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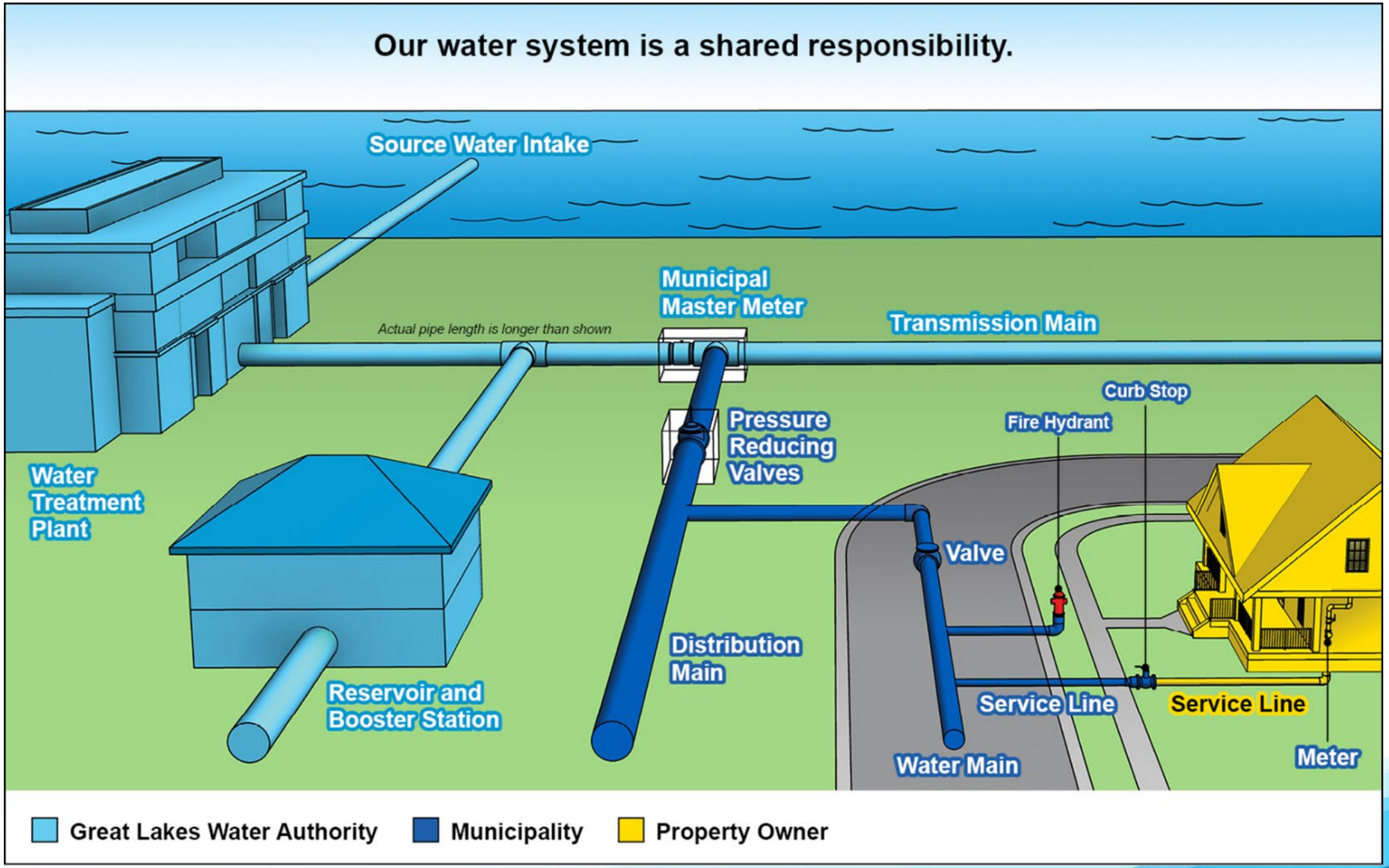
Corrosion Control Updates

November 20, 2025 | Cheryl Porter, COO - Water & Field Services


Our water system is a shared responsibility.
Source Water Intake
Municipal Master Meter
Transmission Main
Actual pipe length is longer than shown
Curb Stop
Fire Hydrant
Pressure Reducing Valves
Water Treatment Plant
Valve
Distribution Main
Reservoir and Booster Station
Service Line
Service Line
Water Main
Meter
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Municipality
Property Owner

GLWA's Corrosion Control Program

- Optimal dosing study conducted in the 1990s
- Requires maintaining pH levels and orthophosphate dosage at treatment plant tap

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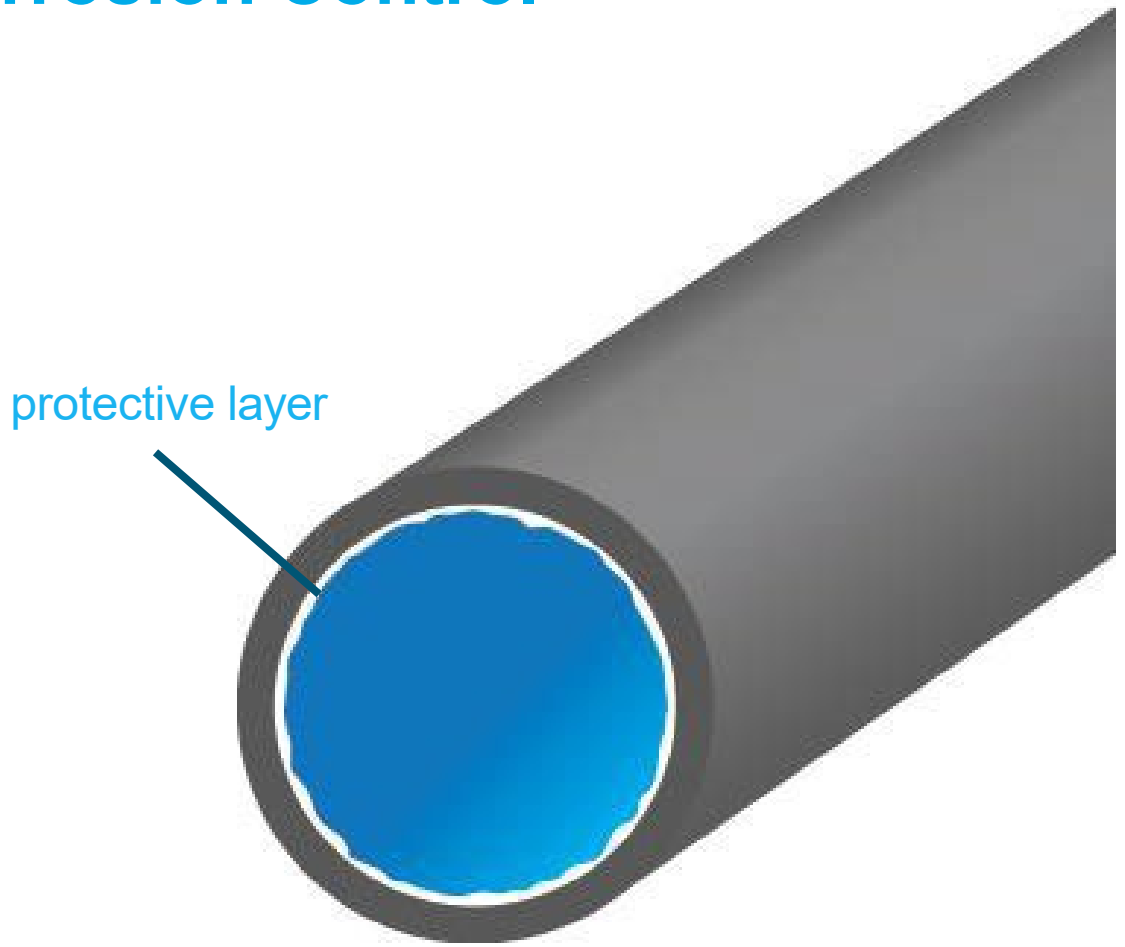
Value of Corrosion Control

Forms a protective layer inside plumbing materials to prevent lead and other metals from dissolving into the water



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GLWA's Optimization Study

Proactive Study

- Voluntarily Initiated and Funded by GLWA
- Confirm Water Quality is Optimized
- Findings are specific to GLWA water and Member Partner pipes

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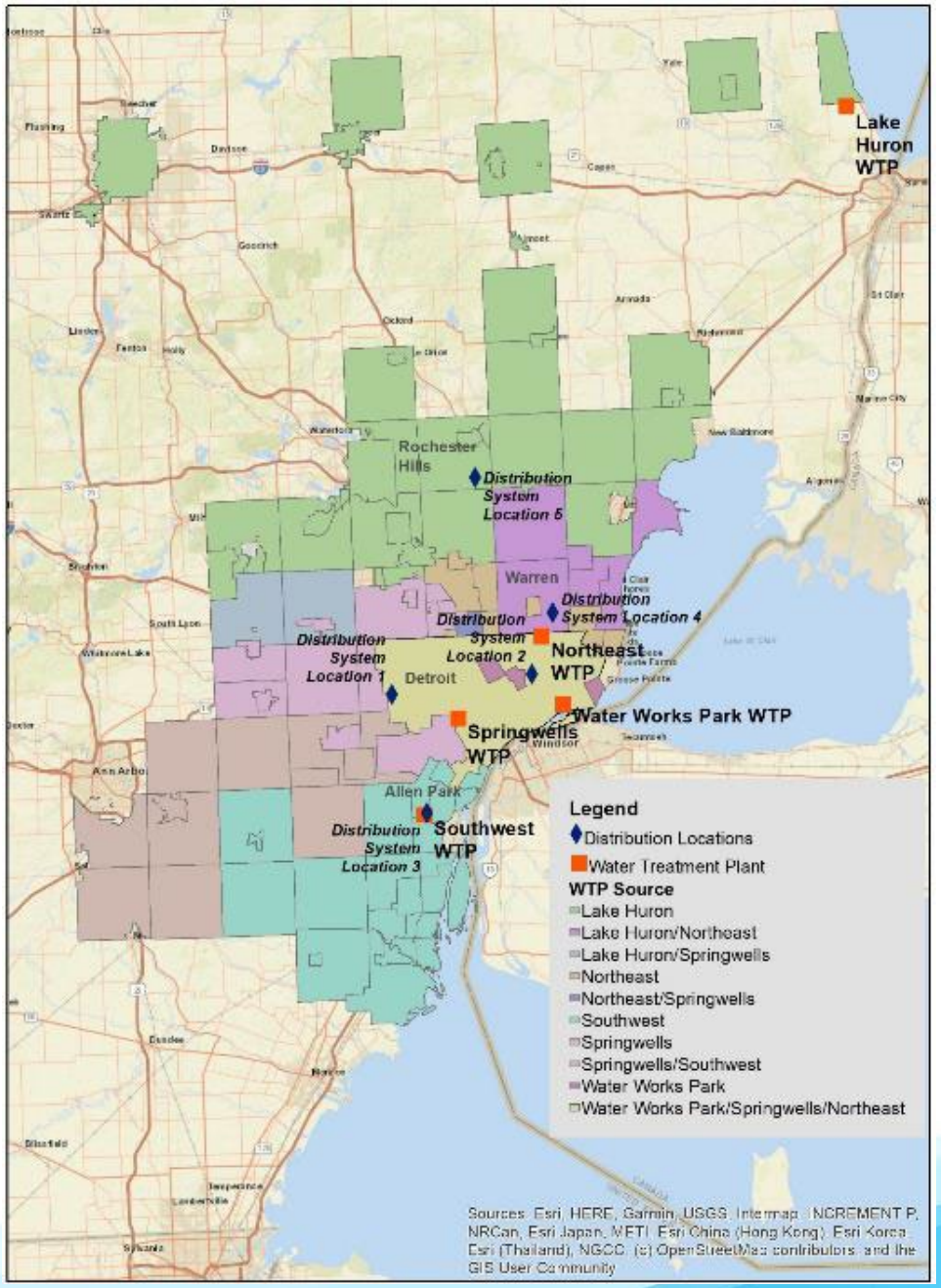
10 Pipe Rig Locations

Water Treatment Plants (WTP)

- Water Works Park WTP
- Lake Huron WTP
- Springwells WTP
- Southwest WTP
- Northeast WTP

Distribution Locations

- Allen Park
- Detroit (Central Services Facility)
- Detroit (West Yard)
- Rochester Hills
- Warren



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Harvesting Partners

- Oakland County WRC
- Southeastern Oakland County Water Authority
- Hazel park
- Detroit
- Royal Oak
- Birmingham
- Warren
- Ypsilanti
- Southgate
- Melvindale
- Farmington
- Plymouth
- Pontiac

Thank you

Corrosion Control Study Timeline

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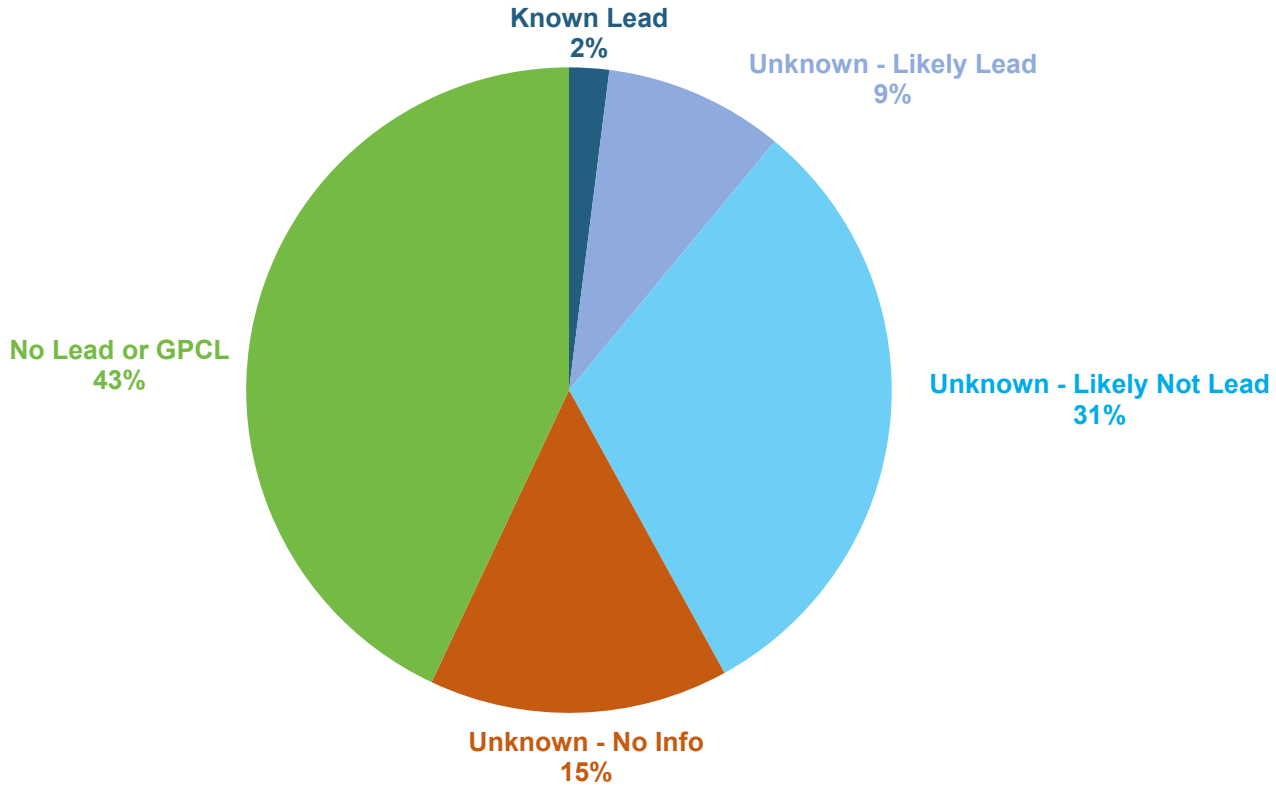
Removing Lead from Systems is the Best Defense



Michigan – Lead and Copper Rule (LCR) requires all Lead Service Lines to be removed by 2041

If approved, the USEPA LCRI would require removal by 2037

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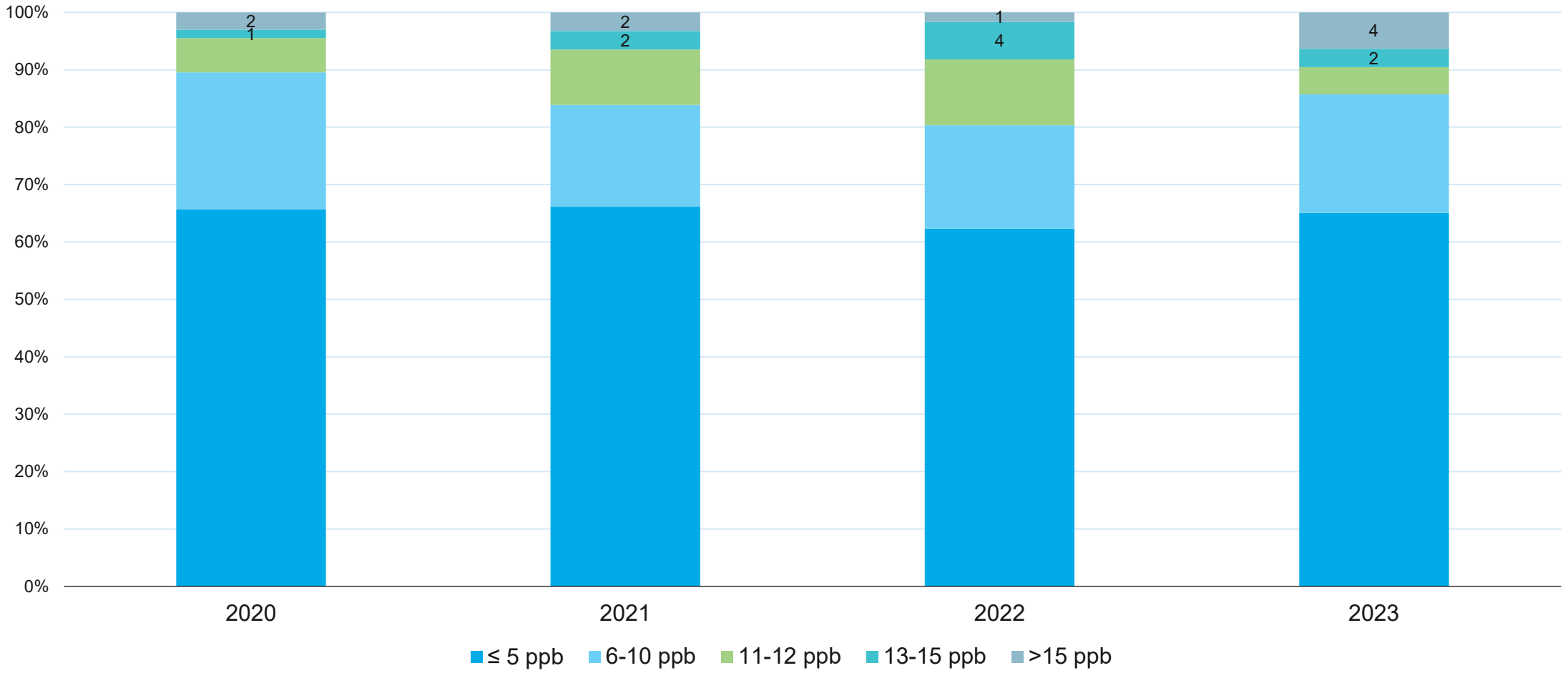
90th Percentile Member Partner Lead Results



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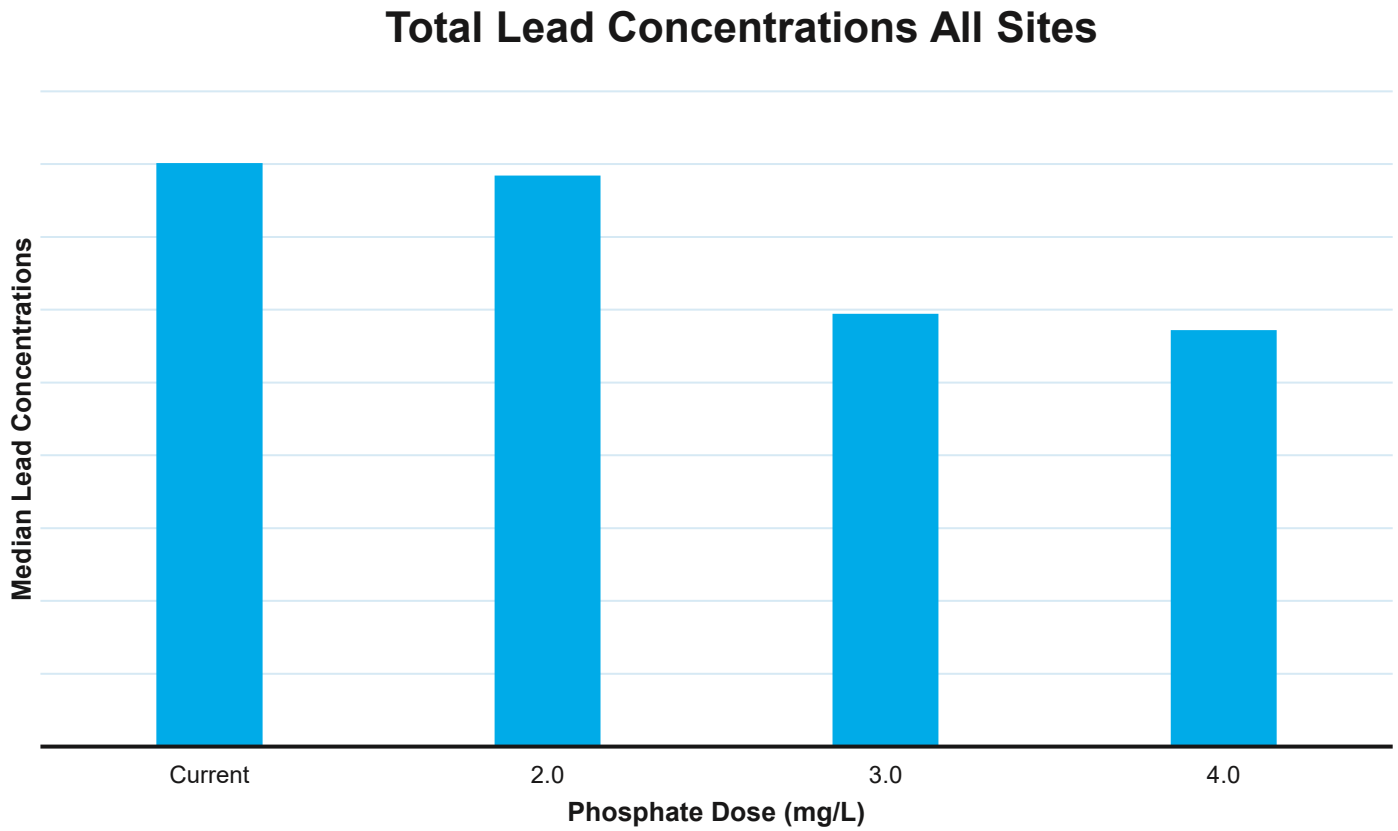
Preliminary Results

- No statistically significant difference between lead concentrations at the control (Current) and orthophosphate dose of 2.0 mg/L
- **Statistically significant difference between lead concentrations at a dose of 2.0 mg/L and 3.0 mg/L**
- No statistically significant difference between lead concentrations at a dose of 3.0 mg/L and 4.0 mg/L



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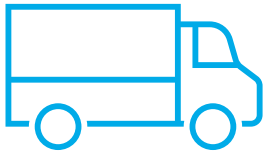
Implementation Considerations

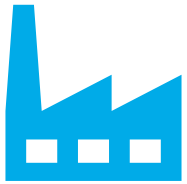
Capacity limitations of our existing chemical feed systems

(See Appendix)



Chemical supply chain concerns

Water quality parameter (WQP) monitoring results at the points of entry and throughout the distribution systems



Increased phosphorus loading at the Water Resource Recovery Facility (WRRF)

Customer feedback

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- Existing phosphoric acid chemical storage and delivery systems at select plants limit the concentration that can be dosed to 2.4 mg/L

- Challenges to maintaining sufficient supply on hand, especially with current supply chain issues

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Current Orthophosphate Plant Storage Capacity for Average Flow

GLWA Water Treatment Plant (WTP)	Average Flow (MGD) [1]	Dose as o-PO_4	Supply (Days)	Dose as o-PO_4	Supply (Days)
Lake Huron WTP	120	2.4 mg/L	30	3.0 mg/L	24
Springwells WTP	120		32		26
Water Works Park WTP	60		65		52
Southwest WTP	50		71		57
Northeast WTP	85		42		33

[1]Based on flow data from December 1, 2022 – November 29, 2023

Highlighted sites do not meet the 30-day storage requirement for a given flow and dose scenario.

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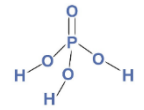
Drinking Water Corrosion Control

GLWA process for changing water treatment plant corrosion control treatment (CCT)

GLWA uses phosphoric acid as its source of the *ortho*-phosphate used to for corrosion control.



Phosphoric acid

- 2019 – 2024: GLWA performed an extensive corrosion control study in the water treatment plants and distribution system to ascertain whether changes to our corrosion control treatment would be needed.
- The study was complete in the fall of 2024, and it was determined that GLWA would increase their dosage of ortho-phosphate from 1.2 mg/L to 2.4 mg/L in a 2-phase process.
  - October 21, 2024: Phase-1 began by increasing the dosage to 1.8 mg/L and allow sufficient time for the treatment to stabilize in the distribution system.
  - January 21, 2025: Phase-2 began by increasing the dosage to 2.4 mg/L.

GLWA has kept Member Partners and the Michigan Department of Environment, Great Lakes, and Energy (EGLE) informed along every phase of the project.

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Implementation Plan & Recommendations

- Increase the dose to 2.4 mg/L as orthophosphate
- Evaluate secondary impacts and compliance data
- Move forward with the recognition that while Corrosion Control can reduce dissolved lead concentrations, it may not fully control particulate lead release.

Getting the lead out of systems is the best safeguard.

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GLWA Distribution System Corrosion Control Treatment

06-17-2025 to 09-17-2025	PO_4 ≥ 1.8 ppm (25% of the dose)	PO_4 ≥ 2.2 ppm (10% of the dose)	PO_4 ≥ 2.4 ppm (Greater than or equal to dose)	Excursions (PO4 < 1.8 ppm or pH < 7)
GLWA Water Plants	99.9 %	99.2 %	96.2%	0
Distribution Systems	95.5 %	91.7 %	77.7 %	33

EGLE has not set a new minimum *ortho*-phosphate requirement level for GLWA and member partners.

- **Distribution Excursion days <u>if 2.2 ppm is the standard:</u>** 59-excursion days **GLWA WTPs:** 0-excursion days
- **Distribution Excursion days <u>if 1.8 ppm is the standard:</u>** 33-excursion days **GLWA WTPs:** 0-excursion days
- **Distribution Excursion days <u>if 0.9 ppm is the standard:</u>** 6-excursion days **GLWA WTPs:** 0-excursion days

<u>1.8 ppm is 25% of the 2.4 ppm dose and</u> or <u>2.2 ppm is 10% of the 2.4 ppm dose</u> & <u>0.9 ppm is the current standard</u>

Distribution sites 6-Excursion days due to the unknown issue at Springwells Plant.

Plant Name [06-17 to 09-17]	Percent of Water Plant samples < 1.8 mg/L	Percent of Water Plant samples ≥ 1.8 mg/L & < 2.4 mg/L	Percent of Water Plant samples ≥ 2.4 mg/L
GLWA WTPs	0.0 %	3.7 %	96.2 %
Water Works Park	0.0 %	2.2 %	97.8 %
Springwells	0.0 %	8.1 %	91.5 %
Southwest	0.0 %	1.1 %	98.9 %
Northeast	0.0 %	0.0 %	100.0 %
Lake Huron	0.0 %	7.4 %	92.6 %

Plant Name [06-17 to 09-17]	Percent of Distribution System samples < 1.8 mg/L	Percent of Distribution System samples ≥ 1.8 mg/L & < 2.4 mg/L	Percent of Distribution System samples ≥ 2.4 mg/L
All Distribution Sites	4.55 %	17.79 %	77.66 %
Water Works Park	0.00 %	7.14 %	92.86 %
Springwells	19.55 %	20.67 %	59.78 %
Southwest	0.00 %	21.76 %	78.24 %
Northeast	0.00 %	24.81 %	75.19 %
Lake Huron	0.00 %	9.87 %	90.13 %

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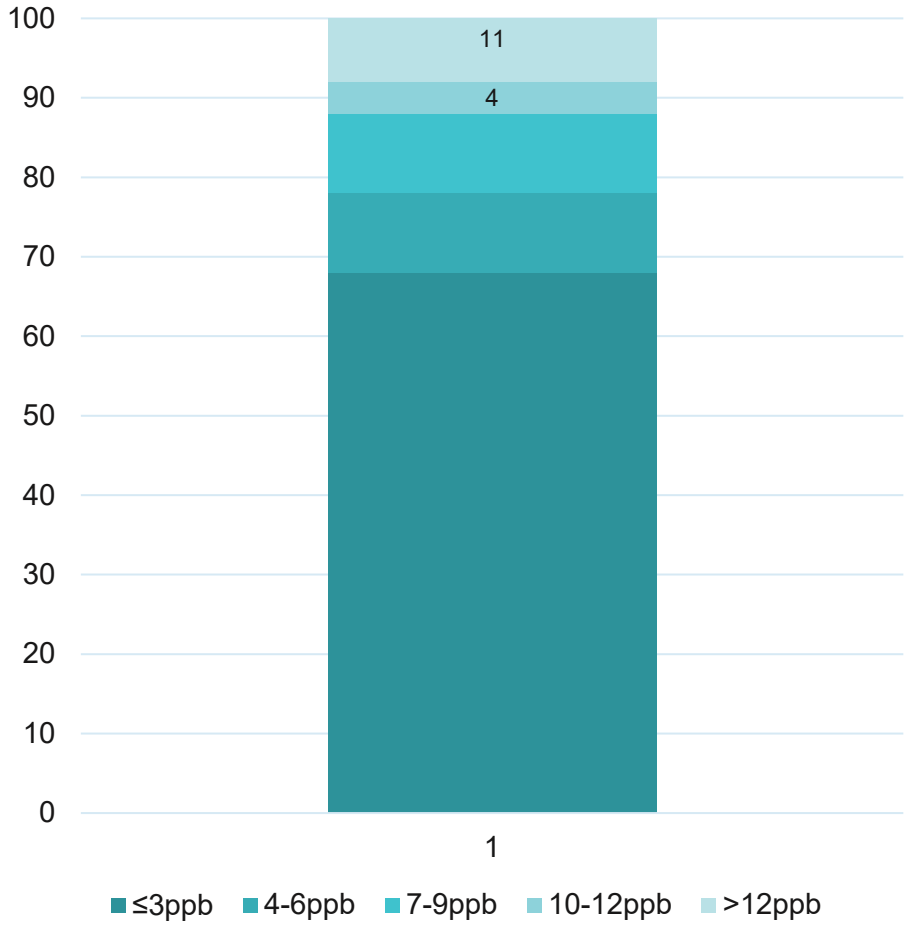
90th Percentile 2024 Member Partner Lead Results



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Too Much of A Good Thing?

Could an increased ortho-phosphate dosage impact phosphorus removal at WRRF?

- If water supply increases the orthophosphate residual, then WRRF will need to increase removal of phosphorus to meet NPDES permit limits
- Phosphorous reduction prevents or reduces algal bloom formation

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