

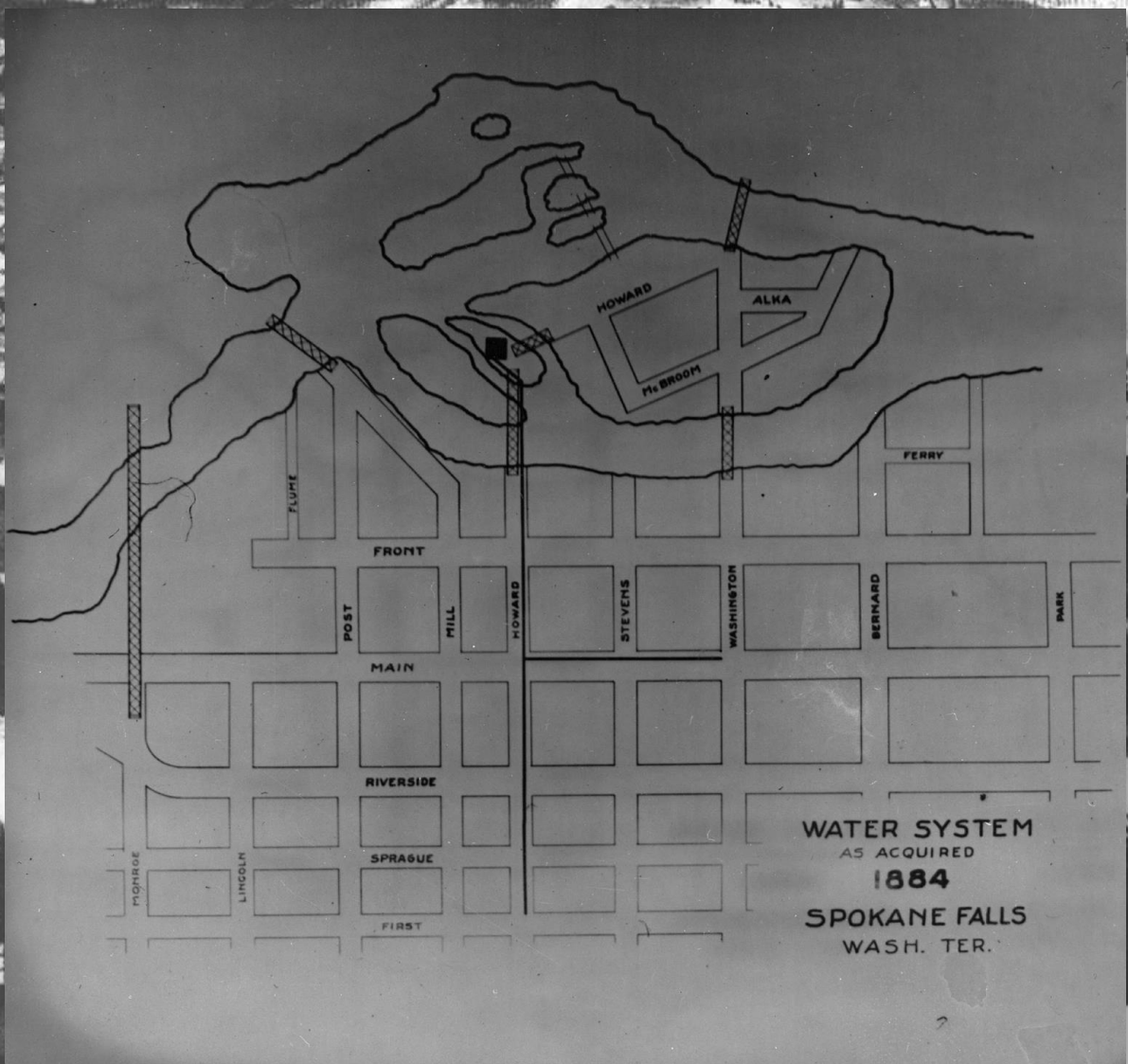
FLOW-WARD BOUND: MAKING WAVES WITH RESIDENTIAL AUDITS

WILL RETTIG

Water Efficiency Specialist

City of Spokane Water Department





WEST SIDE OF HOWARD-STREET.



NORTH-SIDE OF RIVERSIDE-AVE.

BIRD'S EYE VIEW OF
SPOKANE FALLS, W.T.

1884

NO. CHURCH AND SIBOGA.
 1-Congregational Church.
 16-Sprague House, Wm. Kaiser, prop.
 18-California House.
 20-Northern Pacific House, J. M. Grimmer, prop.

SPokane references.
 J. J. Brown, Attorney, Riverside ave.
 J. T. McArthur, Investor and Real Estate Dealer, How-
 ard st.
 Davis & Hale, Attorneys, Howard st.

Chas. A. Webster, Real Estate and Mill Broker, West
 side ave.
 S. J. Holland, Wholesale Liquors, Brown's Block, River-
 side ave.
 W. M. Wacosten, Hardware, Riverside ave. cor. Mill st.



1894 UPRIVER DAM & PUMPING STATION

WELL 1 – 1907

Depth: 40ft

Diameter: 28ft

Capacity: 56 mg/day



SOURCE UNKNOWN

SPOKANE'S WATER SUPPLY DRAWN FROM DEEP WELLS

Purified by Running Through Gravel of Valley—Source Unknown.

408 miles of water main.
56,502,300 gallons maximum pumpage.
20,690,000 gallons minimum pumpage.
85,500,000 gallons capacity.

Two Spokane rivers flow through Spokane.

One rushes and tumbles over the falls to make electricity for the entire Inland Empire, and sights for the tourists.

The other flows uninterrupted through the mains of the city water system, clear, cold and sparkling, to quench the thirst of the citizens of Spokane, and keep the lawns green.

When Spokane needed water for drinking purposes, back in the '80s, and the Spokane river became a rather questionable source, the members of the water division went hunting, and found a spot five miles east of town, near the river, that looked as if it might produce drinking water.

First Unit in 1894.

In 1894, the first unit of the present water system was built at Upriver. The dam, which furnishes hy-

draulic power for the pumping ton, was constructed then, a 10,000,000-gallon plant was drawing water from the river.

Reservoirs were the next question for it was necessary to have a large area. In 1907 the first well sunk, at Upriver, and since time no river water has through the city plant. Two additional wells were added with short time, and the system enlarged.

The next addition was an electric power unit that added materially the daily capacity of the plant, wells, and what is known as a "well station," were added in with electrically-operated machinery within the wells. The present daily capacity of 85,500,000 gallons was the result.

The source of the water, which far has proved unlimited, is a matter of conjecture. But its purity has been declared the best that can be secured from natural sources. It filters into the wells from gravel subsoil of the valley, during the night of the day, to the claim "Pure, but not filtered." The temperature of the water, which is constant at 45 degrees Fahrenheit, summer and winter, makes it exceptional drinking water.

Wells Kept Pure.

Concrete housing over the wells and an elaborate system of drain-

SPOKANE WATER IS FROM WELLS

Supply Unlimited

"Water is important to any community not only for fire protection and for domestic use but it is also important in attracting industries," Arend said. "An unlimited supply of pure water accounts, in part, for the location in the Spokane valley of the Inland Empire Paper company's mill and the aluminum rolling mill at Trentwood and other industries. The water supply is one of the first things prospective industries inquire about."

"The cost of tapping these sources in this area is slight, compared to the hundreds of millions of dollars that have been spent to bring water 350 miles to supply Los Angeles and other cities in that part of California," said Arend. "In listing the advantages of Spokane and the Inland Empire as a place to live and to develop industries we should not overlook this tremendous asset."

7/27/1948

Evening newspaper in 40,000 homes. 11/10/1933

SPOKANE WATER SUPPLY TOO PURE

Spokane's water supply is too pure."

This was the statement today of Ralph Hendricks, commissioner of public affairs, in explaining the strong objection of chlorine in city water.

All cities that use surface water—most of them do—are forced to deal with chlorine," Dr. Hendricks said.

"Impure water containing organic matter absorbs chlorine so it is not tasted. Water such as comes from Spokane's well, containing no organic matter, gives a much stronger objection of chlorine because it is not absorbed."

As far as taste is concerned, people would be better satisfied if we turned the Spokane river into the wells. Organic impurities would absorb the chlorine."

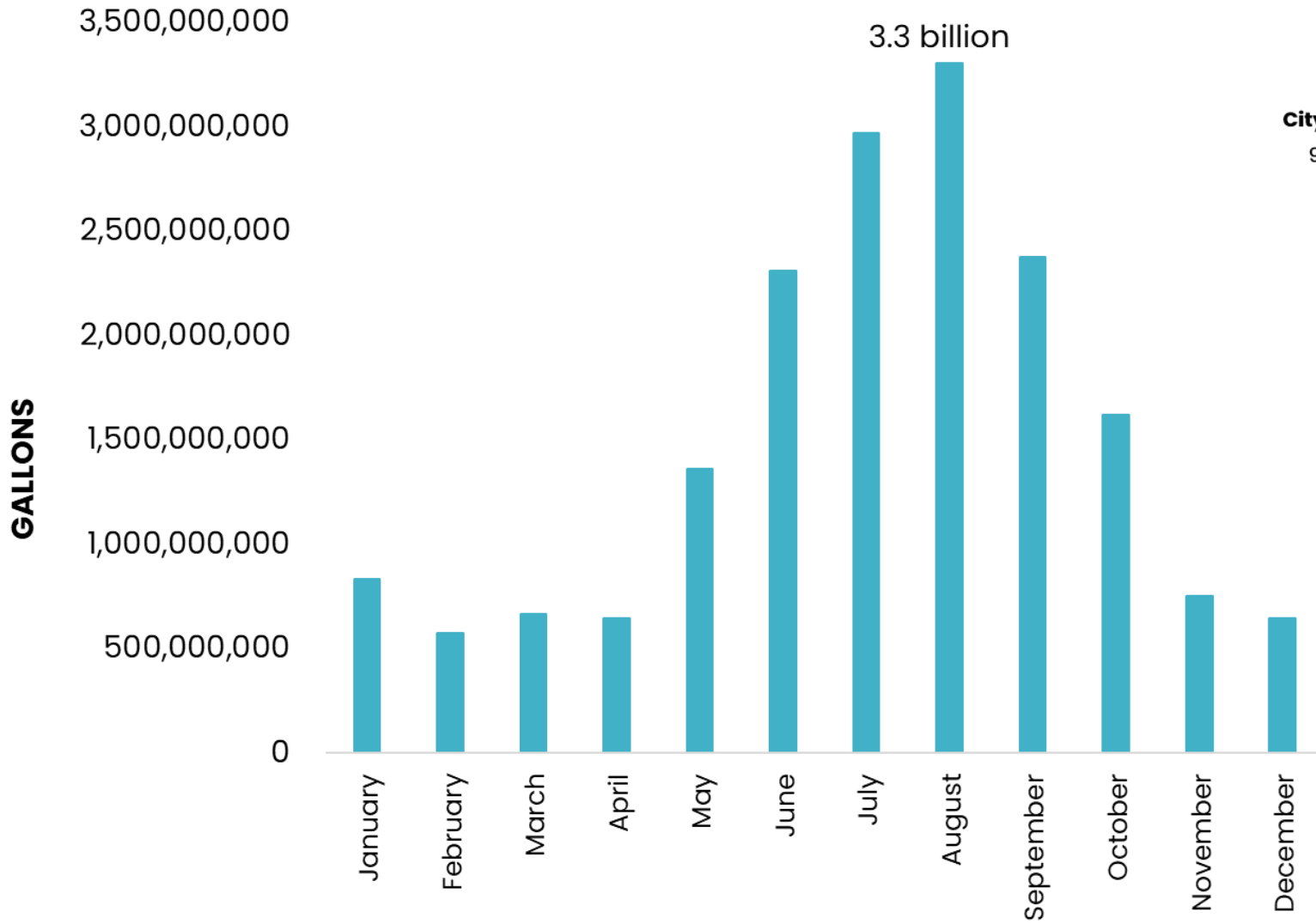
3/23/36 Spokane Daily Chronicle

TODAY'S WATER SYSTEM

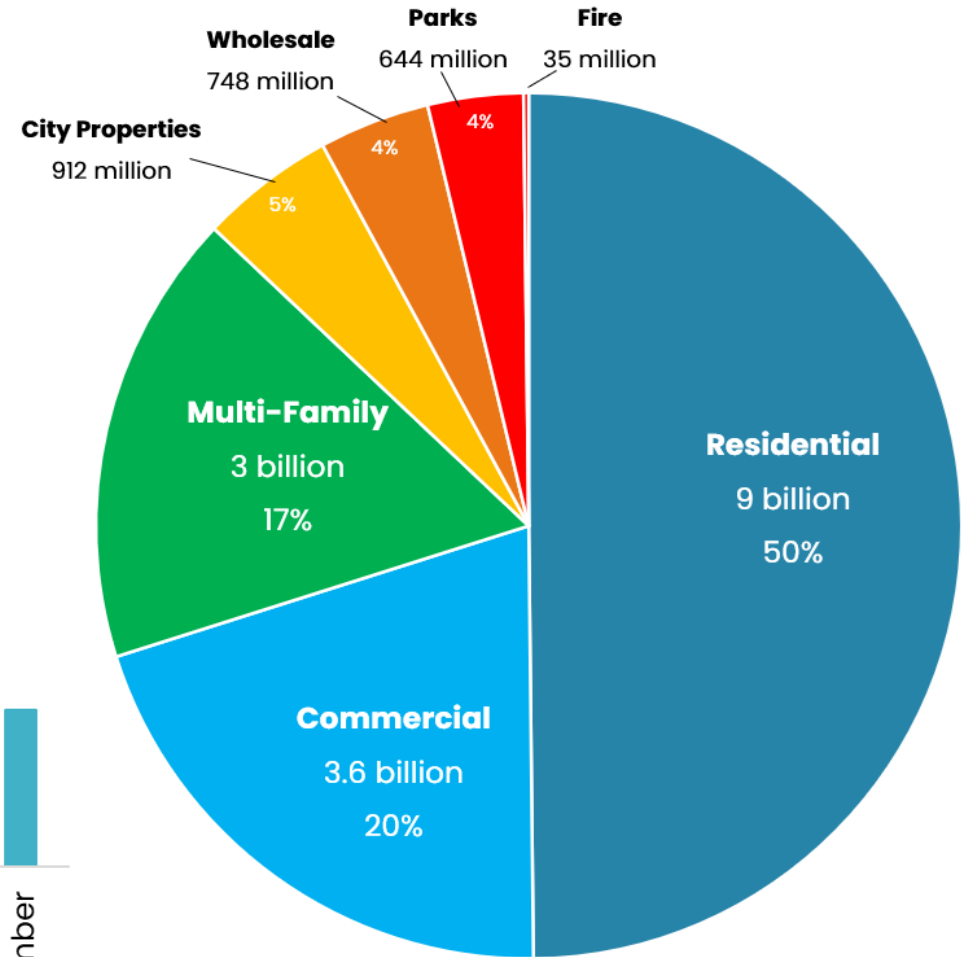


2023 Consumption Review

Gallons Sold by Month

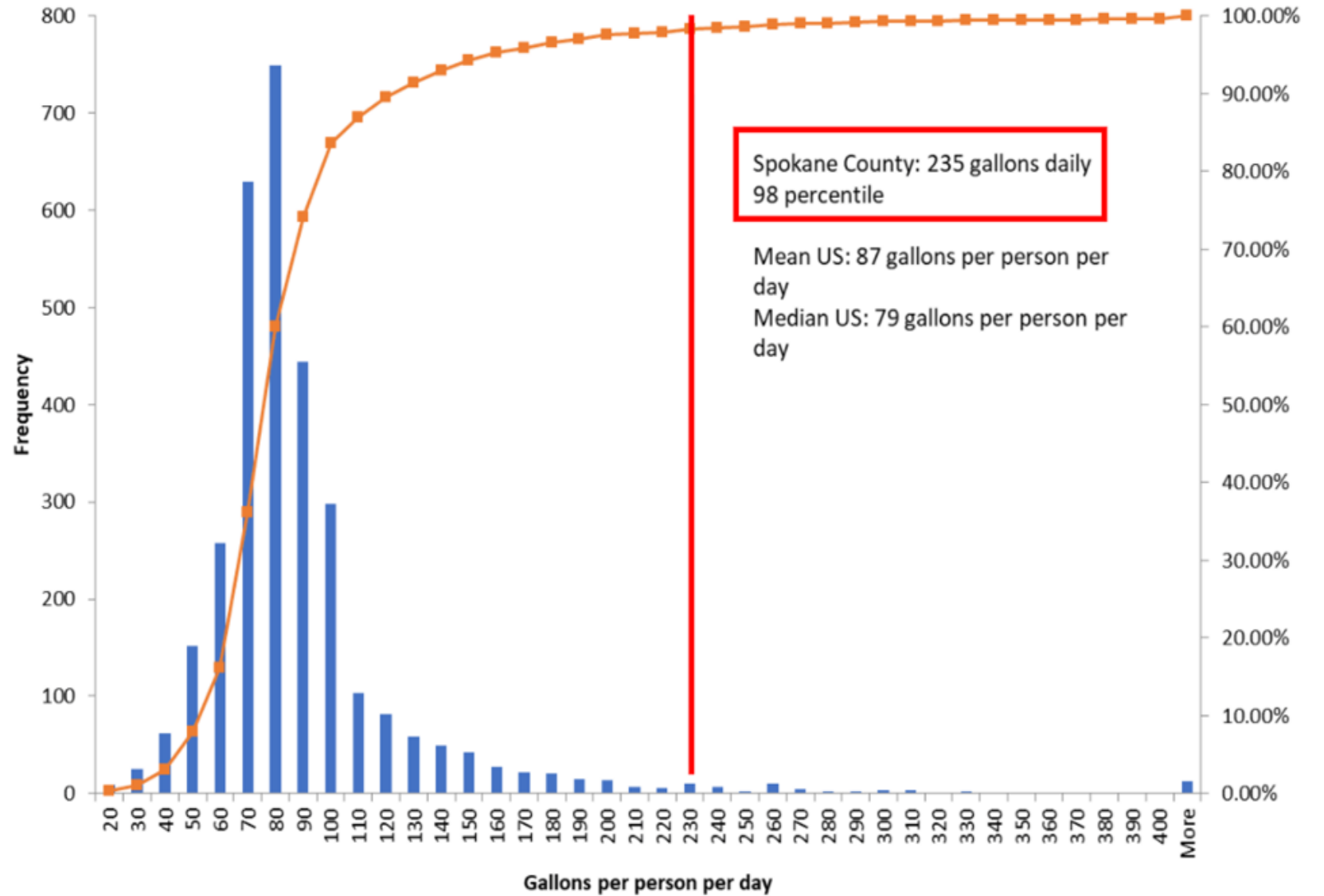


2023 Purchased Water By Customer Class



WHY SAVE WATER?

US Publically Supplied Ground Water per capita, by county, 2015



Source: Version 2.0: Dieter, C.A., Linsey, K.S., Caldwell, R.R., Harris, M.A., Ivahnenko, T.I., Lovelace, J.K., Maupin, M.A., and Barber, N.L., 2018, Estimated use of water in the United States county-level data for 2015 (ver. 2.0, June 2018): U.S. Geological Survey data release, <https://doi.org/10.5066/F7TB15V5>.

Water Use in the City of Spokane

Outdoor watering of lawns and gardens makes up approximately 83% of average home water use in Spokane.

Where Do We Use Water The Most?



Data is representative of average consumption; your water use may vary.

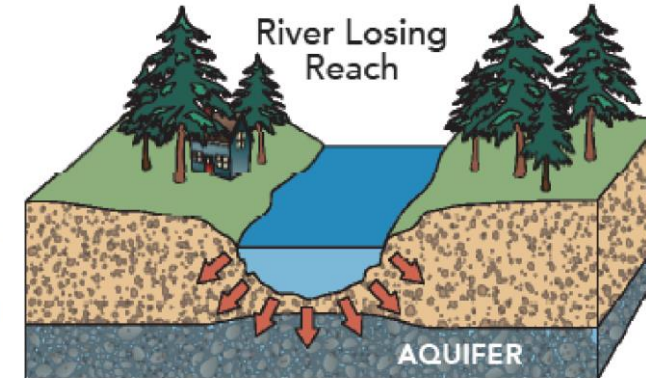
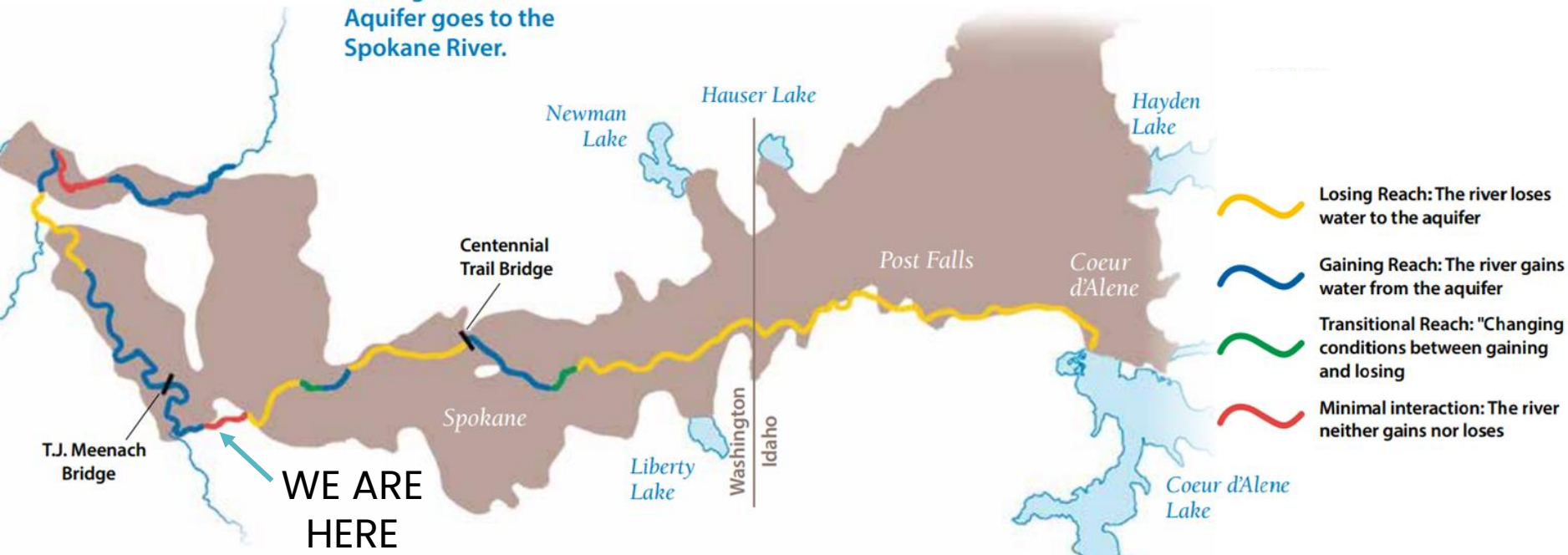
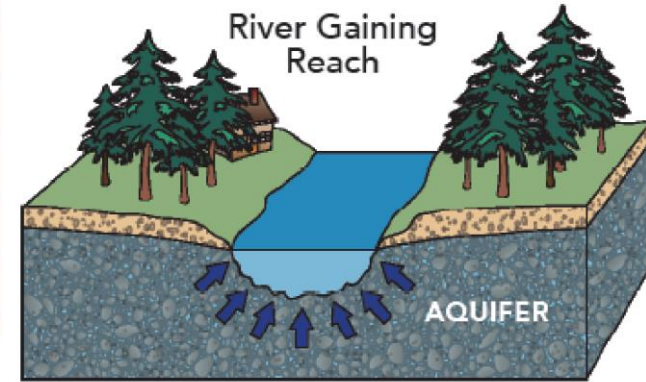
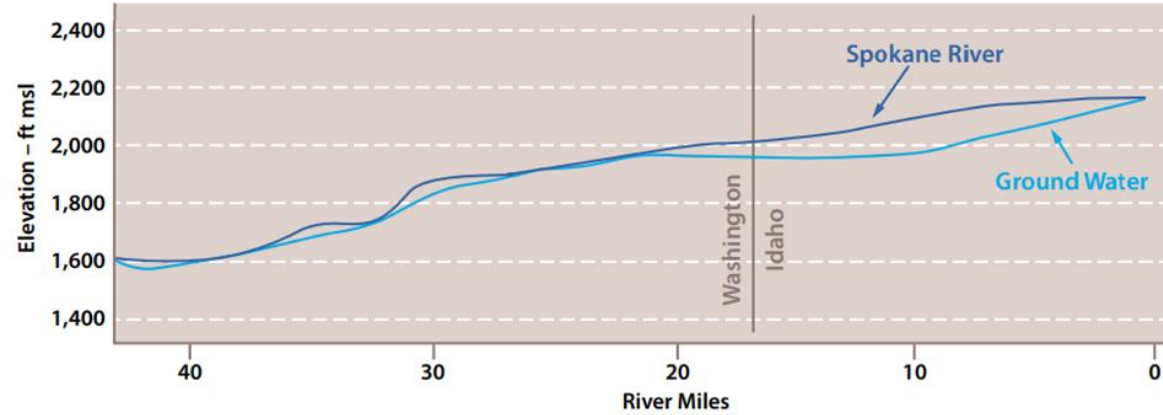




THE RIVER-AQUIFER CONNECTION



The Spokane River is the largest source of water to the SVRP Aquifer and most water leaving the SVRP Aquifer goes to the Spokane River.





Customer Name: Click or tap here to enter text.
 Billing Number: Click or tap here to enter text.
 Consultation Type: Indoor Outdoor Both
 Leak Detection
 High Usage
 Water Efficiency

Recommendations

<p>Repairs:</p> <ul style="list-style-type: none"> Replace damaged sprinkler body Raise buried heads Replace drip (Zone 9) Cap extra heads 	<p>Retrofit:</p> <ol style="list-style-type: none"> Convert all garden beds to drip irrigation or high efficiency rotary nozzles Smart Weather-Based Irrigation Controller Extend 29 drip irrigation to cover shrubs/bushes where impact rotor is.
---	--

Do a visual inspection 1-2 times a month. Running your system after you mow is a great time to look for leaks and breaks. The "Seasonal Adjustment" or "Special Features" setting on your controller is great way to change your runtimes without having to manually change each zone. You can reduce or increase your runtimes by changing the percentage of your current program's runtimes.

If runtime for a zone is 30 minutes, these are examples of the changes you're making using the Seasonal Adjustment. Adjustment at 100% = 30 min, Seasonal adjustment at 50% = 15 min, Seasonal Adjustment at 150% = 45 min

Recommended watering frequency:
 Watering more frequently than every other day decreases soil fertility and inhibits plant growth.

per week at	May/June: 3 days per week at most OR 75% seasonal adjustment	July/Aug: 4 days per week at most OR 100% seasonal adjustment	Sep/Oct: 3 days per week at most OR 75% seasonal adjustment
-------------	--	---	---

SAVE THE PLANET! CLICK ON THE ICON OR CHECK OUR FULL REBATE MENU HERE.

<p>Smart Irrigation Controller Enabled automation that adjusts runtimes up to \$100 credit.</p>	<p>Rotary Nozzles EPA WaterSense® Certified high efficiency rotary nozzles. Up to \$200 credit.</p>	<p>Spray No-Drip Conversion Replace existing standard spray irrigation with drip irrigation. Up to \$200 credit.</p>	<p>Smart Water Monitors Purchase a Flume and get real-time water monitoring and leak detection delivered to your smartphone. \$24 + tax and shipping.</p>	<p>Toilets (Flurinds) EPA WaterSense® Certified 0.8 gallons per flush toilet or less. Up to \$100 credit.</p>
--	--	---	--	--

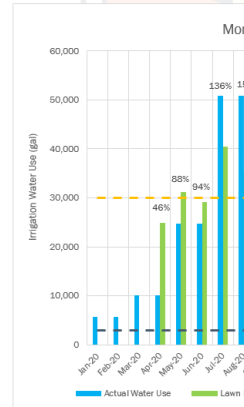
Repeat once per year, and reapply the following year.

Water Usage Graph

This graph shows the changes in your water consumption your calculated lawn needs as well as how to provide you with a baseline.

In Spokane, residents average 2,000 to 3,000 gallons per month during the summer. That's 10x more water than during the winter months.

- Blue Bars:** The blue bars show how much water you actually used.
- Green Bars:** The green bar shows the monthly lawn water needs.
- Orange Dotted Line:** This is Spokane's average monthly water usage.
- Dark Blue Dotted Line:** This line represents the average winter usage (Dec, Jan, Feb).



Indoor and Outdoor Water Audits

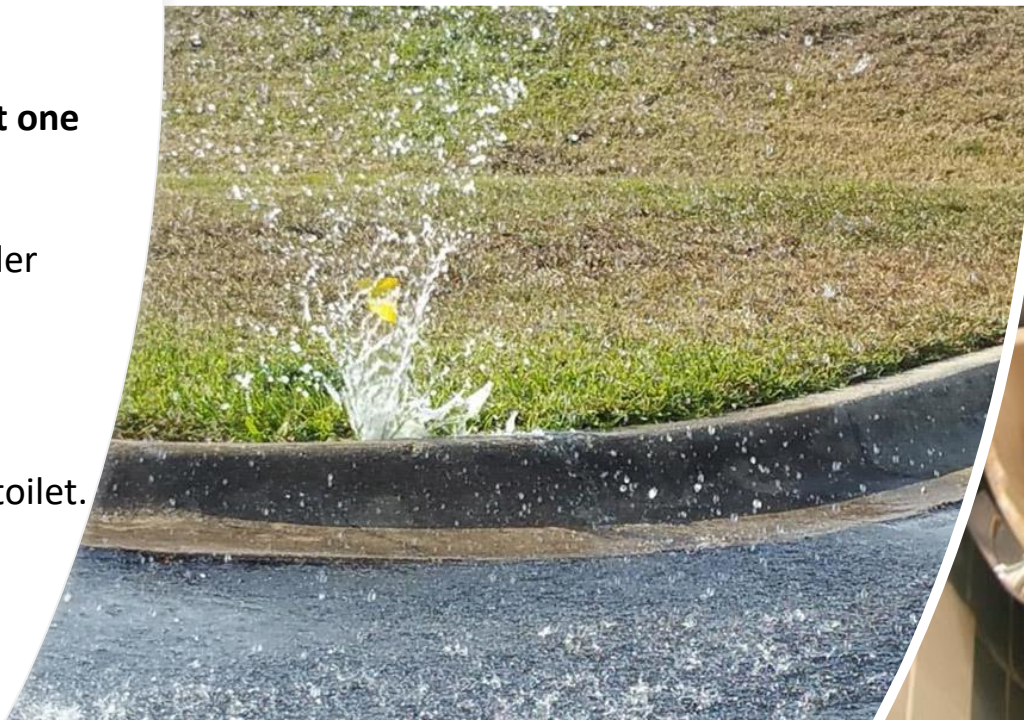
1:1 consults

- Finding leaks or breaks
- Adjust irrigation
- Recommending upgrade
- Habit changing, etc.

236 inspections from 2022 & 2023.

Almost all the properties had at least one of the following issues:

- Overwatering
- Watering hardscape, sprinkler adjustments,
- Irrigation break or leak
- Inefficient and out-of-date fixtures
- Leaking fixtures, or leaking toilet.



**Sign up for a FREE Water Wise
irrigation consult today!
Your technician will:**

- Locate leaks and breaks
- Program complicated controllers
- Adjust watering schedules for optimal plant health



BEFORE

THE WATER WISE SPOKANE TEAM LOCATED BROKEN
SPRINKLER HEADS AND LOWERED THE WATERING TIMES.



AFTER

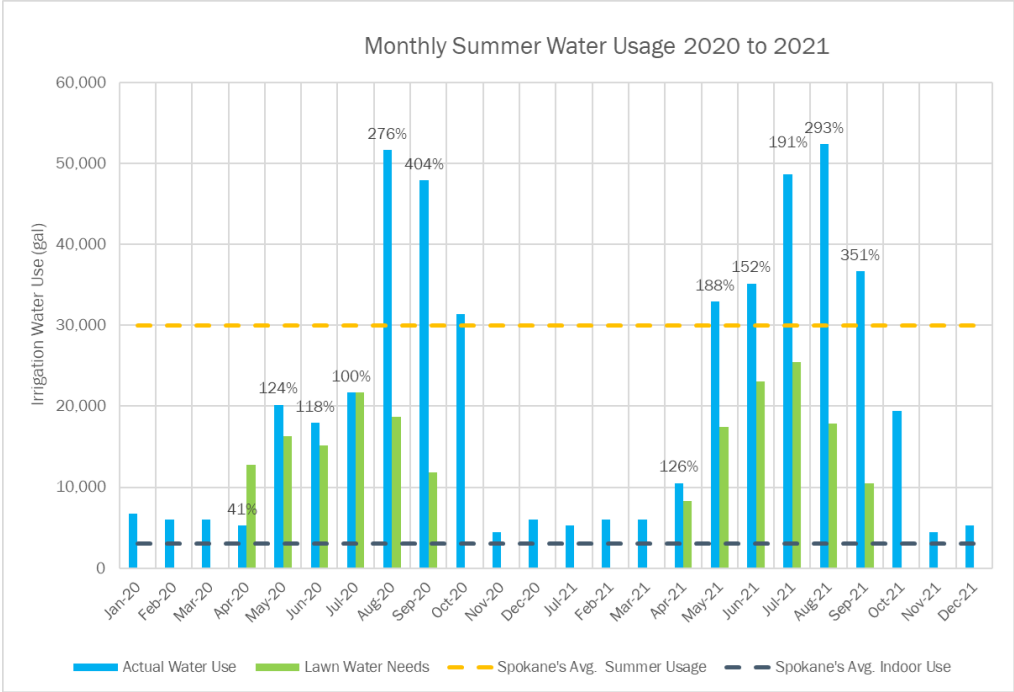
AFTER THE CONSULT- THE GRASS IS MUCH GREENER,
HEALTHIER AND USES HALF THE WATER AS BEFORE!

Water Audits Inspection Process

1. Pre-Inspection Prep.



2. Audit



3. Post-Inspection Report

Payback Projects

Smart Irrigation Controller

Current Annual Use:	113,000.0 Gallons
Current Annual Cost:	\$ 238.7
Savings Potential:	20.0%
Annual Water Savings:	22,600.0 Gallons
Avoided Cost:	\$ 47.7
Project Cost:	\$ 150.0
Rebate Amount:	\$ 100.0
Other Savings:	\$ 0.0
Payback Period:	1.0 Years
Notes:	

Location:

Issue #2 - Zone 8

Condition: Defective

Technology: Sprayhead

Notes: Damaged. Leaking. nozzle or sprinkler body replace

Photos:



Pre-Inspection Preparation

1. Measure Landscape Area



2. Create Water Budget

Water Need - Values in Thousands of Gallons

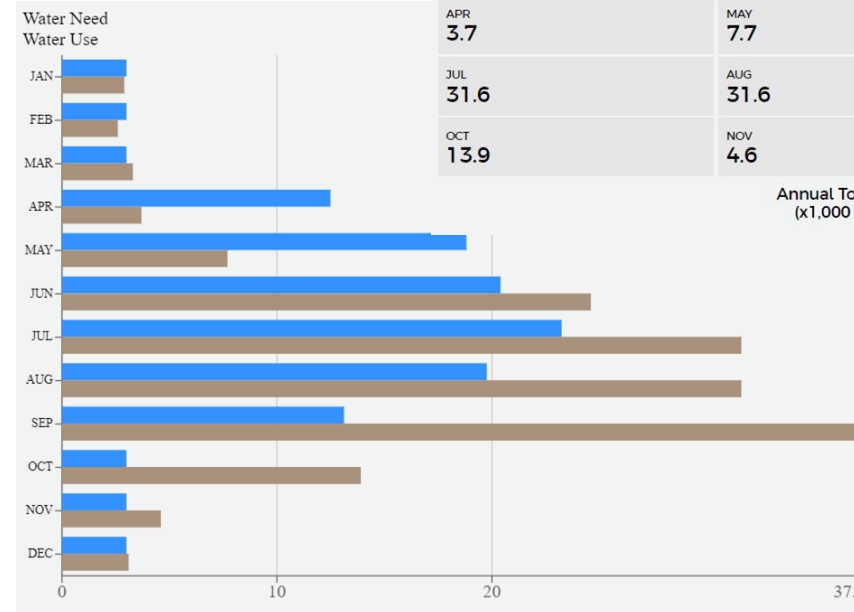
JAN 3	FEB 3	MAR 3
APR 12.49	MAY 18.81	JUN 20.4
JUL 23.24	AUG 19.76	SEP 13.12
OCT 3	NOV 3	DEC 3

Annual Total = 125.82
(x1,000 Gallons)

Water Use - Values in Thousands of Gallons

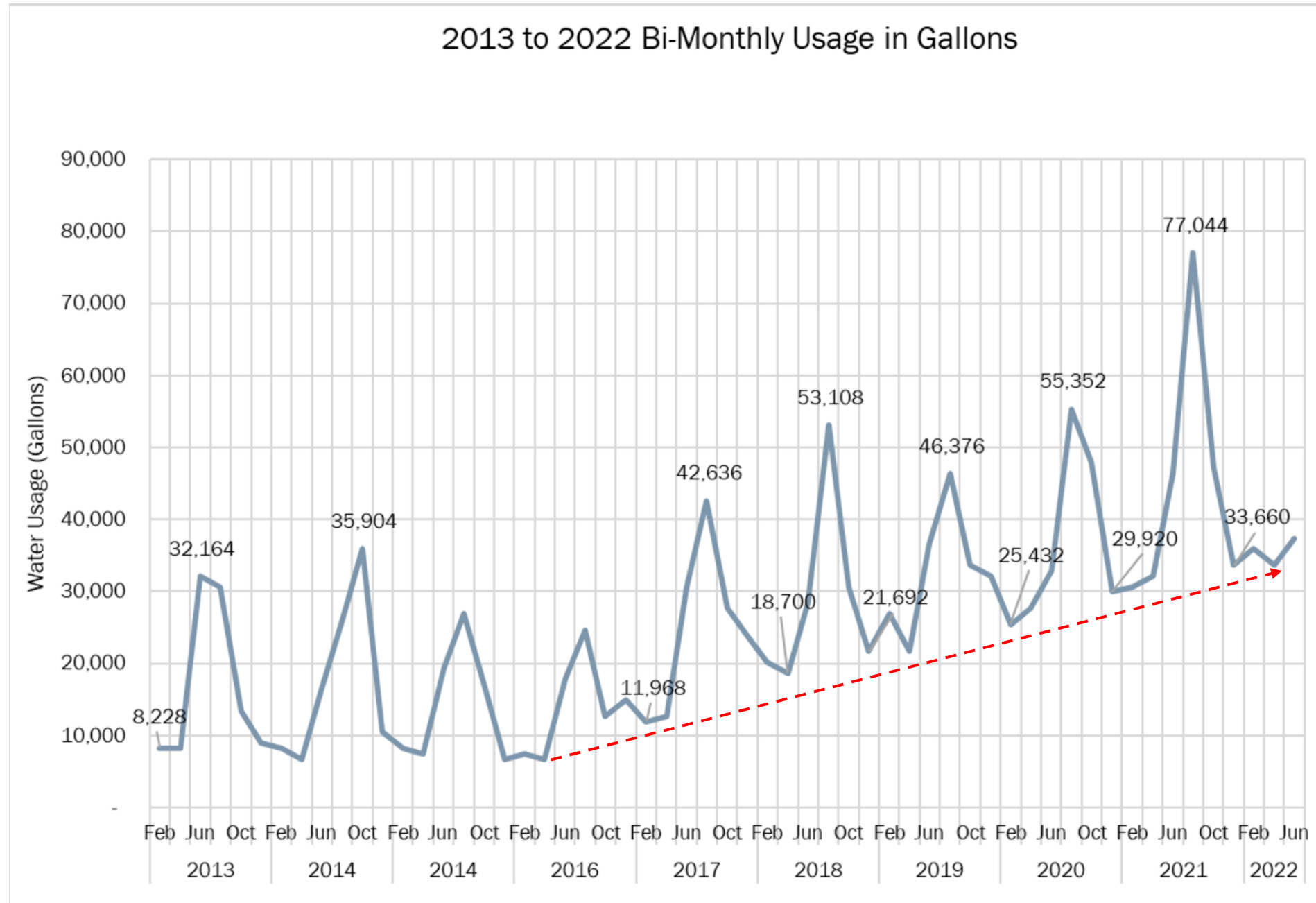
JAN 2.9	FEB 2.6	MAR 3.3
APR 3.7	MAY 7.7	JUN 24.6
JUL 31.6	AUG 31.6	SEP 37.1
OCT 13.9	NOV 4.6	DEC 3.1

Annual Total = 166.7
(x1,000 Gallons)



Identify Major Issues

- Save Money
- Save Water
- Asset Protection



PLANT SCIENCE & WATER BUDGETS

- Focus on efficiency rating as opposed to gallons used.

Total Turfgrass
Evapotranspiration
For Billed Cycle

$\frac{\text{Crop Coefficient}}{\text{Assumed Irrigation Efficiency (60-70%)}}$

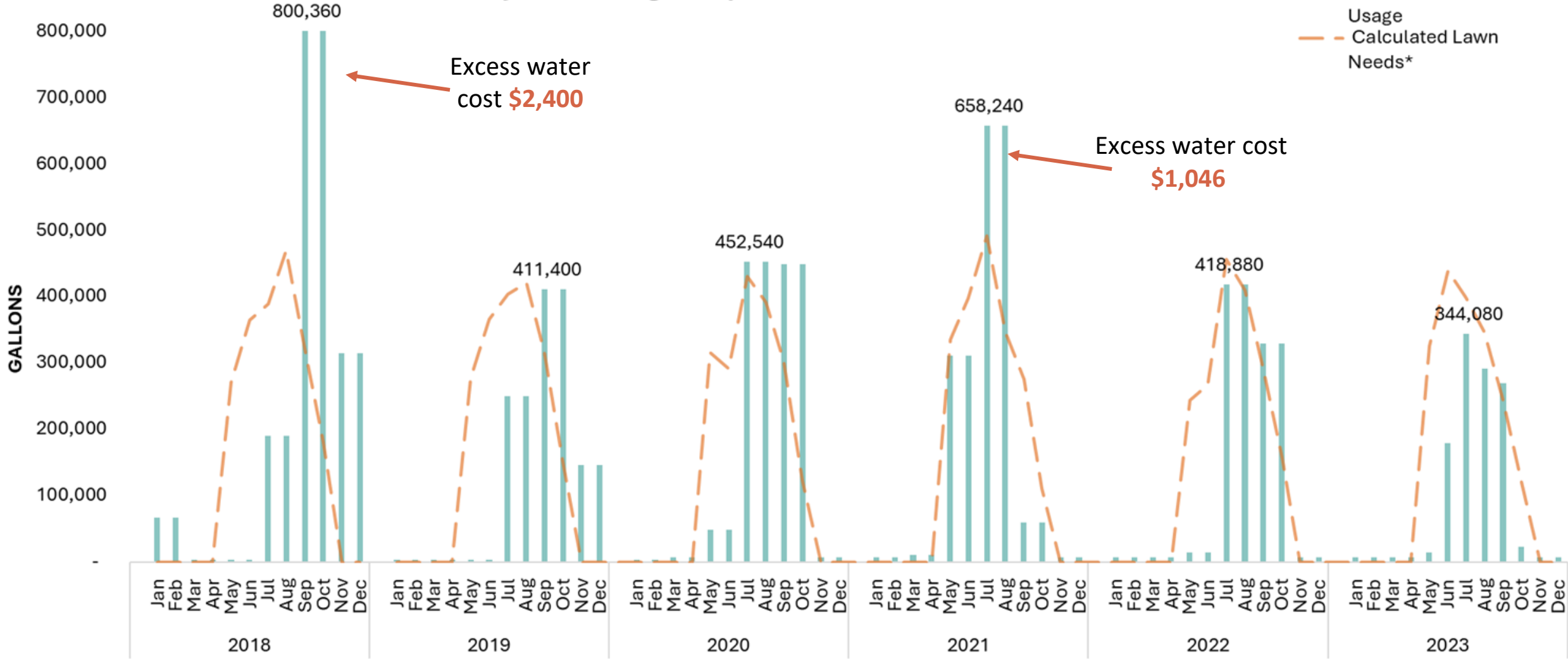
Landscape
Area

$$\text{Grass Budget (gallons)} = \left(\left(\frac{ET_c(\text{inches})}{12 \text{ inches}} \right) \times \left(\frac{K_c}{IE} \right) \times \text{Landscape area}(f^2) \right) \times \frac{7.48 \text{ gallon}}{ft^3}$$



Monthly Water Budget: Top 5 Residential Water User

■ Customer Water Usage
- - - Calculated Lawn Needs*



2021:

- Conducted irrigation audit.
- Identified several leaks
- Recommended repairs, adjustments, & upgrades.
- Retrofitted rotary nozzles.

2022:

- Installed Smart Irrigation Controller.
- Removed 500 ft² grass and installed SpokaneScape (drought-tolerant and native planting).

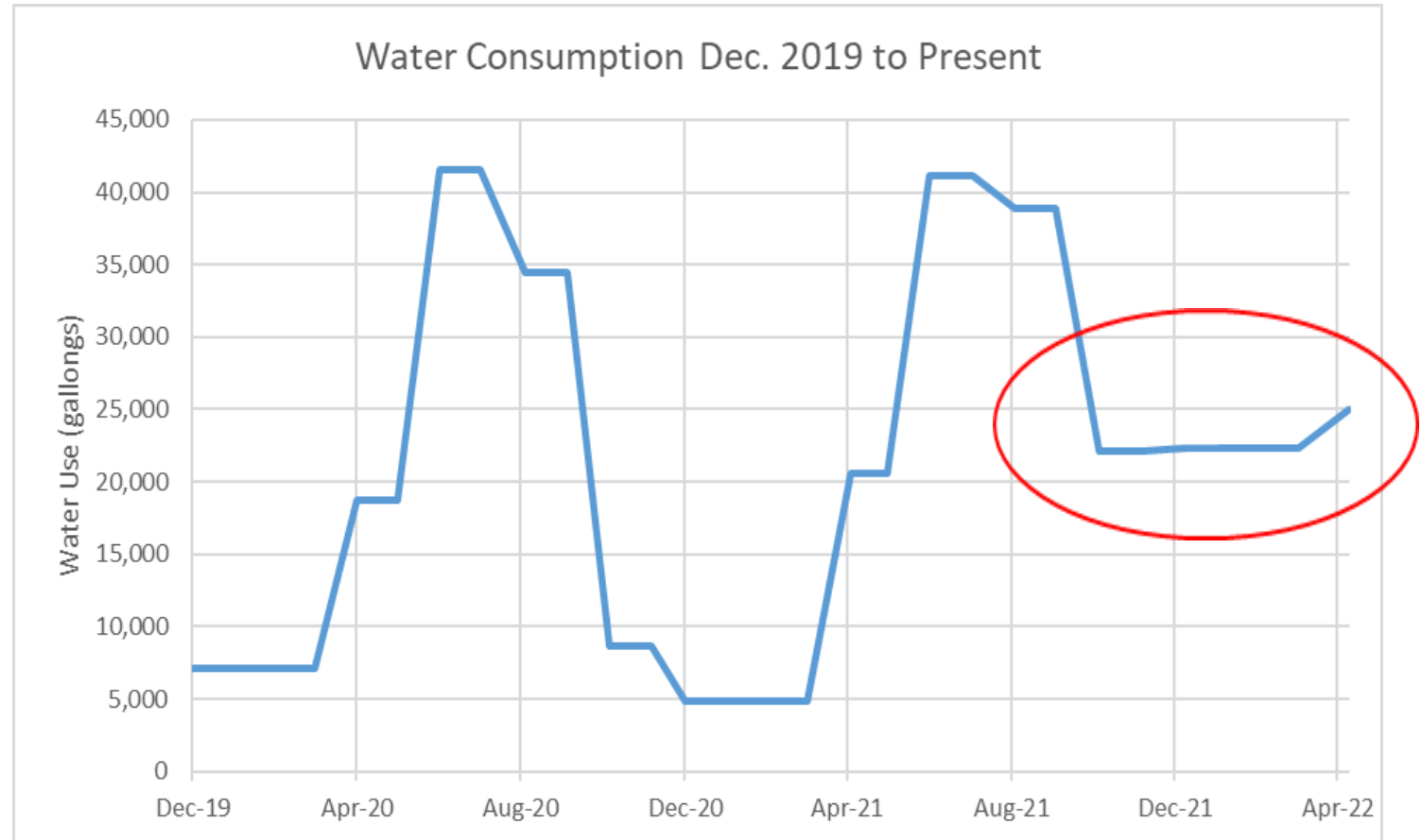
2023:

- Conducted irrigation audit
- Noted several leaks
- Recommended coverage adjustments.



INDOOR INSPECTIONS

- Identify water fixtures and appliances
 - Faucets & Sinks
 - Toilets
 - Water Softeners & RO Units
 - Valves
 - Water Meters



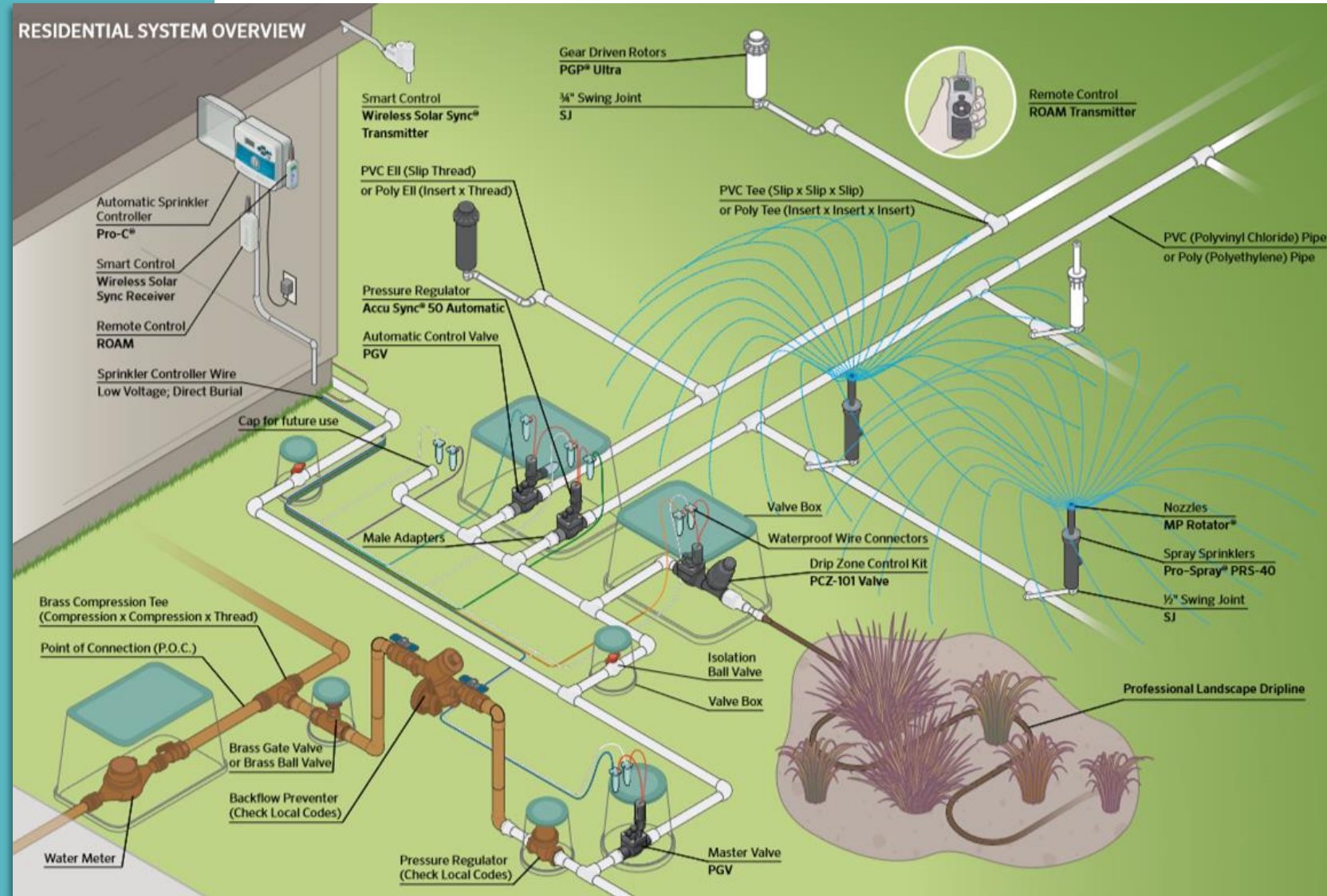
OUTDOOR INSPECTIONS

Irrigation

- ? Leaks and breaks
- Coverage & Adjustments
- Zone Flow Rates
- Irrigation Program & Controller
- Habits, Maintenance routine, Landscapers, etc.

Water Features

- Pools
- Fountains
- Filters, Pumps, Valves, Controllers



**Sign up for a FREE Water Wise
irrigation consult today!
Your technician will:**

- Locate leaks and breaks
- Program complicated controllers
- Adjust watering schedules for optimal plant health



BEFORE

THE WATER WISE SPOKANE TEAM LOCATED BROKEN
SPRINKLER HEADS AND LOWERED THE WATERING TIMES.

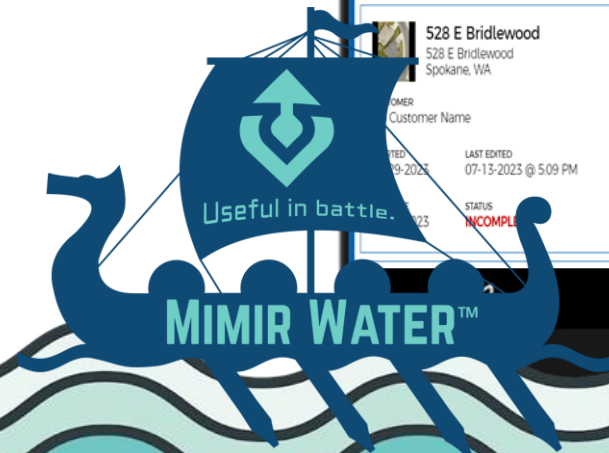
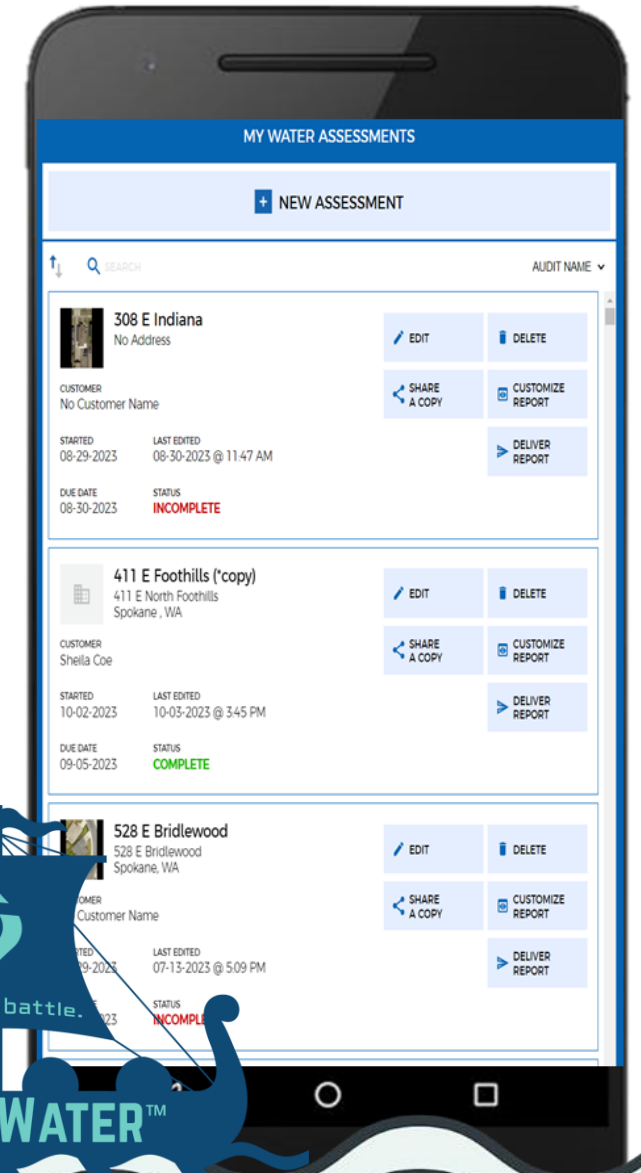


AFTER

AFTER THE CONSULT- THE GRASS IS MUCH GREENER,
HEALTHIER AND USES HALF THE WATER AS BEFORE!

DOCUMENT EVERYTHING!

- Document everything & take photos
 - Take flow rates & quantify leaks
 - Controller make & model
 - Capture leaks/damage & the location
- Find a system to document & organize audits.
 - Keep track of program stats (*leaks found, leak type, homes watering everyday, etc.*)



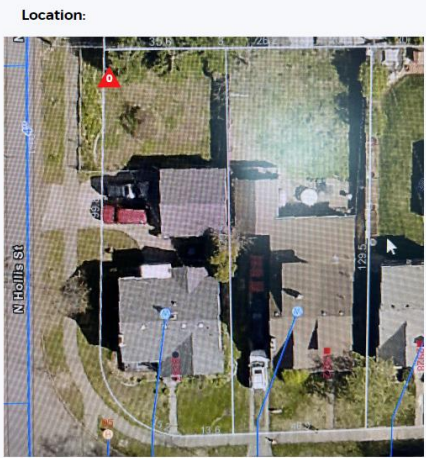
3. Post-Inspection Report

Recommended Watering Schedule

Payback Projects

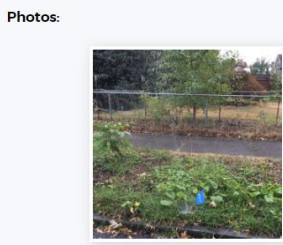
Smart Irrigation Controller

Current Annual Use:	113,000.0 Gallons
Current Annual Cost:	\$ 238.7
Savings Potential:	20.0%
Annual Water Savings:	22,600.0 Gallons
Avoided Cost:	\$ 47.7
Project Cost:	\$ 150.0
Rebate Amount:	\$ 100.0
Other Savings:	\$ 0.0
Payback Period:	1.0 Years
Notes:	



Issue #2 - Zone 8

Condition:	Defective
Technology:	Sprayhead
Notes:	Damaged, Leaking, nozzle or sprinkler body replace



ZN#	FLOW RT	Current Program		New Program	
		CYC./DAY	FREQUENCY	CYC./DAY	FREQUENCY
		1	7 DAYS/WK	2	4 DAYS/WK
		RUN TM	GAL/MO	RUN TM	GAL/MO
1	15	15	6,300	10	4,800
2	16	15	6,720	10	5,120
3	8	15	3,360	10	2,560
4	5	15	2,100	10	1,600
5	13.5	15	5,670	10	4,320
6	8	15	3,360	10	2,560
COMBINED PROGRAM TOTALS:			27,510		20,960

PROGRAM RESULTS

2022

- 107 residential audits
- 37 Indoor & 70 Outdoor
 - 70 irrigation leaks (65%)
 - Leaking Valve
 - Damaged Sprinkler Head
 - Mainline Leak
 - 33% were watering everyday
 - 5 homes had indoor leaks
 - 1 Meter Bypass
 - 1 OPL

2023

- 129 residential audits
- **~20% increase**; 49 Indoor & 115 Outdoor
 - 60 irrigation leaks (47%)
 - Leaking Valve
 - Damaged Sprinkler Head
 - Mainline Leak
 - 19% were watering everyday
 - 5 homes had indoor leaks
 - 1 OPL

WATER BUDGET

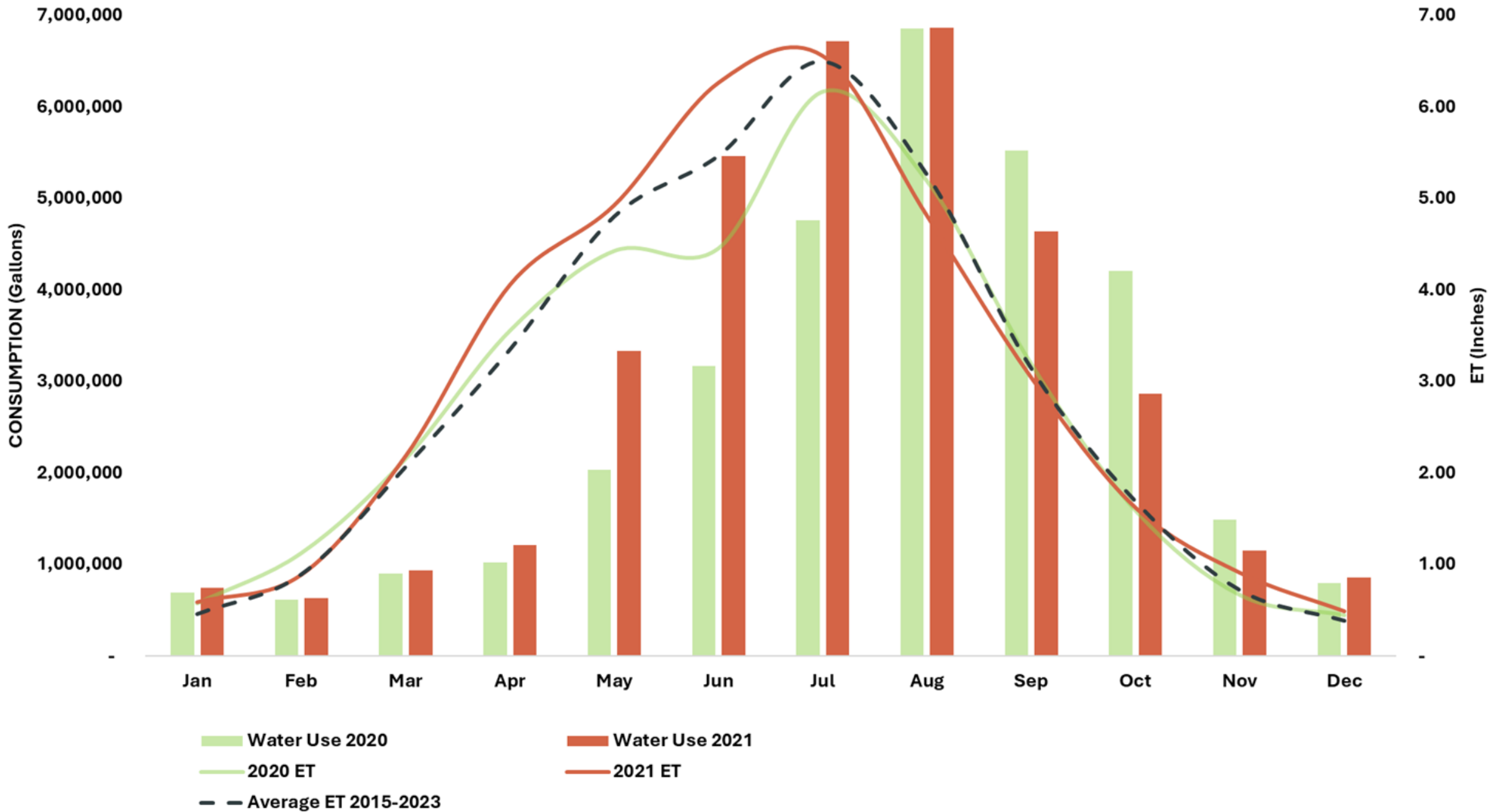
	2022 Audits Summer Review	2023 Audits Summer Review	Annual Consumption	Historic Climate Data	
Year	Percent of Water Budget	Percent of Water Budget	Gallons Used	Summer ET <i>(Jun, Jul, Aug, Sep)</i>	Annual Total Precipitation
2020	258%	142%	32,109,898	19.01 in	15.30 in
2021	221%	205%	35,461,164	20.68 in <i>Hottest Recorded Summer</i>	11.50 in
2022	143%	123%	27,665,226	20.0 in <i>Cooler than average Spring</i>	17.72
2023	161%	157%	28,732,045	19.74 in <i>Cooler than average Fall</i>	13.75 in



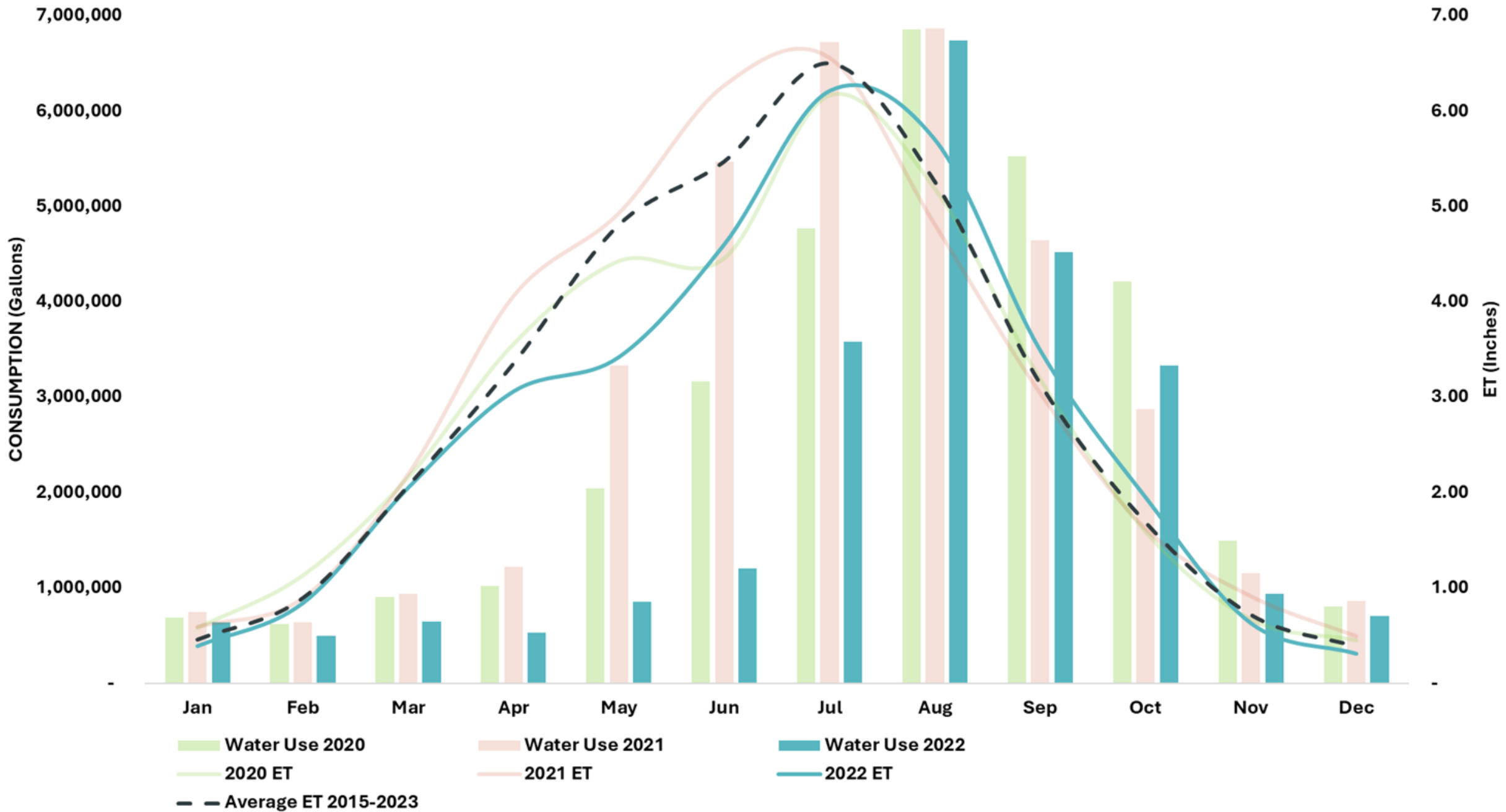
2020 Monthly Water Usage & ET



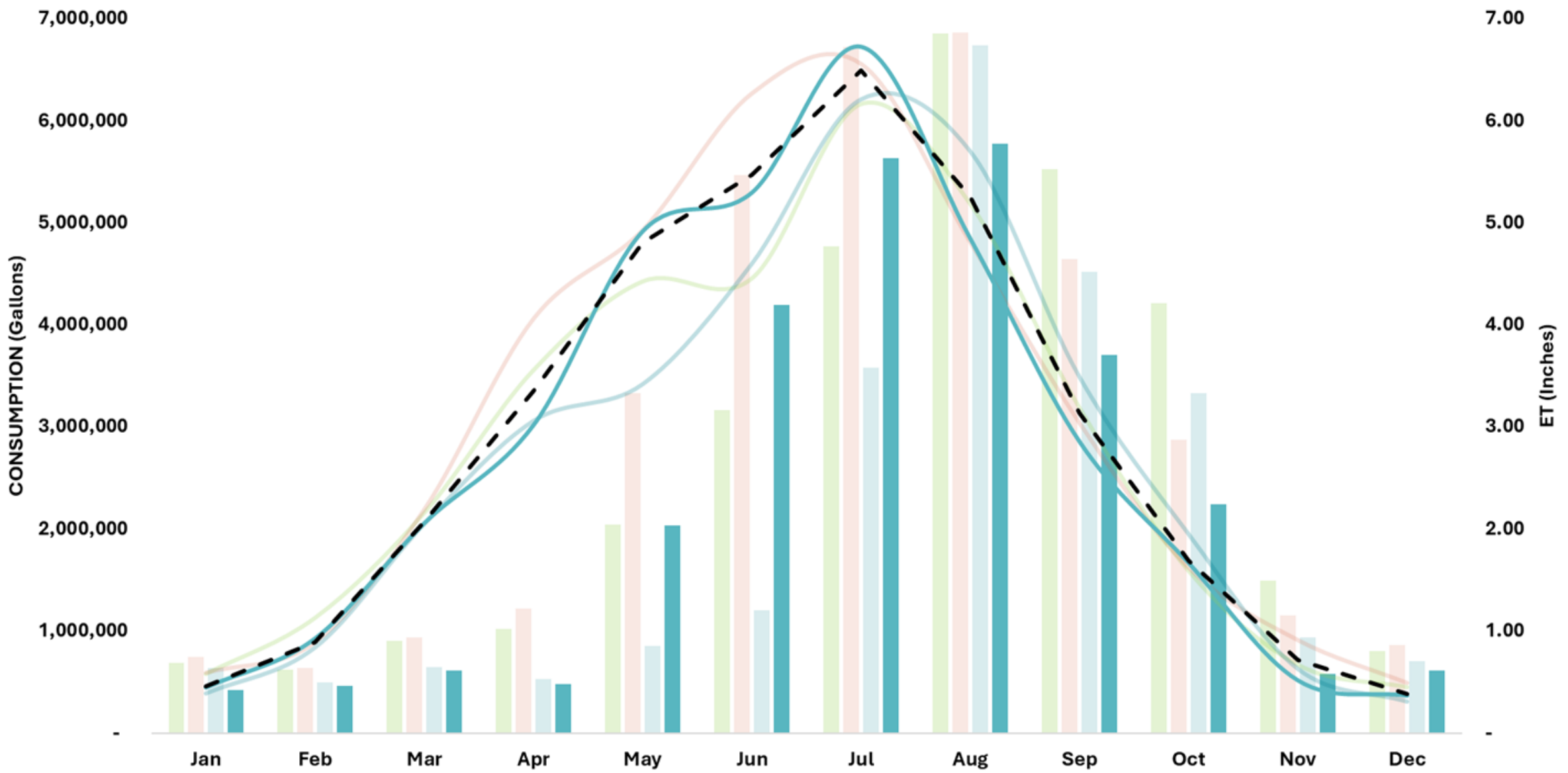
2021 Monthly Water Usage & ET



2022 Monthly Water Usage & ET



2023 Monthly Water Usage & ET



■ Water Use 2020
 ■ Water Use 2021
 ■ Water Use 2022
 ■ Water Use 2023
 - - - Average ET 2015 to 2023
— 2020 ET
 — 2021 ET
 — 2022 ET
 — 2023 ET

MOVING FORWARD

Monthly Newsletter

- Watering schedule reminder
- Irrigation tips
- Summer watering rules/Ordinances

Post Inspection Follow-up

- 2-3 weeks after the inspection do a follow-up.
- Irrigation check-in
- Controller adjustments and fine-tuning

Irrigation Controller Adjustments

- One Stop-15 min controller adjustments

ADJUSTING THE CONTROLLER ONCE PER MONTH IS THE MOST WATER CONSCIOUS THING YOU CAN DO.

May 2024

Water Well with Will

Volume 1



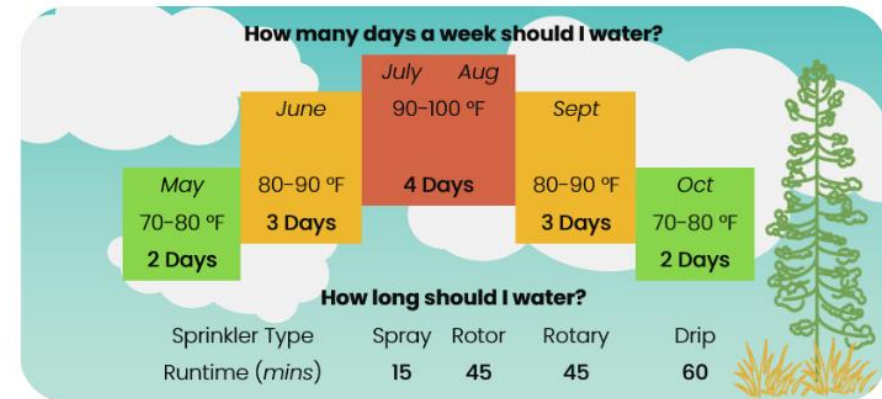
Watering Schedule

On Mother's Day in May, your garden is now in play! Keep irrigation off until then, it's okay to delay.



Green Grass, Done Right!

Adjusting your irrigation program once per month is the most water conscious decision you can make this summer.



Sprinkler Tip:

Check your sprinklers for leaks or damage caused by winter!

THANK YOU!

For more information or to sign up go to: WaterWiseSpokane.org



FIND US ONLINE!