATE: RESILIENCY AND GREENHOUSE GAS REDUCTIONS

Historical Climate and Geography

La Conner is a historic rural town settled in the 1860's that has preserved much of its small-town character. It is located approximately 12 miles southwest of the City of Mount Vernon, Washington between the Swinomish Channel, Sullivan Slough, and Skagit Bay in the agriculturally rich Skagit Valley of Washington State. Most of the community is at or near sea level. The topography of the Town area is characterized by a basaltic hill with flat agricultural lands to the east and the Swinomish Channel to the west.

Washington State's climate is strongly influenced by moisture-laden air masses created in the Pacific Ocean. The airflow from the Pacific Ocean is interrupted first by the Olympic Mountains and then significantly by the Cascade Mountains. As a result of the mountain ranges, the west or windward sides of the Cascades receive moderate to heavy precipitation. Due to its unique location in the "rain shadow" of the Olympic Mountains, La Conner receives less precipitation than areas outside the "rain shadow", an average of only 30" of rain per year. This location and mild marine temperatures help make La Conner a popular recreation area, and a pleasant tourist destination.

Mean temperatures vary from a high of 70 degrees in July to a low of 40 degrees Fahrenheit in January with extreme variations recorded at -3 to a high of 102 degrees Fahrenheit. The average annual growing season is about 170-190 days. Approximately 80 percent of the precipitation occurs from October through March.

Topography ranges from 0 to about 100 feet above Puget Sound on the hills. The main residential hill, facing the Downtown district, drops off abruptly in places with slopes ranging from 40 to 100 percent.

Impacts of Climate Change and Degradation

La Conner residents are highly impacted by changes to weather and climate. As the effects of anthropogenic change continue to accumulate, La Conner will experience changes in local weather and climate patterns. Some of these changes are outlined in the matrix below:[1]

[1] All changes discussed in the below chart are based on the High Emissions scenario, using the CMRW webtool, charted for the year span 2020-2049. Individual citations are included below.

Hazard	Change[2][3][4]	Impact
1. Extreme Heat[5]	By 2050, the average summer temperature is expected to increase by 4 degrees. There will be an increase of between one and three weeks where the humidex index is over 90 degrees. There is expected to be an increase of roughly 12 days with a minimum humidex above 65 degrees. The humidex is a "real-feel" measurement that combines the effects of heat and humidity.	Higher temperatures and humidex cause strain to vulnerable populations. La Conner is particularly sensitive to this due to the age of its population. An increase in the number of nights with a minimum humidex above 65°F is expected to increase heat-related deaths, illness, and hospitalizations. High heat can cause additional wear and tear on equipment and roadways due to asphalt softening. High heat results in greater bodily stress on those working outdoors, including La Conners Public Works.
2. Riparian Flooding[6]	By 2050, the return streamflow of a 25-year riparian flooding event will be 15 years instead, meaning that the potential for high riparian flooding will be increased.	La Conner experiences effects from both coastal/tidal and riparian flooding. Many of the dikes surrounding La Conner are privately owned, and are at risk of being over-topped. An increase in the severity or frequency of riparian

[2] Adelsman, H., & Ekrem, J. 2012. Preparing for a changing climate: Washington State's integrated climate response strategy. Department of Ecology, Olympia, WA.

[3] Snover, A.K., Mauger, G.S., Whitely Binder, L.C., Krosby, M., Tohver, I. 2013. Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers. State of Knowledge Report prepared for the Washington State Department of Ecology. Climate Impacts Group, University of Washington, Seattle.

[4] Mauger, G.S., J.H. Casola, H.A. Morgan, R.L. Strauch, B. Jones, B. Curry, T.M. Busch Isaksen, L. Whitely Binder, M.B. Krosby, and A.K. Snover. 2015. State of Knowledge: Climate Change in Puget Sound. Report prepared for the Puget Sound Partnership and the National Oceanic and Atmospheric Administration. Climate Impacts Group, University of Washington, Seattle. https://doi.org/10.7915/CIG93777D

[5] Abatzoglou J.T. and Brown T.J. A comparison of statistical downscaling methods suited for wildfire applications, International Journal of Climatology (2012), 32, 772-780.https://doi.org/10.1002/joc.2312

[6] Chegwidden, O. S., B. Nijssen, D. E. Rupp, P. W. Mote, 2017: Hydrologic Response of the Columbia River System to Climate Change [Data set]. Zenodo. doi:10.5281/zenodo.854763.

		flooding will have large negative impacts on La Conner.
3. Tidal/Coastal Flooding	For a full account of how tidal flood events are expected to change, please see the Sea Level Rise report attached as appendix 12A.	For a full account of how tidal flood events are expected to change, please see the Sea Level Rise report attached as appendix 12A.
4. Drought[7]	Although total precipitation is expected to increase by 2050, late summer precipitation is expected to decrease by roughly 7%. Between the years 2030-2059, there is a 30% chance that any given year will experience summer or year-long drought conditions	This means that there will be less water for agriculture, livestock, fire-fighting, and may result in additional impacts on vulnerable populations. These effects will be exacerbated by a longer growing season and more heat.
5. Wildfire[8]. Smoke and air quality impacts.	Both La Conner's and Skagit County risk of wildfire is very low. With there being a less than 1% chance of conditions likely to result in wildfire within the next 30-year period in La Conner, and a roughly 3% of wildfire occurring in Skagit County it is unlikely that a wildlife will occur. However, there is still a 13 day increase in the number of potential "high fire" days. A high fire danger day is a day in which 100-hour fuel moisture is less than the historical 20th percentile.	An increase in high fire danger days indicates greater potential for wildfire danger to damage infrastructure, interrupt businesses, and affect public health and well-being. Smoke from surrounding areas impacts community health and may interrupt outdoor recreation and activities. Smoke can travel from very far away with the right wind conditions, so La Conner should still plan to manage wildlife smoke, even if the risk of fire is low.
6. Extreme Precipitation	La Conner will experience a 9% increase	Increased precipitation will put additional

[7] Abatzoglou J.T. and Brown T.J. A comparison of statistical downscaling methods suited for wildfire applications, International Journal of Climatology (2012), 32, 772-780.https://doi.org/10.1002/joc.2312

[8] T. Sheehan, D. Bachelet, K. Ferschweiler. Projected major fire and vegetation changes in the Pacific Northwest of the conterminous United States under selected CMIP5 climate futures. Ecol. Model., 317 (2015), pp. 16-29. https://doi.org/10.1016/j.ecolmodel.2015.08.023

	in the magnitude of a 25-year storm event, which means that storms are more likely to damage Town infrastructure and more likely to cause flooding due to the overflow. Currently, developers must plan stormwater systems for 2.6 inches of in a 24-hour period, the current 25-year event.	pressure on the Town's storm water systems to handle overflow. La Conner's infrastructure risks failure and other harmful effects if the magnitude of the storm events increase without accompanying development requirements.
7. Sea Level Rise	Please see appendix 12A	Please see Appendix 12A

La Conner's various assets will be affected differently by these hazards. For a full assessment of the hazard and assets, please see Appendix 12B: Assessment Matrix.

La Conner Climate Goals and Policies

GOAL A

Ensure that development and redevelopment projects are resilient to the impacts of climate change.

Policies

12A-1 Plan and build facilities, utilities, and infrastructure projects to avoid or withstand flooding from rising sea levels and associated climate impacts (e.g., changing flood plains).

12A-2 Review required buffers and setbacks for steep slopes and shorelines vulnerable to erosion exacerbated by climate change, and establish new minimums, if necessary, so that improvements are not required to protect structures during their expected life.

12A-3 Require the design and construction of commercial and residential buildings and their surrounding sites to reduce and treat stormwater runoff and pollution.

12A-4 Design buildings for passive survivability to ensure that they will stay at a safe temperature for occupants if the power goes out.

12A-5 Establish overlays, special zoning districts, design standards, or other strategies to increase resilience to climate hazards.

12A-6 Identify and plan for climate impacts to valued community assets such as parks and recreation facilities, including relocation or replacement.

12A-7 Develop or modify design standards to integrate exterior building features that reduce the impacts of climate change and increase resilience.

12A-8 Design and site new and expanded roads and pathways to have the least possible adverse effect on the shoreline, account for sea-level rise projections, not result in a net loss of shoreline ecological functions, or adversely impact existing or planned water-oriented uses, public access, and habitat restoration and enhancement projects.

12A-9 Consider climate change, including sea-level rise, extreme precipitation, increased winter streamflow, and other impacts, in floodplain management planning.

12A-10 Direct new development into areas where exposure to climate hazards is low.

GOAL B

Prioritize the adaptive reuse of buildings, recognizing the emission-reduction benefits of retaining existing buildings.

Policies

12B-1 Retrofit buildings for energy efficiency.

12B-2 Preserve and reuse existing buildings.

GOAL C

Protect community health and well-being from the impacts of climate-exacerbated hazards — prioritizing focus on overburdened communities — and ensure that the most vulnerable residents do not bear disproportionate health impacts.

Policies

12C-1 Provide all residents equitable opportunities to learn about climate impacts, influence policy decisions, and take actions to enhance community resilience.

12C-2 Ensure that all community members have equitable access to green space within a half-mile.

12C-3 Protect the health and well-being of outdoor workers exposed to extreme heat and other climate-exacerbated hazards.

12C-4 Develop and implement an urban heat resilience strategy that includes land use, urban design, urban greening, and waste heat reduction actions.

12C-5 Choose native drought- and pest-resistant trees, shrubs, and grasses in restoration efforts to support climate resilience.

12C-6 Manage tree canopy and forests (including parks, greenbelts and urban forests) to decrease climate-exacerbated risks from severe wildfires, protect residents, and improve ecosystem health and habitat.

12C-7 Require open space set-asides (such as parks) for new development.

GOAL D

Increase housing diversity and supply within urban growth areas to reduce greenhouse gas emissions and support environmental justice.

Policies

12D-1 Prioritize infill development through zoning and permitting process.

12D-2 Establish form-based codes where appropriate to better integrate higher-density development.

12D-3 Implement complementary, mixed land uses versus traditional zoning, such as locating business districts, parks and schools in neighborhoods to promote cycling and walking and reduce driving.

12D-4 Develop and implement inclusionary zoning to support greater income diversity in housing types.

GOAL E

Improve the efficiency of Town systems to reduce greenhouse gas emissions.

Policies

12E-1 Phase out the use of use of gas-powered landscaping equipment.

12E-2 Utilize the Town's Asset Management System to reduce vehicle miles traveled by Public Works, eliminating unnecessary time spent on the road.

GOAL F

Safely expand electric vehicle charging infrastructure that prioritizes on-site installations, maintains pedestrian safety, and preserves the character of historic neighborhoods, while allowing limited right-of-way (ROW) charging where no other feasible options exist.

Policies

12F-1 Research and identify necessary safety requirements of EV technology

12F-2 Require all new and retrofitted buildings to be capable of providing electric vehicle charging infrastructure.

12F-3 Research the possibility of Electric Vehicle Charging Station Right-of-Way Program to create opportunities for all property owners to access EV charging stations.

GOAL G

Incorporate sea-level rise information, along with tsunami hazard mapping, into critical area delineation for siting critical infrastructure, land-use planning, and emergency management.

Policies

12G-1 Develop regulations for elevating or setting back new and substantially improved structures to reduce the risk of damage caused by sea level rise.

12G-2 Consider sea-level rise in coastal and nearshore habitat restoration projects.

12G-3 Identify and implement strategies to increase the resilience of the shoreline environment to sea-level rise and other climate hazards,

while also protecting shoreline ecological functions, allowing water-dependent uses, and providing public access.

GOAL H

Protect community health and well-being from floods and extreme water level events.

Policies

12H-1 Require that proposals for shoreline stabilization demonstrate a need, and require the use of soft shore stabilization methods to the extent practicable to protect sites from wave-driven erosion or flooding exacerbated by sea level rise.

12H-2 Identify and quantify the ecosystem services benefits of natural systems, and include these natural capital assets in cost-benefit assessments for community and development planning.

12H-3 Protect significant historic sites prone to floods or other hazards worsened by climate change.

La Conner must consider public safety when enacting goals and polices related to climate resiliency and greenhouse gas reductions. Electric Vehicles have the capacity to reduce greenhouse gas emissions, but the infrastructure required can pose a safety hazard. Solar panels and the associated battery storage systems, particularly lithium-ion based battery systems, can also pose safety hazards.

Developing regional partnerships along with climate-based planning will help La Conner safely and responsibly manage these safety hazards while ensuring La Conner resources are properly managed. La Conner staff takes advantage of regional trainings and informational sessions, and maintaining this practice will be crucial as green technologies are introduced. In addition, collaborating with neighbors will help La Conner achieve its own climate goals, as it will be reducing waste and unnecessary expenditures.

La Conner's Emergency Management Commission took climate hazards into account when generating the La Conner Comprehensive Emergency Management Plan (CEMP). In future review of this plan, climate-based hazards will also be reevaluated to ensure that they are still effectively considered within the CEMP.

Residential and commercial properties are both affected by climate. La Conner's central downtown hub is a historical waterfront community that includes both commercial and residential uses. The historic nature of the district makes it difficult to effectively floodproof the structures, leaving them susceptible to flood damage. As discussed in the Economic Element, La Conner's economy is largely tourism based. If this area of town were to be experience an extreme climate-related disaster, it would be challenging to recover. In accordance with Appendix

12A, Sea Level Rise, La Conner will need to develop unique adaption-mitigation pathways based on the community's vision and held values.

2/23/2023 Prepared by: Ajah Eills, Assistant Planner, Town of La Conner

Sea Level Rise and Impact on La Conner

Introduction:

Over the years, the need to plan for sea level rise has increased. In 2022, the National Oceanic and Atmospheric Administration (NOAA) released their 2022 Sea Level Rise Technical Report and accompanying Application Guide in order to provide local municipalities updated sea level rise data and offer suggestions on ways that local planning can help mitigate the effects of the sea level rise. As a "hydro-friendly" town located on the Swinomish Channel, this guide will be helpful as La Conner looks to the next 20, 50, and 100 years in La Conner.

As La Conner develops the best planning practices for managing the effects of the rising sea level locally, it is important to understand how the regional sea level projections are linked to the coast-wide and global projections. This may help compensate for the potential variability of sea level rise and help design more accurate local methods for mitigate the effect of sea level rise in La Conner.

Luckily, NASA and NOAA have developed regional and local projections designed to help coastal communities plan for the change in sea level. This is important because the more place-specific information La Conner can use, the better La Conner can plan mitigation effects for the community.

This update was a progress by a joint task force that included the National Aeronautics and Space Administration, the National Oceanic Atmospheric Administration, Environmental Protection Agency, U.S. Geological Survey, and U.S. Army Corps of Engineers, along with partners in academia. If requested, more detail around the collection and normalization of the data can be provided. An important note: the data has been normalized for a 2000 baseline, so any increases are based on the 2000 coastline. A two-foot rise in sea level is a two-foot rise since 2000.

Sea Level Rise (SLR) in La Conner

When planning for SLR, there are two main challenges: the sea rise itself, and the accompanying increase in flooding, or Extreme Water Levels (EWLs). Although the increase

in both intensity and frequency of EWLs may be more memorable to the affected community, it is important to remember that the number one factor in EWLs is the continued SLR, so the best way to reduce harm from EWLs is to plan extensively for SLR. High tide flooding (HTF) is expected to rise in the coming years, with projections suggesting a doubling of its current rate by 2030.

On the following pages, data on SLR and EWLs specific to La Conner is presented and discussed, along with several approaches to planning and mitigation, followed by potential approaches designed to integrate the data into long-term planning for La Conner. The Technical Report outlines five different scenarios of SLR; Low, Low-Intermediate, Intermediate, Intermediate-High, and High, over both near term (to 2050) and long term (to 2150) time spans.

In the short term the five projections do not vary much, it is only in the long-term planning scenarios that the uncertainty of the projections begins to grow, leading to divergence. The single driving rate of SLR is the continued warming of the ocean, which is largely dependent on human behavior. As it is difficult to estimate the rate of ocean warming in the future (as it largely depends on mitigation measures developed by the current human population) it is much more difficult to calculate the related sea level rise after 2050.

In developing this report, the Intermediate-High projection is used. In order to determine the best projection to use, two questions were asked:

1. What level of **risk-tolerance** is most appropriate for La Conner?
2. What **scenario** is best suited for La Conner to avoid **widespread inundation** in a **50-year adaptation plan?**

The two questions are related to one another, and the answer to the first question is informed by the second. In order to find the answers to these questions, NOAA's Sea Level Rise Scenario tool was utilized, which allows a user to view data projections by year. In this case, Port Townsend is the closest physical gauge to La Conner, so the tool developed projections for La Conner based on the Port Townsend gauge. In 2070 (roughly 50 years away) **widespread inundation** occurs at a rise of 2 feet. This most closely matches the **intermediate-high** projection scenario, which calculates 1.87ft of rise in 2070. In order to

avoid widespread inundation, La Conner should plan mitigation effects for an intermediate-high scenario; therefore, the answer to question two is an **intermediate-high scenario,** and the answer to question is one is an **intermediate to low risk tolerance**. Note that the planned for scenario and the associated risk tolerance are reciprocals of each other. Figure 1 and Figure 2, below, offer a visual representation of what sea level rise of one or two feet could look like for La Conner in the year 2070. Green indicates low-lying areas.

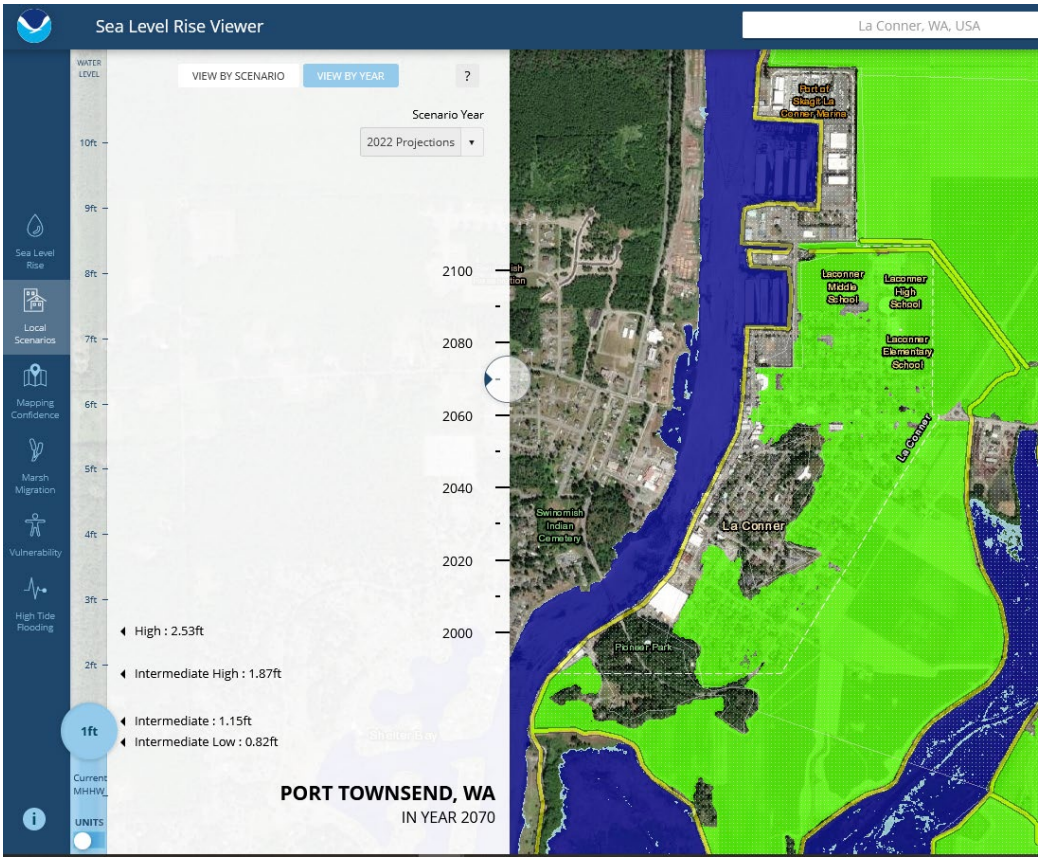


Figure 1: Visual of a projected sea level rise of 1ft in La Conner in the year 2070. Green indicates low-lying areas.

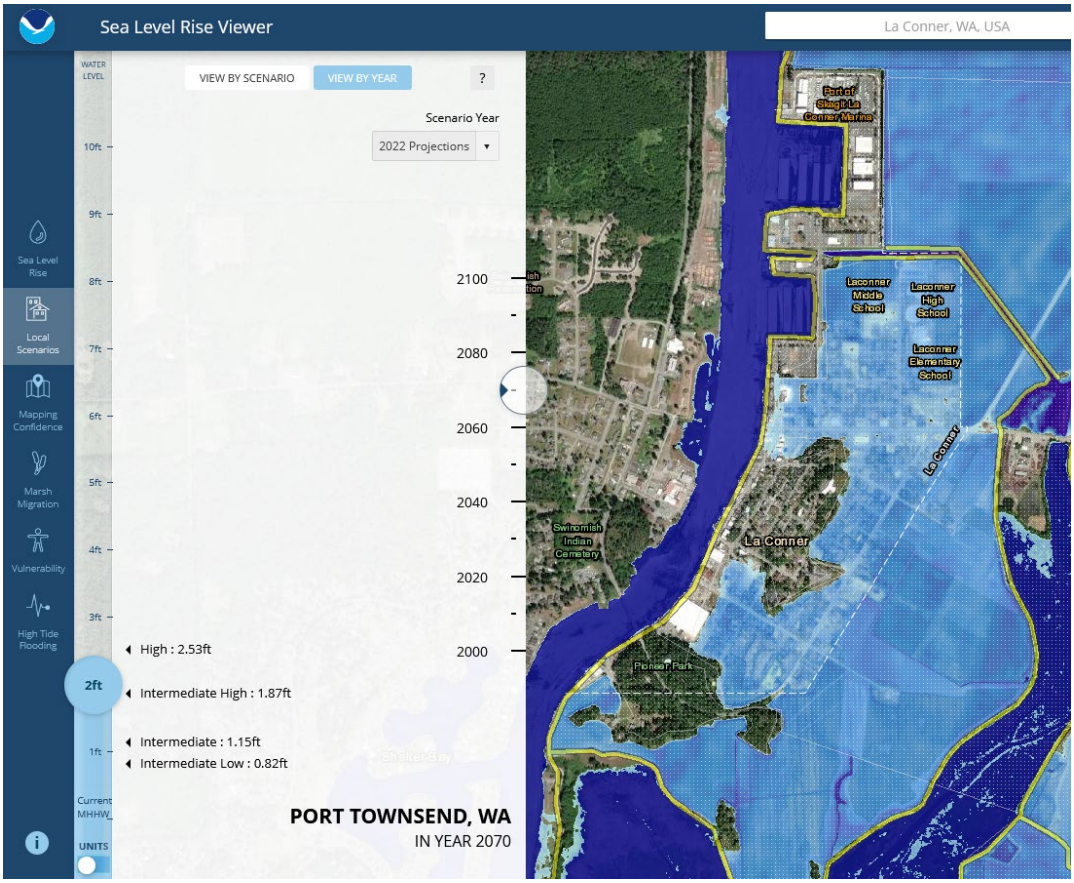


Figure 2: Visual of a projected sea level rise of 2ft in the year 2070 in La Conner. Wide spread inundation occurs at this sea rise level, which most closely matches the Intermediate-High scenario.

The below tables show the four tidal gauges closest to La Conner and the expected SLR in the Intermediate-High and Intermediate scenarios at 2050 and 2100.

Place	*Year*	*Scenario*	*Rise (ft)*	*Decade*	*Scenario*	*Rise (ft)*
Seattle	2050	Intermediate-High	0.95	2100	Intermediate-High	4.39
Port Townsend	2050	Intermediate-High	0.84	2100	Intermediate-High	4.16
Cherry Point	2050	Intermediate-High	0.51	2100	Intermediate-High	3.47
Friday Harbor	2050	Intermediate-High	0.74	2100	Intermediate-High	3.96
Average			0.76			4.00

Place	*Year*	*Scenario*	*Rise (ft)*	*Decade*	*Scenario*	*Rise (ft)*
Seattle	2050	Intermediate	0.74	2100	Intermediate	2.92
Port Townsend	2050	Intermediate	0.63	2100	Intermediate	2.69
Cherry Point	2050	Intermediate	0.3	2100	Intermediate	2.05
Friday Harbor	2050	Intermediate	0.53	2100	Intermediate	2.49
Average			0.55			2.53

Here is a general graph outlining the SLR for the Northwest Coast, from 2020 to 2150.

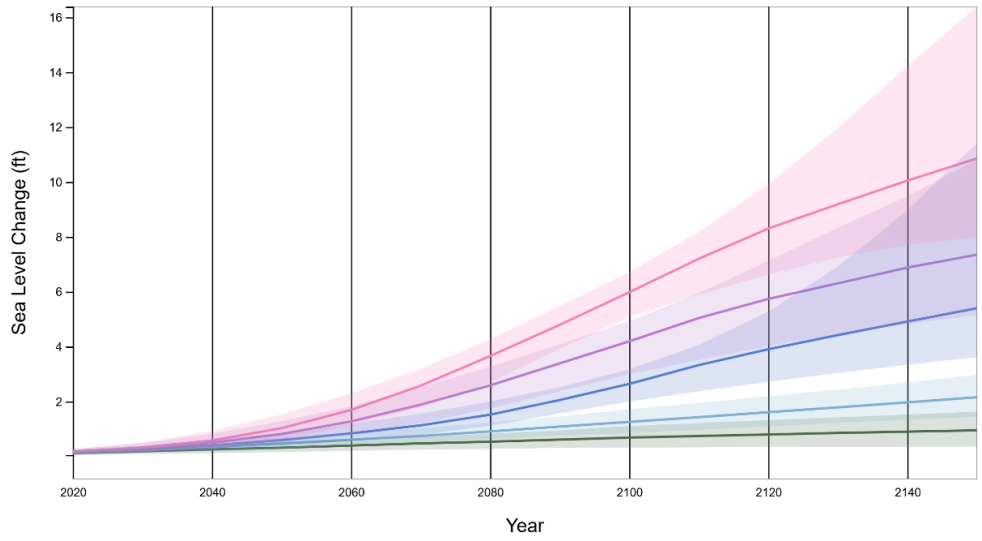


Figure 3: SLR for the Northwest Coast projected to 2150 in five different scenarios. From bottom: Low, Intermediate-Low, Intermediate, Intermediate-High, and High. Confidence intervals are shown in shading on the graph

Regional estimates provided by NOAA can be helpful in planning for near-term effects and SLR. Regional estimates come from tide gauge observations like the ones above and other sets of observations in the region. The graph below illustrates how the regional observed SLR is extrapolated to the projected SLR to 2050. Again, because of robust statistical processes applied by NOAA and other authors of the report, there is a low level of uncertainty in these projections. Below is a graph of the Northwest regional SLR scenarios up to 2050.

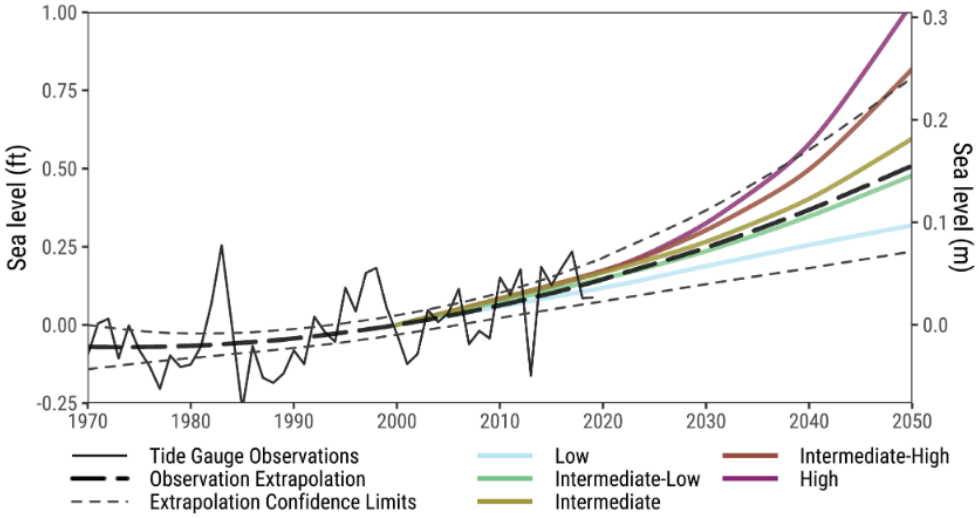


Figure 4: Regional SLR scenarios and the observation-based extrapolation for the Northwest Region (Washington and Northern Oregon). Variability due to cyclical ocean dynamics is overlaid for context and was removed prior to generating the observation-based extrapolation.

It is true that the median observation-based extrapolation of sea level rise (the likely range) for the near-term (2050) Northwest coastline is bounded by the Intermediate-Low to Intermediate scenarios, so some may say planning for an Intermediate-High scenario is overly cautious. However, given that most scenario divergence occurs after 2050, given that uncertainty increases after 2050, and given that a substantial amount of land in La Conner is low-lying (highlighted green in figure 1) using the intermediate-high scenario provides reasonable confidence that mitigation measures will provide a long and lasting impact. Even at projected levels of global emissions causing a 5.4°F increase in global air temperature in 2100, there is a less than 1% chance that the Intermediate-High SLR scenario will be exceeded. This is a reduction from the 5% chance that an Intermediate SLR scenario will be exceeded, and a reduction from the 82% probability that the Intermediate-Low scenario will be exceeded.

Please note that, in general, greater warming and higher human emissions are needed to arrive at the Intermediate, Intermediate-High, and High scenario.

If certain structures or town locations are later shown or determined to have a low-tolerance (high-risk) to SLR, there are specific strategies outlined in the Application Guide designed for risk-intolerant locations which could be applied.

Please note that the projected sea level rise in North West Washington is the lowest for the entire US coastline. This means that the mitigation methods used in other communities will

likely be effective in La Conner, as other communities will be planning for a higher increase in SLR. However, La Conner is about 50% low lying areas, so it may be more vulnerable to SLR than its direct neighbors in the Northwest, and it may be more vulnerable to the expected increase in EWL and HTF.

In order to best prepare for EWLs and HTF, it is necessary to find La Conner specific EWLs and HTF projections.

Extreme Water Levels (EWL) and Flood Regime Shift:

Over the next 30 years, SLR will create a regime shift in coastal flooding, causing more damaging flooding more often. NOAA's flood characterizations are broad, and based in damage done to property or infrastructure rather than water level alone. Extreme Water Levels, in comparison, represent the water level alone, with no regard to damage. NOAA characterizes minor flooding as flooding with little to no long-term impacts, moderate flooding as flooding with some longer-term impacts and short-term impacts on small areas of property or infrastructure, and major flooding as flooding with long-term impacts on a considerable amount of property and infrastructure. By 2050, La Conner can expect to see an increase of about 10 times more moderate flooding. More specifically, in 2050 La Conner can expect to see about 4 moderate flooding events per year. For reference, today La Conner sees around 3 events of minor flooding per year. The December 2022 flood would be considered in a major flood under this maxim. Major flooding will jump from about a 4% yearly chance to a 20% yearly chance by 2050. In 2060 and the following years, La Conner could expect to see a "December flood" about once every two years, and possible more frequently.

Before continuing to discuss flooding in La Conner, it is important to emphasize that the 1% annual chance water levels, sometimes referred to as a 100-year flood, in this analysis are not the same as those found in the Federal Emergency Management Agency's (FEMA's) regulatory products such as the Flood Insurance Rate Maps. More detail can be provided on the relationship between the EWL analysis and FEMA's regulatory floodplain if needed (*Section 3.1*).

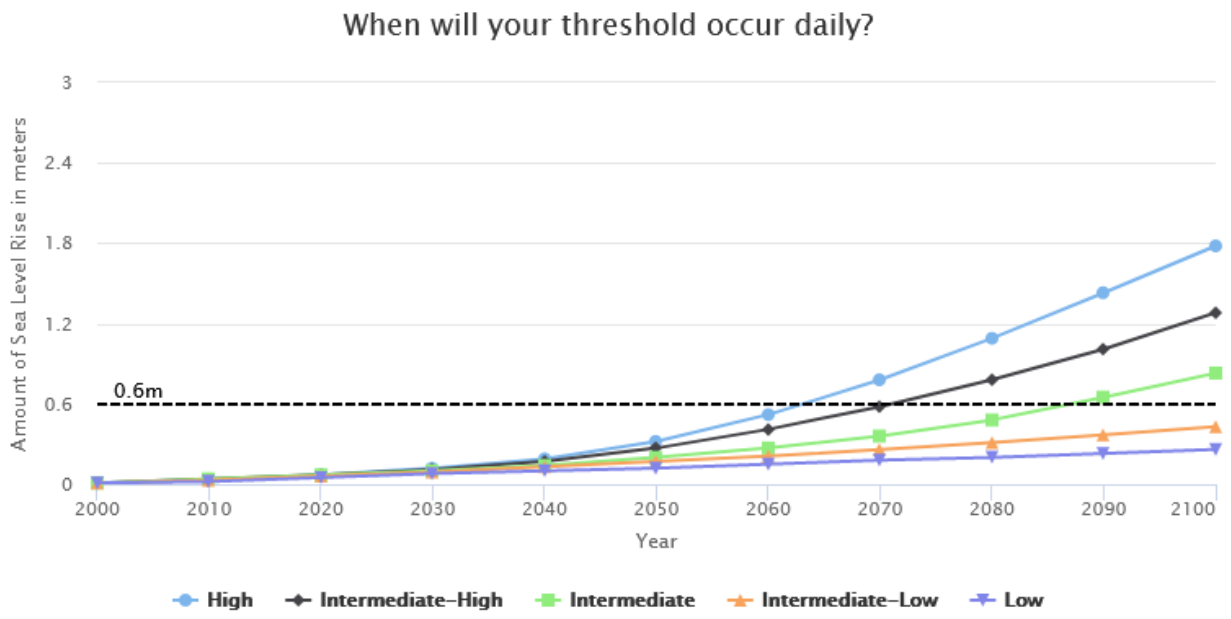
Among the tools associated with the updated technical report, NOAA developed a Local Quick Flood Assessment tool for communities using the 2022 projections. In order to use this tool, one must specify the height and frequency level at which flooding becomes a concern for the community. For the following projections, a height level of 0.6m above the current average daily tides was chosen. 0.6m comes from the regionalized 1-degree grid Minor Flood level as indicated in the 1-degree grid developed for regional projections. The below chart lists the four closest tide gauges to La Conner and the associated heights at which minor, moderate, and major flooding occurs. As can be seen, the minor flooding levels for all four gauges are roughly 0.6 meters. In addition, 0.6 meters is ~1.9 ft, which is the level previously established in this report for widespread inundation.

EWL Grid No.	NOAA ID	Location	Latitude	Longitude	Tide Range (m)	Flood Index u (m, MHHW)	u Trend (mm/yr)	Epoch of u	Minor Flood (m, MHHW)	Moderate Flood (m)	Major Flood (m)
49239	9444900	Port Townsend, WA	48.11	-122.76	2.597	0.538	1.7	1983–2001	0.604	0.878	1.274
48880	9447130	Seattle, WA	47.60	-122.34	3.462	0.541	2.1	1983–2001	0.639	0.904	1.309
49239	9449424	Cherry Point, WA	48.86	-122.76	2.788	0.585	0.4	1983–2001	0.612	0.884	1.282
49238	9449880	Friday Harbor, WA	48.55	-123.01	2.364	0.554	1.2	1983–2001	0.595	0.871	1.265

Figure 5: Four closest tide gauges to La Conner and the associated information provided by NOAA, including the height at which minor, moderate, and major flooding occurs in 2022.

In deciding the frequency level at which flooding would become a problem for the community, the previously established intermediate to low risk tolerance was used to establish that 12 days of 0.6m flooding (once a month) a year would cause a problem for the community. This is because the tool itself suggests 24 days of flooding (two days a month) as a threshold when calculating for an intermediate risk tolerance. As La Conner is working with an intermediate to low risk tolerance, a lower threshold was chosen. At any point, this analysis can be redone using any height or frequency thresholds as needed. Currently, a 0.6m flood has about a 50% chance of occurring in any given year. Put another way, this means that La Conner experiences a 0.6m flood on average once every 2 years.

The following graph shows when La Conner can expect to reach a water level of 0.6m daily depending on the projected scenario. Intermediate-High, the scenario used for La Conner in this report, is shown in black triangles on a line. As can be seen, this graph shows that La Conner might reach a 0.6m water level daily in 2070, which matches the previous projections for SLR.



This also helps La Conner estimate when and how La Conner can expect its 100-year water level to change. Currently, La Conner's 100-year level, or flooding that has a **1% chance of occurring each year**, is flooding at or exceeding **0.98 m above MHHW**. If La Conner experiences a SLR of 0.38 m, or about 1.2 ft, this level of flooding will have **a 50% chance of occurring each year**, and La Conner could expect to see flooding at this level every 2 years. So, when should La Conner expect to see this increase in flooding? The below graph outlines the years that 0.38m of SLR will occur in the five (low, intermediate-low, intermediate, intermediate-high, and high) potential scenarios. The scenario that La Conner is planning for, Intermediate-High, shows this increase happening in **2060**.

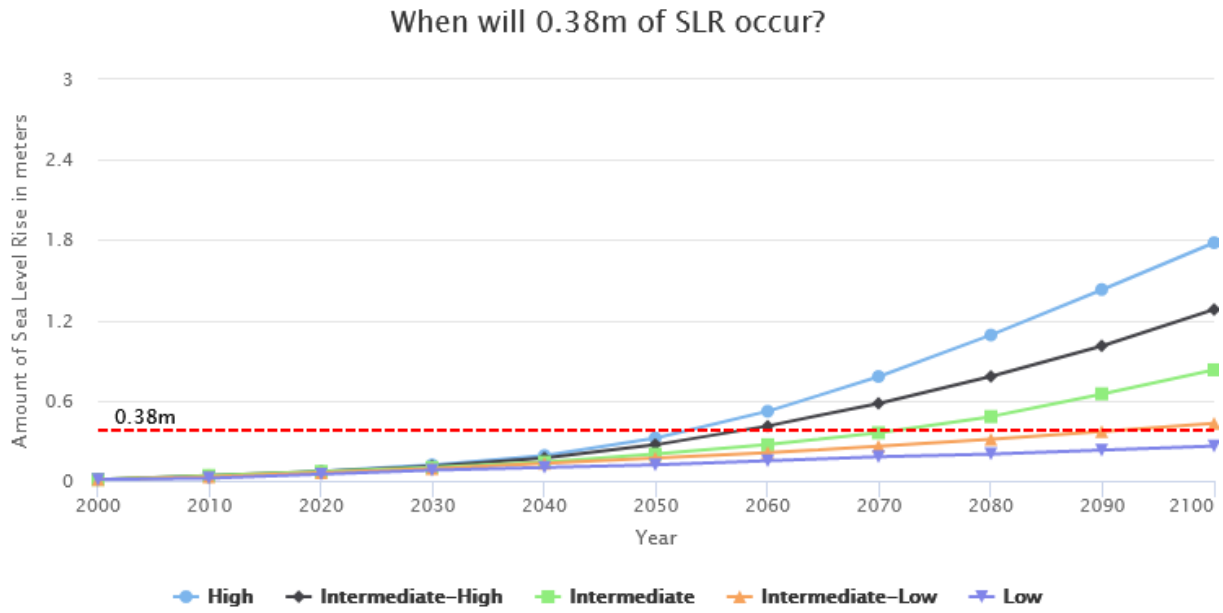


Figure 6: this graph outlines the potential years in each scenario when 0.38m of SLR will occur, which in the Intermediate-High scenario will be in roughly 2060.

In 2060, La Conner can expect to see today's 100-year flood every 2 years instead. Of course, this flood regime shift will affect all flooding in La Conner, not just the major flooding events. Currently, it is fairly rare for La Conner to experience High Tide Flooding, with a flooding event of 0.6m occurring roughly every two years, with a 50% chance of occurring in any given year. By 2030, it is projected that La Conner will see around 12 days of 0.6m flooding, roughly one flood per month. The next decades will see that number jump sharply upward. **By 2060, La Conner can except to see 163 days per year of 0.6m flooding under an Intermediate-High scenario. By 2070, it's 293 days.**

As La Conner plans for this flooding increase, it will be important to work closely with Public Works to assess La Conner's storm drain and stormwater management systems. NOAA does provide tools for this assessment, which La Conner will use in connection with local experience and expertise.

How Should La Conner Move Forward?

Given that mitigation measures will clearly be required in order for La Conner to persist as the thriving community it is, how should La Conner plan for this SLR and increase of EWLs in a consistent and effective way? Luckily, La Conner is not alone in answering this

question. NOAA, along with other governmental agencies, have developed outlines of different approaches that could be used in La Conner to plan for SLR.

Risk-Tolerance Planning:

As the name indicates, this approach relays on establishing acceptable risk in a community and then working within that framework to develop mitigation scenarios that would align with the chosen level of risk avoidance. Establishing acceptable risk includes understanding how critical the location or asset is to the community, the cost of damage, sociocultural value, how easily it can be adapted to accommodate SLR (adaptive capacity), and its life expectancy. This approach was used in the Sea Level Rise section of the report to determine that La Conner as a whole is not very risk-tolerant. As La Conner moves forward in SLR mitigation planning, La Conner can use risk tolerance planning to develop unique mitigation plans for specific risk-adverse projects or properties. NOAA recommends that risk tolerance for specific places and structures be developed with local community stakeholders to understand place-based significance as well as local socioeconomic and cultural values.

Using a risk tolerance approach does run the risk of over-investment and over-design. It is essential to consider future technology advancements, energy-climate policies, and social priorities along with how these may shift in the next 50 years.

Scenario-Based Planning:

Scenario-Based planning involves using a team to examine a range of "future scenarios" that include both human and environmental changes (land use changes, SLR, precipitation changes, demographic changes, etc.). Multiple mitigation/adaptation strategies are evaluated under the range of future scenarios to determine which strategies is most effective under the majority of scenarios. This often results in a community picking an action or mitigation that is *somewhat effective* under *multiple* scenarios, as opposed to an action or mitigation that is *best* under *one* scenario.

The following is a visual conceptualization of scenario planning.

Figure 7: Conceptualization of scenario planning. The colors designate how well a management strategy meets a desired outcome (red = does not meet outcome, yellow = moderately meets the desired outcome, green = meets the desired outcome). In this conceptualization, Management Strategy 2 would likely be the best investment (indicated by the dashed outline) because while it is not the best (green) under all scenarios, it supports the desired outcome to some level under all future conditions explored.

Although scenario planning often requires more time and effort than risk tolerance planning because of the necessity of developing multiple different scenarios and management strategies, it may be a good choice for La Conner because of the ample opportunities for stakeholder integration. As the Town is currently undergoing a review of its Public Engagement Program with an eye towards increasing engagement, developing stakeholder integration opportunities alongside future planning would not be out of place. Using scenario-based planning may be better suited for near-term planning horizons when there is less uncertainty and a narrower range of potential scenarios, which would allow more detailed evaluations of other stressors in the scenarios.

Scenario planning is often used to evaluate adaption strategies designed to prevent or reduce coastal erosion against multiple SLR scenarios and storm events. For example, La Conner could use scenario planning to evaluate how difference mitigation strategies such as seawalls, rock revetments, shoreline planting, or other strategies would perform against its expected SLR.

Adaptation Pathways Approach:

An adaptation pathway approach maps out a sequence of adaptation strategies in response to SLR. This approach allows municipalities to plan for a variety of potential scenarios but only invest in the mitigation strategies when necessary. An adaptation pathway is built around a specific goal or goals (such as protecting a specific structure or maintaining a LOS standard) and examines futures and possible mitigation strategies to achieve that goal or

goals. Adaptation pathways are built around "tipping points" which trigger the implementation of a particular adaptation strategy. These tipping points could be tied to any threshold chosen by the Town. Often, the various adaptation strategies are ordered so that more cost-effective strategies are implemented first, and more significant/expensive mitigation methods are triggered later in the process, so the municipality has more time to prepare for the implementation of expensive capital projects. When there is little adaptive capacity for this flexible implementation schedule, an adaptation pathway may be less appropriate. Adaption pathways are often very complex and wide reaching due to their capacity for analysis of mitigation strategies. A simple chart to visual adaption pathways is below.

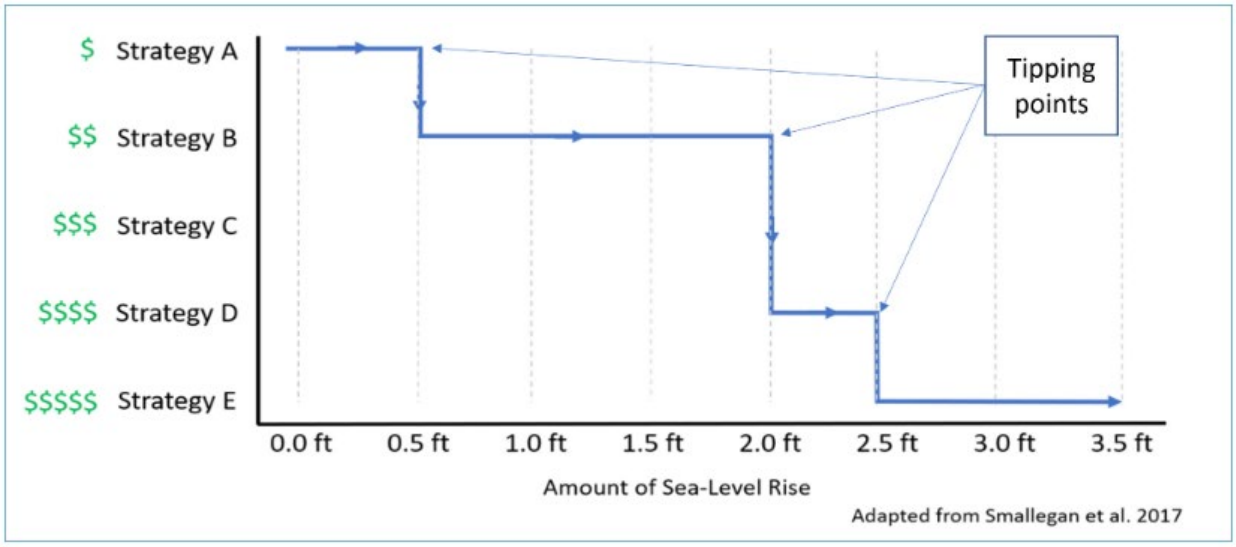
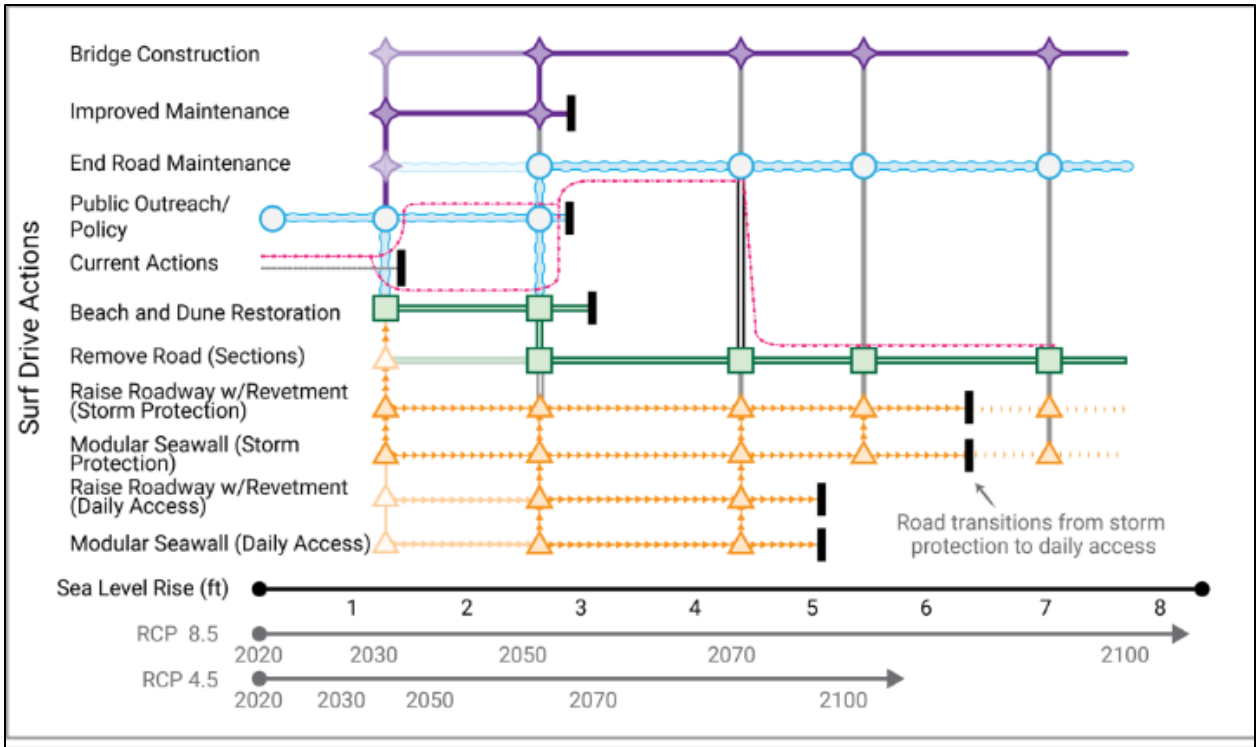


Figure 8: Diagram of an adaptation pathway planning approach. In this diagram, tipping points are associated with SLR, but they could be anything. The strategies are ordered based on expense. Strategies B and C have been skipped in this example as they will have already been rendered ineffective by the amount of SLR.

Adaptation pathways also provide frequent opportunities to engage community residents and other stakeholders by involving them in the determination and evaluation of mitigation strategies. For example, the community could participate in identifying tipping points (when mitigation strategies should be implemented) and in defining success and failure for a particular strategy (e.g. success could be defined as a seawall holding, failure

could be defined as Town storm infrastructure being overwhelmed). Involving the community in such a way would increase shared understanding of how and why some efforts are undertaken and not others. It would also provide a basis for clear communication when, in the future, additional actions are decided on. Adaptation pathways can be prepared for one, or many areas of town. In some cases, it may make sense to create an adaptation pathway as an additional measure of protection for a particular area of town or for a particular structure. The more an adaptation pathway covers in terms of scenarios and mitigation strategies, the more complex it can be. A key aspect of adaptation pathways is that they can be as simple as Figure 8, or as complex as Figure 9 on the next page.

The Town of Falmouth, MA, provides a good example of a more complex and detailed adaptation pathway, which they developed for Surf Drive, one road in Falmouth.



Pathway Scorecard

	Path Actions	Relative Costs	Target Effects	Side Effects
1.	Managed Retreat	+	Balances present uses with increased costs and risks in the future through a multi-phase retreat plan	Loss of Homes No Connection via Surf Dr. Loss of Accessible Beach
2.	Protection	+++++	Protects operational capacity of existing infrastructure and features	Loss of Accessible Beach Aesthetics/Visuals
3.	Natural Resources	+++	Preserves and enhances coastal and marine ecosystem functions	Loss of Homes No Connection via Surf Dr.
4.	Connection	++++++	Maintains important public access, utility connections, and transportation corridors	Loss of Homes
5.	Preferred	+++	Balances present uses with increased costs and risks in the future through a multi-phase retreat plan, while enhancing ecosystems	Loss of Home No Connection via Surf Dr.
6.		+++	Improved maintenance for short-term uses with a long-term focus on ecosystem restoration	Loss of Homes No Connection via Surf Dr.
7.		+++++	Coastal habitat restoration in the short-term, with protection of existing infrastructure in the long-term	Loss of Accessible Beach Aesthetics/Visuals

Figure 9: An example of a dynamic adaptation pathway adopted by Falmouth, MA. Actions are developed, categorized, and evaluated for feasibility under different SLR conditions. The preferred action, pathway 5, is a combination of path actions with general themes of Managed Retreat, and Natural Resources. This adaptation pathway is highly specific to Surf Drive in Falmouth, but it is useful to show a complex example of a dynamic adaptation pathway.

Next Steps: Resources for Mitigation Development

As La Conner moves forward in developing its own unique mitigation strategies, some or all of which may follow the strategies outlined in this report, it will be important to work in conjunction with neighbors the Port of Skagit and the Swinomish Indian Tribal Community. Working together will allow each community to better assess the expected changes in the Pacific Ocean, and more specifically the Swinomish Channel. It is also likely that mitigation strategies will require money, time, and political buy in. Working together and sharing resources with neighbors may help defray these costs.

NOAA offers over 170 trainings on their Office for Coastal Management: Digital Coast website, many of which are self-paced. As La Conner develops unique mitigation strategies for SLR and EWLs, these trainings will provide additional resources for development. NOAA also offers nine examples of SLR planning from municipalities across the United States. These example cases will also be helpful in developing La Conner specific mitigation strategies.

The Design Charrette Report developed in 2017 in conjunction with the Skagit Climate Science Consortium may be beneficial as a starting point in the development of mitigation strategies. Additional helpful materials may come from future conversations with other partners as well, such as academic institutions, climate resilience firms, or other specialty consultants.

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Sectors	Hazards				
	Extreme Heat	Flooding – Riparian and Coastal, and Extreme Precipitation Overall Probability of Flood Events: High – La Conner already sees flooding, especially when high tidal and low barometric pressure converge. With SLR also occurring and causing more frequent flooding events, it is likely that flooding events will happen fairly often in the future. Extreme water levels are discussed in appendix 12A, Sea Level Rise. La Conner is a small community within a complex floodplain, and susceptible from flooding from a variety of sources.	Drought	Wildfire – Smoke Impacts	Sea Level Rise (SLR) Overall Probability of SLR: Medium. As discussed in appendix 12A, Sea Level Rise, SLR projections are calculated under an intermediate-high projection scenario, which requires a certain level of both human emission and limited regulation. Please see appendix 12A for more information about how the intermediate-high projection was chosen.
Agriculture and Food System: Some local gardens, surrounded on landward sides by NRL-AG	Higher heat will result in fewer opportunities for local gardens, as gardeners facing high heat conditions will have less optimal conditions gardeners, potentially impacting their ability to produce food for themselves. In addition, La Conner is surrounded by agricultural natural resource land, and extreme heat can take a significant toll on agricultural workers. Sensitivity: Low – while Skagit County NRL-AG may be impacted, La Conner does not have these lands within its borders. Adaptive Capacity: Medium – farm land cannot be moved, but local knowledge of heat best practices can be implemented. Vulnerability: Low – La Conner may see indirect impacts, but not direct ones.	Flooding will impact the neighboring jurisdiction of Skagit County which includes natural resource agricultural land. With a system of private dikes that have a potential for failure, riparian flooding could result in the agricultural dikes overtopping and the Town becoming inundated. Coastal flooding could add salt to the soil, negatively impacting the long-term soil fertility. Sensitivity: Low – while Skagit County NRL-AG may be impacted, La Conner does not have these lands within its borders. Adaptive Capacity: Medium – farm land cannot be moved, but local knowledge of flood management can be implemented. Dikes can be redone and fortified to prevent more extensive flooding events. Vulnerability: Low – La Conner may see indirect impacts, but not direct ones.	Increased drought conditions will result in less water for agriculture. While this likely will not have a direct impact on La Conner, the impacts on Skagit County will likely indirectly affect La Conner, and may result in additional impacts on vulnerable populations, including the elderly. Sensitivity: Low – while Skagit County NRL-AG may be impacted, La Conner does not have these lands within its borders. Adaptive Capacity: Medium – farm land cannot be moved, but local knowledge of drought management can be implemented. Vulnerability: Low – La Conner may see indirect impacts, but not direct ones.	While La Conner and the rest of Skagit County is at a very low risk for wildfire itself, eastern Washington's fire risk is increasing, which could result in additional smoke and air quality problems in La Conner. Labors working in La Conner or Skagit County will need to adjust work hours and productivity during times of low air-quality. Sensitivity: Low – while Skagit County NRL-AG may be impacted, La Conner does not have these lands within its borders. Adaptive Capacity: Medium – farm land cannot be moved, but local knowledge of smoke hazard management among workers can be implemented. Vulnerability: Low – La Conner may see indirect impacts, but not direct ones.	Sea level rise may increase the ground water level and the level of salt in the soil, resulting in changes to the soil fertility in Skagit Valley. SLR contributes to flooding, so the consequence of SLR are far reaching. Sensitivity: Low – while Skagit County NRL-AG may be impacted, La Conner does not have these lands within its borders. Adaptive Capacity: Medium – farm land cannot be moved, but local knowledge of flood management can be implemented. Dikes can be redone and fortified to prevent more extensive flooding events. Vulnerability: Low – La Conner may see indirect impacts, but not direct ones.
Building and Energy: Town Hall, Maple Hall, La Conner School District (LCSD), Garden Club, Public Works Building, La Conner Swinomish Library,	Extreme heat will result in additional energy usage as HVAC systems and air conditioning units are used more often. Some Town assets, such as the Garden Club, do not have an AC or HVAC system, which potentially impacts the usefulness of these buildings in high heat.	Maple Hall, LSCD, the Library, the Fire Department, the WWTP and the Public Works building are all within the 100-year floodplain, making them vulnerable to damage from increased flooding. La Conner can experience flooding from any direction, and the combination of tidal/coastal flooding, riparian flooding, and extreme water events	N/A	Not all town buildings are equipped with systems that purify air and air particles. In the event of poor air quality due to smoke, it may be difficult to use these buildings as refuge from poor air quality. The buildings are not at risk from burning due to wildfire.	Based on the projections contained within the attached Sea Level Rise report, the LCSD can expect widespread inundation by the year 2070, along with a significant portion of Skagit County. Sensitivity: High

Fire Department Hall, Wastewater Treatment Plant (managed through contract)	Sensitivity: Medium – some buildings have AC, while others do not. Adaptive Capacity: High – building systems could be added to existing buildings to increase their resiliency to high heat Vulnerability: Medium – while La Conner can address this impact, it will require target efforts to upgrade the Capital Facilities within La Conner. Probability: Medium Magnitude: Low – extreme heat would not result in the loss of critical asset, but would affect the way these assets are utilized for the deration of the heat being present. Risk Characterization: Green– accept risk	result in a complex floodplain that is difficult to predict and manage. Sensitivity: High – all of these building could be impacted by flooding Adaptive Capacity: Medium – some of these buildings could be raised, but many of them are in the historic district and have other challenges associated with repairs. Vulnerability: High Probability: High Magnitude: High – most Town asset buildings are within the floodplain and almost none of these buildings have redundances. Risk Characterization: Red – Take Action		Sensitivity: Medium – some buildings will be affected by this while some will not be. Adaptive Capacity: High – there are advance air filtration systems available, and the Capital Improvements schedule could prioritize these installations. Vulnerability: Low	Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: High – critical assets with no redundancy would be underwater based on the projected SRL. Risk Characterization: Red – Take Action
Cultural Resources and Practices: La Conner Historic Preservation District (HPD), Gaches Mansion, Pioneer Park, Street-End Parks, Waterfront Park	Many buildings within the HPD do not have HVAC or AC systems, putting residents and commercial owners at a higher right for heat related injuries. Parks may see less community use as people do not want to be outside in the extreme heat. Sensitivity: Medium – some cultural building can provide AC, many cannot Adaptive Capacity: Medium – Historic preservation guidelines often make it very difficult to renovate buildings within the HPD. There is limited design flexibility. Vulnerability: Medium – while it can be fixed, it is often difficult to do so, and many owners will find it too difficult. Probability: Medium Magnitude: Low – extreme heat would not result in the loss of critical asset, but would affect the way these assets are utilized for the deration of the heat being present. Risk Characterization: Green– accept risk	First and Morris Street are anchors of the HPD, and both streets are fully within the floodplain of La Conner. In addition, many of these buildings are not built to the current FEMA standards due to their status in a historic district, which makes them more vulnerable to flooding. Many of these buildings would be extremely costly to rebuild, making it unlikely that these cultural resources would be preserved in the event of extensive flood damage. Sensitivity: High – the HPD already experiences flooding Adaptive Capacity: Low – the core of the HPD and La Conner's waterfront is the boardwalk, which has low adaptive capacity for flooding and has flooded out before Vulnerability: High Probability: High Magnitude: Medium – the HPD is a critical asset for La Conner, but there are some redundancies contained within the district in architectural examples contained outside the floodplain, and two museums in Town are also outside the floodplain, so those assets will not be affected. Risk Characterization: Red – Take Action	If more severe or frequent droughts occur during the summer, there may be more water conversation efforts undertaken by the community. It is possible that this will result in water restrictions. Droughts may also impact the green spaces in La Conner's town parks, decreasing the recreational opportunities. Sensitivity: Low – La Conner's Pioneer Park is a 12-acre site capable of absorbing impacts to its ecology. Other cultural sites in La Conner will likely be minimal affected by the drought. Adaptive Capacity: High – La Conner has a series of volunteers for park maintenance to help support the natural functions. Vulnerability: Low	Many of La Conner's cultural resources are meant to be viewed outside, such as the many historical parks and displays throughout town. Poor air quality means that fewer people will be out and about, resulting in less use of these resources. In addition, many historical buildings do not have air purification systems, which make the use difficult with smoke present. Sensitivity: Medium – Outside cultural resources, including the La Conner boardwalk, will be affected by negative air quality. Adaptive Capacity: Low – there is no way to massively impact outside air quality on a city-by-city basis. People will have to wear personal protective equipment (PPE) if the external air is significant impacted. Vulnerability: Medium Probability: Low – specific wind and fire conditions in eastern Washington would have to be present. Magnitude: Low – while this is a critical asset, it would not be lost due to this hazard. Risk Characterization: Green– accept risk	While the majority of La Conner's Historic District is shown to avoid inundation based on the projections, the flooding of the LCSD will have lasting implications for the Town. In addition, SLR increases the frequency and severity of coastal flooding, exacerbating those impacts. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: Medium – SLR would result in loss of certain parts of the HPD, but there are some redundancies contained within the district in architectural examples contained outside the projected SLR, and two museums in Town are also outside the projected SLR, so those assets will not be affected. Risk Characterization: Gold – Take Action

Economic Development: Business Hub contained within the HPD, extensive Port Property	La Conner is primarily a tourist town, which depends on foot traffic. High heat makes foot traffic less likely, which impacts local businesses. In addition, industrial work occurring at the north and south end of town may be impacted as workers adjust to high heat conditions. Sensitivity: High – La Conner depends on primarily foot traffic. Adaptive Capacity: Medium – La Conner could develop programs that cool the city scape in key economic areas, reducing the effects of heat. Vulnerability: High – these programs would likely take a long time to be implemented, and in the meantime, adverse impacts may occur	Almost 100% of the commercial districts in La Conner are within the floodplain. Flooding could prevent people from accessing their workplaces. La Conner is primarily a tourism-based economy. Flooding could prevent customers from reaching local business, impacting economic vitality. Sensitivity: High – La Conner's core Commercial hub is within the floodplain Adaptive Capacity: Medium – while some shops could relocate or raise the shop, many of these shops are also within the HPD, adding additional challenges. In addition, while some shops went online through covid, there is a limited ability to navigate a reduction of walk-in traffic. Vulnerability: High Probability: High Magnitude: Medium – losing access to the Commercial hub would be losing a critical asset and resources, however, there is some redundancy with online operations. Risk Characterization: Red – Take Action	N/A	La Conner is a tourism-based economy, which largely depends on foot traffic. If poor air quality stops foot traffic, La Conner businesses could lose revenue. Sensitivity: Medium – some business will have advanced air filtration systems allowing customer to comfortable shop. Industrial, light industrial, and port industrial work could be impacted due to poor air quality limited work hours. Adaptive Capacity: High – shops without current air filtration could install those system, and business with outside work could adapt to the air conditions by requiring additional PPE Vulnerability: Low	One of the economic hubs of La Conner, Morris Street, may be completed inundated by 2070, resulting in decreased economic output. In addition, coastal flooding during storms or extreme weather events, which can disrupt business operations and damage property. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: Medium – Morris street is a critical asset for the Town's economic development, but there are other important economic areas of Town that are not projected to be affected by SLR as much that could function as redundancies, including First Street and the Port owned properties. Risk Characterization: Gold – Take Action
Ecosystems: Shoreline Systems and low-quality category 3 non-tidal wetlands.	Extreme heat will have a limited direct impact on the shoreline and non-tidal wetlands in La Conner, but may negatively impact the organisms and ecological systems that occur within the La Conner shoreline and non-tidal wetlands. Sensitivity: Low – indirect impacts only Adaptive Capacity: Low – there is almost no regulatory option that would change the impact. Vulnerability: Low.	Flooding and associated flood recovery efforts have the capacity to impact the ecosystems contained within the shoreline of La Conner. Floodway and stormwater management could negatively impact jurisdictions downstream. These impacts must be considered before additional flood control or flood protection is installed. Sensitivity: Medium – La Conner shorelines have experienced flooding before with minimal effects, but the flooding impacts cannot be avoided completely. Adaptive Capacity: Medium – using guidance from Department of Ecology and the Department of Natural Resources, La Conner could likely develop some type of mitigation or capacity for flood events within the shoreline. Vulnerability: Medium	Skagit County is expecting to see less late summer precipitation, resulting in lower streamflow, a reduction in water quality, and a reduction in the growth and productive of some plants. Sensitivity: Low – La Conner does not have any significant streams within its borders, and gets all water from Anacortes. Adaptive Capacity: Medium – La Conner could prioritize drought-resistance plants in its landscaping plans. Vulnerability: Low	Smoke and poor air quality from wildfires also impacts animals, insects, and other organisms that keep our shoreline and ecosystems diverse and healthy. In addition, frequent wildfires have the potential to increase runoff and sediment to streams, which can reduce aquatic habitat quality. Sensitivity: High – La Conner's wildlife will be impacted by smoke effects from the fires. Adaptive Capacity: Low - there is no way to massively impact outside air quality on a city-by-city basis. Cities can invest in plants and ecological systems that help filter and restore air quality, but that is a long-term fix that works slowly. Vulnerability: High Probability: Low – specific fire and wind conditions would have to be present in eastern Washington	SLR is expected to cause changes to coastal ecosystems and can reduce habitats for some aquatic, wildlife, and plant species. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: Low – La Conner's shoreline and ecosystem is a critical asset, but effects on the shoreline and ecosystem should be viewed both in terms of the Town's borders and the overall watershed and ecosystem, which extends beyond La Conner's borders. Action taken to mitigate this

		Probability: High Magnitude: Low – La Conner's shoreline and ecosystem is a critical asset, but effects on the shoreline and ecosystem should be viewed both in terms of the Town's borders and the overall watershed and ecosystem, which extends beyond La Conner's borders. Risk Characterization: Gold – take action		Mangnitude: Low - La Conner's shoreline and ecosystem is a critical asset, but effects on the shoreline and ecosystem should be viewed both in terms of the Town's borders and the overall watershed and ecosystem, which extends beyond La Conner's borders. Action taken to mitigate this impact will need to be in collaboration with adjacent jurisdictions. Risk Characterization: Green– accept risk	impact will need to be in collaboration with adjacent jurisdictions. Risk Characterization: Green– accept risk Risk Characterization: Green– accept risk
Emergency Management: La Conner Fire Station, Public Works Flood Management	La Conner first responders will likely have to respond to more heat events such as heat stroke or heat exhaustion as La Conner experiences more hot and humid days. Sensitivity: Medium – La Conner's elderly population means that first responders may see increased demand for services related to extreme heat emergencies. Adaptive Capacity: Medium – while La Conner does sometimes partner with other first responders to provide services, those partnership require time and development to set up. Vulnerability: Medium Probability: Medium Magnitude: Low – while this may result in changes in how the asset is managed, there is no indication that this hazard will result in a critical loss for the asset.	Flooding events will require first responders and the public works crew to navigate recovery efforts. County wide emergency management efforts may be needed for some flood events. When first responders are navigating flood events, they are less likely to be available for other calls. Sensitivity: Medium – First responders are trained to address flooding, but the Fire Hall is in a floodplain. If the Fire Hall floods, it will be more difficult to mobilize an emergency response. Adaptive Capacity: High – the Fire Hall was built to the best-known floodplain standards at the time of design, and the Town could redesign the Hall. Vulnerability: Low	Increasing frequency of summer droughts also increase the need to plan and prepare for water shortages. Sensitivity: Medium – La Conner's fire department may be affected in its ability to fight fires with limited water. Adaptive Capacity: High – La Conner sometimes provide permits for additional irrigation in the summer for local farmers. In order to preserve water for emergency fire-fighting, this program could be halted. Vulnerability: Low – while this may impact La Conner, it is unlikely to cause challenges.	First responders may spend more time responding to respiratory distress calls. Sensitivity: Medium – First responders will likely be impacted by this, but it will depend on people's level of personal responsibility regarding safety in unsafe air conditions. Adaptive Capacity: Low – because this depends on people's personal choices, La Conner could do an informational campaign with the goal of adjusting community behavior, but limited other adaptive planning options are available. Vulnerability: Low	SLR will cause an increase in flooding events, which could increase the need for emergency services to plan, respond to and recover from coastal flooding. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: High – La Conner would lose multiple critical assets and infrastructure if strategic retreat needs to occur, including emergency management assets. Risk Characterization: Red – Take Action

Health and Wellbeing: La Conner Retirement Inn, Balance Point Physical Therapy, Aging and elderly population characteristics	La Conner has an aging population and a high percentage of residents above 65 years of age. This makes La Conner's population uniquely susceptible to being affected by increased in extreme heat. As La Conner can expect to see an increase in both hot days, humid days, and humid nights this may result in a greater demand for health and first responder services. La Conner does not have any hospitals or urgent care services within its borders, but the Retirement Inn should be prepared to see an increase in heat related illnesses as the years pass. In	Flooding may block access points in and out of town for emergency services, thereby creating a higher risk for vulnerable communities such as the elderly. Sensitivity: High – Street Flooding in La Conner is present during high flood events, but has not blocked emergency access during high flood events. Adaptive Capacity: Low – the pump stations currently work at capacity, but the stormwater and draining system is not built for the most extreme flood events. Vulnerability: High	Drought, and the root causes of drought, may negatively impact the mental, emotional, and physical health of a community. Sensitivity: Medium – La Conner is often included in Department of Ecology's drought emergency determinations, but it has not appeared to have a large impact on the community. Adaptive Capacity: High – La Conner residents have a history of support both each other and treasured	Vulnerable populations, including the elderly, are more prone to impacts caused by poor air quality and smoke. Sensitivity: High – these populations will be affected to a higher degree than other populations. Adaptive Capacity: High – there are advanced air filtration systems available for use that could mitigate this risk, as well as PPE that could mitigate this risk. While that is a personal decision, institutions such as the La Conner Retirement Inn could	SLR, along with associated increase in flooding, may block access points in La Conner for emergency services, creating a higher risk for vulnerable communities. In addition, SLR and displacement due to SLR can negatively impact the mental, emotional, and physical health of a community. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High

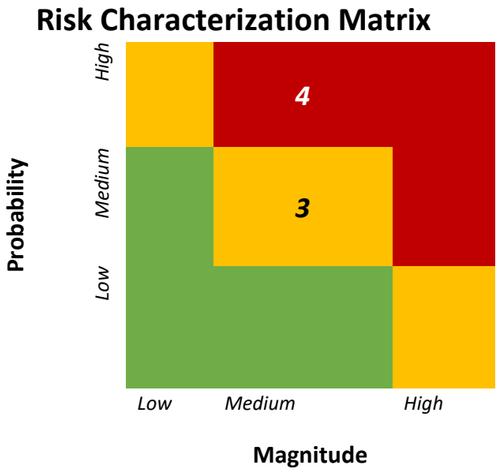
	addition, both the Swinomish Library and the LCSD have in the past opened as cooling centers, which provides a valuable use to the community but may disrupt programming from these community centers. Sensitivity: High – La Conner has a large population of vulnerable elderly that may be affected. Adaptive Capacity: Medium – changes to existing cityscapes and building design may be able to help lessen the impacts on health and wellbeing. Vulnerability: Medium Probability: Medium Magnitude: Medium – La Conner has an aging population, which makes it more susceptible to heat stressors. The losses that could occur from extreme heat may be significant. Risk Characterization: Green– accept risk	Probability: High Magnitude: Low – while this may occur, there is not evidence currently that floodwaters will block all emergency access routes or result in difficulties getting to vulnerable populations. Risk Characterization: Gold – Take Action	institutions, as seen by the community response during the covid lockdown and grassroots support for local reporting. Vulnerability: Low	install and promote these systems for a board impact. Vulnerability: Low	Probability: Medium Magnitude: High – multiple neighborhoods around La Conner could suffer displacement and La Conner's community is a critical asset that has no redundancies. Displacement of full neighborhoods would be a massive loss for La Conner. Risk Characterization: Red – Take Action
Transportation: Streets and Sidewalks	Extreme heat puts stress on roadways and other paved surfaces, resulting in deterioration acceleration or other types of surface degradation. This could result in greater transportation infrastructure and repair costs and traffic disruptions. In addition, extreme heat will limit the working hours during which repairs can be accomplished, and negatively impact the working environment for public works, both of which will exacerbate the impacts to transportation systems. Sensitivity: Medium – La Conner has a mix of old and new road systems. Old systems are more likely to experience failure. Adaptive Capacity: Medium – Public Works has control over the 6-year Transportation Improvement Program and could prioritize the most vulnerable assets. Vulnerability: Medium Probability: Medium	Flooding may block streets, resulting in less access for the Town. Longterm damaging of streets and sidewalks may occur depending on the severity of the flooding. Sensitivity: High – Street Flooding in La Conner is somewhat unavailable during high flood events. Adaptive Capacity: Low – the pump stations currently work at capacity, but the stormwater and draining system is not built for the most extreme flood events. Vulnerability: High Probability: High Magnitude: Low – while streets may be flooded for a time and experience associated negative impacts, the floodwater will likely recede from the streets and sidewalks with minimal damage. Risk Characterization: Gold – Take Action	N/A	Poor air quality and wildlife smoke will limit the working hours during which repairs can be accomplished, and negatively impact the working environment for public works, both of which will exacerbate the impacts to transportation systems. Sensitivity: High – outdoor work will be impacted by smoke and poor air quality. Adaptive Capacity: High – PPE and other filtration systems could be implemented in order to cope with the change in air quality. Vulnerability: Low	SLR may block streets, resulting in less access for the Town. Longterm SLR may result in complete disuse of certain streets and areas in Town, depending on the mitigation applied by the Town. If La Conner takes no action, strategic retreat may be necessary. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: High – La Conner would lose multiple critical assets and infrastructure if strategic retreat needs to occur. Risk Characterization: Red – Take Action

	Magnitude: Low Risk Characterization: Green– accept risk				
Waste Management: La Conner WWTP is within the UGA, but outside the Town boarders	La Conner's WWTP is outside of the Town boarders, but supplies compost to those with compost tickets, sold at Town Hall. Extreme heat will limit the ability of the workers to load compost. Sensitivity: Low – workers could implement best management practices to avoid adverse impacts Adaptive Capacity: High – new policies could be put in place to adjust this to cope with increased heat. Vulnerability: Low	La Conner's WWTP is right next to a dike; if this dike overtopped the plant could be damaged by flooding. Floodwaters running though the WWTP may have additional impacts on the ecosystem. Sensitivity: Medium – the WWTP is designed to handle some flooding, but it is located close to a series of private dikes that could overtop. Adaptive Capacity: Medium – the WWTP could potentially be redesigned to a higher flood standard, but La Conner has limited to no control over the management of the private diking system. Vulnerability: Medium Probability: High Magnitude: Medium – losing access or capabilities from the WWTP would be a significant loss for La Conner, as there is no redundancy for these services. Risk Characterization: Red – Take Action	N/A	Poor air quality and wildlife smoke will limit the working hours during which compost can be loaded, and negatively impact the working environment for WWTP workers, both of which will negatively impact the WWTP. Sensitivity: High – outdoor work will be impacted by smoke and poor air quality. Adaptive Capacity: High – PPE and other filtration systems could be implemented in order to cope with the change in air quality. Vulnerability: Low	SLR would cause the WWTP to experience flooding at a more frequent severity, disrupting operations and creating a negative environment for workers. Sensitivity: Medium Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Collaboration with Skagit County will be necessary as the WWTP is outside of Town borders. Vulnerability: High Probability: Medium Magnitude: Medium – losing access or capabilities from the WWTP would be a significant loss for La Conner, as there is no redundancy for these services. Risk Characterization: Gold – Take Action
Water Resources: La Conner gets all water from Anacortes, but manages Stormwater through public works.	Extreme heat will impact the ability of public works crews to fix water lines. Hot days can pose risks to the health and safety of maintenance and construction crews, limiting working hours. Sensitivity: Low – workers and Town Staff could implement best management practices to avoid adverse impacts Adaptive Capacity: High – new policies could be put in place to adjust this to cope with increased heat. Vulnerability: Low	Flooding is currently managed through pump stations located throughout La Conner. The capacity of these stations is listed in Chapter 8, Utilities. An increase in flood events, whether from riparian or tidal events or extreme precipitation, would create additional pressure on these systems, potentially aging them faster and decreasing the effective lifespan. Sensitivity: Low – most flood events do not impact the Anacortes facility and the pump stations have functioned during past flood events. Adaptive Capacity: Medium – pump stations could be redesigned and reworked for a higher capacity. Vulnerability: Low	N/A – La Conner gets all water from Anacortes. Residents in La Conner many need to prepare for volunteer or mandatory conservation measures.	Poor air quality and wildlife smoke will limit the working hours during which repairs can be accomplished, and negatively impact the working environment for public works, both of which will exacerbate the impacts to water resources. In addition, changes in water quality may result in the need for increase treatment and filtration. However, La Conner gets all water from Anacortes. Sensitivity: High – outdoor work will be impacted by smoke and poor air quality. Adaptive Capacity: High – PPE and other filtration systems could be implemented in order to cope with the change in air quality. Vulnerability: Low	SLR would result in increased flooding for the Town of La Conner. An increase in flood events, whether from riparian or tidal events or extreme precipitation, would create additional pressure on these systems, potentially aging them faster and decreasing the effective lifespan. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: Low – La Conner's water lines may be affected by SLR, but the Town is already engaging in monitoring these water lines and scheduling pressing replacements.

					Risk Characterization: Green – Accept Risk
Zoning and Development: One residential zone for all types of housing, multiple commercial districts.	Extreme heat will affect all of La Conner, but impact certain neighborhoods for difference reasons. Housing within the HPD is less likely to have adequate AC or HVAC systems installed, while housing outside of the HPD has been developed more recently, which results in an immature tree canopy and more impervious surface, which can compound the effects of high heat. As more housing gets built and impervious surface increase, the effects of high heat will be seen more clearly in residential neighborhoods. Sensitivity: Medium – new development will see impacts of extreme heat much more than existing. Adaptive Capacity: Medium – new policy could help curtail impacts on new development by developing additional cooling city scape information, but current new developments would not be subject to those same standards. Vulnerability: Medium Probability: Medium Magnitude: Low – while this may result in changes in how the asset is managed, there is no indication that this hazard will result in a critical loss for the asset. Risk Characterization: Green– accept risk	Roughly 70% of Town is in the floodplain; this area includes both residential and commercial zoning. There is extremely limited land available for use outside of the floodplain. Developing housing within the floodplain has additional costs associated with it, making it much more difficult to develop affordable housing within the floodplain. Houses built prior to the current FEMA guidance are at higher risk for flood damages. Sensitivity: High – Homes in La Conner have flooded in the past, especially older homes in low-lying areas. Housing is more difficult to build within the floodplain. Adaptive Capacity: Low – it is up to individual structure owners to decide how to floodproof their homes beyond the FEMA requirements of Town. Older homes may have been built prior to the FEMA guidelines. Vulnerability: High Probability: High Magnitude (Critical Asset, System Redundancy): High – housing is a critical asset for La Conner, and preserving existing housing is important for the community. While some redundancies in housing existing outside of the floodplain, repeated damaged to home within the floodplain would be a large loss, and could also result in resident displacement. Risk Characterization: Red – Take Action	Droughts may decrease the value of existing public recreation land in La Conner. Sensitivity: Low – La Conner has not seen negative land impacts on parks and other public lands in the past. Adaptive Capacity: Low – La Conner does not have the capacity to manage extensive drought resiliency programs for its public lands. Vulnerability: Low	N/A.	SLR would cause La Conner to both experience widespread inundation and an increase in flooding events. This increase in hazards is expected to result in less land available for both residential and commercial development. If no action is taken, strategic retreat and displacement of residents may occur. Sensitivity: High Adaptive Capacity: Medium – adaptive pathways and scenario planning as outlined in the SLR Report could be used. Vulnerability: High Probability: Medium Magnitude: High – La Conner would lose multiple critical assets and infrastructure if strategic retreat needs to occur. Risk Characterization: Red – Take Action

Interpretation Notes:

Medium Vulnerability Indicator. When asset-hazard pairs have a vulnerability assessment of medium or high, additional information is included about the probability of hazard occurrence and the magnitude of the potential loss and consequences. Magnitude of loss considers how critical the asset is for La Conner and if there is system redundancy if the asset fails.
High Vulnerably Indicator: When asset-hazard pairs have a vulnerability assessment of medium or high, additional information is included about the probability of hazard occurrence and the magnitude of the potential loss and consequences. Magnitude of loss considers how critical the asset is for La Conner and if there is system redundancy if the asset fails.
Composite Risk Rating: Based on the probability of the hazard occurring and the magnitude of loss, each asset-hazard pair has a composite risk rating (green, gold, or red) based on the matrix below. Then, based on this rating, a decision is made to either Take Action (TA) or Accept Risk (AR)


Risk Characterization Matrix
Probability
High
Medium
Low
4
3
Low
Medium
High
Magnitude