Best Management Practices for Enhancing Water Use Efficiency in Minnesota Lawns

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Monticello
Monticello
Elk River
Buffalo
Coon Rapids
Maple Grove
Forest Lake
Dresser
Somerset
Stillwater
Roseville
Minneapolis
St Louis Park
St Paul
Maplewood
Hudson
Lakeland
Mound
Minnetonka
Shorewood
West St Paul
Woodbury
Afton
Edina
Richfield
Mendota Heights
Eden Prairie
Bloomington
Inver Grove Heights
Cottage Grove
Eagan
Chaska
Shakopee
Carver
Savage
Burnsville
Rosemount
Apple Valley
Prior Lake
Coates
Vermillion Highlands
Jordan
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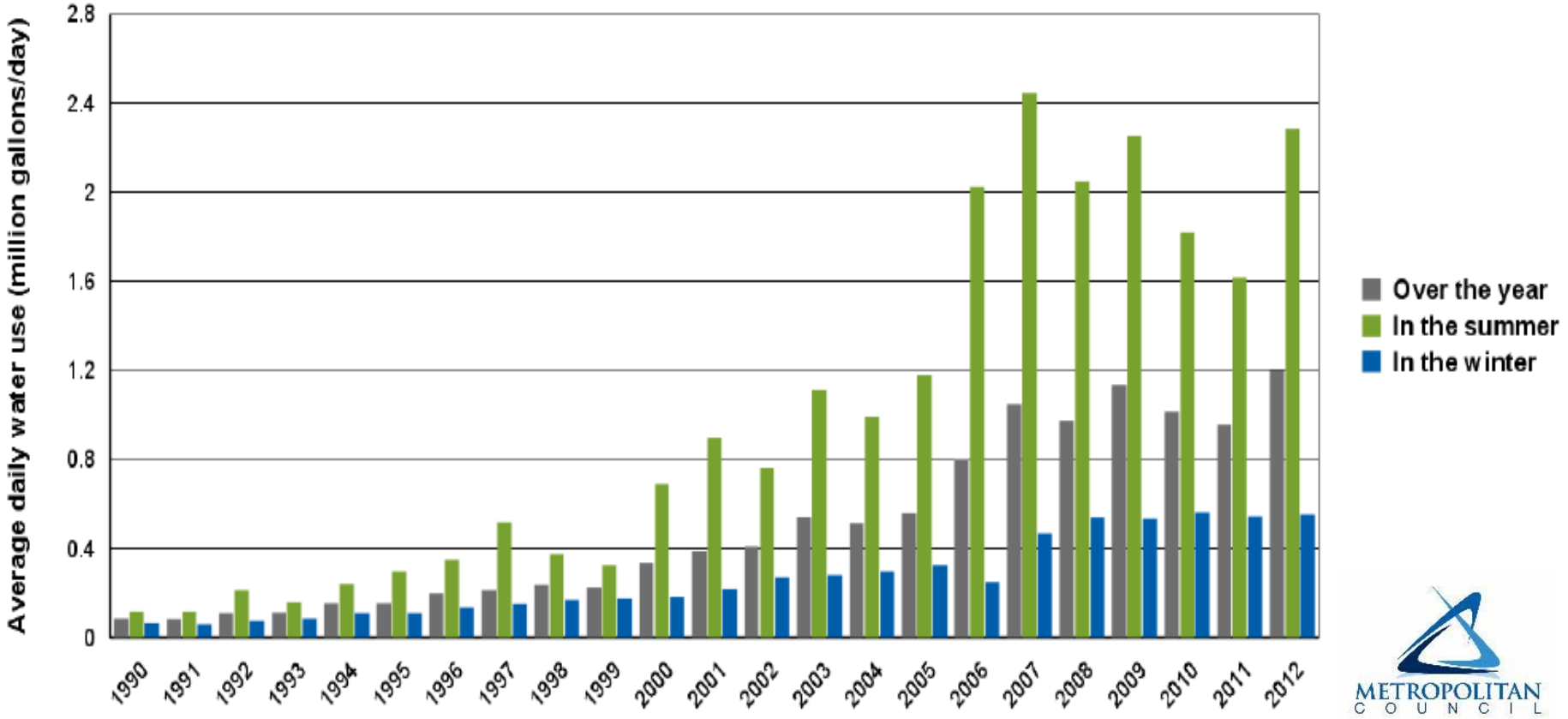
Summer Peaking Factors

Historical municipal water use in the community



METROPOLITAN COUNCIL

Potential Savings to Growing Communities

http://www.municipalwellandpump.com/welldrilling.cfm

Toro

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Irrigation Survey

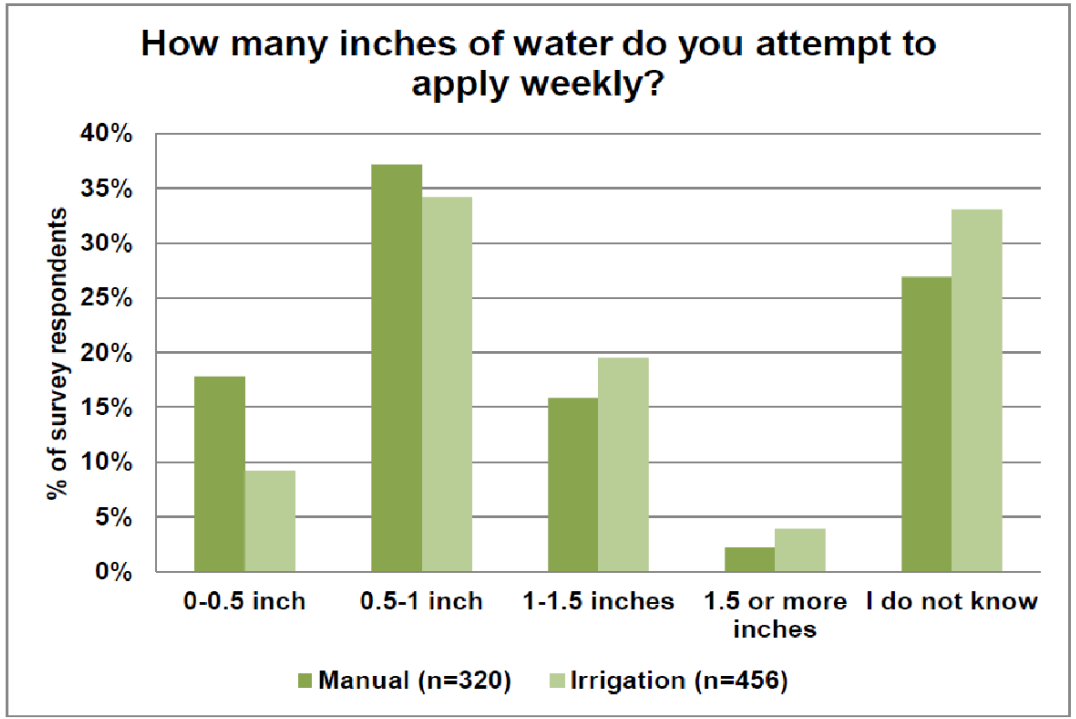


Figure 12: Inches of water applied on a weekly basis

EFFICIENT WATER USE ON TWIN CITIES LAWNS THROUGH ASSESSMENT, RESEARCH, AND DEMONSTRATION

Final Report

University of Minnesota Extension Turfgrass Science

March 2018

https://metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/Twin-Cities-Lawn-Irrigation-System-Surveys-And-Ass.aspx

Irrigation System Audits

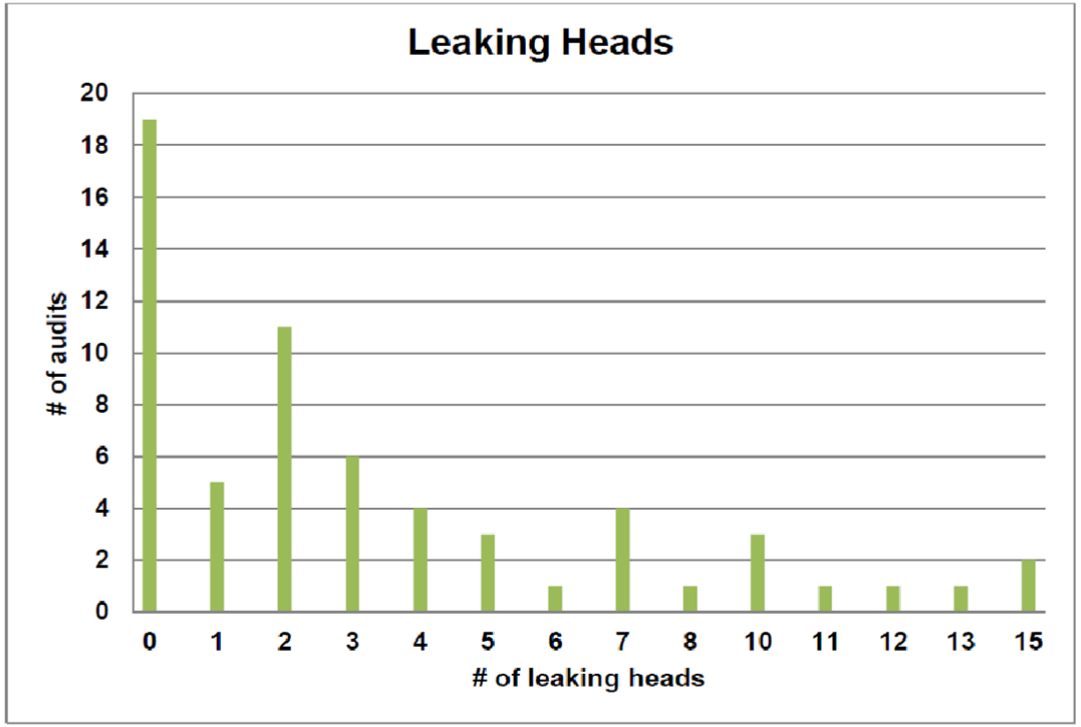


Figure 31: Distribution of leaking heads

Lawns & Irrigation

- Rising urbanization leads to competition for freshwater resources

- **Outdoor water use is visible to public**
  - Irrigation during rain
  - Irrigation runoff onto impervious surfaces
  - Broken sprinkler heads & nozzles






LOCAL

Turf war: Overwatering our lawns is sucking up our water supply

Researchers are looking at changes because current water use rates mean aquifer levels in some areas could drop more than 40 feet by 2040, according to Met Council estimates.

By **Hannah Covington** Star Tribune | AUGUST 21, 2016 — 12:15PM

ELIZABETH FLORES

Jonah Reyes, a research scientist at the University of Minnesota, placed cups on a resident's lawn in Rosemount to measure water from the irrigation system.

Getting her first $300 water bill was all it took for Hollie Jones to yank the plug on her automatic sprinkler system.

"It blew me away," said Jones, who was new to yard upkeep when she moved into her Brooklyn Park home four years ago. "I was wasting tons of water and turning my yard into a jungle."

For Jones, the decision to start running her sprinkler system on an as-needed basis made financial sense, but scientists say this kind of tweak in lawn care could yield crucial benefits in water conservation. During the summer months, water use in the metro area surges, in some places tripling compared with the amount of water pulled from rivers and aquifers in the winter. And that seasonal gap is widening.

Researchers from the Metropolitan Council and the University of Minnesota Extension suspect bad watering habits are largely to blame. So they've been

STATE + LOCAL

Overwatering lawns — and pavement — is the norm in the Twin Cities

A survey of 1,000 homeowners shows thirsty turf is sucking down the metro's water. On average, residents watered 500 square feet of pavement.

By **Josephine Marcotty** Star Tribune | OCTOBER 3, 2017 — 10:32AM

JERRY HOLT – STAR TRIBUNE

Sam Bauer, who studies lawns and grasses checked a water meter while working in the experimental growing fields at the UMN St. Paul campus Monday October 2,2017 in St. Paul, MN.

Most homeowners overwater their lawns — to say nothing of their pavement — and have a love affair with a type of grass that doesn't really belong in Minnesota.

That's the wrap-up from a survey of 1,000 Twin Cities residents conducted in an effort to reduce the pointless lawn watering that is draining the metro area's aquifers and was one of the major issues behind a legal battle over shrinking White Bear Lake.

Conducted by University of Minnesota researchers and the Metropolitan Council, the survey found that more than half of homeowners leave their sprinkling systems on the automatic cycle. That means their lawns get watered whether they need it or not.

Three-fourths of the systems had at least one leaking sprinkler head.

On average, residents watered 500 square feet of pavement — which doesn't need it and increases runoff and water pollution.

EDITORIAL

Sprinkling sidewalks: Hey, watch where you're pointing those things

Think of the waste. Think of pedestrians.

By **Editorial Board** Star Tribune | JULY 12, 2019 — 6:15PM

As Twin Cities residents who variously walk, bike, drive, and ride transit, members of the Star Tribune Editorial Board are sometimes amused, sometimes alarmed by the factions that arise in support of favored activities. We think it takes all these things to make a metro, although occasional adverse experiences with each allow us to understand how tensions originate.

Into this simmering stew we'd like to add our own flavor of peevishness — a complaint against homeowners who heedlessly water sidewalks and streets along with their lawns. Such behavior wastes a resource and, depending on the spray, antagonizes pedestrians, forcing them either to test their agility or navigate a dry perimeter, perhaps one less protected from traffic.

We do appreciate people who take care of their properties — this also makes communities desirable. We're not about to tell anyone to give up their Kentucky bluegrass, though we'd note that a lush carpet is not the only pleasing kind of lawn and that making some of it less water-intensive is worth a thought.

But, again, the pavement. It's been estimated that half the irrigation used on landscapes is ineffective. To that we'd add (without even getting into the issue of runoff) that any water trained on a nonporous surface is woefully deployed unless you're hoping one day to grow moss.

The water supply may not seem like much of a problem in our region just now. In recent months, an abundance has fallen from the sky, with consequences including flooding and delayed planting. In general, though, we're lucky to live in an area that dependably turns green in the springtime and presents only occasional, terminable droughts. But much of the world suffers more tenuous patterns of replenishment. In India, the metropolitan area around Chennai, home to 9 million people, has been watching wells run dry. In California, a multiyear drought contributed to wildfires that killed more than 100 people last fall. (If you have concerns about how human behavior might alter our own aquatic bounty, you may mentally add them here.)

So watch where you point that water. Also, it wouldn't be wrong to be aware of bicyclists and pedestrians when you drive, follow expectations no matter your mode of movement, make eye contact at intersections, and always clean your plate.

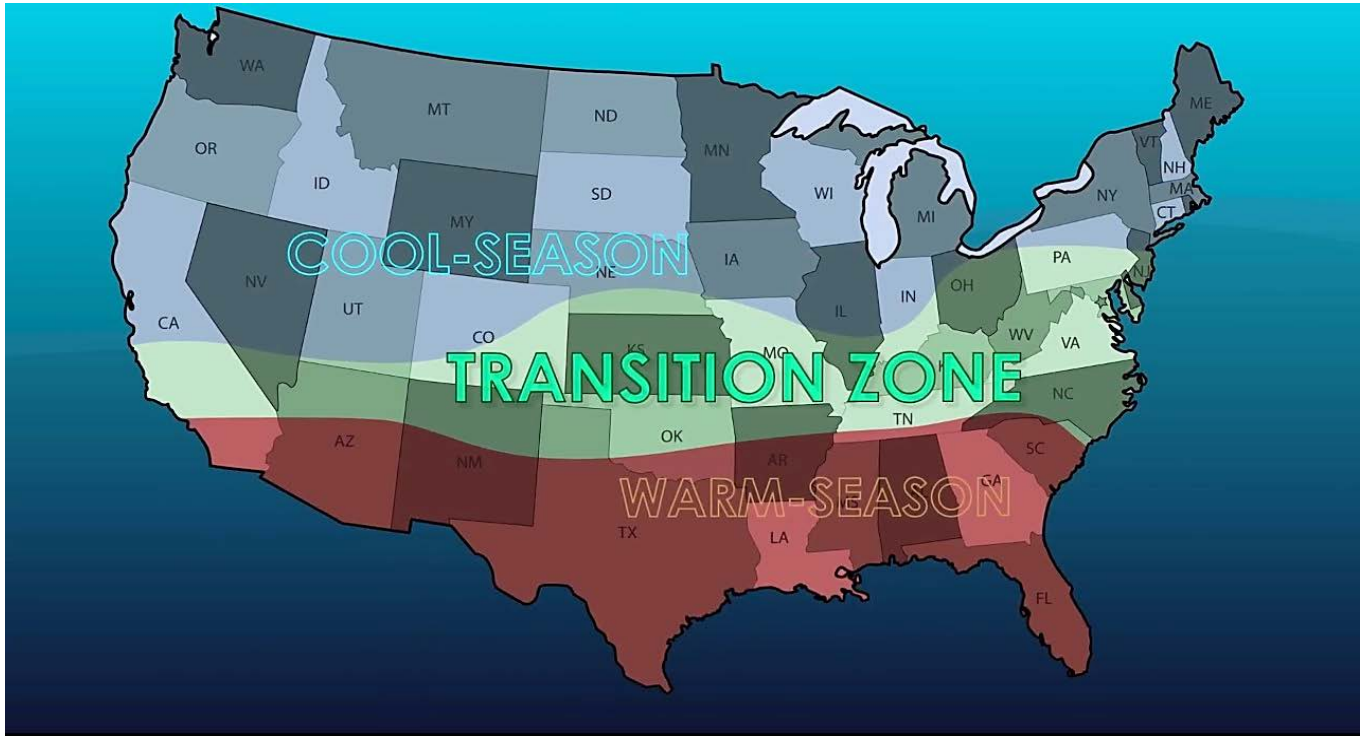
Effective Water Conservation in Lawns

Education and implementation of best management practices

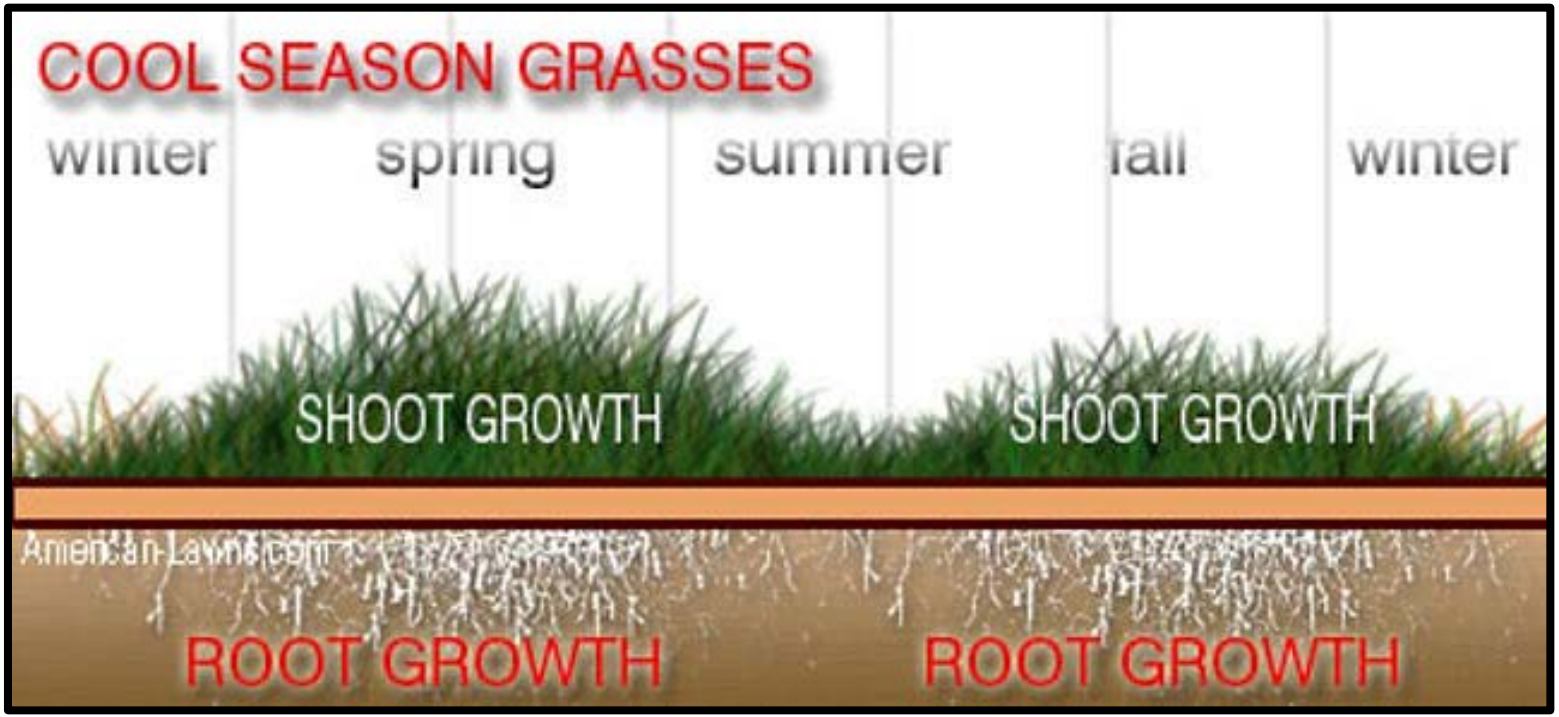
- ✔ **Proper turfgrass species** selection and using drought-resistant varieties
- ✔ **Smart Irrigation practices**: annually auditing sprinkler systems and using new technologies to increase water efficiency
- ✔ **Correctly following cultural practices**: mowing, fertilization, cultivation, pest management

NO SILVER BULLET!

Grasses in the United States



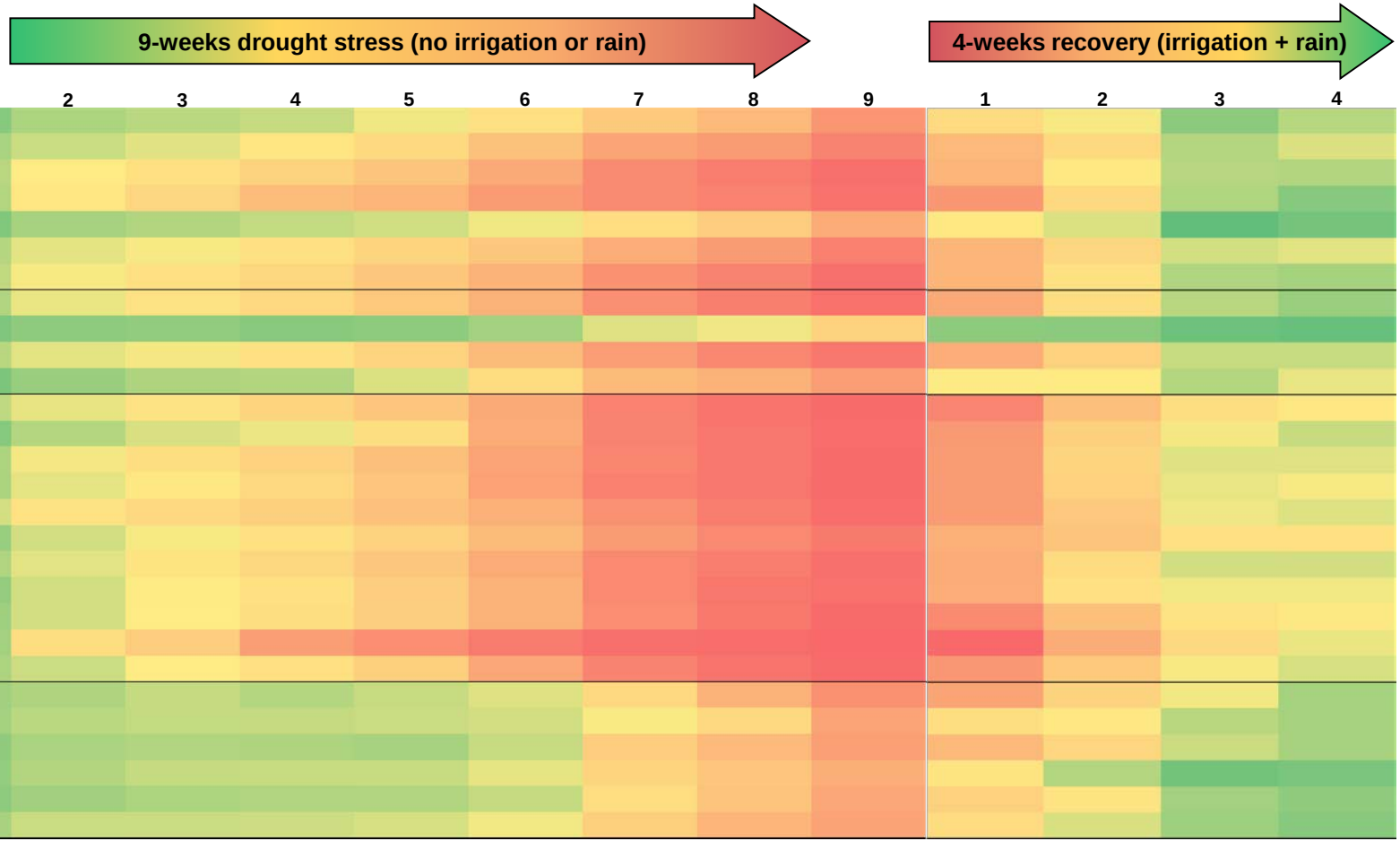
Cool Season Grasses



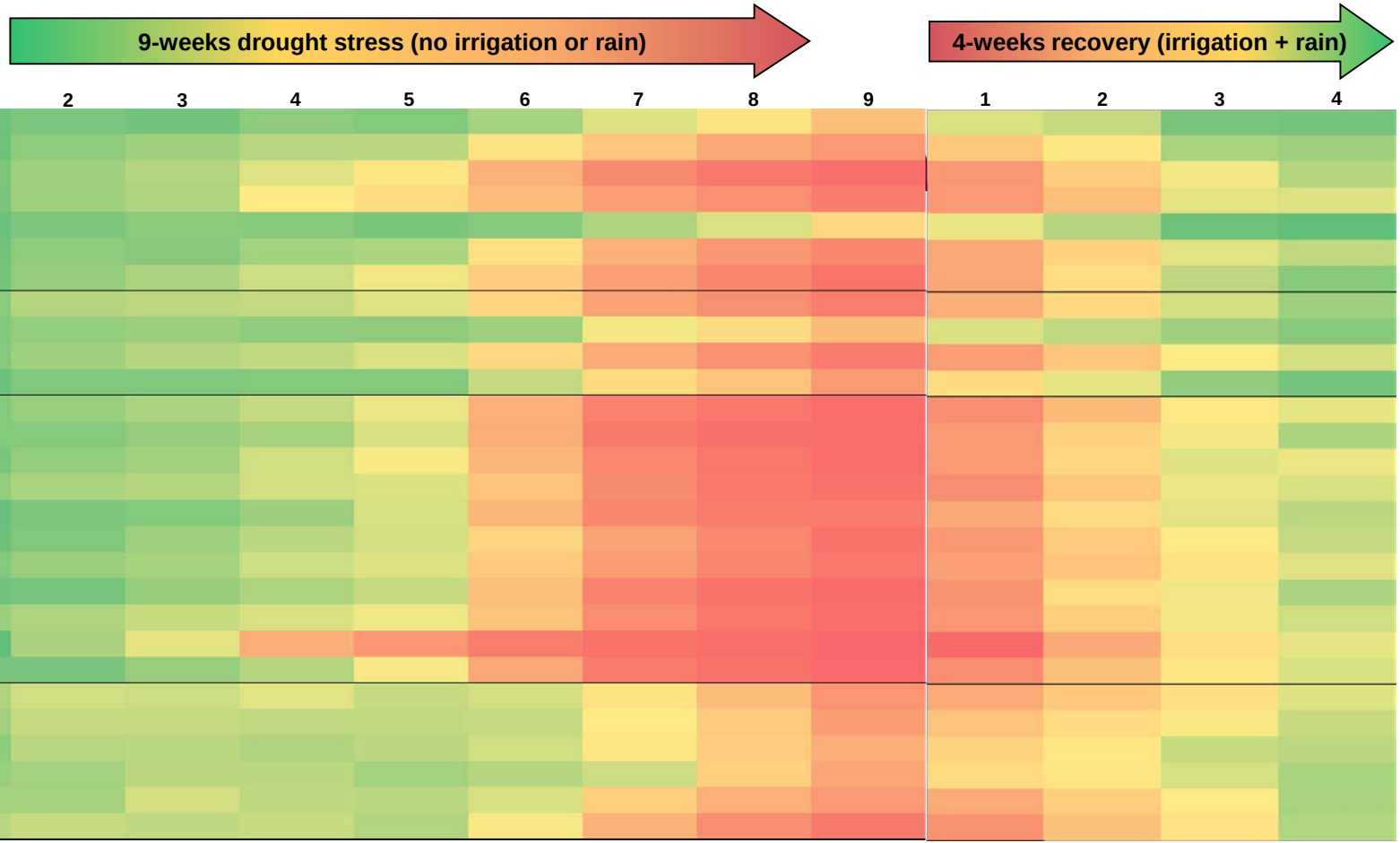
Cool-Season Turfgrasses for Minnesota Lawns

- **Perennial ryegrass**: great for quick establishment
- **Kentucky bluegrass:** traditionally-used MN lawn turf; requires routine mowing and seasonal irrigation and fertilizing
- **Tall fescue:** very drought and shade-tolerant, also high wear tolerance, lower maintenance required compared to bluegrass
- **Fine fescues**: very low-maintenance, drought and shade tolerant, very little mowing and fertilizer required

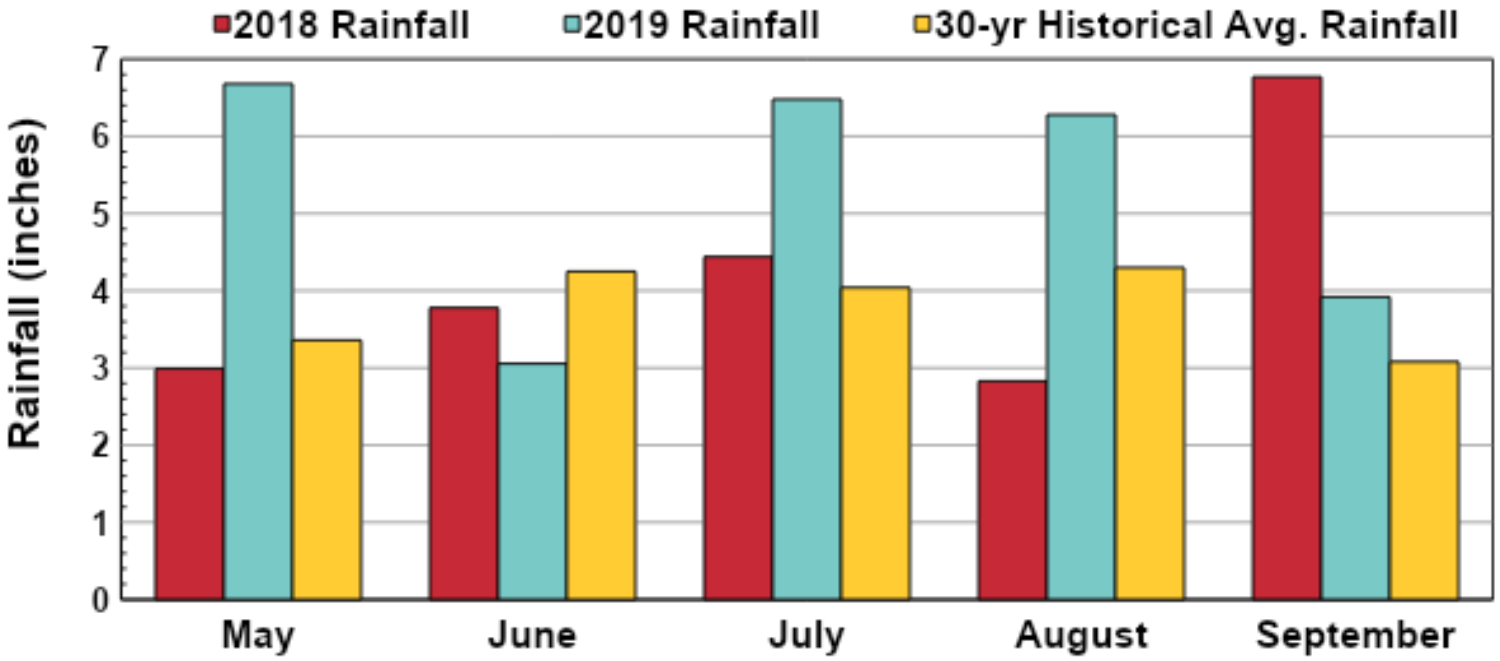
2.0-inch mowing height



3.5-inch mowing height



Is Irrigation Even Necessary?

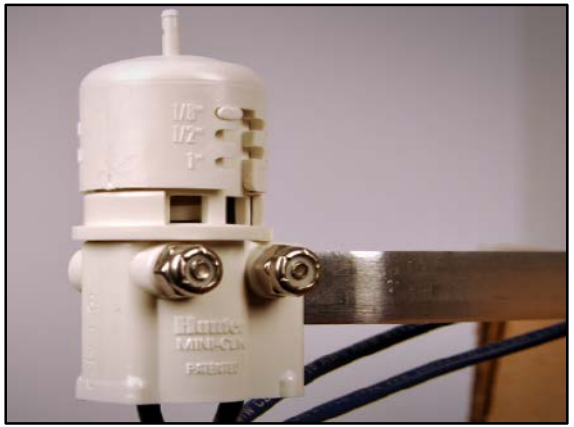


Source: GHCND:USW00014922; https://www.ncdc.noaa.gov/cdo-web/datatools/normals

Conduct and Irrigation Audit Annually

Rain Sensors

- Bypass irrigation on-demand, or using a rainfall threshold
- Hygroscopic cork discs swell upon wetting, triggering a signal to interrupt / inhibit irrigation
- Dry-out time of discs effects duration in which irrigation is bypassed
- $15 to $30



Soil Moisture Sensors

- Continuously monitor soil moisture
  - Bypass scheduled irrigation programs if plenty of water in turfgrass rootzone.
- Prevents watering when soil moisture is above a default-calibrated or user-adjustable moisture threshold
- $120 to $200


OFF
PRG
X-CORE
RUN
SENSOR BYPASS
SYSTEM OFF
CURRENT TIME/DAY
ACTIVE
MANUAL-ONE STATION
START TIMES
SOLAR-SYNC SETTINGS
RUN TIMES
SEASONAL ADJUSTMENT %
WATER DAYS
Hunter
TORO
BYPASS
MENU
PRECISION SOIL SENSOR
QUESTIONS?
Call the Toro Helpline
(877) 345-8676
www.toro.com
Irrigation Allowed
Irrigation Blocked
Current Moisture Level (%)
Indicates signal strength with
Indicates battery strength with
To adjust moisture press or

Smart Controllers

- Utilize weather data from local weather stations and/or add-on weather sensors

- Adjust runtimes based on environmental conditions
  - temperature, wind, solar radiation, humidity, rainfall

- Many work with smartphones and utilize Wi-Fi
- Cost dependent on number of zones (~$200 - $300)

Many Options

Rain Bird LNK Wi-Fi Module
+ Rain Bird Smartphone App

HC Controller with Hydrawise™

web-based software

Hunter Hydrawise +
Hydrawise Smartphone App

2018 Minnesota Statutes

103G.298 LANDSCAPE IRRIGATION SYSTEMS.

All automatically operated landscape irrigation systems shall have furnished and installed technology that inhibits or interrupts operation of the landscape irrigation system during periods of sufficient moisture. The technology must be adjustable either by the end user or the professional practitioner of landscape irrigation services.

History: *2003 c 44 s 1*

Smart Controller Study at Utah State

Smart Controllers

- Wi-fi enabled
- Emergency schedule
- Can be programmed from smart phone

Hunter Controller

- Experimental control
- Programmed according to USU extension recommendations

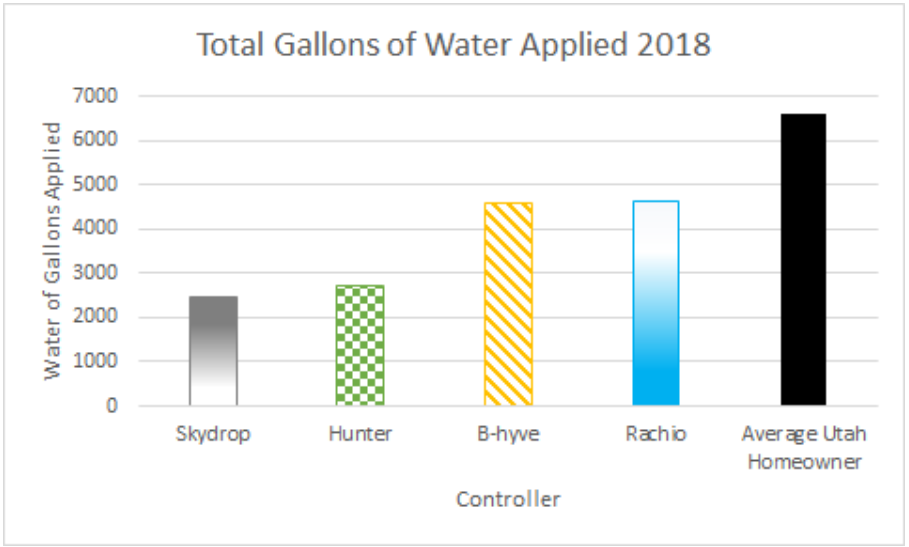
rachio

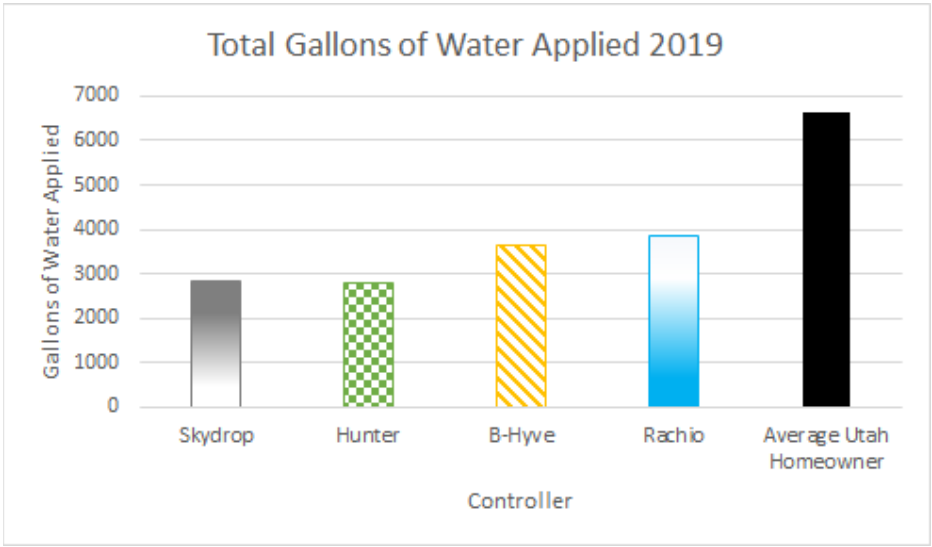
b·hyve

skydrop

Hunter
The Irrigation Innovators

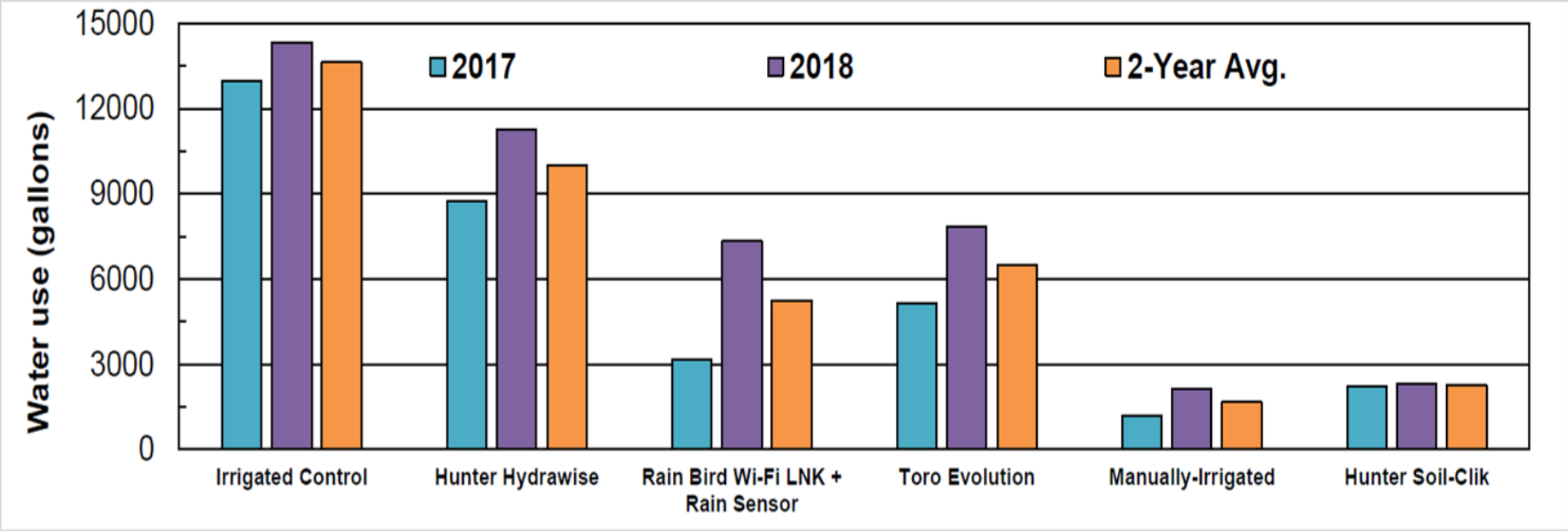
2018-2019 Irrigation Totals





https://metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/Irrigation-Systems-Demonstration-Project.aspx

Experiment Results



Smart Irrigation Research Study

- Traditional odd/even irrigation
- Rain sensor
- Smart controllers
- Soil moisture sensor
- Non-irrigated turfgrass
- Low-input turfgrass species

Minnesota Landscape
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Thank you!

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  - https://lowinputturf.umn.edu
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  - https://metrocouncil.org/Wastewater-Water/Planning/Water-Supply-Planning/Studies-Projects-Workgroups-(1)/Ongoing-Studies-Projects/Twin-Cities-Lawn-Irrigation-Efficiency-Study.aspx