Washington County Water Consortium

December 3, 2025
2 to 3:15 pm
Remote meeting – Zoom
(If you are not on the Consortium listserv, please email
Adriana.Atcheson@washingtoncountymn.gov for the Zoom link and access code)

Agenda

2:00 – 2:05 **Welcome**
Introductions, Announcements

2:05 – 2:20 **Metropolitan Council's Updated Metro Area Water Supply Plan**

Topic: This presentation describes the Met Council's Metro Area Water Supply Plan update, including stakeholder input and how it can be used to guide cities' and watersheds' water supply planning work.

Presenter: Lanya Ross – Environmental Analyst, Metropolitan Council

2:20 – 3:00 **Navigating Salinity Shift: A Multi-Faceted Approach to Understanding Salinization in Urban Lakes**

Topic: Hailey is a research scientist specializing in aquatic microbial ecology and environmental change. Her work bridges molecular biology, limnology, and biogeochemistry to understand how human-driven stressors alter freshwater systems. She recently helped lead an LCCMR-funded project that used high-frequency monitoring, paleolimnology, and modeling to identify salinity tipping points in urban lakes, and assessed how chloride pollution alters mixing, oxygen dynamics, and nutrient cycling.

Presenter: Hailey Sauer – Research Scientist, Science Museum of Minnesota's St. Croix Watershed Research Station

3:00– 3:15 **Washington County Groundwater Plan Update**

Topic: The Washington County Board has recently adopted the 2025-2035 Washington County Groundwater Plan. The plan is a comprehensive document that lays out the technical framework, issues, goals, strategies, and actions to address existing and future groundwater-related problems. Hear about the process of plan development, components of the plan, and implementation.

Presenter: Smita Rakshit – Public Health Program Supervisor, Washington County Public Health & Environment

Updated Metro Area Water Supply Plan

Part of the 2050 Water Policy Plan and Imagine 2050

December 3, 2026

Washington County Water Consortium

METROPOLITAN COUNCIL

Regional Planning Cycle

Imagine 2050 Vision

A prosperous, equitable, and resilient region with **abundant opportunities for all to live, work, play, and thrive.**

Regional Goals

- Equitable and inclusive communities
- Healthy and safe communities
- Dynamic and resilient region
- Leadership in addressing climate change
- Protection and restoration of natural systems

Imagine 2050: Water Policy Plan

High-quality water is essential for a healthy environment, thriving economy, and public health.

- Create climate-resilient water resources, ecosystems, and water infrastructure through innovative design and adaptive planning.
- Optimize regional water protection, planning, and infrastructure investments.
- Promote universal accessibility to water services and benefits.
- Maintain watershed-based management strategy that fosters collaboration across political boundaries.
- Integrate water management, from water supply to wastewater systems to surface waters.

IMAGINE 2050

Metropolitan Council

Why the Met Council Developed and Updates the Metro Area Water Supply Plan

MN Statute 473.1565

- Responsibility to develop a metro area water supply plan was established in 2004; the first plan was approved in 2010
- The plan has been updated twice since then – in 2015 and again in 2025 – to reflect updated regional policies
- Plan is prepared in cooperation with and approved by a metropolitan area water supply advisory committee:
  - Provides guidance
  - Emphasizes conservation, cooperation, and long-term sustainability
  - Addresses reliability, security, and cost-effectiveness

Met Council Environmental Service's Vision & Mission

We partner, plan, and provide services to ensure clean water for future generations.

Funding for Regional Water Supply Planning

METROPOLITAN COUNCIL

CLEAN WATER LAND & LEGACY AMENDMENT

What the Plan *Is* and *Is Not*

- ***Is*** a regional guide connecting regional goals and policies to strategies that support water supply planning
- ***Does*** recognize that water is all connected
- ***Is*** intended to strengthen and align planning efforts, not to add burden

- ***Is not*** a regulatory document
- ***Does not*** replace local plans
- ***Is not*** prescriptive – it provides tools and direction, but local decisions remain local

An Iterative, Collaborative Process

2020 Met Council report on 2005-2020 regional water supply planning activities to MN Legislature

2021 MAWSAC and TAC provide initial input on priority issues

2022 MAWSAC and TAC report on water supply planning recommendations to Met Council and MN Legislature

2023 Subregional engagement approach established, and policy drafted based on research papers

2024 Completed subregional engagement and finalized policy for public comment period

2025 Planned Council adoption of MAWSAC-approved Metro Area Water Supply Plan, with Imagine 2050

Water Supply Advisory Committees Provided Direction and Framing

MAWSAC

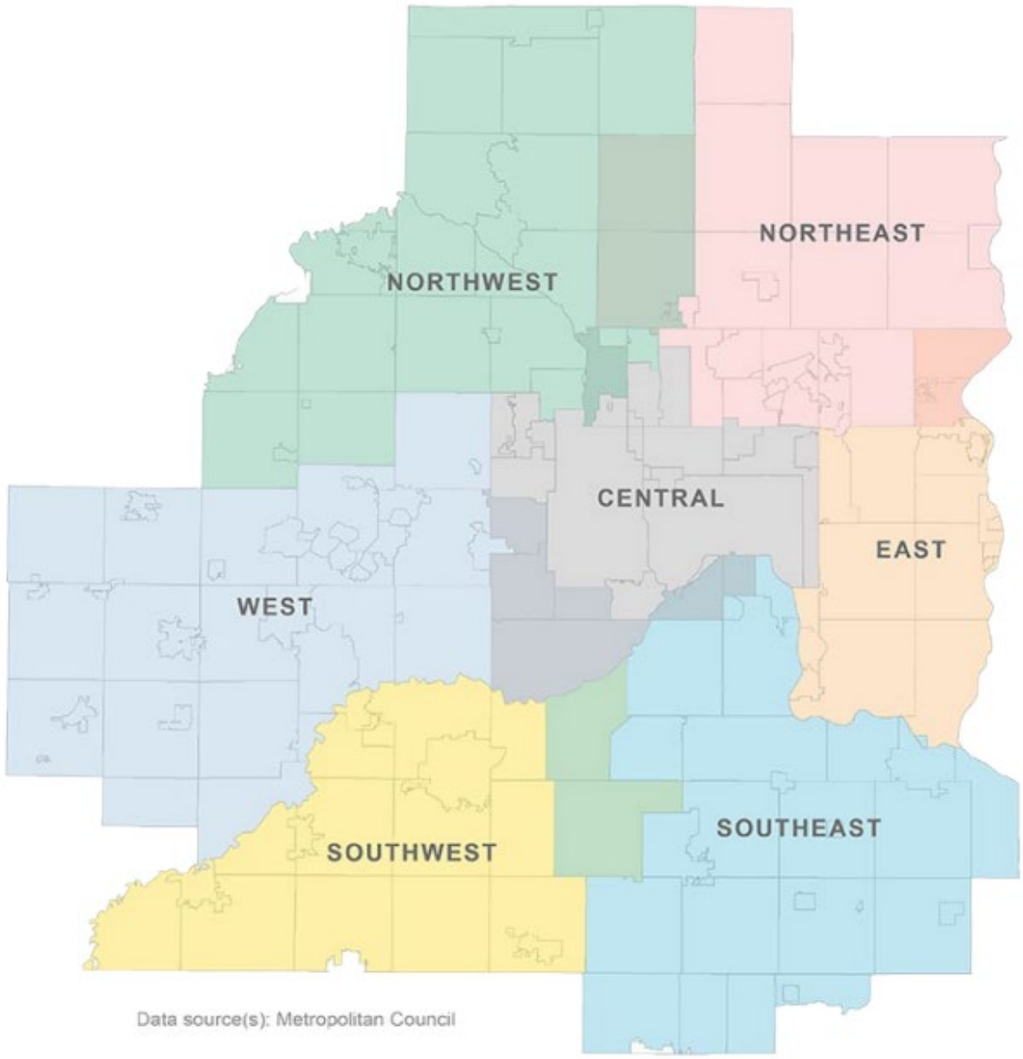
- MDA, MDH, DNR, MPCA
- Two officials from metro counties
- Five officials of non-county LGUs
- Metropolitan Council
- Chisago, Isanti, Sherburne, and Wright counties
- St. Paul Regional Water Services
- Minneapolis Water Department

TAC

- Single-city public water supply systems
- Multicity public water supply systems
- Experts in water resources analysis
- Experts in hydrology
- Experts in engineering, planning, design and construction of water systems or water system finance

Many contributed ideas to subregional chapters

- Overall, around 150 people participated
- 23 engagements over 7 months
- 76 cities and townships represented
- 44 non-community organizations represented:
  - 14 watershed organizations
  - 12 county and county soil water conservation districts
  - 5 state agencies
  - 5 consulting firms
  - 3 private large-volume water users
  - 3 nonprofits/advocacy groups
  - 1 community advisory group member (Washington County Groundwater Plan)
  - 1 tribe
- Included updates to CONDAC, Water Utility Council, and MDH staff working on the Minnesota Drinking Water Plan

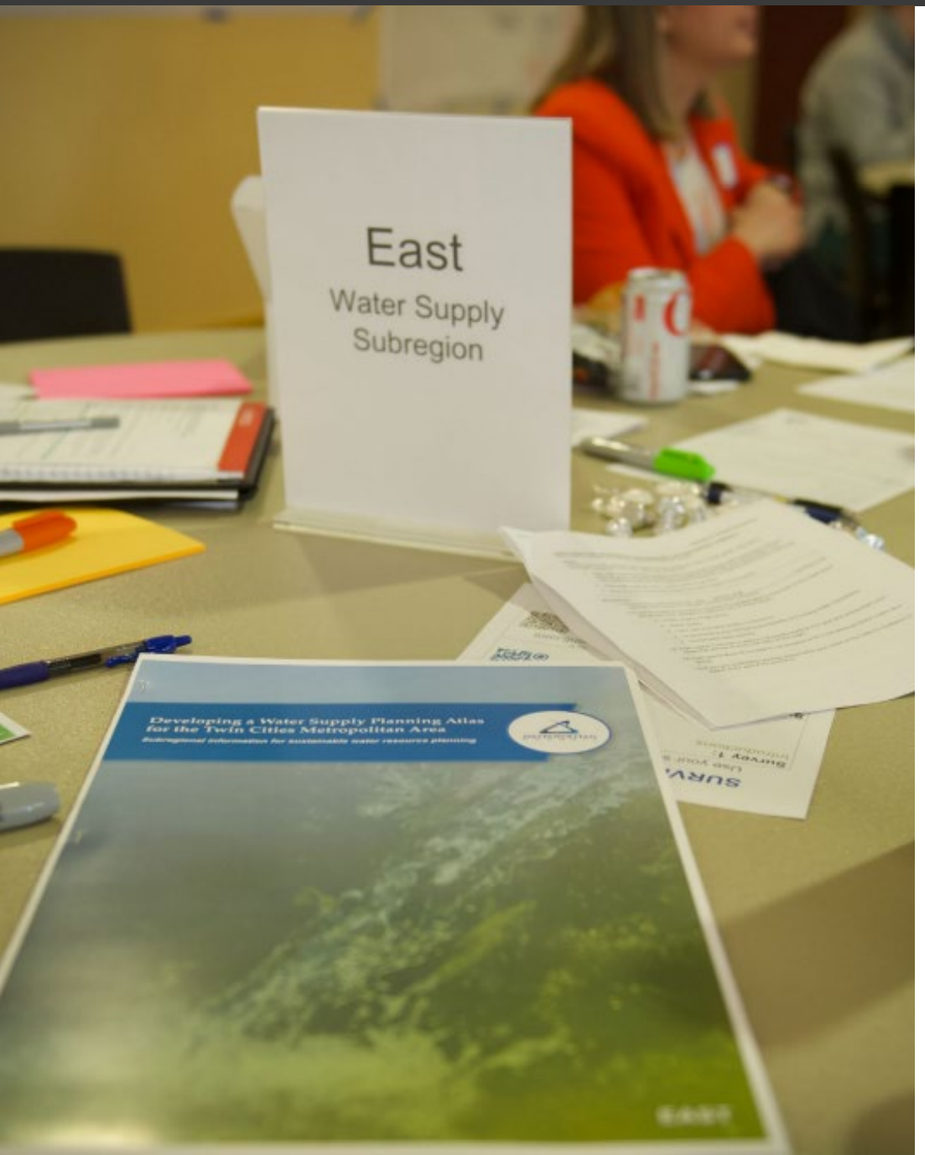


Engagement Continued Throughout the Process

The public comment process was a final check that stakeholder input was included as it was intended

- 50 detailed comments received
  - 12 cities and townships
  - 3 counties
  - 2 non-governmental organizations
  - 1 state agency (Minnesota Department of Health)
- Over half of comments resulted in plan revisions
- About a third were advisory and did not result in changes
- 8 comments were related to subregional content
- 6 comments were more closely related to the Water Policy Plan or Land Use Policy (outside the Metro Area Water Supply Plan)

Stakeholder Input: What Worked, and What Did We Learn?



Successes

- Broad regional agreement around water sustainability
- Local partners helped identify subregional issues, opportunities
- A process that helped strengthen relationships

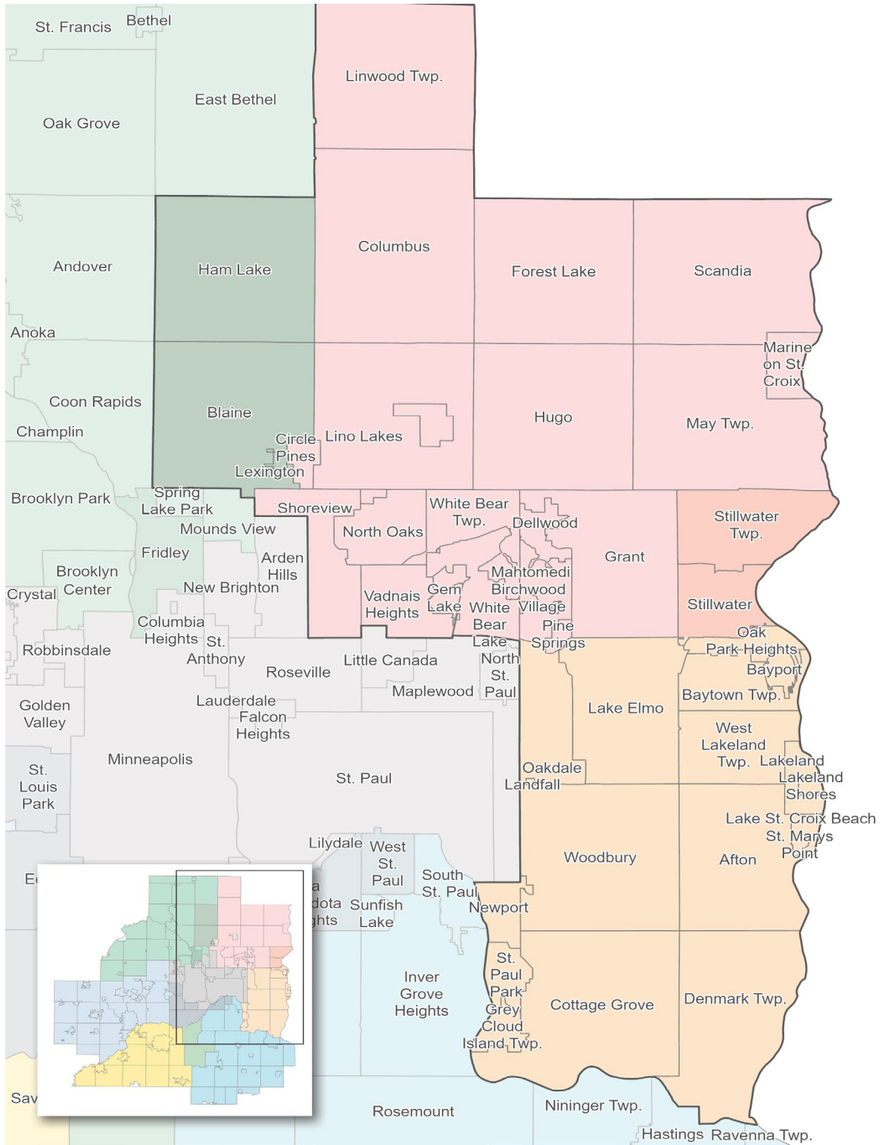
Challenges

- Water supply issues vary widely across the region
- Concerns about the complexity of water planning, confusing roles

Lessons Learned

- People want clearer connections between regional guidance and local comprehensive plan requirements
- There is strong interest in practical tools and case studies, not just policy language
- ***There is strong appetite for collaboration – many partners expressed interest in continuing subregional conversations beyond the plan update process***

Phase 2 Subregional Engagement in the East/Northeast Metro



Purpose:

- Provide a space for water and planning professionals to collaborate and coordinate on water issues facing the East/Northeast region, discussing possible projects, partnerships, and other topics of interest

Additional Objectives:

- Work together to implement parts of the Metro Area Water Supply Plan that each subregion helped develop during Phase 1 engagement
- Phase 1 focused primarily on water supply, we would like to pursue a more integrated approach to water planning moving forward

Lila Franklin
Senior Planner, Water Policy and Planning
Lila.Franklin@metc.state.mn.us

IMAGINE 2050

Metropolitan Council

Find the Metro Area Water Supply Plan on the Met Council website

To explore the separate elements in a web page format:

https://imagine2050.metrocouncil.org/reference-materials/water/water-supply-plan/

To download the PDF version:

https://imagine2050.metrocouncil.org/media/rtxjni3c/imagine-2050-water-policy-plan-ada.pdf#page=117

Why a City or Watershed Would Use This Plan

"Your downstream water is someone else's upstream water."

Why a City or Watershed Would Use This Plan

- It supports your local comprehensive plan and watershed plan updates.
- It guides implementation projects that can benefit local partners.
- It supports subregional collaboration.

Related Resources

- **Local Planning Handbook:** https://handbook.metrocouncil.org/
- **Climate resources:** https://handbook.metrocouncil.org/required-plan-elements/climate/
- **Natural systems resources:** https://handbook.metrocouncil.org/required-plan-elements/natural-systems/
- **Priority Waters List:** https://metrocouncil.org/Wastewater-Water/Planning/Water-Resources-Management/Priority-Waters-List.aspx
- **Water planning resources:** https://handbook.metrocouncil.org/required-plan-elements/water-resources/
- **Water Supply Planning Atlas:** https://metrocouncil.org/Wastewater-Water/Planning/Water-Supply-Planning/Basics/Atlas.aspx

Together, we can foster a more prosperous future for our region and future generations.

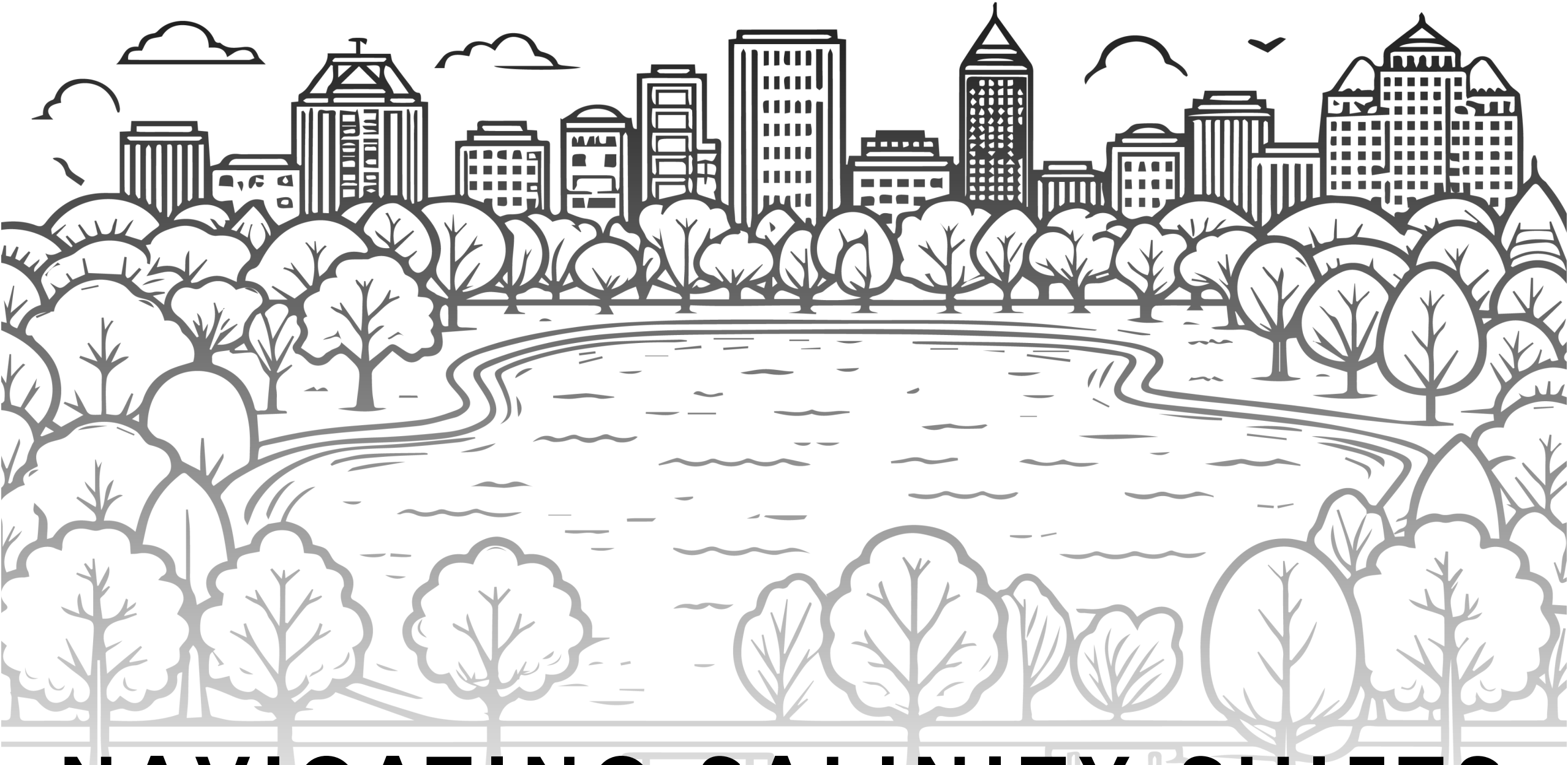
Questions?

Lanya Ross
Environmental Analyst, Water Policy and Planning

Lila Franklin
Senior Planner, Water Policy and Planning
Lila.Franklin@metc.state.mn.us

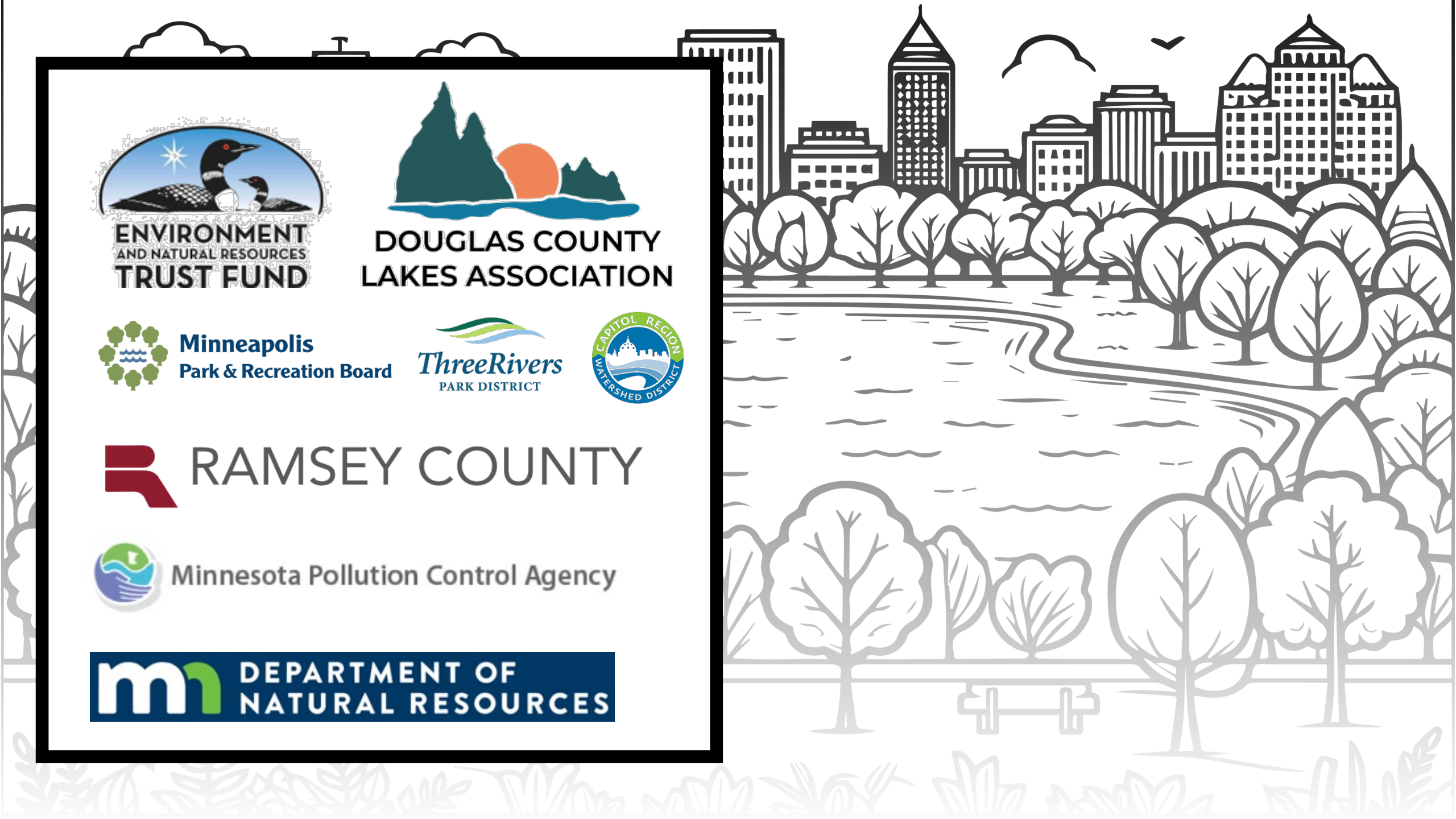
METROPOLITAN COUNCIL

IMAGINE 2050



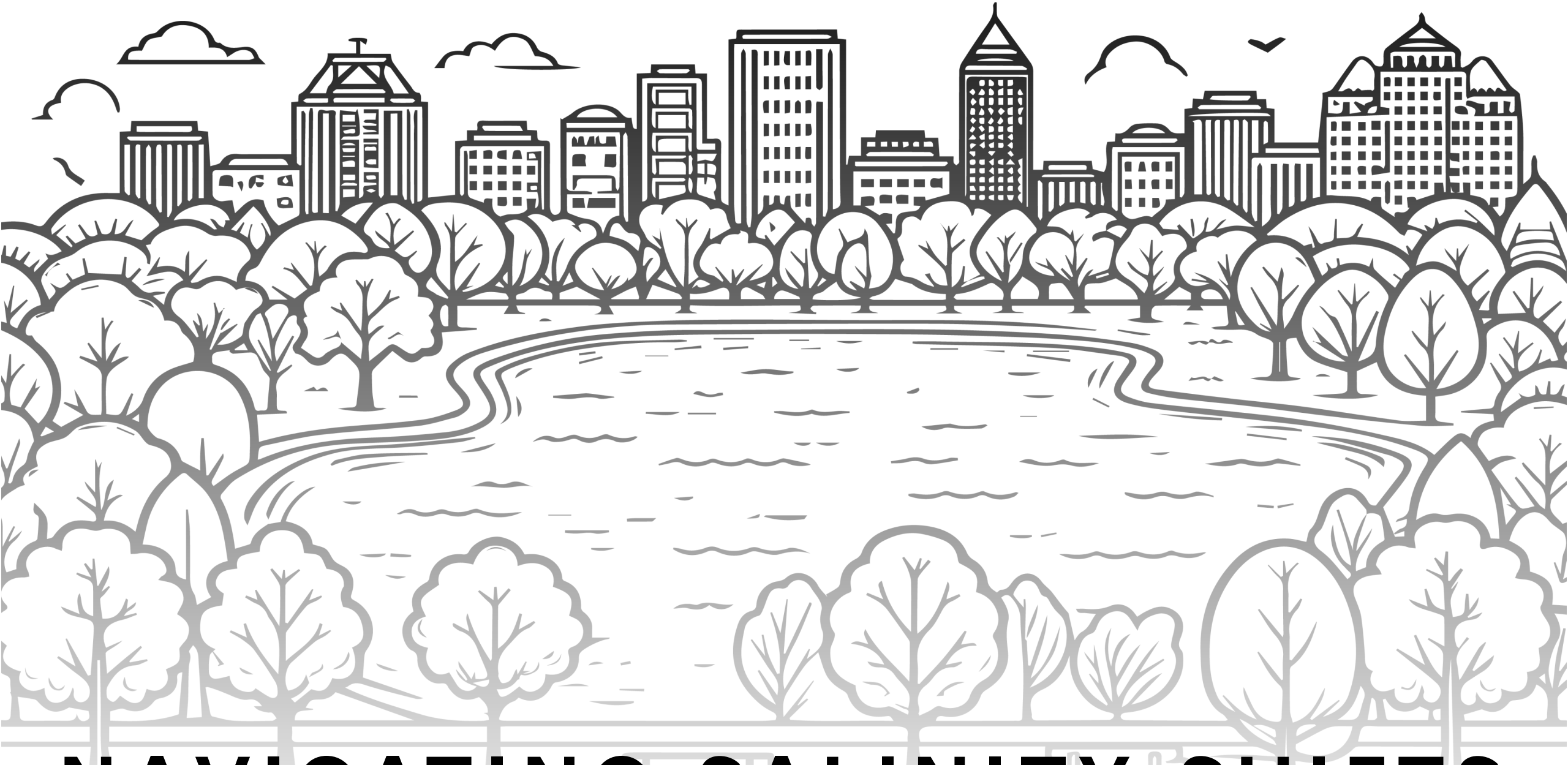
NAVIGATING SALINITY SHIFTS

A Multi-Faceted Approach to Understanding Freshwater Salinization in Urban Lakes


ENVIRONMENT
AND NATURAL RESOURCES
TRUST FUND
DOUGLAS COUNTY
LAKES ASSOCIATION
Minneapolis
Park & Recreation Board
ThreeRivers
PARK DISTRICT
CAPITOL REGION
WATERSHED DISTRICT
RAMSEY COUNTY
Minnesota Pollution Control Agency
DEPARTMENT OF
NATURAL RESOURCES


St. Croix Watershed
Research Station
Marine on St. Croix


We seek to better understand challenges facing clean water and humanity's relationship with our most precious resource.
Science Museum of Minnesota



NAVIGATING SALINITY SHIFTS

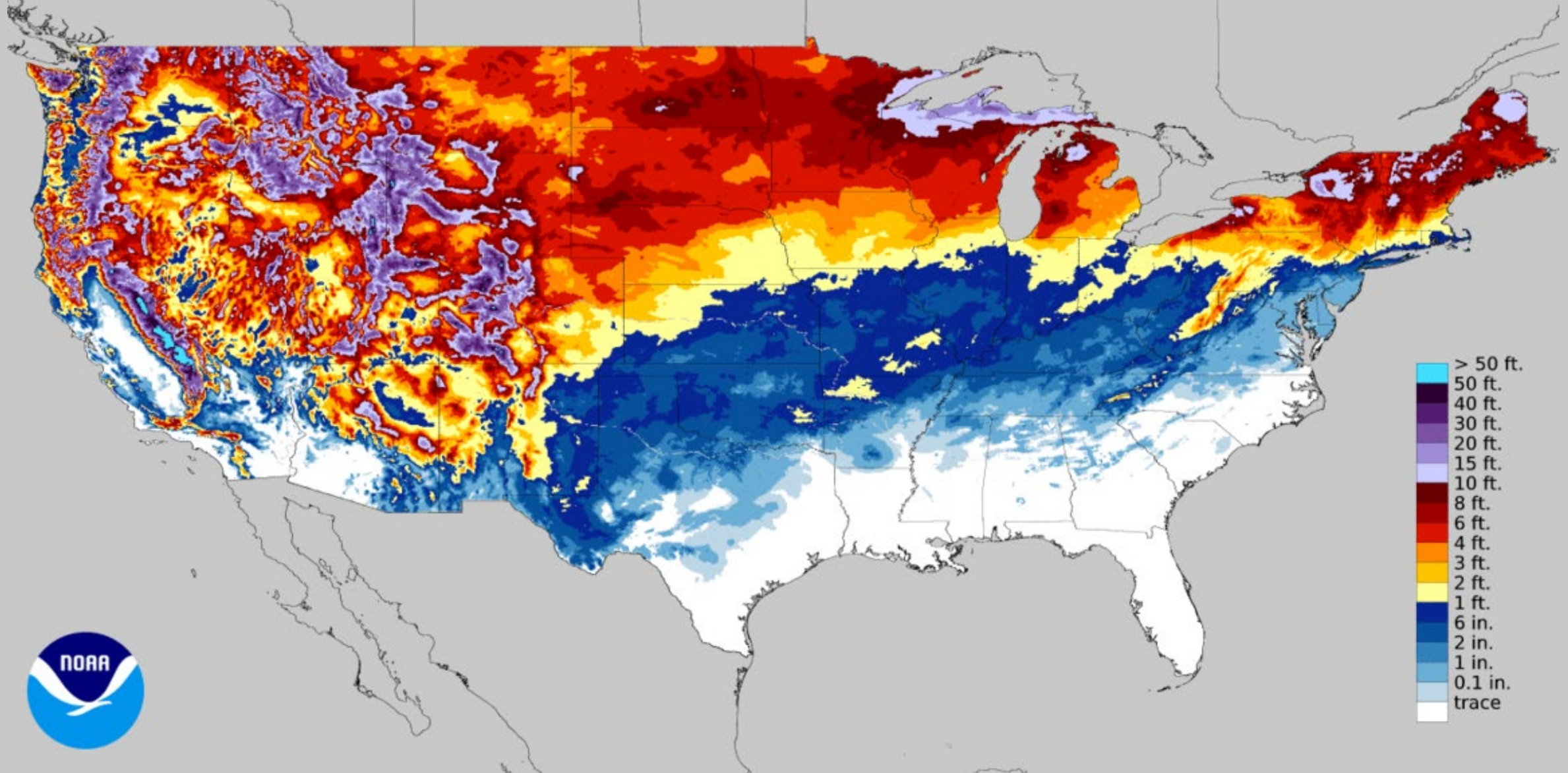
A Multi-Faceted Approach to Understanding Freshwater Salinization in Urban Lakes

70% of the US population lives in snow/ice affected areas

USDOT

SNOWFALL ACCUMULATION

2022-2023



African Elephant

African Elephant

13,000 lbs.

390 tons/mi

Stillwater Lift Bridge

12

African Elephant

13,000 lbs.

390 tons/mi

Stillwater Lift Bridge

SALT SAVES LIVES

reducing icy/snow related road deaths by ~80%

Hintz 2021

SALT

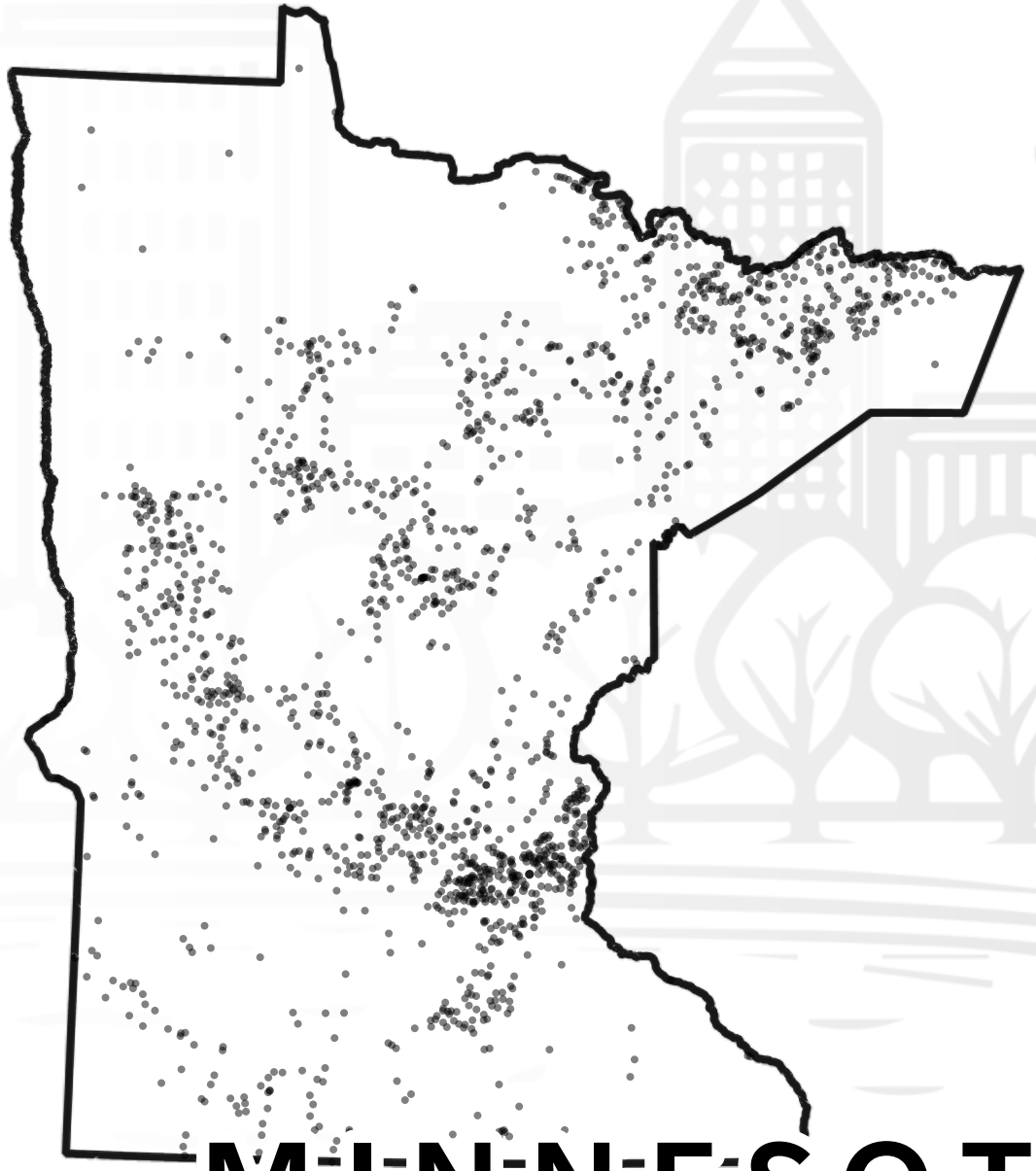
IS A POLLUTANT

contaminating ~45% of North America's lakes

Dugan 2017

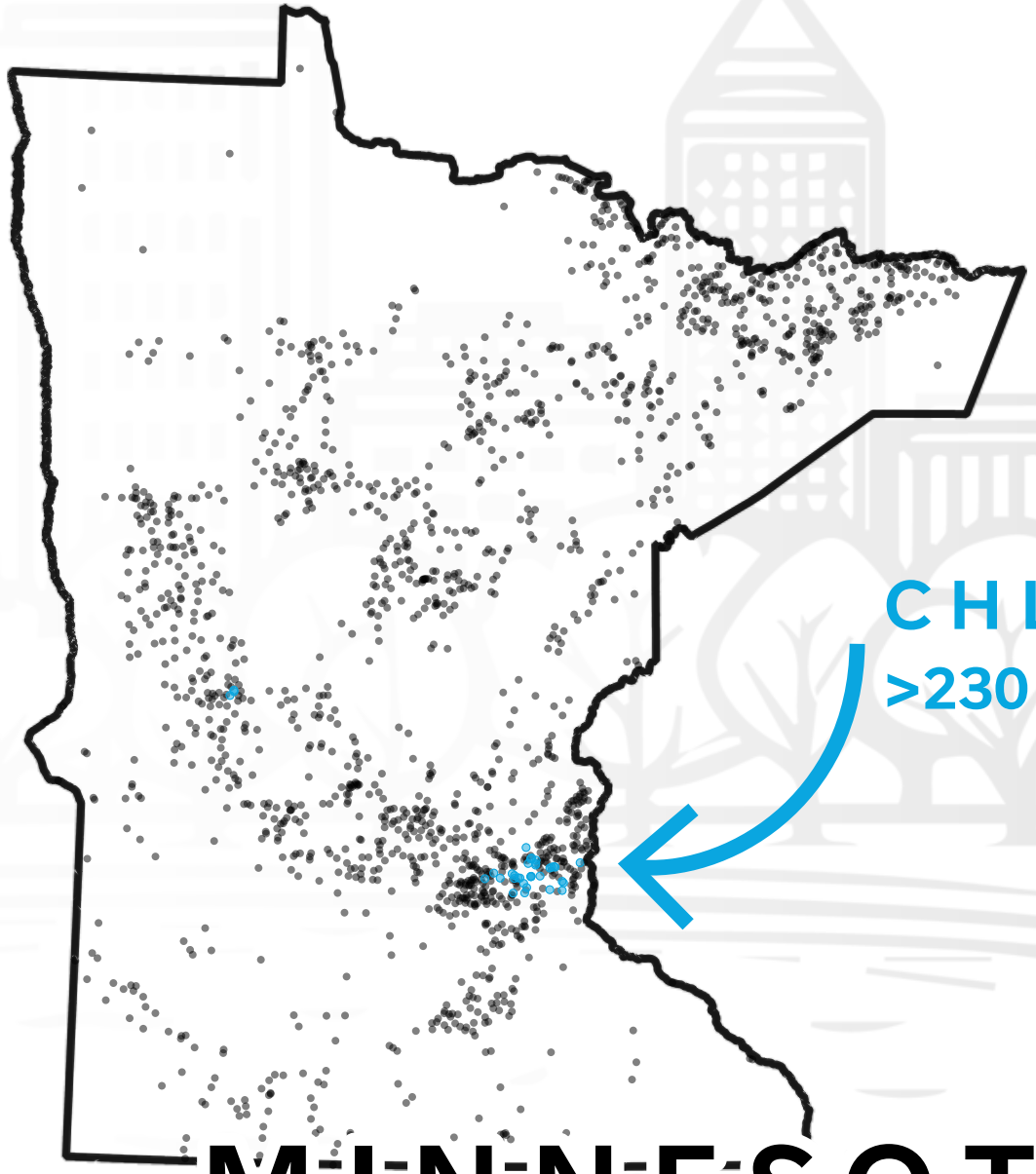
MINNESOTA

Land of 10,000 Lakes



MINNESOTA

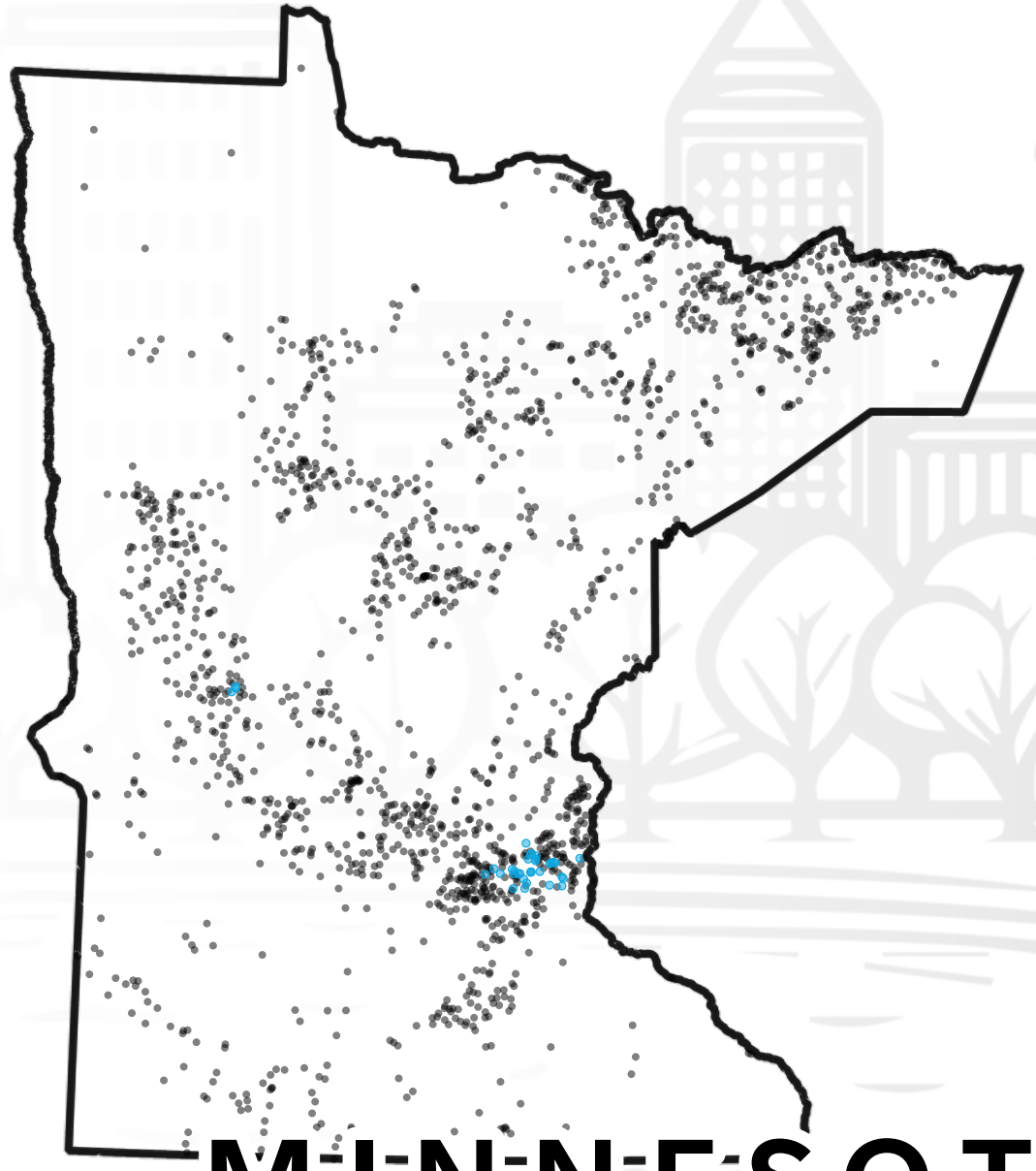
Land of 10,000 Lakes



CHLORIDE IMPAIRED
>230 mg/L

MINNESOTA

Land of 10,000 Lakes



MINNESOTA

Land of 10,000 Lakes

CHLORIDE

Acute Toxicity | 860 mg/L

Chronic Toxicity | 230 mg/L

Wood Frog Tadpoles | ~1600 mg/L

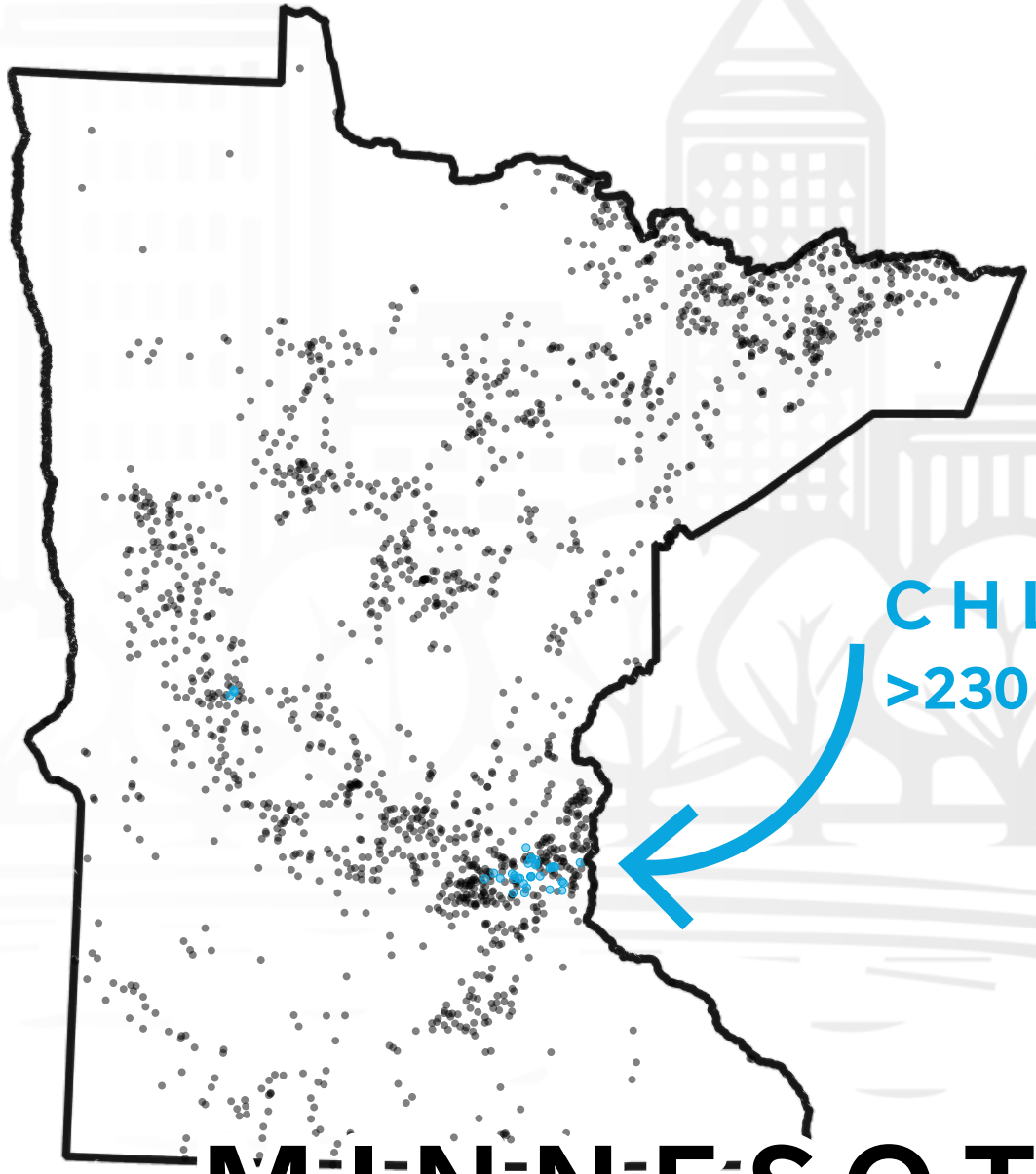
Caddisfly | 2,000 – 8,000 mg/L

Mayfly | 400 – 3,000 mg/L

Bluegill | 6,000 – 12,000 mg/L

Fathead Minnow | 4,500 – 6,500 mg/L

** LC50 for organisms dependent upon time and temperature conditions.*



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MINNESOTA

Land of 10,000 Lakes

CHLORIDE IMPAIRED
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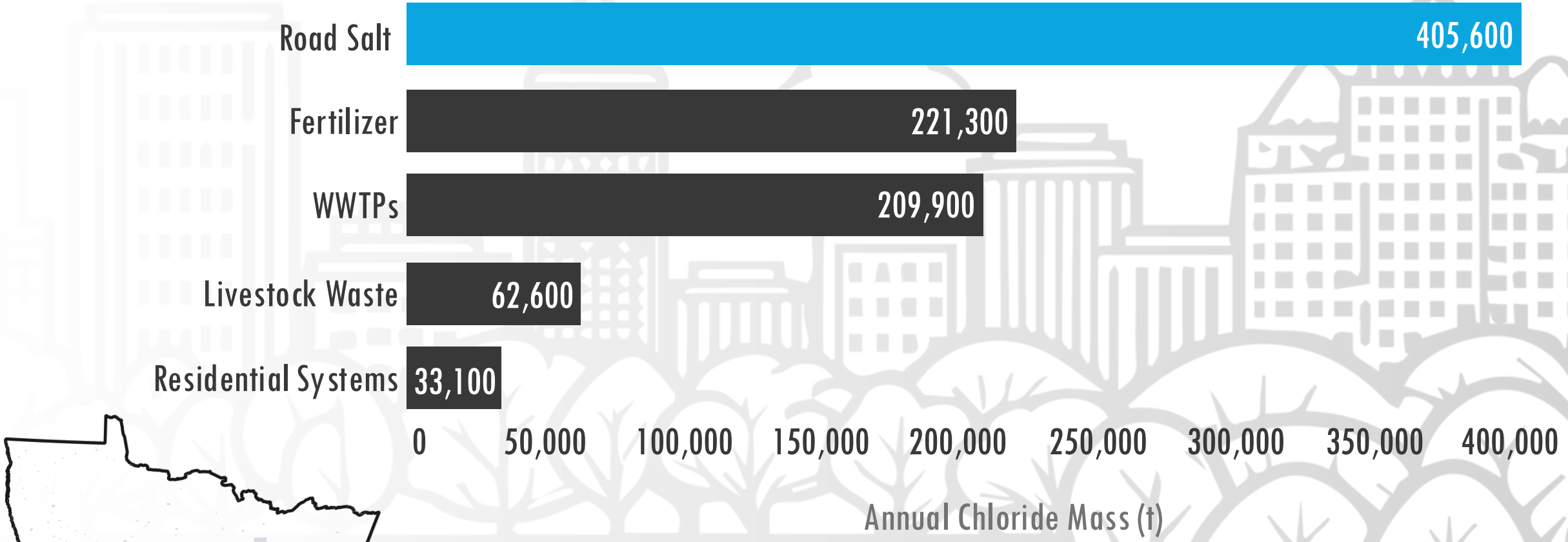
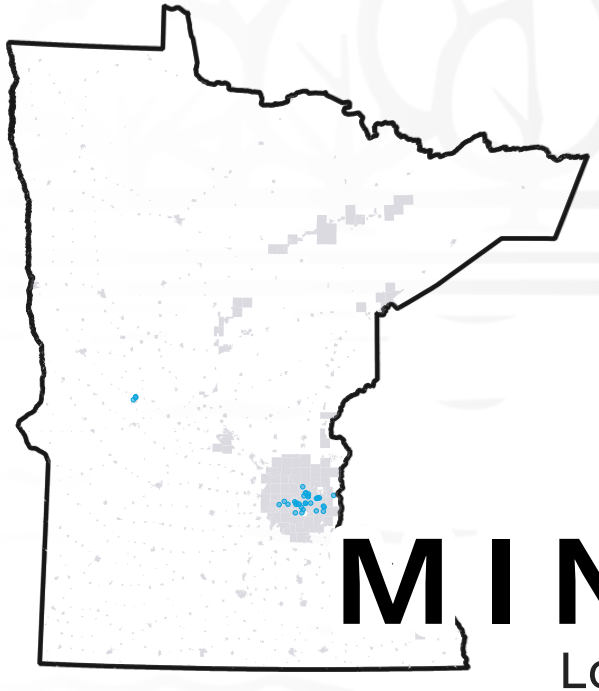
MINNESOTA

Land of 10,000 Lakes

CHLORIDE BUDGET





MINNESOTA

Land of 10,000 Lakes

Overbo et al., 2021; STOTEN

NAVIGATING SALINITY SHIFTS

A Multi-Faceted Approach to Understanding Freshwater Salinization in Urban Lakes

1

HISTORICAL CONTEXT

Analyze biological and geochemical signatures during periods of increased salinization.

2

CONTEMPORARY DYNAMICS

Evaluate how salinity impacts mixing and internal loading.

3

PROSPECTIVE OUTLOOK

Model the potential salinization tipping points – transition to meromixis.

4

THEORETICAL IMPLICATIONS

Explore the effects of alternative deicers on stratification and internal loading.

1

HISTORICAL CONTEXT

Analyze biological and geochemical signatures during periods of increased salinization.

2

CONTEMPORARY DYNAMICS

Evaluate how salinity impacts mixing and internal loading.

3

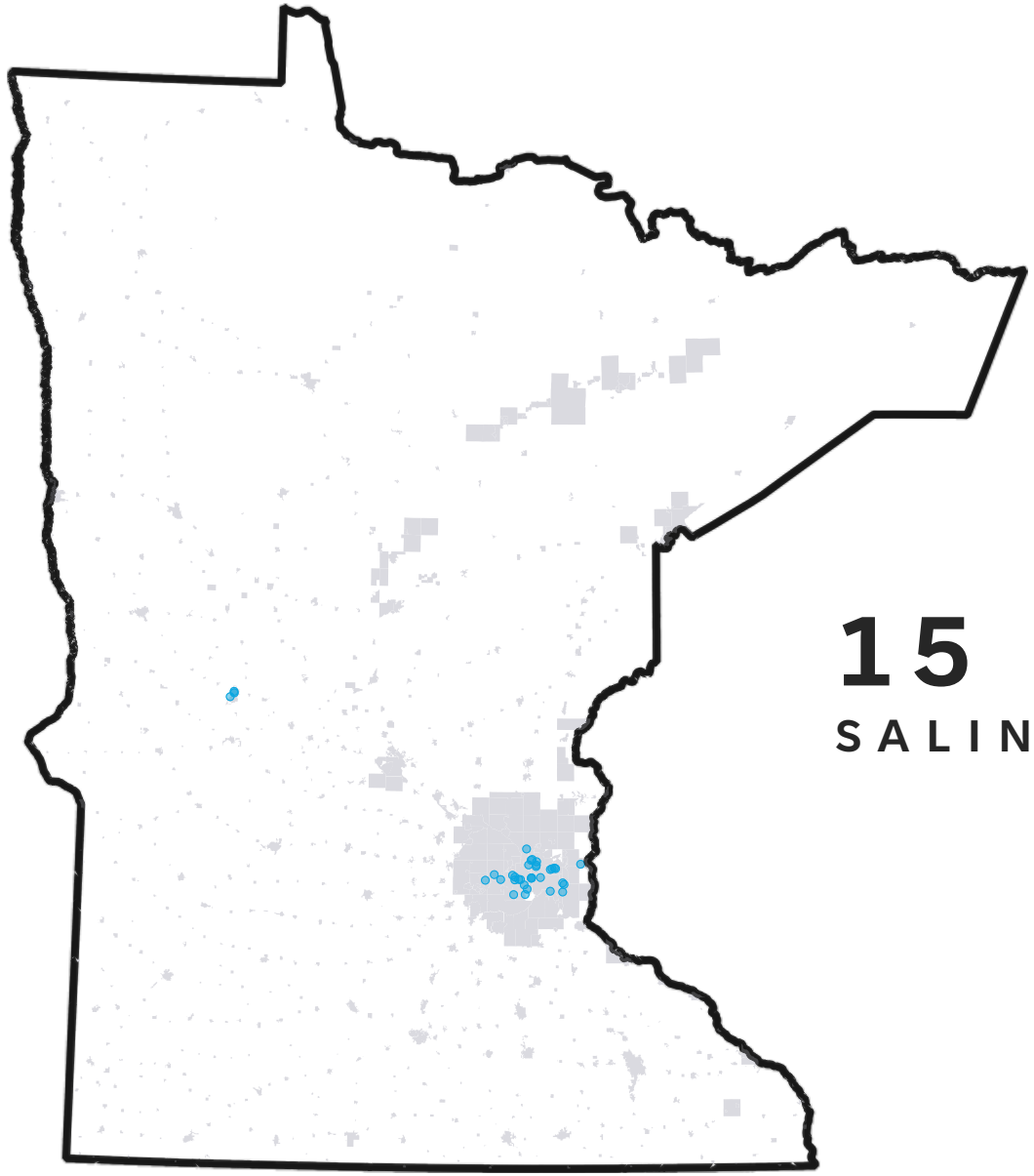
PROSPECTIVE OUTLOOK

Model the potential salinization tipping points – transition to meromixis.

4

THEORETICAL IMPLICATIONS

Proposed alternatives (potassium acetate) discovered to be more toxic to aquatic life and resulted in high biological oxygen demand (BOD).
- Cassidy 2022

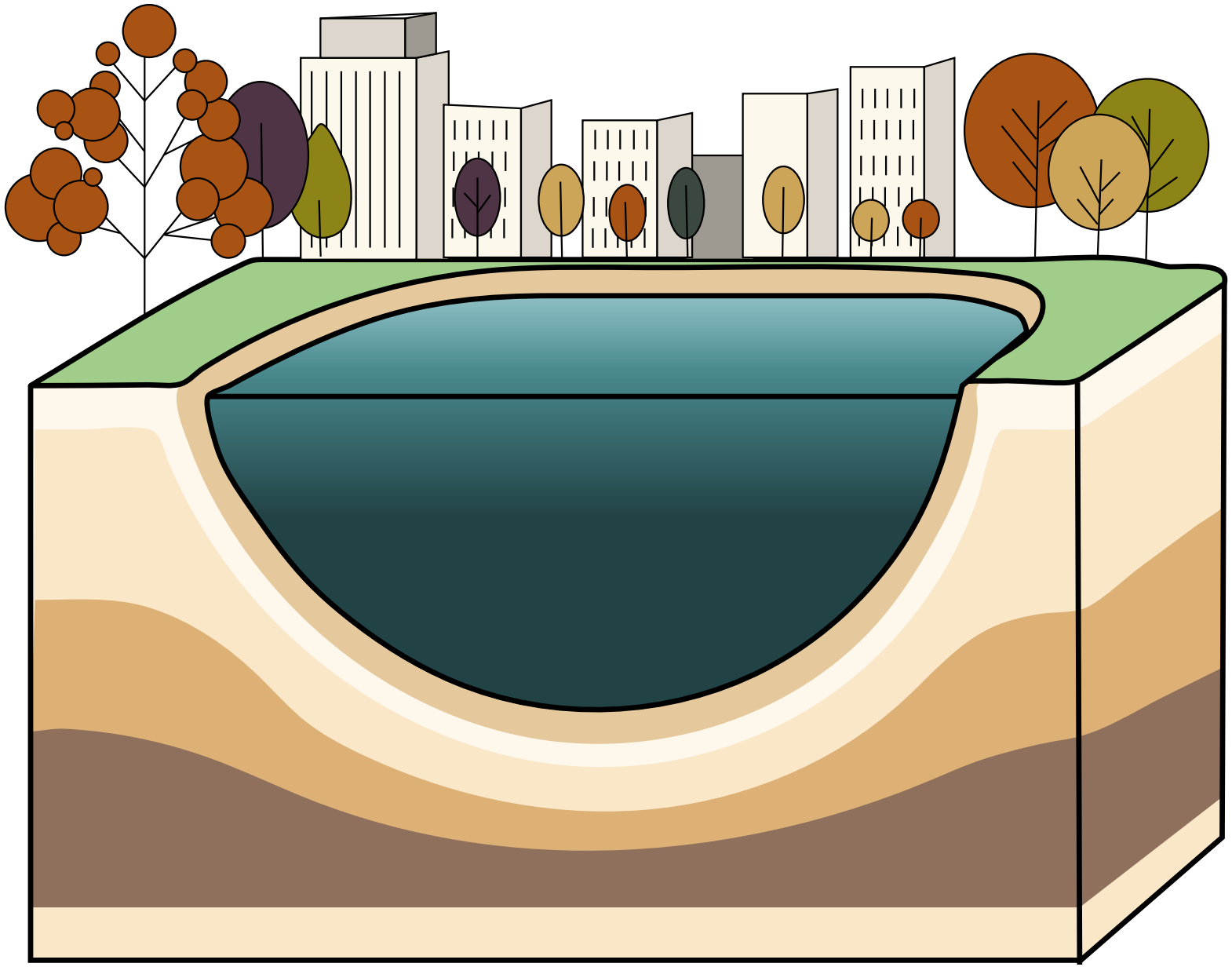


1

HISTORICAL CONTEXT

15 Lakes

SALINITY RANGE 52-1200mg/L



1

HISTORICAL CONTEXT

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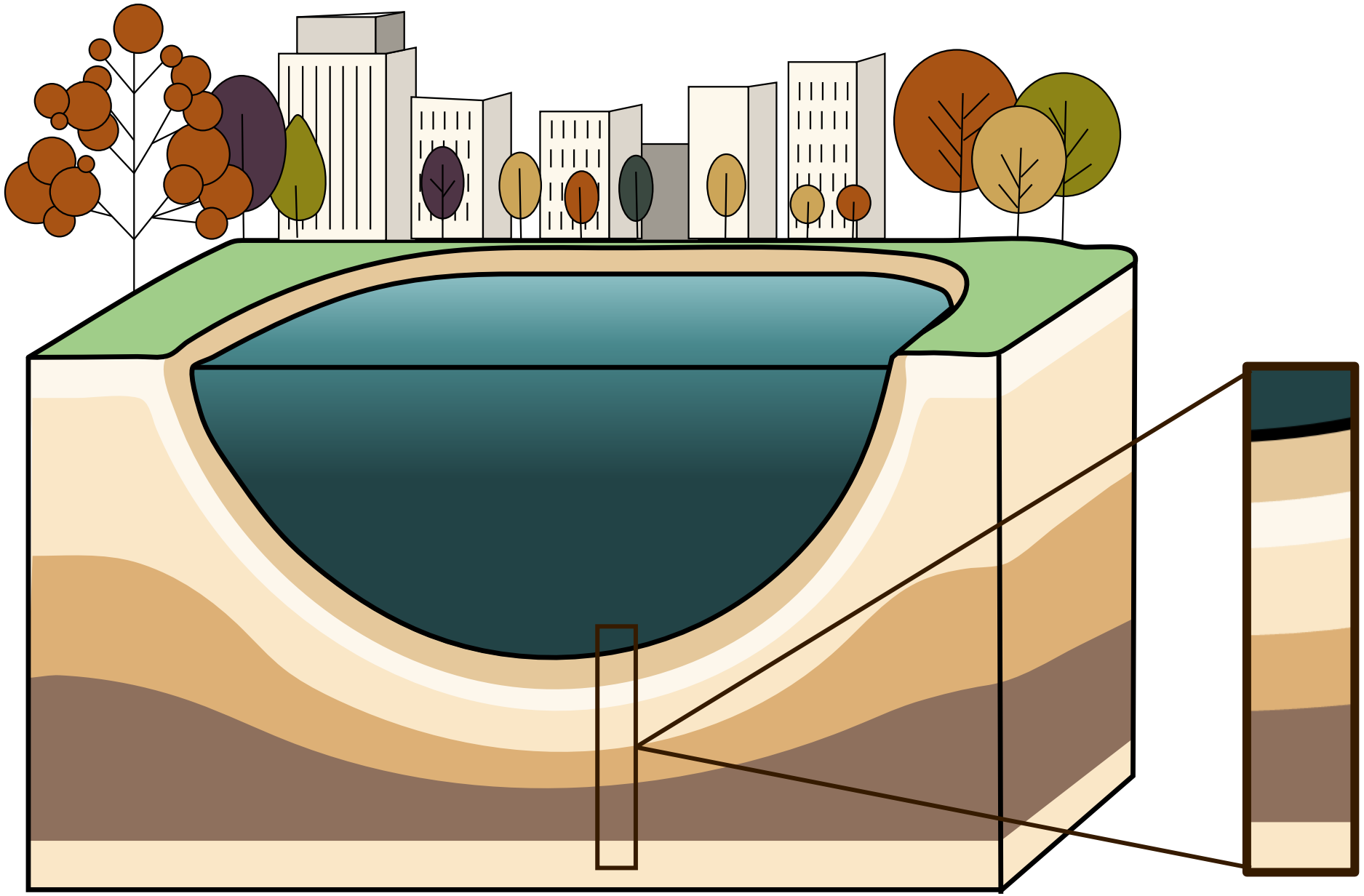
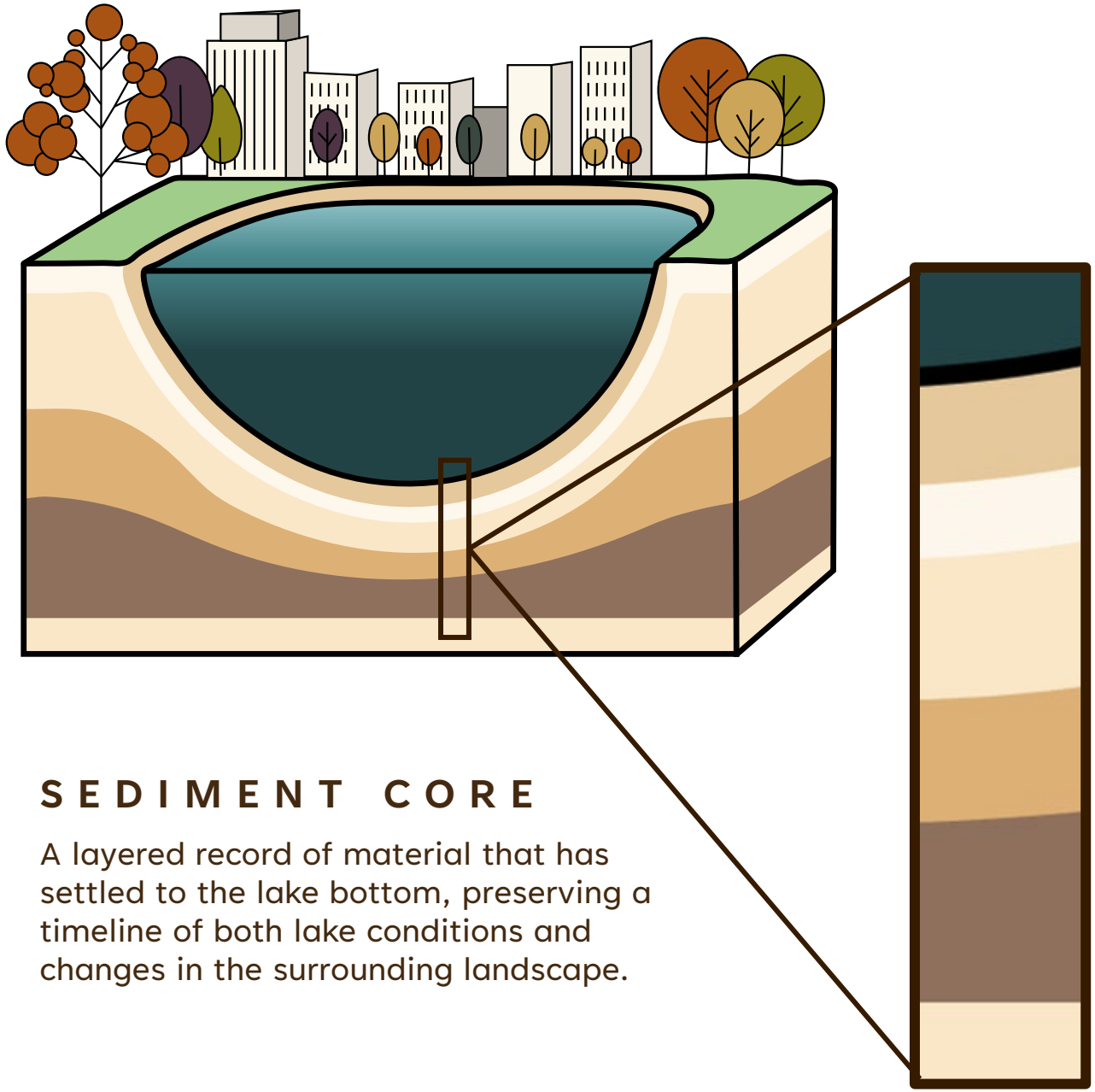


SEDIMENT CORE

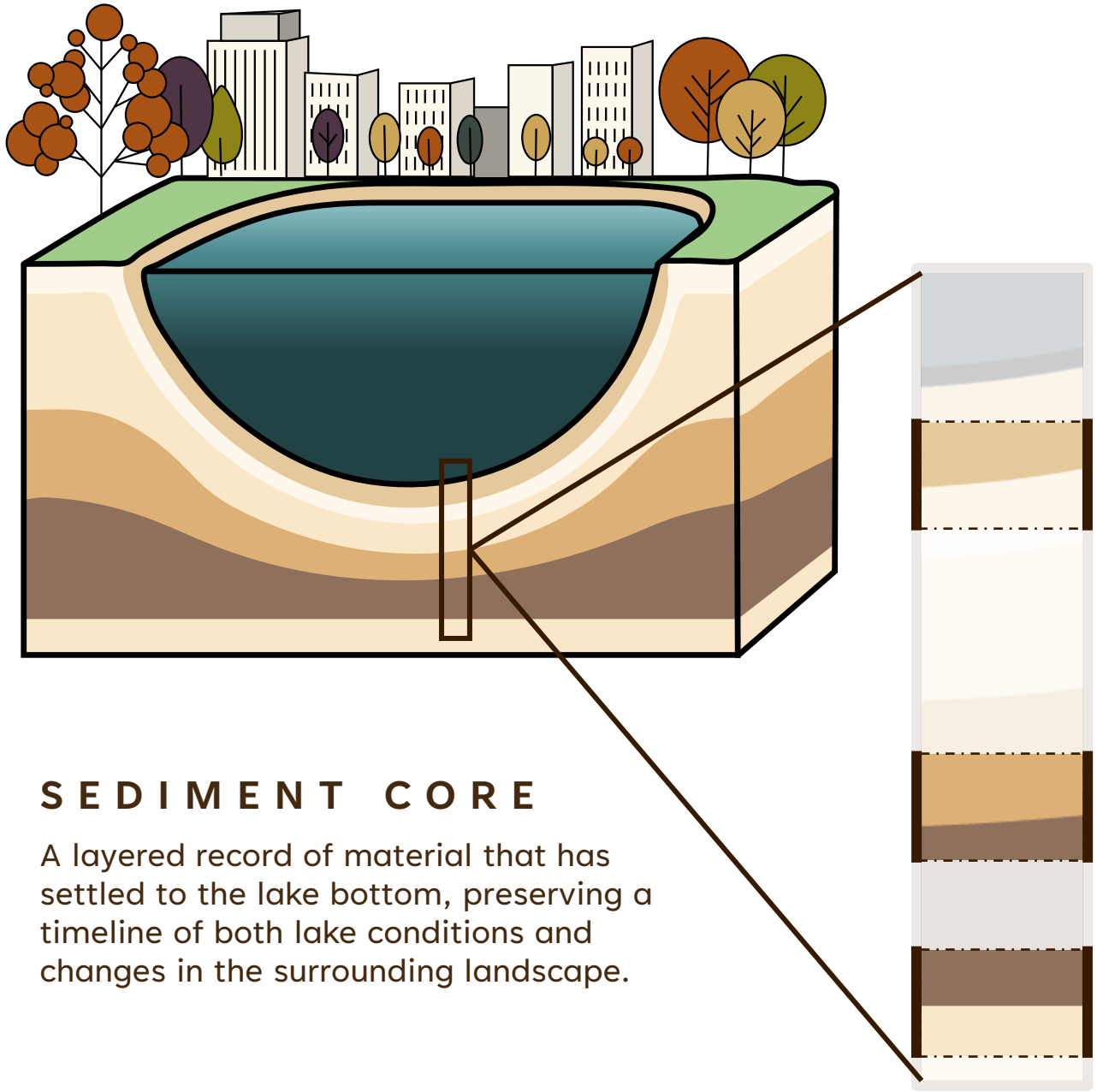


SEDIMENT CORE

A layered record of material that has settled to the lake bottom, preserving a timeline of both lake conditions and changes in the surrounding landscape.

1

HISTORICAL CONTEXT



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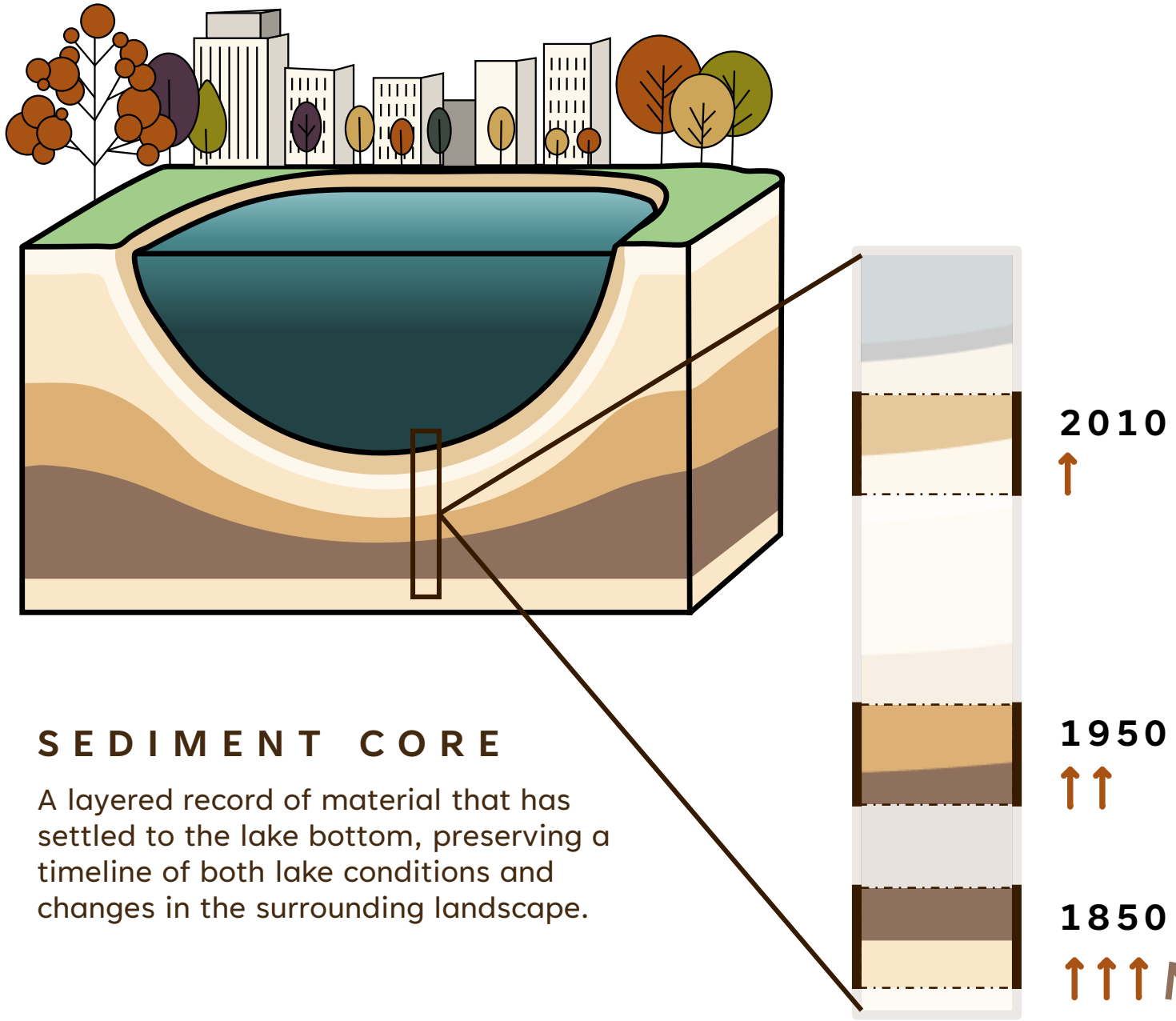

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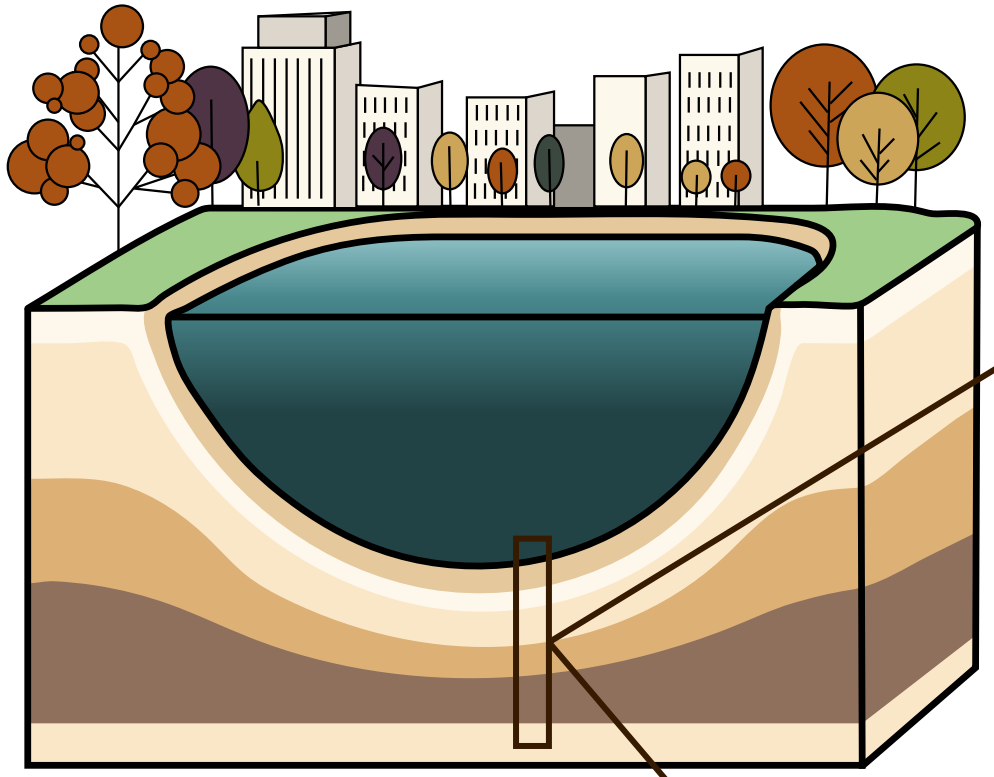
HISTORICAL CONTEXT

RADIOMETRIC DATING & SEDIMENT ACCUMULATION

Measuring isotopes (^{210}Pb & ^{137}Cs) to determine the date and from that calculate how fast sediments are accumulating.



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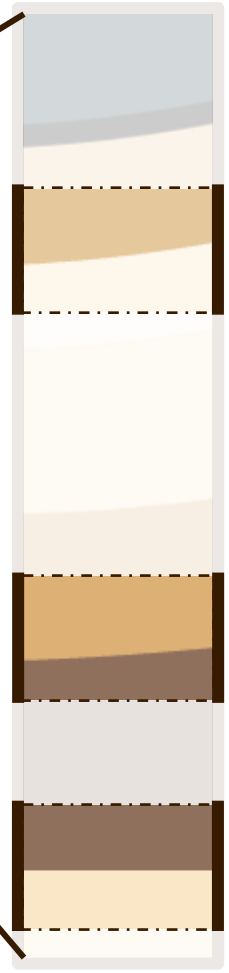
RADIOMETRIC DATING & SEDIMENT ACCUMULATION

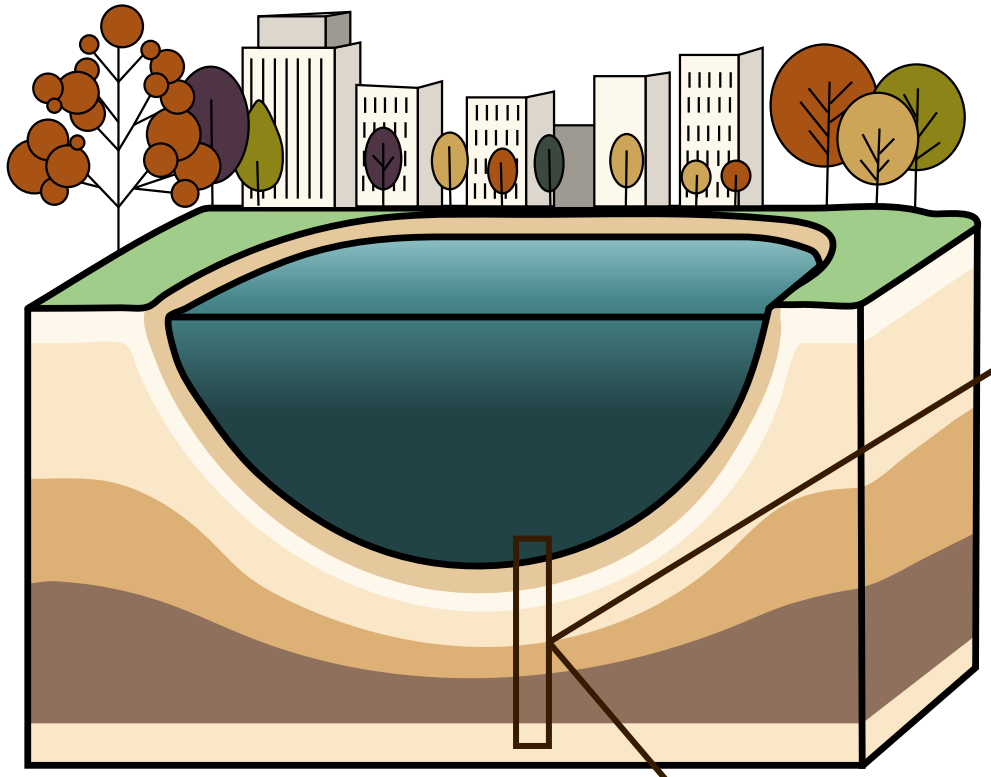


Eutrophication & Oxygen Depletion

HISTORICAL CONTEXT

PHOSPHORUS GEOCHEMISTRY

Measuring phosphorus concentrations and fractionations to determine the nutrient status and oxygen conditions of the lake.



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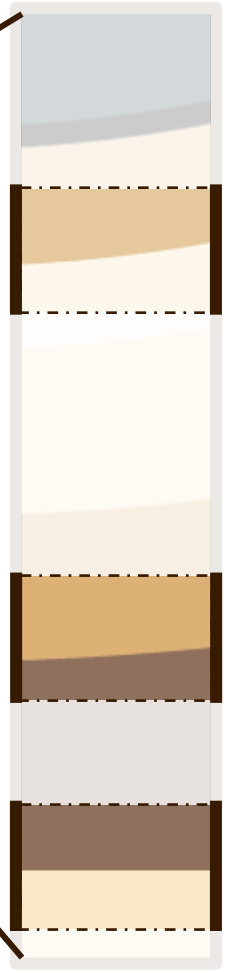
RADIOMETRIC DATING & SEDIMENT ACCUMULATION

P PHOSPHORUS GEOCHEMISTRY



2010
↑P

Eutrophication & Oxygen Depletion

1950
↑↑P

1850
↑↑↑P

1

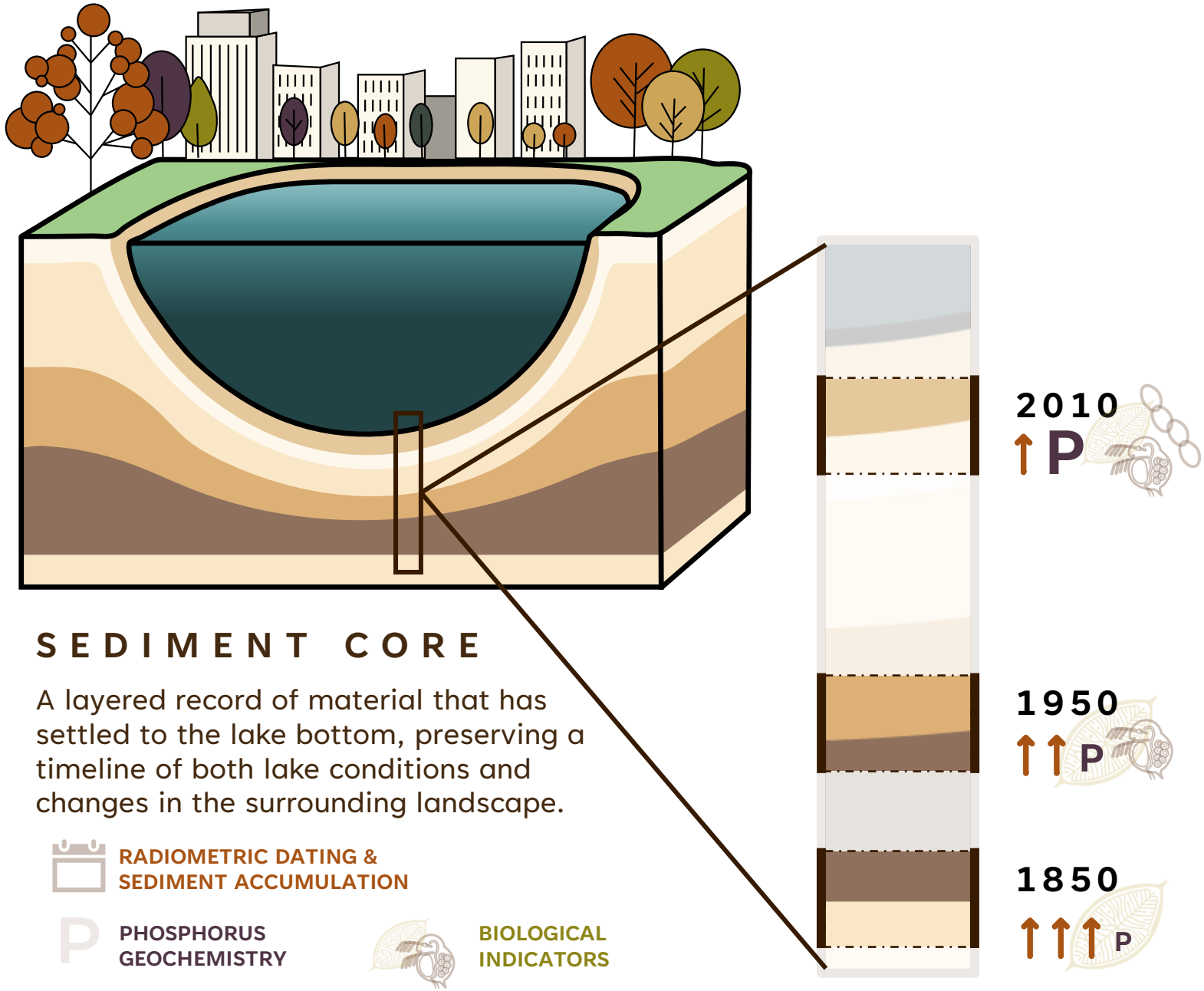
HISTORICAL CONTEXT

PHYTOPLANKTON & ZOOPLANKTON

Measuring algal pigments and counting preserved diatoms to determine phototrophic conditions. Measuring zooplankton fossils to determine food web structure. All to help determine trophic status or unique conditions of the lake.

1

HISTORICAL CONTEXT



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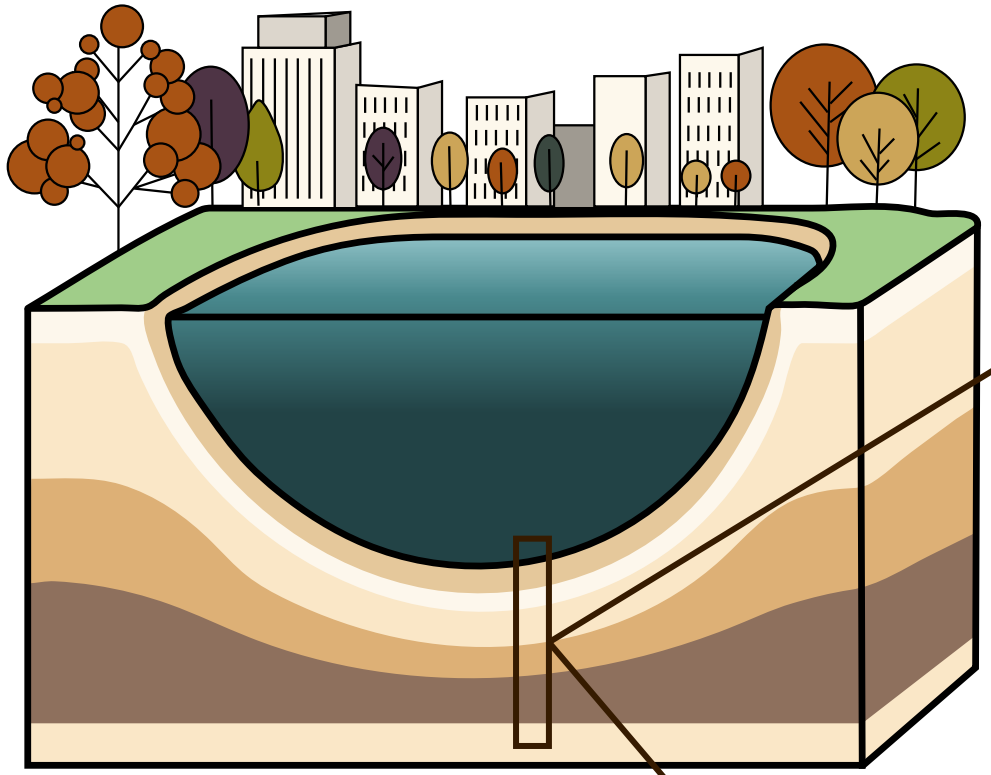
RADIOMETRIC DATING & SEDIMENT ACCUMULATION

P PHOSPHORUS GEOCHEMISTRY

BIOLOGICAL INDICATORS



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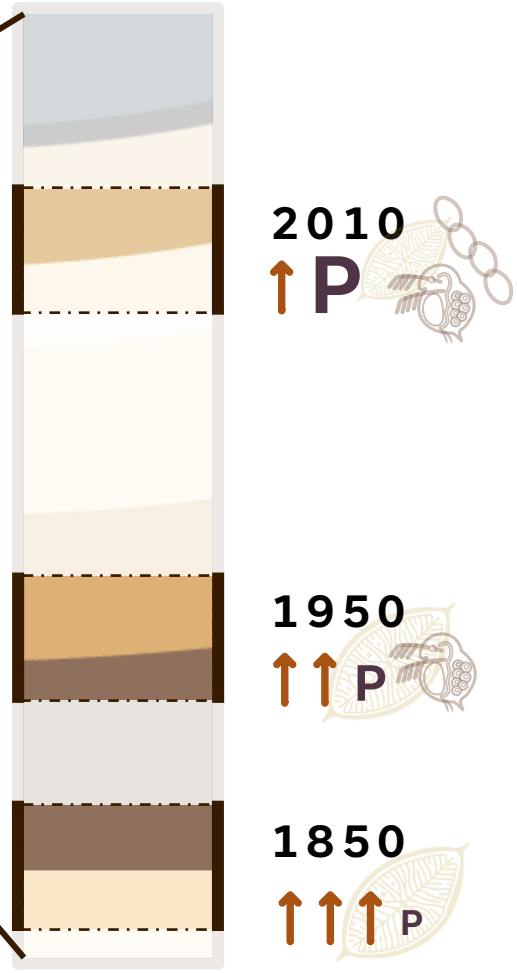
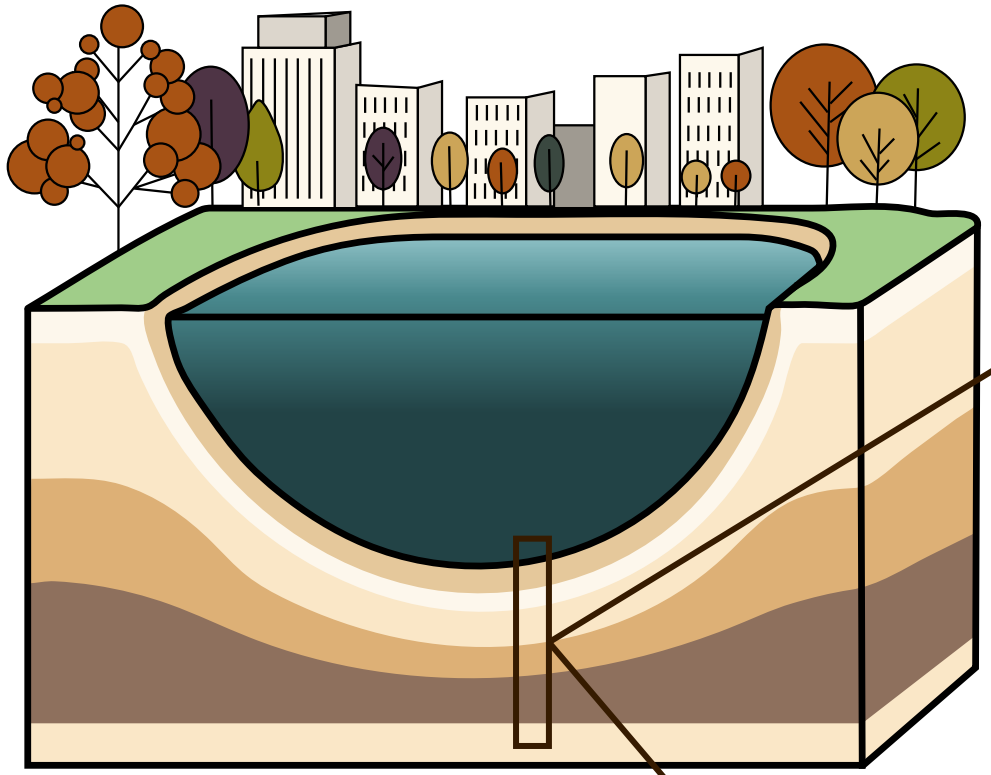


1

HISTORICAL CONTEXT

INCREASED SALTING



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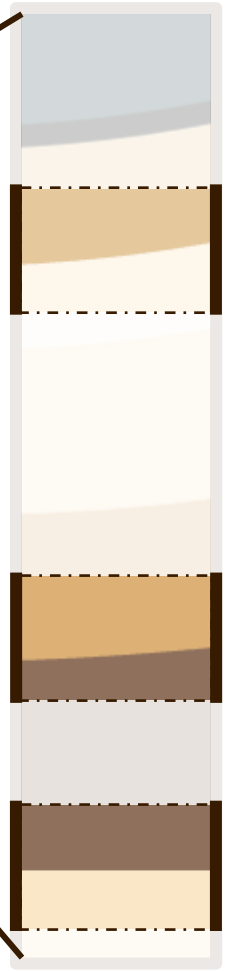
RADIOMETRIC DATING & SEDIMENT ACCUMULATION

PHOSPHORUS GEOCHEMISTRY

BIOLOGICAL INDICATORS



2010

1980

1950

1850

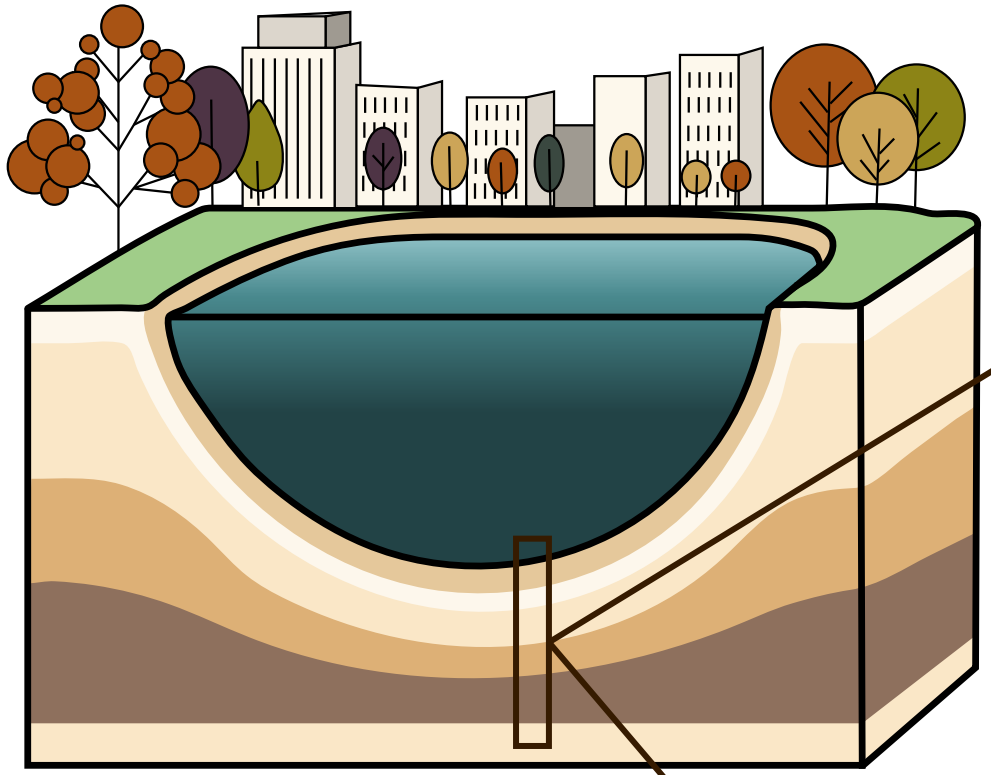
1

HISTORICAL CONTEXT

Ctenophora pulchella
Tabularia fasciculata

Salt Tolerant Diatoms

INCREASED SALTING



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RADIOMETRIC DATING & SEDIMENT ACCUMULATION

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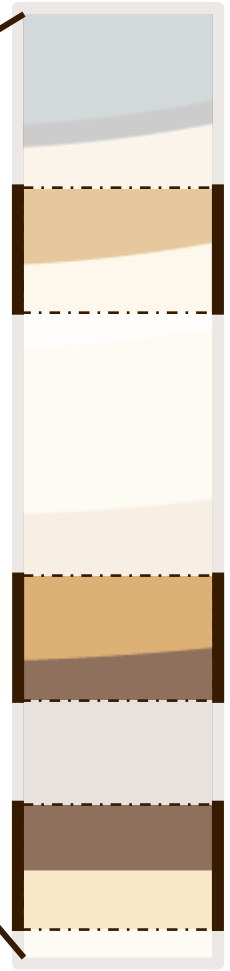


2010

1980

1950

1850

1

HISTORICAL CONTEXT

Ctenophora pulchella
Tabularia fasciculata

Salt Tolerant Diatoms

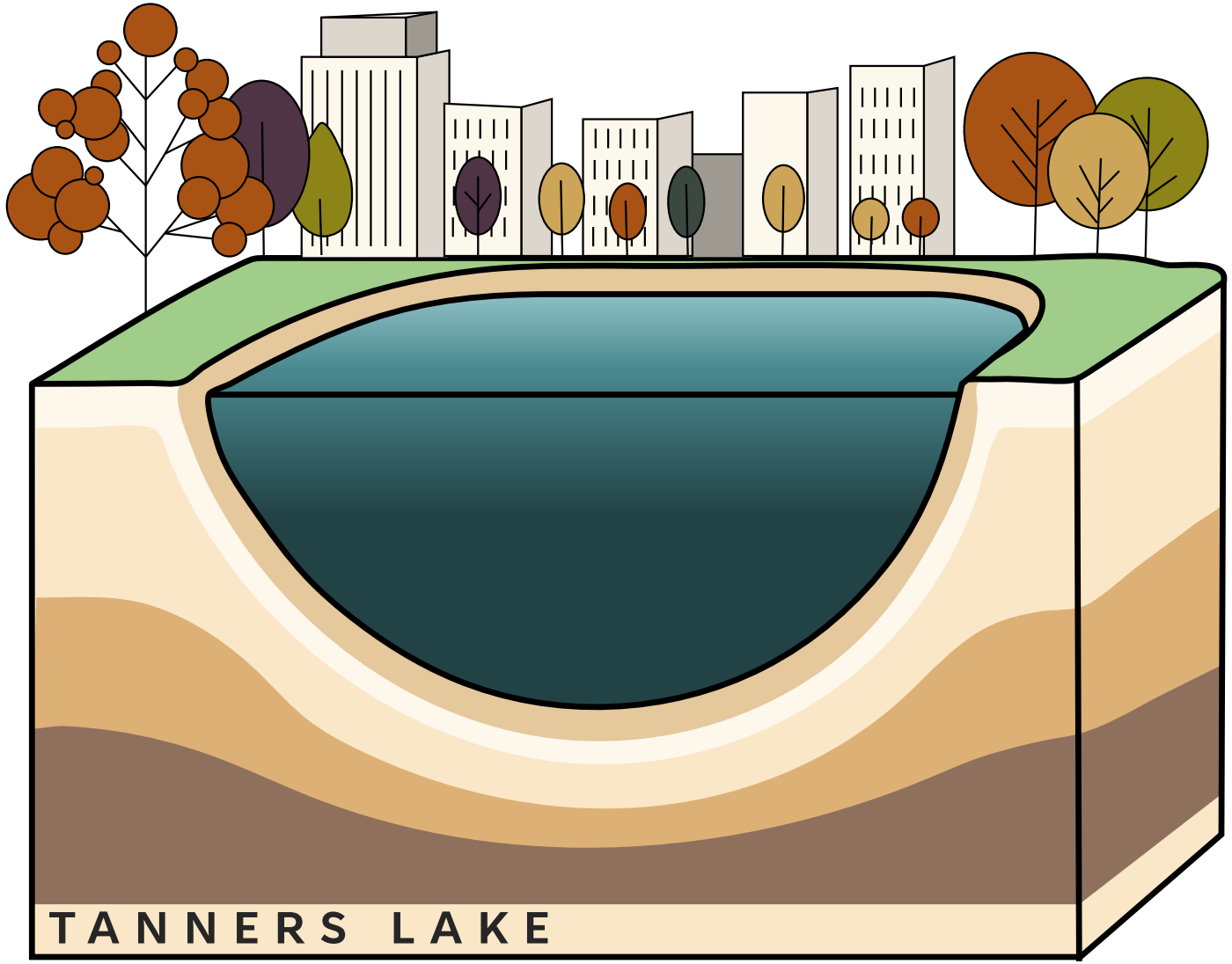
INCREASED SALTING

Zooplankton Resilience

EVALUATE ZOOPLANKTON RESILIENCE TO SALT

DAPHNIA PULICARIA ARE RAPIDLY ADAPTING TO SALINIZATION

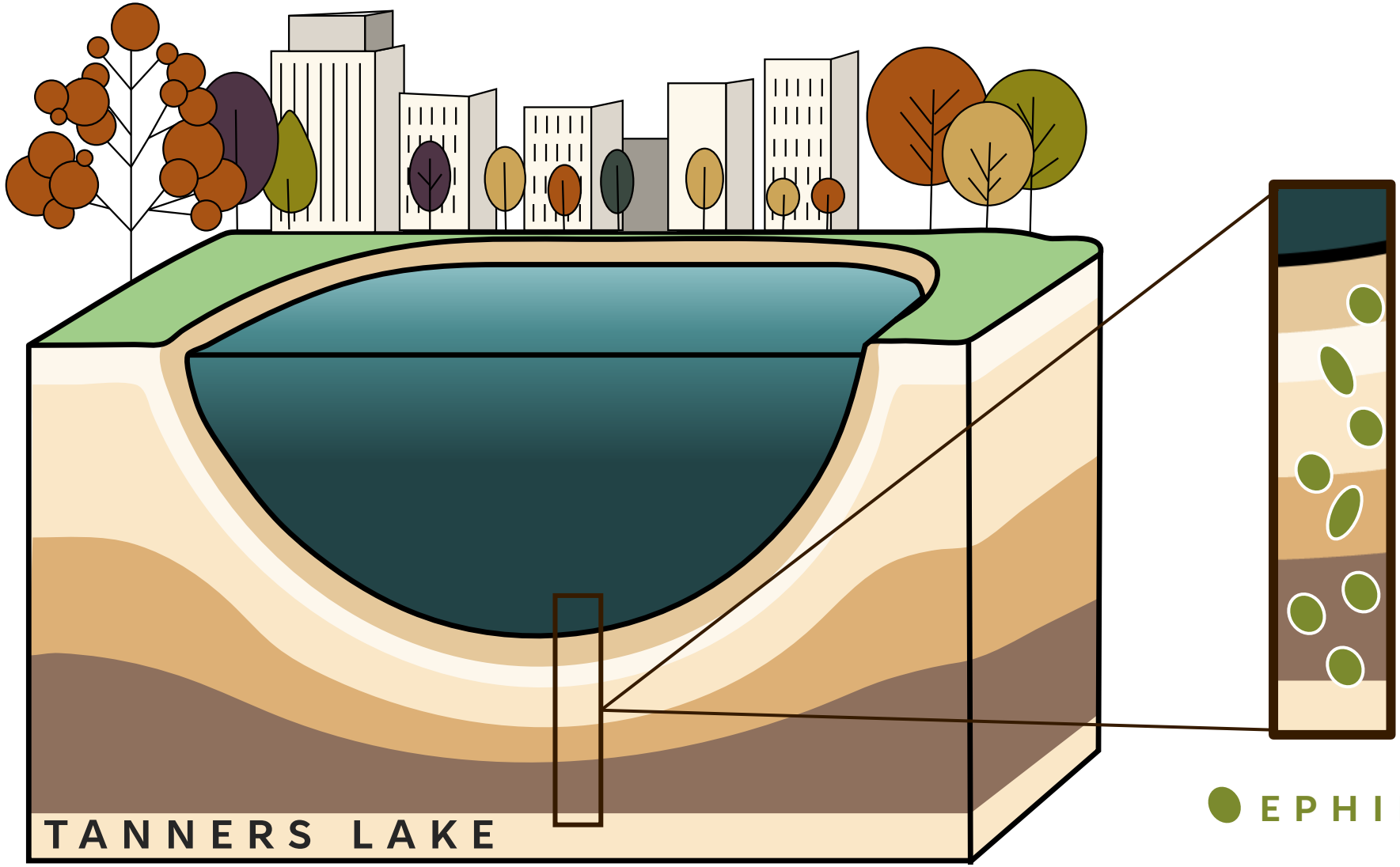
WERSEBE 2022



HISTORICAL CONTEXT

DAPHNIA PULICARIA ARE RAPIDLY ADAPTING TO SALINIZATION

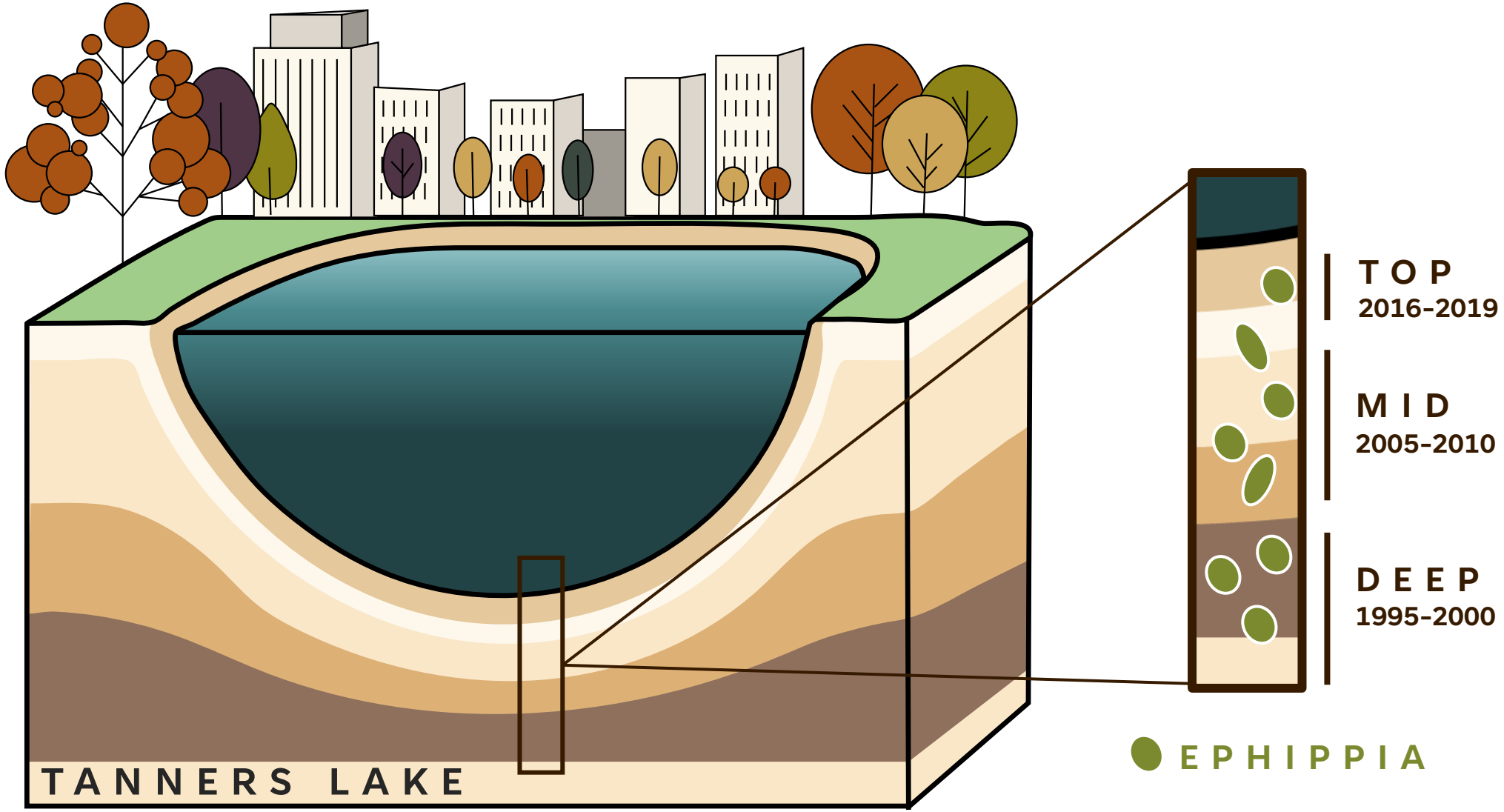
WERSEBE 2022



EPHIPPIA

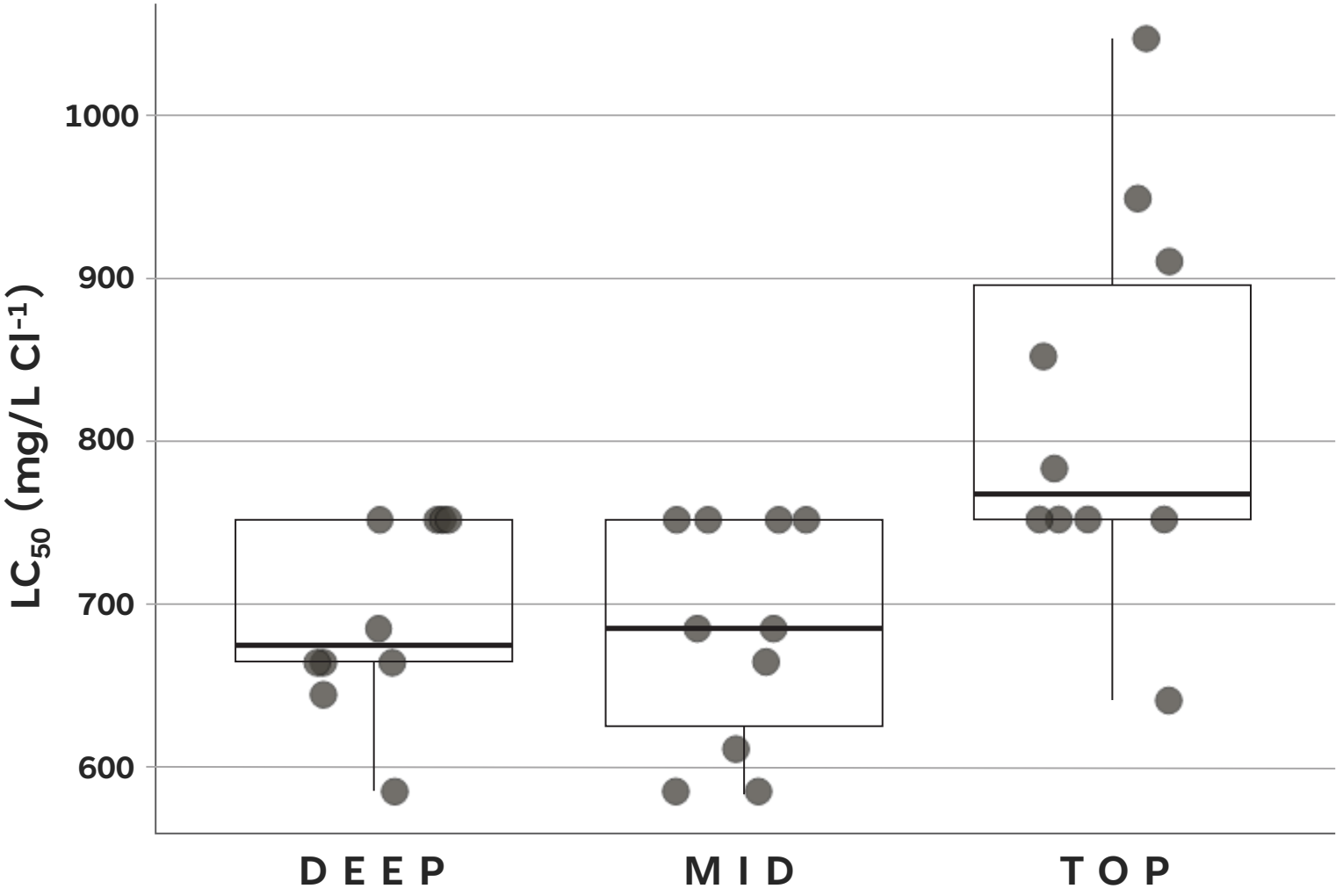
DAPHNIA PULICARIA ARE RAPIDLY ADAPTING TO SALINIZATION

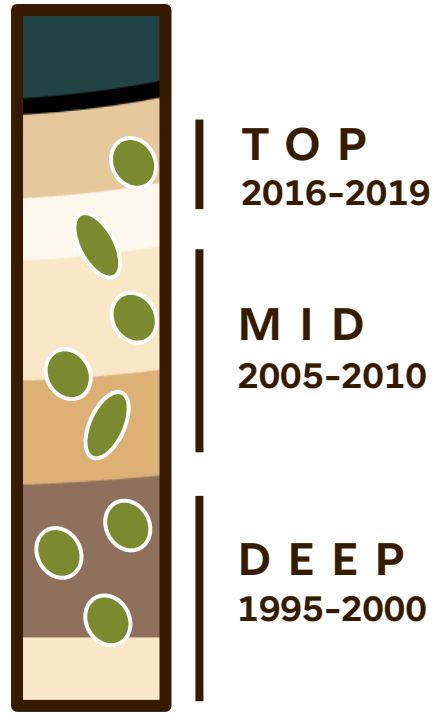
WERSEBE 2022



DAPHNIA PULICARIA ARE RAPIDLY ADAPTING TO SALINIZATION

WERSEBE 2022





TOP
2016-2019

MID
2005-2010

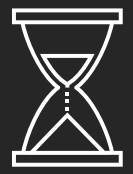
DEEP
1995-2000

EPHIPPIA

1

HISTORICAL CONTEXT

Limited salt signal, only the most impaired systems had salt tolerant diatoms. However, Daphnia show rapid evolution to increased chloride conditions.



2

CONTEMPORARY DYNAMICS

Evaluate how salinity impacts mixing and internal loading.

3

PROSPECTIVE OUTLOOK

Model the potential salinization tipping points – transition to meromixis.

4

THEORETICAL IMPLICATIONS

Proposed alternatives (potassium acetate) discovered to be more toxic to aquatic life and resulted in high biological oxygen demand (BOD). - Cassidy 2022

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HOW DOES SALT ENTER AND AFFECT THE SYSTEM?

CONTEMPORARY DYNAMICS

DECEMBER

JANUARY

FEBRUARY

MARCH

APRIL

MAY

JUNE

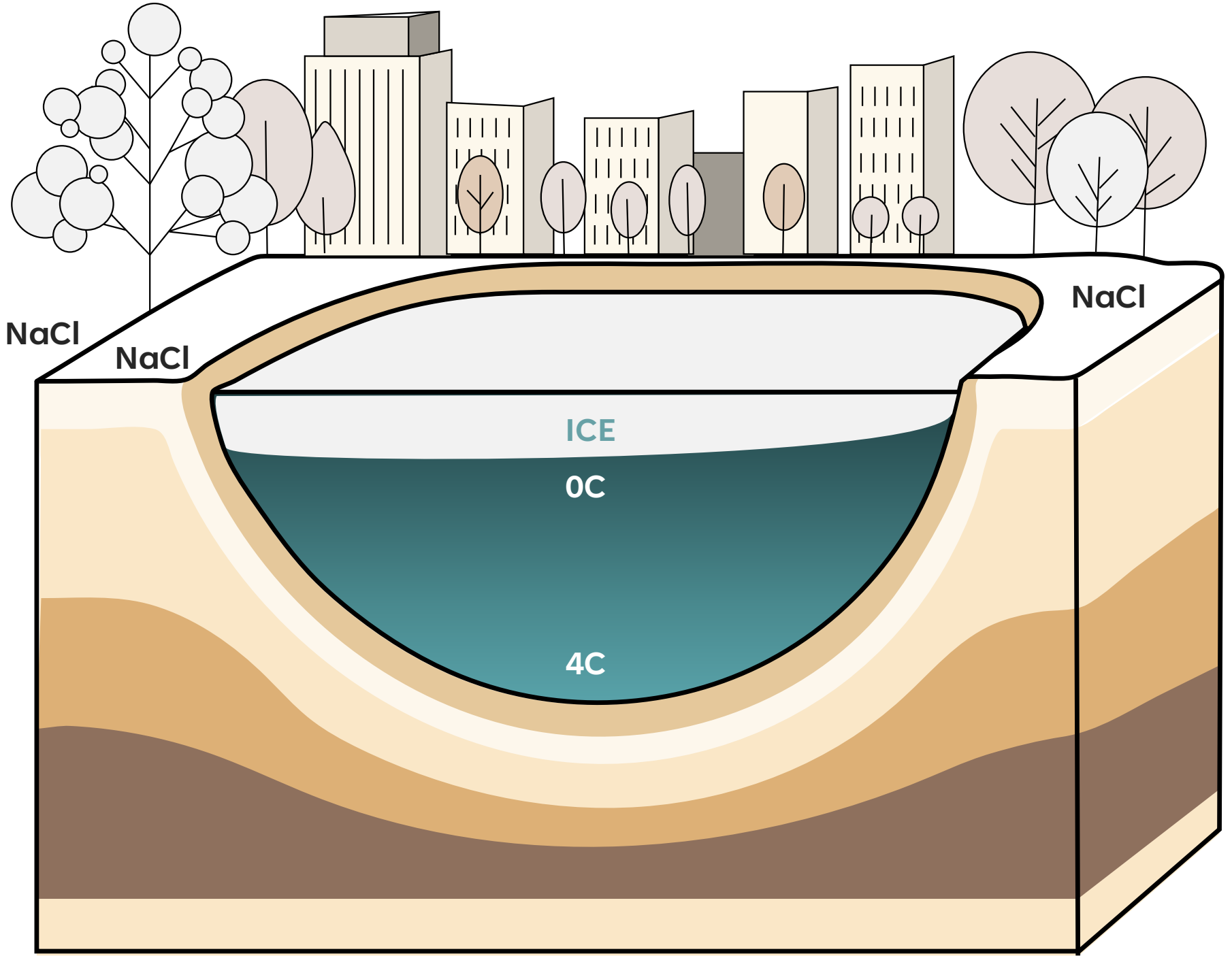
JULY

AUGUST

SEPTEMBER

OCTOBER

NOVEMBER



DECEMBER

JANUARY

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MARCH

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JUNE

JULY

AUGUST

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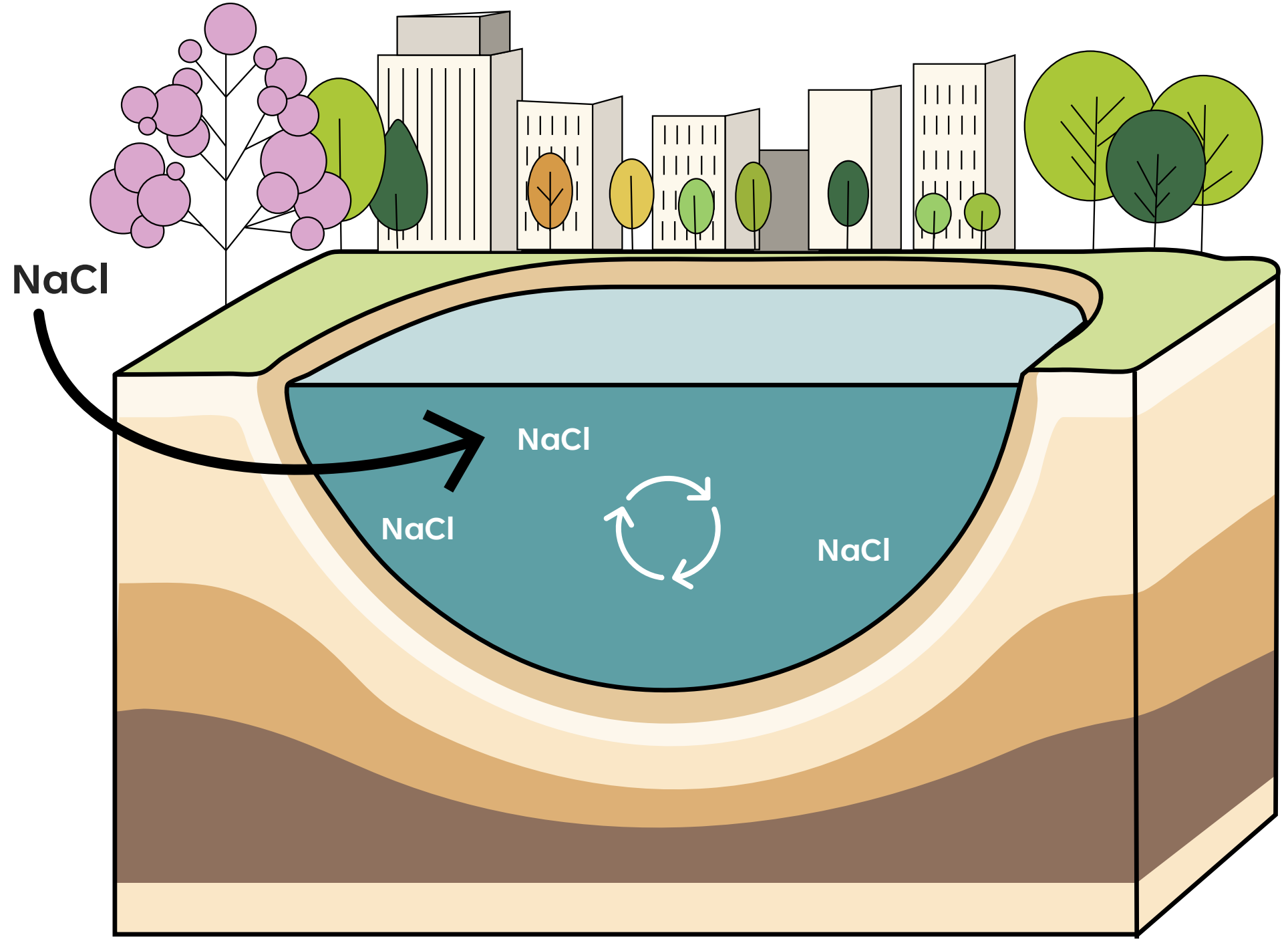

DECEMBER

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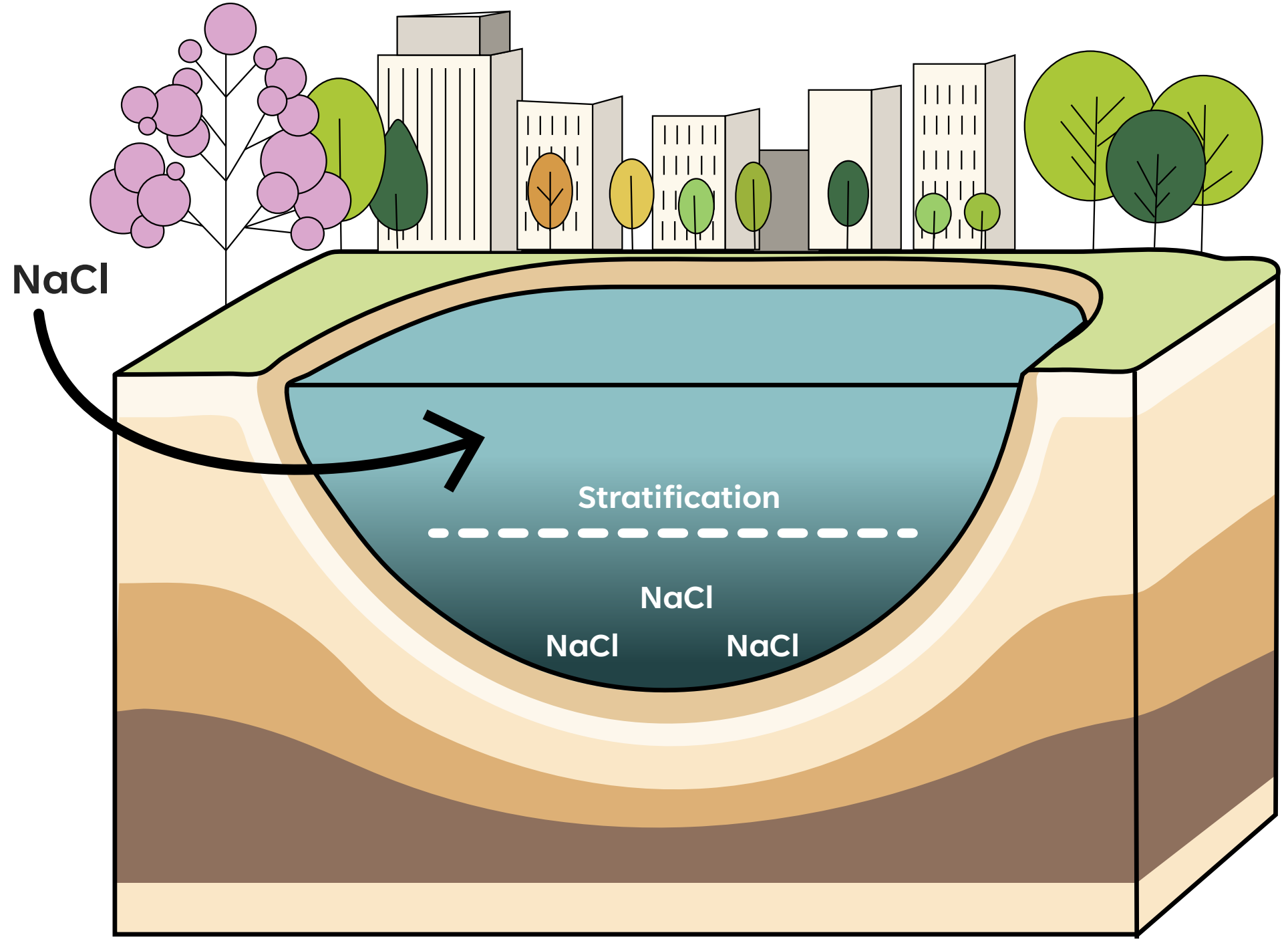

DECEMBER

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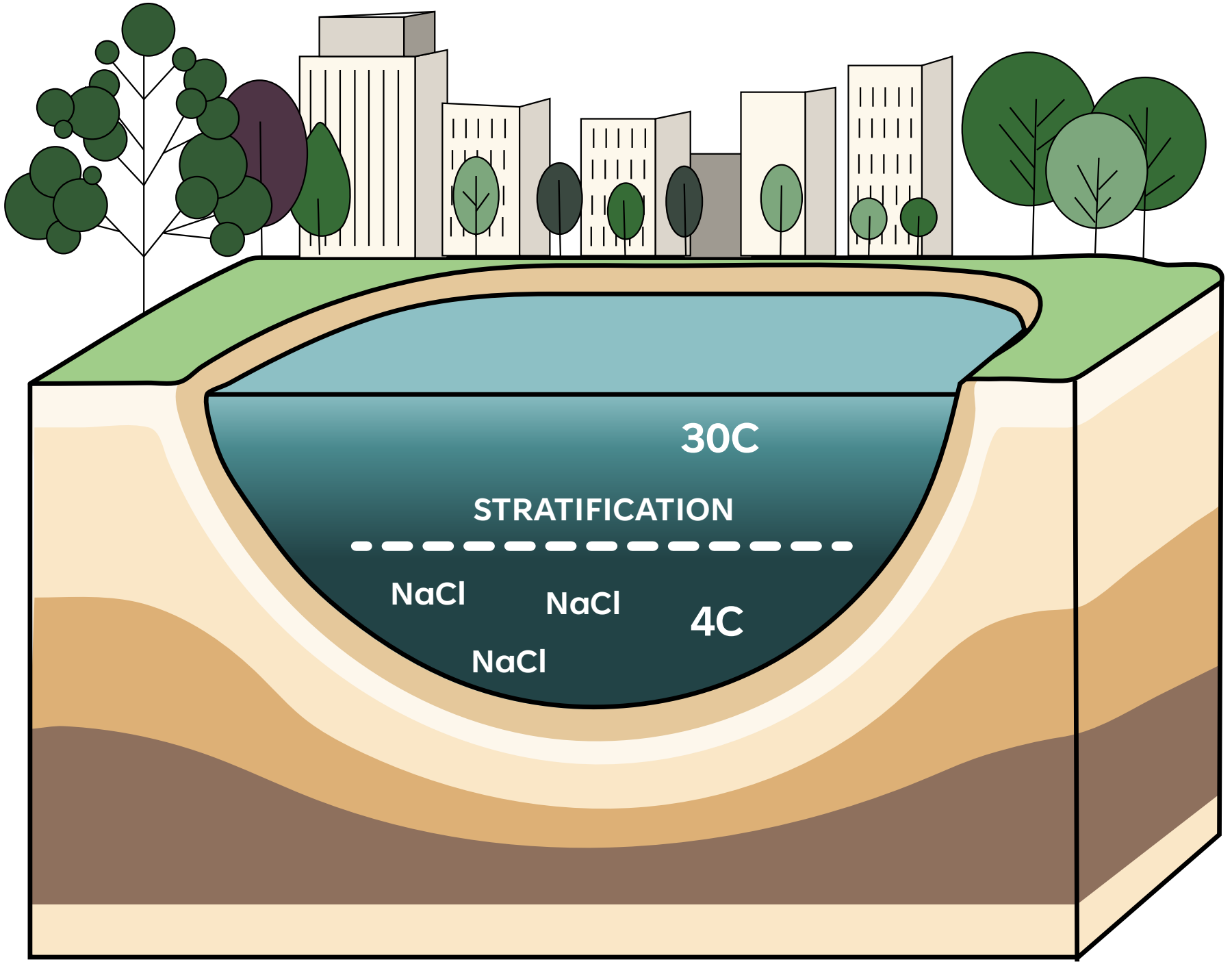

DECEMBER

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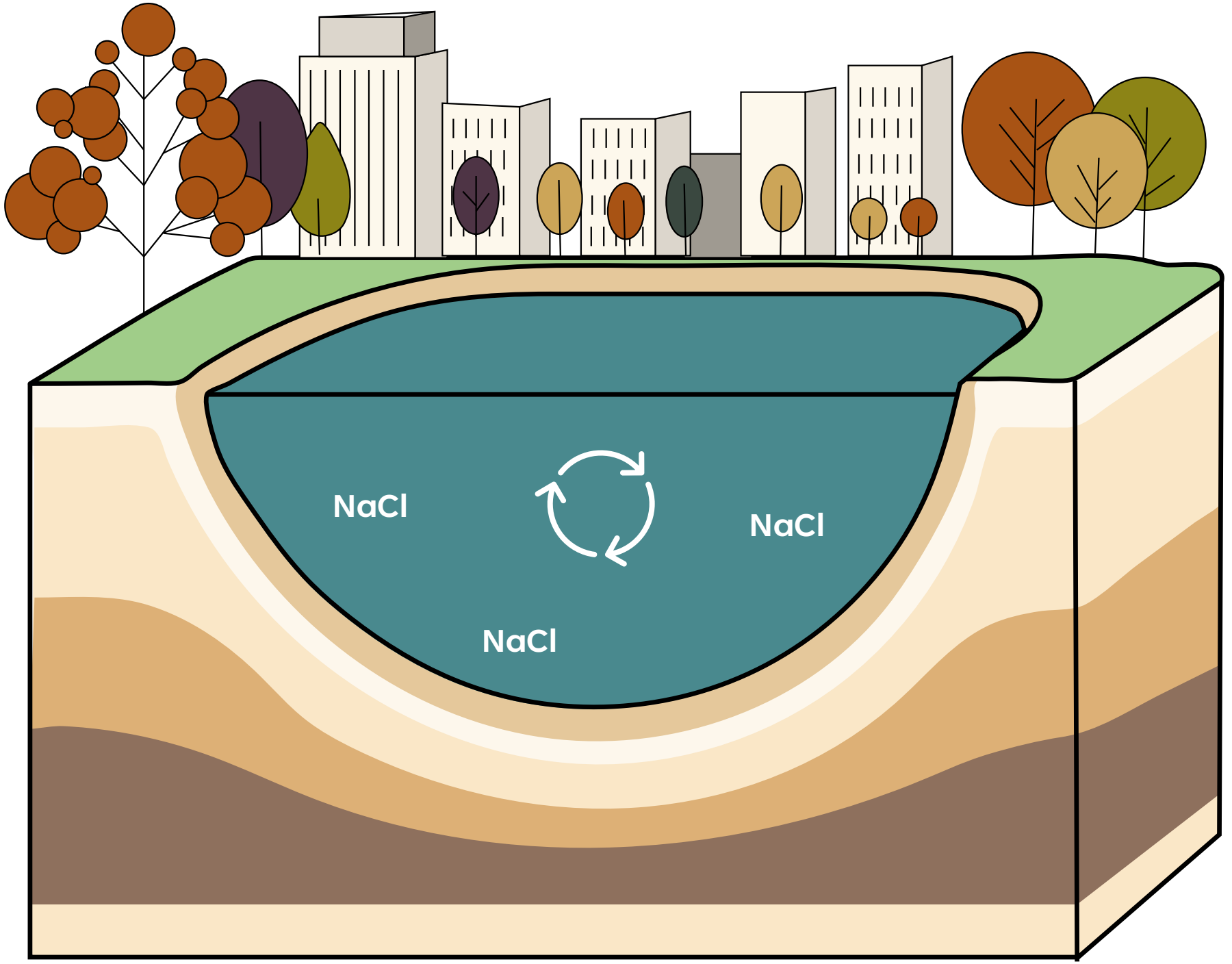

DECEMBER

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MARCH

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MAY

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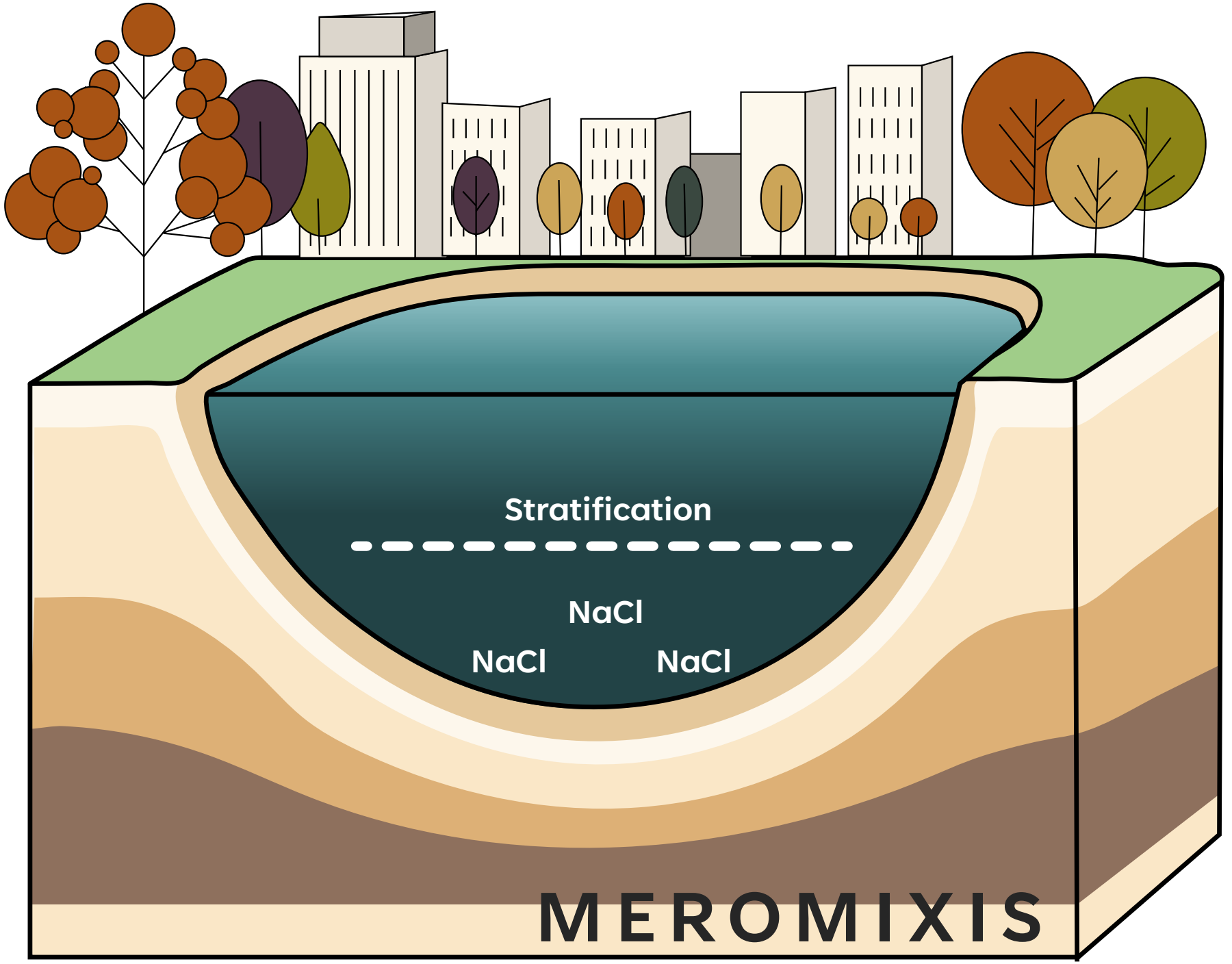
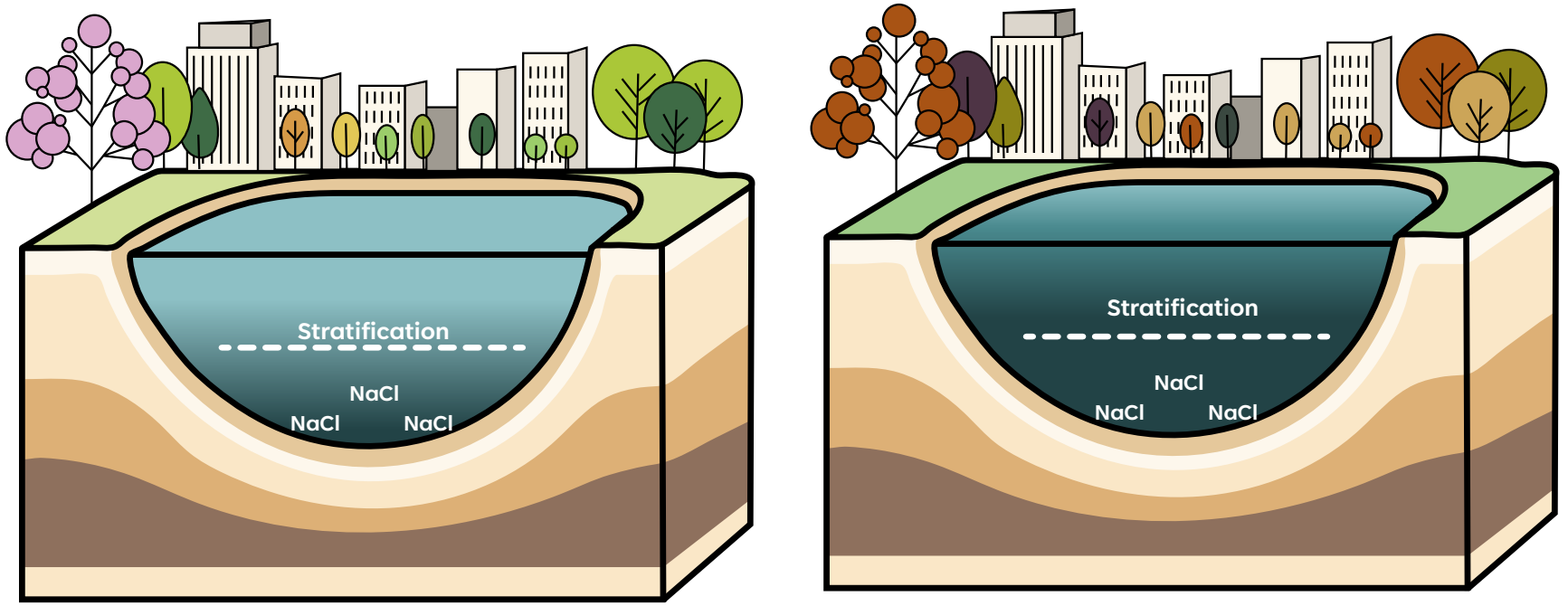


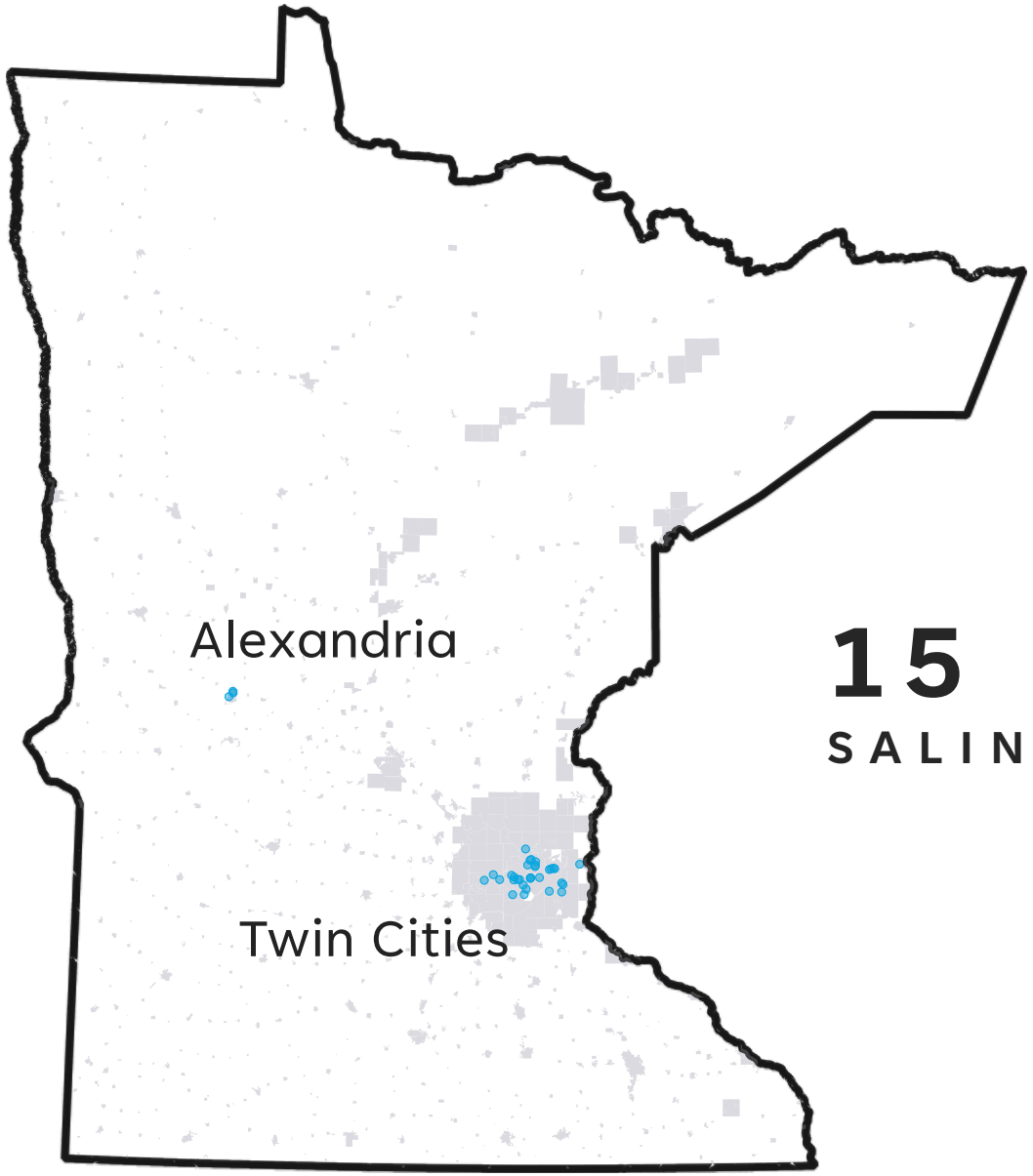
SPRING

FALL



CULTURAL MEROMIXIS

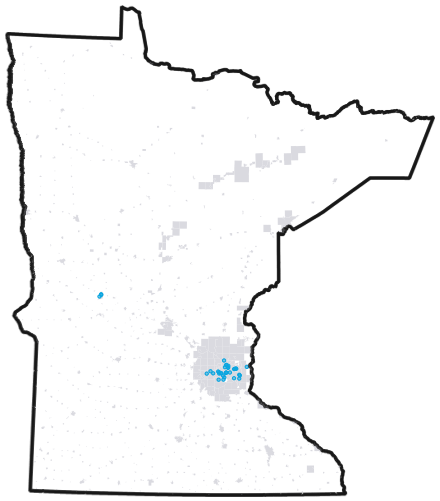
CONTEMPORARY DYNAMICS

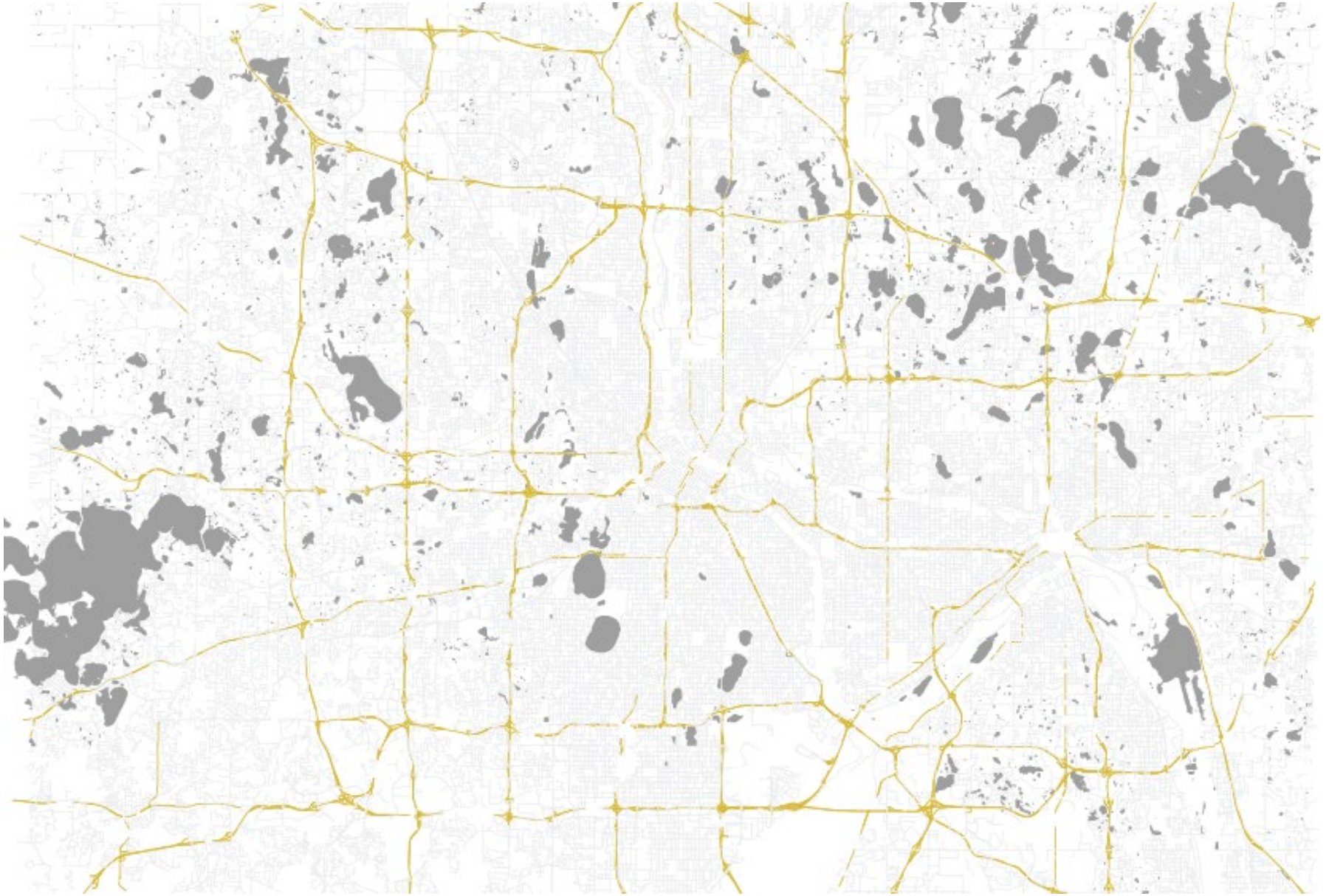


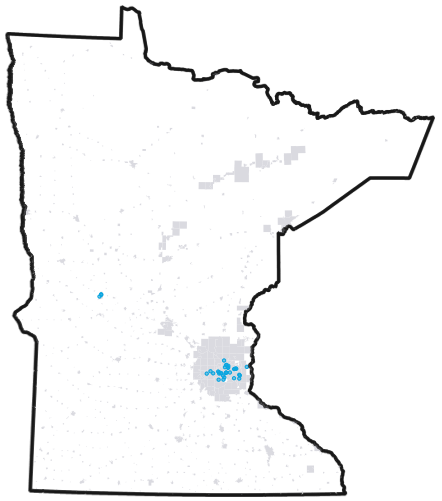
15 Lakes

SALINITY RANGE 52-1200mg/L

CONTEMPORARY DYNAMICS



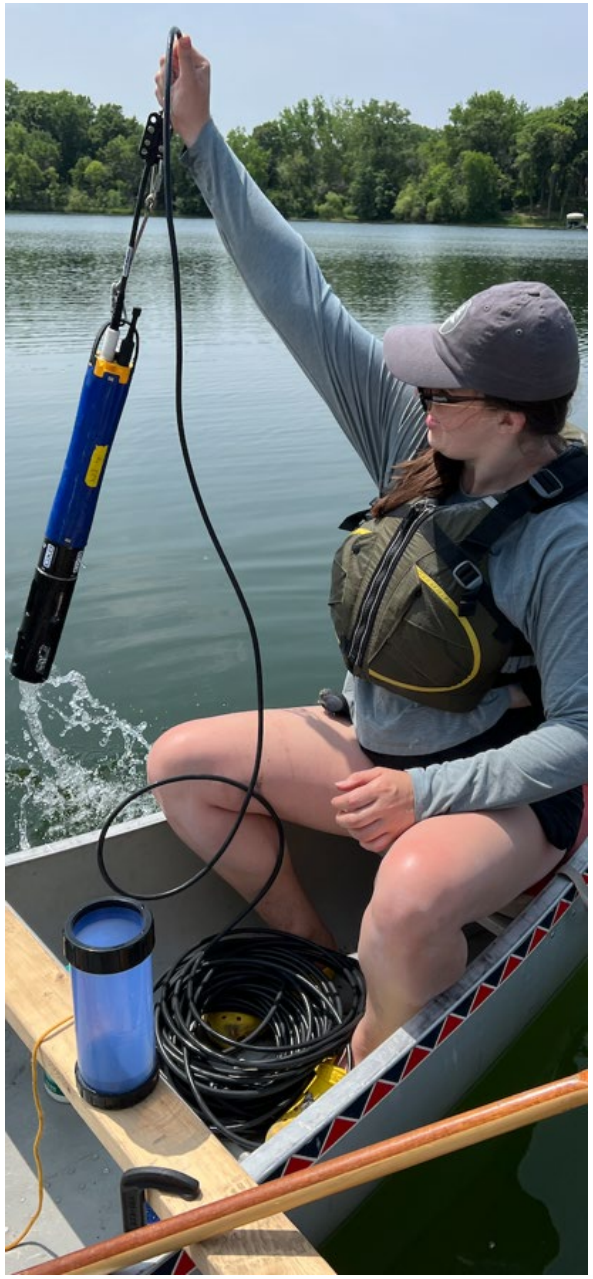




12 Lakes Metropolitan Regions

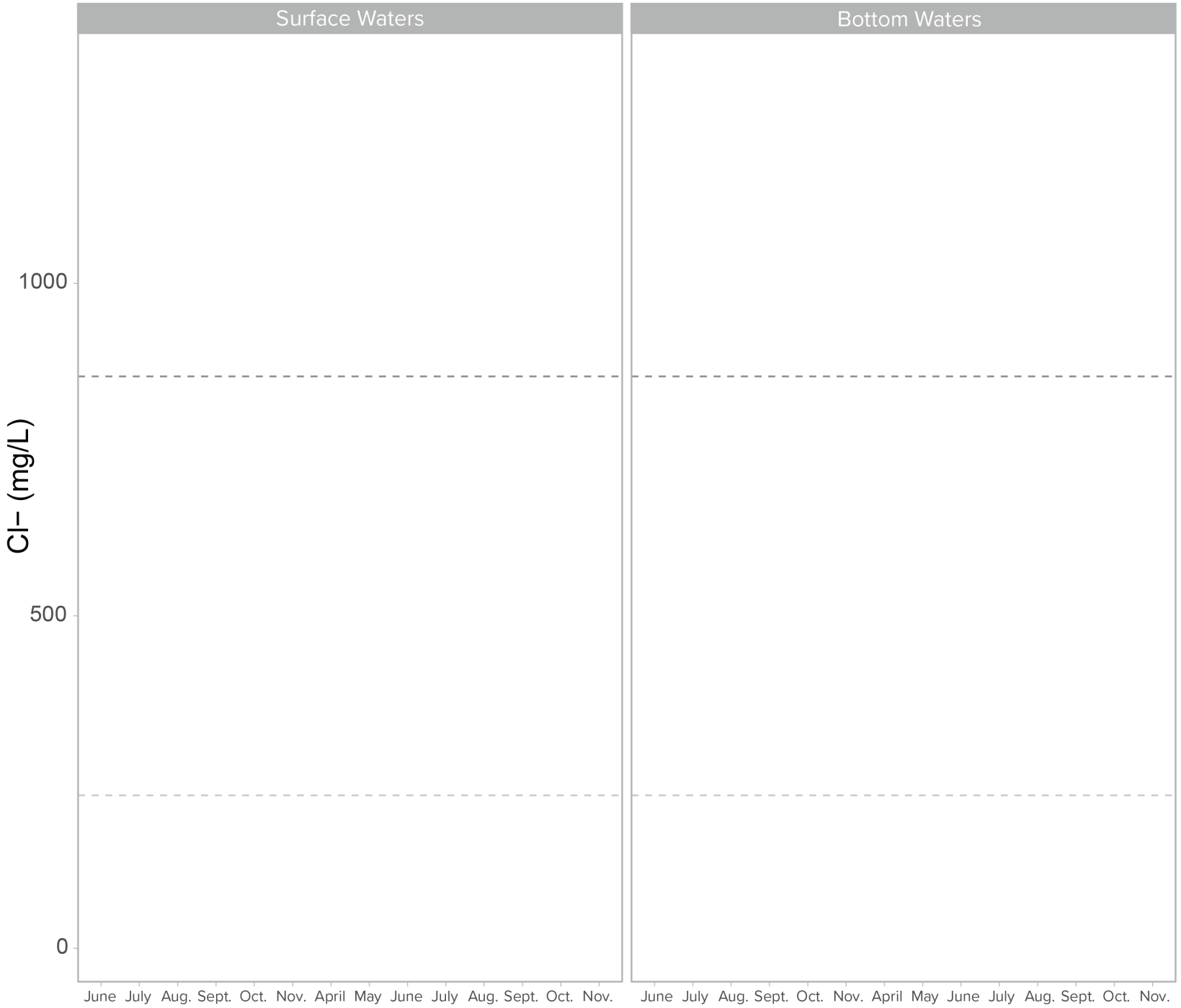
SALINITY RANGE 52-600mg/L

CONTEMPORARY DYNAMICS

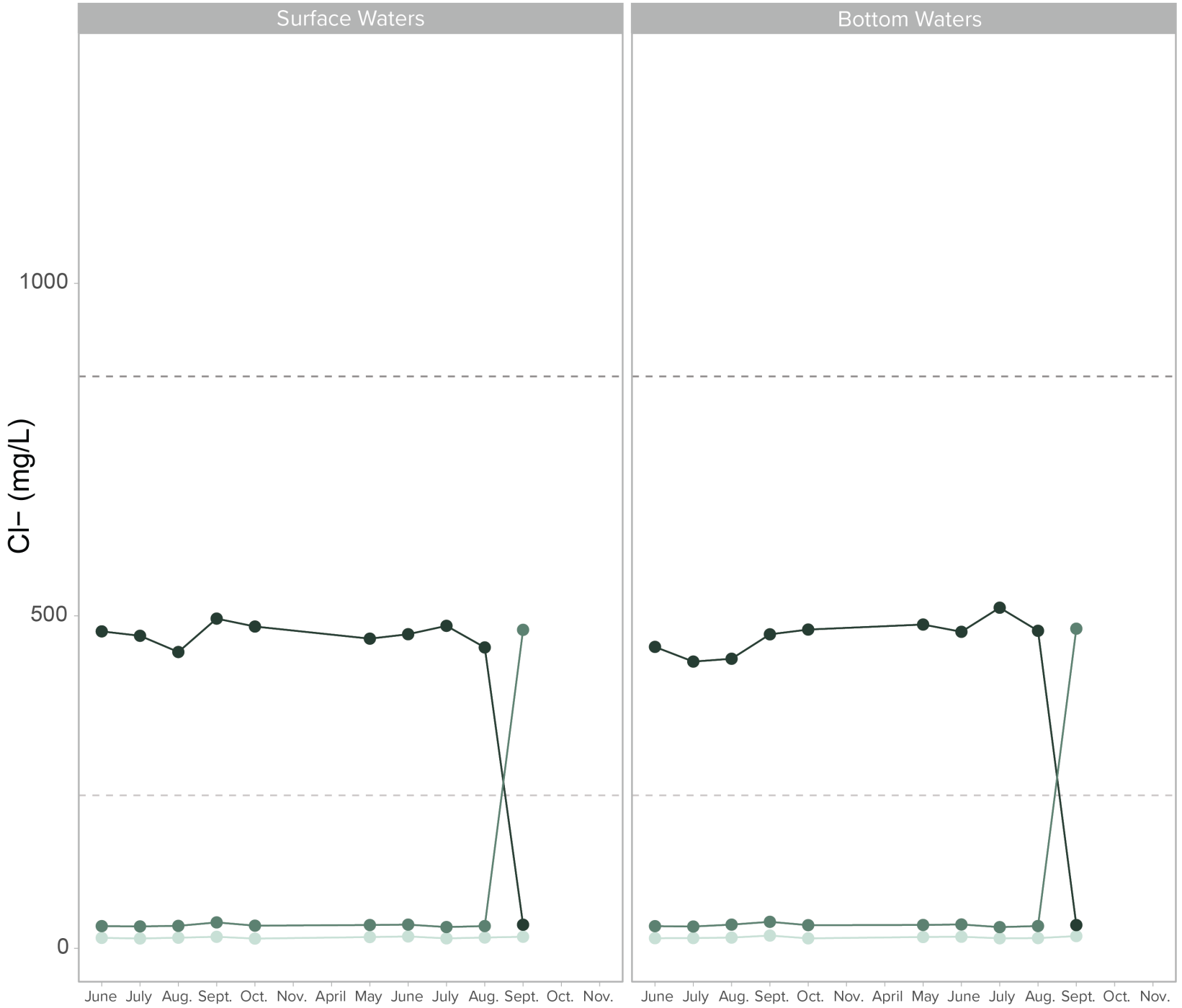


MONTHLY MONITORING

CONTEMPORARY DYNAMICS



CONTEMPORARY DYNAMICS



ALEXANDRIA

- Henry
- Uhlenkolts
- Smith

Acute Toxicity
860 mg/L

Chronic Toxicity
230 mg/L

CONTEMPORARY DYNAMICS

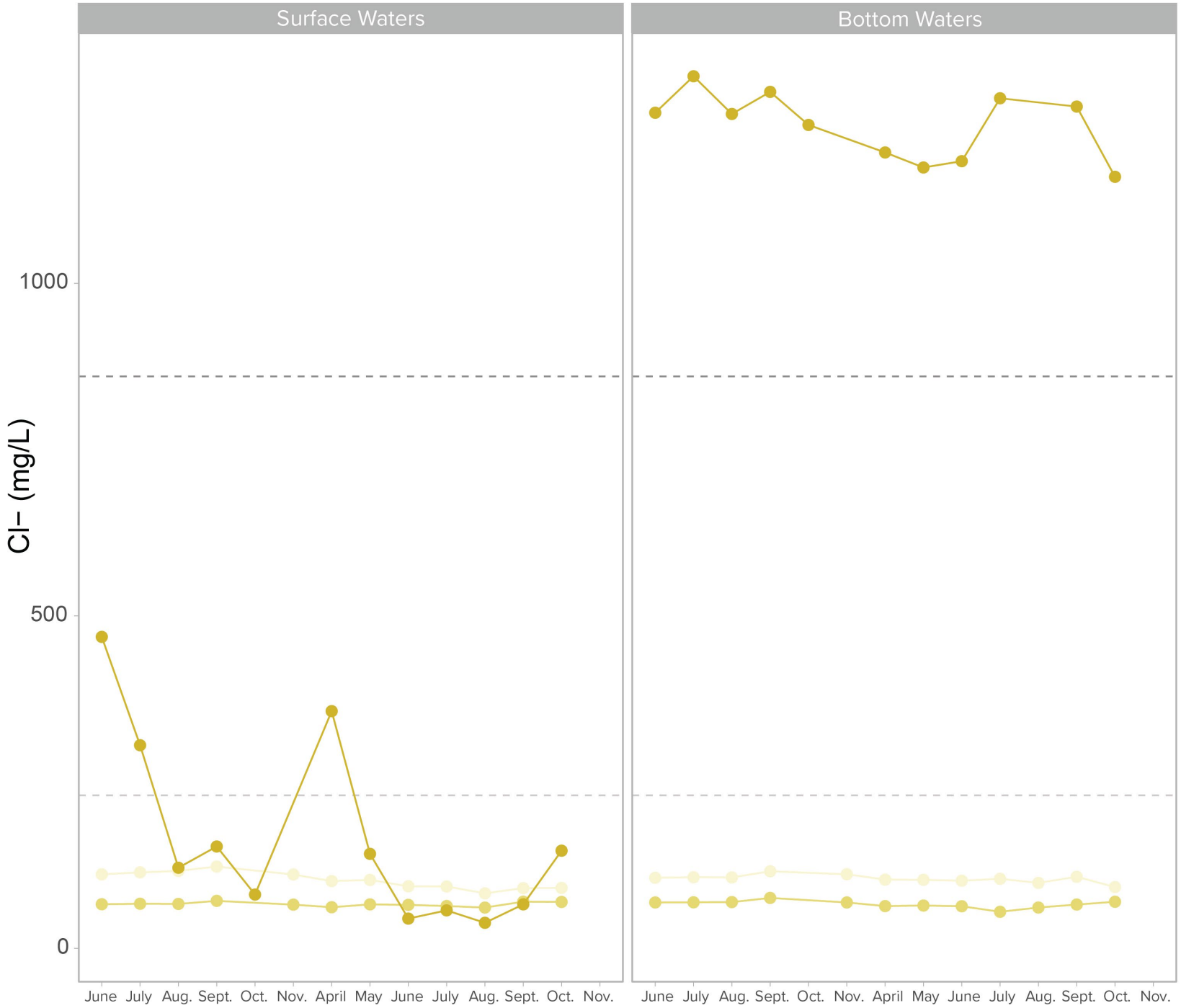
MINNEAPOLIS

- Brownie
- Bde Maka Ska
- Cedar

Acute Toxicity
860 mg/L

Chronic Toxicity
230 mg/L

CONTEMPORARY DYNAMICS



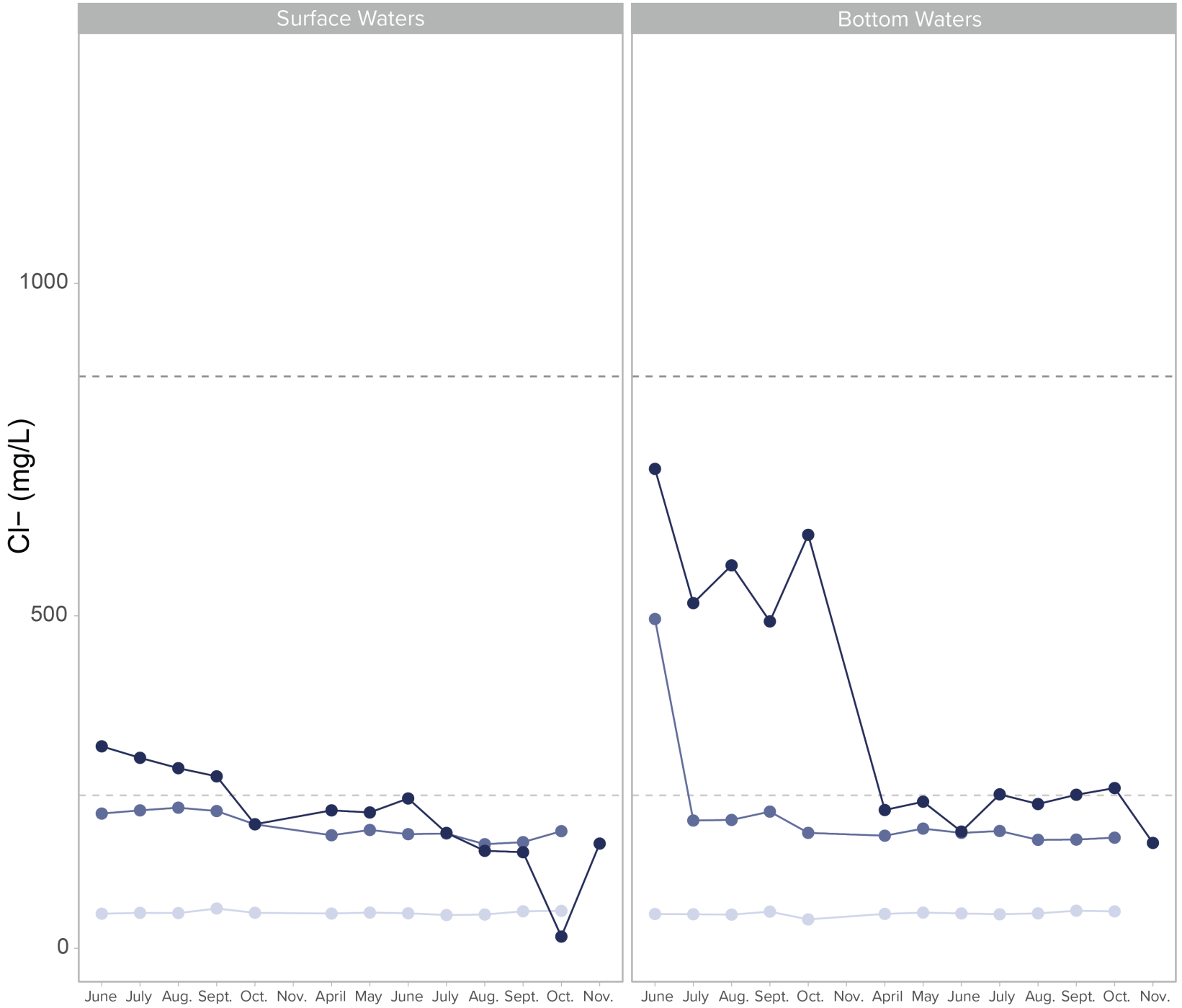
NORTH METRO

- Little Johanna
- Wabasso
- Snail

Acute Toxicity
860 mg/L

Chronic Toxicity
230 mg/L

CONTEMPORARY DYNAMICS



WEST METRO

- Parkers
- Medicine
- Minnetonka

Acute Toxicity
860 mg/L

Chronic Toxicity
230 mg/L

CONTEMPORARY DYNAMICS

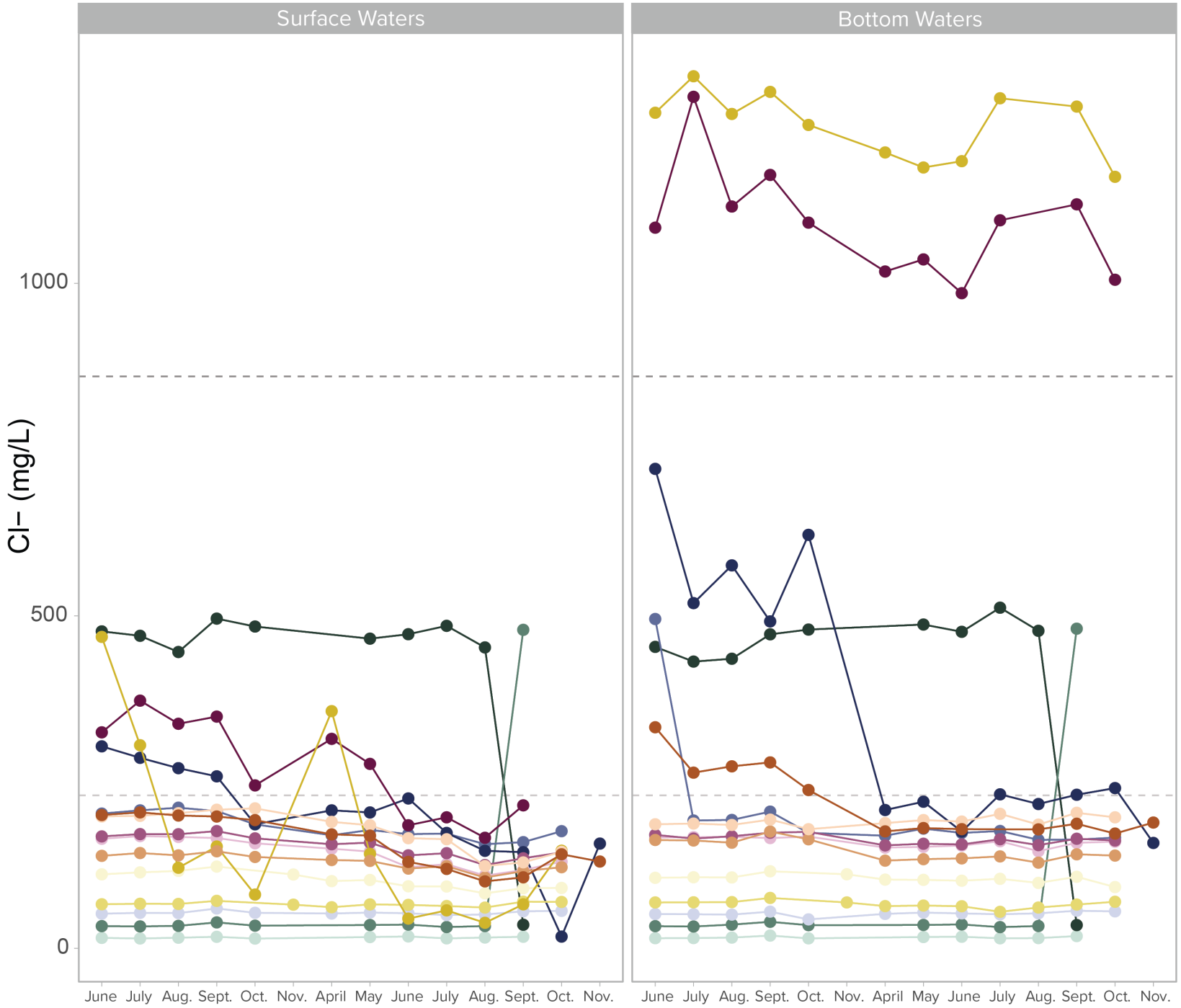
EAST METRO

- Tanners
- McCarrons
- Phalen

Acute Toxicity
860 mg/L

Chronic Toxicity
230 mg/L

CONTEMPORARY DYNAMICS



ALEXANDRIA
- Henry
- Uhlenkolts
- Smith

MINNEAPOLIS
- Brownie
- Bde Maka Ska
- Cedar

NORTH METRO
- Little Johanna
- Wabasso
- Snail

WEST METRO
- Parkers
- Medicine
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EAST METRO
- Tanners
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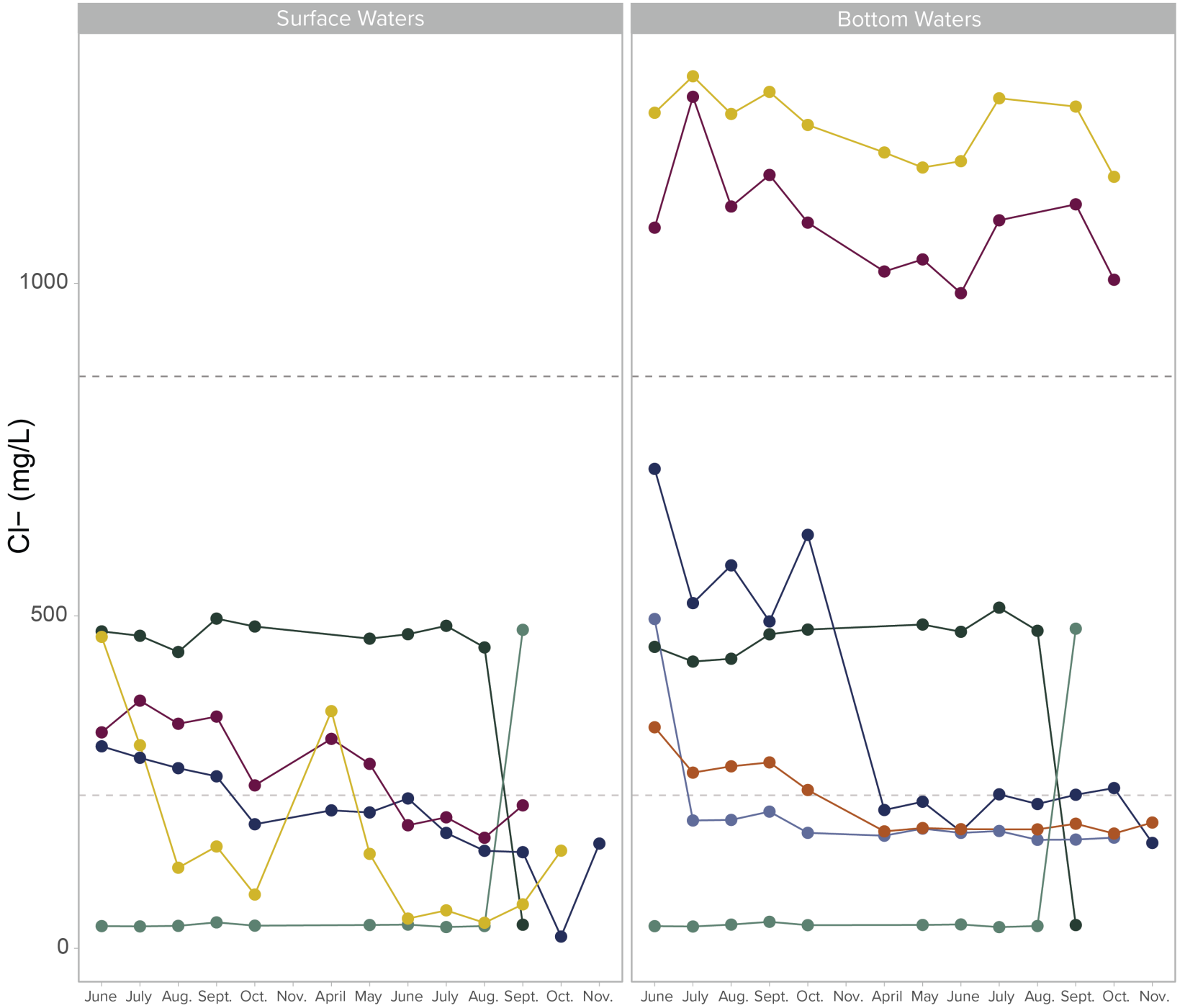
CONTEMPORARY DYNAMICS



ALEXANDRIA
- Henry
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MINNEAPOLIS
- Brownie

NORTH METRO
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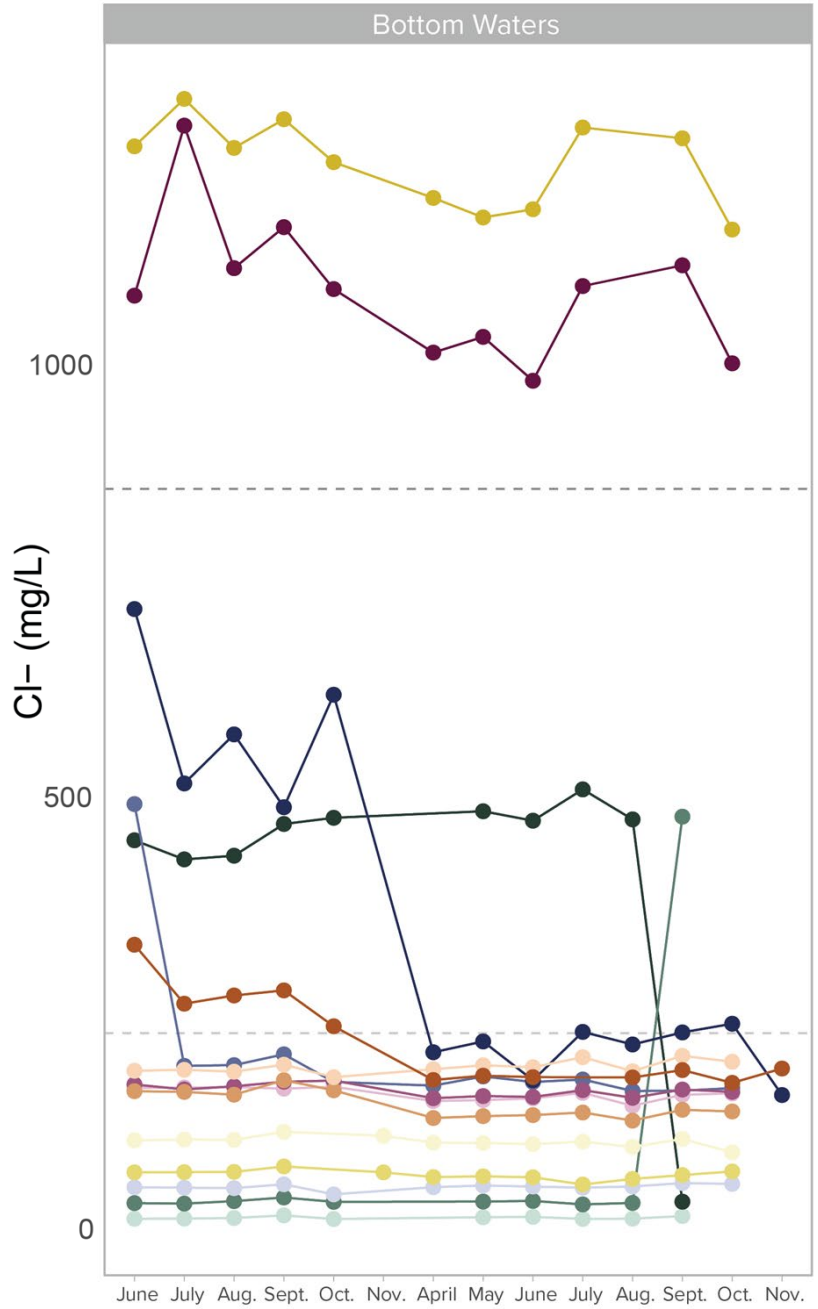
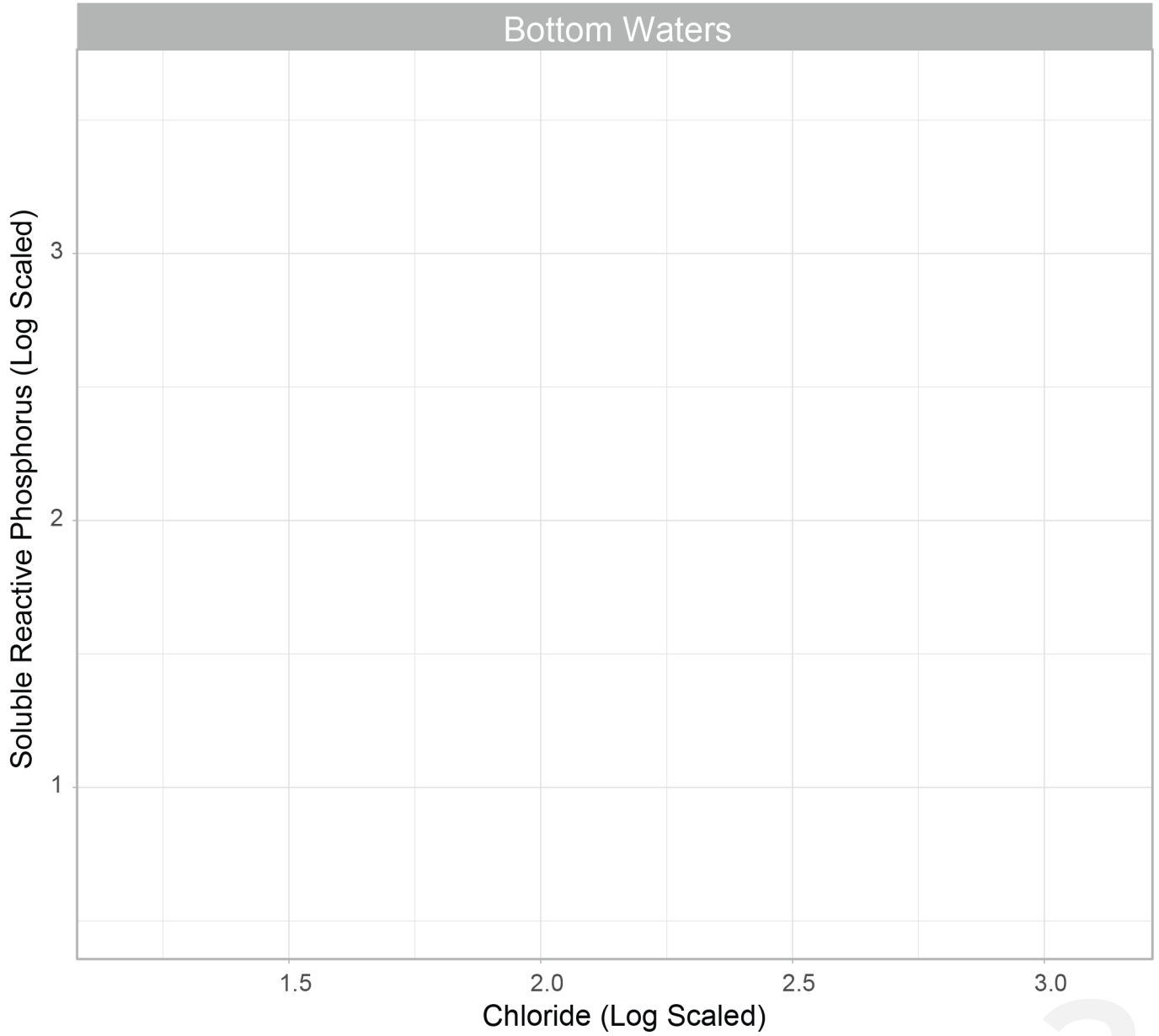
CONTEMPORARY DYNAMICS





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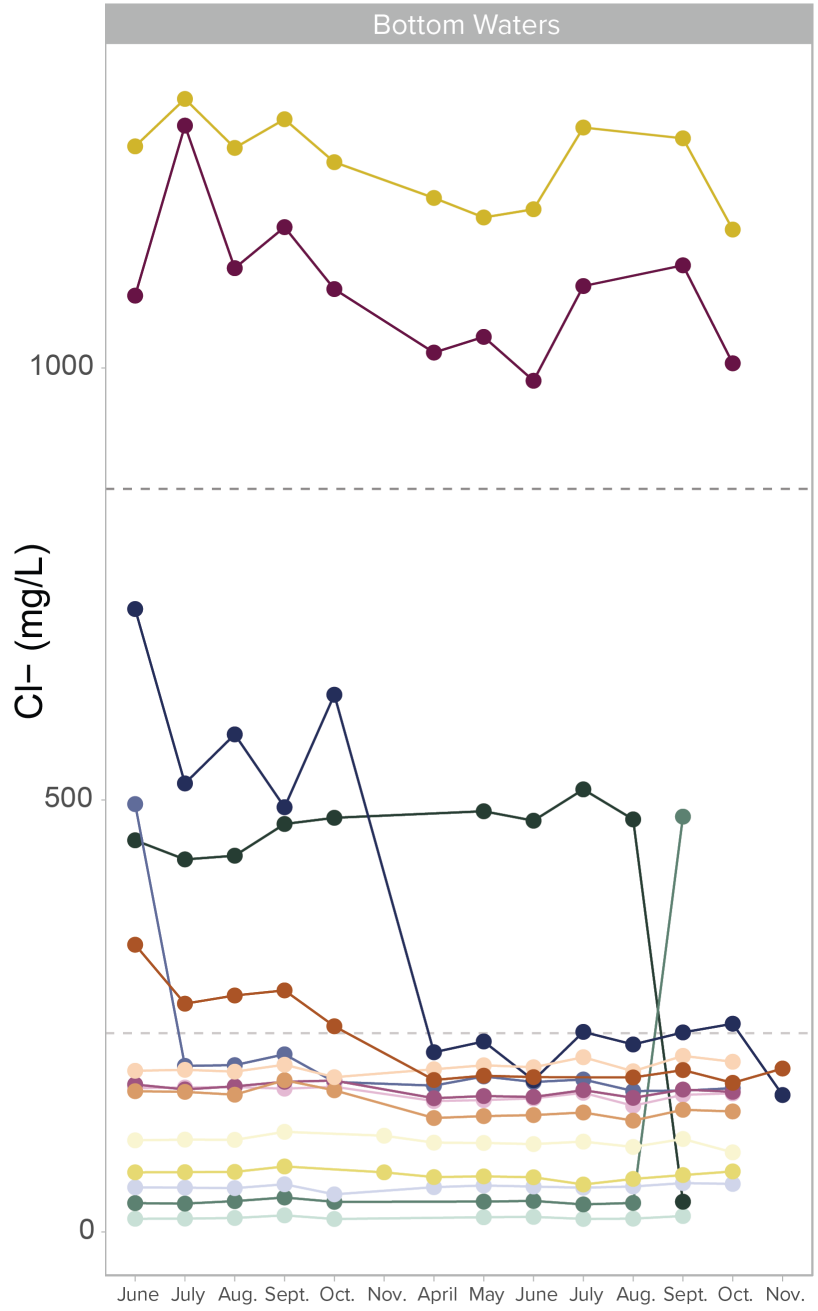

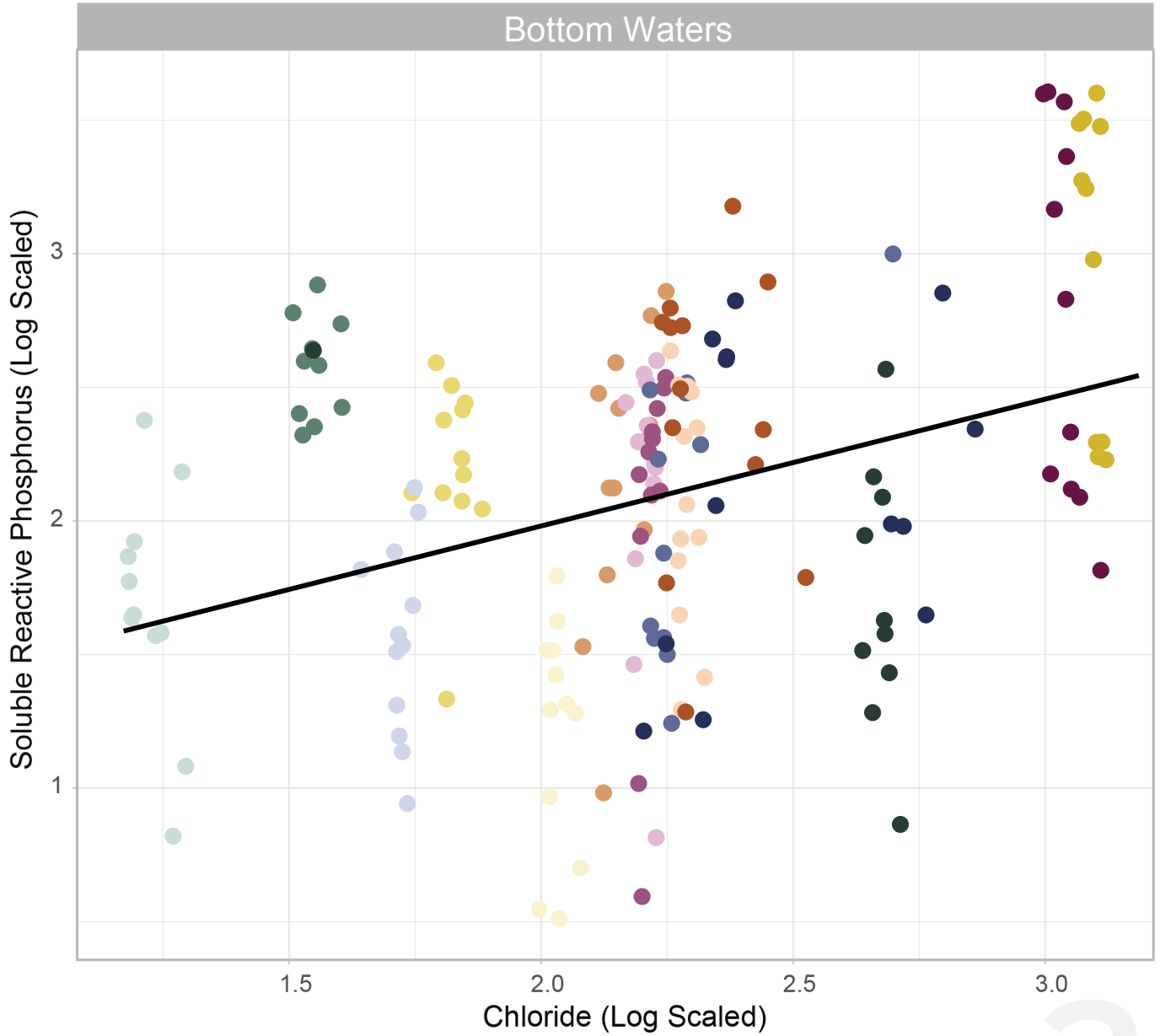

CONTEMPORARY DYNAMICS

EVALUATE HOW SALINITY IMPACTS MIXING AND INTERNAL LOADING

CONTEMPORARY DYNAMICS

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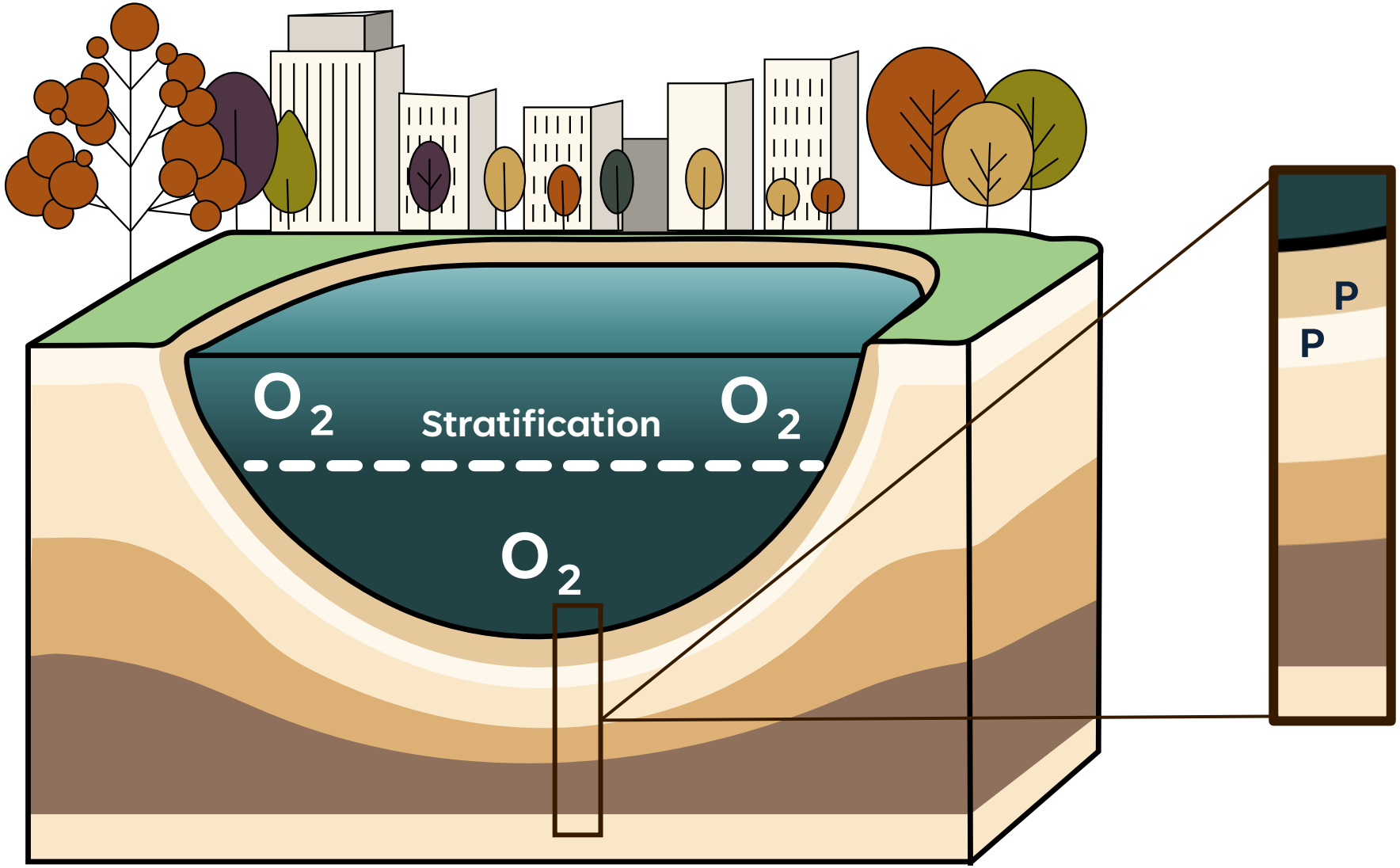

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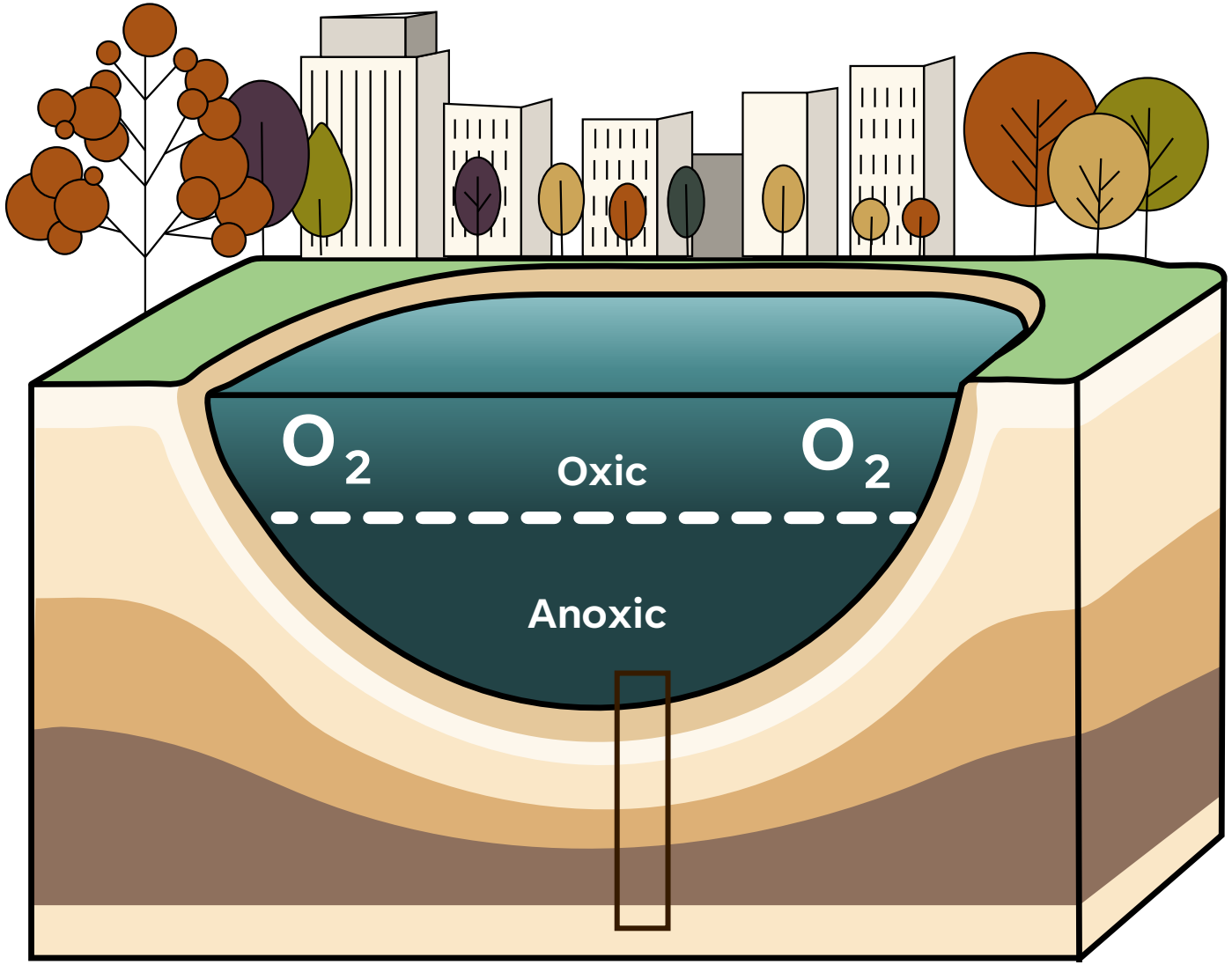

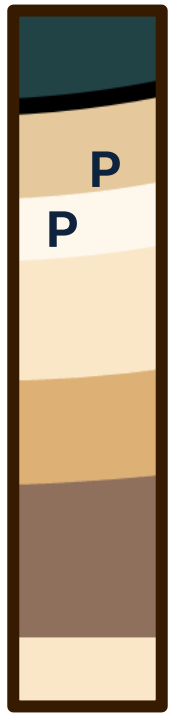

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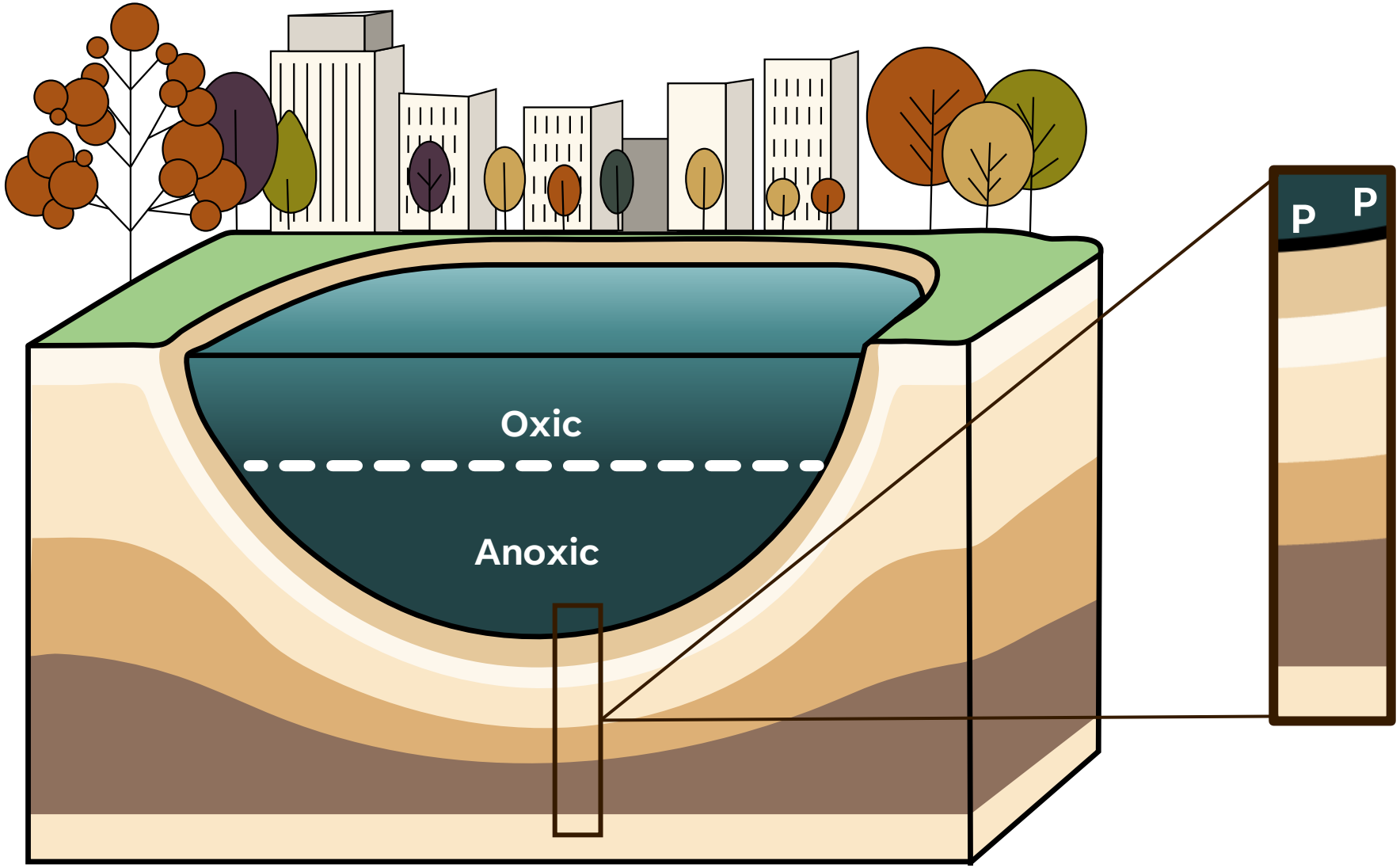

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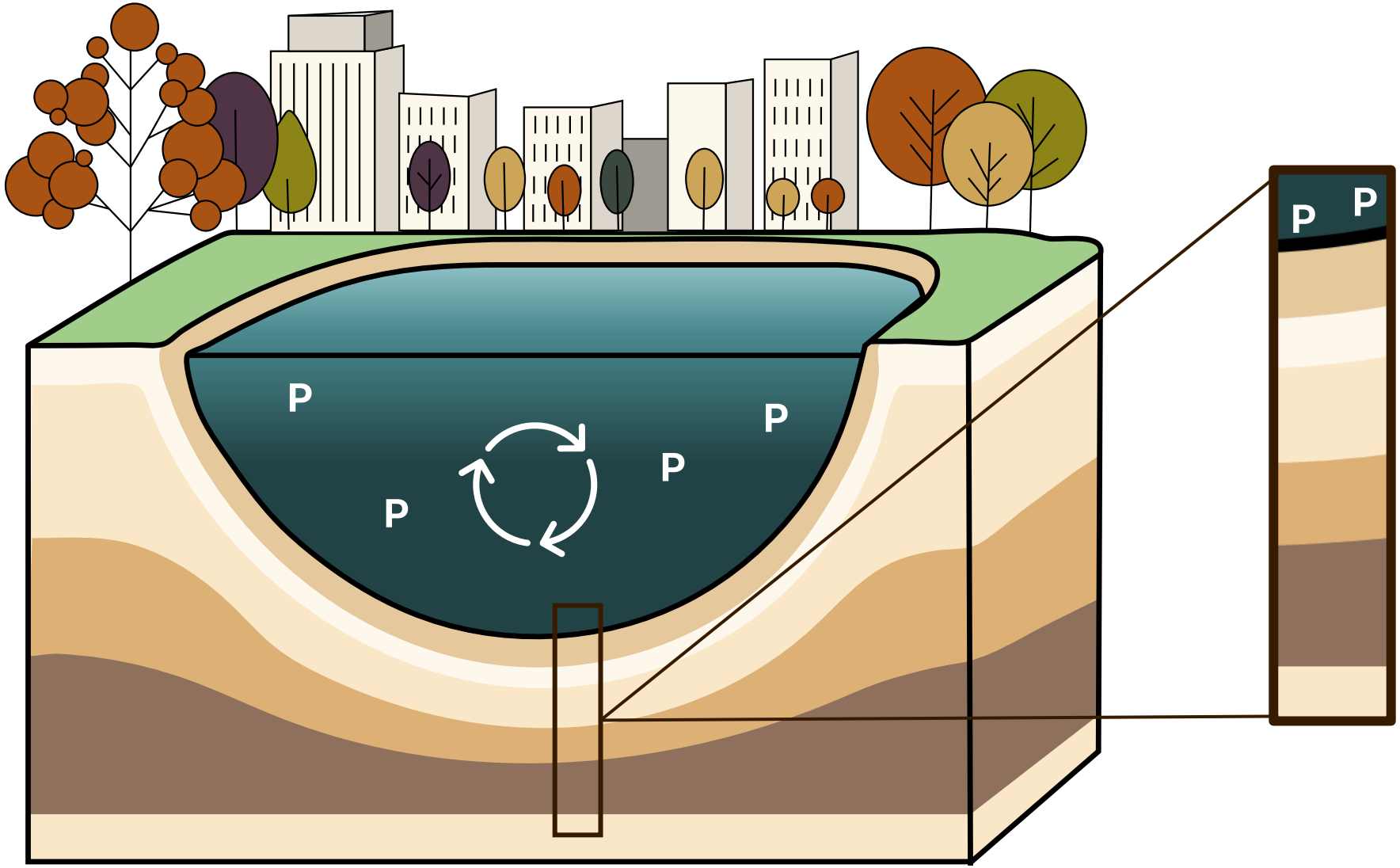

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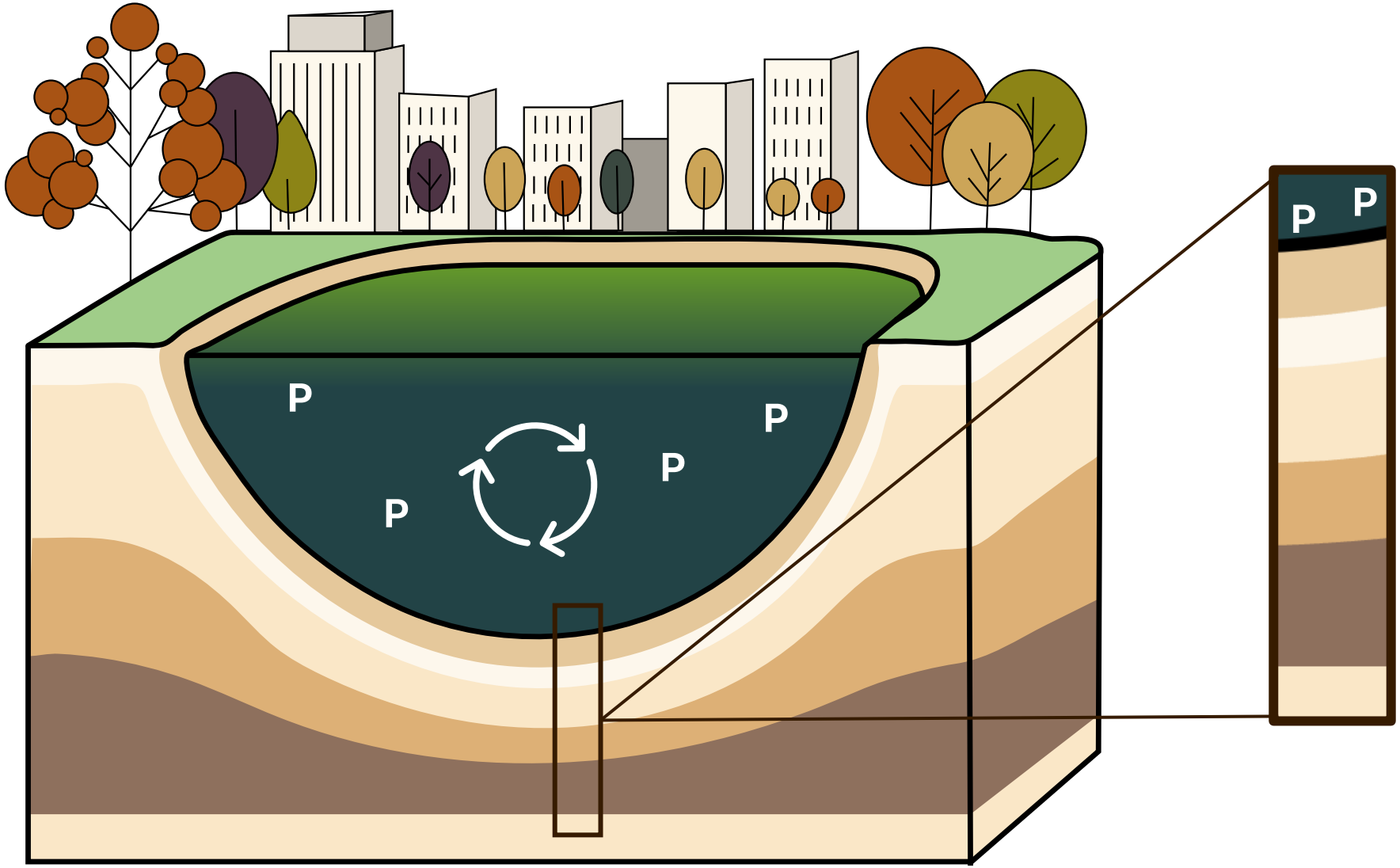

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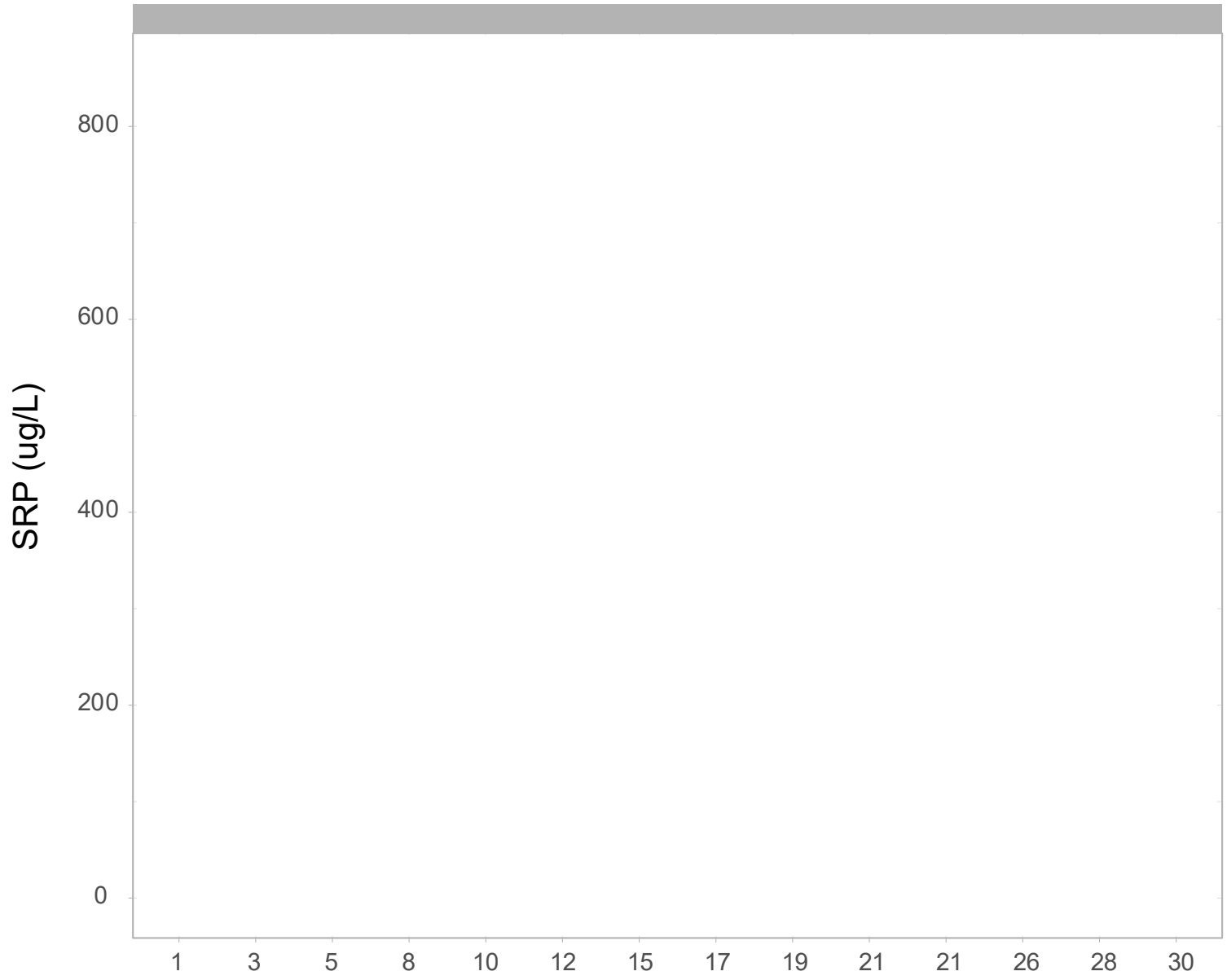
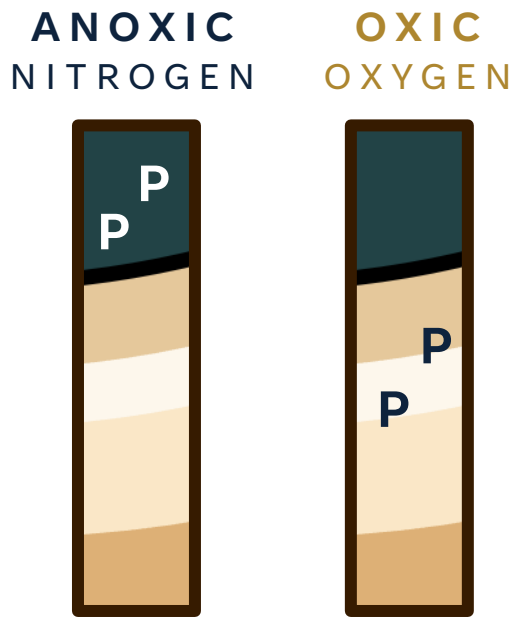
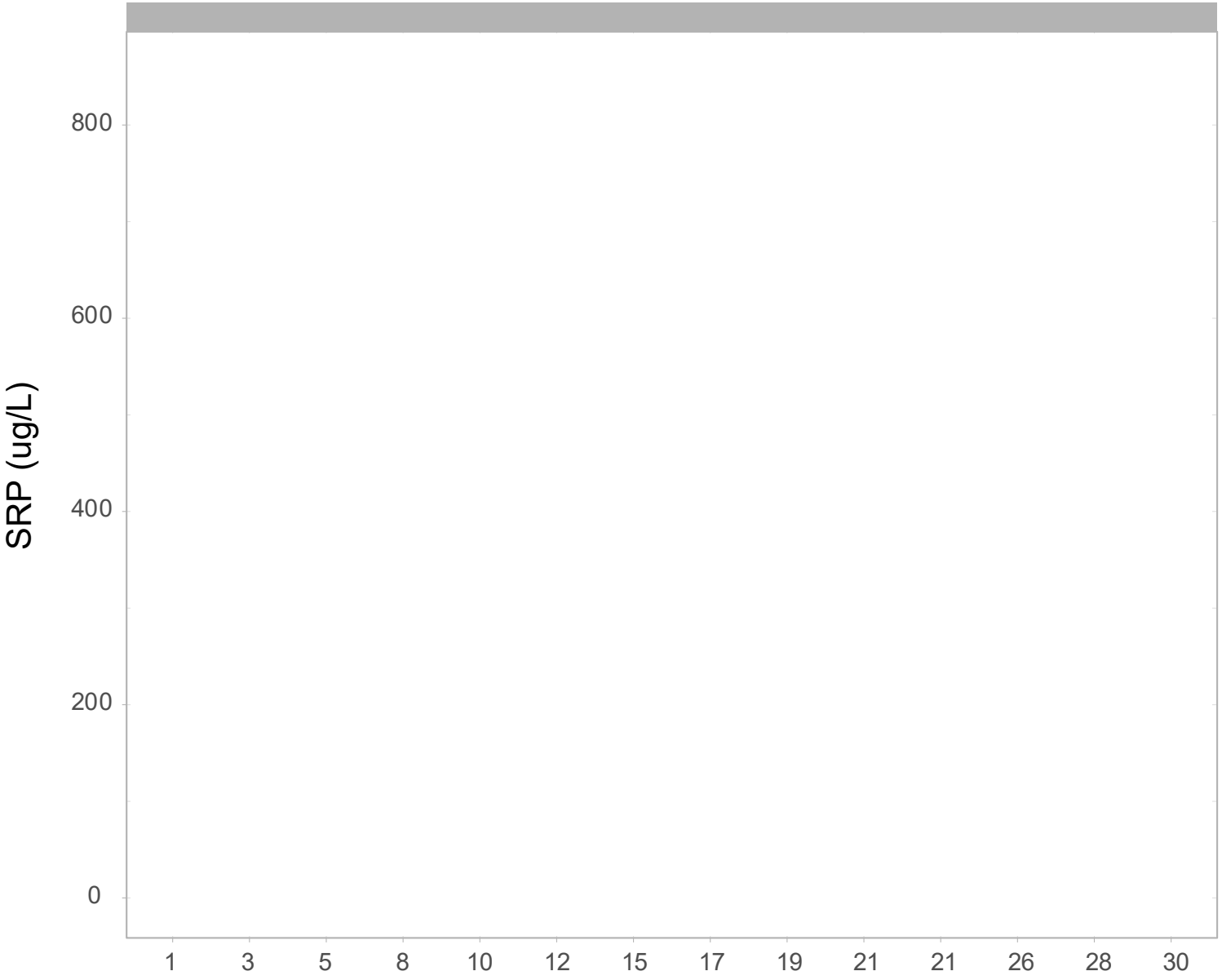


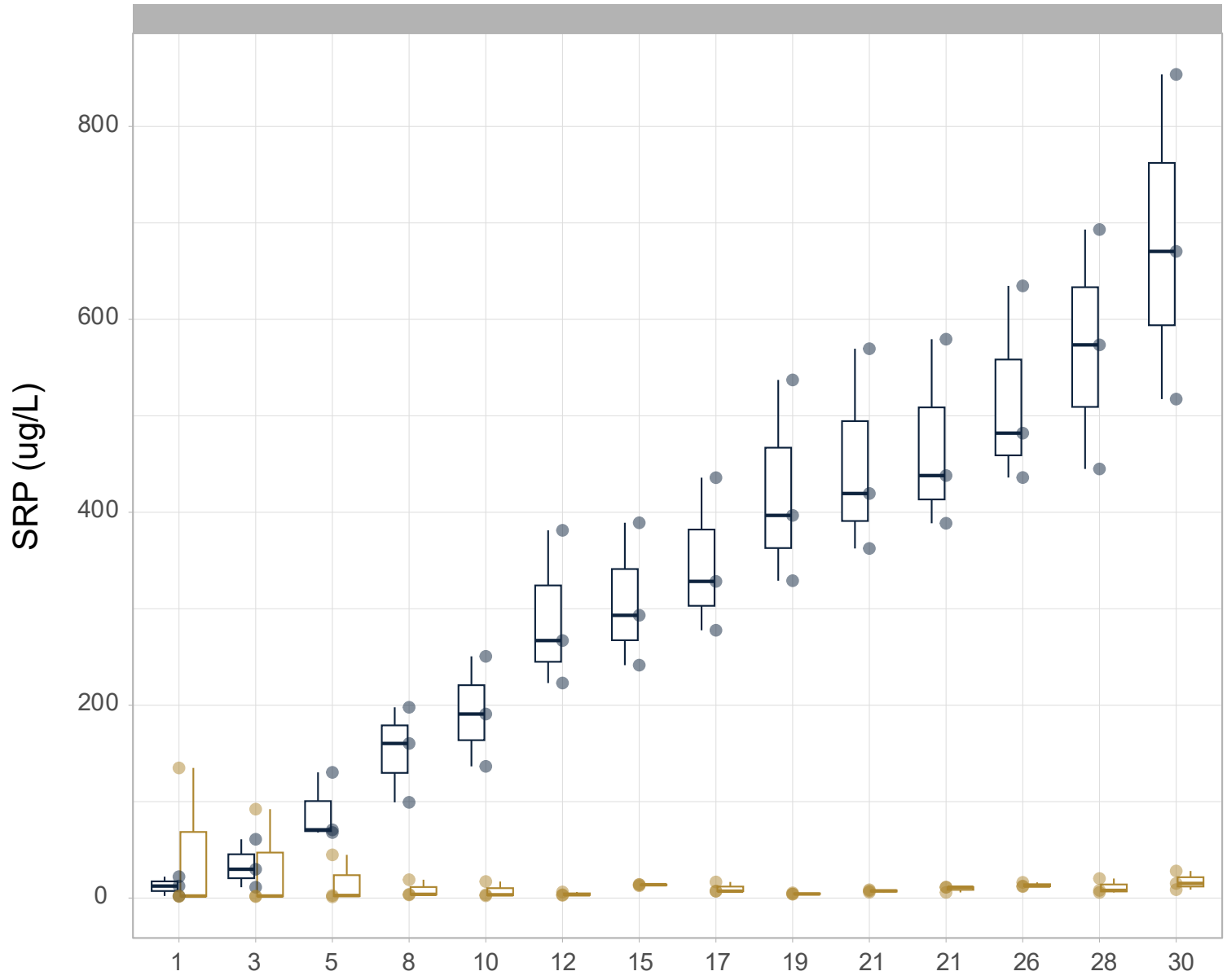


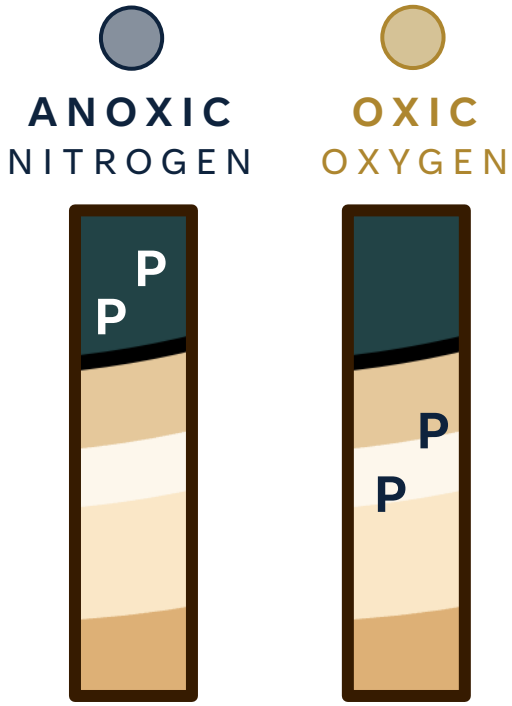
SEDIMENT INCUBATIONS

CONTEMPORARY DYNAMICS



CONTEMPORARY
DYNAMICS





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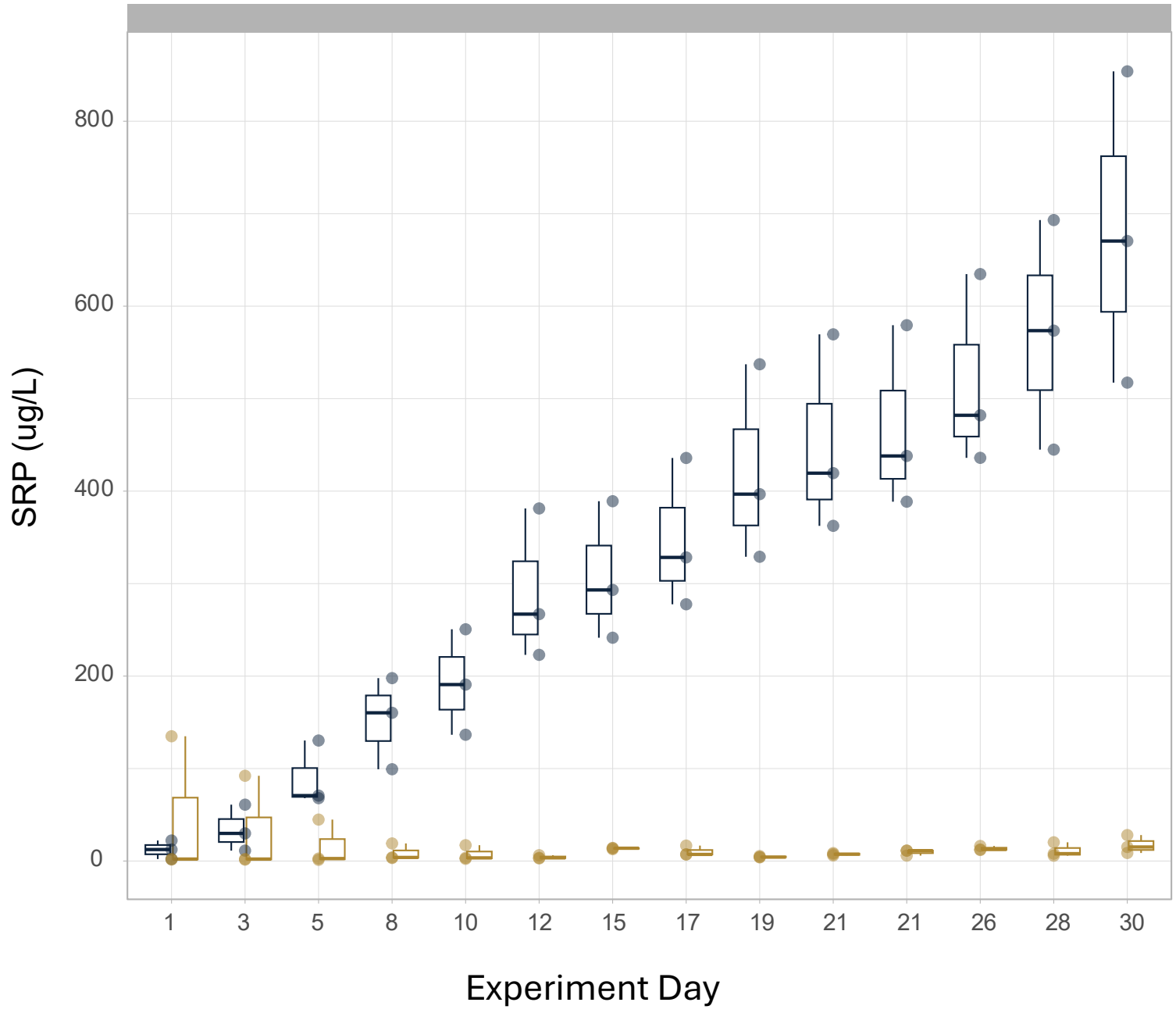


ANOXIC
NITROGEN

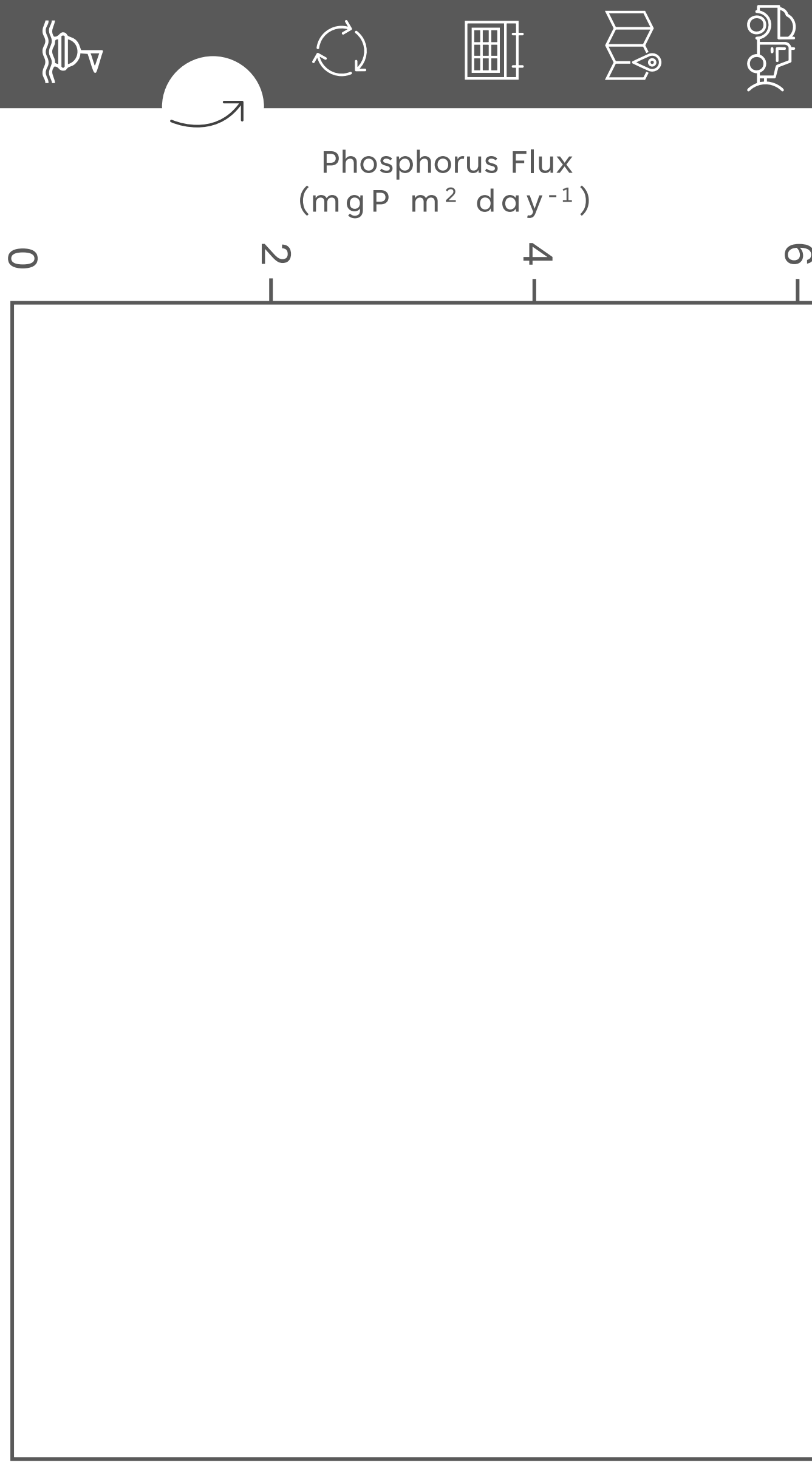
3.27 ± 0.62
mgP m^2 day^{-1}

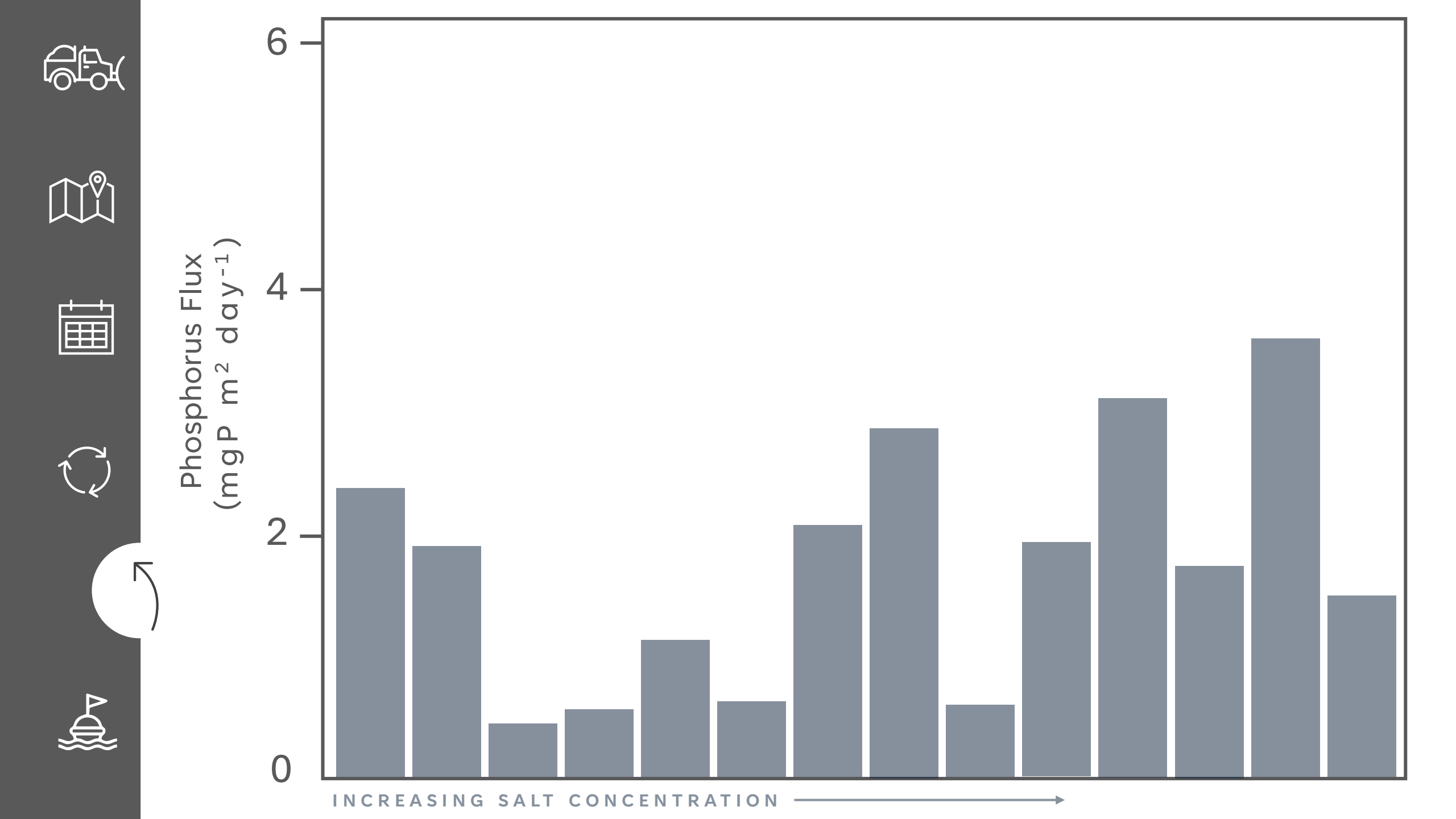
OXIC
OXYGEN

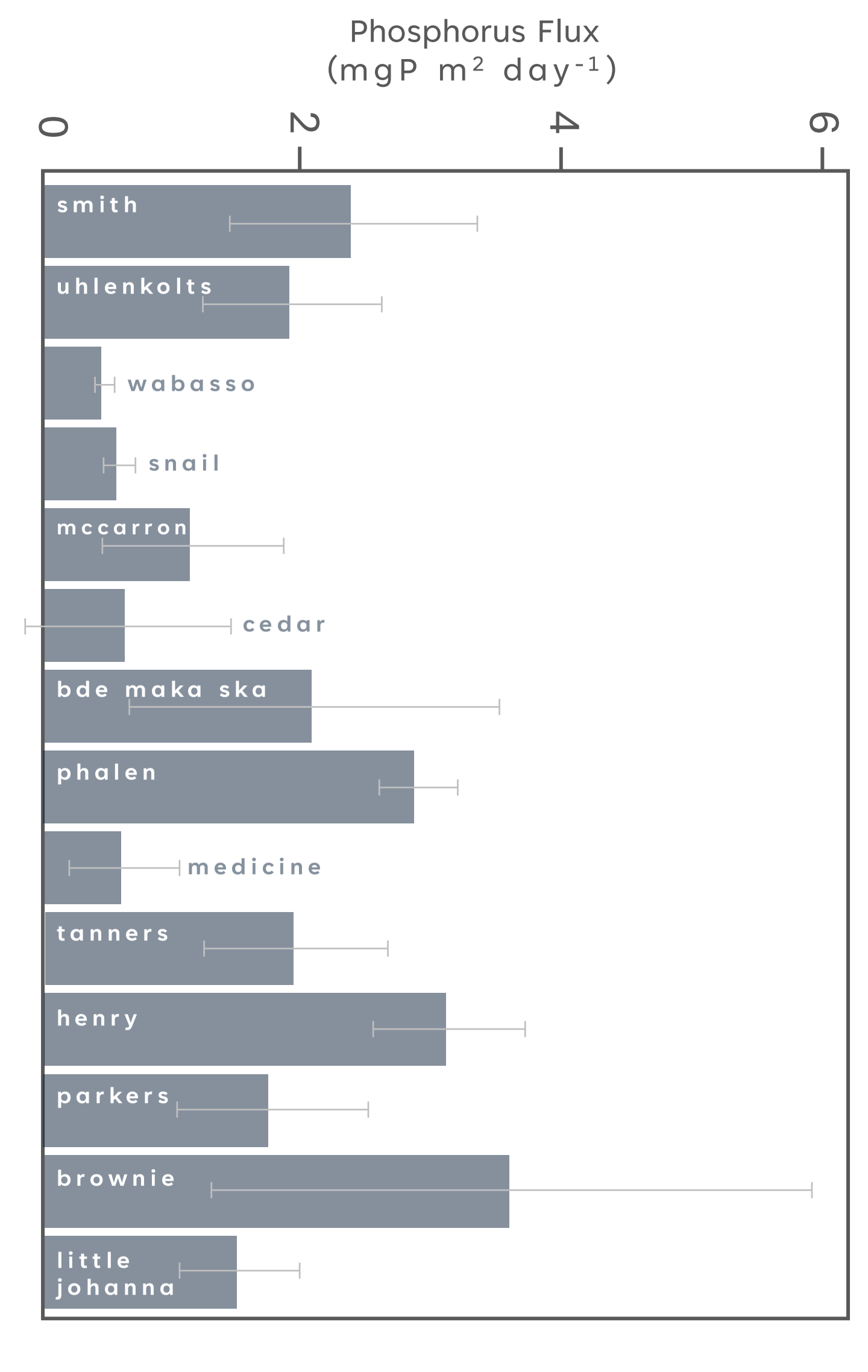
0.09 ± .26
mgP m^2 day^{-1}

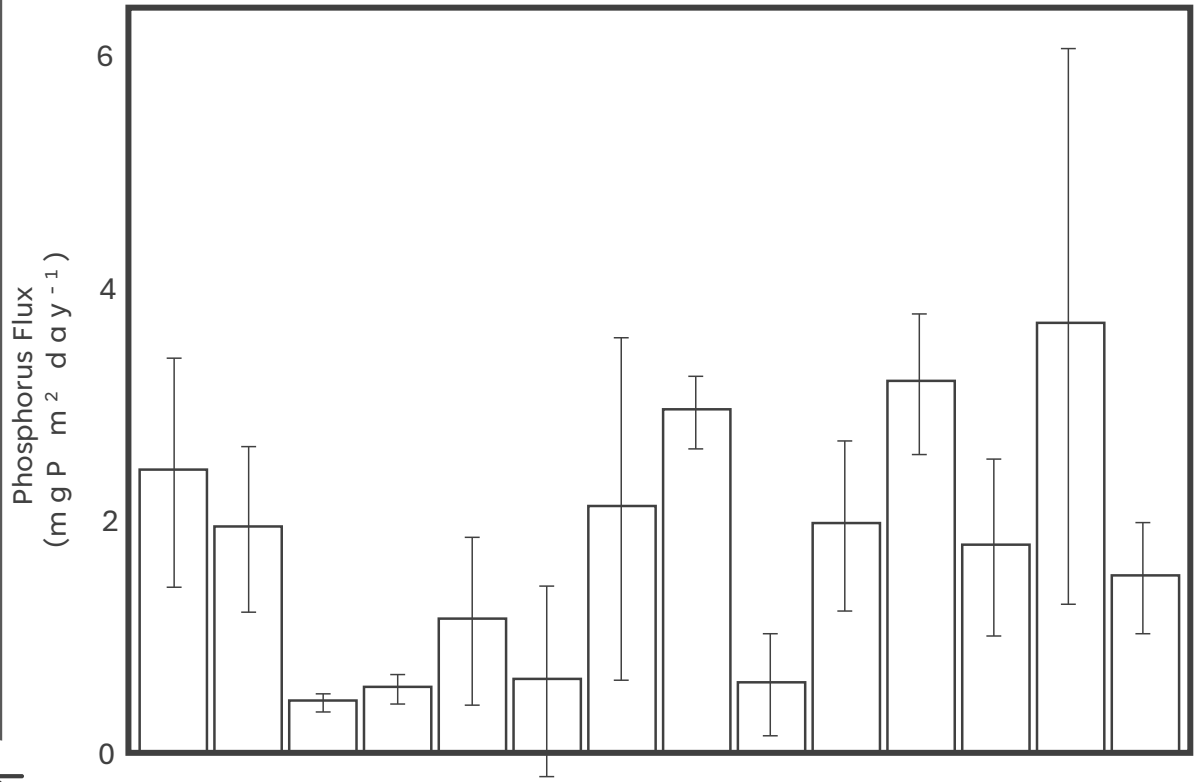
36 fold change

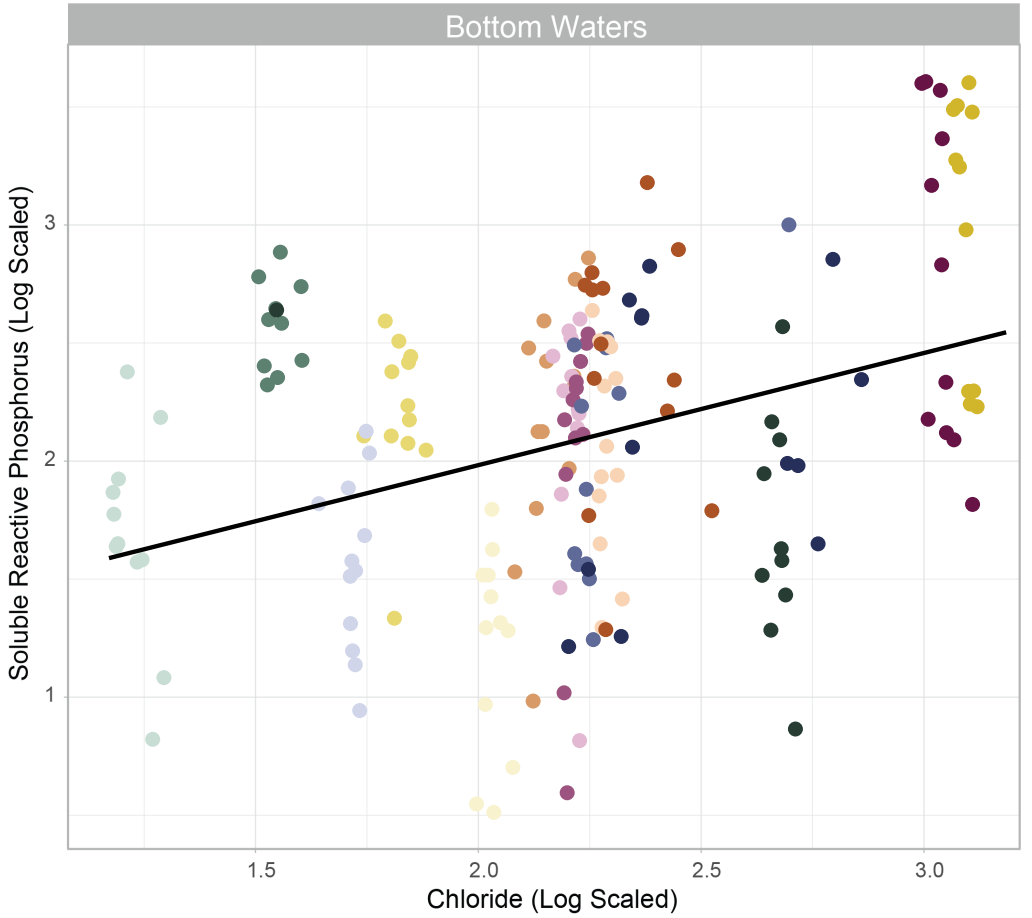
CONTEMPORARY DYNAMICS


Phosphorus Flux
(mgP m² day⁻¹)
0
2
4
6


6
4
2
0
Phosphorus Flux
(mgP m² day⁻¹)
INCREASING SALT CONCENTRATION


Phosphorus Flux
(mgP m² day⁻¹)
0
2
4
6
smith
uhlenkolts
wabasso
snail
mccarron
cedar
bde maka ska
phalen
medicine
tanners
henry
parkers
brownie
little johanna

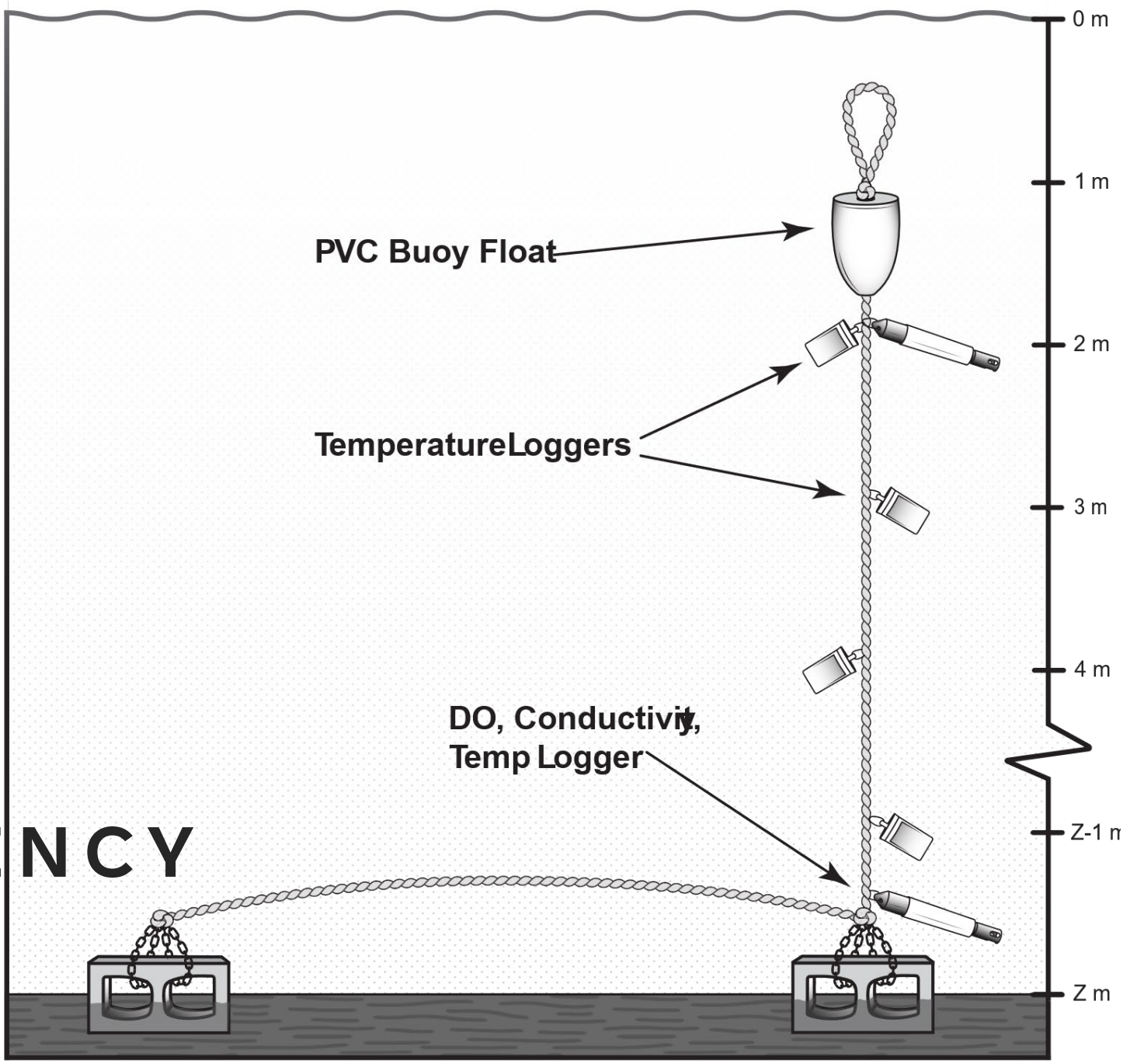


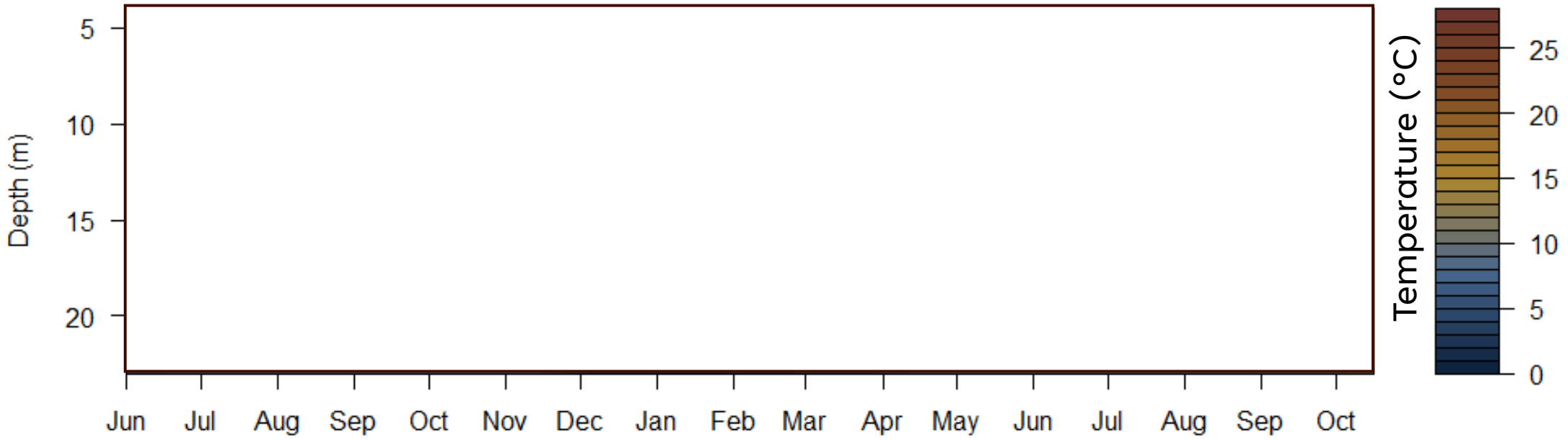


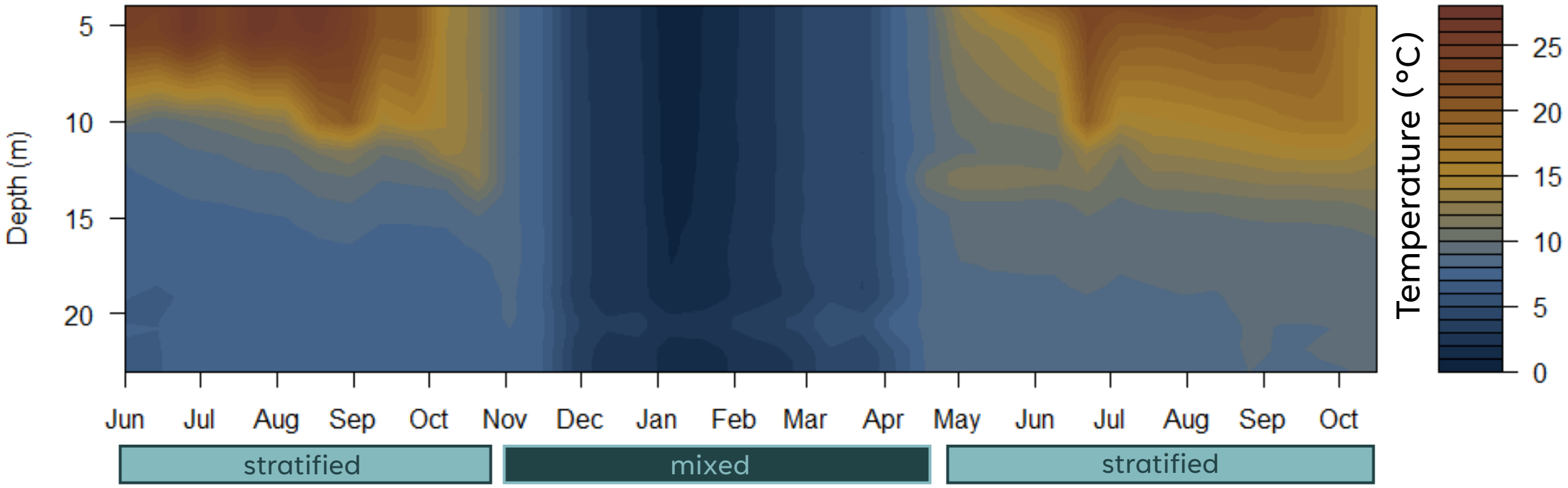
SALINITY CORRELATES WITH ADDITIONAL PHOSPHORUS LOADS; HOWEVER, SALT ALONE ISN'T THE DRIVING FORCE

HIGH FREQUENCY MONITORING

30 MINUTES




Depth (m)
5
10
15
20
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Temperature (°C)
25
20
15
10
5
0


Depth (m)
5
10
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20
Jun
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Mar
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stratified
mixed
stratified
Temperature (°C)
25
20
15
10
5
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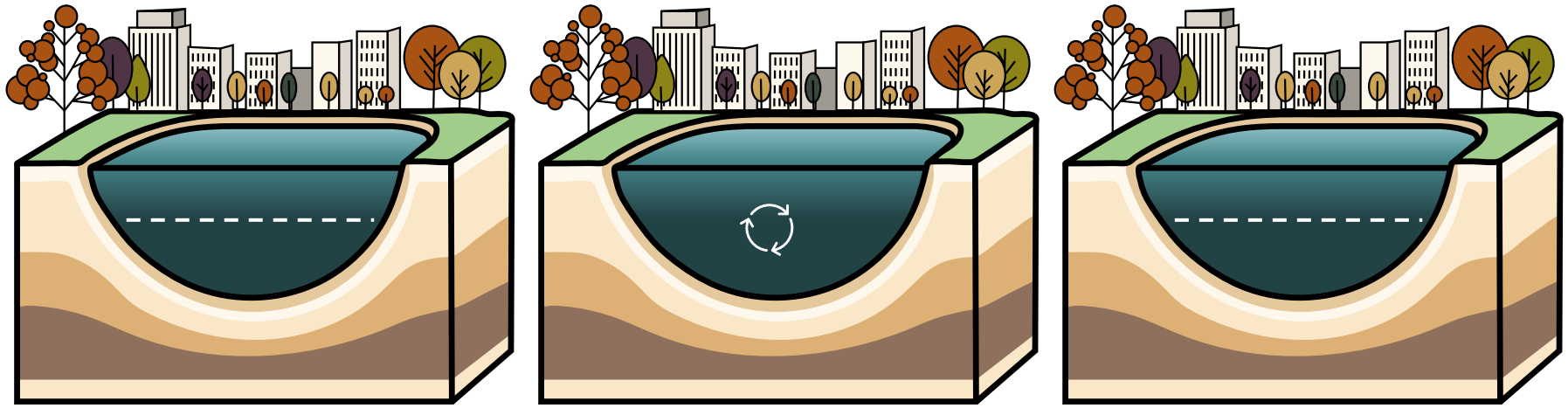

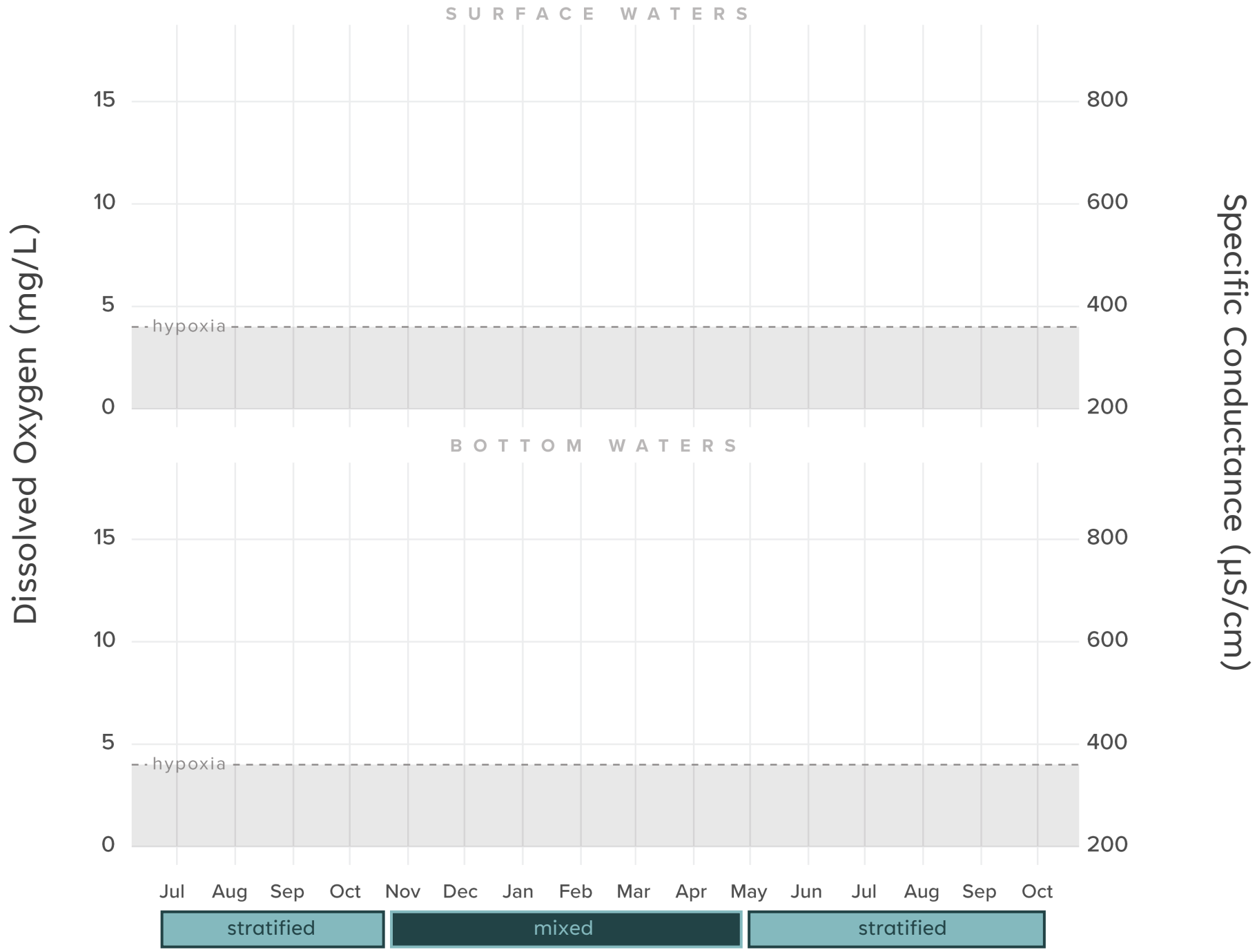
SURFACE WATERS
15
10
5
0
hypoxia
800
600
400
200
BOTTOM WATERS
15
10
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hypoxia
800
600
400
200
Dissolved Oxygen (mg/L)
Specific Conductance (µS/cm)
Jul
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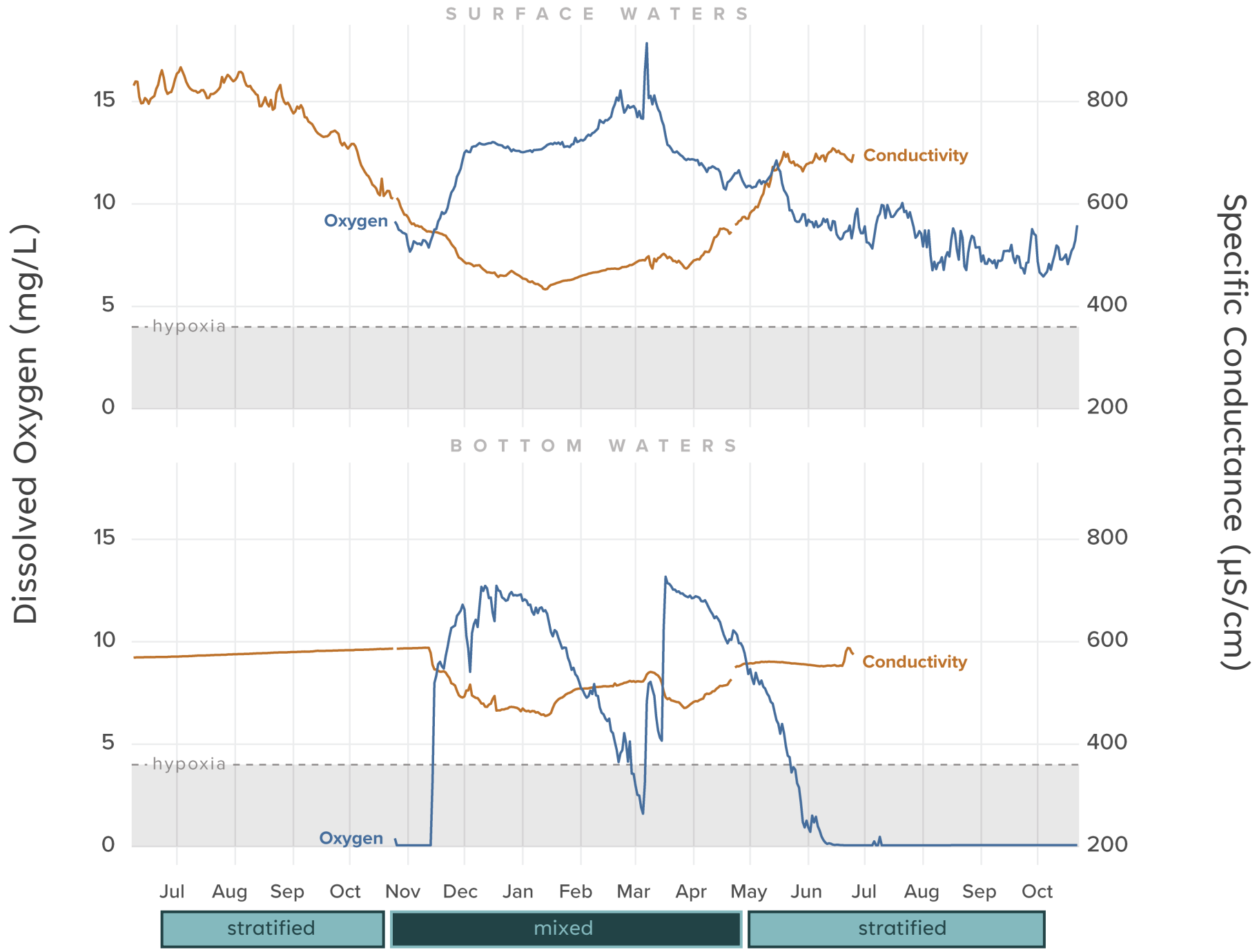
stratified


SURFACE WATERS
BOTTOM WATERS
Dissolved Oxygen (mg/L)
Specific Conductance (µS/cm)
15
10
5
0
800
600
400
200
Oxygen
Conductivity
hypoxia
Jul
Aug
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Mar
Apr
May
Jun
Jul
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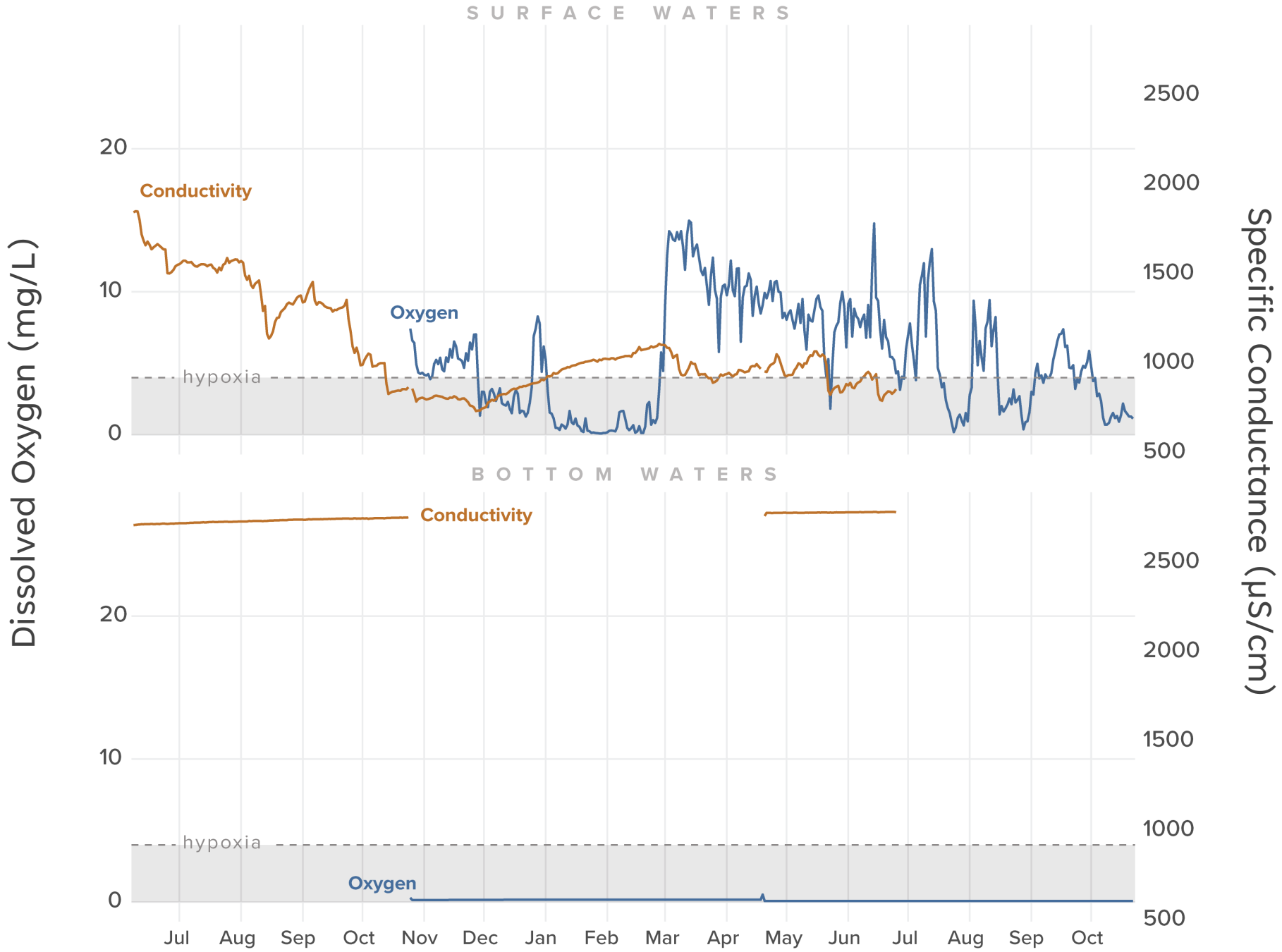
Sep
Oct
stratified
mixed
stratified


SURFACE WATERS
Conductivity
Oxygen
hypoxia
BOTTOM WATERS
Conductivity
Oxygen
hypoxia
Dissolved Oxygen (mg/L)
Specific Conductance (µS/cm)
20
10
0
2500
2000
1500
1000
500
Jul
Aug
Sep
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Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

1

HISTORICAL CONTEXT

Limited salt signal, only the most impaired systems had salt tolerant diatoms. However, Daphnia show rapid evolution to increased chloride conditions.

2

CONTEMPORARY DYNAMICS

Bottom water salinity correlates with increased phosphorus concentrations; however, the prominent mechanism for p-flux is still anoxia due to thermal stratification

3

PROSPECTIVE OUTLOOK

Model the potential salinization tipping points – transition to meromixis.

4

THEORETICAL IMPLICATIONS

Proposed alternatives (potassium acetate) discovered to be more toxic to aquatic life and resulted in high biological oxygen demand (BOD). - Cassidy 2022

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"quantify the hypolimnetic salinity threshold that will establish stabilizing conditions”

3

PROSPECTIVE OUTLOOK

"how much salt would we need to add to the bottom waters of lakes to prevent mixing”

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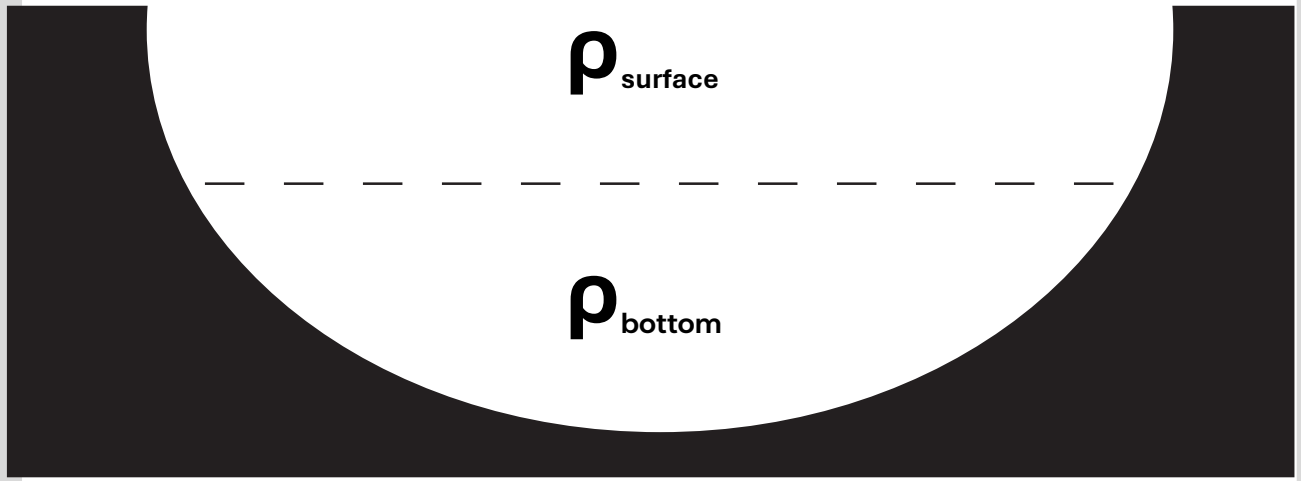
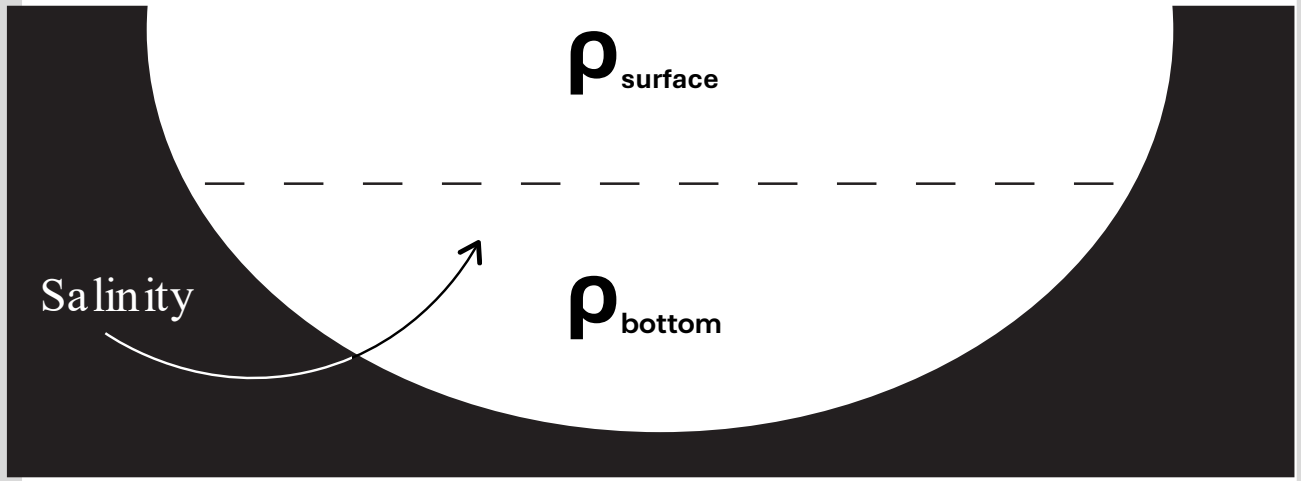


3

PROSPECTIVE OUTLOOK

"how much salt would we need to add to the bottom waters of lakes to prevent mixing”



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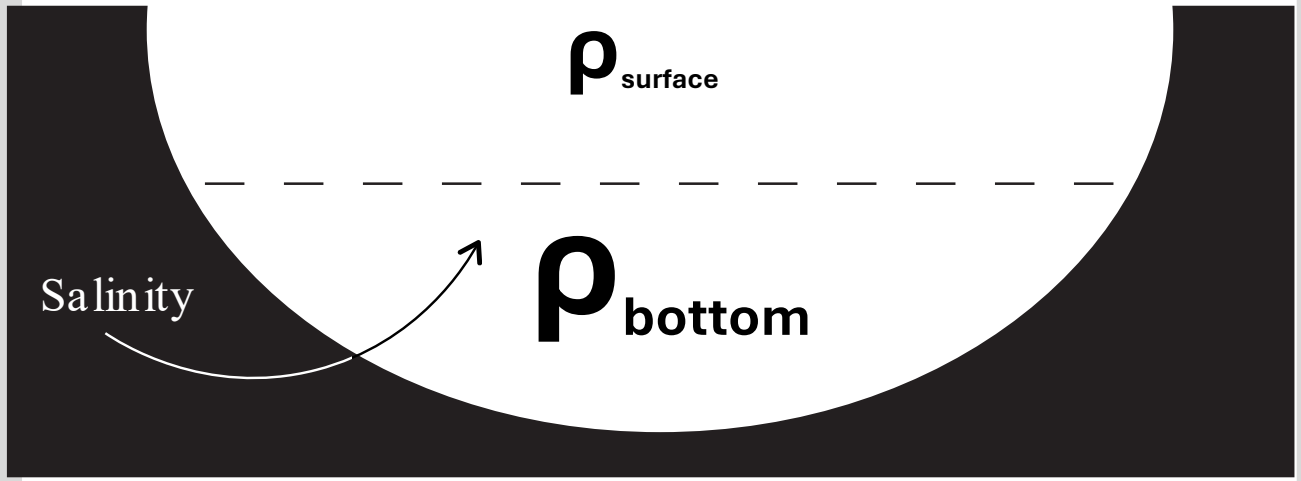
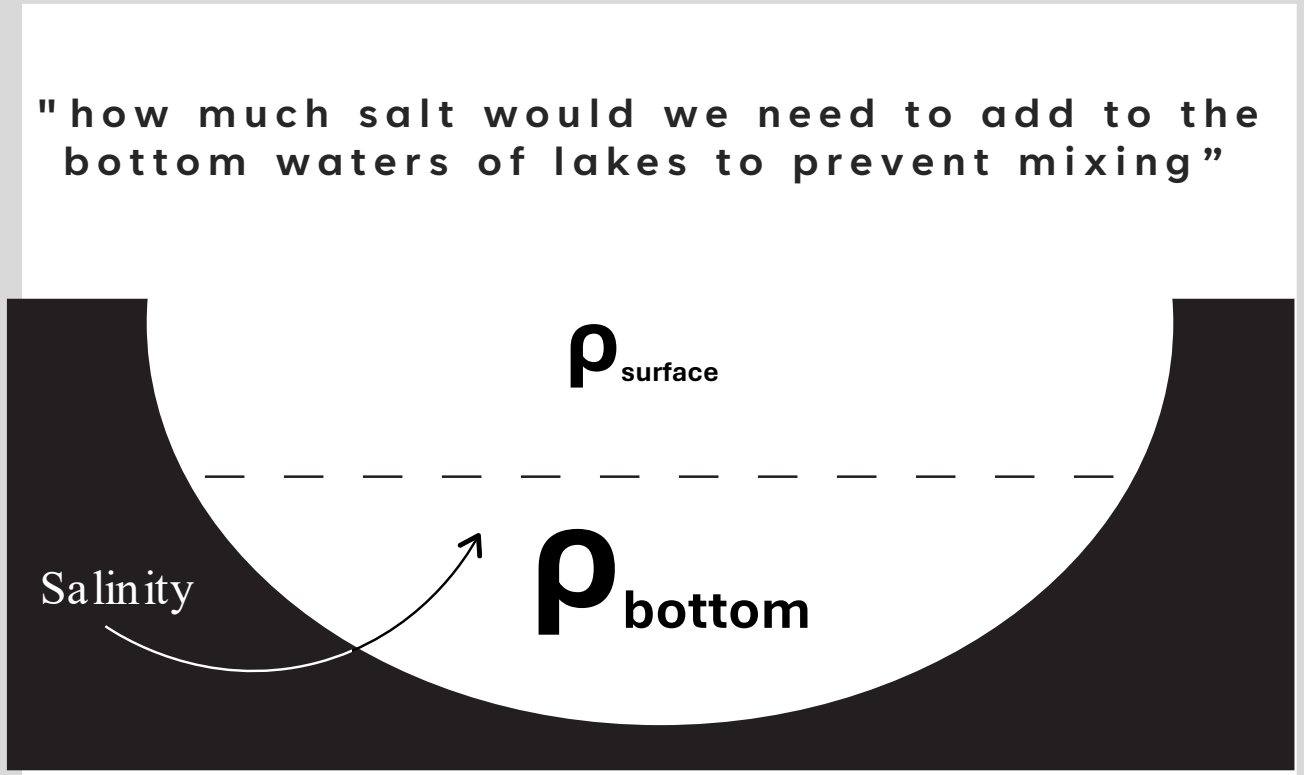
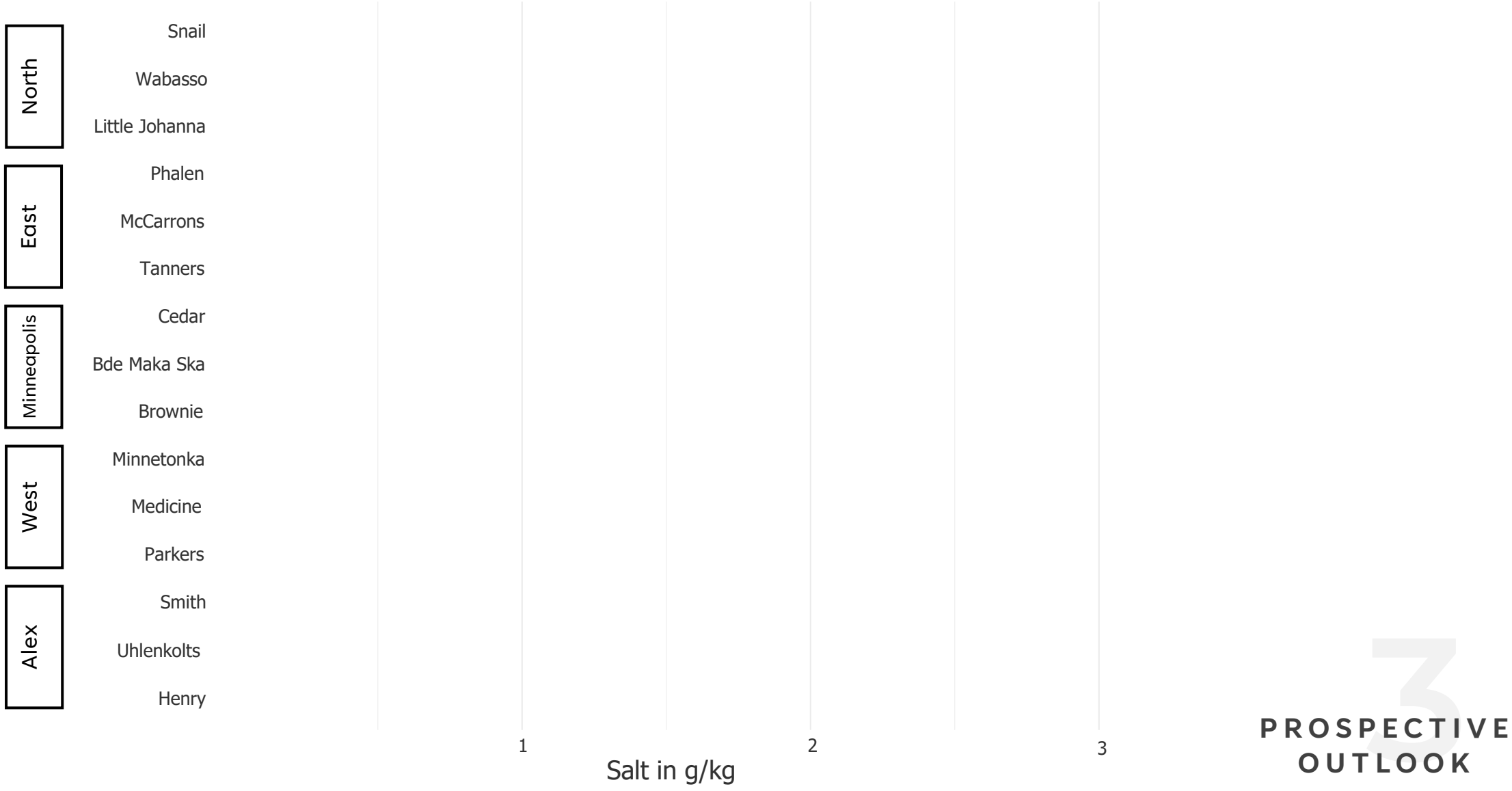


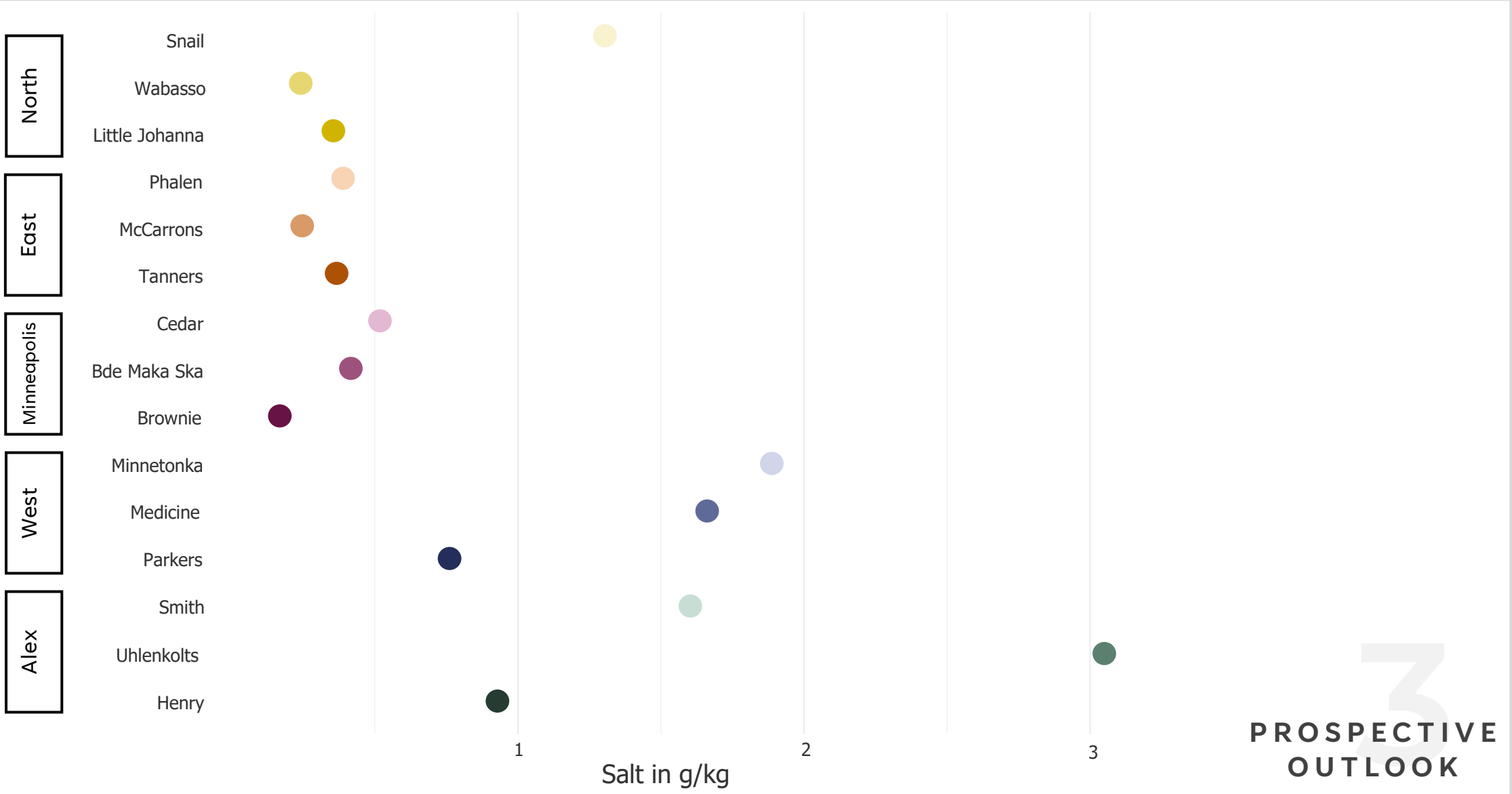


S_crit

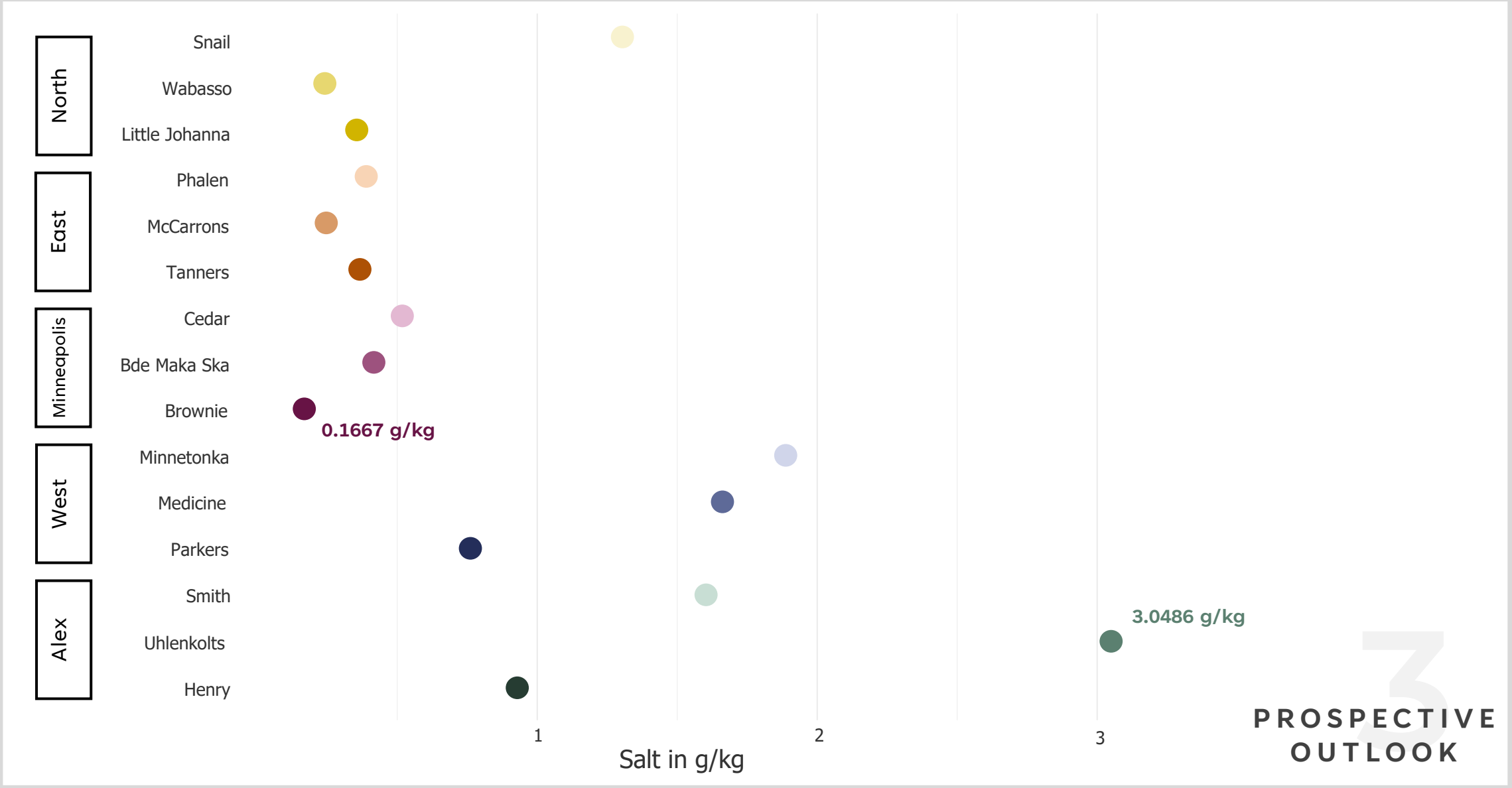
*Theoretical salinity threshold that if present in a lake would **prevent spring mixing** under average wind conditions.*

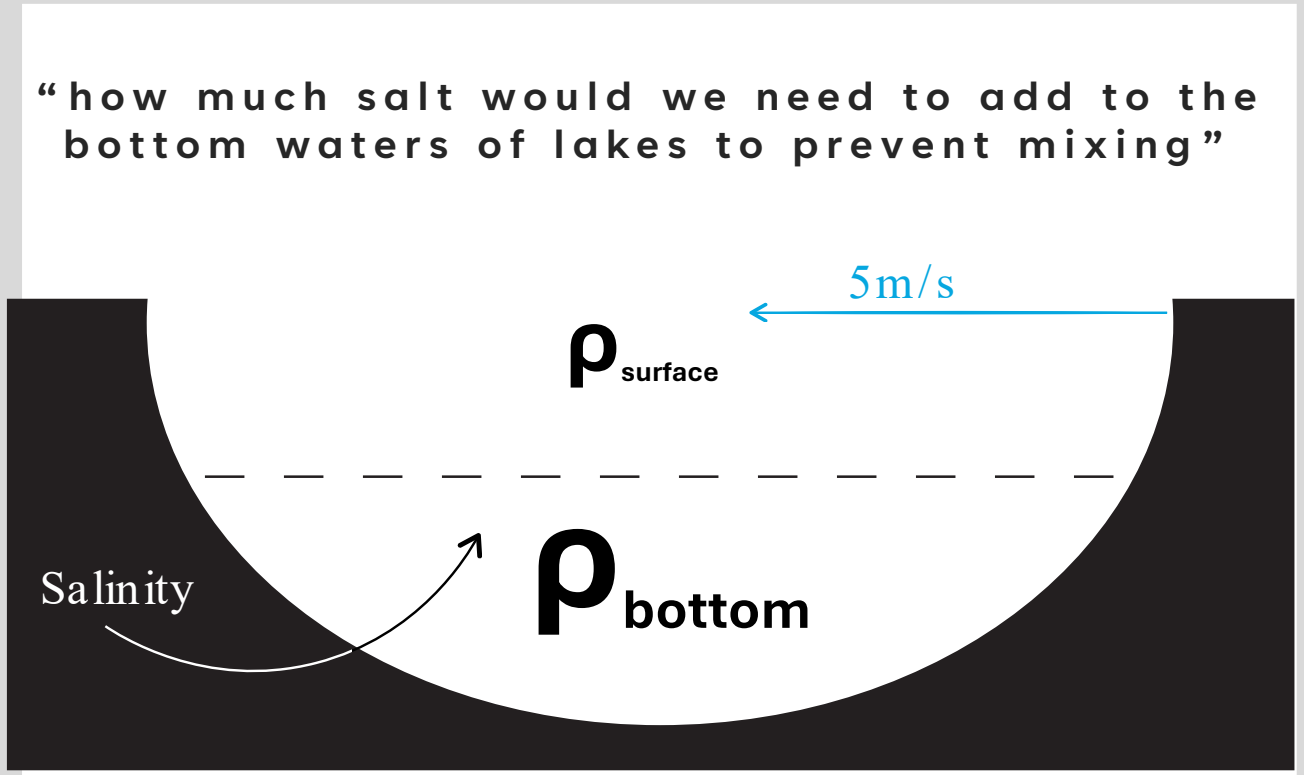


PROSPECTIVE OUTLOOK



PROSPECTIVE OUTLOOK


North
East
Minneapolis
West
Alex
Snail
Wabasso
Little Johanna
Phalen
McCarrons
Tanners
Cedar
Bde Maka Ska
Brownie
0.1667 g/kg
Minnetonka
Medicine
Parkers
Smith
Uhlenkolts
Henry
3.0486 g/kg
1
2
3
Salt in g/kg
PROSPECTIVE
OUTLOOK



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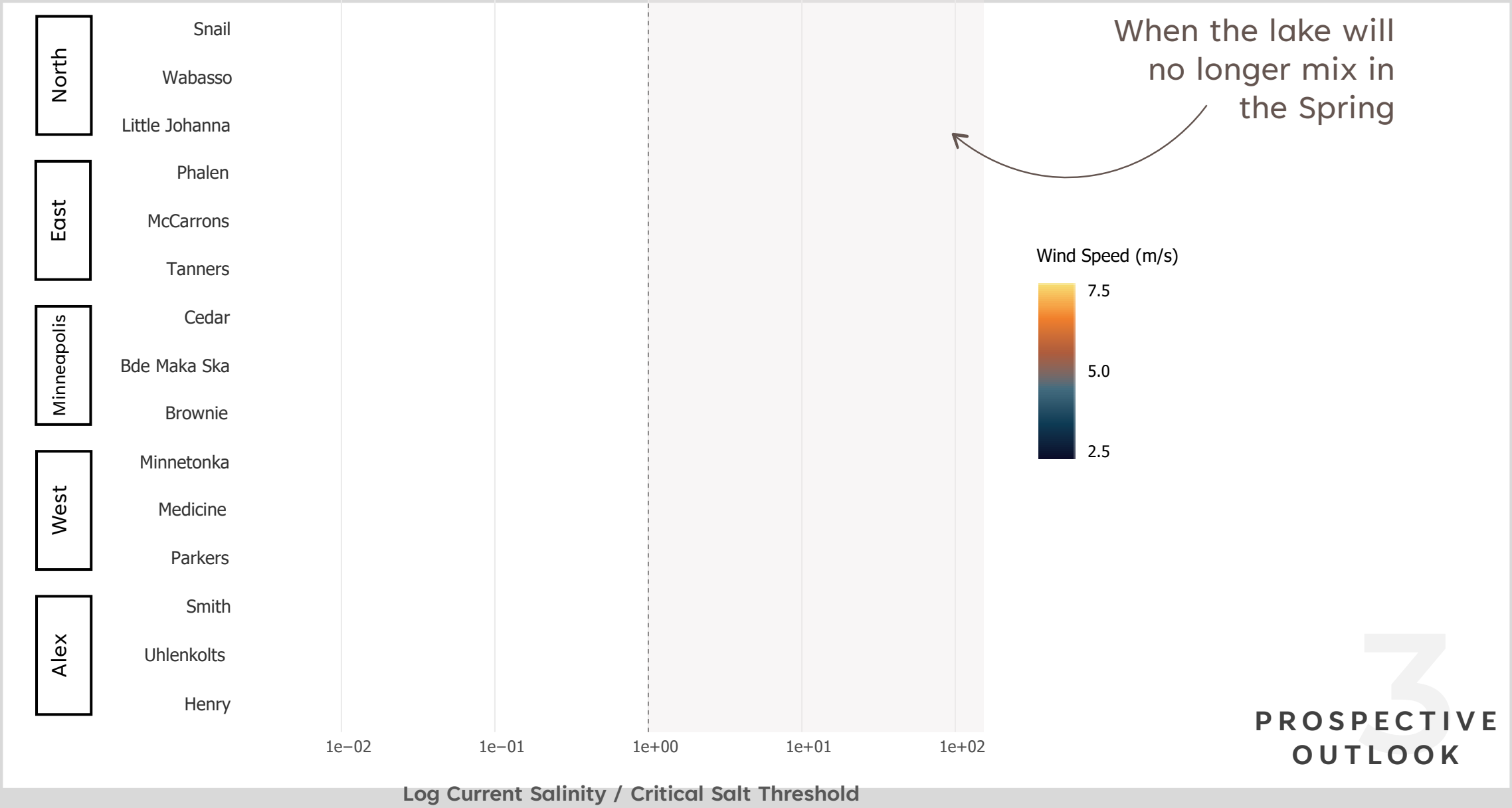

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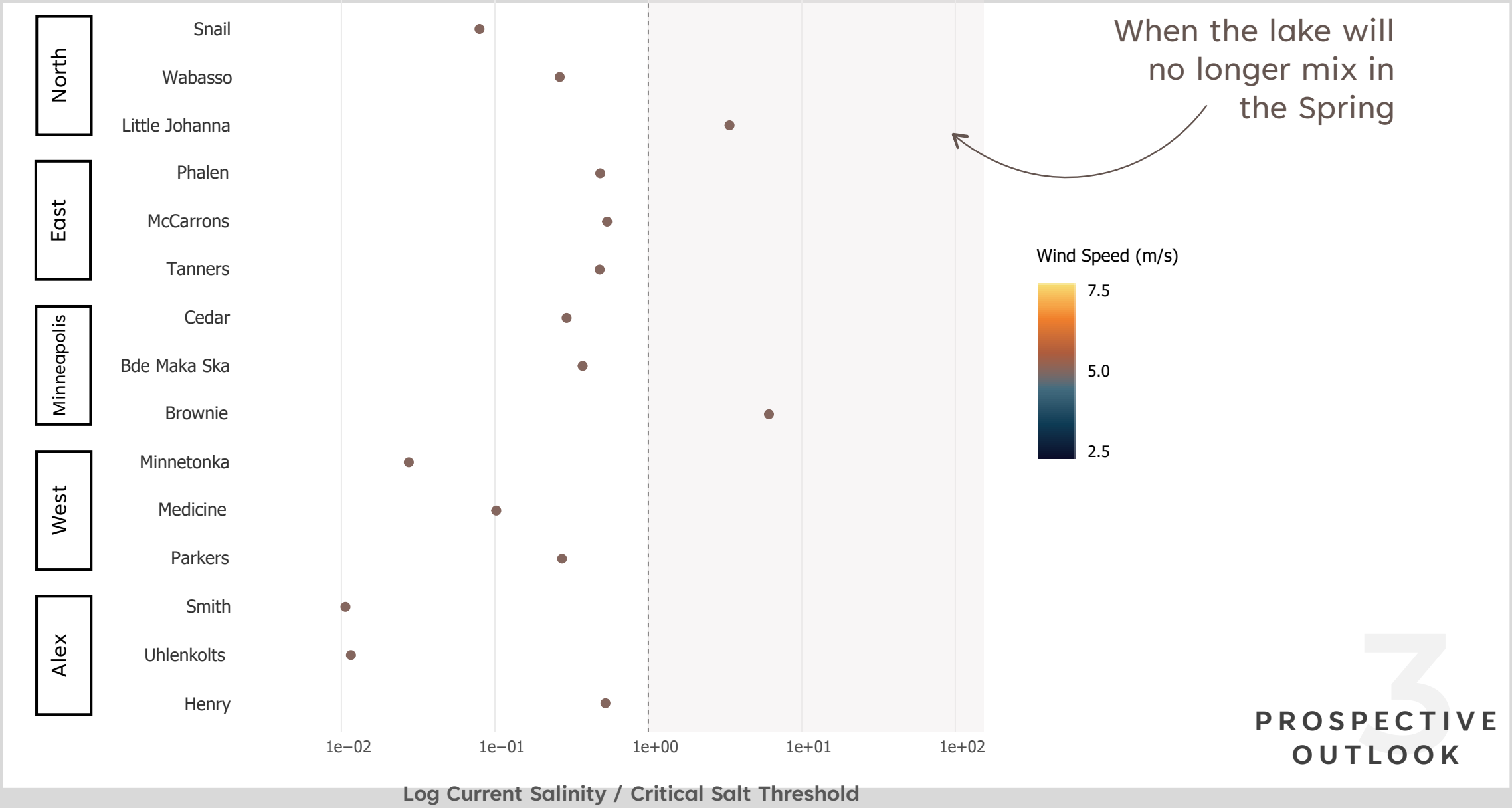
PROSPECTIVE OUTLOOK



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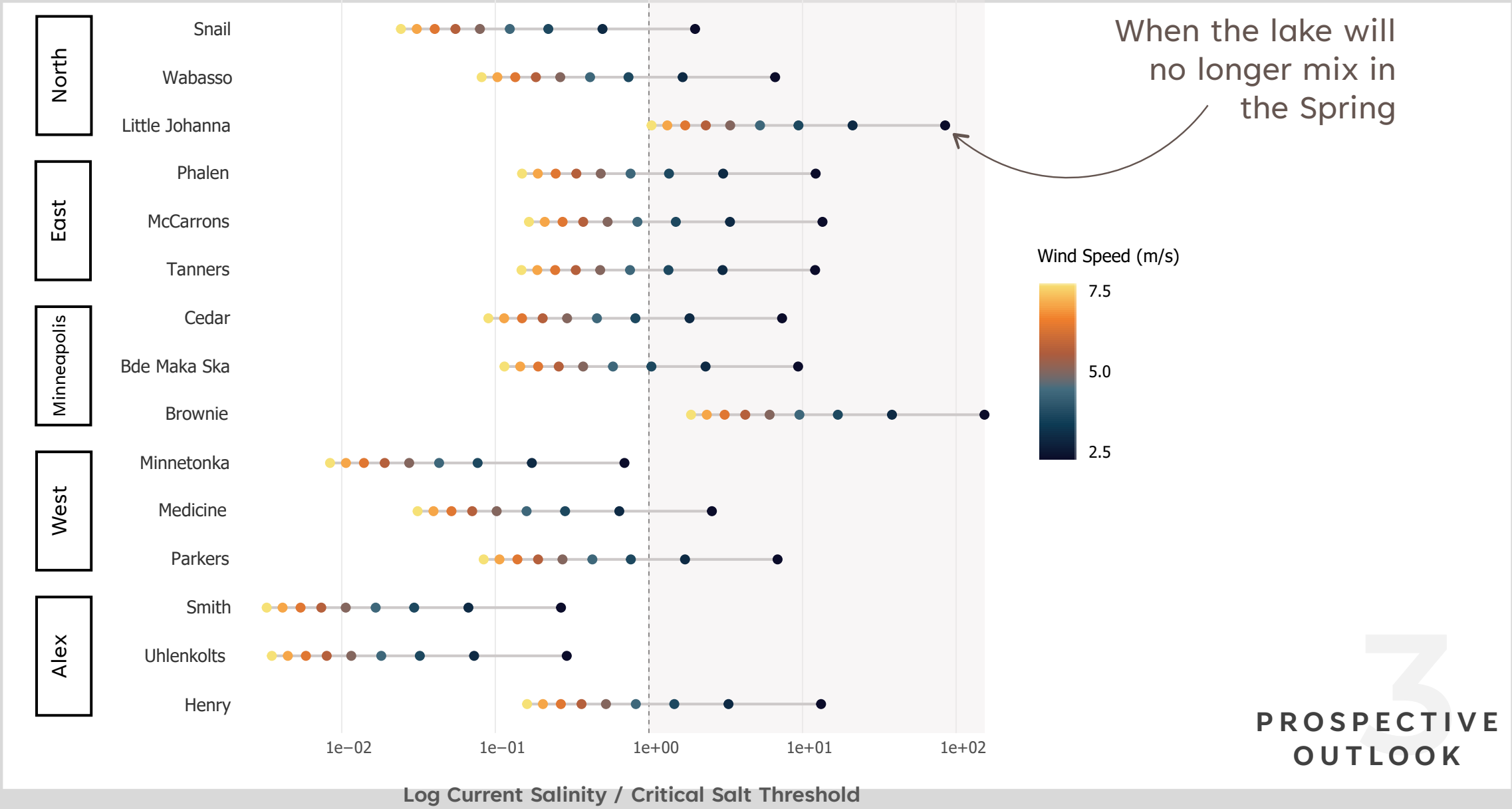
PROSPECTIVE OUTLOOK



3

PROSPECTIVE OUTLOOK

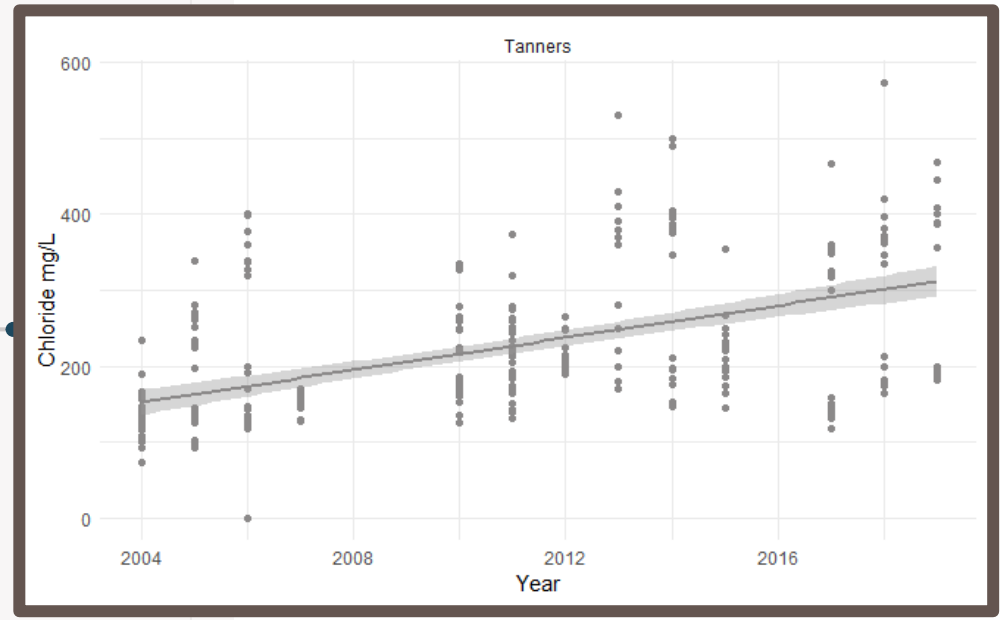
North
East
Minneapolis
West
Alex

Snail
Wabasso
Little Johanna
Phalen
McCarrons
Tanners
Cedar
Bde Maka Ska
Brownie
Minnetonka
Medicine
Parkers
Smith
Uhlenkolts
Henry

1e−02
1e−01
1e+00
1e+01
1e+02

Log Current Salinity / Critical Salt Threshold

When the lake will no longer mix in the Spring



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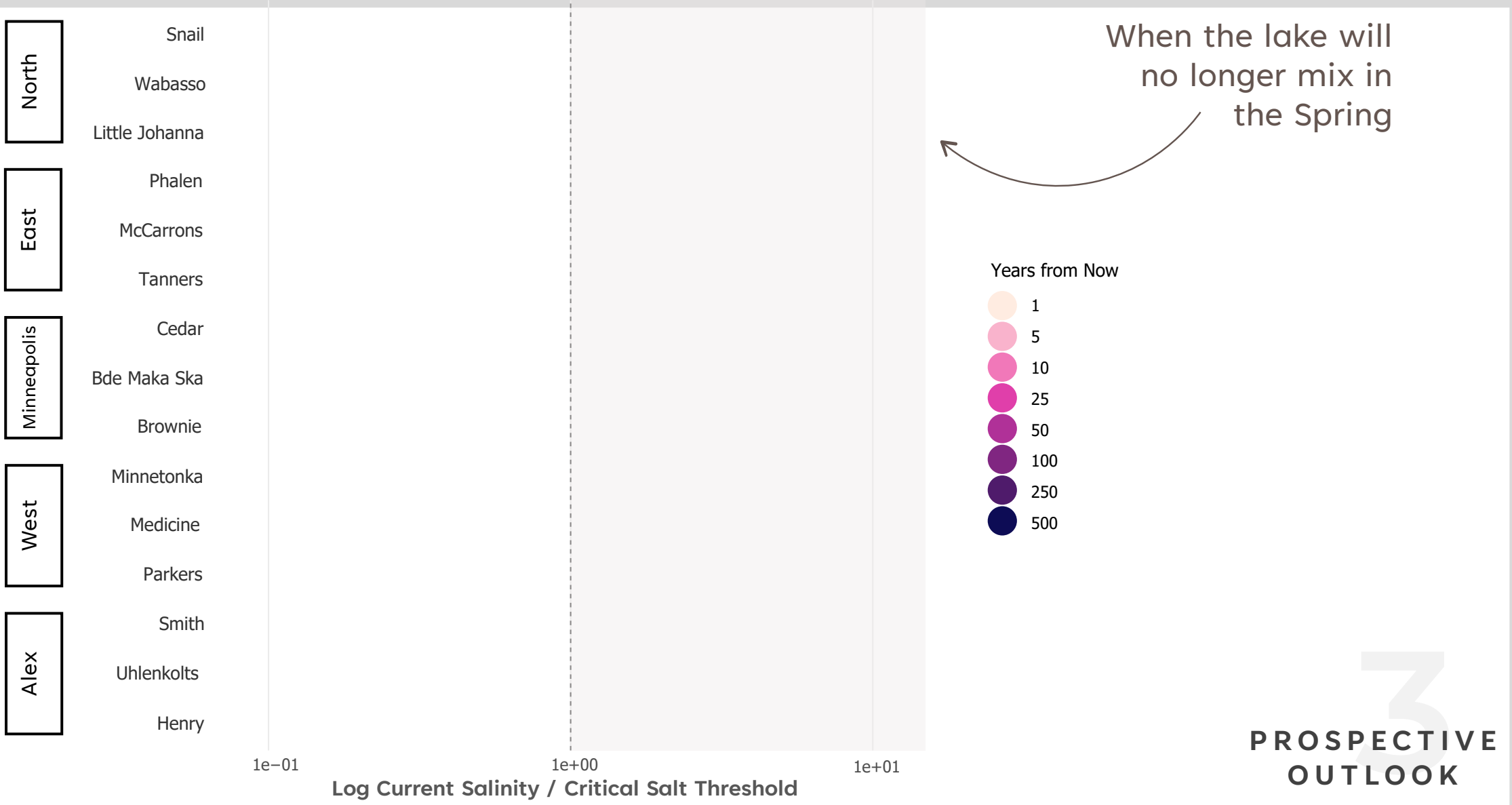
PROSPECTIVE OUTLOOK



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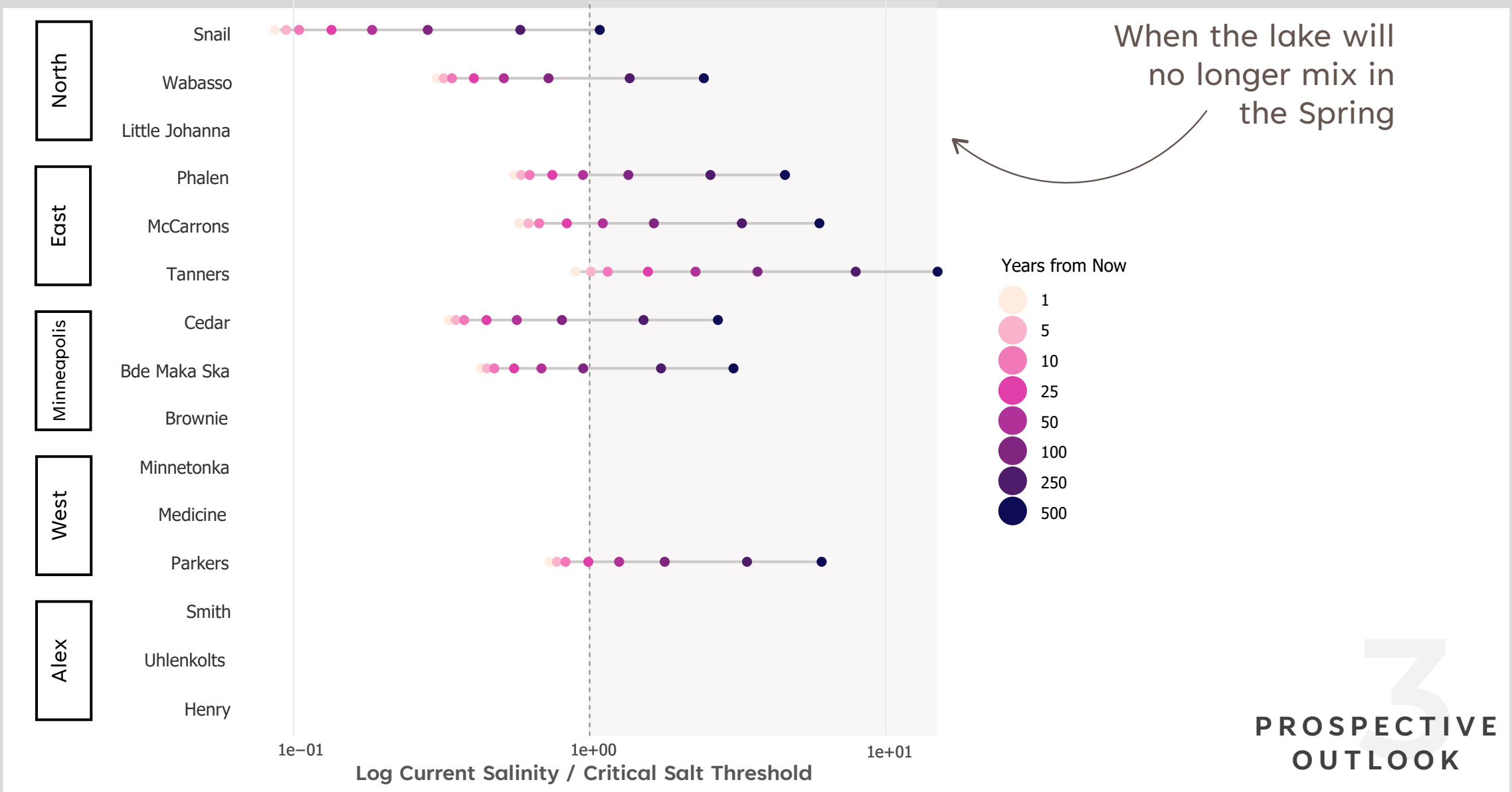
North
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1e−01
1e+00
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Log Current Salinity / Critical Salt Threshold
When the lake will no longer mix in the Spring
Years from Now
1
5
10
25
50
100
250
500
3
PROSPECTIVE OUTLOOK

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NAVIGATING SALINITY SHIFTS

A Multi-Faceted Approach to Understanding Freshwater Salinization in Urban Lakes

SCWRS | Zoe Plechaty, Mari Leland, Erin Mittag, Matthew Wersebe, Jason Ulrich, Joy Hobbs, Amy Myrbo, Adam Heathcote, Lienne Sethna, Kelsey Boeff, Amelia Wilson-Jackson, Mark Edlund

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

Hailey Sauer
hsauer@smm.org
@HMS_Beagles
haileysauer.weebly.com

Science Museum of Minnesota

SAINT CROIX WATERSHED RESEARCH STATION

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@ScienceMuseumMN

Washington County Groundwater Plan 2025-2035

Water Consortium December 3, 2025

Washington County

Purpose, Plan Background

- Washington County relies fully on groundwater for drinking water.
- Challenges to groundwater management include competing interests, groundwater contamination, climate change and equity considerations.
- Public Health and Environment (PHE) leads Groundwater Plan development and implementation.
- Previous Plan years: 1992, 2003, 2014 (expired Aug 2024, extension to Aug 2025).

Agenda

Washington County

Vision Statement

We envision a future where there is plenty of clean water in Washington County to support human health, community growth, and a thriving natural environment.



Washington County

Engagement – County Board & Partners

County Board

- County board liaison to advisory committee
- Guides development
- Adopts final plan

Board of Water and Soil Resources

- Agency in charge of plan review and approval

Groundwater Advisory Committee

- Representatives from Construction, Agriculture, Hydrogeology, Well Drilling, 4 residents and 7 combined between cities, townships and watersheds.

Technical Advisory Committee

- Technical experts and partners from watersheds, the Washington Conservation District, county departments, interested cities and townships, state agencies, and Met Council

Washington County

Engagement – Community

- Community Engagement Survey and Events – August to October 2023.
- Survey included 3 groundwater questions:
  - Do you know where your drinking water comes from?
  - What are your concerns about groundwater in Washington County?
  - How can Washington County, and our state and local partners, help address groundwater concerns?
- 62% of respondents knew that their drinking water comes from groundwater.
- Two largest concerns: (I) presence of contamination, (II) sources of contamination.

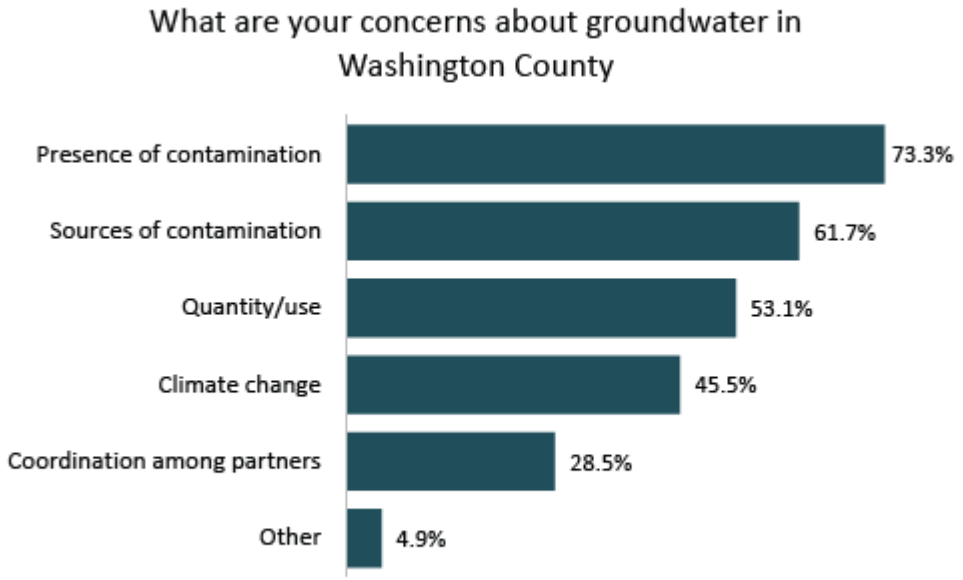


Figure 3. Groundwater Concerns Bar Chart, Resident Survey

Engagement – Community

Table 2. Average Ratings of Environmental Concerns by Year, Resident Survey

Please rate to what degree, if at all, each of the following is an environmental concern in Washington County (0=not at all a concern, 100=major concern)

Environmental concern	2022	2019	2016	2013	2008	2006	2001
Quality of drinking water	59	57	41	46	54	47	NA
Quality of water in lakes and streams	57	57	48	55	55	53	NA
Energy use	51	48	NA	NA	NA	NA	NA
Climate change	50	51	NA	NA	NA	NA	NA
Quantity of useable water supply	50	50	40	NA	NA	NA	NA
Exposure to radon	38	40	NA	NA	NA	NA	NA
Lack of recycling	35	40	NA	NA	NA	NA	NA
Yard waste disposal	33	NA	NA	NA	NA	NA	NA
Quality of outdoor air	31	32	28	30	37	37	NA
Proper disposal of garbage	31	31	23	29	38	40	NA
Safety of food in public establishments	28	27	28	34	37	36	NA

Source: Washington County Resident Survey

Alignment with Other Plans

County Plans:

- 2040 Comprehensive Plan
- Solid Waste Management Plan
- Community Health Improvement Plan
- County Strategic Plan

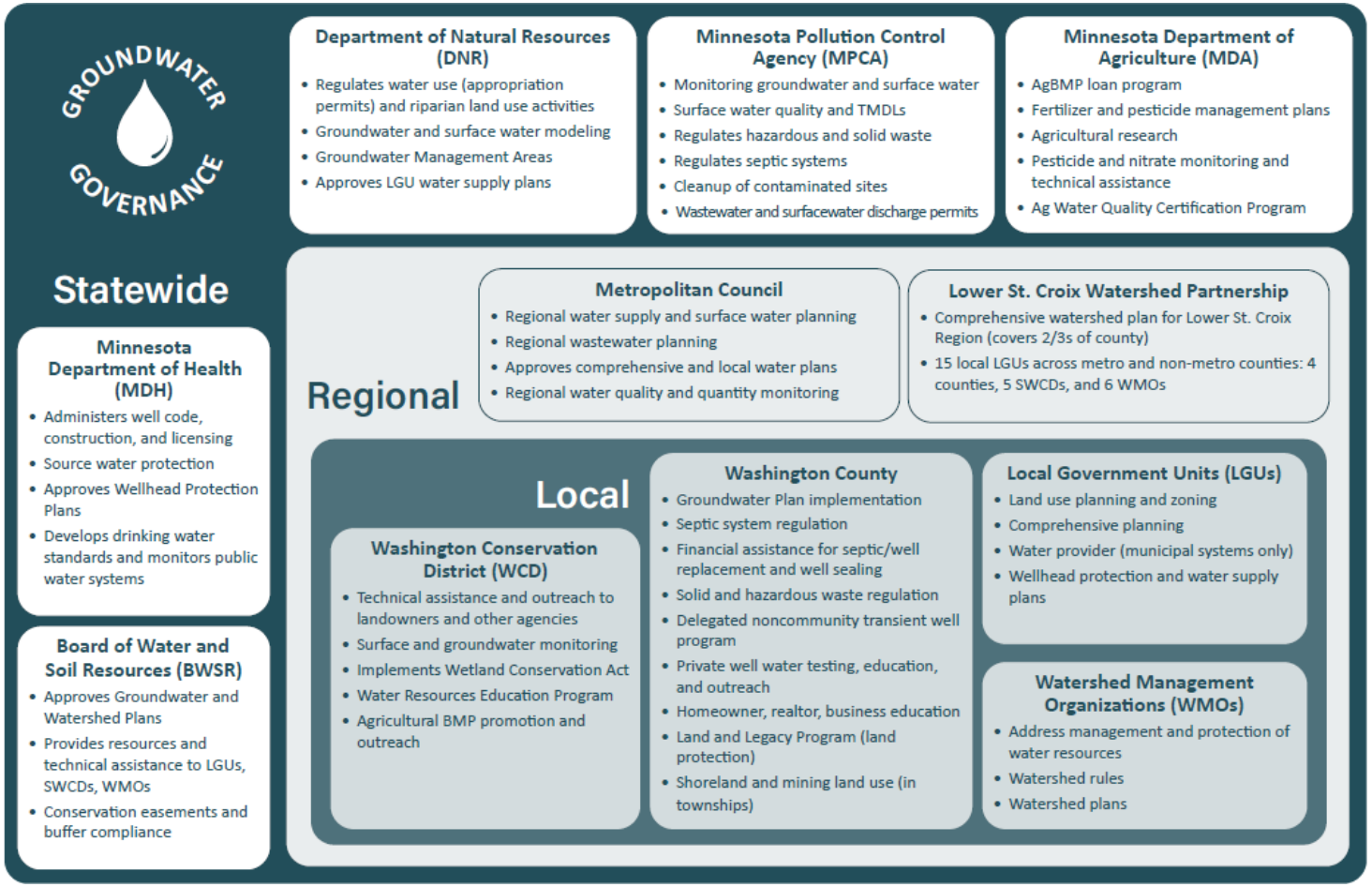
External Plans:

- Metropolitan Council Water Policy Plan
- Metro Area Water Supply Plan
- Lower St Croix One Watershed One Plan
- Watershed Plans
- City Plans

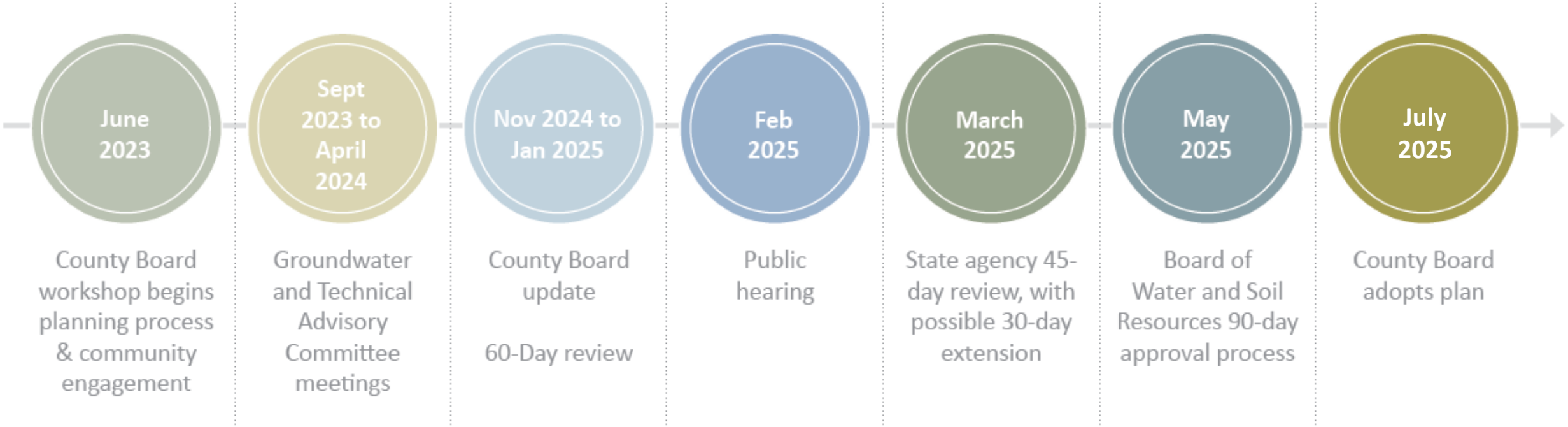
Washington County

Groundwater Management Structure

- There are many state and local agencies involved in groundwater
- County role:
  - Licensing programs for septic systems and solid and hazardous waste management
  - Financial assistance – grants and loans
  - Private well water testing services
  - Convene and collaborate with partners
  - Education/outreach
- The plan provides a county wide framework that guides the protection and conservation of groundwater resources.



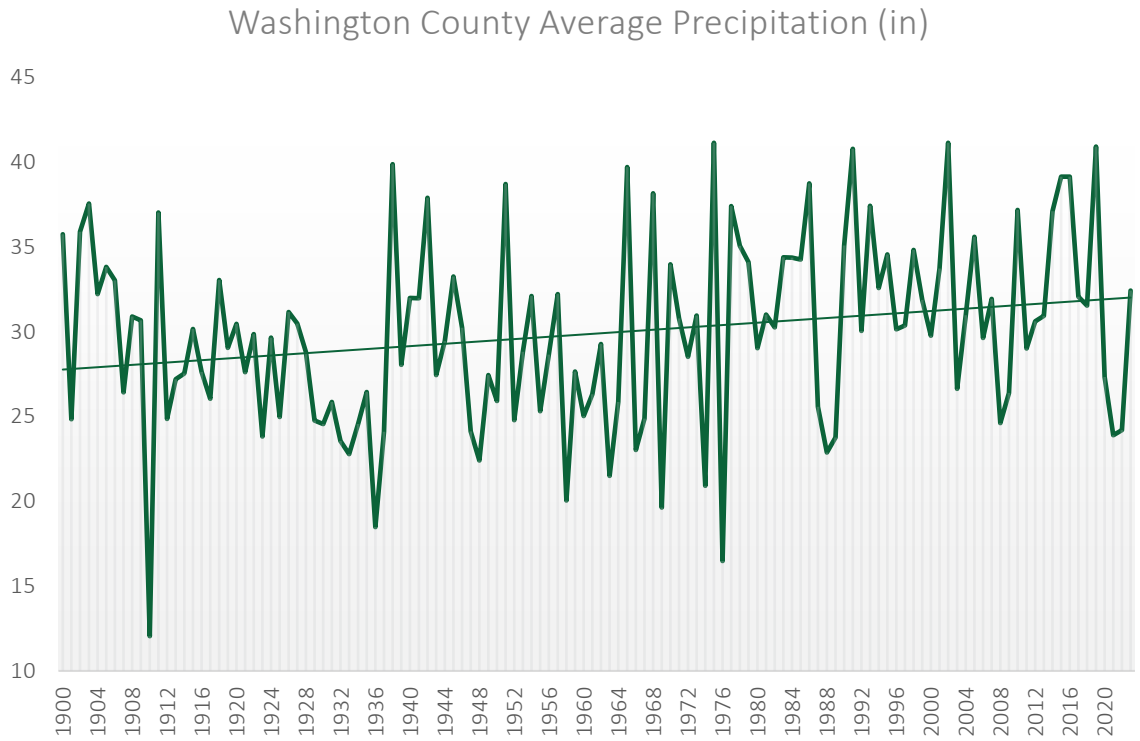
Plan Update Timeline

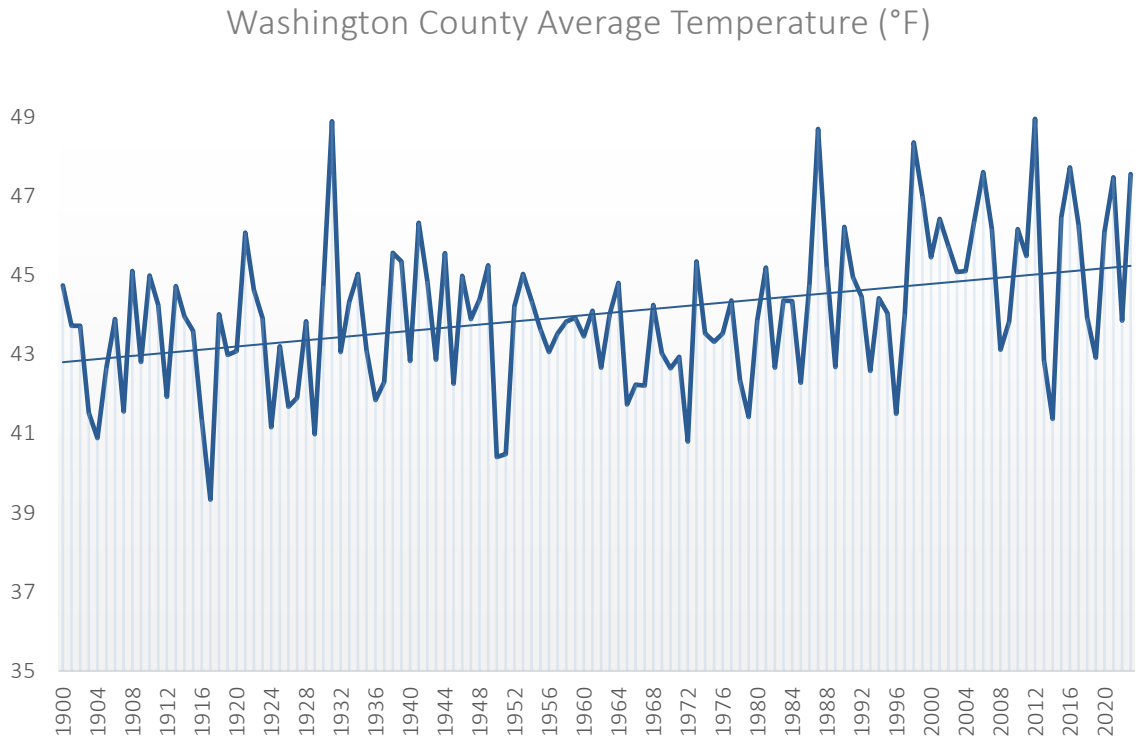


Washington County

New Priorities – Climate Change

- Climate change may impact both groundwater quality and quantity.
- Woven throughout the plan.

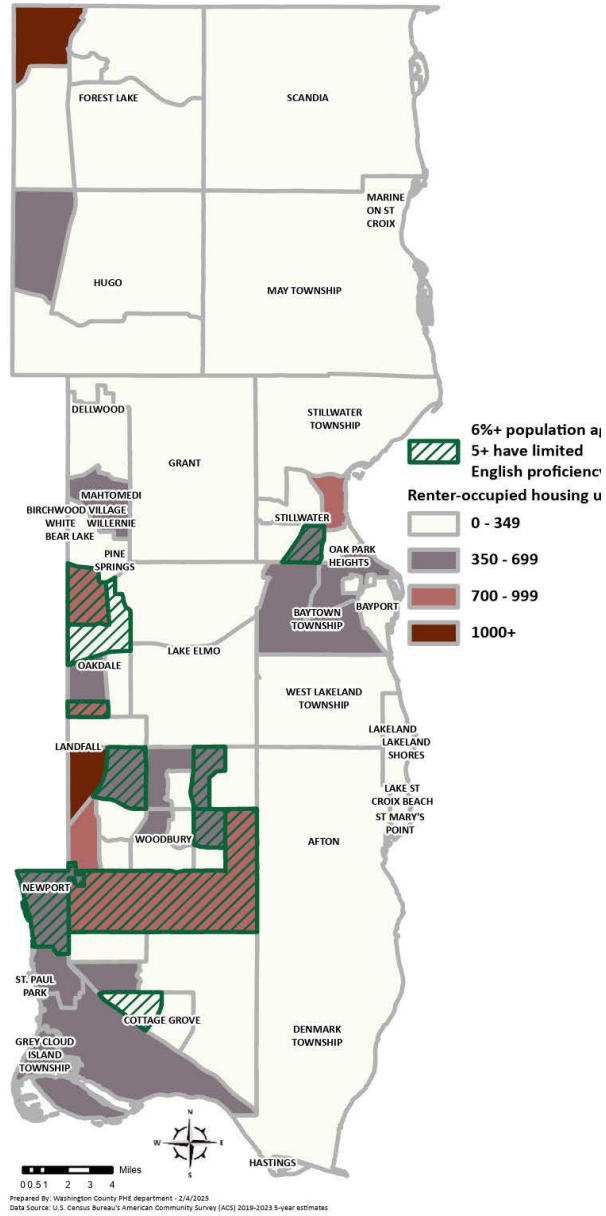


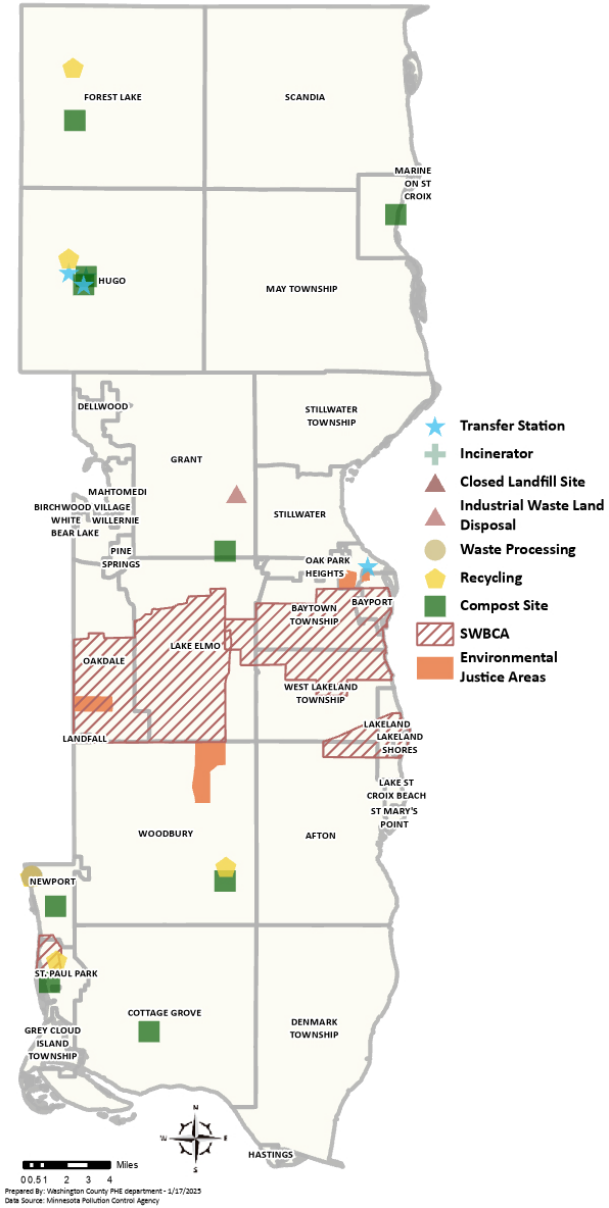


Washington County

New Priorities - Environmental Justice

- Achieved when everyone benefits from the same degree of environmental protection and has equal access to the decision-making processes that contribute to a healthy environment.
- Low-income neighborhoods and communities of color are often disproportionately impacted
- Populations served by non-municipal community public water supply systems and those that are renters are at risk for water equity issues.





Washington County

Plan Structure

Plan Structure:

- Chapter 1: Introduction and Plan Overview
- Chapter 2: Plan Implementation
- Chapter 3: Governance, Roles and Responsibilities
- Chapter 4: Groundwater Resource Overview
- Chapter 5: Population and Land Use
- Chapter 6: Groundwater Quality
- Chapter 7: Groundwater Quantity

Washington County

Implementation Structure

4 goal areas, 21 strategies and 94 actions under those strategies

- Action No. – A reference number for each action.
- Action – The activity to take place.
- Activity – Identifies if the activity is something to continue, new, or whether it needs to be expanded or modified.
- Role – Identifies if the county's role for the action is to lead, partner, regulate, educate, fund, advocate for, monitor, or operate.
- Target – The target audience.
- Time Frame – When the action will be implemented over the ten years.
- External Partners – The partners the county will work with on the action.
- Measure – The measure to determine if the action is effective.

Goal Number	Goal area	Strategy Number	Strategy	Priority	Action No.	Action	Activity	Role	Timeframe	External Partners	Measure
1	Quality	1.A	Participate in PFAS activities led by state agencies and communicate with residents.	High	1.A.1	Assist residents in connecting with PFAS information and resources provided by state agencies and monitor state response for potential gaps related to PFAS testing and lab access.	Continue	Advocate	Ongoing	MDH, LGUs, PWSs	# of residents referred, Update website quarterly

Strategies and Actions

- Combination of new and continued efforts
- Room for new, emerging issues
- Partnership is the key

Groundwater Quality

Groundwater is safe to drink.

Strategies:

1.A	Participate in PFAS activities
1.B	Assist private well owners
1.C	Collaborate with partners
1.D	Reduce agricultural contamination
1.E	Reduce contamination from chlorides
1.F	Prevent pollution from wastewater impacts (SSTS)
1.G	Address pollution from industrial operations, mining, and contaminated sites
1.H	Implement land spreading program
1.I	Manage stormwater to prevent pollution

Washington County

Groundwater Quantity

Groundwater is plentiful to support human needs and a thriving natural environment.

Strategies:

2.A Understanding groundwater and surface water connections.

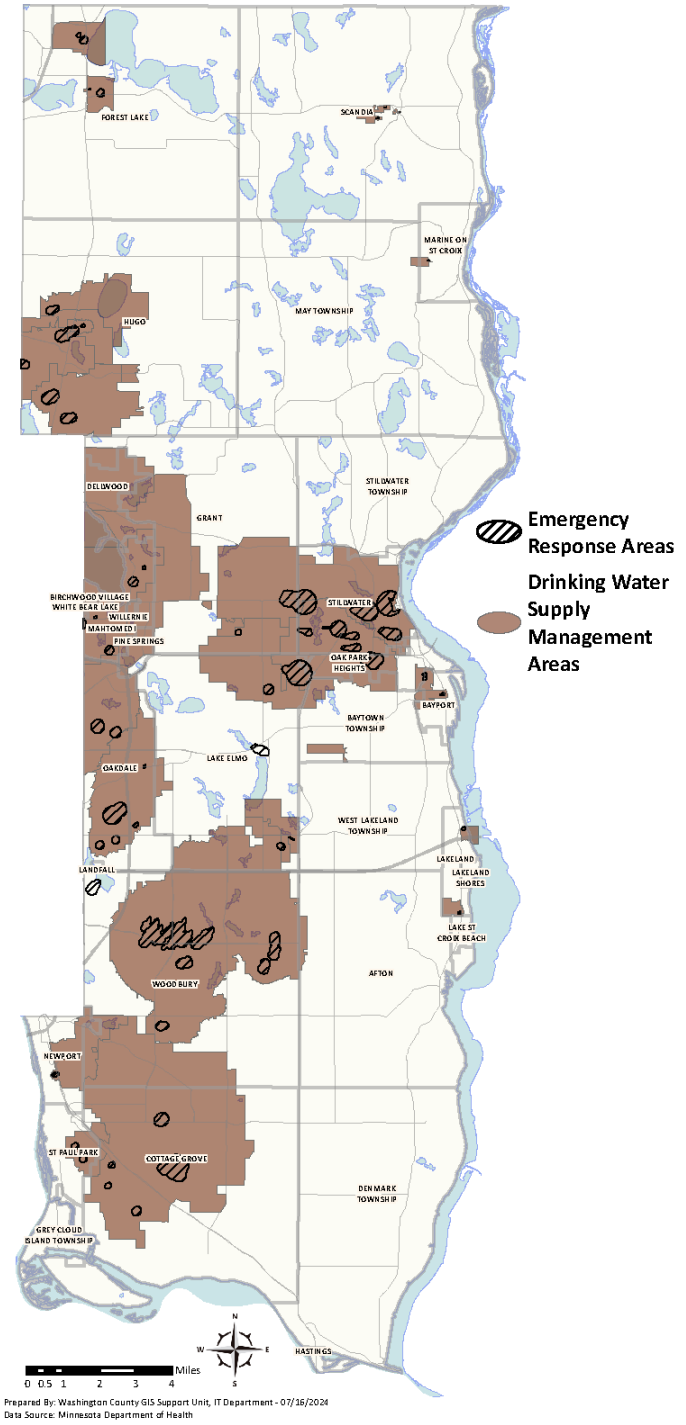
2.B Promote and implement water conservation and efficiency.

2.C Support stormwater retention, infiltration and aquifer storage.

2.D Protect, preserve and restore resources that support groundwater depending ecosystems.

2.E Support and encourage safe and feasible water reuse.

2.F Update and share water quantity data.



Washington County

Groundwater Education

People who live and work in Washington County understand the importance of groundwater and adopt practices and behaviors that conserve and protect groundwater.

Strategies:

3.A Inform and educate targeted audiences
Examples include: elected officials, realtors, well owners, business

3.B Inform and educate residents
Includes quality, quantity, climate change

Washington County

Groundwater Governance

Groundwater management is coordinated, efficient, and effective.

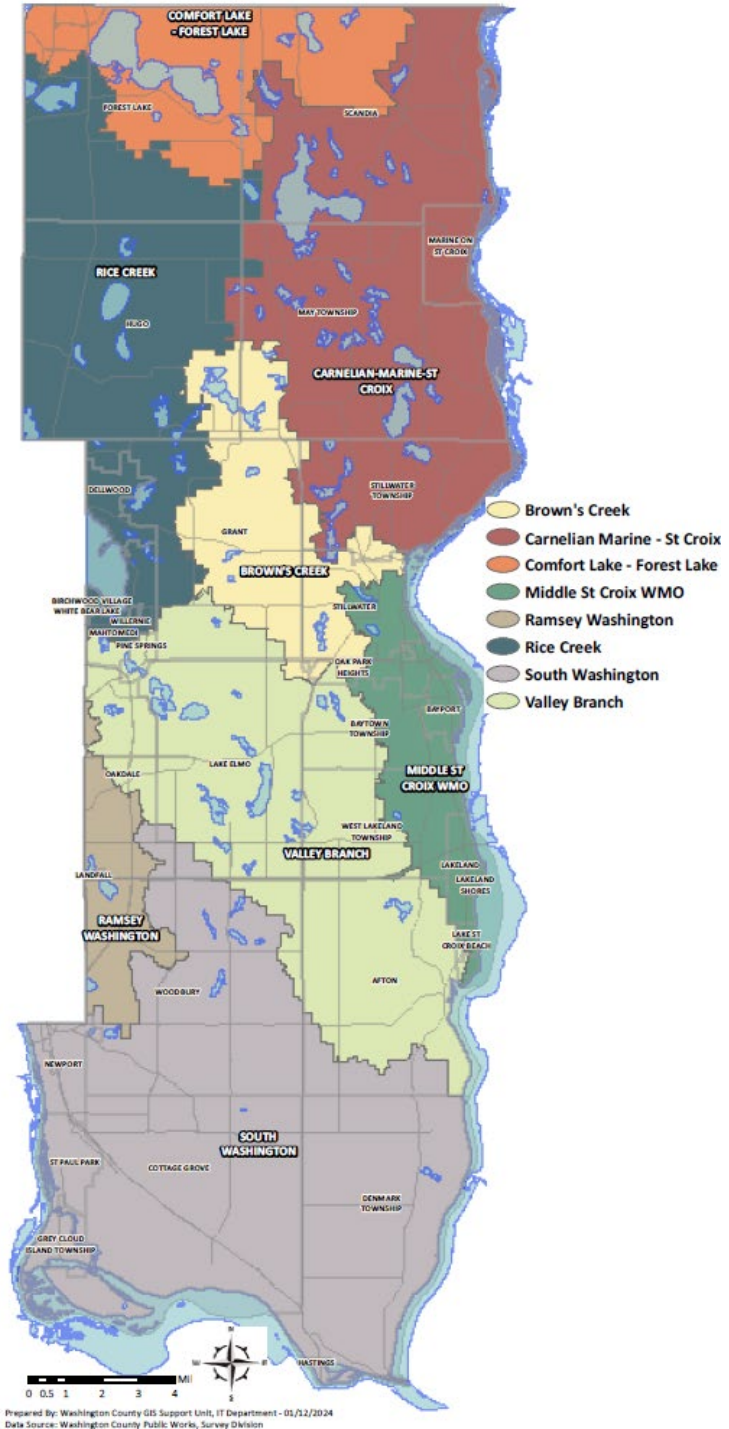
Strategies:

4.A Collaborate with all levels of government

4.B Support and create regulations and policies that improve and protect groundwater

4.C Advocate for grant funding

4.D Support county programs that improve and protect groundwater



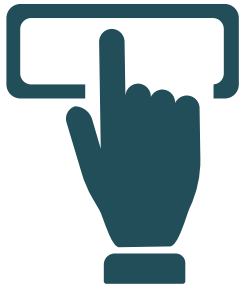
Washington County

Summary of Comments

- Comments of support
- Land spreading
- Groundwater data collection
- Measurement and implementation
- Explore well delegation



Link to the plan on our website:



https://www.washingtoncountymn.gov/DocumentCenter/View/794/Groundwater-Plan-2025-2035-PDF

Questions?

Washington County