

**SUMMARY NOTES OF THE NOVEMBER 13, 2024, MEETING OF THE
TECHNICAL ADVISORY COMMITTEE FOR
A CHLORIDE IMPACT STUDY FOR THE SOUTHEASTERN WISCONSIN REGION**

INTRODUCTION

The November 13, 2024, meeting of the Technical Advisory Committee (TAC) for *A Chloride Impact Study for the Southeastern Wisconsin Region* (Study) was convened online at 10:03 a.m. The meeting was called to order by Committee Chairman Thomas M. Grisa, Director of Public Works, City of Brookfield. Mr. Grisa welcomed the attendees to the meeting. Attendance was taken using the online software.

Members Present

Thomas M. Grisa, Chairman.....Director, Department of Public Works, City of Brookfield
Laura K. Herrick, Secretary Chief Environmental Engineer, SEWRPC
Mandy Bonneville.....Deputy Director, County Conservationist, Walworth County
Brian CaterInterim Director of Public Works/City Engineer, City of Kenosha
Cody Churchill.....Winter Maintenance Engineer, WisDOT
Steven R. Corsi Research Hydrologist, Chemistry, U.S. Geological Survey
Craig Helker..... Water Resources Biologist, WDNR
Richard Hough Director of Public Works, Walworth County
Samantha J. Katt Urban Stormwater Specialist, Wisconsin Department of Natural Resources
Matthew T. MagruderEnvironmental Research Manager, Milwaukee Metropolitan Sewerage District
Cheryl Nenn Riverkeeper, Milwaukee Riverkeeper
Charles J. Paradis Assistant Professor, Department of Geosciences UWM
Scott Schmidt.....Chief Public Works Officer, Washington County Highway Department
David Strifling Director, Water Law and Policy Initiative, Marquette University Law School

Guests and Staff Present

David Buser Hydrogeologist, WDNR
Karin M. Hollister Principal Engineer, SEWRPC
Collin A. Klaubauf..... Engineer, SEWRPC
James M. Mahoney Engineer, SEWRPC
Nicklaus J. Neureuther.....Specialist, SEWRPC
Aaron W. Owens.....Senior Planner, SEWRPC
Justin P. Poinatte Principal Specialist, SEWRPC
Thomas M. Slawski Chief Biologist, SEWRPC

Ms. Herrick introduced the presenters and the agenda for the meeting to review portions of SEWRPC Technical Report No. 63, *Chloride Conditions and Trends in Southeast Wisconsin* and Technical Report No. 66, *State of the Art in Chloride Management*.

[Secretary’s Note: The agenda for this meeting is attached herein as Exhibit A.]

**REVIEW OF THE SUMMARY NOTES FROM THE APRIL 17, 2024,
TECHNICAL ADVISORY COMMITTEE MEETING**

Ms. Herrick asked the TAC for any comments or edits for the Summary Notes from the April 17, 2024, TAC meeting. That meeting reviewed the full draft Technical Report No. 64, *Regression Analysis of Specific Conductance and Chloride Concentrations*, and the Report was published in May 2024. TAC members offered no questions or comments on the Summary Notes.

REVIEW OF A PART OF SEWRPC TECHNICAL REPORT NO. 63, *CHLORIDE CONDITIONS AND TRENDS IN SOUTHEAST WISCONSIN*

TR-63 Chapter 1 Introduction

At Ms. Herrick's request, Mr. Slawski introduced the draft TR-63 chapters to be reviewed at this TAC meeting, which were Chapters 1, and then portions of Chapter 2 and Chapter 5. He then briefly reviewed draft Chapter 1 "Introduction" of TR-63. This introductory chapter puts this Report into context for the Study and lays out the format for the Report chapters. TAC members offered no questions or comments for draft Chapter 1.

TR-63 Chapter 2 Study Area Background

Mr. Owens explained that the purpose of Chapter 2 was to provide some context for later chapters in the Report that assess chloride conditions and trends in the waterways of the study area. Mr. Owens then began the review of draft Chapter 2 of TR-63 with Section 2.1 "Study Area Characteristics," reviewing planning level data for the study area. Mr. Owens indicated that a critical factor impacting chloride conditions in the study area was the type, amount, and locations of certain land uses. He reviewed the historical trends in land use and urban development based on Commission land use inventories ranging from 1963 to 2020. Mr. Owens described the land use trends in the study area with an emphasis on the percentage of urban land uses and the percentage of road and parking lot land uses within the watersheds and subwatersheds.

Mr. Owens also summarized the characterization of the study area based on other potential factors that could impact chloride conditions and trends in the surface water and groundwater of the study area. This included characterization of active and abandoned wastewater treatment facilities, stormwater management, sources of water supply, and areas vulnerable to groundwater contamination. Finally, Mr. Owens indicated that Section 2.1 also included subsections characterizing each major watershed in the study area on a finer scale. These watershed characterizations were based on the same factors that were used to assess the study area as a whole.

Ms. Hollister continued the review of draft Chapter 2 with Section 2.2 "Regional Climate Conditions and Trends." She reviewed the sources of climate data for the study area, with a focus on the Study monitoring period from 2018 to 2021. The monitoring period climate data for temperature, precipitation, and snowfall, were compared with the respective normal values for the 1991-2020 period. Temperatures during the Study monitoring period began near normal and transitioned to warmer than normal conditions during the latter half of the period, starting with the 2019-2020 winter season. Ms. Hollister reviewed precipitation during the Study monitoring period, highlighting 2018 and 2019 as the wettest years on record for the Region. Wetter than normal conditions at the beginning of the Study transitioned to predominantly drier than normal conditions by the end of the Study. Ms. Hollister noted that during the Study monitoring period, the Region experienced higher than normal snowfall for the 2018-2019 winter season followed by near normal snowfall totals for the following two winters.

Ms. Hollister also reviewed climate trends from 1950 to 2023 published by the Wisconsin Initiative on Climate Change Impacts (WICCI). WICCI temperature and precipitation trends show that the Region is getting warmer and wetter. The most significant warming trends have been observed for winter temperatures and overnight temperatures, when it is usually the coldest. Overall, the WICCI analyses have concluded that Wisconsin is experiencing more extreme rainfall events, with increased frequency and magnitude.

Ms. Hollister continued the review of draft Chapter 2 with Section 2.3 “Relative Measures of Winter Severity” which are used to compare winter seasons over time and put current conditions into historical context. She reviewed both the WisDOT Winter Severity Index (WSI) and the Midwest Regional Climate Center Accumulated Winter Season Severity Index (AWSSI). Ms. Hollister noted that both the regional average WSI and the AWSSI for Milwaukee follow similar trends, and the WSI correlates well with regional snowfall totals and regional road salt usage. The Study monitoring period winters were not abnormally severe and were fairly consistent with the range of severity index values seen from 1992 to 2023.

Ms. Herrick concluded the review of draft Chapter 2 with Section 2.5 “Water Quality Standards.” She noted that Wisconsin’s chronic and acute standards for chloride are comparable to the standards from neighboring states and Canada. This Section also includes a discussion on if the state chloride standards are protective to biological communities. Lower chloride thresholds were first introduced in TR-62, and some of these lower values will be used in the draft Chapter 5 discussion on lake chloride trends.

TAC members offered no questions or comments for the above sections of draft Chapter 2.

TR-63 Chapter 5 Conditions and Trends: Lakes

Mr. Neureuther began the review of draft Chapter 5 with Section 5.1 “Introduction.” He noted that in the early 1900s chloride levels in lakes in the study area were about 5 mg/l or less. Chloride levels in lakes began to rise in the 1960s and the period from the 1960s to the present will be the focus of this Chapter.

Mr. Neureuther continued the review of draft Chapter 5 with Section 5.2 “Regional Lake Background Information.” He described the summary of study area lakes which included lake size, depth, watershed size, and residence times.

Mr. Poinatte next discussed draft Chapter 5 Section 5.3 “Data Collection and Organization.” He described the lake chloride and conductance data available for the study area, commenting that most of the lakes had little to no data. Of the 803 lakes in the study area, only 45 lakes had enough chloride data to analyze trends over time. Mr. Poinatte also noted the significant amount of time required to clean the lake dataset for analysis.

Mr. Neureuther finished the review of draft Chapter 5 with Section 5.4 “Recent Chloride Conditions of Region Lakes.” He noted that none of the study lakes with data exceeded the chronic standard (395 mg/l) for chloride. But many of the lakes exceed lower thresholds indicating impacts on biological communities. Lake watershed data was created using the WDNR Water Explorer (WEx) tool, and mean lake chloride concentrations correlated strongly with their watershed percent urban land use and percent roads and parking lots. It was also noted that mean annual chloride concentrations in lakes within the “Recent Chloride Conditions” period were greater than any prior concentrations over the entire period of record for all of our lakes with chloride data. Hence, in general, chloride concentrations among the Region lakes are getting worse (i.e., increasing) with time, and those trends will be summarized in more detail in subsequent sections of this report.

TAC members offered no questions or comments for the above sections of draft Chapter 5.

REVIEW OF A PORTION OF SEWRPC TECHNICAL REPORT NO. 66, *STATE OF THE ART IN CHLORIDE MANAGEMENT*

TR-66 Chapter 1 Introduction

At Ms. Herrick's request, Mr. Owens briefly reviewed draft Chapter 1 "Introduction" of TR-66. This introductory chapter puts this Report into the context of the entire Chloride Impact Study and lays out the format for the Report chapters. TAC members offered no questions or comments for draft Chapter 1.

TR-66 Chapter 3 Chloride Management at Municipal Water and Wastewater Utilities

Mr. Mahoney began a review of draft TR-66 Chapter 3 with Section 3.1 "Introduction." He noted that the primary source of chloride to municipal wastewater treatment plants (WWTPs) is waste from ion-exchange water softeners at homes and businesses. Mr. Mahoney commented that traditional wastewater treatment plant processes do not remove chloride.

Mr. Mahoney continued with a review of draft Chapter 3 Section 3.2 "Sources of Chloride to WWTPs and Chloride Effluent Limits." Other sources of chloride to WWTPs include human waste, household products, industrial waste, infiltration and inflow of runoff to sanitary sewers, and chloride-containing compounds used in wastewater treatment. He commented that as of January 2024 there are 14 WWTPs with discharge chloride variances in the study area.

Mr. Mahoney continued with the review of draft Chapter 3 with Section 3.3 "Chloride Removal Alternatives at WWTPs." He reviewed the processes of reverse osmosis (RO), electrodialysis reversal (EDR), and ion exchange (IX) for WWTPs to remove chloride. All these processes produce a waste brine with a high chloride concentration. This waste brine can be reduced and then disposed of in a landfill or reused for deicing. He noted that chloride disposal in a landfill may lead to chloride groundwater contamination in the long term. Mr. Mahoney noted that for reuse the waste brine would need to be analyzed to confirm no harmful constituents exist. Also, the waste brine would need to be stored during non-winter times, and that storage volume required may be significant. Mr. Mahoney presented costs for RO at municipal WWTPs and noted that the available dataset of costs was limited and varied significantly. He also noted that chloride removal at WWTPs is typically significantly more expensive than centralized softening as a chloride reduction alternative.

Mr. Mahoney continued with the review of draft Chapter 3 with Section 3.4 "Centralized Softening at Water Supply Facilities." He noted that RO, EDR, and IX can also be done at a central water supply facility, and the technology is the same as was discussed at WWTPs. Mr. Mahoney therefore presented lime softening and distillation as additional options at water supply facilities (WSFs). He commented that some hardness will need to be retained in the treated water supply to protect the scale on the distribution pipes. This therefore would mean that home and business softeners may still be needed to satisfy consumer expectations. All the centralized softening processes at WSFs would also produce a waste product, but this would be predominantly calcium and magnesium for RO and EDR while IX waste would also include high chloride concentrations. The waste stream containing mostly dislodged hardness constituents would need to be conveyed to the WWTP with potentially significant costs, while the IX waste stream would need separate treatment processes due to the presence of chloride. Capital costs for lime softening and RO were presented, and cost varied greatly for a reasonably sized dataset. Overall, the lowest cost water treatment technology would be IX, but this would require additional waste treatment processes to avoid contributing additional chloride to the WWTP.

Mr. Mahoney completed the review of draft Chapter 3 with Section 3.5 "Other Municipal Chloride Reduction Alternatives." These other options include softening at individual wellheads, improving the

efficiency of home/business softening, and water quality trading. Mr. Schmidt asked if there was a rule of thumb for optimal salt usage in residential water softeners. For example, a typical family of four should use about X pounds of water softener salt per month/year. Mr. Mahoney replied that TR-66 Chapter 4 will tackle the state of the art for private water softeners and this topic will be discussed in that Chapter.

TAC members offered no other questions or comments for the above sections of draft Chapter 3.

NEXT STEPS FOR THE PLAN

Ms. Herrick stated that comments will be taken on the draft TR-63 and TR-66 chapters reviewed during this TAC meeting until December 6, 2024. She added that comments on the draft TR-63 and TR-66 text can also be submitted through the Study webpage at www.sewrpc.org/chloride-study or directly to Tom (tslawski@sewrpc.org) or Aaron (aowens@sewrpc.org) respectively.

Ms. Herrick reviewed the next steps for the Study. Work will continue with research and report writing, developing loading analyses, analyzing chloride conditions and trends, and gathering information on state-of-the-art practices. She stated that she anticipates that the next TAC meeting will be in spring 2025 and consist of a review of a portion of TR-65, which documents the chloride mass balance analysis. She indicated that meeting presentations and summary notes along with draft chapters will be posted on the SEWRPC project website at www.sewrpc.org/chloride-study. Ms. Herrick noted that with the new SEWRPC website the TAC materials (agendas, summary notes) can be found under the Committee tab on the right hand side of the Study webpage.

ADJOURNMENT

There being no further business, the meeting was adjourned by unanimous consent at 12:03 p.m.

Respectfully submitted,

Laura Herrick
Recording Secretary

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11/19/24, 12/6/24, 12/13/24

Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

**TECHNICAL ADVISORY COMMITTEE FOR
A CHLORIDE IMPACT STUDY FOR THE SOUTHEASTERN WISCONSIN REGION**

DATE: Wednesday, November 13, 2024

TIME: 10:00 am to Noon

ZOOM LINK: <https://zoom.us/j/98072990385?pwd=kTyIkZ5ZAZJLqeBOflUtK1CIsAkf4U.1>

Meeting ID: 980 7299 0385

Passcode: 076111

Dial in for audio if needed (312) 626-6799

AGENDA:

1. Roll call
2. Review of [summary notes](#) from the April 17, 2024, TAC meeting
3. Review of a portion of **SEWRPC Technical Report No. 63, Chloride Conditions and Trends in SE Wisconsin**
 - a. [Chapter 1 – Introduction](#)
 - b. [Chapter 2 – Study Area Background \(part\)](#)
 - i. [Appendix A – Characteristics of Major Watersheds in the Study Area](#)
 - c. [Chapter 5 – Conditions and Trends: Lakes \(part\)](#)
 - i. [Appendix – Lake Chloride and Conductance Plots](#)
4. Review of a portion of **SEWRPC Technical Report No. 66, State of the Art in Chloride Management**
 - a. [Chapter 1 – Introduction](#)
 - b. [Chapter 3 – Municipal Water and Wastewater Utilities](#)
 - i. [Appendix X – Calculations for Chloride Removal at WWTPs Costs](#)
5. Next steps
6. Adjourn

Laura K. Herrick
Chief Environmental Engineer