



# Aquifer Injection and Lake Augmentation – Update - Study 6

Work Group Meeting, White Bear Lake Area Comprehensive Plan

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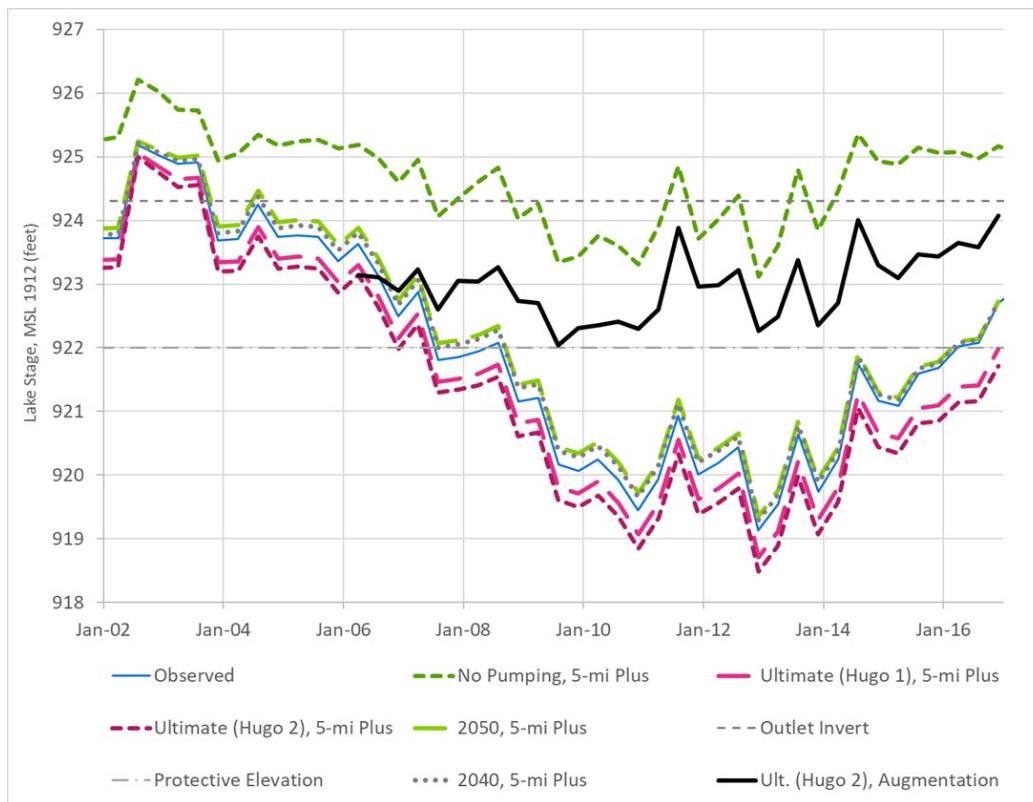
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# Background

- Study 6 initially looked at augmenting White Bear Lake with current wastewater volumes, but future water use scenarios
- Updated memo evaluates:
  - Augment 2 MGD under existing water use scenario
  - Augment 3.8 MGD under existing water use scenario
  - Augment 4 MGD under ultimate Hugo 2 water use scenario
  - Cost Opinions for 3.8 MGD augmentation and aquifer injection

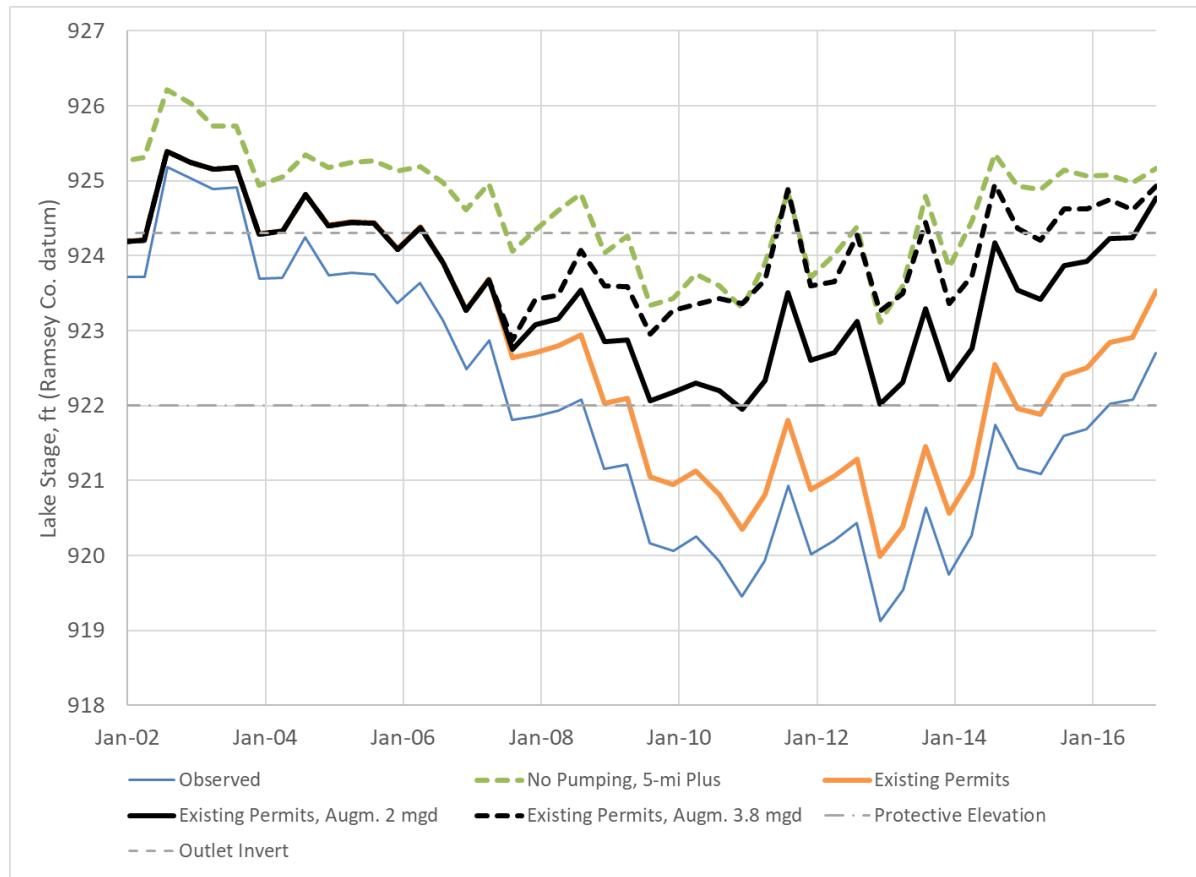


# Augmentation – Ultimate Water Use Scenario



- Ultimate (Hugo 2), Augmentation
- Up to 4 million gallons per day – *cannot currently do this much with reuse water*
- Augmenting during open water season

# Augmentation – Existing Water Use Scenario



- Existing Use Scenario
- 2 MGD and 3.8 MGD Augmentation Modeled
- Augmenting during open water season

# 2 MGD Augmentation – Capital Cost Opinion

Component	Unit	Est. Quantity	Unit Price	Cost
Effluent Diversion	LS	1	\$910,000	\$910,000
0.5 MG Equalization Tank	LS	1	\$2,500,000	\$2,500,000
2.5 MGD Wastewater Treatment Plant <sup>1</sup>	LS	1	\$75,000,000	\$75,000,000
2 MGD RO Reuse Treatment Plant	LS	1	\$18,000,000	\$18,000,000
2 MG Storage	LS	1	\$5,000,000	\$5,000,000
0.5 MG Reject Water Equalization	LS	1	\$2,500,000	\$2,500,000
12" Augmentation Watermain	LF	2,800	\$500	\$1,400,000
Augmentation Outfall <sup>2</sup>	LS	1	\$4,100,000	\$4,100,000
			Subtotal	<b>\$109,400,000</b>
			40% Contingency	\$43,800,000
			<b>Construction Subtotal:</b>	<b>\$153,200,000</b>
			Easement and Land Acquisition	\$2,000,000
			15% Engineering	\$23,000,000
			15% Construction Administration	\$23,000,000
			<b>Total:</b>	<b>\$201,200,000</b>

## 3.8 MGD Augmentation – Capital Cost Opinion

Component	Unit	Est. Quantity	Unit Price	Cost
Effluent Diversion	LS	1	\$1,400,000	\$1,400,000
0.5 MG Equalization Tank	LS	1	\$2,500,000	\$2,500,000
4.8 MGD Wastewater Treatment Plant <sup>1</sup>	LS	1	\$130,000,000	\$130,000,000
3.8 MGD RO Reuse Treatment Plant	LS	1	\$30,500,000	\$30,500,000
4 MG Storage	LS	1	\$7,300,000	\$7,300,000
0.5 MG Reject Water Equalization	LS	1	\$2,500,000	\$2,500,000
16" Augmentation Watermain	LF	2,800	\$550	\$1,500,000
Augmentation Outfall <sup>2</sup>	LS	1	\$4,100,000	\$4,100,000
			Subtotal	<b>\$179,800,000</b>
			40% Contingency	\$71,900,000
			<b>Construction Subtotal:</b>	<b>\$251,700,000</b>
			Easement and Land Acquisition	\$2,000,000
			15% Engineering	\$37,800,000
			15% Construction Administration	\$37,800,000
			<b>Total:</b>	<b>\$329,300,000</b>

# 2 MGD Augmentation O&M Cost Opinion

Item	Annual Cost
Labor (3 FTE)	\$450,000
Membrane Replacement (5 yr for RO and 7 yr for MF)	\$125,000
Chemicals	\$150,000
Electricity	\$225,000
Natural Gas	\$100,000
Equipment Repair	\$200,000
Lab Testing	\$200,000
<b>Total Annual O&amp;M:</b>	<b>\$1,450,000</b>

# 3.8 MGD Augmentation O&M Cost Opinion

Item	Annual Cost
Labor (5 FTE)	\$750,000
Membrane Replacement (5 yr for RO and 7 yr for MF)	\$200,000
Chemicals	\$290,000
Electricity	\$420,000
Natural Gas	\$150,000
Equipment Repair	\$300,000
Lab Testing	\$250,000
<b>Total Annual O&amp;M:</b>	<b>\$2,360,000</b>

# Aquifer Injection and Augmentation Conclusions



- Aquifer injection or augmentation with reuse water is expensive
- Lake level improvements predicted, especially with augmentation
- Significant regulatory hurdles
- No obvious capital cost offset
- Collect wastewater samples

# Questions?



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