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DEPARTMENT OF
ECOLOGY
State of Washington

KITSAP COUNTY

Sea Level Rise Vulnerability and Risk Assessment

Public Open House #2
December 12, 2024

This project is being funded under a Shoreline Planning Competitive Grant received by the State of Washington Department of Ecology under Grant Agreement No. SEASPC-2325-KiCoCD-00014



Agenda

- Team Introductions
- Project Overview
- Project Analyses & Methodology
- Draft Mapping Results
- Survey Results
- Next Steps & Questions



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Project Team



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Project Purpose

Kitsap County Department of Community Development received a grant from the Washington State Department of Ecology to complete a sea level rise vulnerability and risk assessment to map different projections of sea level rise and identify the potential impacts to natural and built assets.



Project Purpose

Identify

Identify assets with potential for loss of damage from sea level rise.

Complete

Complete risk analysis and vulnerability assessment, based on mapping predictions to be decided by the Technical Advisory Committee (TAC) in July.

Propose

Propose practical region-specific actions or projects, to address increased sea water interactions where appropriate.



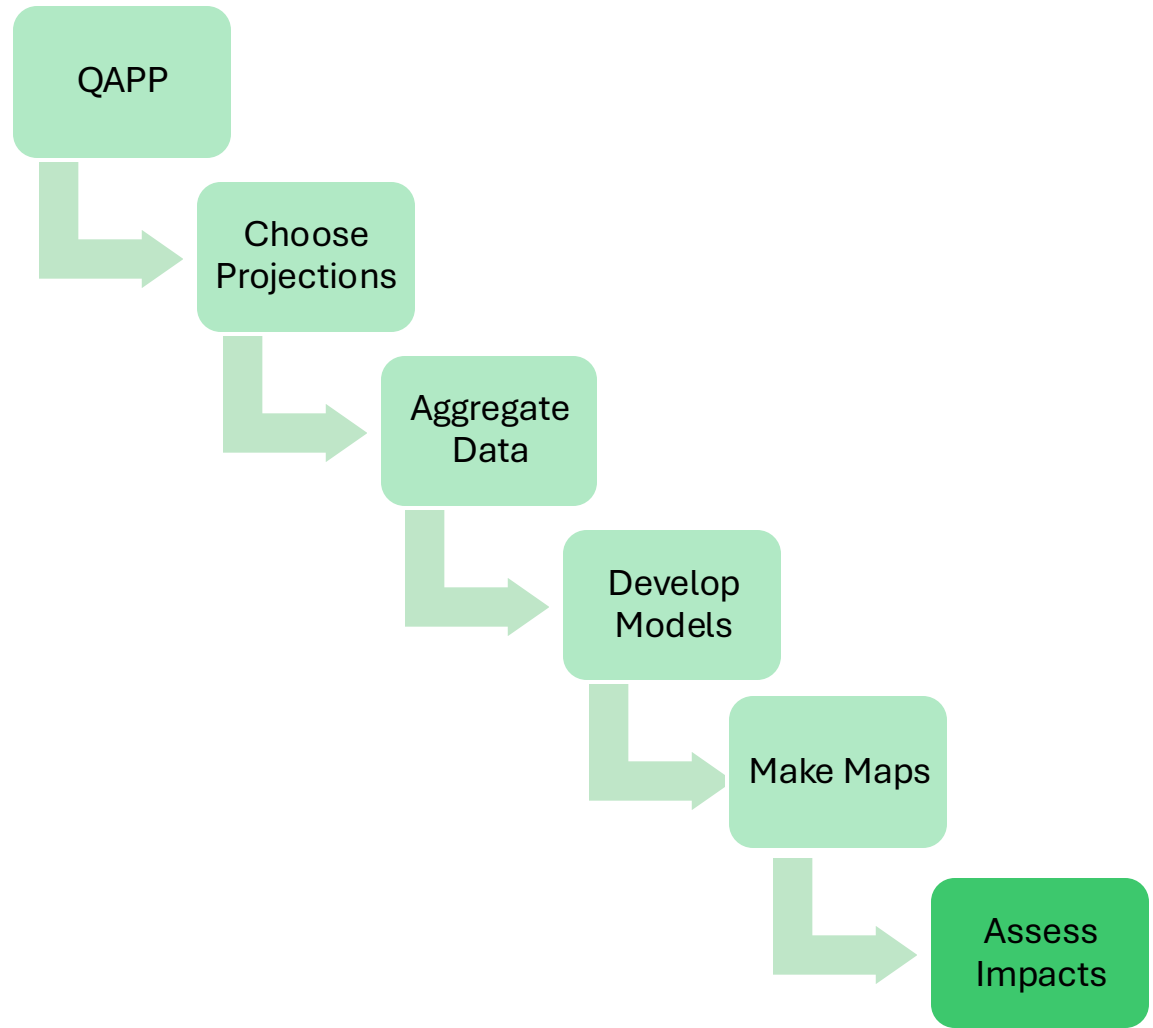
Approach

- **Mapping Development**
- **Community Engagement**
- **Audit of Existing Development Regulations and Policies**
- **Vulnerability and Risk Assessment Report**

Project Analyses



Map Development Overview



Projections – What are they?

- How are Sea Level Rise (SLR) & flood levels estimated?
 - Probability Confidence
 - International predictions based on emissions
 - Tide gauge trends – Mean Higher High Water (MHHW) and extreme flood
- Relative Sea Level Rise
 - Absolute SLR + Land Movement
- Confidence Intervals by year

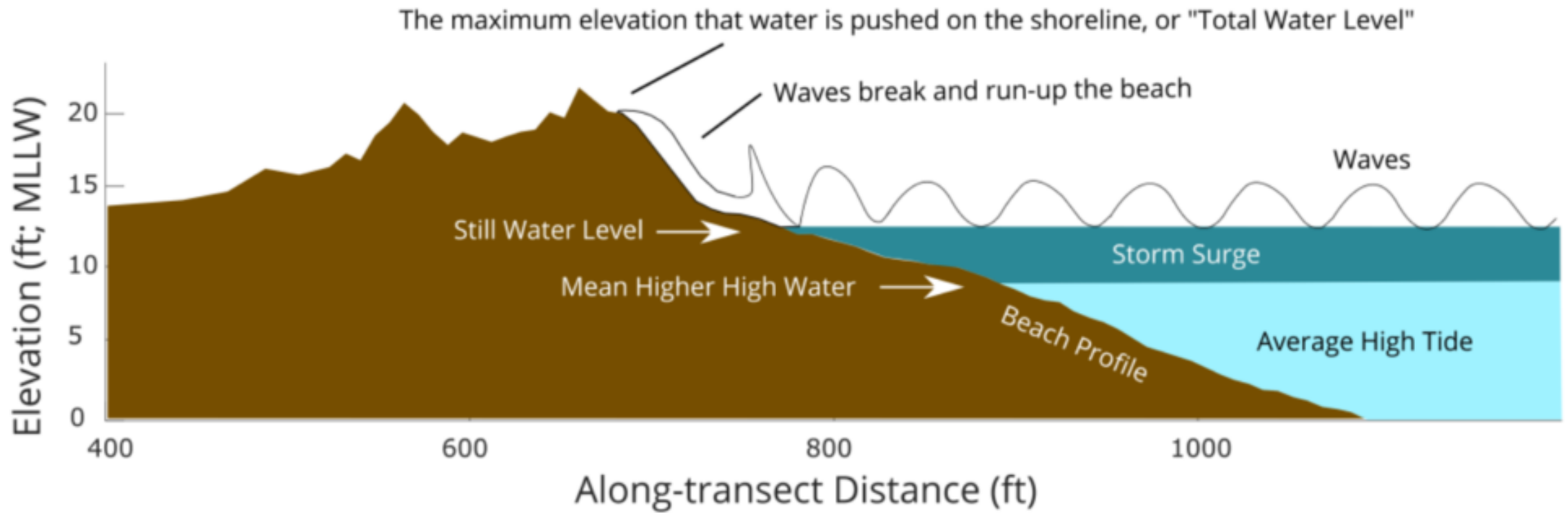
Projections - Where do the levels come from?

- **2018 Report**
 - “Stillwater”, no wave run-up
- **2019 Report**
 - Extreme water levels seen by tide gauges

[Resilience Resource Library | Washington Coastal Hazards Resilience Network](#)
(wacoastalnetwork.com)

[Washington Sea Grant - YouTube](#)





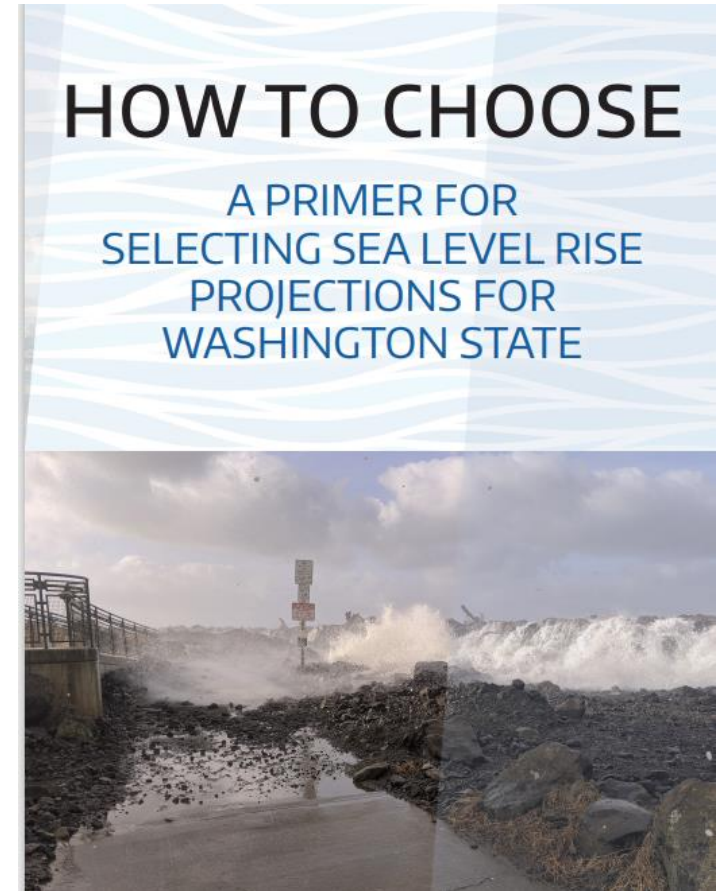
Source: Miller et al. 2019. Extreme Coastal Water Level in Washington State: Guidelines to Support Sea Level Rise Planning.
<https://cig.uw.edu/publications/extreme-coastal-water-level-in-washington-state-guidelines-to-support-sea-level-rise-planning/>

Projections – Selected by Technical Advisory Committee

1. RCP: 4.5 or **8.5**

2. Timeframe: **2050**? 2060? **2100**? 2150*?

3. Certainty/Level of Risk: **1%** (less likely),
50%, **90%** (very likely)



Modeling

SLR:

1. Projections displayed over a DEM,
2. Intersect mapped resources with new tidal surfaces,
3. Quantify and rank impacts

Wind-Wave:

- 1-D wind-wave hindcast on shoreline reaches w/ moderate to high wind-wave energy
- Estimate wind-wave runup using empirical methods

Mapping Projections – Decisions by TAC

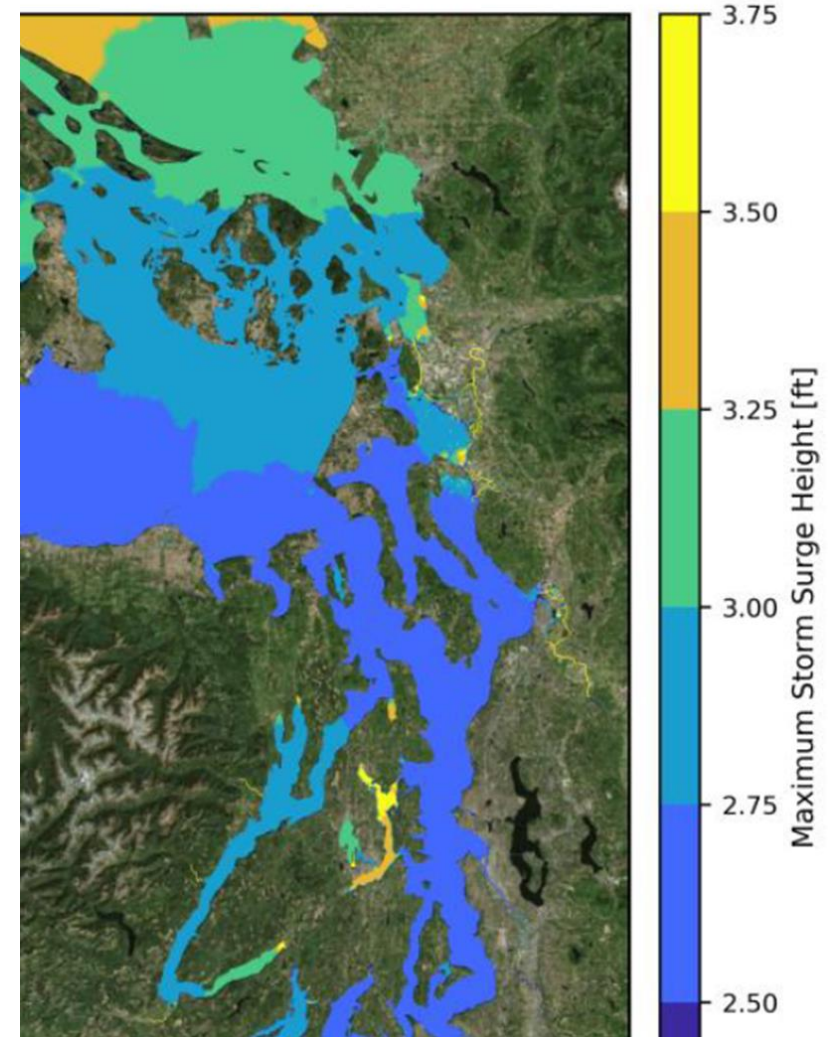
Modeled Increases of tidal height, due to projected sea level rise and extreme flooding, for Kitsap County by 2050 and 2100 under different certainties.

	Certainty			50-yr Return Flood with 50% Certainty		50-yr Return Flood with 90% certainty		50-yr Return Flood with 1% certainty		
	90%	50%	1%	Non-bay areas, Dyes	Sinclair, Agate Pass, Port Gamble, Liberty	Non-bay areas, Dyes	Sinclair, Agate Pass, Port Gamble, Liberty	Non-bay areas	Sinclair, Agate Pass, Port Gamble, Dyes	Liberty
2050	0.5 ft	1 ft	1.5 ft	4 ft	4.5 ft	3.5 ft	4 ft	4.5 ft	5 ft	5.5 ft
2100	1.5 ft	2.5 ft	5 ft	5.5 ft	6 ft	4.5 ft	5 ft	8 ft	8.5 ft	9 ft

Using the RCP8.5 projections. Sources: Projected Sea Level Rise for Washington State (Miller et al, 2018); Extreme Coastal Water Level in Washington State: Guidelines to Support Sea Level Rise Planning (Miller et al, 2019); NOAA Sea Level Rise Viewer Data Download (2024).

Mapping Methodology

- 16 coastal reaches averaged
- Rounded to Half-foot increments
- Bay flooding adjustments
- Marine and disconnected areas



Source: *Extreme Coastal Water Level in Washington State: Guidelines to Support Sea Level Rise Planning* (Miller et al, 2019).

Assets for Vulnerability Assessment

- Roads, Transportation
- Hospitals, Police Stations, Fire Depts
- Schools, Libraries
- Residences
- Agricultural, Farmland
- On-site septic systems
- Electrical Substations
- Historic and Cultural Resources
- Group A Wells, WWTPs + lift stations
- Beach Access, Parks
- Wetlands, Estuaries
- Marinas, Bays
- Brownfield Sites, Landfills

What this project does not include:

- Site-specific or property-level scale analyses
- Future bluff erosion rates due to sea level rise
- Analysis of tsunami or Cascadia Subduction Zone earthquake risks
- Economic analysis of sea level rise impacts
- Groundwater modeling or saltwater intrusion studies
- Analysis of impacts on riverine systems

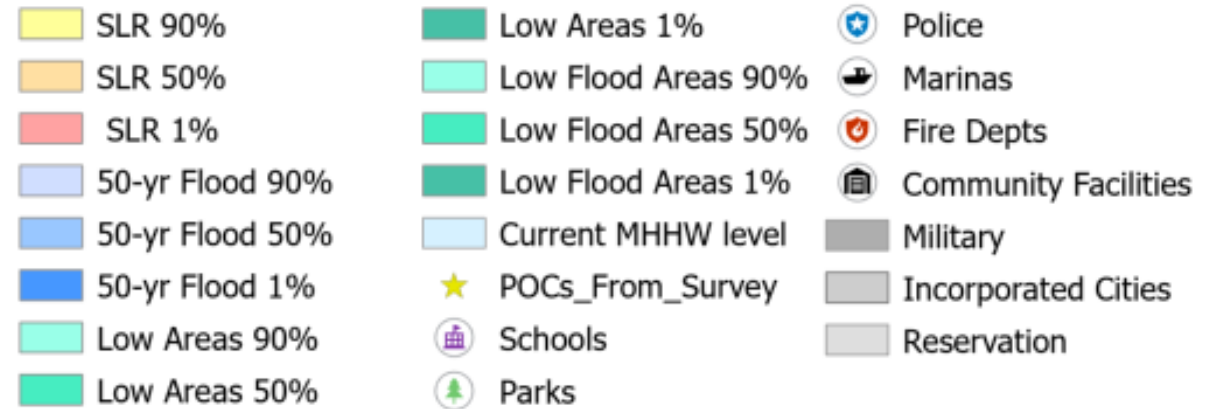
Draft Maps - Legend

SLR – Sea Level Rise. Areas that may be inundated at normal Mean High High Water (MHHW) tides.

50-yr Flood – Areas that may inundate during an extreme weather event that includes flooding seen once every 50 years (based on pre-2017 tide gauge data)

Low Areas – areas that are disconnected from the marine water but may become flooded because of their elevation

Low Flood Areas – areas that are disconnected from marine water but may become flooded during extreme weather flooding because of their elevation.



Next Steps

- Incorporate wind-wave modeling and assess which facilities and infrastructure may be impacted by 2050 and 2100.
- Complete an audit of plans and regulations to address the potential impacts of sea level rise and coastal flooding.
- Conduct outreach with departments and agencies with responsibilities for the potentially impacted infrastructure.
- Identify strategies that can help private and public properties improve resilience.

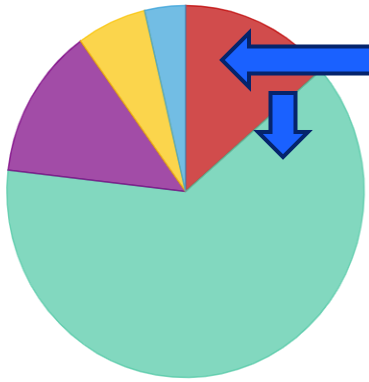
SLR Community Survey Results

Date opened: Sept. 5, 2024

Date Closed: Nov. 10, 2024

Total responses: 200

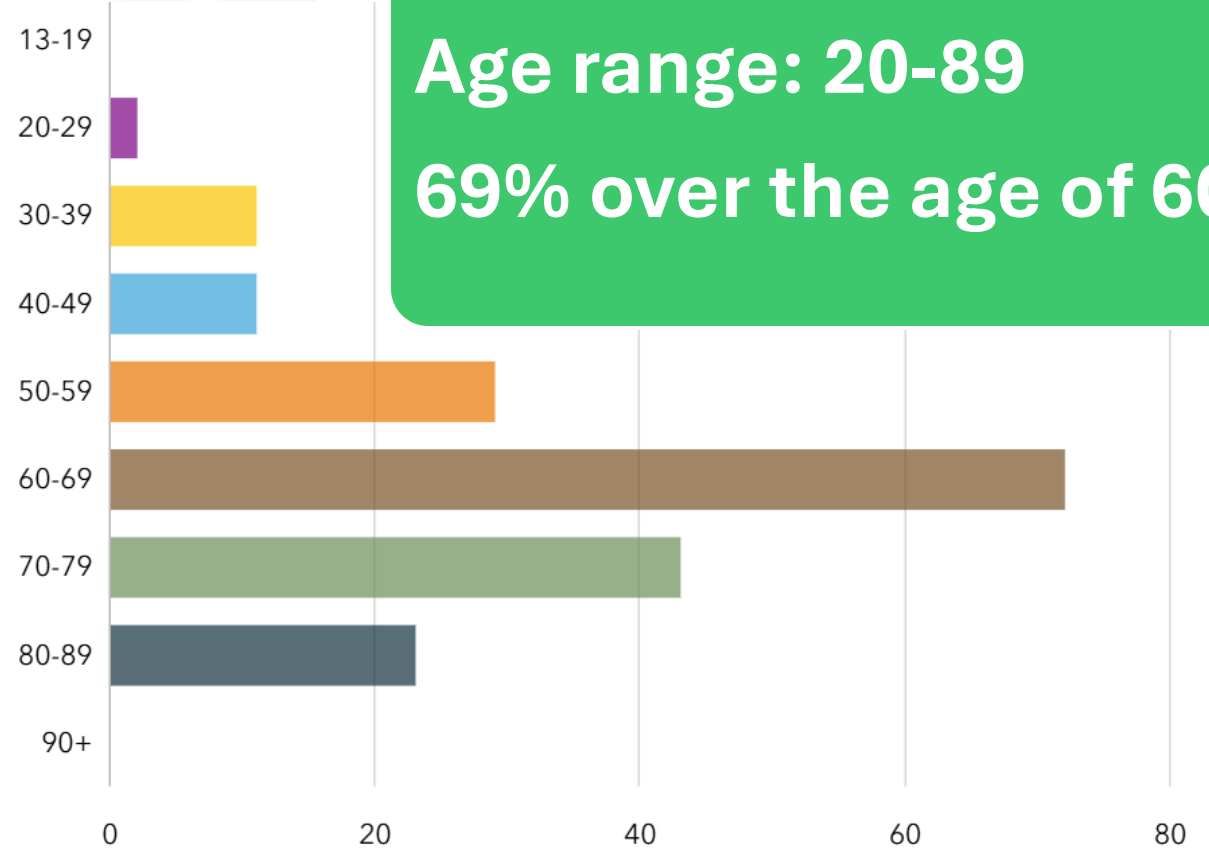
Respondent Demographic Data



**73%
Households
with 1-2
people**

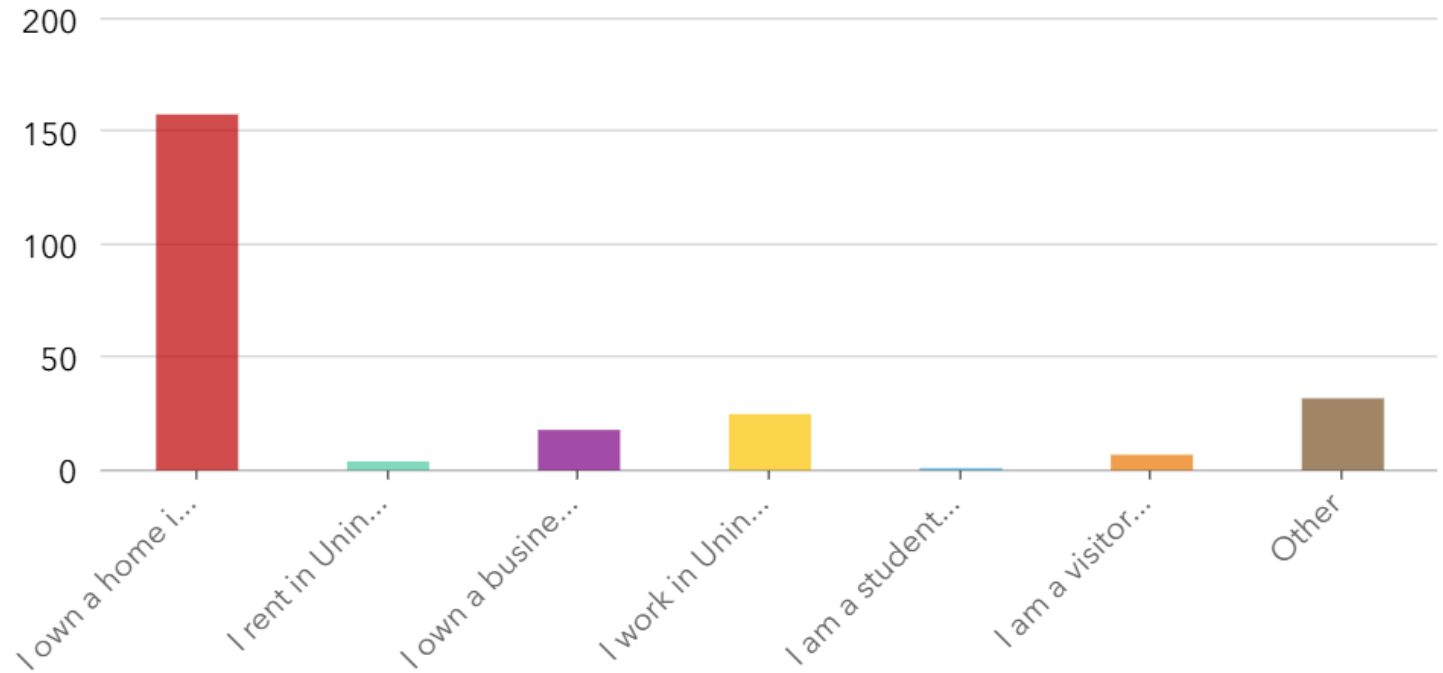
76% White

28% Other, prefer not



**Age range: 20-89
69% over the age of 60**

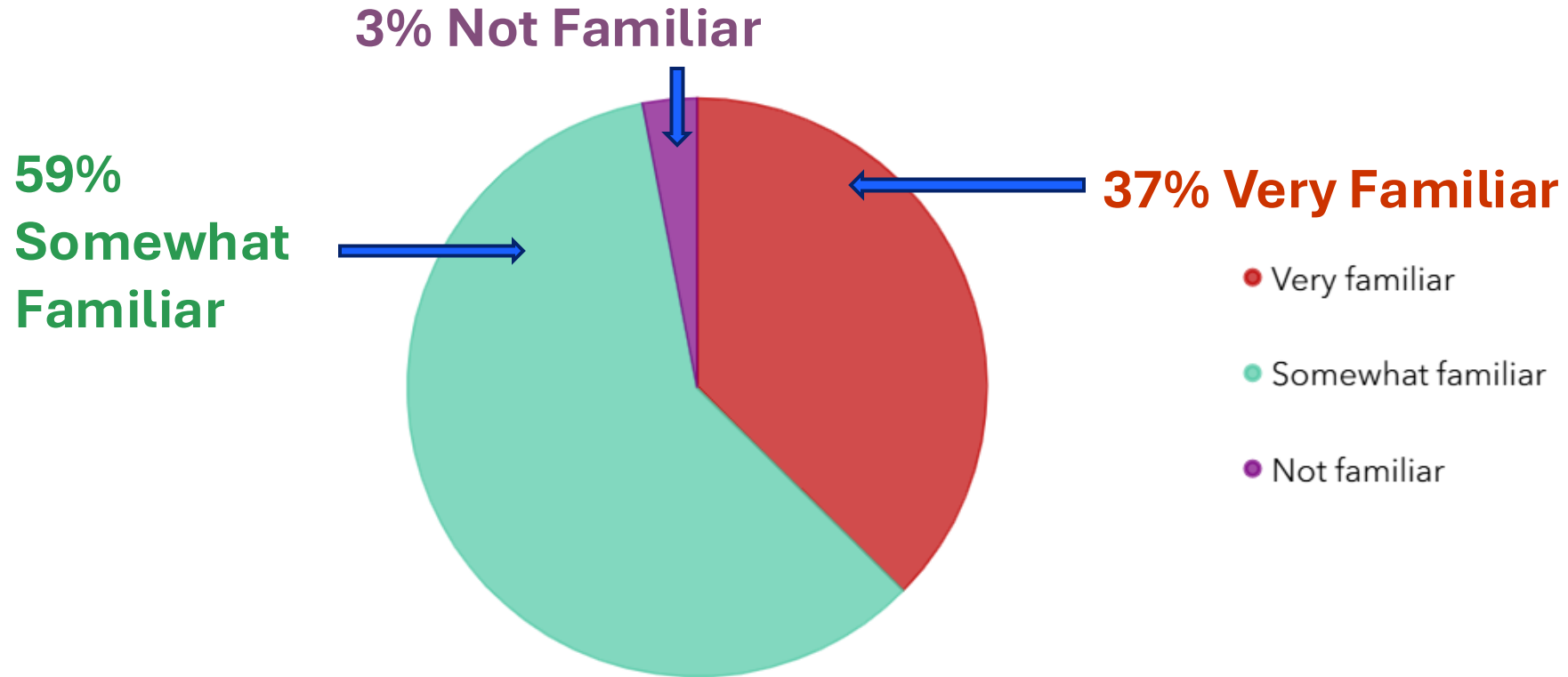
Respondent relationship to Unincorporated Kitsap County



- **79% Own Home (158 respondents)**
- **2% Rent**
- **9% Own business**
- **12.5% Work in the County**

- **1 student!**
- **3.5% Visitors**
- **16% Other**

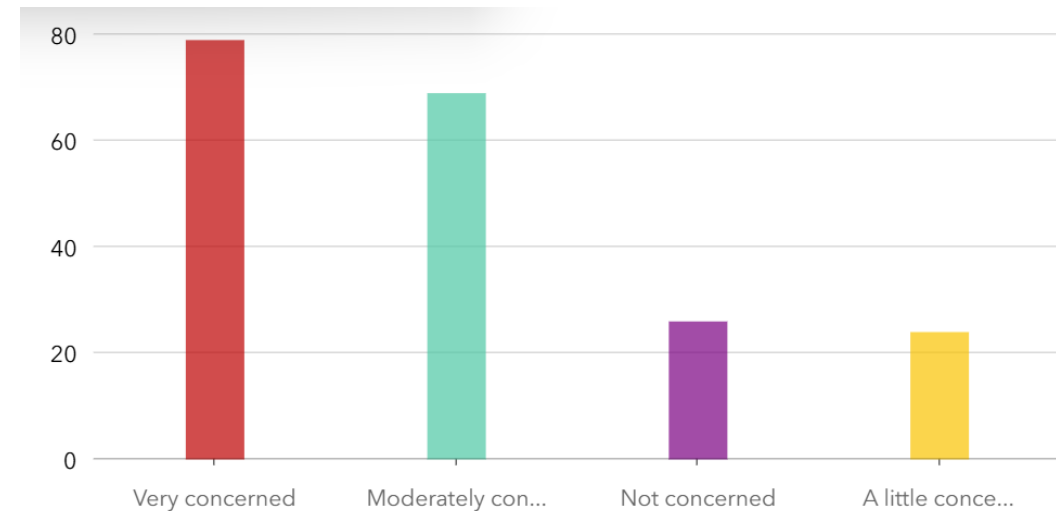
How familiar are you with the topic of sea level rise, coastal flooding and their impacts?



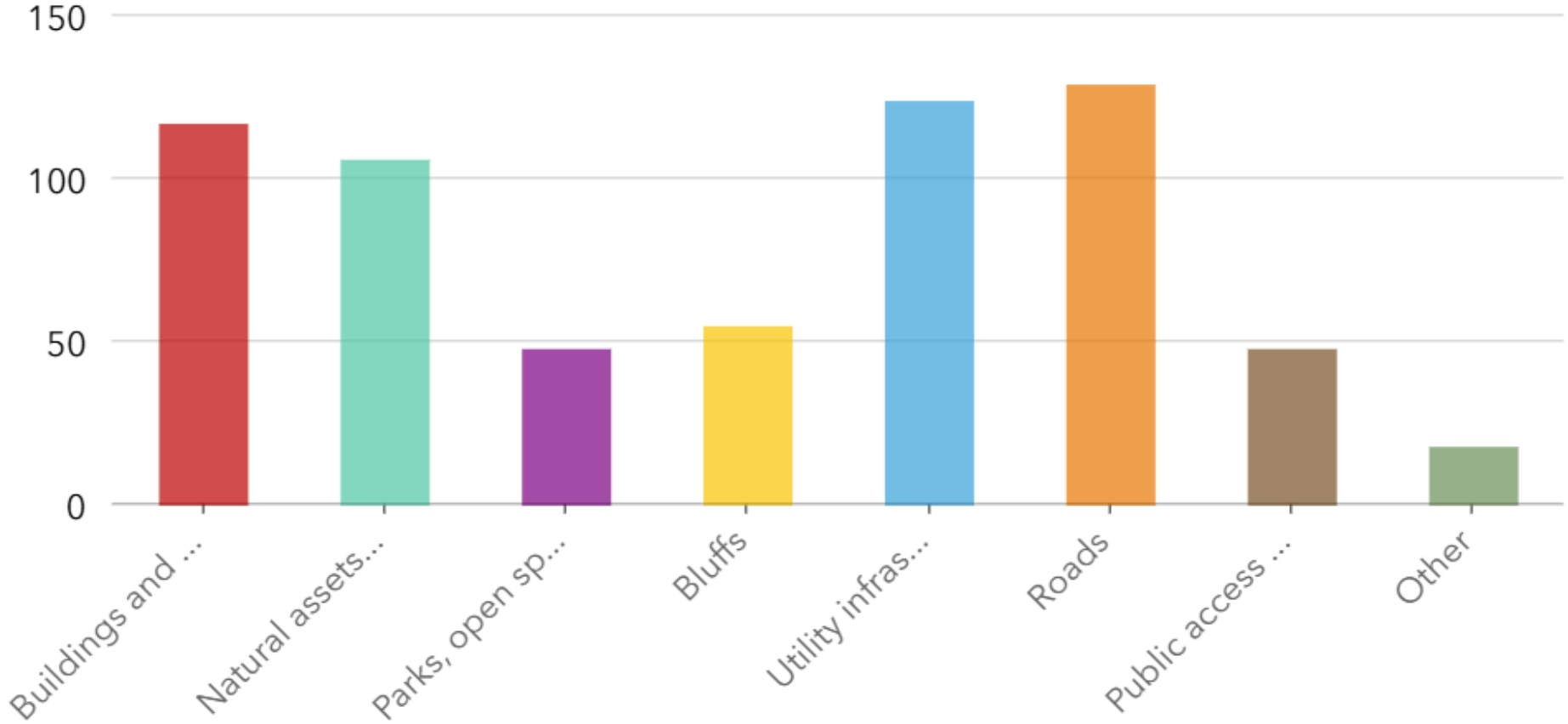
Majority of respondents (96%) are somewhat or very familiar with sea level rise

How concerned are you about the future impacts of sea level rise and coastal flooding in Kitsap County?

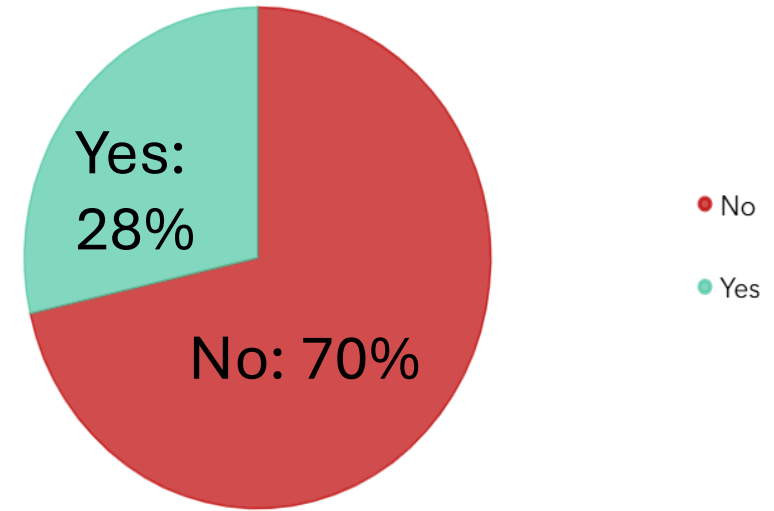
- **39.5% Very concerned**
- **34.5% Moderately concerned**
- **12% A little concerned**
- **13% Not concerned**



Which Assets to you consider the most important for this assessment?



Has coastal flooding impacted your property or someone you know?





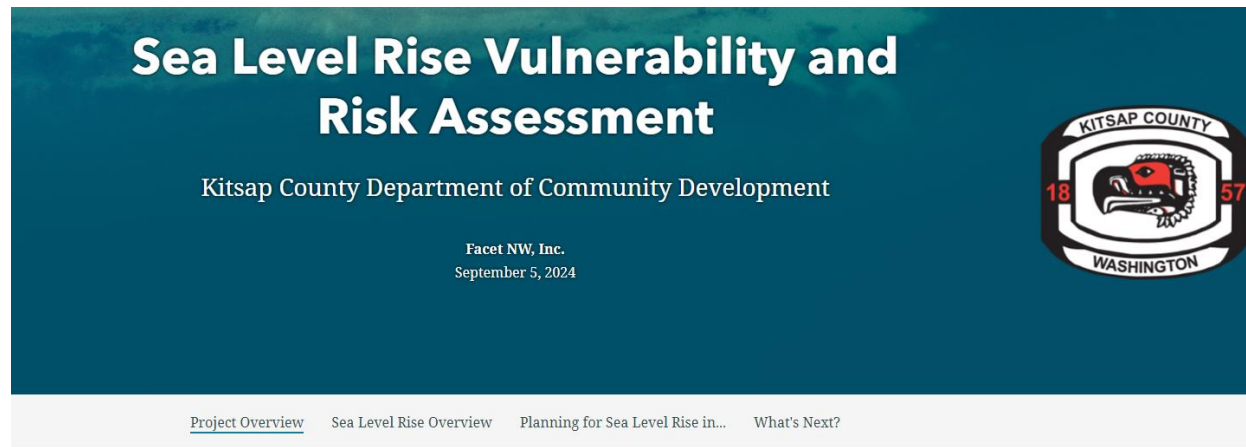
Flooding Images from respondents



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Project StoryMap

[Kitsap County Sea Level Rise Vulnerability and Risk Assessment Story Map](#)



The screenshot shows the title page of the StoryMap. The background is a dark teal color with a subtle wave pattern. The title "Sea Level Rise Vulnerability and Risk Assessment" is centered in white, bold font. Below the title, it says "Kitsap County Department of Community Development". Further down, it lists "Facet NW, Inc." and the date "September 5, 2024". On the right side, there is the Kitsap County seal, which features a red and white eagle head in the center, with "KITSAP COUNTY" at the top and "WASHINGTON" at the bottom, and the numbers "18" and "57" on either side. At the bottom of the screenshot, there is a navigation bar with four links: "Project Overview", "Sea Level Rise Overview", "Planning for Sea Level Rise in...", and "What's Next?".



Kitsap County Department of Community Development received a grant from the Washington State Department of Ecology to complete a sea level rise vulnerability and risk assessment to map different projections of sea level rise and identify the potential impacts to the county's natural and built assets.

This StoryMap is an interactive tool designed to keep the community informed about the project's progress. It will be periodically updated with new information as data is collected, analyzed, and as coastal vulnerabilities are mapped. Through this StoryMap, you can:



Project StoryMap

- **Sea Level Rise Overview**
 - Impacts of SLR
 - Projections
- **Decisions made for this assessment**
- **Survey Results**
- **Assessment maps**



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Timeline

Project Kick-off	June 2024	Public Announcement, Website Materials
TAC Meeting #1	June 2024	Kick off meeting with TAC, Review project and roles
TAC Meeting #2	July 2024	Determine SLR projection to be used in Assessment
Planning Commission / Board of Commissioners Brief	August 2024	Project Overview and Outreach Approach
Community Advisory Council Briefs	September 2024	Project Overview
Public Meeting #1	September 2024	Project Overview
Public Survey	September 2024	Public and Agency Surveys on Concerns and Priorities
TAC Meeting #3	November 2024	Review of Preliminary Maps
Public Meeting #2	December 2024	Review Draft Maps, Survey Results and Preliminary Findings
Draft Documents	January 2024	Draft Maps Published
TAC Meeting #4	February 2025	Review and Discussion of Draft Audit Summary Memorandum and Report
Planning Commission Meeting /Public Meeting #3	March 2025	Review and Discussion of Draft Audit Summary Memorandum and Report
Board of Commissioners/Public Meeting #4	May 2025	Review and Discussion of Final Documents and draft amendments contained within the Audit Summary Memorandum.
Final Report	June 2025	Final Documents Published

Open House Activities

- Question and Answer
- Prompts and Mapping

Prompt Response

Are the projections shown similar to what you would expect? Are there areas that are currently inundated further during extreme flood events than the mapping projections? If so, please mark those areas on the map.



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