Chloride Pollutant Minimization Program/Source Reduction Measures

2024 Annual Report

Madison Metropolitan Sewerage District

SECTION I: OVERVIEW

Name of Permittee: Madison Metropolitan Sewerage District (MMSD), Nine Springs Wastewater Treatment Plant

Permit Number: WI 0024597-09

This is: the first permit issuance requiring implementation of a PMP/SRM.

Permit Effective Date: 05-01-2020

Date of First PMP/SRM: 05-24-2017

This variance is for: Chloride

Concentration targets:

Chloride Weekly Avg 465 mg/l, November 1 through March 31 annually.

Chloride Weekly Avg 430 mg/L, April 1 through October 31 annually.

SECTION II: 2024 POLLUTANT REDUCTION WORK SUMMARY

A. Actions to Identify Pollutant Sources	
User Charge Sampling: Analyze user Charge Program samples for chloride. Evaluate the viability of adding chloride as a billing parameter.	Evaluation of chloride as a billing parameter was not undertaken in 2024. The five main pumping stations influent to the plant continued to be monitored through the end of the winter season. Some user charge points continue to be monitored, notably Pumping Station No. 9, which has been studied since the early 2000s, as a small, isolated sewershed that is characterized as mostly residential.
Road Salt Practices: Evaluate the current status and improvements through a re-survey of customer communities.	Customer communities are required (per MMSD SUO 4.7.2), to report on winter maintenance practices, including salt use. A few communities have already submitted their reports this year, with a couple municipalities electing to do an interview/meeting in lieu of a written report (example written report format).

Baseline social-science survey: Study existing sources of chloride and gather information specifically for development of future outreach strategies; measure awareness and attitudes; collect information about barriers to homeowner action through scientific survey.	This survey was undertaken in 2023, and pertinent results were shared in the 2023 annual report. Based on those results, actions taken in 2024 include development of a blended water pilot later discussed in section "B. Actions to Minimize Sources".

B. Actions to Minimize Pollutant Sources	
Administer training programs: SaltWise Soft Water Training; Winter Maintenance Training and develop/roll-out homeowner information and training program.	Continuing education training occurred in partnership with Local 75 on 2/29, 3/7, and 3/20 in both Madison and Milwaukee. The training instructors continue to advance their delivery of the content. In addition to training of plumbers, MMSD staff have served as advisors to the MN Pollution Control Agency's (MPCA)'s development of a Smart Salting Water Softening training. The goal of this project is to build off of the state's 20+ years of success in working with road salt users, applying lessons learned about creating and delivering the training content, for a new audience with a water-softener and plumbing focus area. Having developed and delivered training for five years, MMSD Staff are eager to share content so that given state funding and backing, the MPCA training can have a greater impact towards changing long-held industry norms than one treatment plant alone. In 2024, District and WI Salt Wise staff have been initiating important conversations about how to codify and standardize water softener efficiency training for the long-term. Having staff from one wastewater treatment plant in Southern Wisconsin alone training plumbers on this material is not sustainable long-term. Through these conversations, we've been exploring ways to standardize curriculum such that all service providers (plumbers as well as limited-license professionals in the water quality industry) are getting consistent and updated information. Plumber's Union Local 75 has already integrated key water softener set-up, sizing, hook-ups, water reuse and other relevant efficiency-related information into their green plumbing curriculum. Additional conversations with the WI DSPS and national Water Quality Association will be required.
Offer and expand salt-reduction rebate programs: simplify administration/	Conversations with City of Madison, regarding coordination with the BESP program required Efficiency Tune-Up process

quantification for programs, evaluate new or expanded programs to target specific markets.	have continued, including assurance of water softener inclusion in the Tune-Up workbook (currently in draft). As this program rolls out (2025), city buildings of a certain size will be required to audit their systems. Details for an updated commercial/industrial softener support upgrade support rebate are underway, so that as those buildings complete the audit and identify 'deficiencies' (including water softening systems) that may require tune-ups, they will have options for cost-share/rebate support. Having collected extensive data to quantify salt savings through pilot programs and past rebate efforts, the rebate in development will greatly simplify administration and expand access to support compared to past programs. Coordination with the City of Madison on incorporation of water softeners into building audits and tune-ups, as well as continued development of a supportive rebate program will continue through 2024 and likely into the next few years. Planning for a blending valve installation pilot with the City of Middleton have been underway, contracts are signed and funding is procured. The launch of the pilot program is scheduled to kickoff in 2025. Road Salt Reduction Equipment Grants will be offered again through winter 24-25.
Offer Road Salt Equipment Grants: Target private and municipal operations; Incentivize salt-reducing innovations and develop leaders in the 'new normal;' measure change in winter maintenance policy & practices through follow up to 2014 & 15 surveys.	This program continues for winter '24-25. There has already been one grant awarded in 2024 going into this winter season. Grant recipients have continued to be some of the best ambassadors for salt reduction, oftentimes coming back to assist with WI Salt Wise open houses and trainings to help other companies learn and develop their skills.
Behavior Change Initiatives: Develop programs to change behavior/social norms with businesses and individuals; leverage WISaltWise to change behavior and social norms.	We continue to provide funding and technical and communications support services to Wisconsin Salt Wise. 2024 is our second year of a three-year contract with Wisconsin Salt Wise. WI Salt Wise continues to do outreach to change behaviors. Q1-Q2 2024, WI Salt Wise efforts focused on changing behaviors through advocating for Limited Liability Legislation. This action was nearly successful; bringing a bi-partisan bill, supported by industry and environmentalists alike through both WI house and senate approval, only to be vetoed by the Governor. The momentum to continue this effort remains and we expect

	another push in 2025. See Attachment A: 2024 for a full list of WI Salt Wise outreach activities.
Capitalize on low-hanging fruit: Develop outreach kit; focus industrial contacts on chloride reduction opportunities; attend community events as appropriate, with emphasis on chloride information.	An outreach kit was developed and distributed to the Southern WI Association of Home Inspectors at their January 2024 and June 2024 meetings. Contents of the folder are included in Attachment B: Various Outreach. The District continues to invest in general community outreach, offering free monthly "first Friday" plant tours for the public, scheduling group tours upon request, and continuing the Shop One Artist/Educator residency program. The district typically hosts over 1500 visitors per year for general plant tours. Kiosks around district facilities in the community (pumping stations, bike path rest areas for example), have been updated seasonally to include salt-awareness messaging as well. Throughout 2024, two other initiatives that will result in improved/increased outreach have been underway: 1) refresh of the effluent building outreach amenities (spaces visitors see on plant tours). With this project, messaging at the end of tours such as 'there is no away', and the importance of proactively protecting water and preventing pollution will both be conveyed more clearly. 2) The district has been working to secure a partnership with the City of Madison and Madison Public Market Foundation to develop and install memorable pollution prevention messaging within the Public Market bathrooms. The building is expected to have a half-million visitors per year, so this is a big opportunity to put this messaging out in the community and in front of people of all ages.
Expand digital presence: expand WiSaltWise.com/campaign and web resources (MMSD website, social media, videos)	Staff continue to monitor web pages, updating with new material as it becomes available. Analytics for the District website, Madsewer.org, recently became available. In the approx. one year span of time from May 1, 2023 - April 30, 2024, there were an estimated 36,400+ views on pollution prevention related content (including web pages, blogs, media, and events). Included content added in 2024 is listed in Attachment B: Various Outreach.

C. Maintenance of Source Reduction

Quantifications/Data Mining: analyze historic data; determine magnitude of	We continue to build data handling and analysis capacity. One area of effort in doing this has been in developing

previous reductions; develop estimates of and future viability.	connections to District laboratory databases so that analysis of continuous data can happen on a more ongoing basis. Part of data mining this year to date has included revisiting and quantifying sources. This work is ongoing, but not yet complete. Analysis this year has also included looking at daily composite samples for each of the 5 main pumping stations influent to Nine Springs WWTP. The completion of winter 2024 marked having 5 years of data. The findings reveal a consistent decreasing trend in standard deviation across the four years for multiple pumping stations. This suggests that the impacts from road salt are becoming increasingly stable. In 2024, the District evaluated potential improvements for our updates to the Sewer Use Ordinance. These will be discussed with legal and our customers in 2025 and updates may include changes to sections relating to chloride.
Cultivate relationships/leverage partnerships: leverage existing social networks, build new relationships with hotels/apartments/industry; continue to facilitate conversations between salt reduction champions and their peers; partner with sustainability focused programs in the region to identify and leverage synergies and speak in venues where our messages can reach broad audiences.	Staff remained engaged with: The Salt Symposium Planning Committee, CSWEA Government Affairs Planning Committee, MadCity BECCSters, APWA, NACWA, as well as peers working on salt reduction such as Cities of Waukesha and Waterloo, and members of the WI Salt Wise Partnership. Notably, staff were keynote speakers at two national-level events on salt-related topics: National Association of Clean Water Agencies, National Pretreatment Workshop + Training, May 14-17, Pittsburgh, PA – Catherine Harris, Pollution Prevention Specialist: *"Source Control and Proactive Water Resources Management"* Salt Symposium, Aug. 26, 2024 – Emily Jones, Pollution Prevention Specialist: "*Plumbing Strategies to Reduce Chloride Pollution"* Leveraging a new form of partnership with City of Madison, as part of their BESP program, the District expects to develop new relationships with commercial entities as this program gets underway. City of Madison being the largest customer of the district, and the jurisdiction with the most commercial/industrial areas, investing in developing these relationships will prove to be an important awareness-building effort for water softeners, and potentially an important precursor to assessment of any policy directions in the future (like for example, ordinance-mandated inspection, minimum performance efficiency standards,

	large softener registration, mandated tune-ups, etc.) Partnership with this program will help get a foot in the door with businesses in a sector that has historically been difficult to reach. Importantly, participating in this program will also create a process for sustainable and ongoing upkeep of softener efficiency (vs. the 1-off approach).
Communications: Develop and roll out videos/case studies and industry/large water user focused messages; target outreach and develop messaging.	"Today's Home Remodeler", is a half-hour tv show aimed at educating homeowners about water softeners. It was developed in partnership with Plumber's Union, Local 75 and first premiered in April 2024. Since then, it has been broadcasting at least once a month on WKOW-TV27 in the Madison media market. This episode will have at least 24 plays on TV (likely more) between April and December 2024, as well as web presence. Reducing Salt Usage In Your Water Softener - Remodeler TV
Wisconsin Salt Wise: undertake strategic planning to establish the future structure of Wisconsin Salt Wise.	No action taken in 2024, previously completed. The District remains a funding WI Salt Wise Partner, a technical resource, and help with strategic direction for Wisconsin Salt Wise. Participate in all Salt Wise meetings/calls and coordinate with the Salt Wise staff closely.
Funding and staffing: maintain on-going staffing and budget to support Chloride Source Reduction Program	Three permanent staff and one intern have been retained for pollution prevention work in 2024 and will continue in 2025. Many additional staff people across the district continue to support and enable pollution prevention work, such as IT, resource/communications teams, collection system (sampling), laboratory staff, year-round.
If any action was not implemented, please explain why. While there are still discussions on alternative approaches to funding pollutant minimization programs, including looking at chloride as a billing parameter, these discussions have opened more challenges and considerations which reduce the ability to quickly implement. A challenge with a local limits type approach is evident with the fact that residential sources and sewersheds contain concentrations of chloride high above the water quality standard (ie: non controllable dominated) leaving no available contribution from non-residential sources. Reducing full-line softening and blending valve introduction both have the ability to interrupt this norm with residential softening.	

SECTION III: YEARLY SOURCE REDUCTION MEASURES SUMMARY

Overview

2024 was a successful year for the Madison Metropolitan Sewerage District's Pollutant Minimization Program. The district continues to be a leader and the programs success is continuing to result in lower mass of chloride annually during a period in which our region is the fastest growing region in the state and where softening systems are being installed in the majority of homes and businesses due to

extremely hard water. One major development in 2024 has been the normalization of blending valves through trials and tests. These will continue and expand in future years. Blending valves bypass hard water around the softener. If there is water with 20-grains of hardness and 5 grains is bypassed with a blending valve, 25% savings in salt and 25% chloride reduction. Drinking water systems with 5-7 grains of hardness generally would not be softened and warranties for water softeners remain intact. As our pilot projects have progressed, blending valves have been embraced and owners have not been removing or turning off the valves. This intervention is a real win for freshwater throughout the world and provides a path toward chloride reduction for many communities. Throughout 2024, there were major achievements in the district's program:

Major Achievements

The district undertook a 5-year review of the chloride pollutant minimization program as part of our WPDES permit reissuance. Many of our current initiatives and trends are included in that report.

There are two major suppliers for softener control heads, Clack Corporation and Pentair. After meeting with our team, Clack Corporation made a change to their control heads that positively impacts the amount of salt they use. They rolled this change out throughout the world. This is a dramatic and positive development which is directly attributable to the district's pollutant minimization program.

District staff were invited to present on Blending Valves at annual Salt Symposium. This discussion was well attended and spurred interest nationally. The district's work to normalize blending valves and increase adoption is gaining momentum. In late 2024, one of the major local water softener providers discussed making the valves a standard part of their softening systems.

During 2024, district staff provided a keynote address for the National Pretreatment Conference hosted the National Association of Clean Water Agencies (NACWA). During this address, our staff discussed the challenges and opportunities associated with moving forward pollution minimization and behavior change initiatives and engaged with national experts, agencies and peer organizations.

In addition, the district applied for a NACWA award for the on-going work of the district's chloride minimization/pollution prevention program. This project was selected to receive the Operational Excellence Award – showing that direct tie between permit compliance and pollution prevention initiatives.

Over the year, District staff participated on the Technical Advisory Committee formed in the state of Minnesota to help develop Softener Training program for the state. Our current training program became the prototype and foundation for the Minnesota program.

Measures Not Pursued

One of our plans for 2024 was to work to improve our Sewer Use Ordinance with regard to chloride compliance. That overall district project has been moved to 2025. This work is still anticipated to be done in 2025.

Limitations/Barriers Encountered

Limited hardware for implementing partial-softening: Among the water softeners commonly available in the area, there are a very limited number which come with functionalities that allow consumer

determined preference for water hardness output level. None, to our knowledge have partial softening as a default. From surveys in our service area, we know that at least a quarter of people are not bothered by some water hardness occasionally. Changing the status quo around full-line softening and softening down to zero grains is going to be necessary for water quality goals. Work to this point has indicated that relying on efficiency-only measures is not sustainable, and will not realistically yield enough salt reductions to change water quality outcomes unless adopted and upkept on a community-wide scale (likely not feasible in current culture). Technologies to implement partial-softening exist but are not widely known or available.

Policies do not allow salt-free technologies: Salt-less softening technologies exist and appear to be successfully used throughout the world. To our understanding, none of these devices are currently approved for use in Wisconsin per state plumbing code. There is no current national certification/approval process for non-salt water conditioning devices. Consumers appear willing to try these technologies, and curious about how they work. They are available to purchase from common online retailers such as Home Depot or Amazon, however, many licensed installers/plumbers are wary of installing them because Wisconsin's Department of Safety and Professional Services does not currently allow these systems to be considered for residential use. If research is required to move these policies, that should begin to get underway – currently the leading research related to water softeners comes from an industry-funded paper that distorts facts to inflate consumer savings as a result of soft water use.

True cost of salt is hidden: Salt is cheap, yet every pound imported into the state takes a toll on our environment, and infrastructure, both public and private. There is not currently any state-wide policy to account for this cost, and salt remains cheap and abundantly accessible. The state of Minnesota has undertaken some of this work already and is in the process of aligning state policies to recognize the damage that chloride wreaks on public infrastructure.

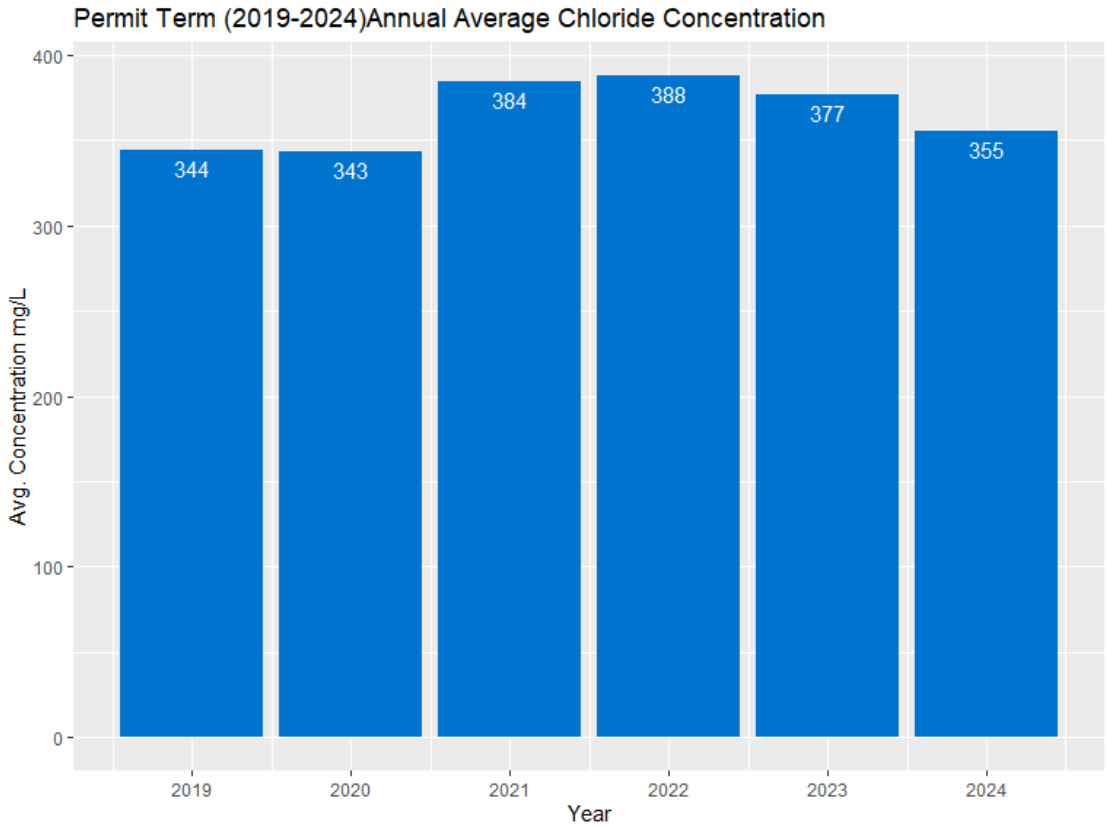
Non-stationary baseline: Development and all that comes with it: more houses/softeners, more roads/road salt, more people is abundant in the Dane County Area. As source reduction measures get underway, there are also new sources being constantly added to the service area. Climate change is increasing uncertainty and variability, as well as intensifying storms, also impacting this work. As has been well documented in previous annual reports – groundwater monitoring has shown increasing trends in chloride concentration as well. We are not operating from a stationary baseline. The rate at which change is occurring to drive up chloride use necessitates solutions that match this pace.

SECTION IV: DATA

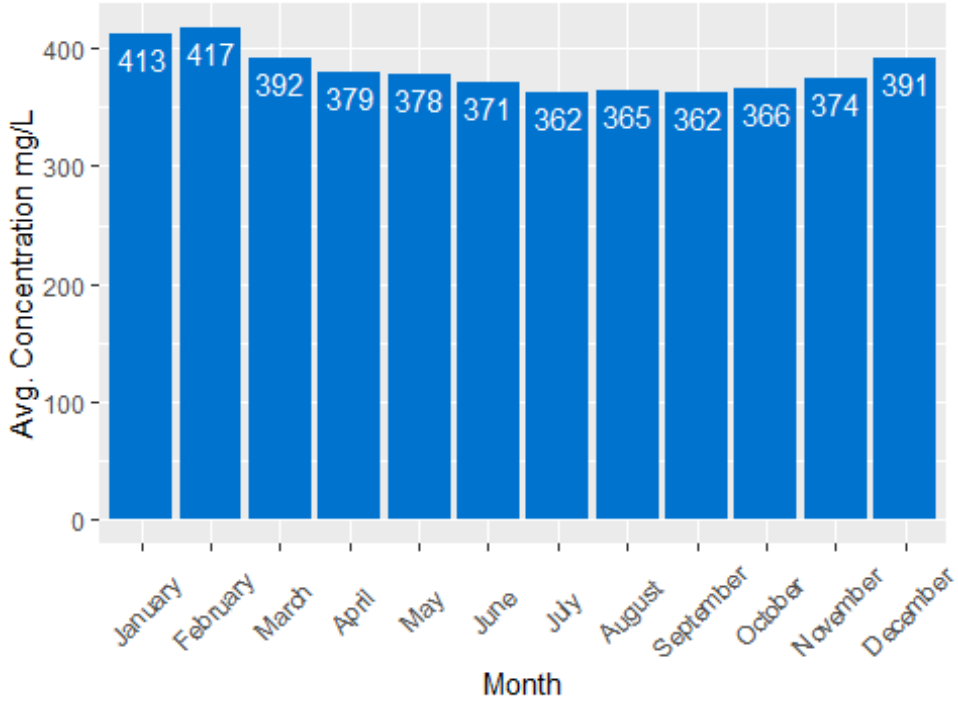
Note on data handling: missing values for all data reported below (unless otherwise noted) were handled through linear interpolation.

Trends

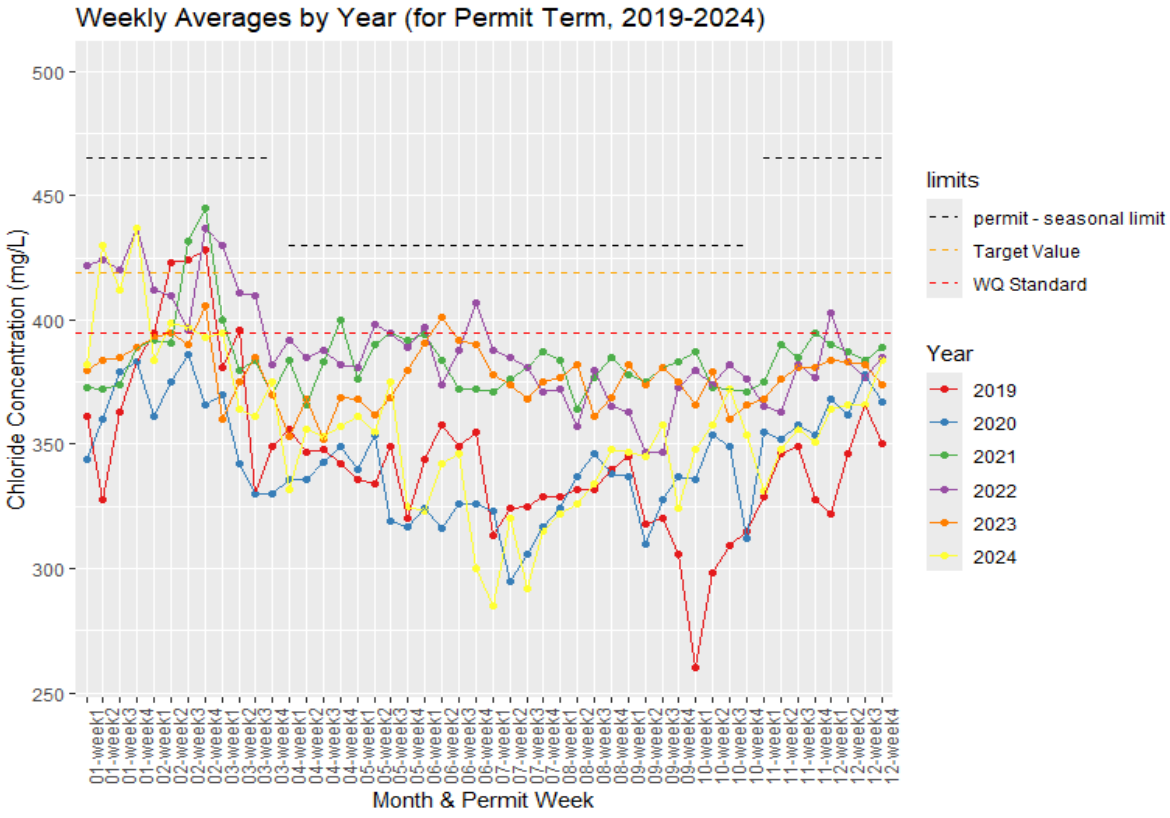
Average Annual Pollutant Concentration

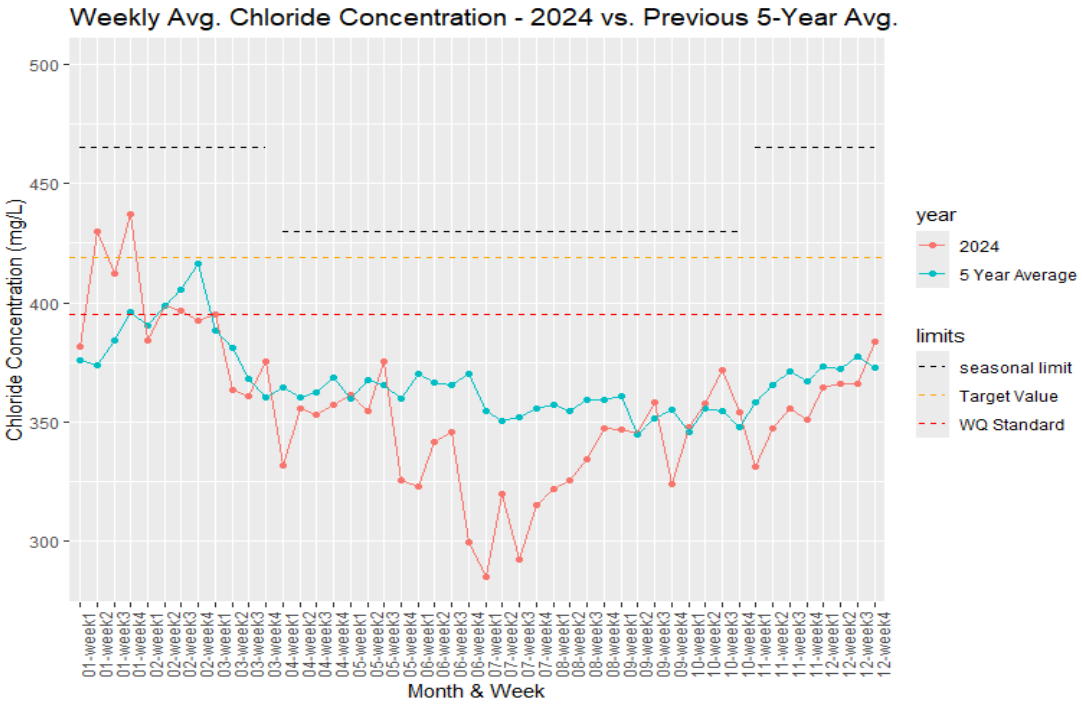


Average Monthly Pollutant Concentration 2019-2024



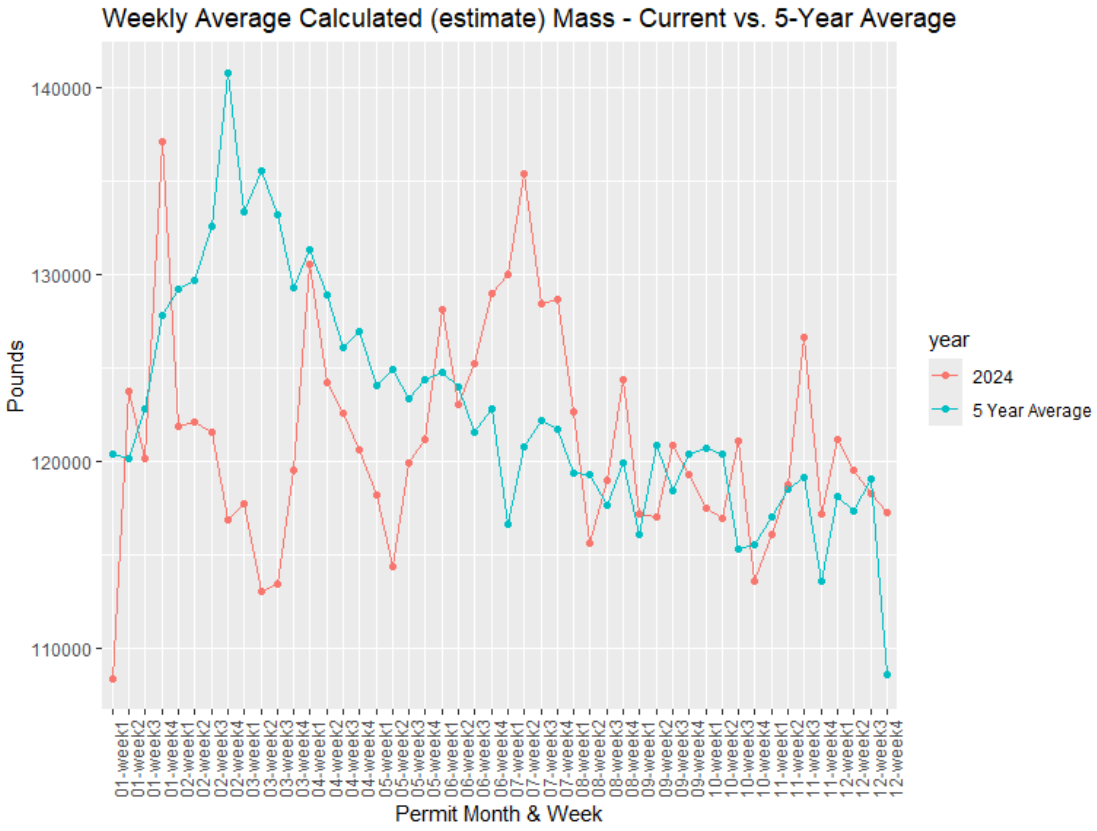
Weekly Pollutant Concentrations 2019-2024**



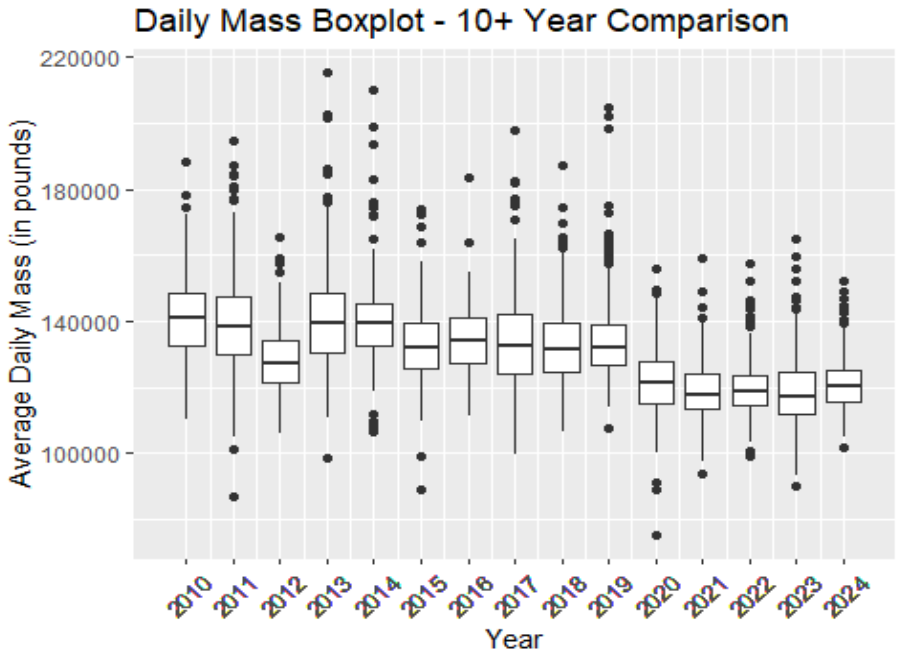


**"permit weeks" are the first 4 weeks of the month. The 29, 30, or 31st are always in the 5th week of any month and are thus excluded from figures displaying 'permit weeks'. Weeks are standardized for each month throughout the year as follows: week 1 = day 1-7, week 2 = day 8- 14, week 3 = day 15-21, week 4 = day 22-28.

Total Mass Discharge

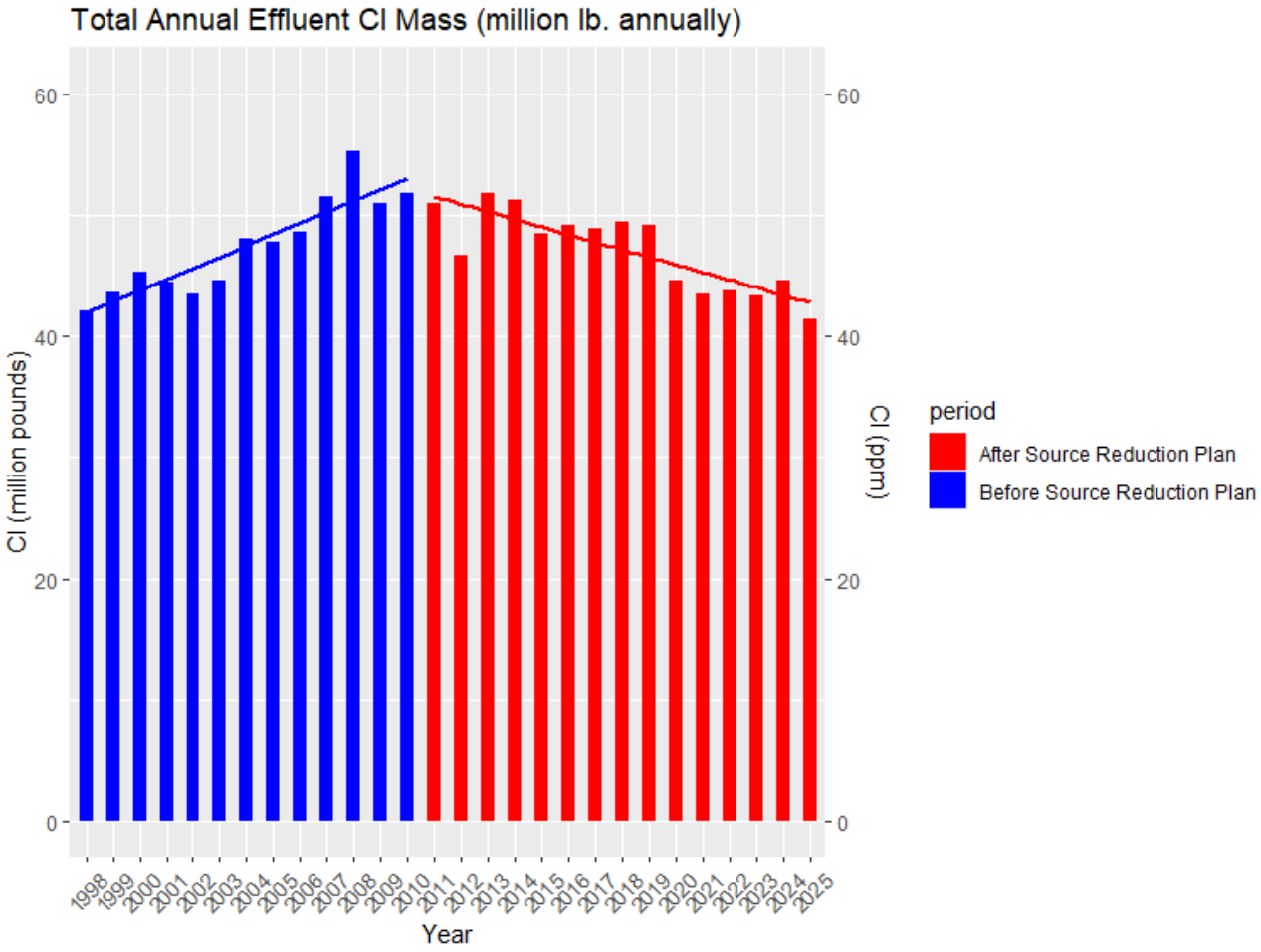


This graph shows the average mass passing through the plant PER DAY during the given permit week.



Total mass (cl-) pass through plant in 2023: 43,340,300

Total mass (cl-) pass through plant in 2024: 44,363,666



Note: Prior to 2010, chloride values were not consistently collected daily. After 2010, missing chloride concentration data is rare, but does exist periodically (typically under 10 missing values annually). Missing data for this graph has been handled with the na.rm=TRUE, meaning that missing values have been removed.

SECTION V: 2025 PLANNED ACTIONS

In 2025, the following activities are planned:

- Building Energy Savings Program (BESP) and associated funding program rolls out with the program – targeting the City of Madison's largest buildings (100,000+sf) in 2025. The BESP inventory and benchmarking will identify softening systems with available improvement potential. The District's funding program will help incentify needed action.
- Middleton Blending Valve Pilot Program is planned to begin in 2025. Contracts and funding are in place.
- The District will continue to be both a funding partner and strategic advisor for Wisconsin Salt Wise to amplify salt reduction messages regionally.
- The District will continue to provide funding for the Road Salt Reduction Grant program to develop ambassadors in the region to try and provide case studies for technology and equipment that helps reduce road salt use.
- The District intends to amplify the 'Hard Water Hacks' blog messages in a more accessible format.
- The District intends to engage with Property Management companies to jointly develop viable pollution prevention approaches.
- The District intends to engage with community members and share chloride pollution prevention messages through our existing digital channels, website, tour program and Madison Public Market partnership.
- The District will continue to monitor, gather and analyze data and trends relating to chloride.
- The District will continue to train plumbers and other professionals and engage with regional partners, peer organizations, other states and nationally regarding Salt Wise Soft Water and Blending Valves.

SECTION VI: CERTIFICATION

I certify that the information contained in this document and all attachments were gathered and prepared under my supervision and based on inquiry of people directly under my supervision and that, to the best of my knowledge, the information is true, accurate and complete.

Eric Dundee, P.E.

Executive Director, Madison Metropolitan Sewerage District

01/29/2025

Date

SECTION VII: ATTACHMENTS

Attachment A: 2024 WI Salt Wise Activities to Date

Attachment B: 2024 Various Outreach

- Package of information distributed to area home inspectors: the folder includes a welcome letter explaining treasured local water resources, encouraging the new homeowners to do their part in keeping the waters clean – includes resources about clean sweep, plant dane, water softeners, I&I reduction/checking laterals, and more!
- General chloride tri-fold – new (to be distributed at the plant and events)
- In development: Informational brochure distributed to utility workers. It is something they can hand out during cross connection inspection/meter swap outs
- Improvements to the softener self-screen: 94 self-screens taken this year
- New web page added about partial softening – including generalized blending valve hand-out & specific blending valve asset for Middleton pilot

List of Salt-Specific Social Media Posts to Date

1/1/2024 – FB, X – Reduce salt use at home
1/2/2024 – FB, X, LI – Salt Awareness Week Webinars
1/22/24 – FB, X, LI – Building WI video from 2023
1/23/24 – FB, X, LI – Efficiency Navigator blog
1/25/24 – FB, LI – Water Test Strips video
1/26/24 – FB, X, IG – softener screen
2/6/24 – FB, X, IG, LI – Today's Home Remodeler
3/5/24 – FB, X, LI – US Forest Products Lab on Channel 3000
4/4/24 – FB, X, LI – Building WI video from 2024
6/5/24 – FB, X, LI – Reducing water softener salt use
6/10/24 – FB, X – Salt Wise salt reduction webinars
7/19/24 – FB – Testing Outdoor Hoses for Soft Water
7/25/24 – FB – Fall Smart Salt Trainings
8/14/24 – FB – Blending Valves
8/29/24 – FB – Low Salt Design Podcast Reshare
8/30/24 – FB – Today's Home Remodeler Reshare
9/5/24 – FB – WI Salt Wise Classes & Midwest Salt Symposium
9/24/24 – FB – 10 Years of Success from Chloride Reduction Grants
10/1/24 – FB – Blending Valve Partnership (Dave Jones & Tim O'Brien Homes)
10/14/24 – FB – Smart Salting for Parking Lots & Sidewalks Training Class & Open House
10/21/24 – FB – Blending Valve Partnership (Dave Jones & Tim O'Brien Homes) Training
12/9/24 – FB - #HardWaterHacks debut
12/28/24 – FB – Water Softeners

Salt-Related Blog/Web Content

1/22/24 – Chloride reduction grant expands reach of Efficiency Navigator program

2/1/24 – Chloride reduction grant awarded to Forest Products Lab for brine innovation (backdated for winter relevance)
6/2/24 – Reduce water softener salt use to protect freshwater systems
9/24/24 – 10 years of success with Road Salt Reduction Grants
12/2/24 - #hardWaterHacks – Bottled Water & Small Appliances
12/18/24 – Winter Salt Week addresses a freshwater pollutant

E-Newsletters

May 2024 – Efficiency Navigator grant featured
Jan 2024 – Salt Awareness Week webinars
Sept 2024 – Winter is coming, Let's make it less salty

Hardness Test Strips

The District began offering "hose-bibb test kits" since 2018, as recommended in NR 106.90(2)(a)2.,5. Source Reduction Tier 1 actions, and, as a way to evaluate the reduction possibility and cost for completing an NR 106.90(4)(a)2., Tier 3 action in the future:

Each kit costs about $2.25 including the cost of the instruction card, the envelope, postage, and the 3-4 test strips provided. In 2023, the process for administering these kits was evaluated (reported on a previous annual report). A new process was implemented Nov. 2023, and since then, 92 kits have been sent out. The new automation process has increased the amount of information we get back from requestors – this has led to us having a better idea of the kit efficacy.