



A Pair of Permitting Perplexities: Sulfate Implementation Strategy and Functional Equivalency

Kurt Carlson, PG | Hydrologist | Metallic Mining Unit

November 17, 2022

MGWA Fall 2022 Conference

Purpose

Two recent initiatives will need to be addressed in future NPDES and/or SDS permits



Sulfate

Sulfate implementation strategy as it relates to wild rice



Functional Equivalency

Whether an indirect point source discharge has the same effect as a direct discharge

Outline

Main Topic	Subtopic
Sulfate Implementation	History
	Current status
	Future
Functional Equivalency	History
	Current status
	Future

Sulfate Implementation Strategy

Sulfate implementation strategy as it relates to wild rice

Sulfate Implementation Strategy

History-Importance

Why is wild rice so important?

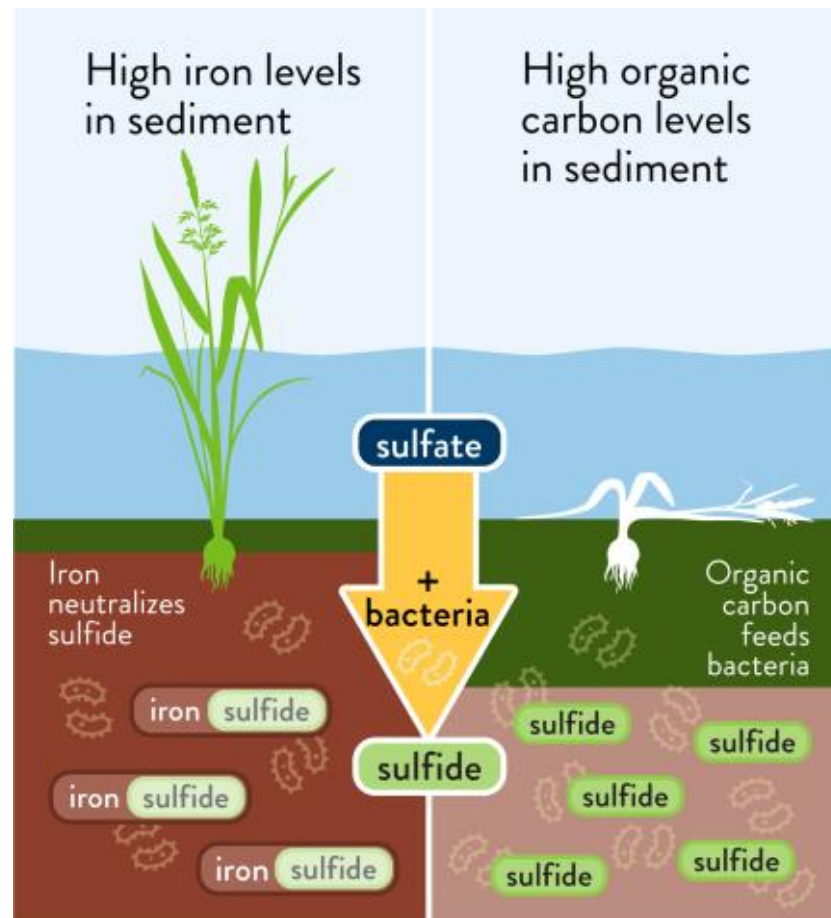
- Ecosystem
- Cultural:

“You will know the chosen ground has been reached when you come to a land where food grows out of the water.” SEVEN FIRES PROPHECY, Minnesota Chippewa Tribe

- Food
- Economic

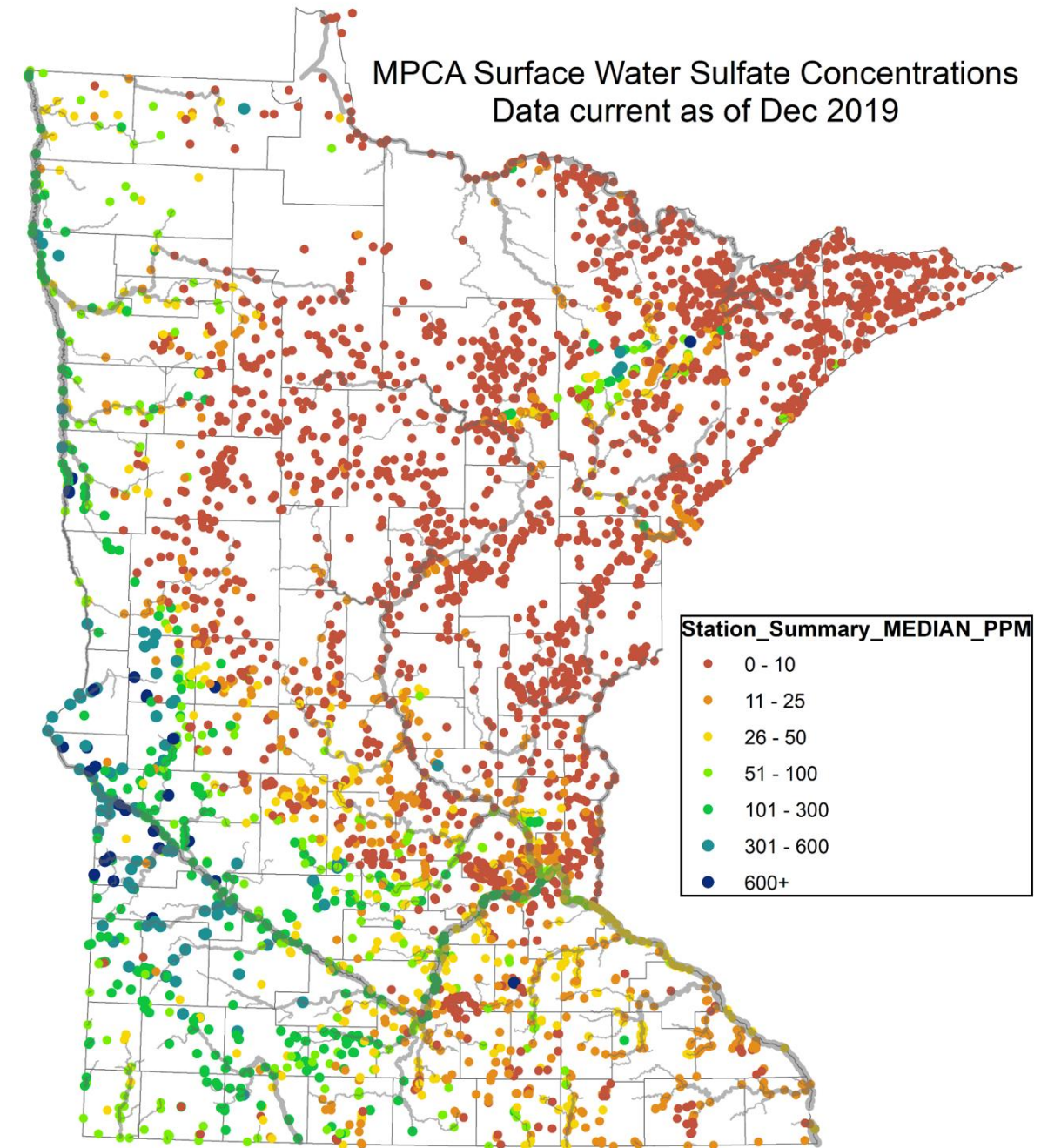
Sulfate Implementation Strategy History

- 1973 Minnesota adopted 10 mg/L sulfate standard
- Early 2010s:



Sulfate Implementation Strategy Current Status:

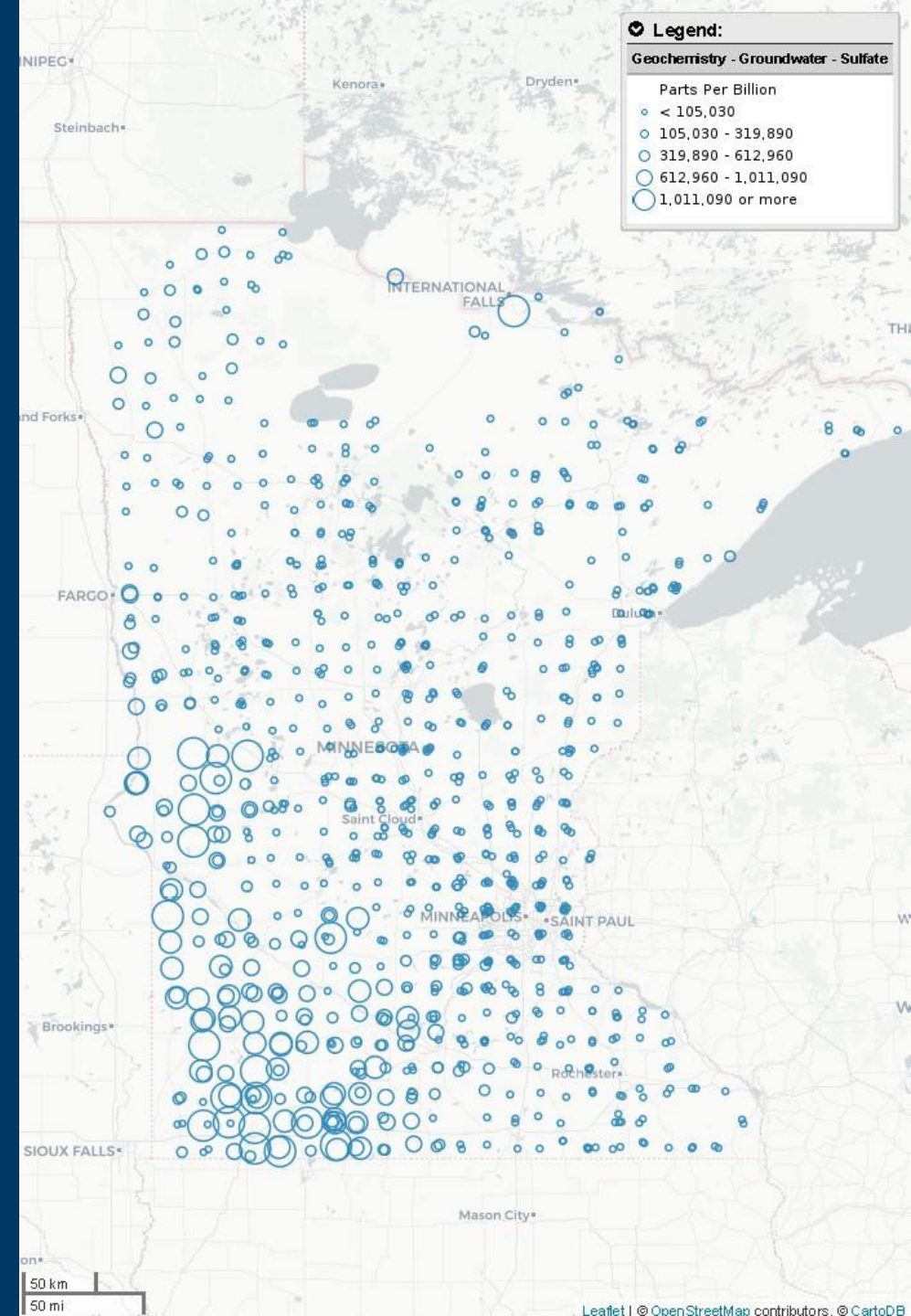
Distribution of Sulfate in Surface Water



Sulfate Implementation Strategy Current Status:

Distribution of Sulfate in Groundwater

Source: https://mnatlas.org/gis-tool/?id=k_0292

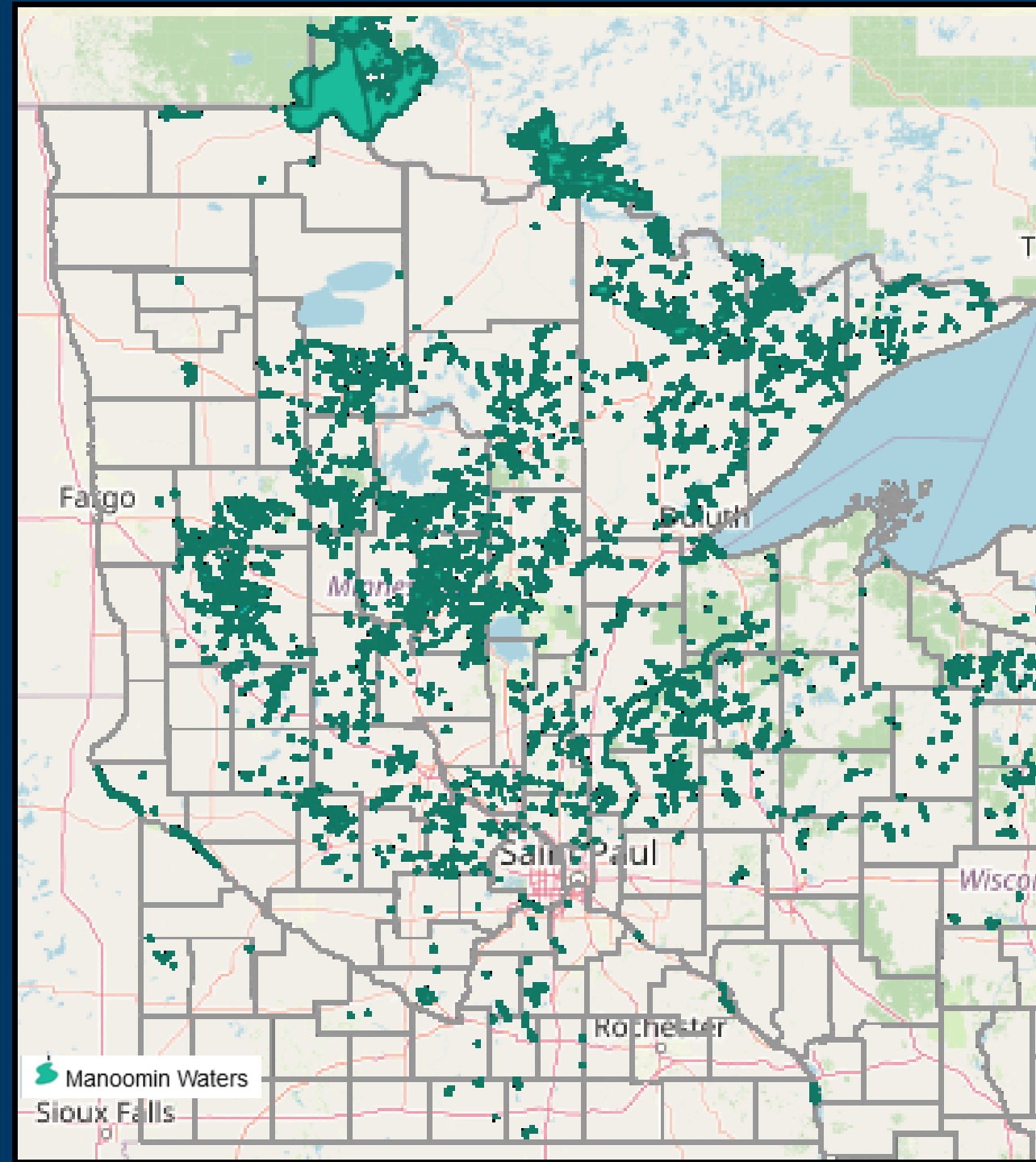


Sulfate Implementation Strategy Current Status:

Distribution of Wild Rice waters

Source:

<https://data.glifwc.org/manoomin.harvest.info/>



Sulfate Implementation Strategy History

Minnesota Rule Making Effort

- 2015 Legislature Session Law
 - “Until the commissioner of the Pollution Control Agency amends ... Minnesota Rules, part 7050.0224, subpart 2... the agency shall not require permittees to expend money for ... sulfate mitigation”
 - “...the agency shall not list waters containing natural beds of wild rice as impaired for sulfate...”
- 2017 Public notice of proposed rules
 - Considered new research information
 - Based on sulfide in sediments
 - Proposal: replace the 10 mg/L standard with an equation considering sulfide, TOC, and iron
- 2018 Report of the Administrative Law Judge: proposed rules disapproved

Sulfate Implementation Strategy History

Minn R 7050.0224 Specific Water Quality Standards for Class 4 Waters

- lists standard for sulfate of 10 mg/L
- Applicability to Class 4A waters: irrigation, crops, vegetation
 - “applicable to water used for production of wild rice during periods when the rice may be susceptible to damage by high sulfate levels”
- Historic permitting challenges

Sulfate Implementation Strategy

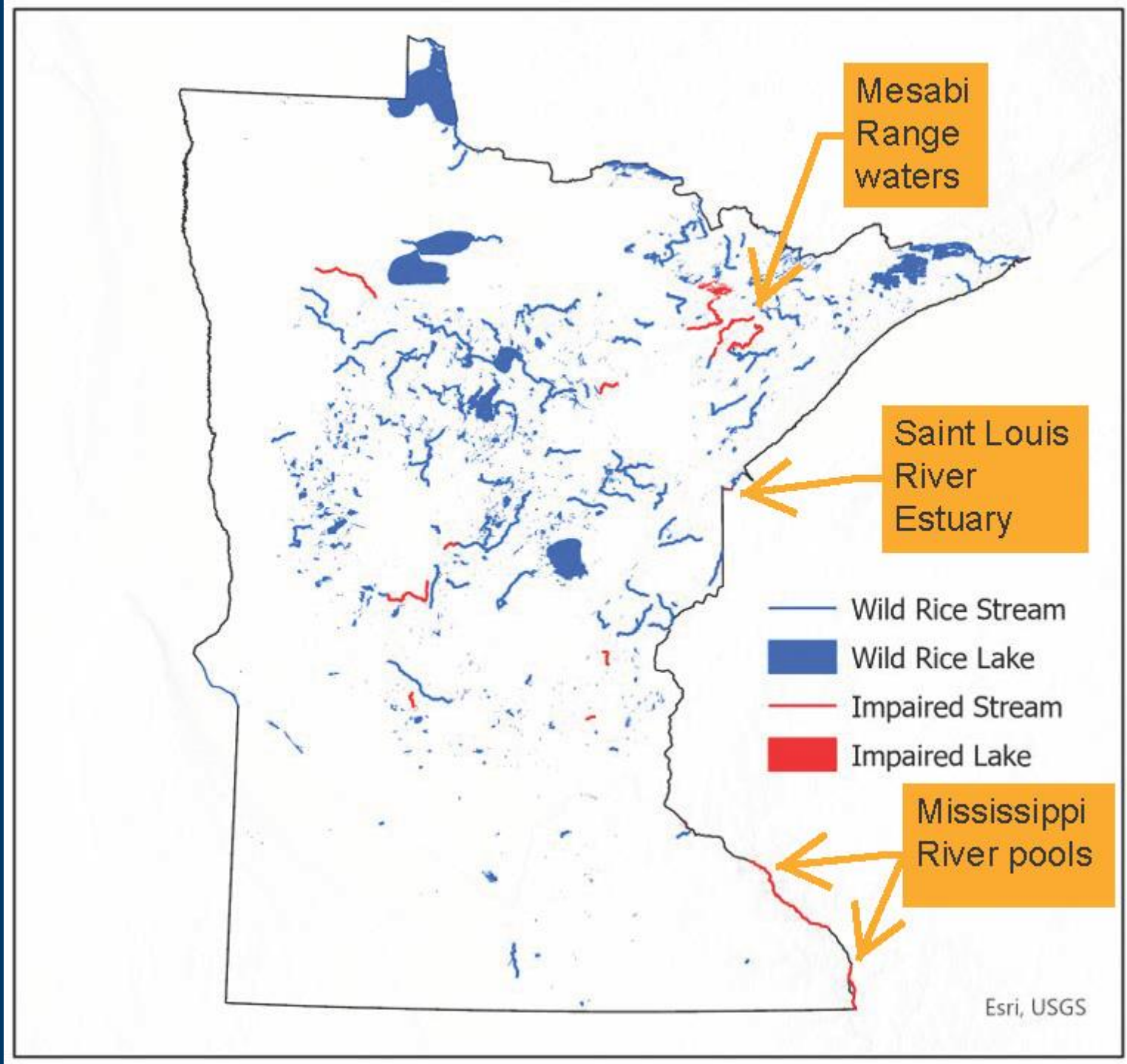
Current Status

2022 Impaired waters listing for sulfate

- 35 impaired waters added to Minnesota's 2020 list. Examples:
 - Streams and lakes local to the Mesabi Range
 - St. Louis River estuary
 - Mississippi River pools below Twin Cities
- Must be addressed in NPDES/SDS permitting process

Sulfate Implementation Strategy
Current Status:

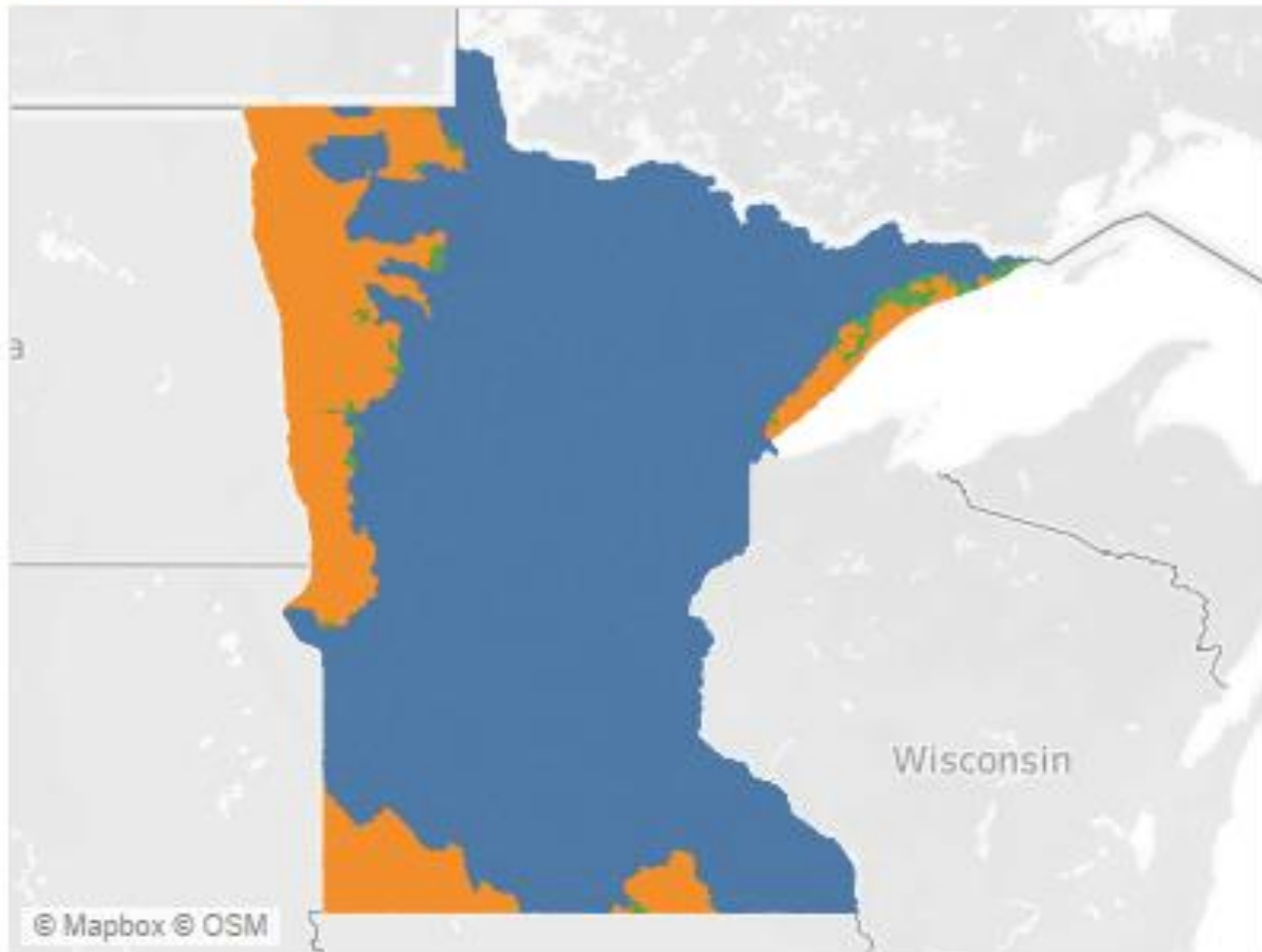
Distribution of Wild Rice Waters and
Impairments
2022 list



What areas could have permits affected by wild rice/sulfate standards?

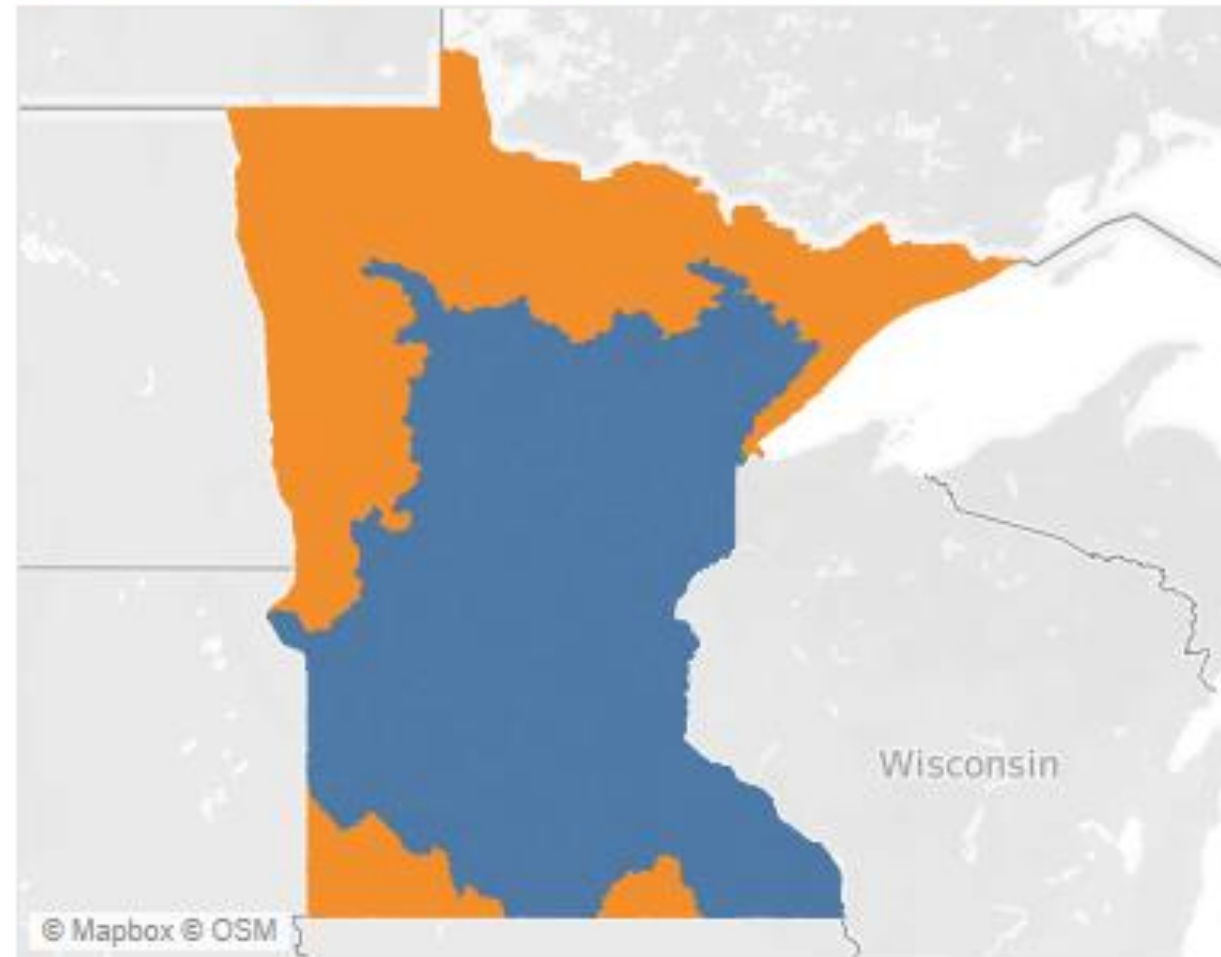
Areas upstream of a water used for wild rice

■ Yes ■ No ■ Partial ■ Not eval..



Areas upstream of a sulfate impairment (2022)

■ Yes ■ No ■ Partial ■ Not eval..



Sulfate Implementation Strategy

Current Status

EPA letter February 2022

- “... determined that the session laws... are inconsistent with the Clean Water Act...”
- “EPA expects that MPCA’s NPDES permits will include effluent limitations to meet all federally-approved WQS ... and EPA-approved Minnesota laws and rules “

To satisfy this obligation, MPCA is in the process of developing a “Sulfate Implementation Strategy for NPDES permits.”

Sulfate Implementation Strategy

Current Status

Factors to be considered

- What are the sources?
 - common constituent in wastewater
 - Present in both municipal and industrial discharges
- Additions and/or the result of natural background
- Limited sulfate monitoring data for many dischargers
- What happens if there is a wild rice water downgradient from a naturally high sulfate area and there is a NPDES discharge in the high sulfate area?

Sulfate Implementation Strategy

Current Status

Permitting challenges

- Very complex issue
- For some waters, there could be dozens or even hundreds of discharges upstream
 - Municipal and Industrial
 - Small to large sulfate contributions to overall sulfate loading
 - Large variation in proximity to impaired water
 - Large variation in natural background
 - Sulfate data availability

Sulfate Implementation Strategy

Current Status

Treatment

- Conventional treatment (activated sludge, lime precipitation, etc.) not effective
- Typically requires some type of membrane treatment (nanofiltration, reverse osmosis).
 - High cost
 - High energy use
 - Secondary waste stream

Sulfate Implementation Strategy

Current Status and Future

Currently internal team developing an implementation strategy for permitting

- Considering the previously mentioned factors
- Involves seeking specific feedback from Tribes and EPA
- Potential components of a permitting strategy
 - Additional monitoring
 - Effluent limit development
 - Variances
 - Permit compliance schedules
 - Site specific standards

End of sulfate

Functional Equivalency

“... require a permit when there is a ... functional equivalent of a direct discharge [into navigable waters].”

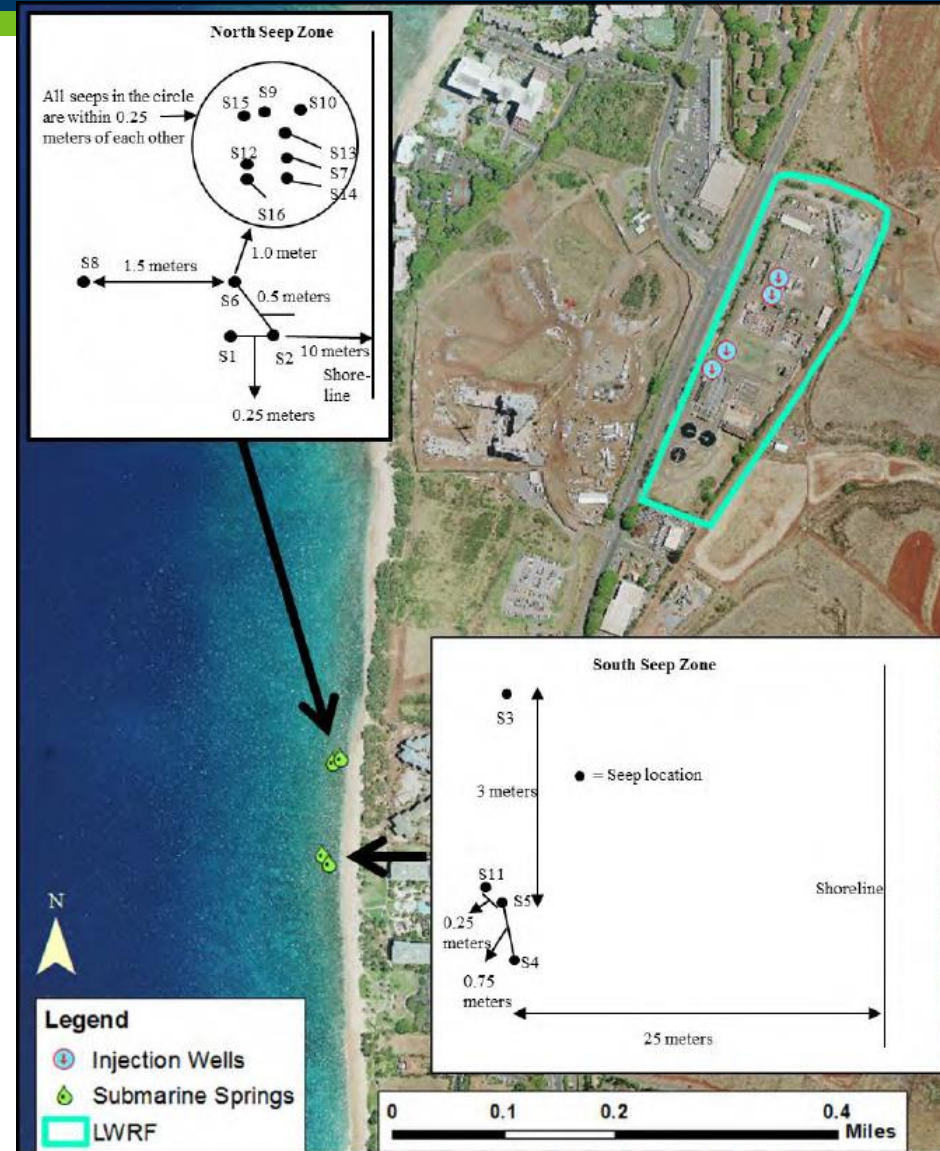
SCOTUS 18-260

Functional Equivalency History

How a situation in Hawaii came to affect Minnesota.

Geologic setting

- County of Maui wastewater injected through wells
~200 ft bgs
- Subsurface
 - 0-30 ft silty clay loam
 - 30-75 ft limestone
 - >75 ft fractured basaltic lava



Functional Equivalency History



2013

Environmental
Assessments -
tracer



2014

District Court



2018

US Court of
Appeals -
Ninth Circuit



2020

US Supreme
Court



Functional Equivalency History

SCOTUS 7 factors “...that may prove relevant depending upon the circumstances of a particular case...”

1. Transit time
2. Distance traveled
3. The nature of the material through which the pollutant travels
4. The extent to which the pollutant is diluted or chemically changed as it travels
5. The amount of pollutant entering the navigable waters relative to the amount of the pollutant that leaves the point source
6. The manner by or area in which the pollutant enters navigable waters
7. The degree to which the pollution (at that point) has maintained its specific identity

Functional Equivalency

Current Status

Interpretation challenges

- Not a straight-forward analysis
- SCOTUS did not provide quantifiers
- Definition of “point source” is open to interpretation:
 - EPA, 40 CFR § 122.2: “any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.”
- A discharge into groundwater must be from a “point source” to be functionally equivalent to a direct point source discharge to navigable waters.

Functional Equivalency Current Status

EPA Region V is conducting a Functional Equivalency Analysis

- For an active tailings basin in Minnesota.
- This is very important because there is not a lot of precedents on how to apply the Court's decision.
- Initiated in fall of 2022
- Being done independently by EPA Region V
- Because of its precedent setting potential, being technically and legally reviewed by EPA headquarters
- Report delayed but expected by end of 2022.

Functional Equivalency

Current Status

- The EPA report will only look at “functional equivalency” (incorporating “point source” as necessary)
- It will NOT look at how MPCA is to apply functional equivalency into NPDES permits, such as:
 - Determination of “reasonable potential” to exceed WQS
 - Calculation of applicable effluent limits
 - Monitoring to verify compliance with effluent limitations

Functional Equivalency Future

Potentially broad implications to Minnesota's WQ permitting program

Has potential relevancy to what is currently not NPDES MPCA permitting

- Will “discharges” to groundwater authorized by the state SDS permitting program need to be regulated under the provisions of the Clean Water Act?
- Rapid infiltration systems?
- Spray irrigation?
- Mining tailings basin seepage?
- Non-mining sources?

Functional Equivalency Future

Future steps for the MPCA

- Review EPA report – Winter 2022-2023
- Using EPA's report, determine guidelines / process for potentially applying to other MN permittees
- Determine process for applying subsequent steps (RP, effluent limits, monitoring, etc.)

End of functional equivalency

Thank you!

Questions?

Kurt Carlson

Kurt.carlson@state.mn.us