

White Bear Lake Area Comprehensive Plan Study 10

Lawn Watering Restriction Policies and
Smart Irrigation Controller Implementation

Progress Update

Presenters: Emily Schabert



April 2, 2026

Purpose of the study

- Summarize existing lawn watering restriction policies
- Review existing research
 - Lawn watering restriction policies
 - Smart irrigation system controllers
- Estimate water use reduction - lawn watering restriction policies
 - Current conditions scenario
 - 2050 development scenario
 - Ultimate development scenario
- Estimate water use reduction - smart irrigation controllers
 - Current conditions scenario
 - 2050 development scenario
 - Ultimate development scenario

Agenda

- Lawn Watering Restrictions
 - Policy types and existing city policies
 - Research on lawn watering policies
 - Estimated water savings
- Smart Irrigation Controllers
 - Overview of smart controller types and programs
 - Estimated water savings
- Monitoring and Enforcement
- Implications, Recommendations, and Conclusions

Lawn Watering Restriction Policies



Policy types

Policy	Description
Even/Odd Days	Even addresses water lawns on even days; odd addresses water on odd days
Two Days per Week	City divides into four zones. Watering allowed two days per week by zone. One weekday and one weekend day per residence. Fridays reserved for commercial watering.
Time-of-Day Restriction	Lawn watering restricted to certain hours, typically before 10:00am and after 5:00pm, to reduce evaporation loses
Even/Odd Days Combined with Time-of-Day Restriction	Follow Even/Odd days with time-of-day restrictions
Two Days per Week Combined with Time-of-Day Restriction	Follow Two Days per Week with time-of-day restrictions

Lawn watering restriction policy research

Lawn watering restrictions do not always reduce water use and can sometimes increase it. Water savings vary due to multiple influencing factors.

Combined Conservation Measures

- Measuring lawn watering restrictions alongside:
 - Public education
 - Smart controller adoption
 - Appliance rebates

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:
 - Property size
 - Landscaping
 - Irrigation practices

Policy Design & Enforcement

- Structure of restriction
 - Frequency
 - Time-of-Day
- Level of enforcement

Summary of policy impact

Restriction Type	City	Restriction Date	RGPCD Before Policy	RGPCD 10 Years After Policy	Estimated 2050 RGPCD
No Policy	North Saint Paul	No Policy	65	Not Applicable	52
Even/Odd Restriction	New Brighton	1998	79	87	63
Even/Odd & Time-of-Day Restriction	Hugo	2001	76	70	61
	Lino Lakes	2023	80	Not Applicable	64
	Mahtomedi	2009	90	78	72
	Oakdale	1995	69	82	64
	Shoreview	2005	72	74	58
	Stillwater	2023	83	Not Applicable	66
	White Bear Township	2009	96	85	77
Time-of-Day Restriction	White Bear Lake	2022	64	Not Applicable	51
Two Days per Week & Time-of-Day Restriction	Lake Elmo	2021	87	Not Applicable	70
	Vadnais Heights	2017	80	70	64
	Woodbury	2023	98	Not Applicable	78

*RGPCD – Residential Gallon Per Capita Per Day

Demand calculation methods

Delta

- Compared 2024 water use to pre-policy use; resulted in inconsistent savings predictions

Extrapolation

- Graphed annual per capita residential water usage over time and developed best fit line

Multiple Linear Regression

- Calculated regression line for periods before and after policy enactment

Median Lot Size

- Graphed annual outdoor water usage per household vs. median lot size

Minimum Use

- Average RGPCD for each city in multiple phases

Estimated water and cost savings

Restriction Type	City	20% Reduction in RGPCD	Water Service Population in 2050	Estimated Gallons Saved in 2050	Calculated Cost Savings	Water Service Population Ultimate	Estimated Gallons Ultimate	Calculated Cost Savings
No Policy	North Saint Paul	13	15,750	74,733,750	\$ 224,201	15,750	74,733,750	\$ 224,201
Even/Odd Restriction	New Brighton	16	25,000	146,000,000	\$ 438,000	25,000	146,000,000	\$ 438,000
Even/Odd & Time-of-Day Restriction	Hugo	15	21,000	114,975,000	\$ 344,925	101,054	553,270,650	\$ 1,659,812
	Lino Lakes	16	25,161	146,940,240	\$ 440,821	55,700	325,288,000	\$ 975,864
	Mahtomedi	18	10,881	71,488,170	\$ 214,465	12,506	82,164,420	\$ 246,493
	Oakdale	5	40,000	73,000,000	\$ 219,000	40,000	73,000,000	\$ 219,000
	Shoreview	14	30,079	153,703,690	\$ 461,111	36,701	187,542,110	\$ 562,626
	Stillwater	17	22,937	142,324,085	\$ 426,972	30,162	187,155,210	\$ 561,466
	White Bear Township	19	11,000	76,285,000	\$ 228,855	11,500	79,752,500	\$ 239,258
Time of Day Restriction	White Bear Lake	13	27,162	128,883,690	\$ 386,651	36,481	173,102,345	\$ 519,307
Two Days per Week & Time-of-Day Restriction	Lake Elmo	17	24,560	152,394,800	\$ 457,184	28,000	173,740,000	\$ 521,220
	Vadnais Heights	16	14,746	86,116,640	\$ 258,350	19,706	115,083,040	\$ 345,249
	Woodbury	20	110,000	803,000,000	\$ 2,409,000	110,000	803,000,000	\$ 2,409,000

Lawn water restriction policies summary

Considerations

- Policies should be tailored to each city's needs
- More restrictive policies may not always lead to increased water savings
- Dynamic policies based on weather conditions are more effective than static policies

Recommendation

- Implement a lawn watering restriction policy if there is not one currently in place
- Pair with community education to increase effectiveness

Smart Irrigation Controllers



Controller types

Technology Type	Key Findings	Typical Savings Range	Key Considerations	Applicability to White Bear Lake
Weather-Based Sensors	Provide climatic input to irrigation controllers	Moderate to High	Requires proper setup and connectivity	High
Soil Moisture Sensors	Provide soil moisture content input to irrigation controllers	Moderate to High	Sensor placement and maintenance are critical	High
Smart Controller + Sensors	Combines multiple inputs for optimization	High	Highest performance when properly configured	High
Conventional Controllers	Fixed schedules; no adaptive control	Low	Baseline condition	Existing condition

Summary of smart controller impact

Water Savings

- Vadnais Heights: 15,000 gallons/household/year
- Woodbury: 30,000 gallons/household/year

Factors Affecting Adoption

- Ease of use
- Total water bill savings
- Site-specific programming and calibration

Key Point

- Smart irrigation controllers consistently reduce outdoor water use when properly installed and targeted toward high water-use customers

Smart irrigation controller research

Minnesota DNR Conservation Reports

- Estimate 9,000 gallons saved per smart controller per year

University of Minnesota Turfgrass Science Program

- Smart controllers typically reduce outdoor water use by **29%**

Broader Research Findings

- Smart controllers typically reduce outdoor water use by **30 to 47%**

Smart irrigation controller research

Total water savings for each city were calculated using two methods:

Percentage-Based Estimate

Estimates savings of 30% of residential outdoor water use per year per controller per UMN and broader research

Conservative estimate of savings

Volume-Based Estimate

Estimates 9,000 gallons saved per year per smart controller per DNR reporting

Higher estimate of savings

Water savings calculations

Water savings were evaluated at a range of assumed adoption levels of 20%, 30%, 40%, and 50%.

Total Smart Irrigation Controller Water Savings by Development Scenario (Gallons Saved per Year)								
Percent Conversion	2025		2050		Ultimate (With Hugo 1)*		Ultimate (With Hugo 2)*	
	Low	High	Low	High	Low	High	Low	High
20%	22,910,000	39,192,000	39,391,000	42,489,000	41,041,000	44,600,000	46,023,000	50,557,000
30%	34,365,000	58,788,000	88,629,000	95,600,000	92,343,000	100,350,000	103,552,000	113,752,000
40%	45,819,000	78,384,000	118,172,000	127,467,000	123,123,000	133,801,000	138,070,000	151,670,000
50%	57,274,000	97,980,000	147,715,000	159,333,000	153,904,000	167,251,000	172,587,000	189,587,000

Cost implications

- A pilot program conducted by the City of Woodbury (2016–2018) identified cost-effective controller options, including the Rachio 3 Smart Sprinkler Controller.
 - Estimated cost range: \$170 to \$200 per controller
 - Average cost used in this study: \$185 per controller

Percent Conversion	Cost to Implement Smart Irrigation Controllers in All White Bear Lake Area Communities			
	2025	2050 Development	Ultimate Development (With Hugo 1)	Ultimate Development (With Hugo 2)
20%	\$1,046,000	\$1,137,000	\$1,192,000	\$1,351,000
30%	\$1,571,000	\$2,554,000	\$2,681,000	\$3,039,000
40%	\$2,095,000	\$3,407,000	\$3,575,000	\$4,052,000
50%	\$2,620,000	\$4,261,000	\$4,469,000	\$5,066,000

Smart irrigation controller summary

Considerations

- Savings vary by community and controller type
- Target historic over-irrigators for highest savings per dollar spent

Recommendations

- Target historic over-irrigators for implementation
- Pair with irrigation meters to quantify water savings

Questions

