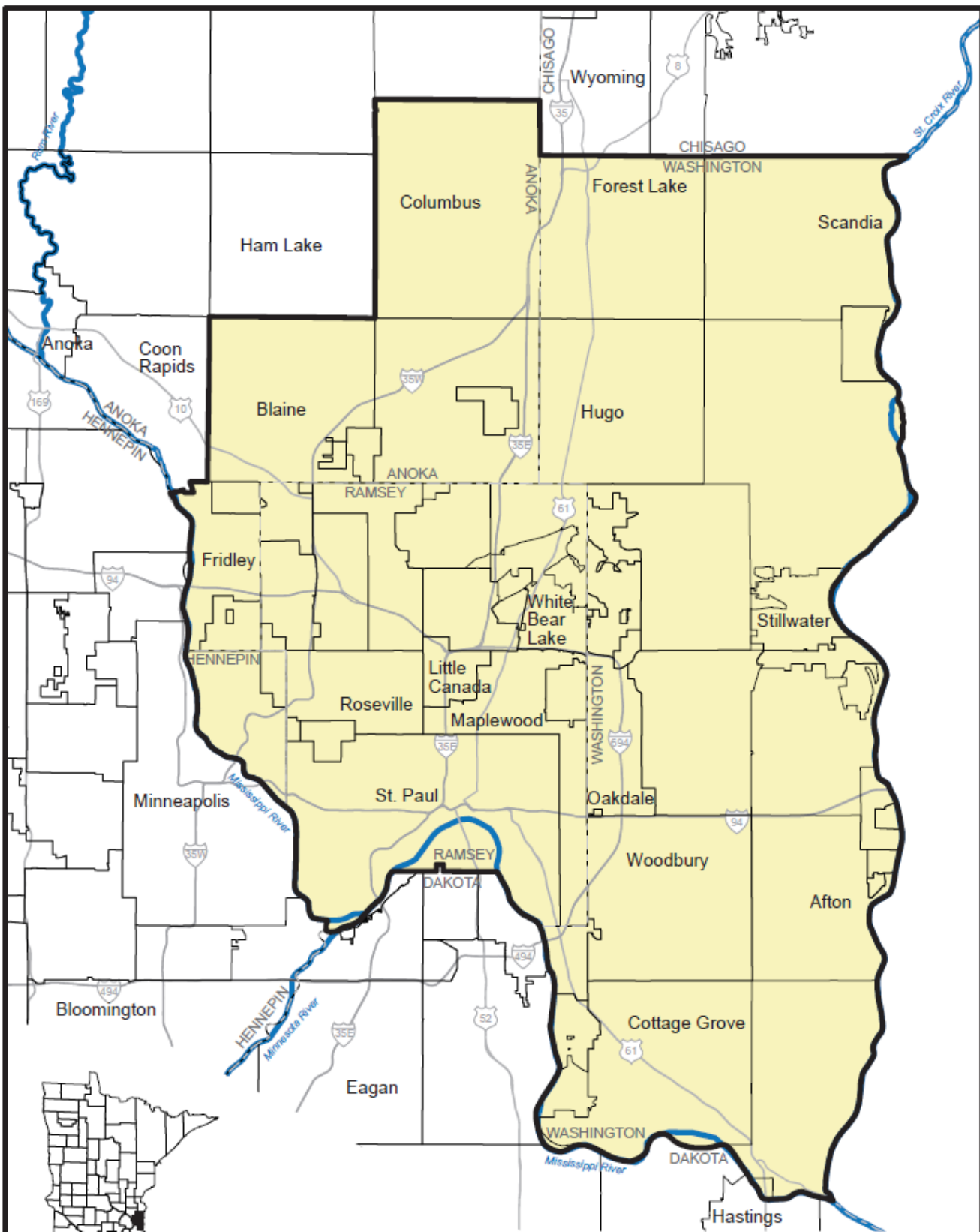




Revised NMLG Model Results for White Bear Lake

Glen Champion | Hydrologist

- NMLG Model background
- Court-ordered analyses
- Other scenario analyses



North and East Metro Groundwater Management Area

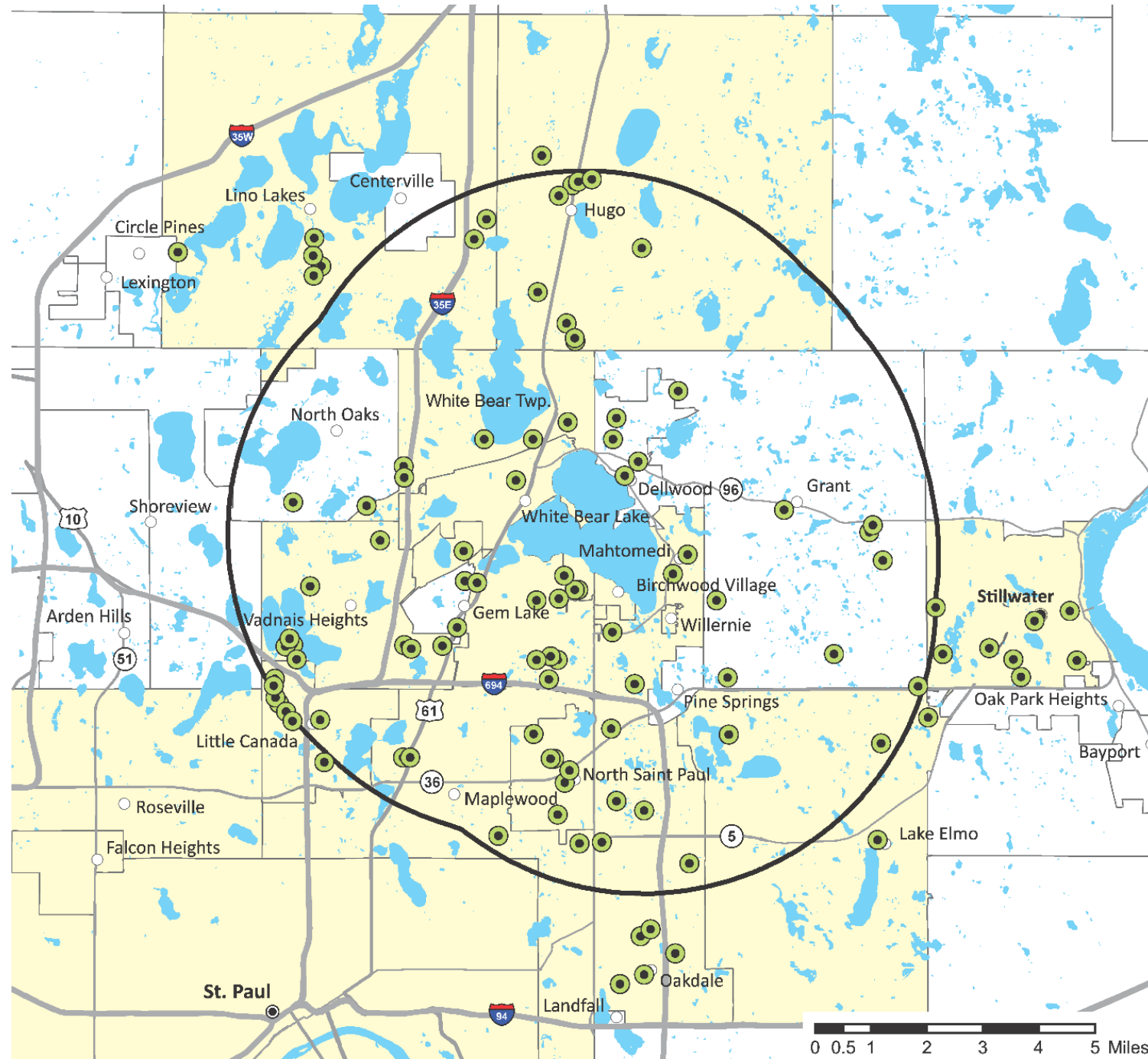
Model and Analysis Timing

- Winter 2017 – draft, steady-state USGS model (“2003 – 2011”)
- Final USGS model archive uploaded July 2017
- April - October 2017 – Initial transient model (1981 – 2016)
- 2018 – model revisions and sustainability analysis
- Late 2018 through 2021
 - Demonstrative scenarios
 - Model updates
 - 2040 scenarios
- Jan 2023 – cumulative annual withdrawal analysis

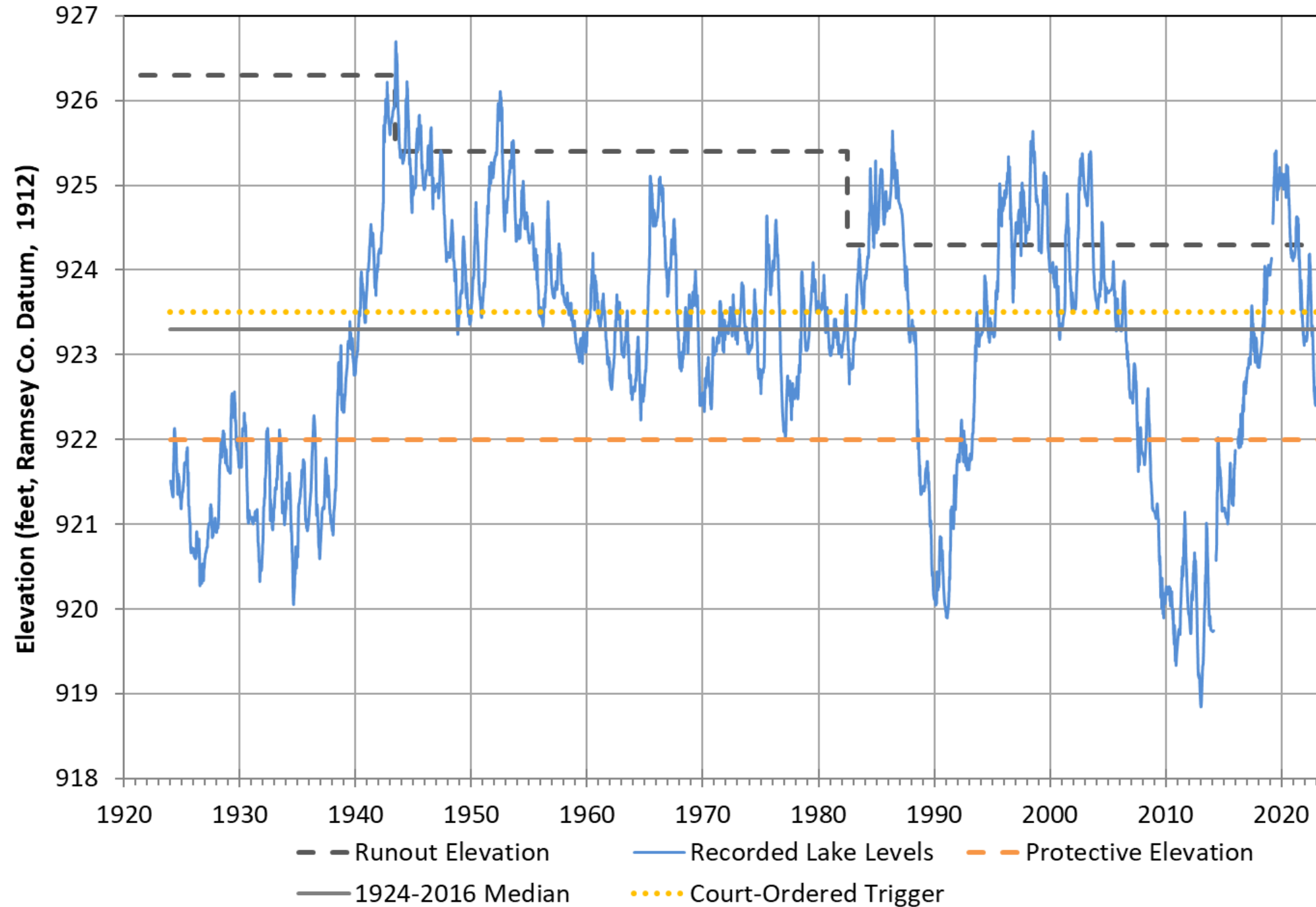
Key Elements of Court Order

- DNR is prohibited from issuing new permits or increases within 5 miles unless certain conditions are met
- Residential irrigation ban at 923.5 lake elevation
- **Residential 75 gpd per capita water use and total 90 gpd**
- **Requires public water suppliers to develop a contingency plan to shift their source of water from groundwater to surface water**
- No groundwater permits can be issued unless the DNR has sufficient hydrologic data to understand the impact on White Bear Lake and the Prairie du Chien-Jordan aquifer
- DNR must review all existing groundwater permits within 5 miles, individually and cumulatively, for compliance with the statutory **Sustainability Standard** (actual and maximum authorized uses)
- DNR to set a collective annual withdrawal limit for White Bear Lake

Permits and Wells w/in 5 Mile Area



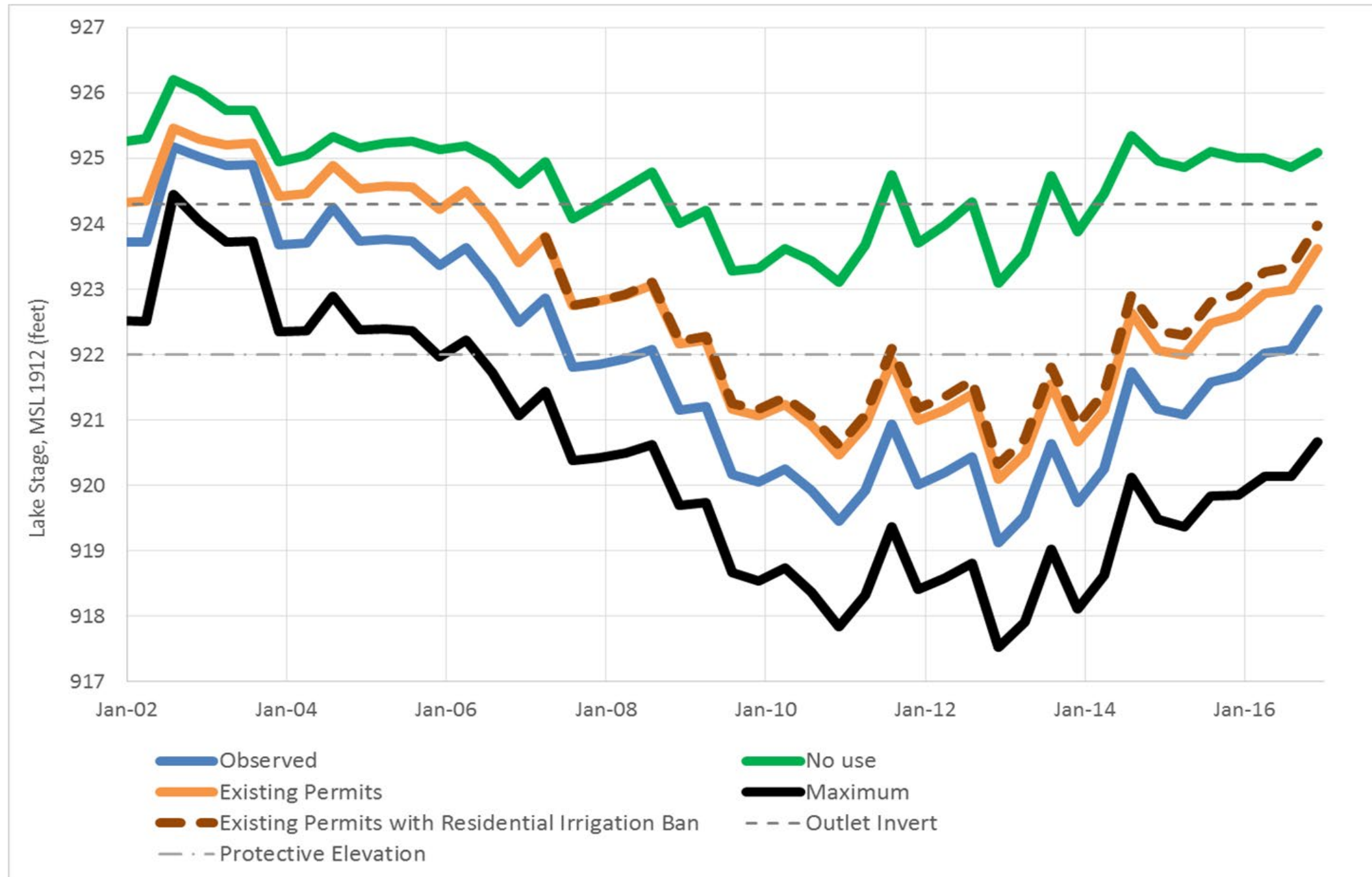
White Bear Lake - Long-term Record



White Bear Lake Hydrology

- Water budget
 - Groundwater flow-through type
 - Often multi-year trends in water levels
- Local to regional hydrologic influences
- Groundwater pumping influences take years to decades to fully propagate

White Bear Lake – Groundwater Model Results for Permits Within 5 miles of White Bear Lake

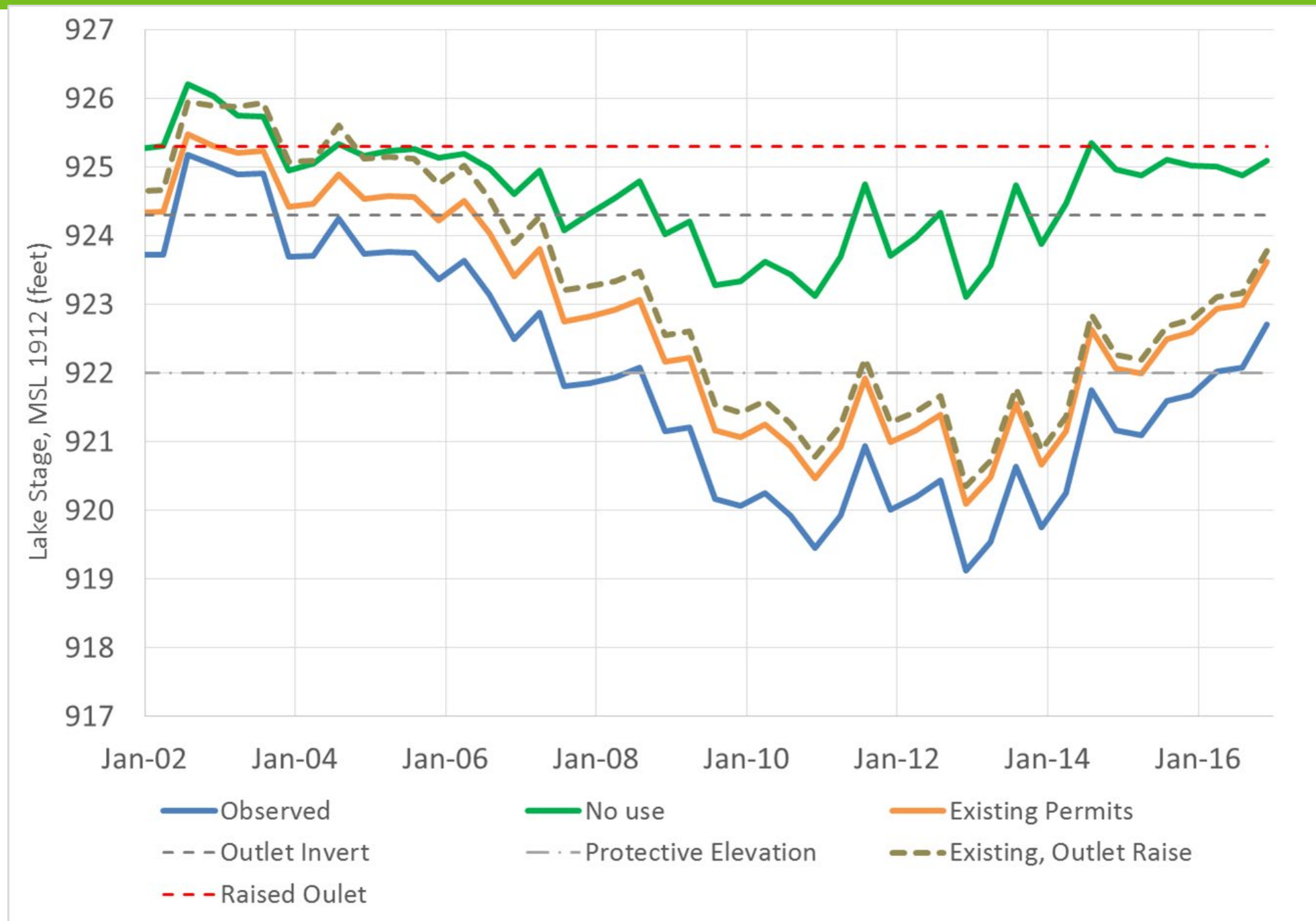


Outlet Structure on White Bear Lake

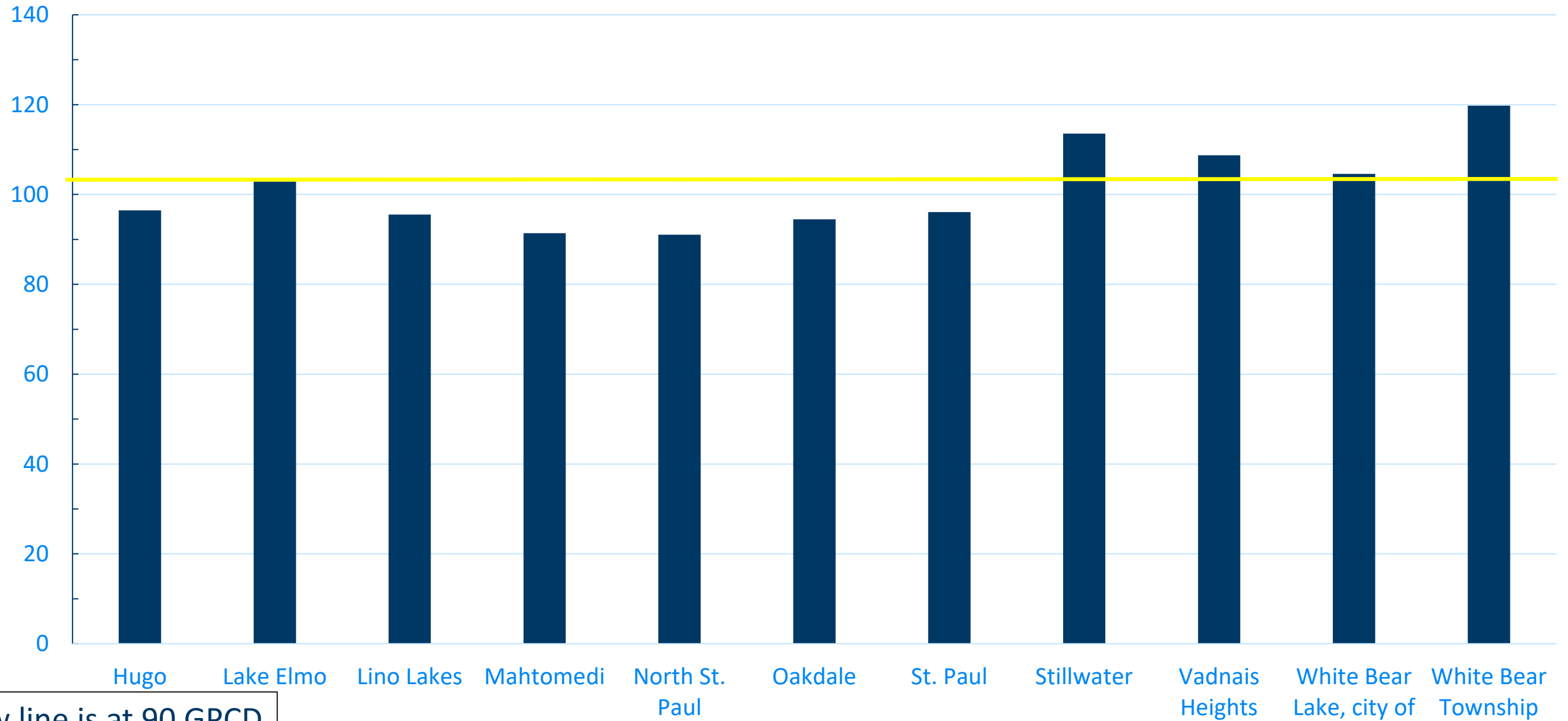


- Spring of 2019 looking south toward White Bear Lake.
- Culverts in the foreground lead north into the Rice Creek watershed
- Water in this photo is flowing out of White Bear Lake

White Bear Lake – Results of Raising the Lake Outlet Elevation One Foot

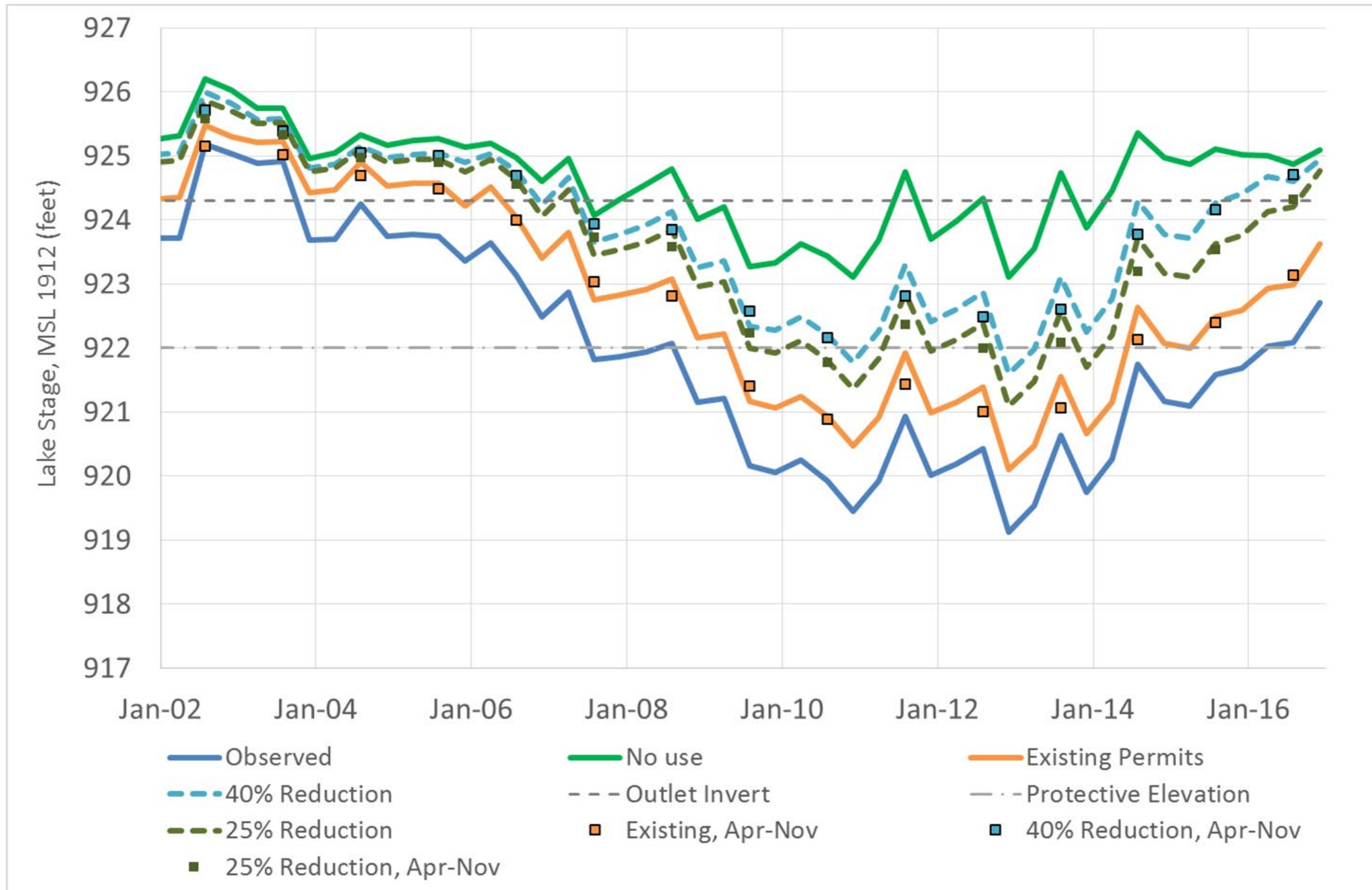


Average Per Capita Water Use 2005-2017 within 5-miles

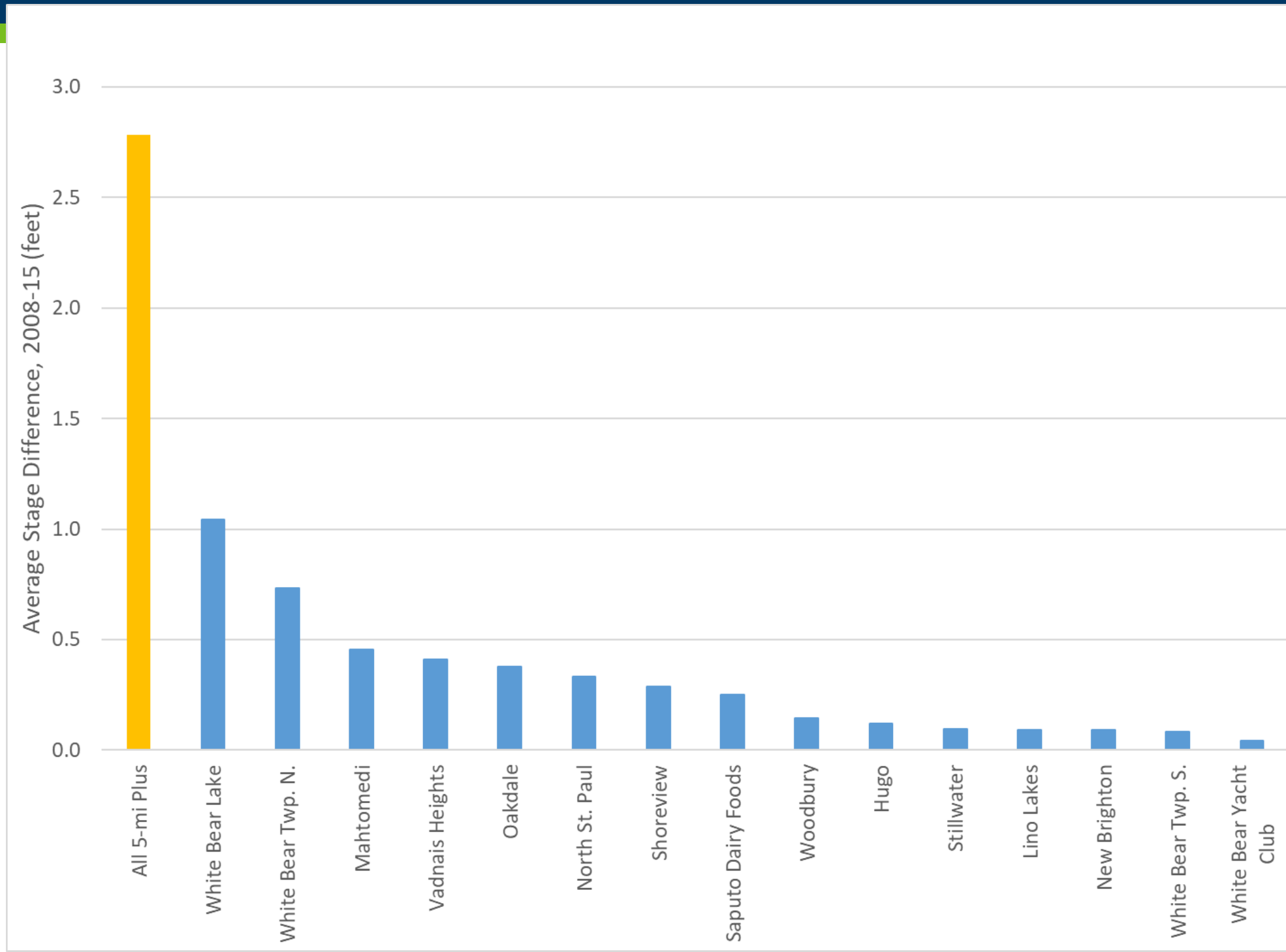


Yellow line is at 90 GPCD

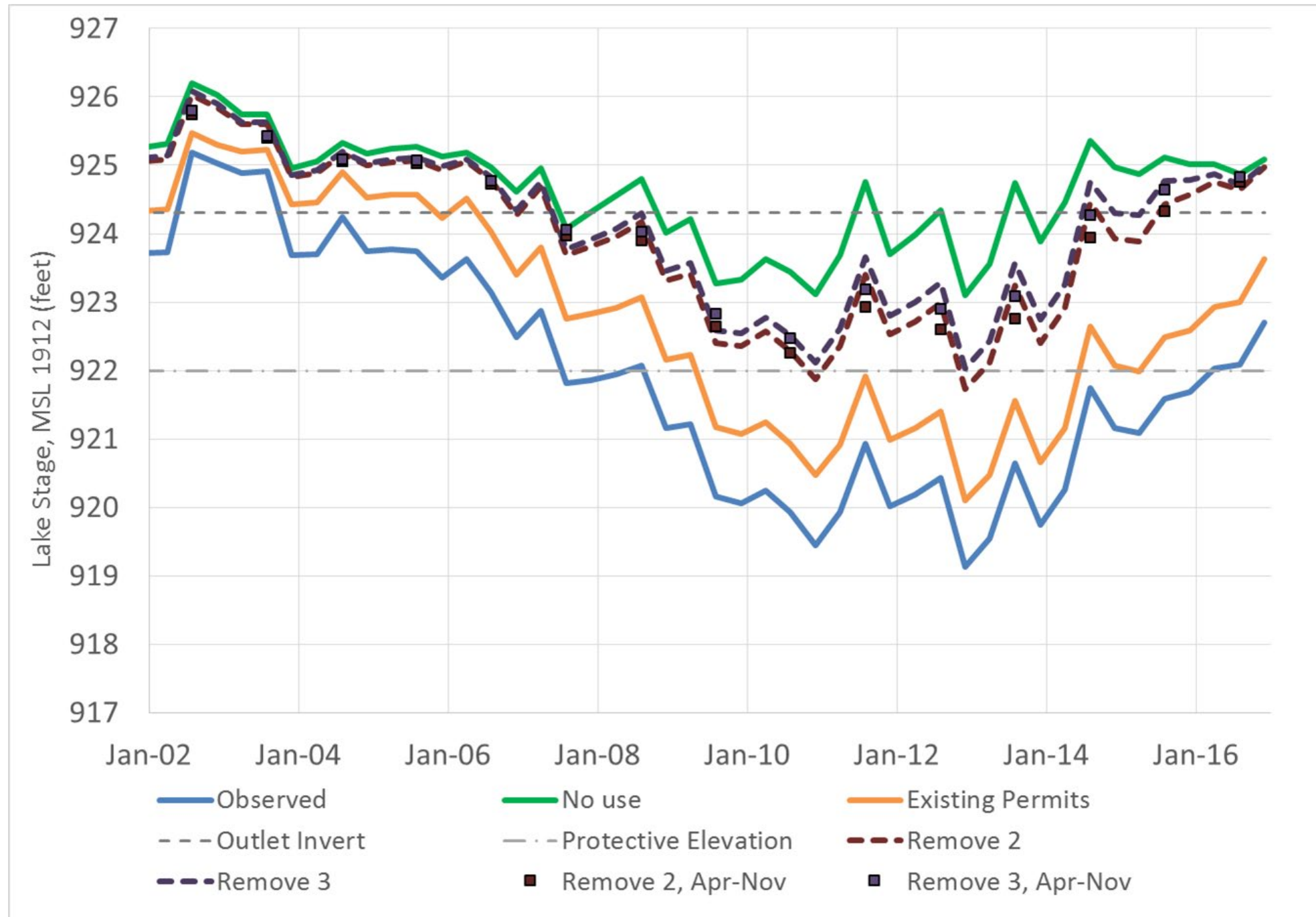
White Bear Lake – Results of Uniform % Reduction of All Permits Within 5 Miles



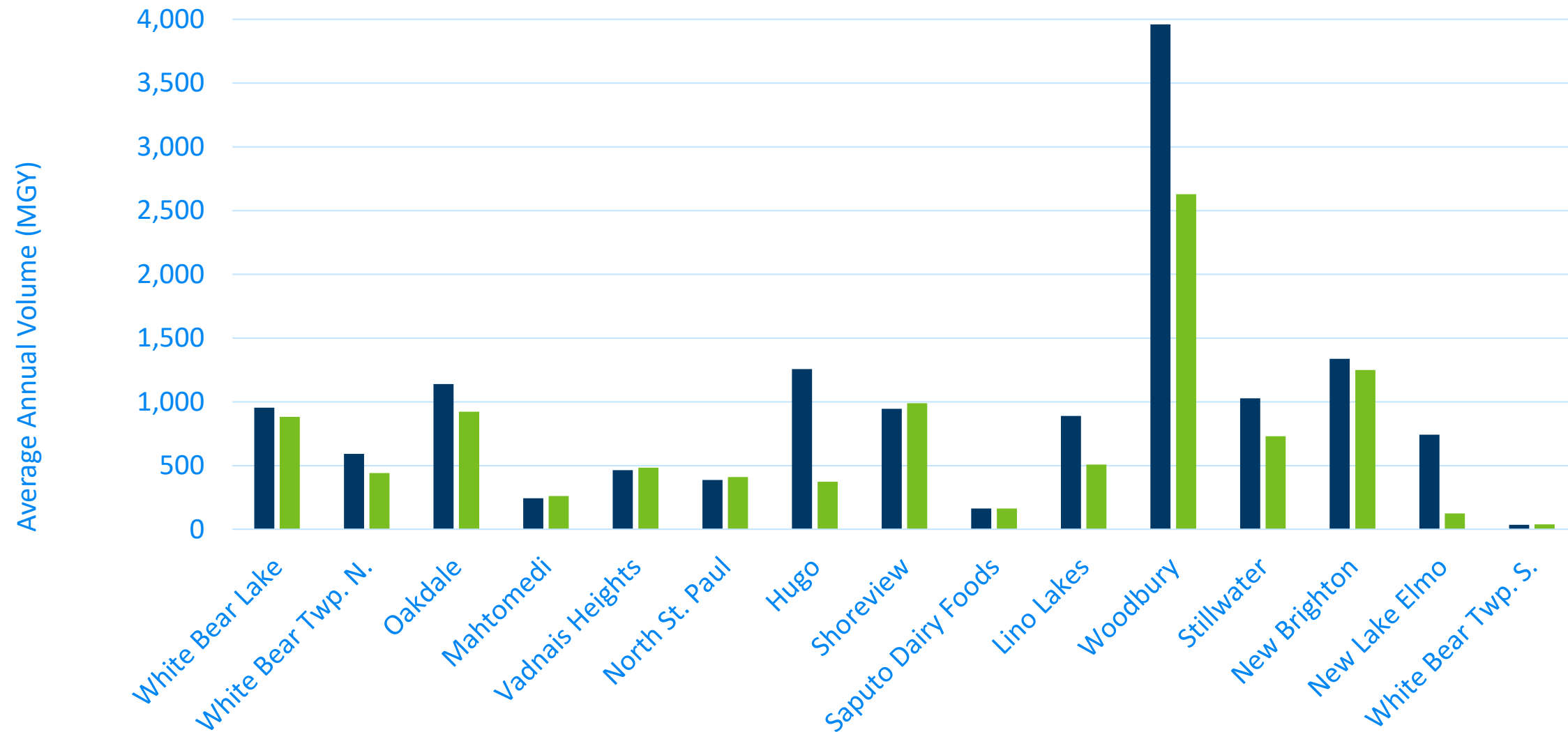
Relative Influence of Individual Permits on Lake Levels Under Existing Use, 5-Mile Plus Scenario- Top 15 Influencers



White Bear Lake – Results of Using an Alternate Source of Water for Several Public Water Suppliers



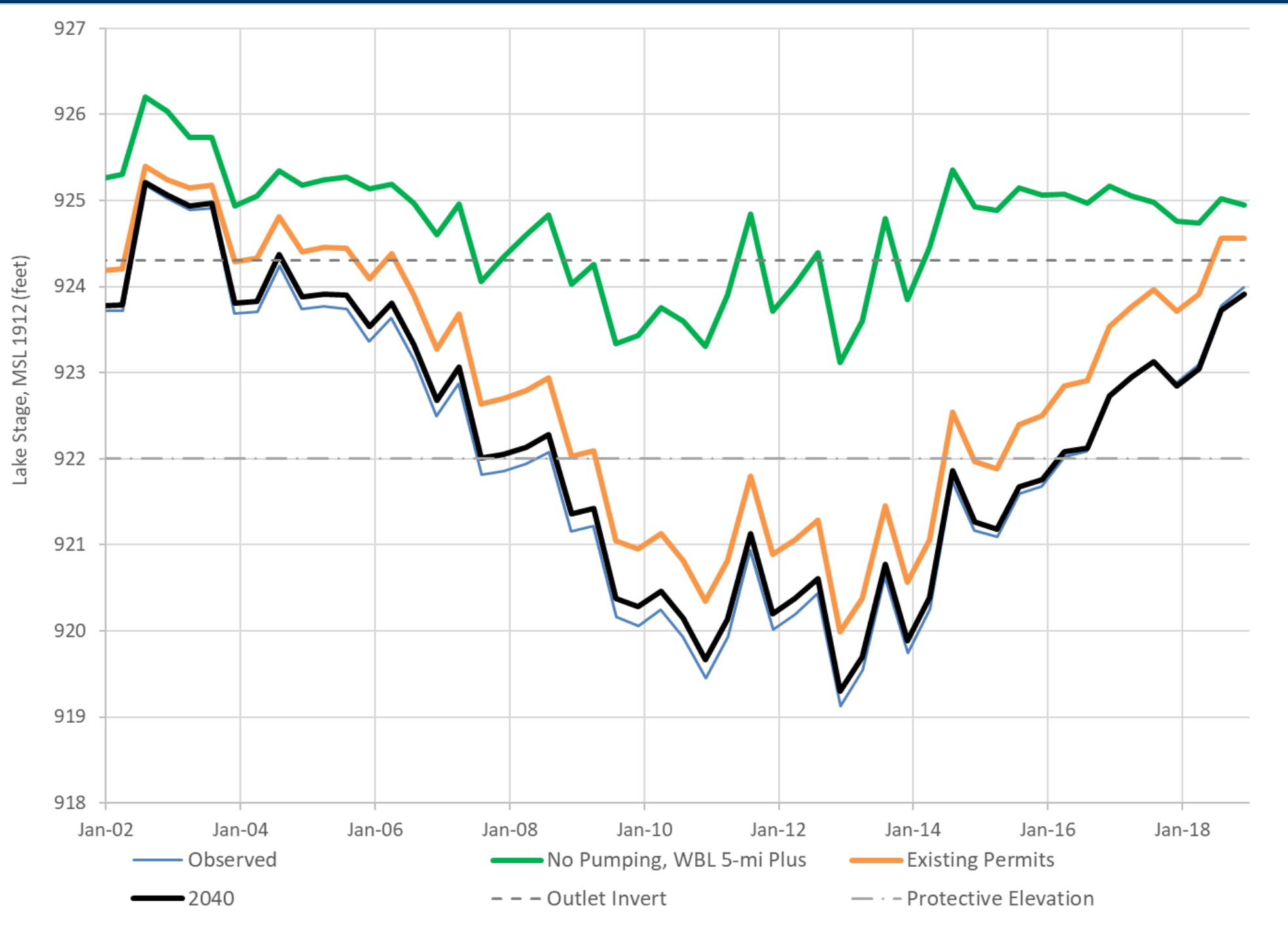
Average Annual Volume of Water Use – Existing and Projected for 2040



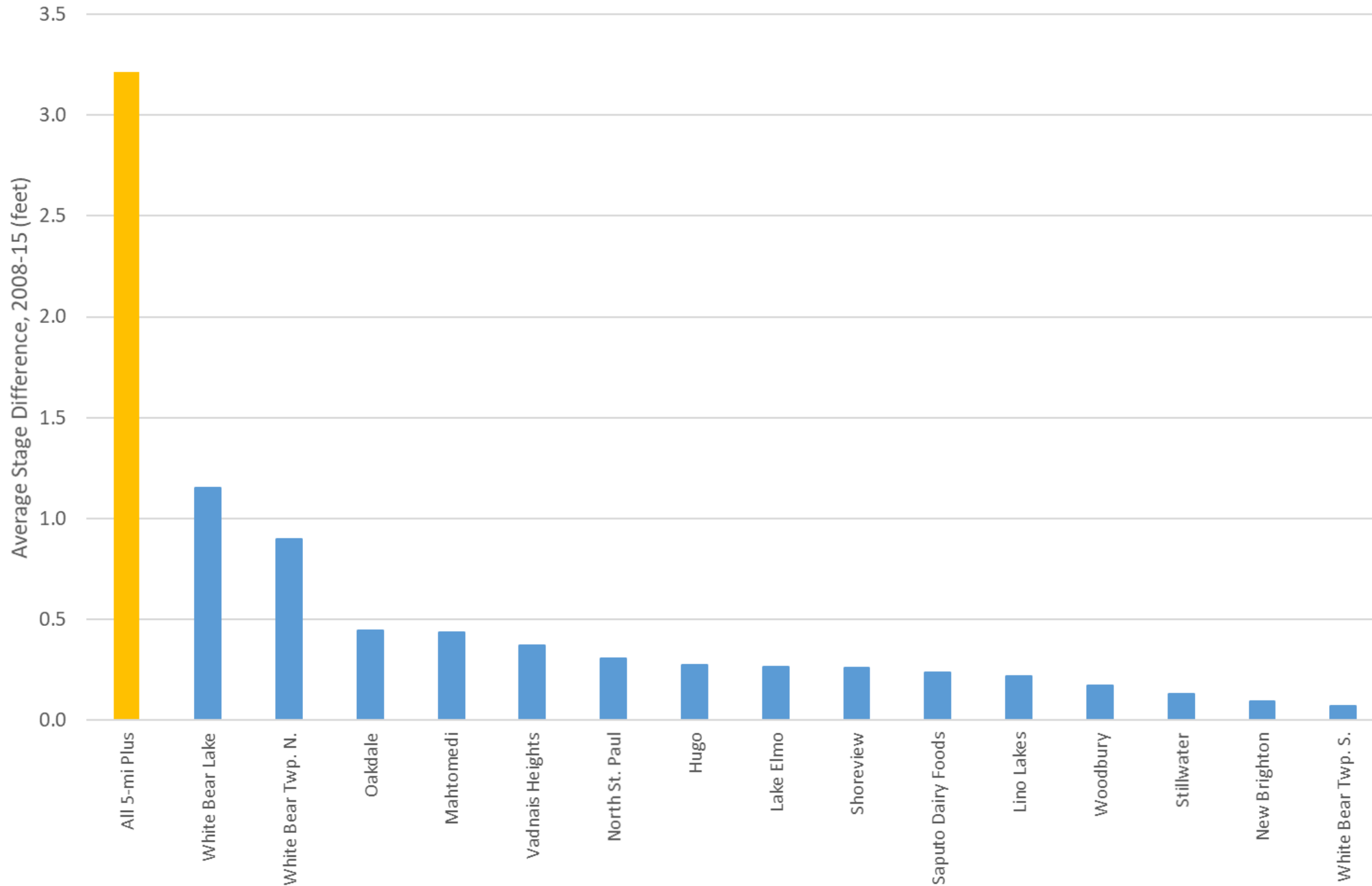
■ 2040 ■ Existing

2040 estimates are based on comprehensive plans and community projections and may not necessarily reflect ongoing efforts at water conservation

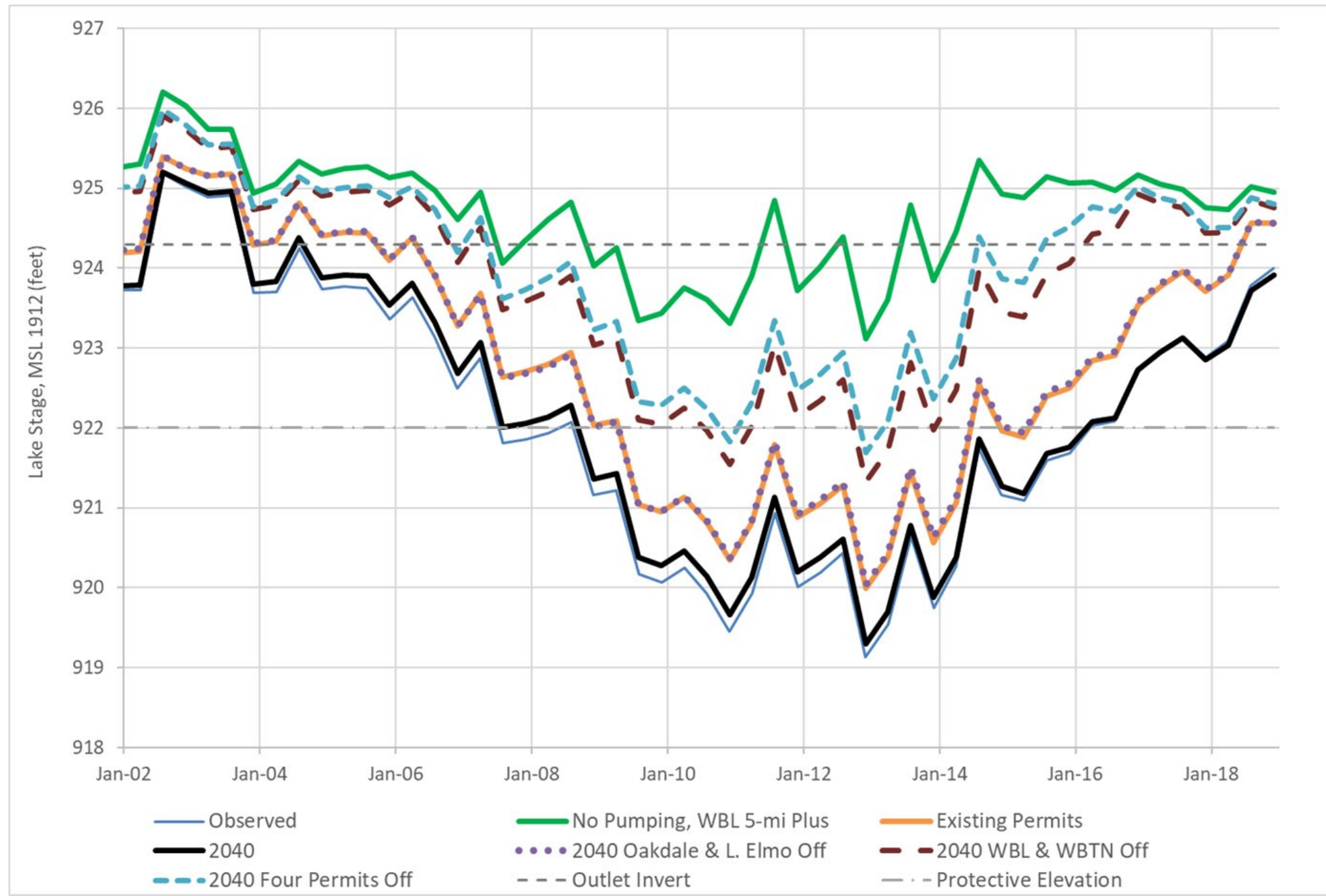
White Bear Lake – Projected Lake Levels Under Average 2040 Water Use in North and East Metro Area



Relative Influence of Individual Permits on Lake Levels Under 2040 Water Use Projections - Top 15 Influencers



White Bear Lake – Projected Lake Levels Under Average 2040 Water Use in North and East Metro Area with Alternate Source for Several Communities



Thank You!

Glen Champion

glen.champion@state.mn.us

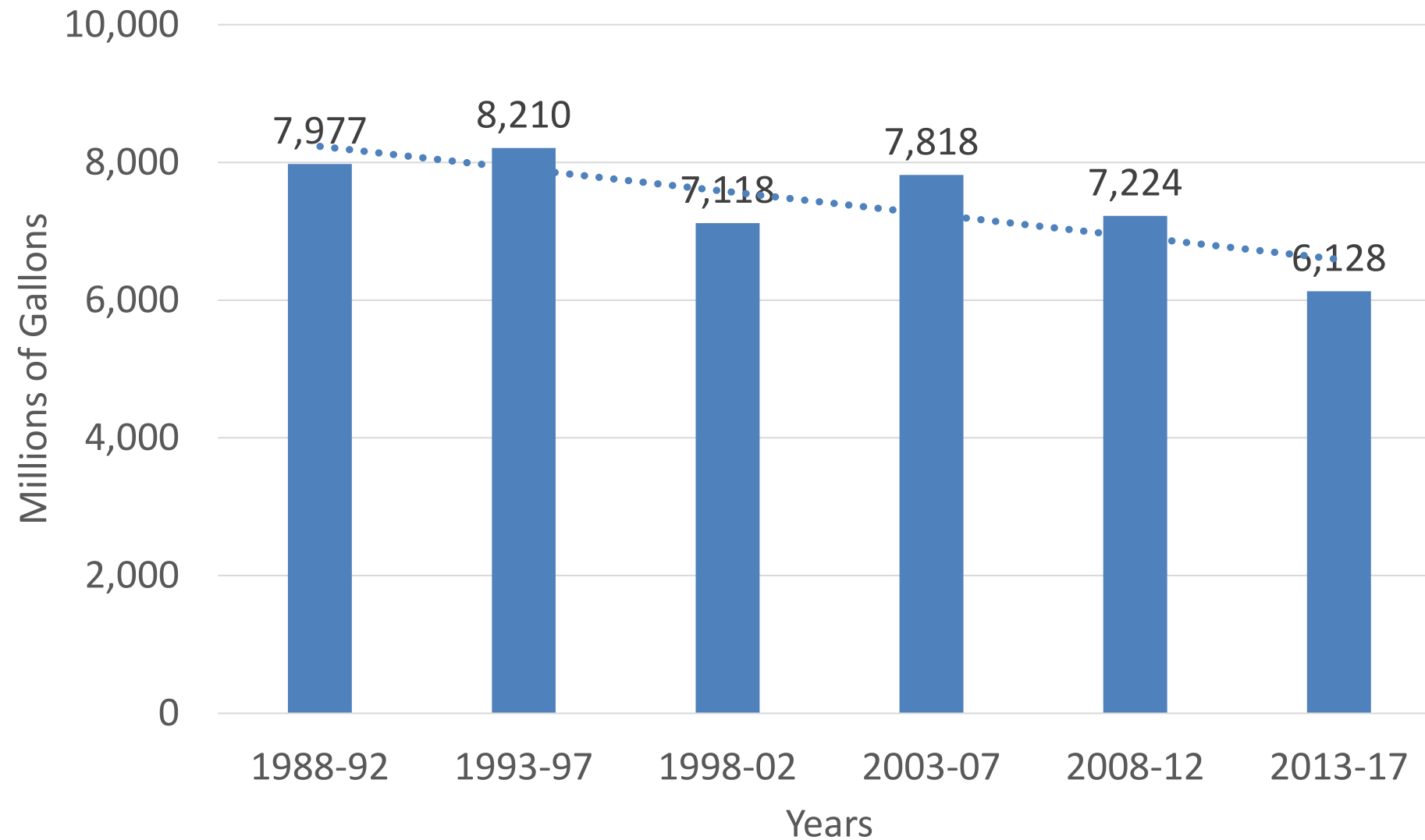
651-259-5652

Supplemental Slides

East Metro Conceptual Water Supply Plan

- DNR and PCA actively meeting with communities in the East Metro to develop a conceptual water supply plan for safe and sustainable drinking water (3M Settlement)
- Several of the community's water supplies are closely connected to the court order and the requirements
 - Some of the cities preferred water plans are in flux or may not be possible
- Conceptual Plan will need to provide flexibility to adjust as needed based on White Bear Lake process
- Communities are anxious to start building the permanent infrastructure as soon as possible

5 Yr Annual Avg Groundwater Use Within 5 Miles of WBL



Note: St. Paul Regional Water Services no longer relying on groundwater

Key Elements of the Court Order

4E. Immediately amending all permits within 5-mile radius of White Bear Lake to require that within one year of the date of this order, permittees submit a contingency plan in their water supply plans for conversion to total or partial supply from surface water sources. This contingency plan will include a schedule for funding design, construction and conversion to surface water supply.... Whether any conversion would occur shall be determined by the DNR and the affected communities.

4F. Requiring that all groundwater permittees report annually to the DNR on collaborative efforts with other northeast metro communities to develop plans as described in (D), above. (D) refers to the per capita 75/90 goals

Mt. Simon - Initial Feasibility Considerations

- White Bear Lake
 - Current treatment plant processes can remove iron, manganese, and radium, but may need modifications/additions/expansion
 - May want to study feasibility/cost of expanding into a central plant for two or three cities
- White Bear Township and Mahtomedi
 - Do not have central water-treatment plants
 - Chemical feed (e.g., polyphosphate) is currently used to sequester iron and manganese but could be insufficient if concentrations in Mt. Simon are too high, and does not remove radium
 - Would be significant water system costs beyond new wells

Mt. Simon Results – Summary

- At best
 - Could supply average day demands, but drawdowns would be “large”
 - Drawdown would be widespread and exacerbate existing cones of depression
 - There may be impacts to other communities that have no other options
- More likely
 - Would not work for the City of White Bear Lake system
 - WB Twp or Mahtomedi may be able to supply Average Day Demands
- The Mt. Simon aquifer has limited capacity and is also expensive