

White Bear Lake Area Comprehensive Plan Study 12

Tiered Increasing Block Water Utility Rates

Progress Update

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Purpose of the Study

- Summarize existing tiered increasing block water utility rates for each of the 14 White Bear Lake Communities
- Review existing research
 - Effectiveness of tiered increasing block water utility rates
- Estimate “tipping point” in a tiered rate structure with respect to minimum cost per volume that would need to be charged to provide a significant reduction in water

Agenda

- Tiered Increasing Block Water Utility Rates
 - Existing tiered increasing block water utility rate structures for each community
 - Research on tiered increasing block water utility rates
 - Summary of water use reduction for each community since implementing tiered increasing block water utility rates
 - Calculating “tipping point” for each community
- Implications, Recommendations, and Conclusions

Tiered Increasing Block Water Utility Rates

Existing Tiered Increasing Block Water Utility Rates

Rate Structure Overview							
City	Year Tiered Rates were Implemented	Current Base Rate	Tier 1 (gal)	Tier 2 (gal)	Tier 3 (gal)	Tier 4 (gal)	Tier 5 (gal)
Hugo	2010 ^[1]	\$44.50	0 – 11,000	11,001 – 20,000	20,001 – 29,000	29,001+	--
		Rate	\$1.15	\$2.30	\$3.45	\$6.45	--
Lake Elmo	2012	\$27.02	0 – 15,000	15,001 – 30,000	30,001 – 50,000	50,001 – 80,000	80,001+
		Rate	\$2.70	\$3.25	\$3.89	\$4.68	\$5.59
Lino Lakes	2023	\$25.00	0 – 20,000	20,001 – 40,000	40,001 – 80,000	80,001 – 120,000	120,001+
		Rate	\$2.28	\$2.53	\$2.86	\$3.80	\$4.43
Mahtomedi	2010	\$24.34	0 – 14,960	14,961 – 24,684	24,685 – 33,660	33,661+	--
		Rate	\$3.73	\$3.89	\$4.71	\$6.59	--
New Brighton	N/A	\$36.56	0 – 8,000	8,001+	--	--	--
		Rate	\$0.00	\$4.57	--	--	--
North Oaks – West	2017	\$48.24	0 – 5,000	5,001 – 10,000	10,001 – 30,000	30,000+	--
		Rate	\$2.69	\$4.33	\$5.99	\$9.85	--
North Oaks – East	2012	\$58.94	0 – 10,000	10,001 – 20,000	20,001 – 30,000	30,001+	--
		Rate	\$2.68	\$2.94	\$3.97	\$6.90	--

Existing Tiered Increasing Block Water Utility Rates

Rate Structure Overview							
City	Year Tiered Rates were Implemented	Current Base Rate	Tier 1 (gal)	Tier 2 (gal)	Tier 3 (gal)	Tier 4 (gal)	Tier 5 (gal)
North Saint Paul	1998	11.92	0 – 7,000	7,001 – 20,000	20,001+	--	--
		Rate	\$3.49	\$4.57	\$6.64	--	--
Oakdale	1997	\$15.84	0 – 25,000	25,001 – 50,000	50,001+	--	--
		Rate	\$2.60	\$2.89	\$3.10	--	--
Shoreview	1992	\$37.47	0 – 5,000	5,001 – 10,000	10,001 – 30,000	30,001+	--
		Rate	\$2.09	\$3.36	\$4.65	\$7.65	--
Stillwater	2021	10	0 – 8,000	8,001 – 18,000	18,001 – 28,000	28,001+	--
		Rate	\$1.75	\$2.29	\$2.84	\$4.48	--
Vadnais Heights	2007	\$15.28	0 – 6,000	6,001 – 20,000	20,001 – 50,000	50,001+	--
		Rate	\$2.00	\$3.21	\$5.39	\$6.99	--
White Bear Lake	2026	\$39.23	0 – 6,000	6,001 – 20,250	20,251 – 56,250	56,251+	--
		Rate	\$0.67	\$2.99	\$3.33	\$3.49	--
White Bear Township	2012	\$45.50	0 – 10,000	10,001 – 20,000	20,001 – 30,000	30,001+	--
		Rate	\$2.60	\$2.85	\$3.85	\$6.70	--
Woodbury	2001	\$9.40	1,000 – 25,000	25,001 – 50,000	50,001 – 75,000	75,001 – 100,000	100,000+
		Rate	\$2.50	\$3.85	\$5.20	\$6.45	\$7.80

Tiered Water Utility Rates Research

Published studies report anecdotal evidence that suggests implementing tiered increasing block water utility rates can have a large effect on water demand.

Community	Water Savings	Comments
Irvine Water District, California	Outdoor water demand fell by 61% per acre.	13 years after the introduction of allocation-based tiered rates.
Eastern Municipal Water District, California	Water demand fell by 10% to 15%.	Demand for efficient users fell by 5 percent while demand for inefficient users fell by 25 percent.
Saratoga Springs, Utah	Water demand fell by 22% in July, 19% in August, and 10% in September compared to the previous year.	Implemented an allotment tiered water utility rate for the irrigation season during drought conditions.
Blanding, Utah	Water demand fell by 14%.	Implemented an allotment tiered water utility rate during drought conditions.
San Antonio Water System(SAWS), Texas	City has grown by 80% while water used to sustain the city has only increased by 20%.	Implemented increasing block rates in the 1980s to incentivize conservation.

Tiered Water Utility Rates Research

Water savings vary due to multiple influencing factors.

Nonprice Water Conservation Policies

- Lawn watering restrictions
- Public education programs
- Water efficient appliances

Drought vs. Non-Drought Conditions

- Restrictions implemented during drought
- Conservation awareness lower in non-drought periods

Customer Behavior & Outdoor Water Use

- Household water use factors:
 - Irrigable lot size
 - Irrigation practices and systems
 - Home age
 - Individual habits

Price Information

- Water utilities that include price information on the water bill can increase residents' responsiveness to price signals

Calculation Methods

Water Use Before and After Implementing Tiered Increasing Block Utility Rates

- Compared 2024 water use to pre-policy use
- Water savings ranged from 12-45%

Median Household Income (MHI) and Average Water Use per Capita

- Graphed annual per capita residential water usage and city median household income (MHI)
- Found a positive correlation between median household income and average water use per capita

Average Water Use per Capita and Average Water Bill as a Percentage of MHI

- Calculated average water bill as a percentage of MHI for each city
- Graphed the average water bill as a percentage of MHI and average water use per capita for each city
- Found a negative correlation for average water bill as a percentage of MHI and water use per capita

Calculated Highest Yearly Water Bill for Each City

- Calculated highest yearly water bill for each city to determine a “tipping point”
- Found that many cities see a decline in water use when they reach an average water bill that is anywhere from 0.15-0.46% of the city’s MHI

Water Reduction Based on Years since Implementation

Years since Implementation	Cities	Average Residential Water Use per Capita Before Implementation (gal/year)	Average Residential Water Use per Capita 2024 (gal/year)	% Reduction
No Tiered Rates	New Brighton ^[1]	28,515	28,166	1%
No Tiers Until 2026	White Bear Lake ^[2]	22,996	16,397	29%
Less than 10 Years	Stillwater	30,970	22,586	27%
	Lino Lakes	29,104	24,605	15%
Less than 20 Years	Vadnais Heights	29,008	25,587	12%
	Mahtomedi	32,856	18,156	45%
	Hugo	26,825	20,008	25%
	White Bear Township	35,617	24,014	33%
	Lake Elmo	35,379	24,808	30%
More than 20 Years	Shoreview	25,036	20,160	19%
	Oakdale	25,974	20,825	20%
	North St. Paul	23,340	14,936	36%
	Woodbury	36,851	22,626	39%

Notes:

[1] New Brighton does not have a tiered rate structure. Therefore, data from 1990 was compared to data from 2024 to determine water reduction without a rate structure.

[2] White Bear Lake did not implement a tiered rate structure until 2026. Therefore, data from 1990 was compared to data from 2024 to determine water reduction without a rate structure.

Summary of Water Reduction Based on Years since Implementation

Cities without tiered rates or with tier rates starting in 2026

- Water reduction of 1%-29%
- Average water demand reduction of 15%

Cities who have had tier rates for less than 10 years

- Water demand reduction of 15%-27%
- Average water demand reduction of 21%

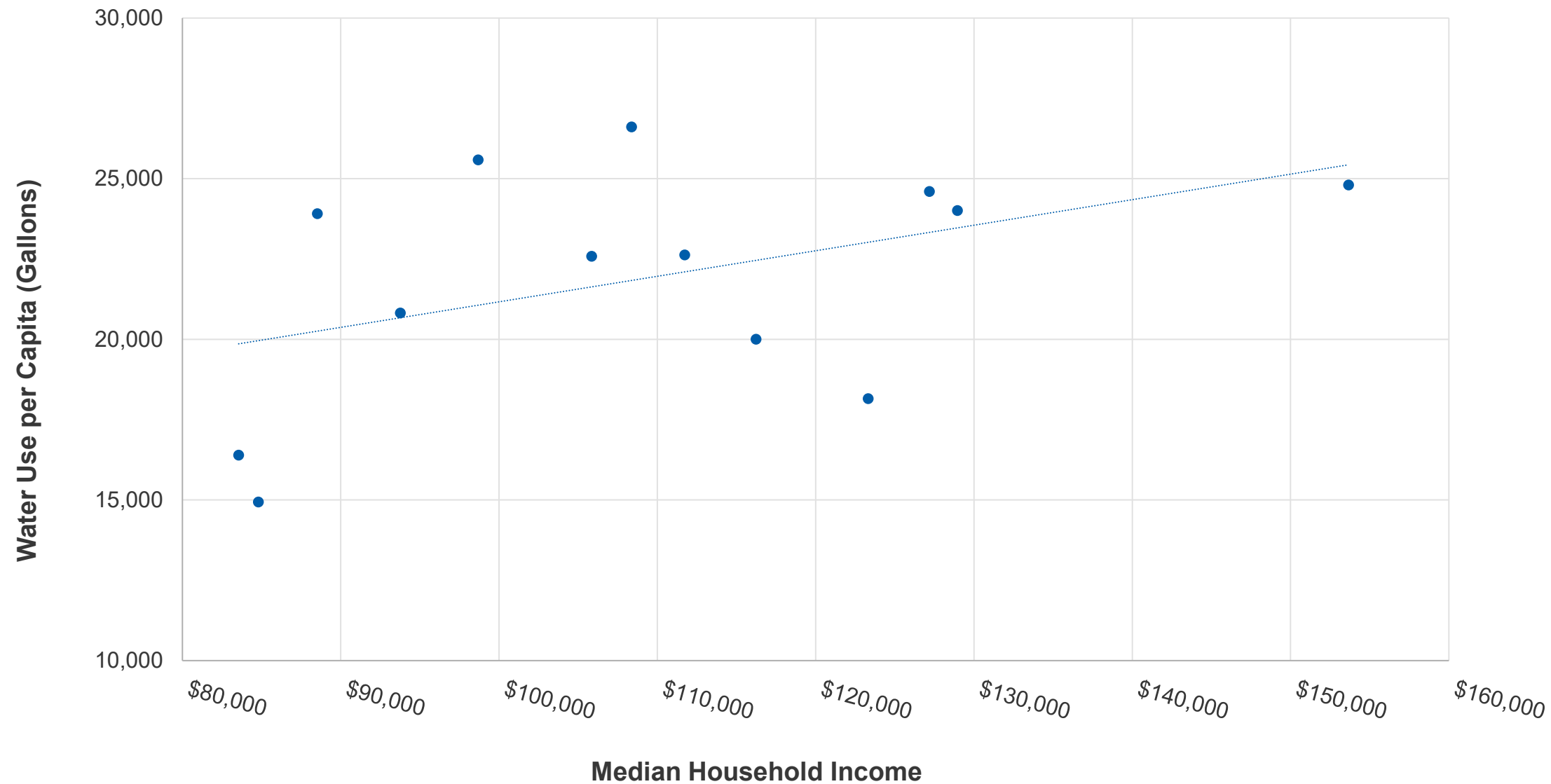
Cities who have had tier rates for less than 20 years

- Water reduction of 12%-45%
- Average water demand reduction of 29%

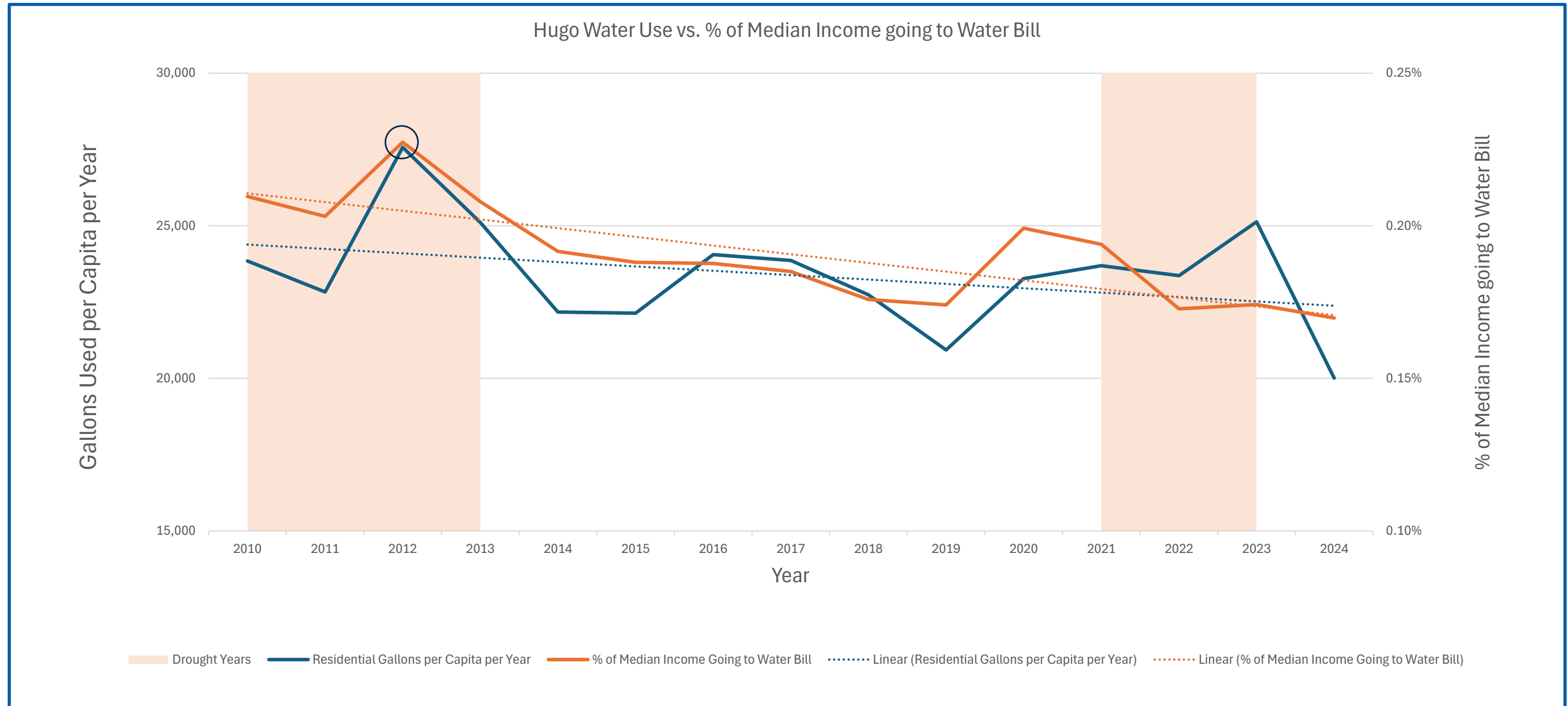
Cities who have had tier rates for more than 20 years

- Water reduction of 19%-31%
- Average water demand reduction of 28.5%

Median Household Income (MHI) vs. Water Use



Water Use vs. Water Bill as a Percentage of Median Income



Cities' Average Water Bill as a Percentage of Median Household Income

City	Median Household Income	2024 Average Water Bill as a Percentage of Median Household Income	Highest Water Bill as a Percentage of Median Household Income	Year Highest Average Water Bill Seen
White Bear Lake ^{[1][2]}	\$ 83,554.00	0.19%	0.22%	2023
North St. Paul ^[1]	\$ 84,797.00	0.32%	0.46%	2018
New Brighton	\$ 88,521.00	0.32%	0.32%	2024
Oakdale	\$ 93,772.00	0.19%	0.19%	2018, 2019, & 2024
Vadnais Heights ^[1]	\$ 98,685.00	0.18%	0.22%	2012
Stillwater ^{[1][2]}	\$ 105,853.00	0.14%	0.16%	2023
Shoreview ^[1]	\$ 108,370.00	0.24%	0.28%	2021
Woodbury ^[1]	\$ 111,734.00	0.15%	0.15%	2022 & 2024
Hugo ^[1]	\$ 116,228.00	0.17%	0.23%	2012
Mahtomedi ^[1]	\$ 123,318.00	0.20%	0.25%	2012
Lino Lakes ^{[1][2]}	\$ 127,181.00	0.18%	0.25%	2023
White Bear Township ^{[1][2]}	\$ 128,963.00	0.25%	0.30%	2023
Lake Elmo ^[1]	\$ 153,669.00	0.16%	0.36%	2012

Notes:

[1] Water use decreased in the following years after city reached the highest average water bill as a percentage of median income.

[2] Highest average water bill seen during drought year and there is not enough data following that year to indicate a trend.

Tiered Increasing Block Water Utility Rates Summary

Conclusions

- Case studies showed that introducing tiered rate structures could contribute to reduced water use
- Cities that have had tiered rates have experienced a 12-45% decrease in water usage since implementation
- Predicting potential water savings from tiered increasing block water utility rates is not possible since customer behavior and tendencies cannot be easily predicted with increased tiered rates and the decrease in water usage over time can be attributed to other factors.

Recommendations

- It is likely that additional water savings can be achieved by increasing tiered rates. Communities should consider these potential savings when studying and adjusting their water rates.
- Implement tiered increasing block water utility rates if they are not currently in place
- Pair with community education to increase effectiveness
- Affordability should be considered when estimating tipping points for tiered rates to achieve water savings

Questions