



CITY OF
BAINBRIDGE ISLAND

GROUNDWATER MANAGEMENT PLAN
SUB-COMMITTEE MEETING
MONDAY, APRIL 8, 2024

11:30 AM

VIRTUAL – ZOOM

JOIN ZOOM MEETING

<https://bainbridgewa.zoom.us/j/87231451243>

AGENDA

1. CALL TO ORDER / ROLL CALL / ACCEPT OR MODIFY AGENDA
2. RE-CAP OF 3/21 TECHNICAL ADVISORY COMMITTEE MEETING
3. DISCUSSION OF FINAL MODELING SCENARIO ALTERNATIVES WITH FOCUS ON:
 - A. UPDATED POPULATION/PUMPING CALCULATION
 - B. UPDATED RECHARGE CALCULATION
4. GOOD OF THE ORDER QUESTIONS
5. NEXT STEPS
6. ADJOURNMENT

MATERIALS ATTACHED:

- 3/21 TAC MEETING SUMMARY
- SUQUAMISH TRIBE COMMENTS
- MODELING SCENARIO SLIDES



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THE SUQUAMISH INDIAN TRIBE

PO Box 498 Suquamish, WA 98392-0498

April 5, 2024

Chris Wierzbicki
Director of Public Works
City of Bainbridge Island
280 Madison Avenue North
Bainbridge Island, WA 98110

RE: City of Bainbridge Island's Groundwater Management Plan - March 21, 2024 Technical Advisory Committee

Dear Mr. Wierzbicki:

Thank you for inviting the Suquamish Indian Tribe of the Port Madison Reservation ("Suquamish Tribe" or "Tribe") to be a part of the Technical Advisory Committee (TAC) for the City of Bainbridge Island (COBI) development of a Groundwater Management Plan (GWMP).

The Tribe is a federally recognized Indian Tribe and pursuant to the 1855 Treaty of Point Elliott, the Tribe reserved the right to fish and gather shellfish at its "usual and accustomed" (U&A) fishing grounds and stations in Puget Sound. The Tribe's U&A extends well beyond the Port Madison Reservation boundaries and includes the marine waters of Puget Sound from the northern tip of Vashon Island to the Fraser River in Canada, including Haro and Rosario Straits, the streams draining into the western side of Puget Sound and Hood Canal. The Tribe's aboriginal homeland includes the entire area of the Kitsap Peninsula including Bainbridge Island.

Since time immemorial the Suquamish people have lived, gathered plants, collected ceremonial and spiritual items, hunted, and fished these lands and waters. Suquamish Tribal members have exercised their treaty right to harvest shellfish from time immemorial. The Tribe harvested shellfish prior to the Rafeedie Decision (*United States v. Washington*, 898 F. Supp. 1453 (W.D. Wash. 1995) (recognizing the Tribe's treaty right to harvest shellfish)) and up to the present.

The quality and quantity of surface and groundwater inputs to marine waters of the Kitsap Peninsula affects the health of fish and shellfish, and the ability to consume and harvest these food resources. Climate change is exacerbating the impact of existing problems by increasing precipitation in winter and extended drought events in summer.

The Tribe has the following comments on the information presented by COBI's consultant, EA Engineering, at the March 21st TAC meeting for the development of a GWMP for COBI.

(1) Climate change impacts on recharge

The impact of climate change on future recharge is more complicated than simply looking at possible changes in annual precipitation. Other important factors that cannot be overlooked include, but are not limited to, changes in land use and impervious surfaces, intensity/duration/timing of rainfall events, increased temperatures and length of growing season. In general, most research has shown that an increase in the growing season combined with more intense storms and more impervious areas will lead to less recharge.

Since directly measuring infiltration/recharge is difficult, an insight to changes in infiltration can be gathered from changes in the portion of rainfall that doesn't infiltrate (runoff). For this, the 2021 King County Surface Water Manual (<https://kingcounty.gov/en/dept/dnrp/nature-recreation/environment-ecology-conservation/stormwater-surface-water-management/surface-water-design-manual/surface-water-design-manual-2021>) provides guidance on estimating runoff using the Rational Method where runoff is directly proportional to changes in rainfall intensity and runoff coefficients. As forested land is cleared for residential development the runoff coefficient increases, from a value of 0.10 for dense forest to 0.25 for lawns to 0.90 for pavement and roofs.

In addition to a larger percentage of rainfall running off due to land use changes, the 2015 University of Washington Climate Impacts Group report (<https://cig.uw.edu/projects/climate-change-in-puget-sound-state-of-knowledge/>) projects the number of high intensity storms to increase from 2 days per year to 7 days per year. The definition of high intensity storms is the frequency of exceeding the historical 99th percentile of 24-hour precipitation (see page 2-16).

Given the projected 100-year population increase on Bainbridge Island of 178% along with the concomitant change in runoff coefficient and the projected increase in frequency of intense storms, it seems that considering a scenario with a significant reduction in recharge is warranted. Thus, the Tribe suggests that the scenario of a 20% decrease in recharge in 100 years should still be considered.

(2) Groundwater interactions with streamflows

While the groundwater model does not directly account for streamflows in specific creeks, the water balance results do show the overall amount of groundwater discharging to streams in the 12 surface water basins of Bainbridge Island. The current initial model results show there to be potentially substantial decreases in these groundwater discharges in the future. The Tribe is concerned over this potential result, especially on some of the more significant salmon-bearing streams such as Springbrook Creek, Manzanita Creek, and Murden Creek.

The Tribe appreciates the ability to work cooperatively with the City of Bainbridge Island and to submit these comments on the direction of the GWMP. If you have questions or comments regarding the comments provided please do not hesitate to contact me.

Sincerely,

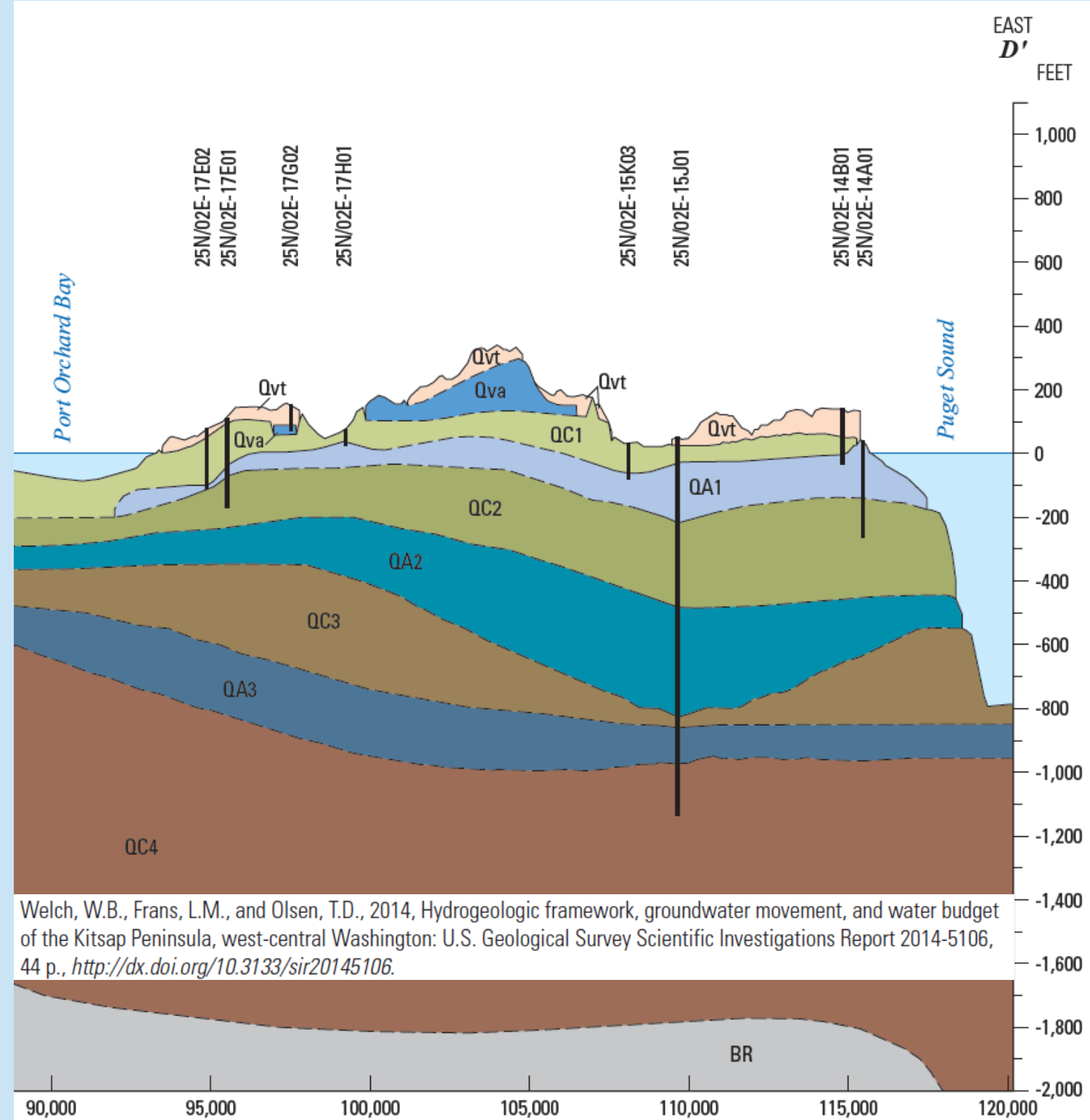
Charlie Kratzer, Hydrologist/Water Resources Coordinator
Ecosystem Recovery Program, Natural Resources Department

Cc: Alison O'Sullivan, Ecosystem Recovery Program Manager



Bainbridge Island Groundwater Management Plan

Sub-Committee Meeting
April 8, 2024





100-Year Groundwater Modeling Scenarios

Comparison scenario – Compare 2024 calibrated model with 2023 model

Baseline scenario – Current conditions projected into the future

Sea-Level Rise Stress Sensitivity Scenarios – Baseline + mod./max. sea-level rise

Recharge Stress Sensitivity Scenarios – Baseline + mod./max. recharge

Pumping Stress Sensitivity Scenarios – Baseline + increases in pumping

Prediction Scenarios – Combination of Baseline + stresses (basis for planning)

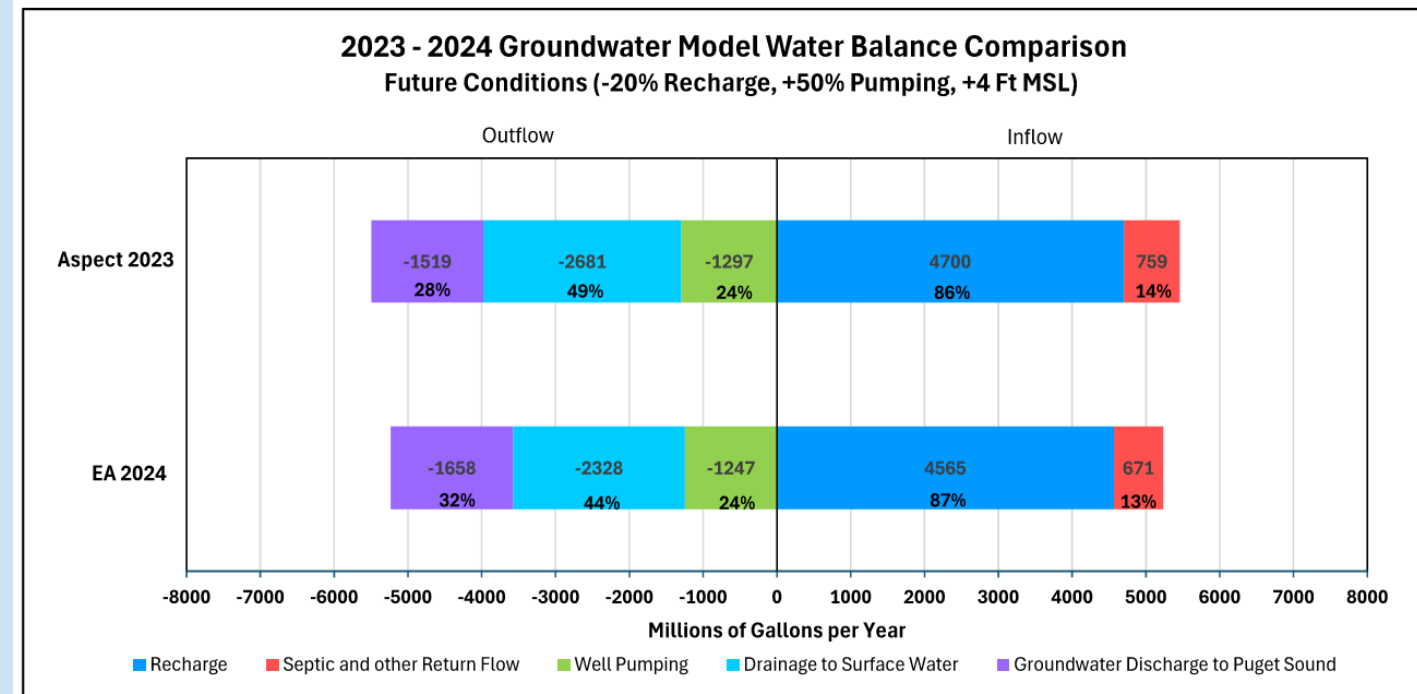
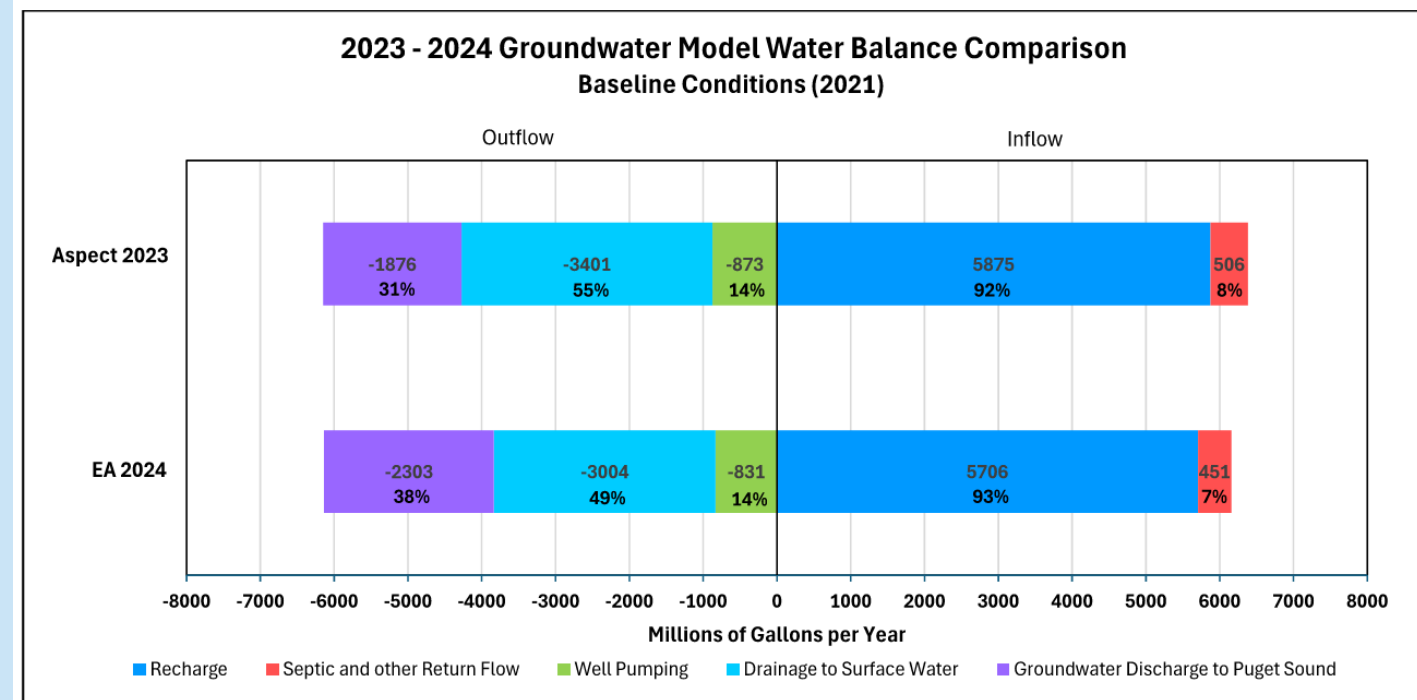
100-Year Groundwater Modeling Scenarios

Baseline scenario – current conditions projected into the future.

Comparison scenario – Compare 2024 calibrated model with 2022 model.

Stresses:

- -20 % Recharge
- +50 % Pumping
- 4 Ft Sea Level Rise

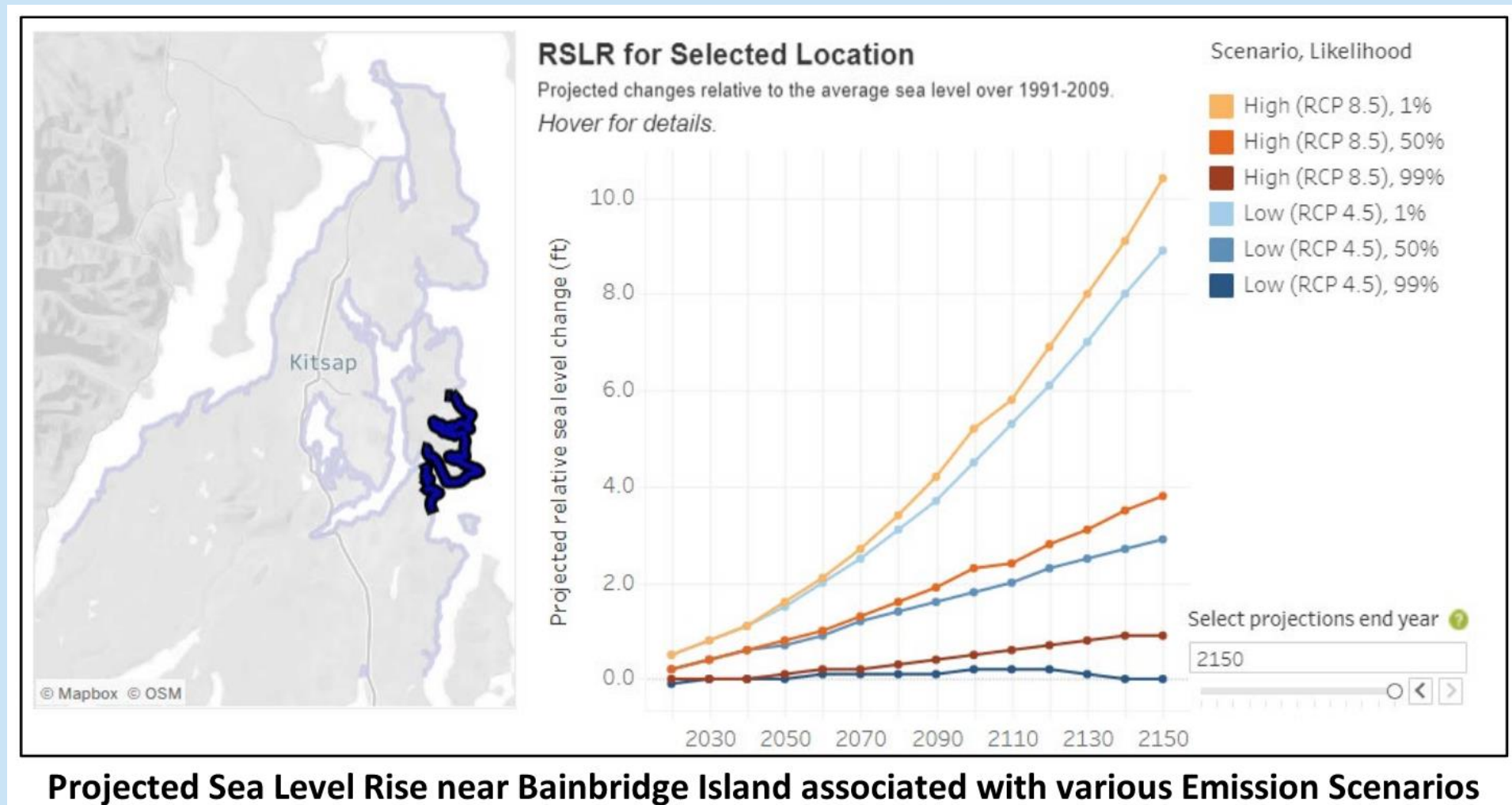




100-Year Groundwater Modeling Scenarios (continued)

Sea-Level Rise Stress Sensitivity Scenarios – Baseline + mod./max. sea-level rise (sub-committee agreement)

- Baseline + Median sea level rise (2.8 ft in 100 yrs)
- Baseline + Max. sea level rise (6.9 ft in 100 yrs)



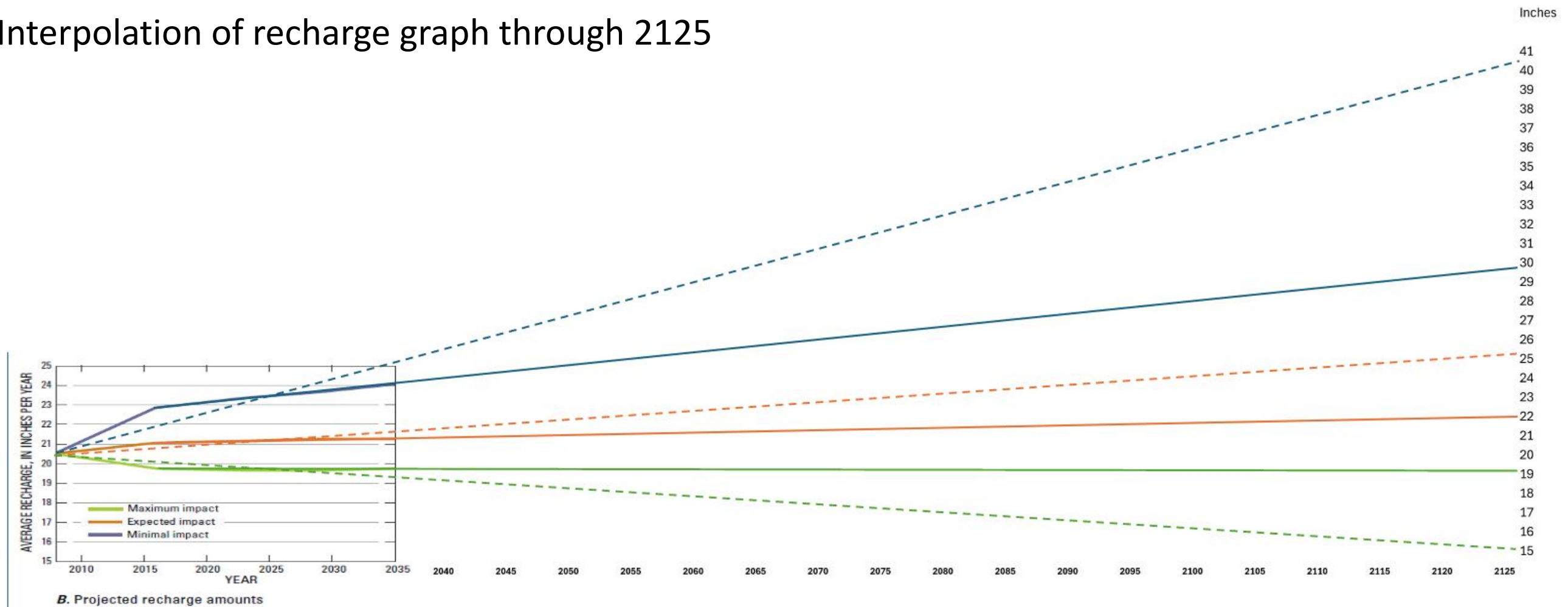


100-Year Groundwater Modeling Scenarios (continued)

Recharge Stress Sensitivity Scenarios – Based on interpolation of recharge predictions

- Baseline + 15% increase in precipitation/recharge
- Baseline – 15% decrease in precipitation/recharge

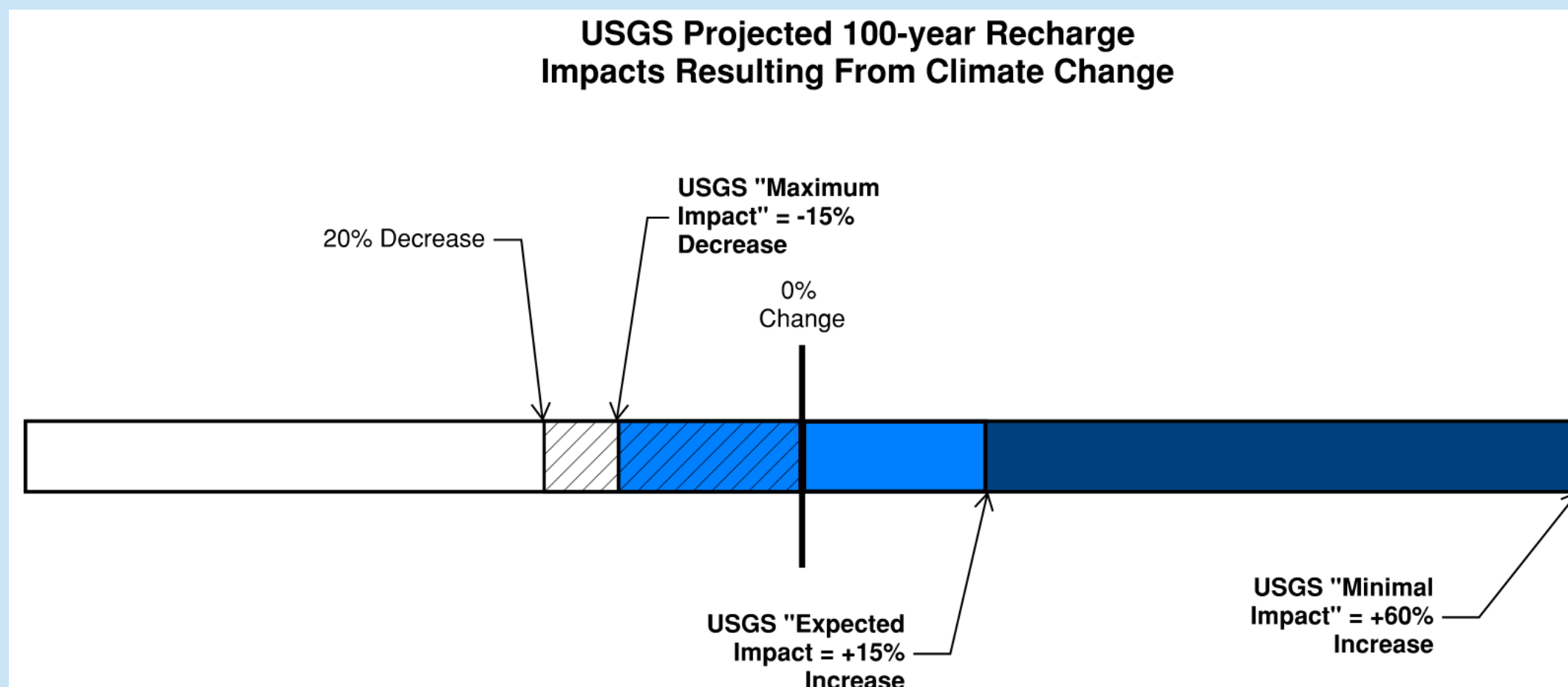
Interpolation of recharge graph through 2125



100-Year Groundwater Modeling Scenarios (continued)

Recharge Stress Sensitivity Scenarios – Based on interpolation of recharge predictions

- Baseline + 15% increase in precipitation/recharge
- Baseline – 15% decrease in precipitation/recharge





100-Year Groundwater Modeling Scenarios (continued)

Pumping Stress Sensitivity Scenarios – Baseline + increases in pumping/population (conceptual subcommittee agreement)

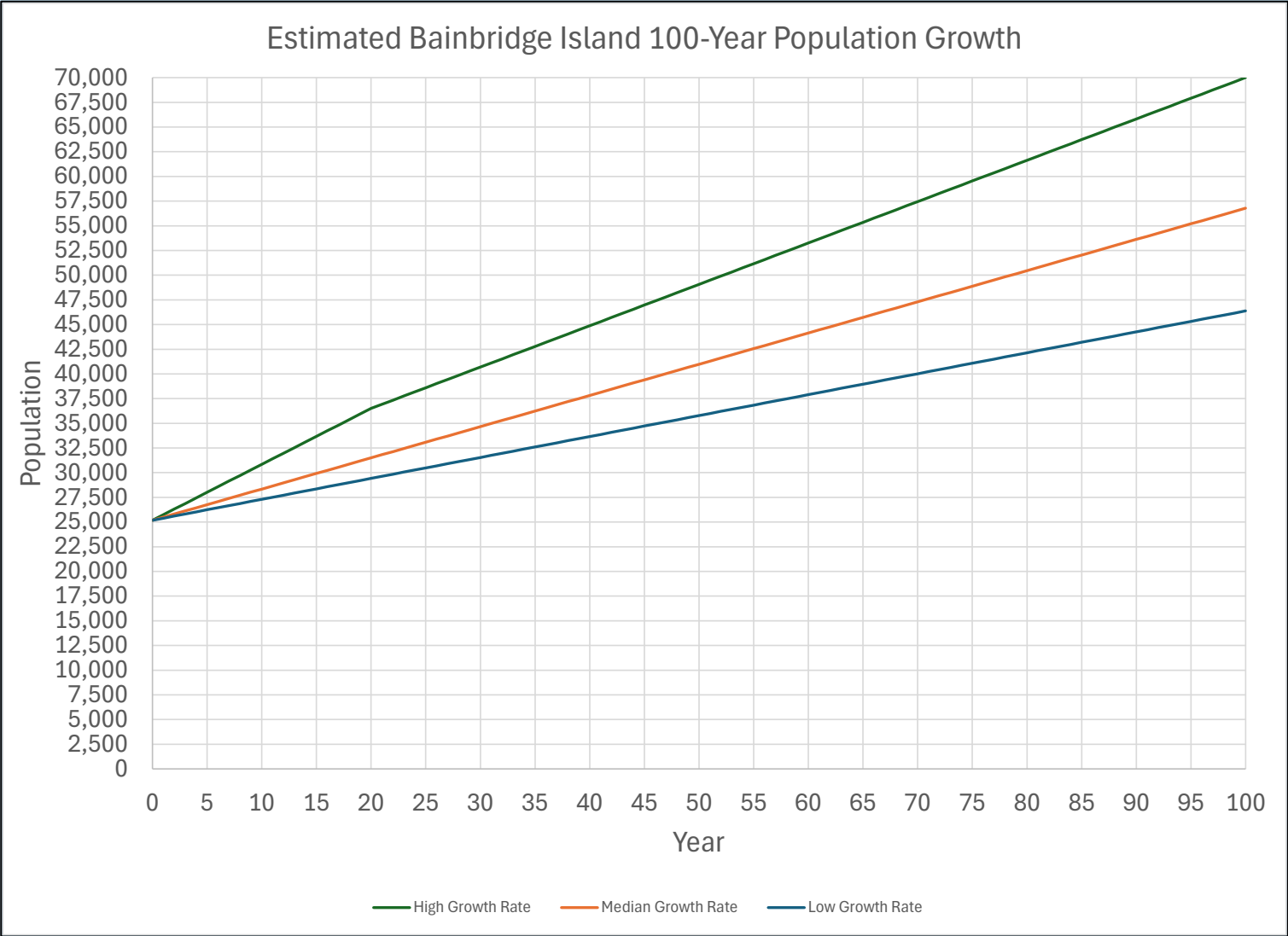
- Projections are unique to Winslow (City water system), North end systems, South end systems, and private wells.
- Low – historic growth projected into the future.
- Middle – historic growth + highest Winslow Sub-Area Plan growth alternative.
- High – middle option + 1% growth increases in all areas in years 20-100.



100-Year Groundwater Modeling Scenarios (continued)

Pumping Stress/Population Growth – unique to Winslow (City water system), North end systems, South end systems, and private wells.

- Using the estimated 2023 Bainbridge Island population of 25,108 for year 0.
- High Growth Rate
 - Includes an increased growth rate for Winslow during the first 20 years to account for Winslow high-growth planning rate.
 - 100-year population = 70,010
 - 178% increase
- Median Growth Rate
 - 100-year population = 56,780
 - 125% increase
- Low Growth Rate
 - 100-year population = 46,380
 - 84% increase





100-Year Groundwater Modeling Scenarios (continued)

Prediction Scenarios – Combination of Baseline + stresses (basis for planning)

- Combination of lowest stress outcomes
- Combination of highest stress outcomes
- Combination of stresses with highest sensitivity analysis



Schedule / Next Steps

- Mid-April - City Council check-in/approval of scenarios /virtual engagement for general public
- Late April - begin running scenarios
- May-June - Review scenario findings with sub-committee, TAC and City Council
- June-July - Complete remaining sections of Draft GWMP



Bainbridge Island Groundwater Management Plan

Discussion/Recommendations

