



Coastal Flooding Maps

This map bundle shows coastal flooding results for Skagit River areas along Skagit Bay, Swinomish Channel, Padilla Bay, and Samish Bay.

This set includes an overview map of the area and zoomed-in map areas for Padilla and Samish Bays, La Conner, and Skagit Bay. Background information on coastal flooding and climate change can be found in the full *Understanding Current and Future Skagit Flood Risk Through New Modeling Capabilities* report and specific details on the hydraulic model that created these maps can be found in Appendix A. Animations for select locations can be found at the Skagit Climate Science Consortium website.

These maps are products of the hydraulic model detailed in Appendix A. They are provided without any warranty of performance or fitness for a particular purpose. They should not be depended upon as a sole source of information as they illustrate potential scales of flooding rather than exact locations and do not account for real-time changes like erosion, dike failures, larger than modeled events, or other factors. Maps should be used at your own risk.

What Is Included in This Appendix

This appendix contains map bundles for Upriver Flooding (Marblemount to Sedro-Woolley), Lower River Flooding (Sedro-Woolley to Skagit, Padilla and Samish bays), Coastal Flooding, and Dike Failure Scenarios.

Each of these map bundles has a map showing results for the entire map bundle area and then more zoomed in maps for key population centers. Maps include: flood depths, flood hazard (depth and velocity), and duration. For dike failure scenarios, a depth difference map is also included.

FLOOD FREQUENCIES

Floods are described in terms of “flood frequencies”; in this report we provide results for the 10-, 25-, 100- year events. As described in the report, this terminology can be confusing because it makes it sound like a flood event will only happen once in a given timeframe. In fact, the “10-year event” is a shorthand way to describe a flood event that has a 10% probability (or 1 in 10 chance) of occurring in any given year. Similarly, a 25-year event has a 4% chance of occurring in any given year, and a 100-year flood event has a 1% chance of occurring in any given year.

CLIMATE CHANGE

Climate change is projected to result in larger and more frequent floods. For example, models project that today’s 1% annual chance event will become about a 4–5% chance event by midcentury. To help the reader understand how flood risk is changing, this report uses the common terminology of 10-, 25-, and 100-year flood frequencies combined with different timeframes: historic, 2040s and 2080s.

FLOOD DEPTH MAPS

Flood depth maps show the depth and extent of flooding for specific locations and events.

DEPTH-VELOCITY HAZARD MAPS

Depth-velocity hazard maps show the danger posed by flood waters. Based on both water depth and velocity, the maps show the likely risk for children, adults, vehicles, and structures. These maps do not include secondary hazards such as erosion, avulsion, landslides or debris flows.

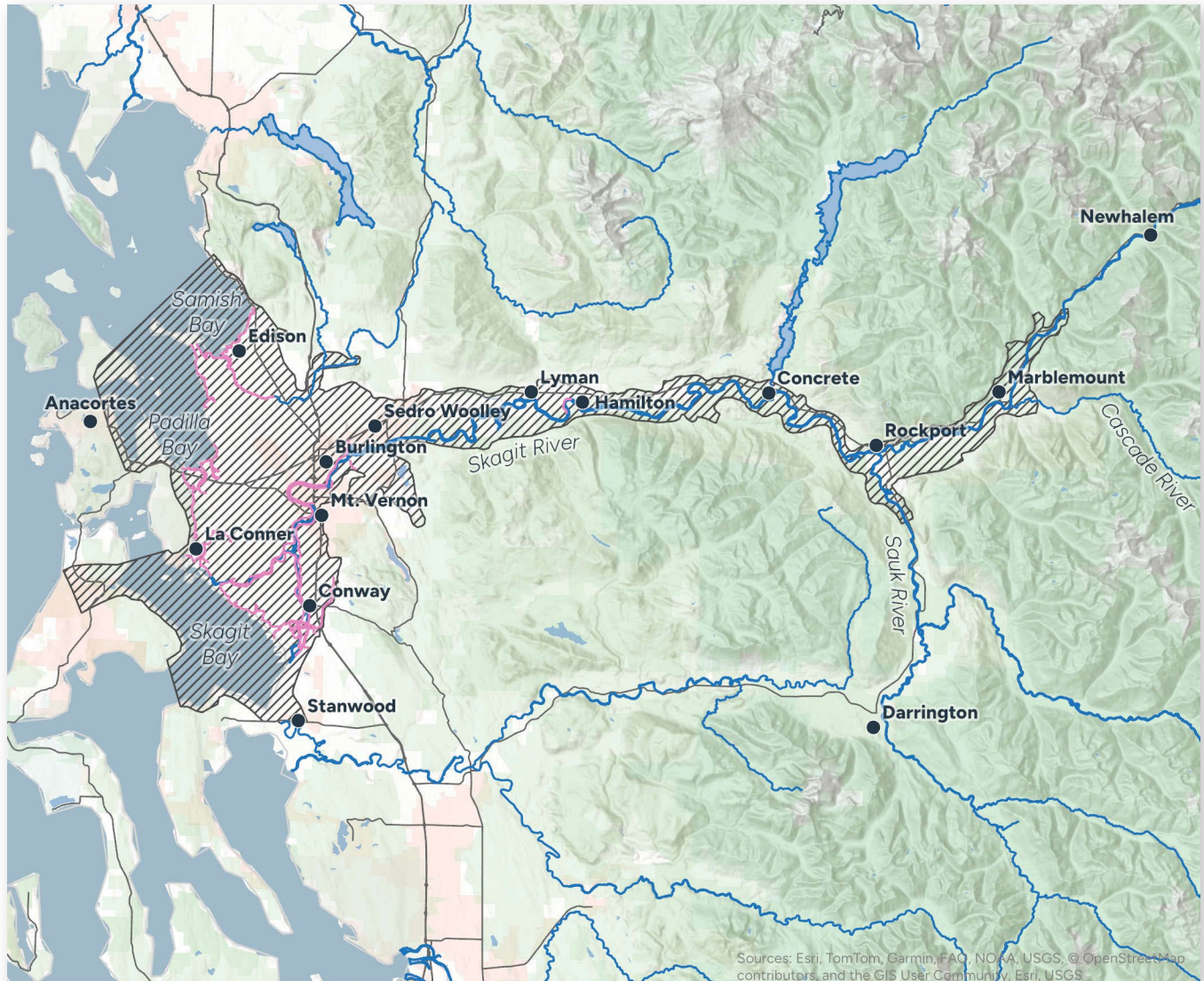
DURATION MAPS

Duration maps show the amount of time a location is flooded. This can be important for understanding the impacts on buildings, roads, dikes, emergency response, livestock, and many other important aspects of flood risk.

Disclaimer

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Skagit River System Overview



Hydraulic Model Domain

Maps included in Appendix B are products of the 2-D hydraulic model described in Appendix A. This map shows the model domain. The hatching shows that the model extends into Skagit, Padilla and Samish Bays in order to simulate coastal flooding. Water flowing into the model domain during flood events – from the Baker River, Upper Skagit River, Sauk River, and many smaller tributaries – are all included, even though the hydraulic model simulations are confined to the Skagit River floodplains.

- Cities
- Major Roads
- Rivers
- Dike or Coastal Dike
- ▨ 2D Model Domain

0 2.5 5 10 Miles

How to Read Coastal Flooding Maps

What These Maps Show

For all maps, the background is based on aerial imagery (USDA 2023). Structures are shown as orange rectangles (Microsoft 2022). Pink lines, if present, show dike or coastal dike locations (Skagit County 2022), and dark gray lines show major transportation routes (WSDOT 2008, Skagit County 2019). Dark blue lines show rivers on the overview maps. Coastal model results are shown for areas above the mean tide line.

FLOOD DEPTH MAPS



These maps are organized into sets of three, showing results for Historic (top), 2040s (middle), and 2080s (bottom) flood magnitudes. Each set of maps shows the model results for a specific flood frequency: 10-year, 25-year, and 100-year. Maps show the depth of coastal flooding in shades of blue, where darker blue indicates deeper water and lighter blue indicates shallower water. In order to see how coastal flooding is projected to change in the future, the Historic and 2040s maps also show the estimated extent of the 2080s flood in bright green. There is no bright green shading for the 2080s map because the map is already showing the depth and extent of the 2080s flood. All three maps are at the same scale.

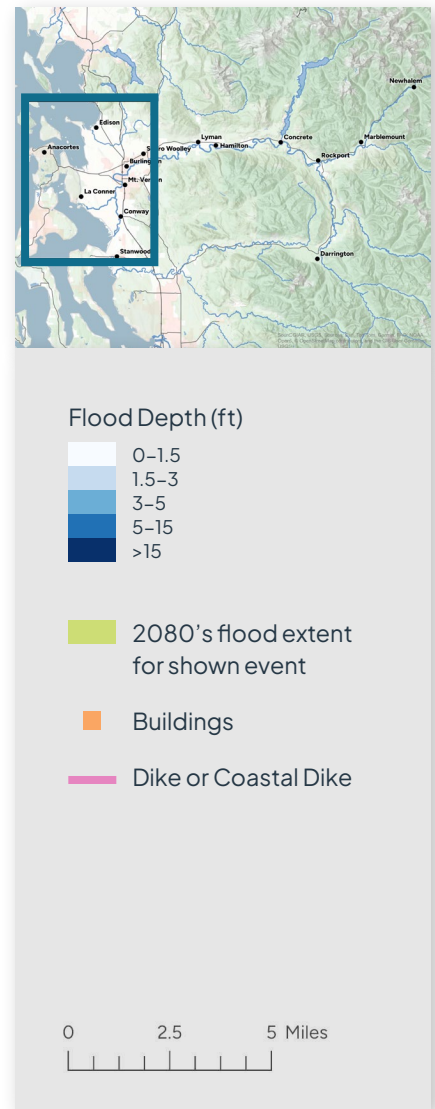
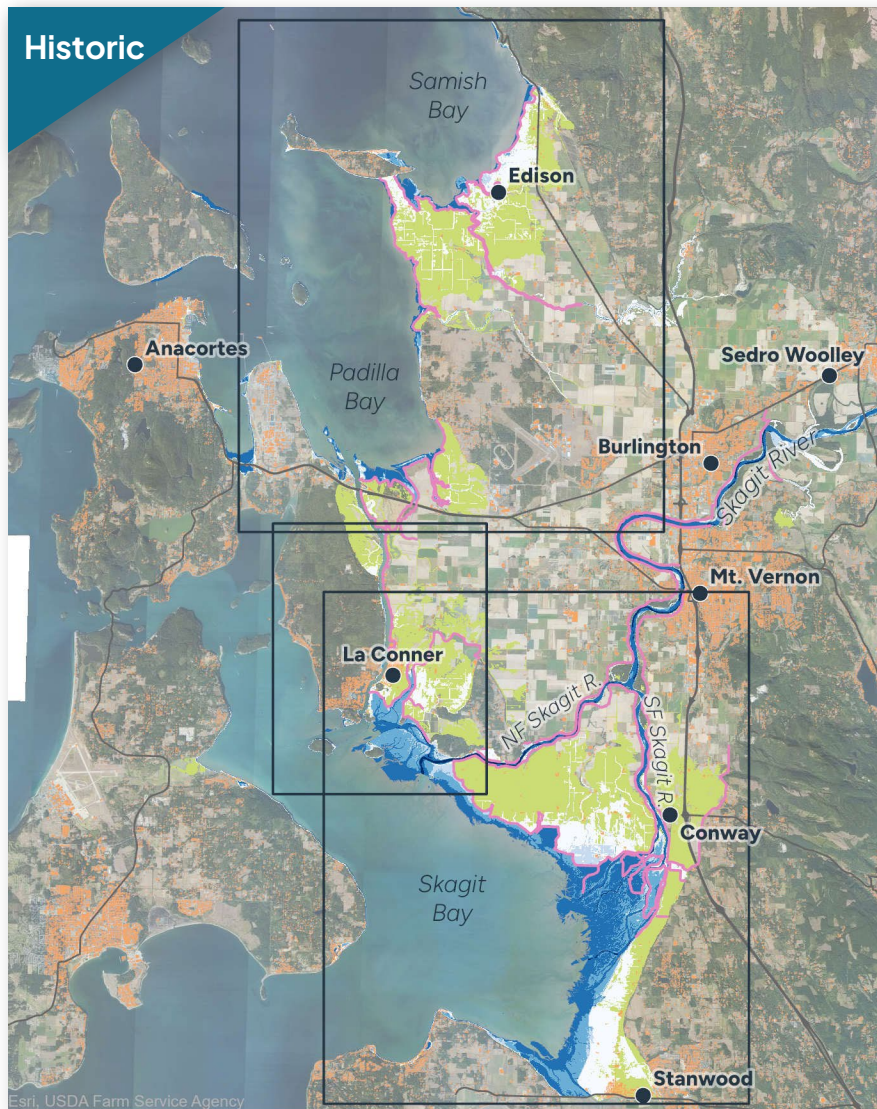
DEPTH-VELOCITY HAZARD MAPS



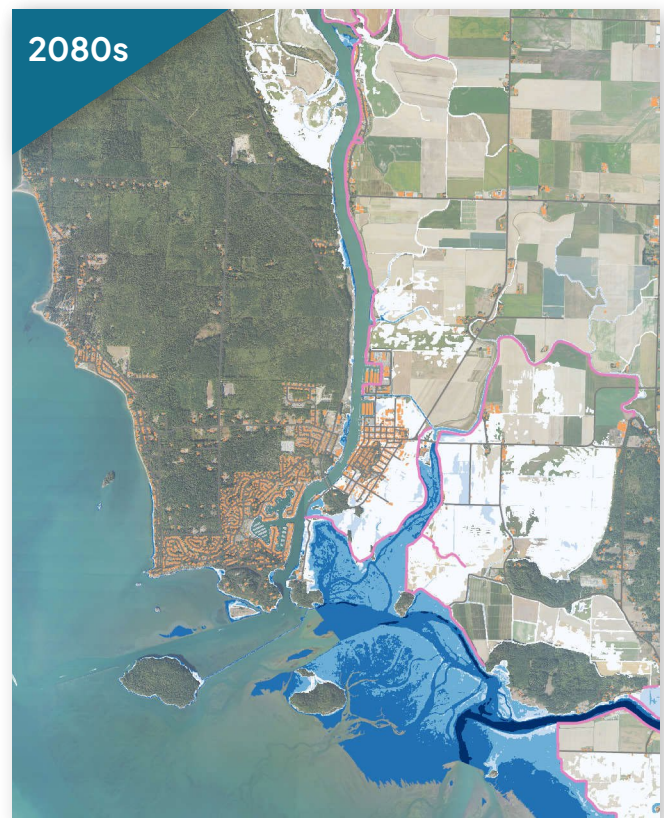
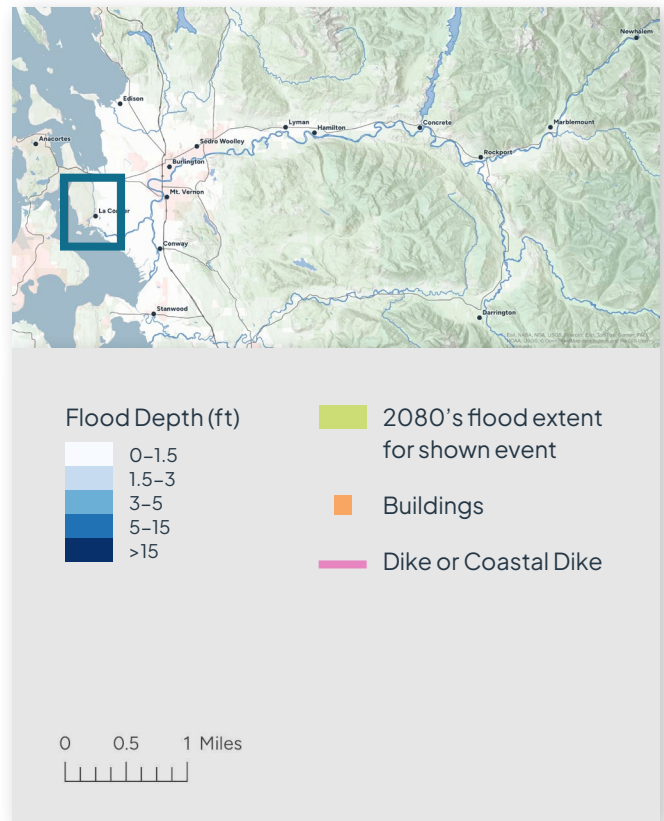
These maps show depth-velocity hazards for a historic 100-year event. Only the historic results are shown; maps for the 2040s or 2080s are not included. The hazard classifications shown in the key were assigned based on a standard international practice (AIDR, 2017) and grouped into six hazard ratings. The hazard mapping is based on clearwater hazards and does not account for secondary hazards such as geomorphic hazards (e.g., erosion, debris flows, etc.). In addition, the hazard categories were developed for riverine flooding, and may not apply as readily to coastal flood risks. Colors show when water poses a risk to children, adults, vehicles, and structures due to depth, water velocity or a combination of the two.

COASTAL FLOODING MAPS

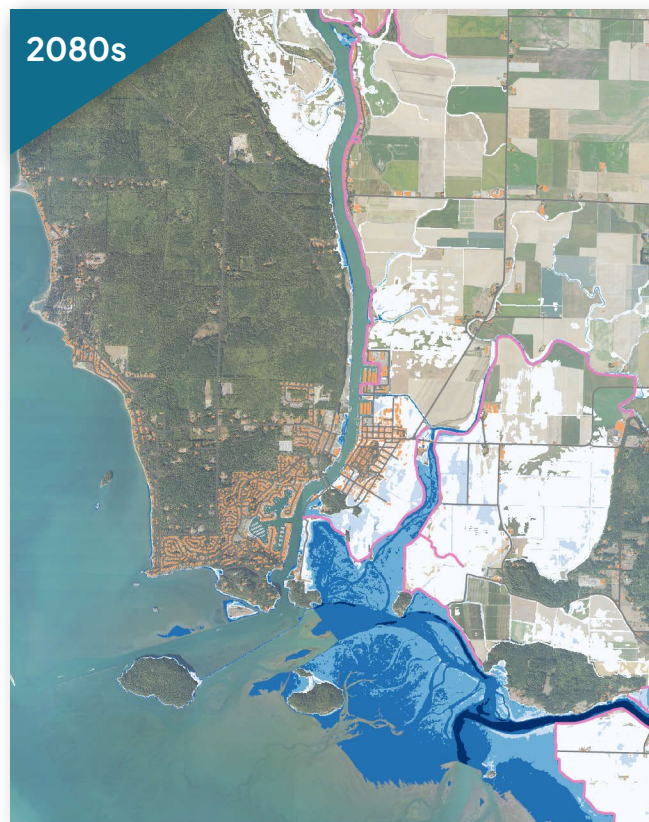
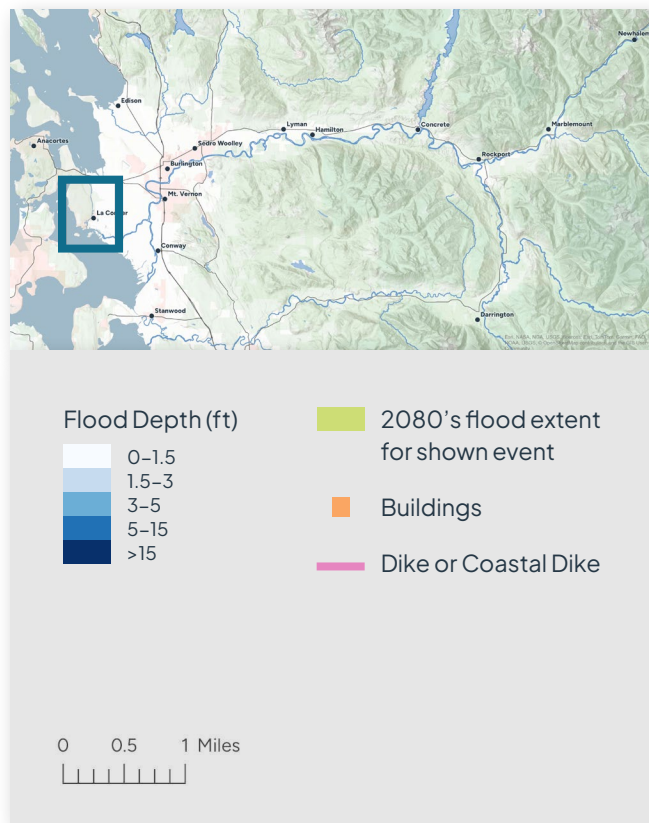
Overview Map



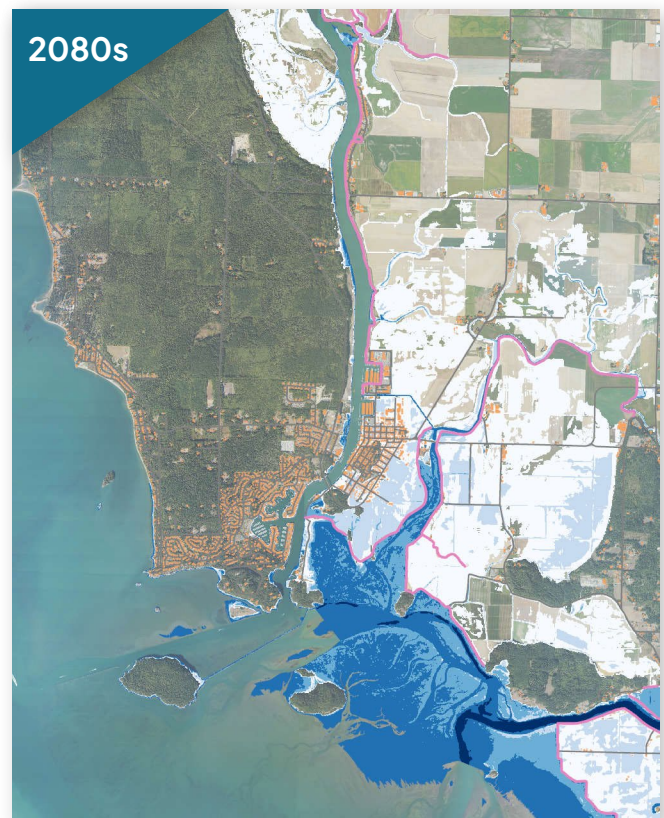
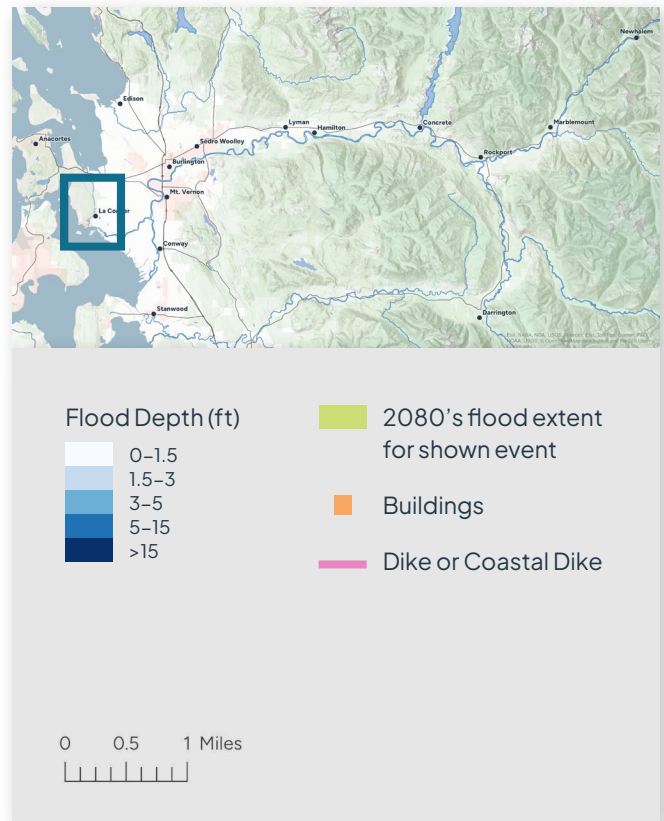
La Conner | 10 Year Flood



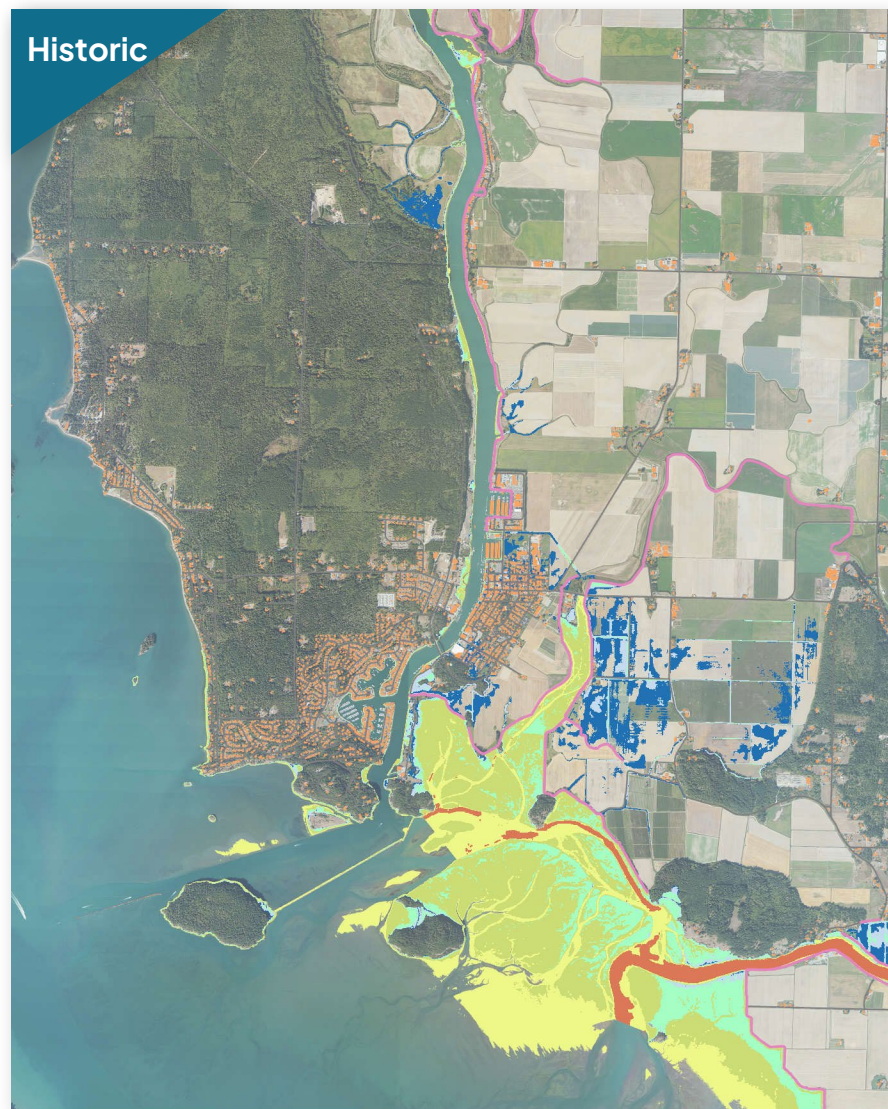
La Conner | 25 Year Flood



La Conner | 100 Year Flood



La Conner | Depth-Velocity Hazard

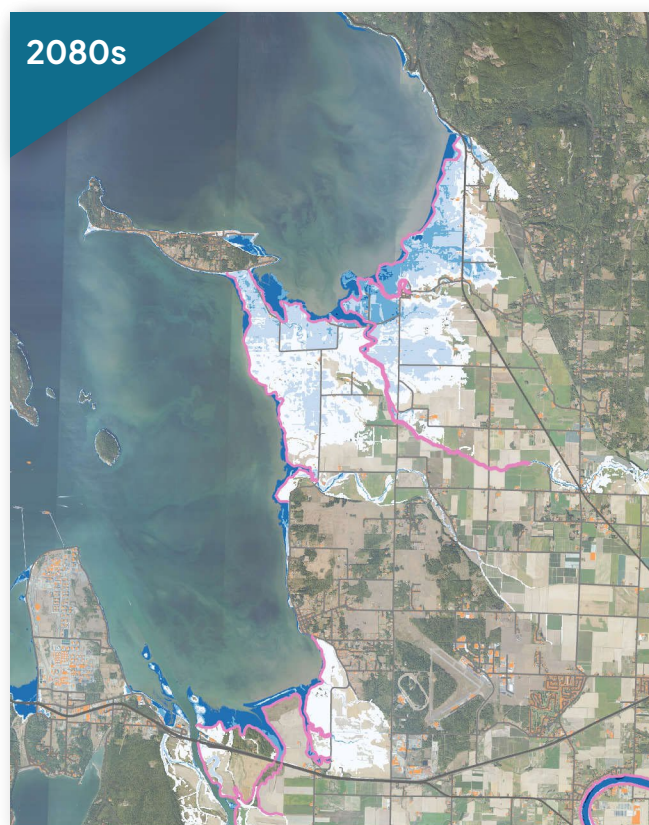
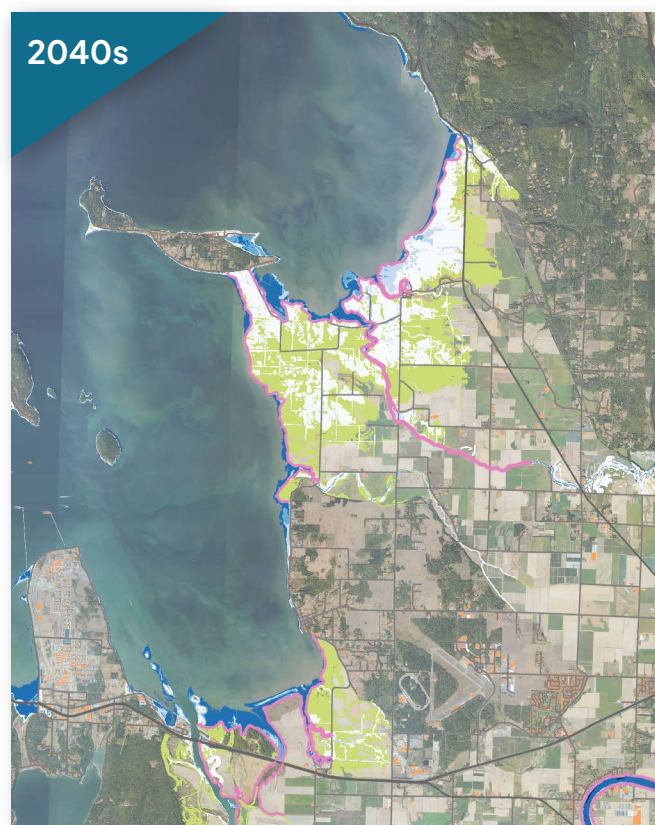
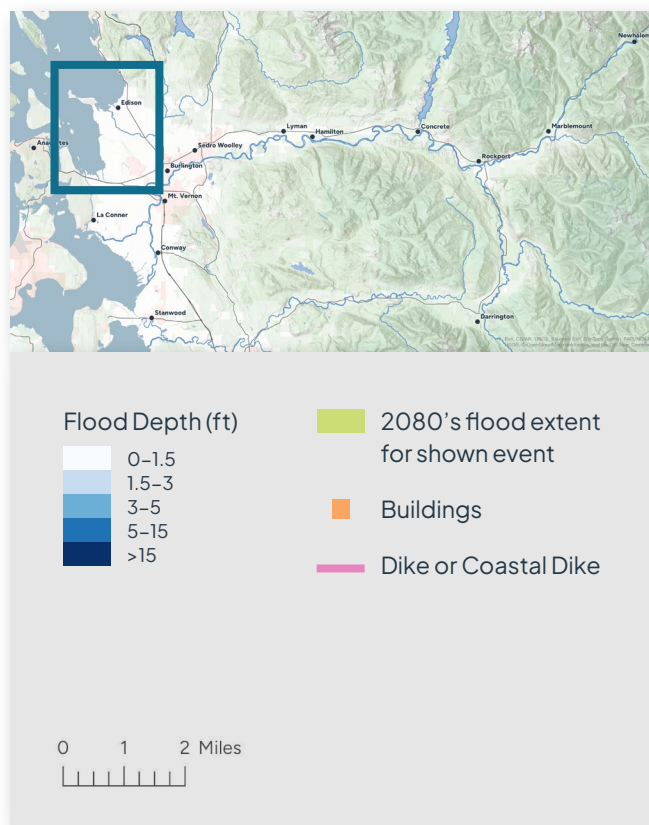
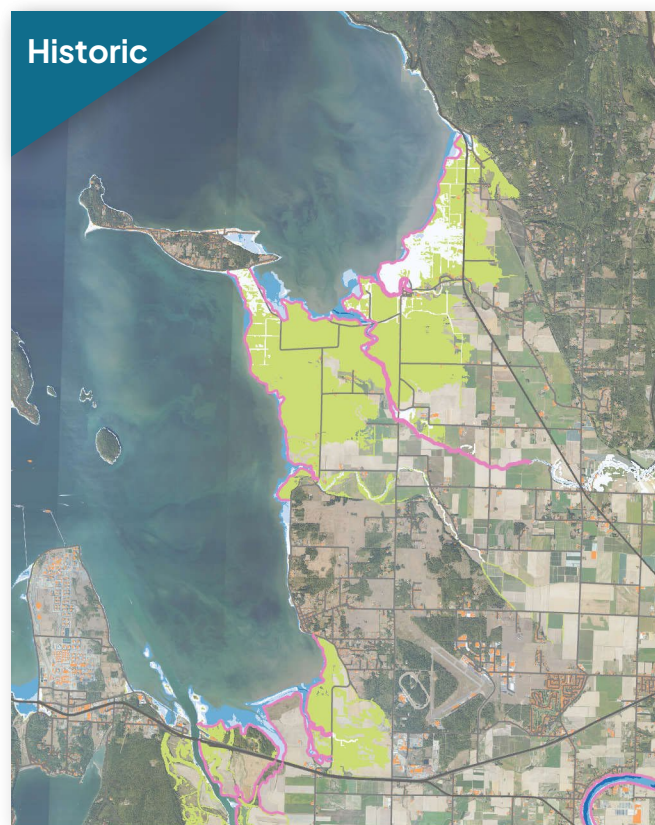


Descriptions for Flood Hazard Rating Mapping (AIDR, 2017)

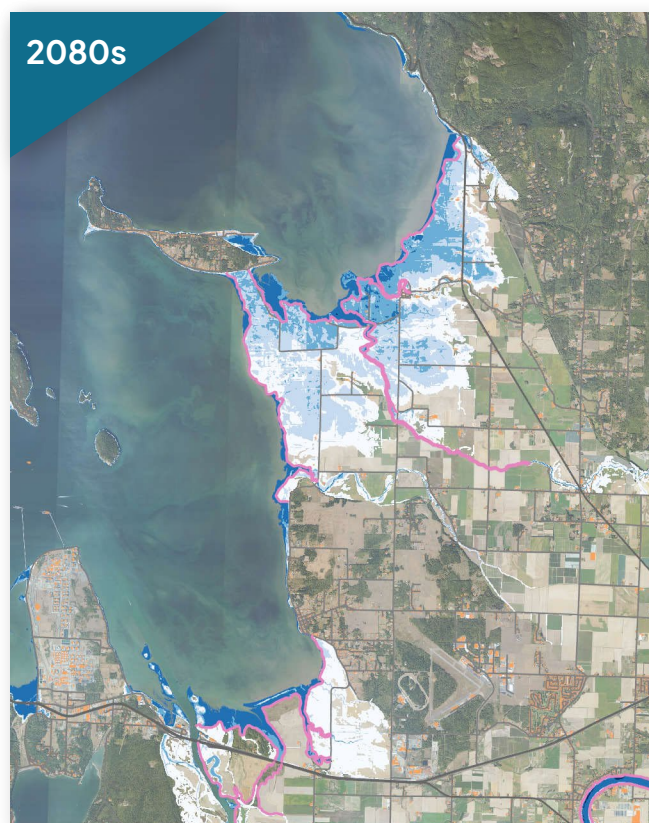
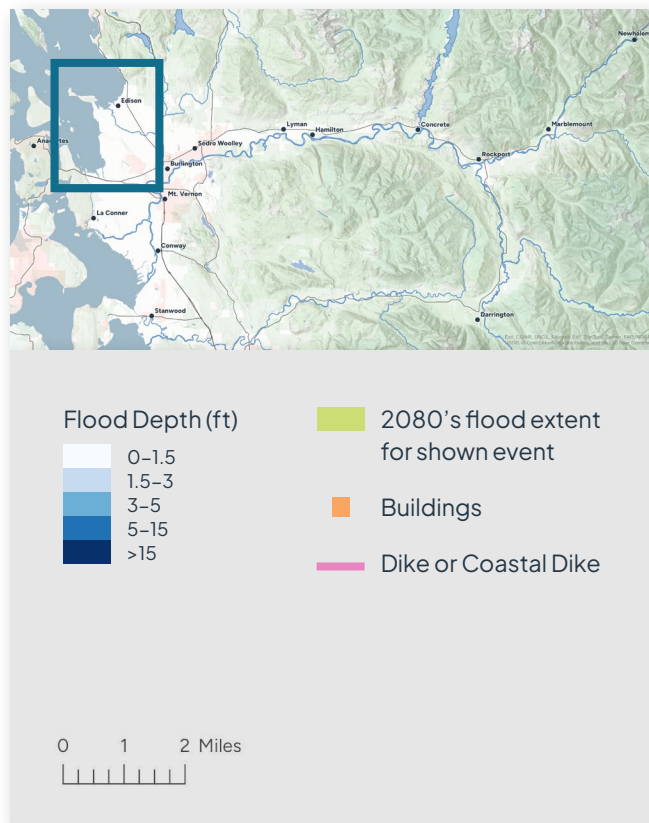
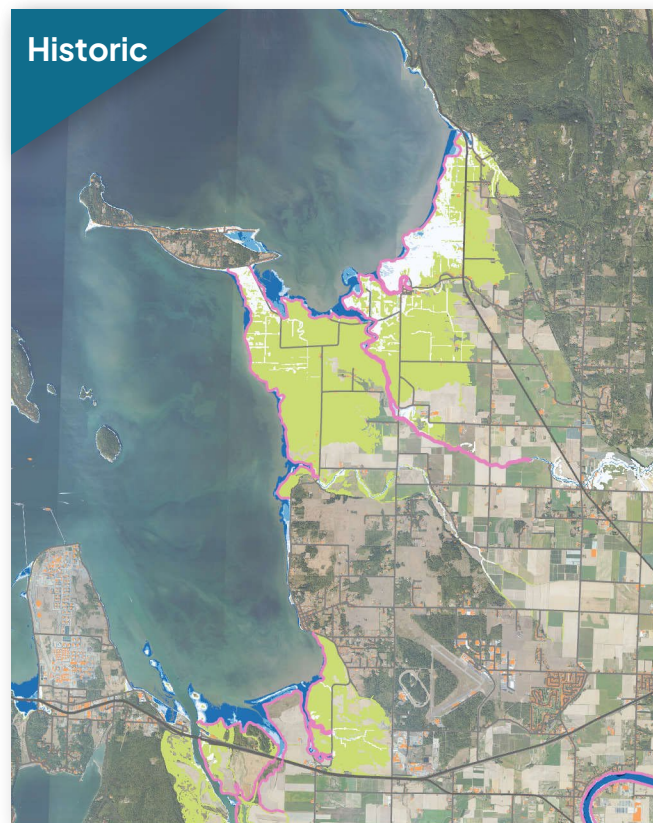
- Generally safe for vehicles, people, and buildings
- Unsafe for small vehicles
- Unsafe for vehicles, children, and the elderly
- Unsafe for vehicles and people
- Unsafe for vehicles and people. All building types vulnerable to structural damage.
- Unsafe for vehicles and people. All building types considered vulnerable to failure.
- Buildings
- Dike or Coastal Dike

0 0.5 1 Miles

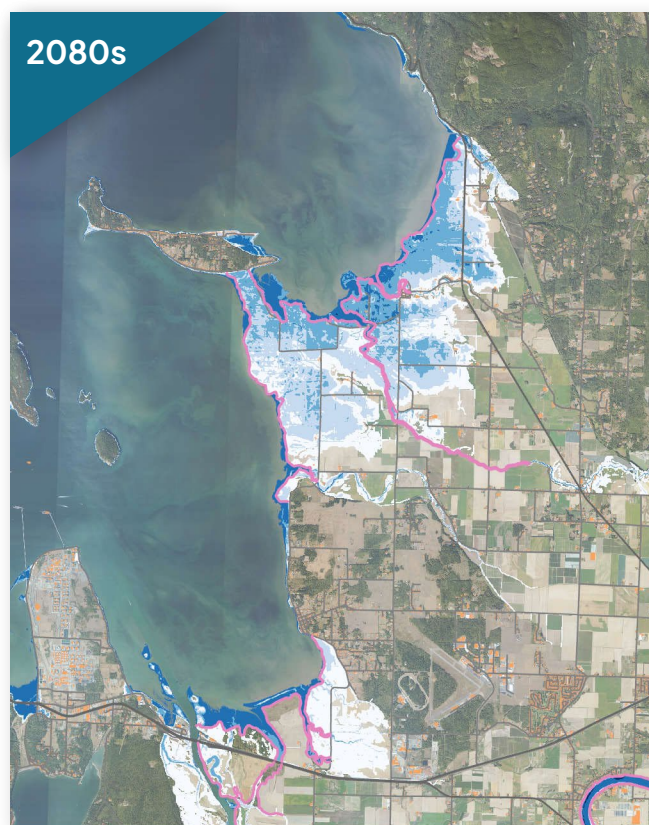
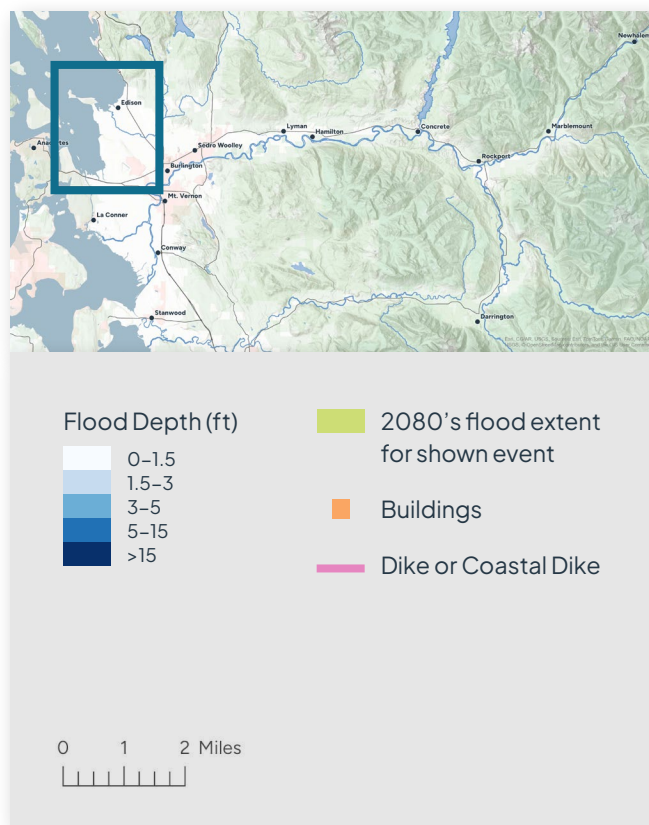
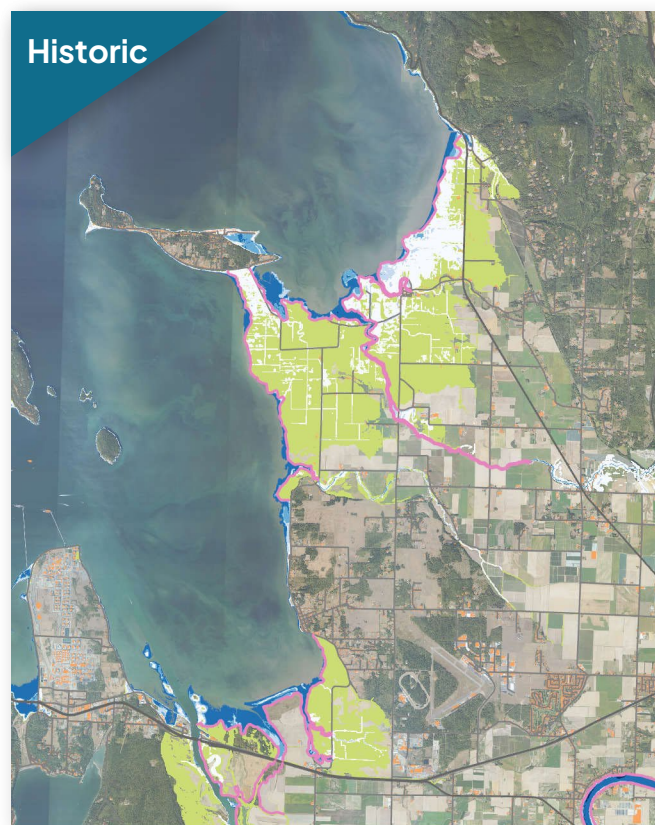
Padilla and Samish Bays | 10 Year



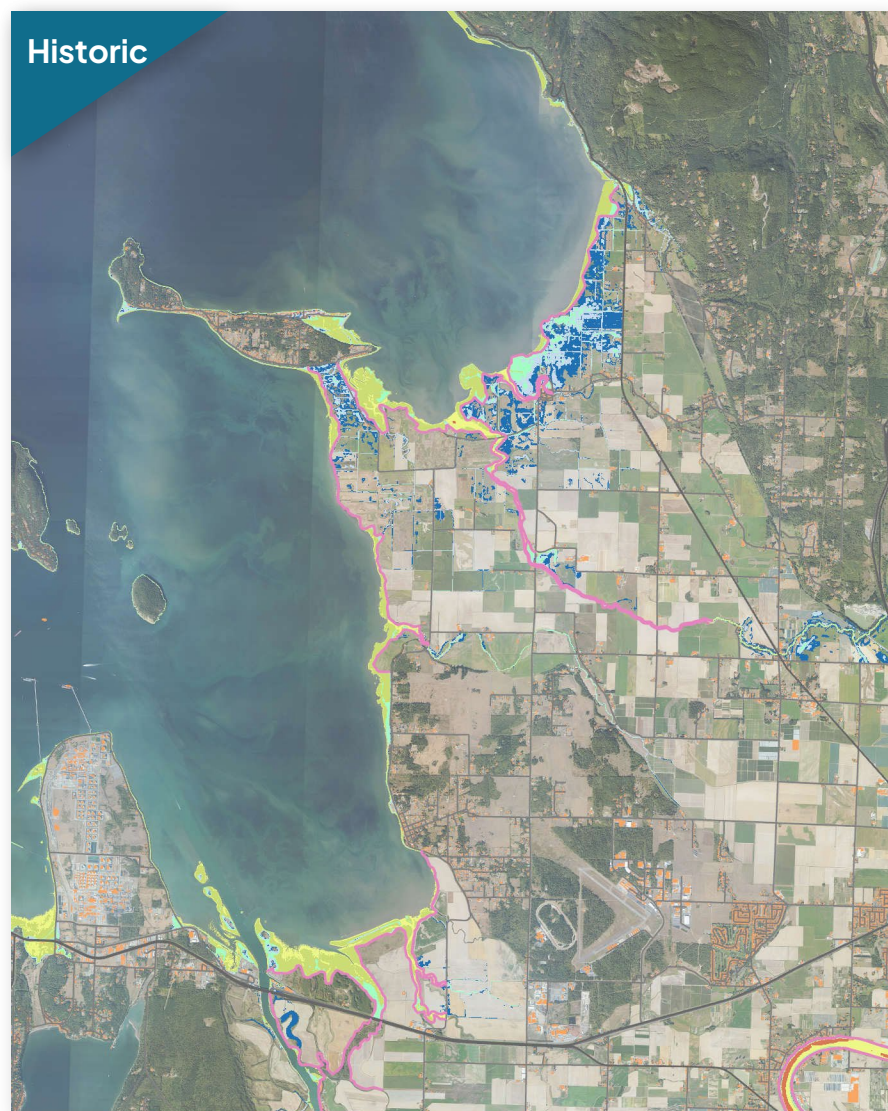
Padilla and Samish Bays | 25 Year



Padilla and Samish Bays | 100 Year



Padilla and Samish Bays | Depth-Velocity Hazard

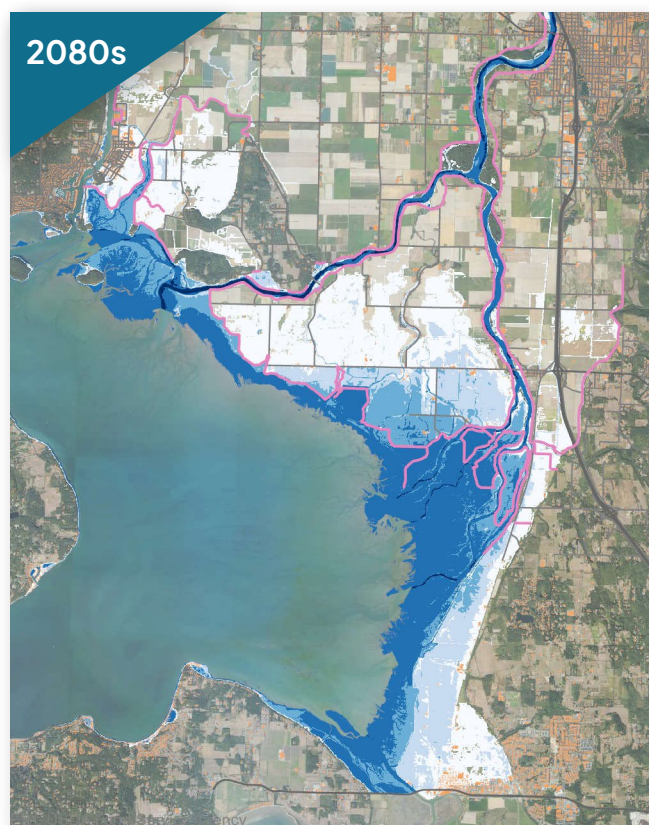
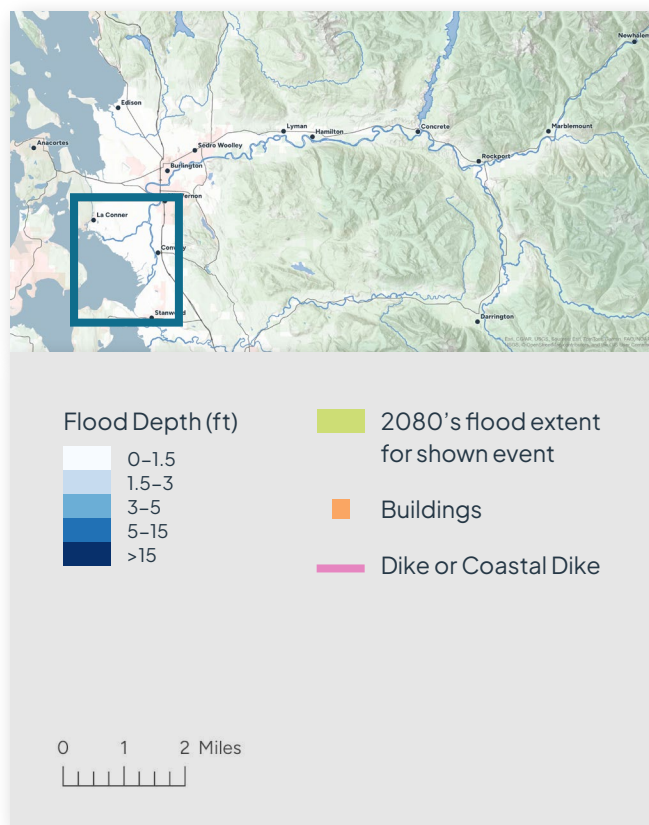
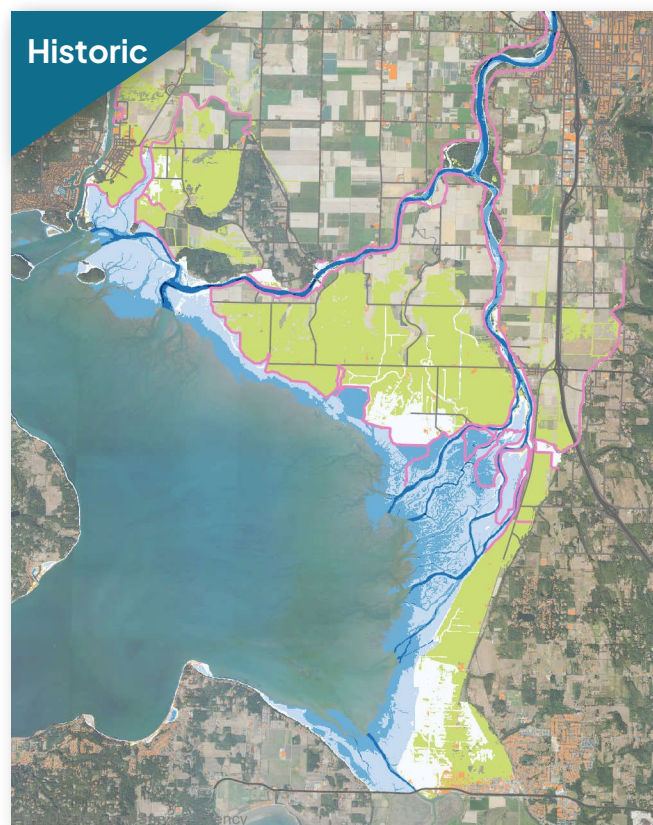


Descriptions for Flood Hazard Rating Mapping (AIDR, 2017)

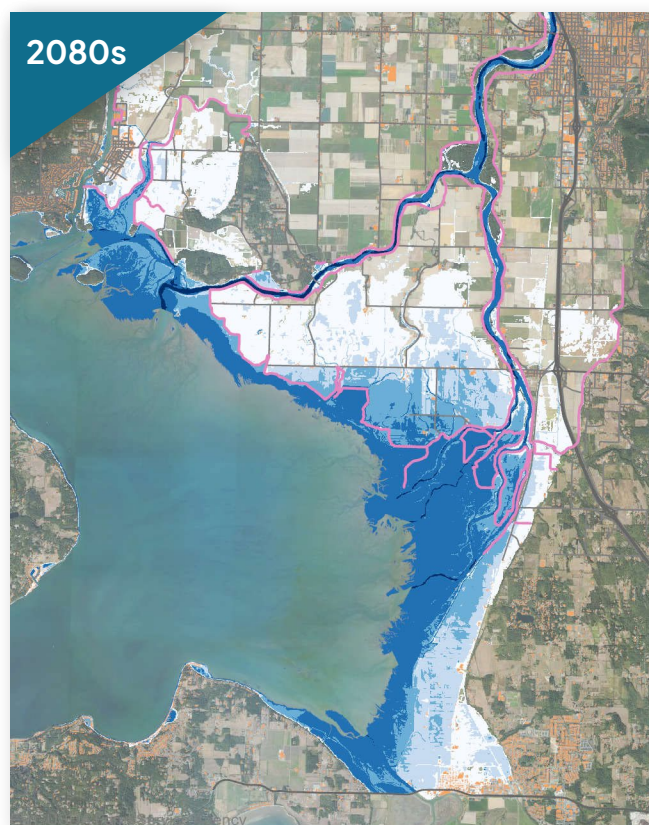
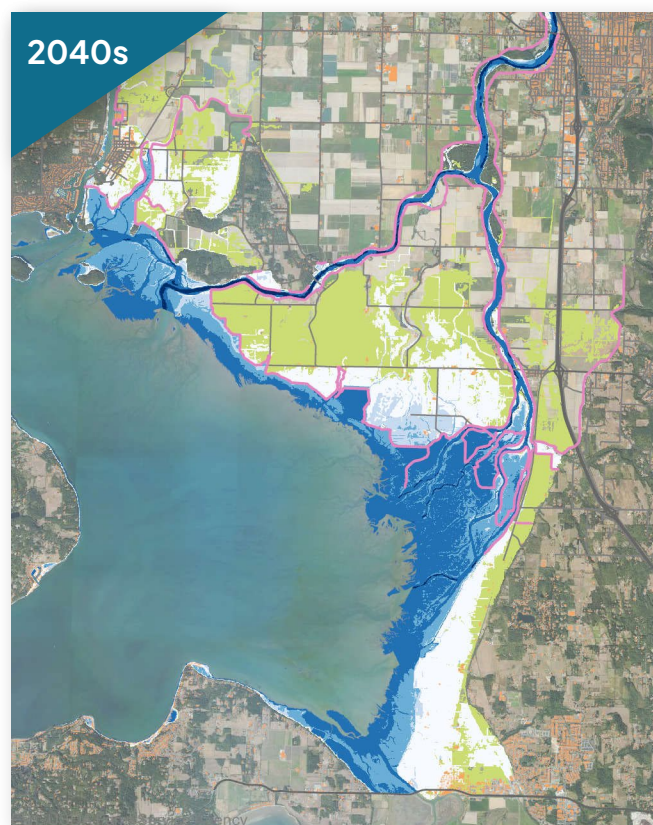
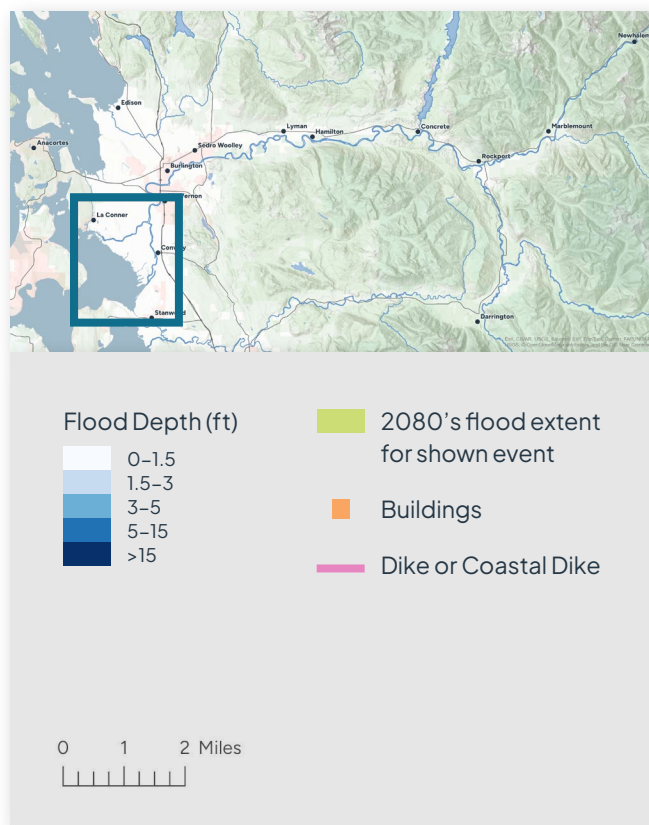
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- Buildings
- Dike or Coastal Dike

0 1 2 Miles

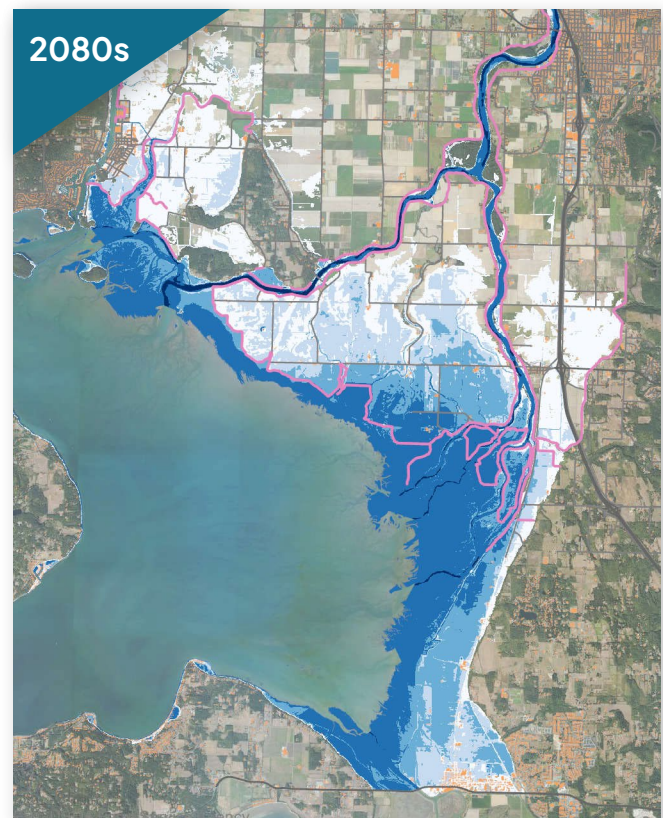
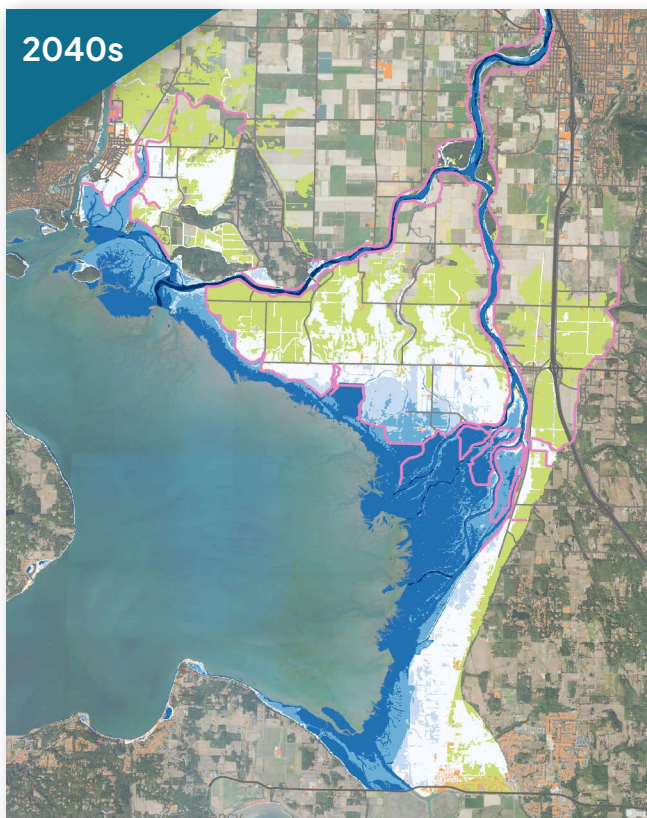
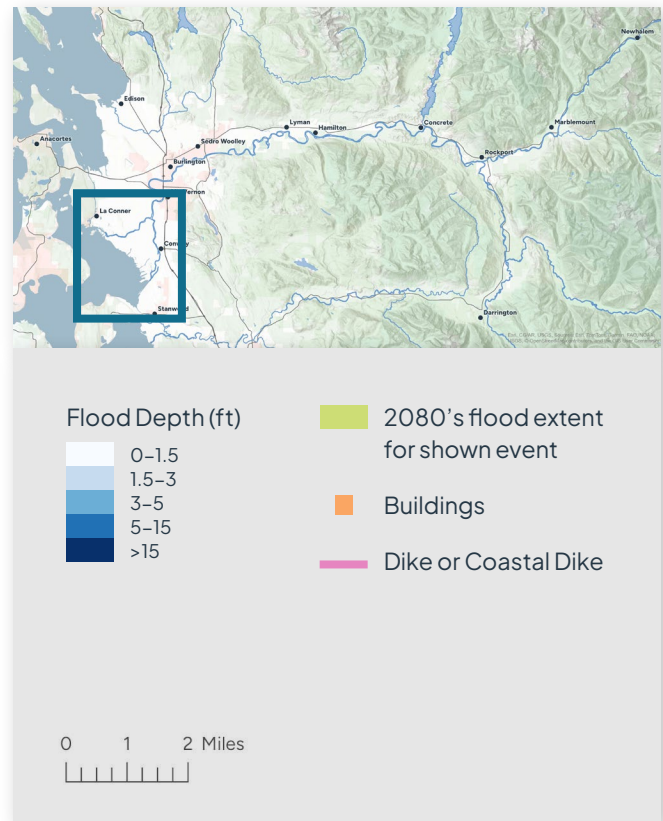
Skagit Bay | 10 Year Flood



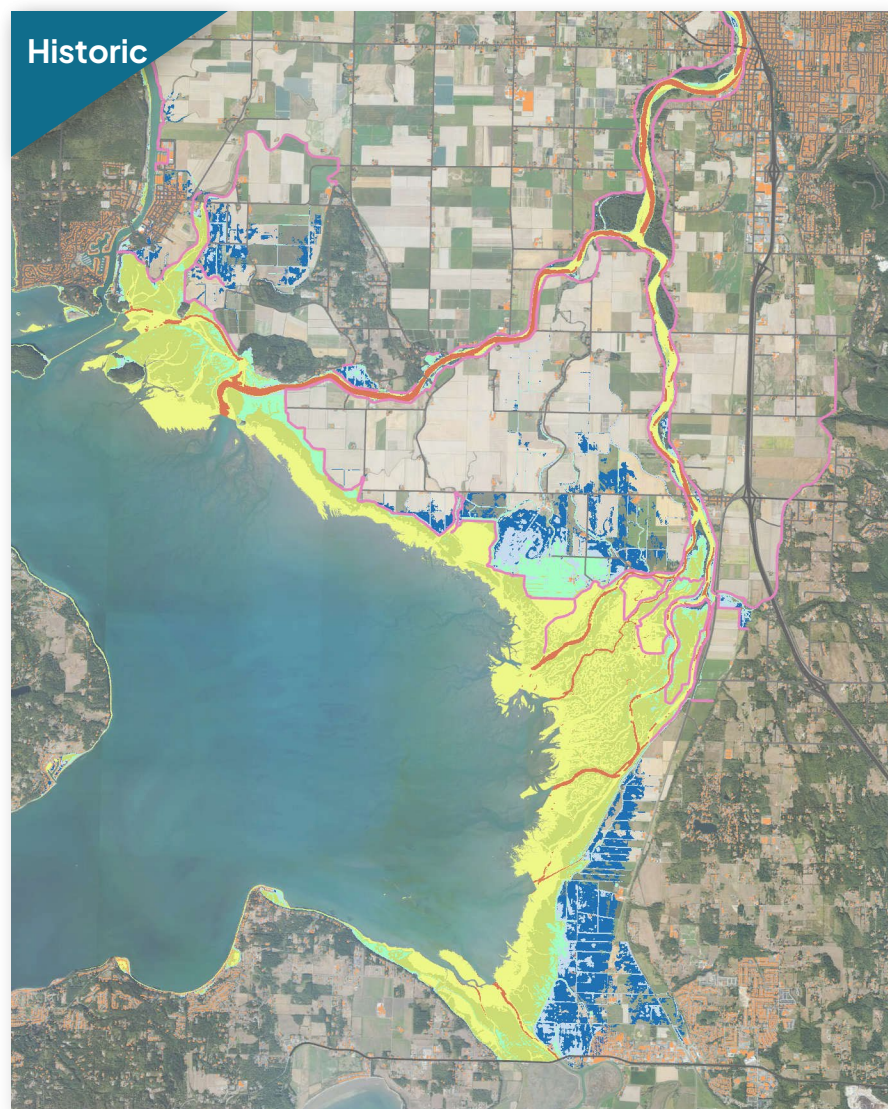
Skagit Bay | 25 Year Flood



Skagit Bay | 100 Year Flood



Skagit Bay | Depth-Velocity Hazard



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- Unsafe for vehicles and people. All building types considered vulnerable to failure.
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0 1 2 Miles

References

Microsoft (2022). Building Footprints [shapefile]. File last modified 2022. <https://www.arcgis.com/home/item.html?id=bb69f10baf334d4c935a0fb23d758f38>

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Skagit County GIS. Road Centerline [shapefile]. File published 2019.

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(USDA) United States Department of Agriculture (2023). USDA Farm Service Agency, National Agriculture Imagery Program (NAIP) 2023 Imagery. <https://nracs.app.box.com/v/naip>

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