Marco Graziani

Minnesota Pollution Control Agency

Morning Speaker August 1

Chloride Water Quality Trading

SALT SYMPOSIUM

MINNESOTA POLLUTION CONTROL AGENCY

August 1, 2023
Chloride Water Quality Trading

Marco Graziani

What is Water Quality Trading?

- Many different sources of pollutants affect water quality in a watershed
- Pollutant load reductions beyond legally required levels can generate water quality trading credits
- A portion of a wastewater or stormwater permit's pollutant load reduction responsibilities can be offset by pollutant load reductions achieved elsewhere in the watershed
- Pollutant load reductions must exceed the credits made available to the buyer – addressed through trade ratios
- Credits are calculated to benefit the buyer's immediate receiving water or specific downstream waterbodies
- Trading can be a cost-effective pollutant load reduction alternative for permitted wastewater and stormwater sources
- Nonpoint source credits can result in ancillary benefits beyond the pollutant offset
- Trading can help accelerate the implementation of voluntary nonpoint source BMPs by providing additional funding sources for practices designed to improve water quality
- Trading can also result in "demand" for BMPs to be established in specific locations that will result in a greater volume of water quality credits
- Water quality trading is a tool, not a goal

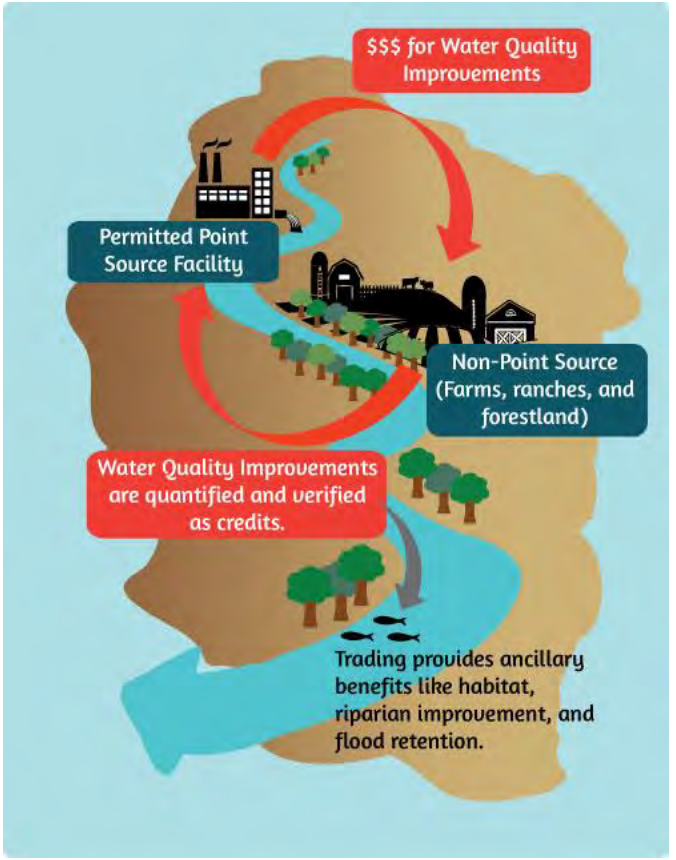

Image source: Willamette Partnership: https://willamettepartnership.org/water-quality-trading-101/

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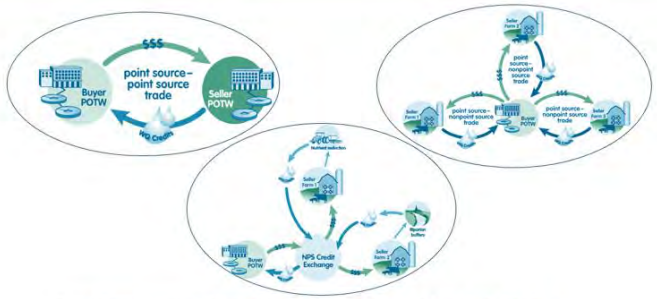
Summary of important trading concepts

Water quality trading models



Source: https://www.epa.gov/sites/production/files/2016-04/documents/wqtradingtoolkit.pdf

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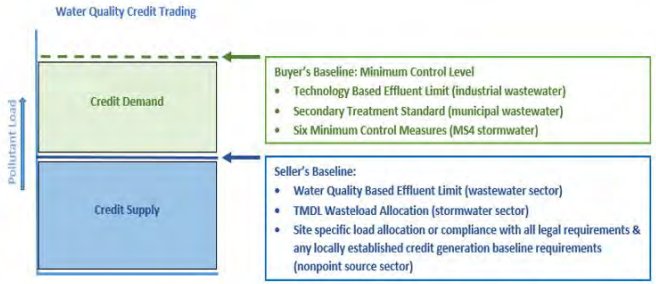
Baselines



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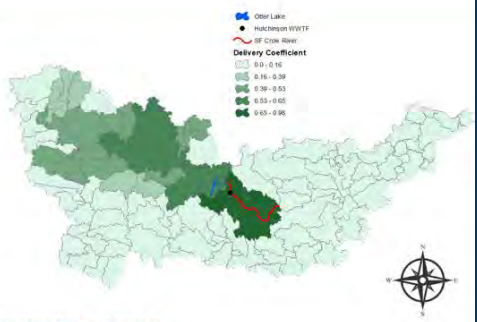
Credit quantification

- Credit value is based on the expected pollutant load reduction at the waterbody of concern
- Credit quantification – allows for sampling and modeling
- Considerations include edge of field delivery, pollutant fate and transport, temporal variability and any conditions specific to the water quality standard and/or watershed modeling assumptions



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Trade ratios

- Trade ratios are used to account for uncertainty and ensure water quality benefit
- Default trade ratios are low for wastewater generated credits because effluents are monitored and uncertainty is low
- Stormwater generated credits have moderate uncertainty because BMPs are not monitored (effluent quality) but they are subject to permit requirements (inspection, maintenance)
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Default Trade Ratios		Credits Users (Buyers)
		NPDES Permittees
Credit Generators (Sellers)	Wastewater NPDES	1.1:1.0
	Stormwater NPDES	2.1:1.0
	Nonpoint Source	2.6:1.0

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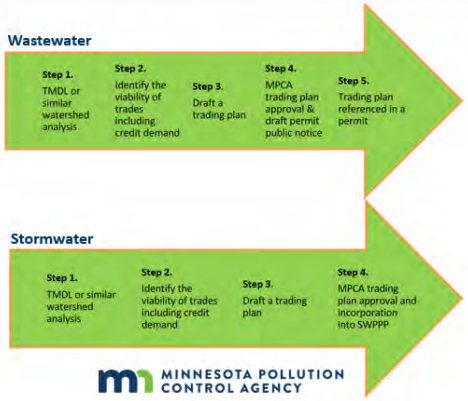
How does it work in practice?



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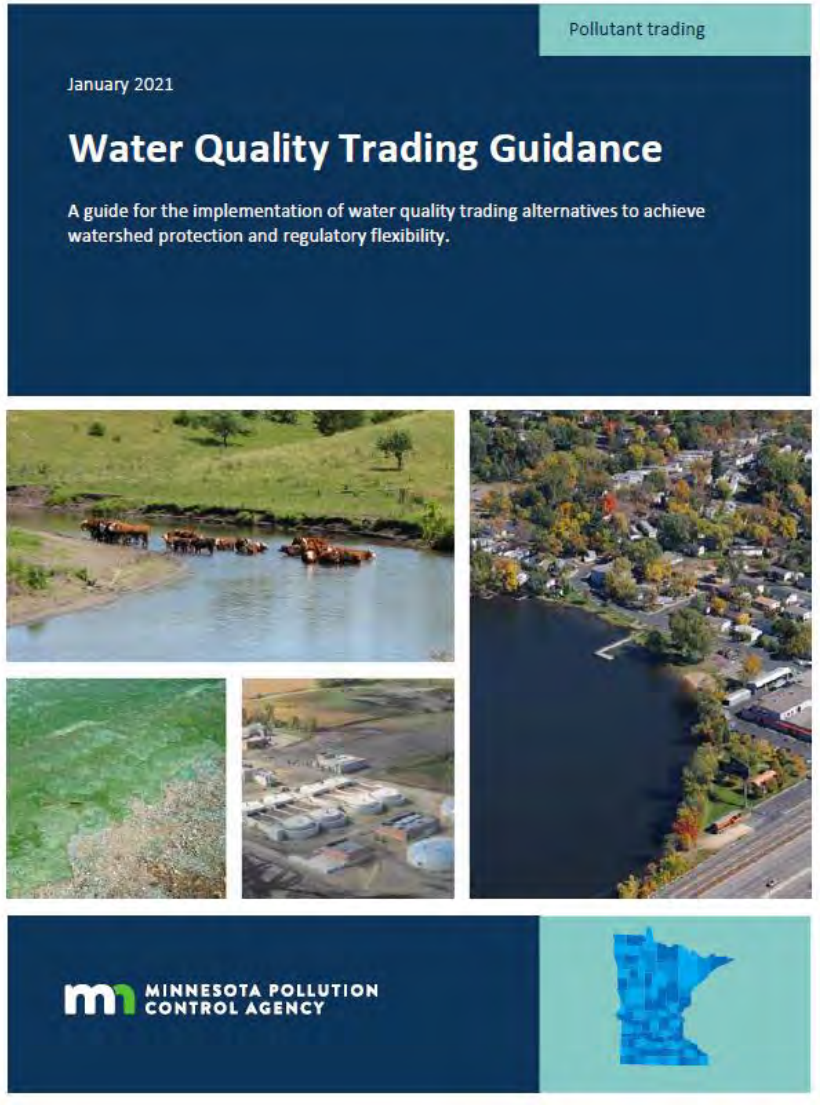
Water Quality Trading Guidance

- Water Quality Trading Guidance
- Published March 1, 2021
- Available on the MPCA's water quality trading webpage:

https://www.pca.state.mn.us/water/water-quality-trading



Challenges with chloride trades

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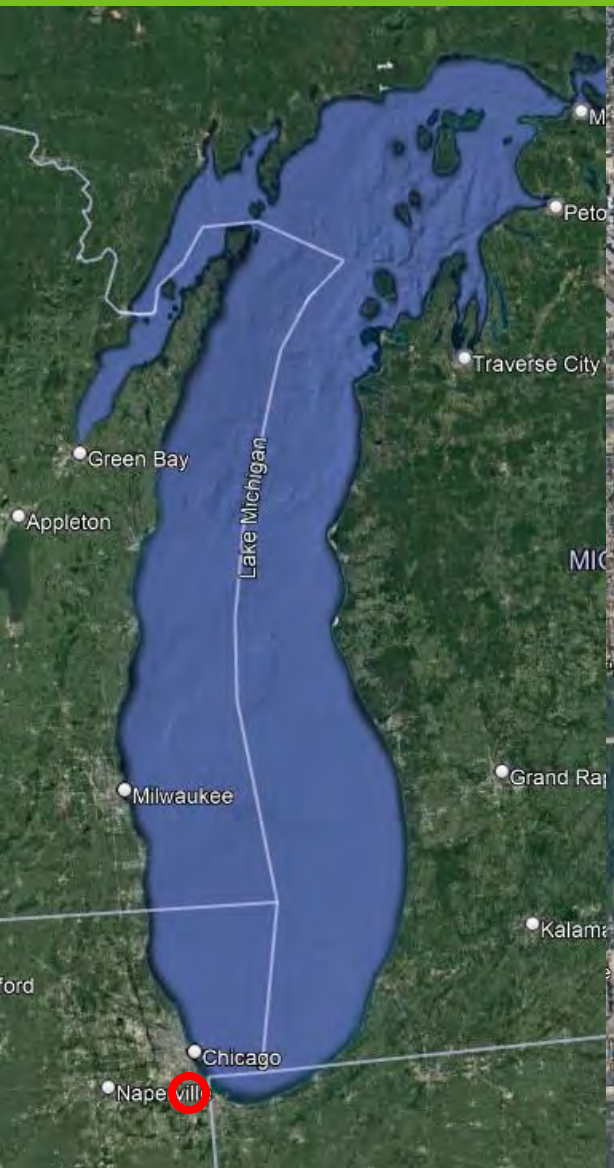
Yikes!


Traverse City
Green Bay
Appleton
Lake Michigan
Milwaukee
Grand Rap
Kalama
Chicago
Naperville

Birrieria Ocotlan
La Fruteria
National Shrine of St Jude
McDonald's
ILLINOIS
Calumet Fisheries
Tacos El Rey
Calumet Park
Calumet Park
Calumet River
EAST SIDE
Calumet River

E 100th Street Bridge
E 100th St
E 100th St
E 100th St
Mota Bros
Morton Salt
Calumet River

How would chloride trading work?

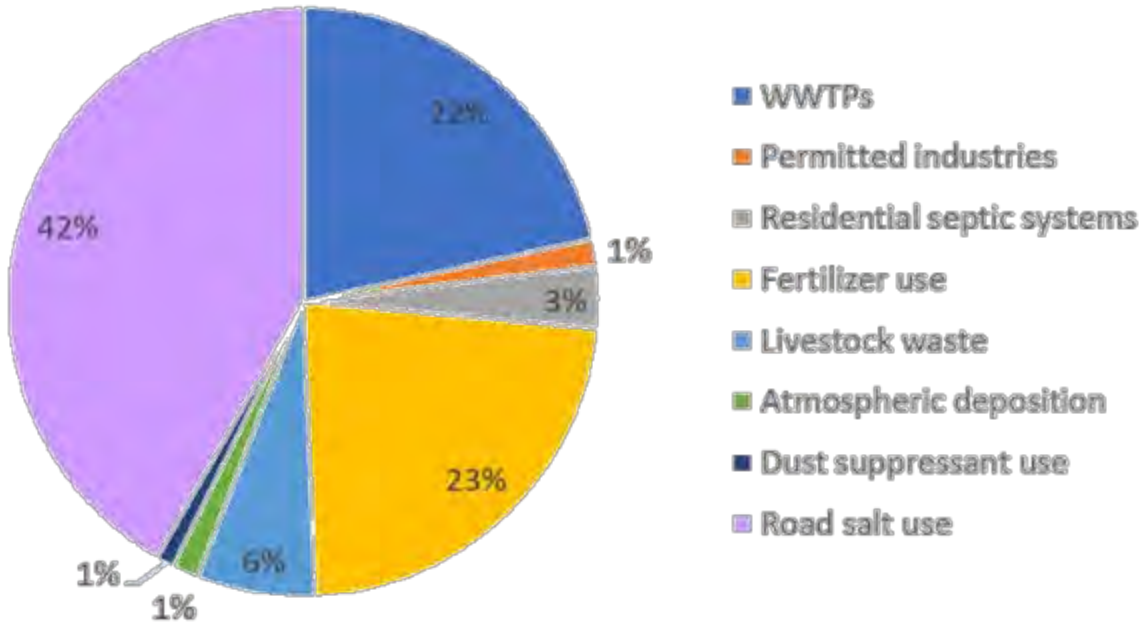


Figure 4: Fraction of annual chloride contributions from major point and nonpoint sources for State of Minnesota (Overbo et al. 2019)

**Please note that Road salt use is actually all de-icing salt applied to roads, parking lots, sidewalks, and trails.*

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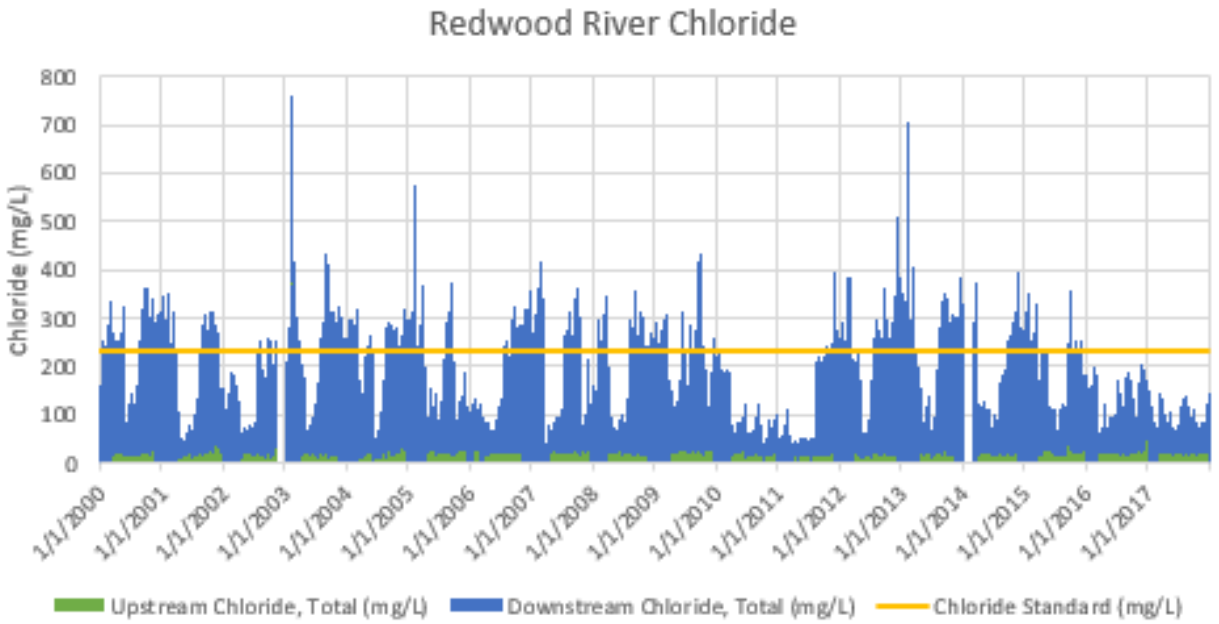
Redwood River – Marshall, MN



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Redwood River Chloride TMDL

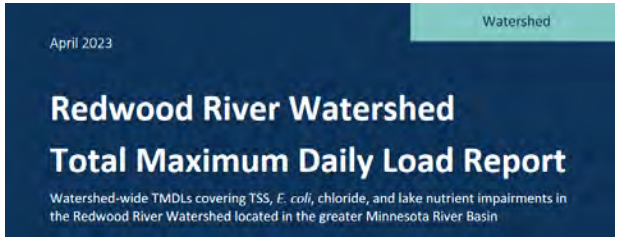
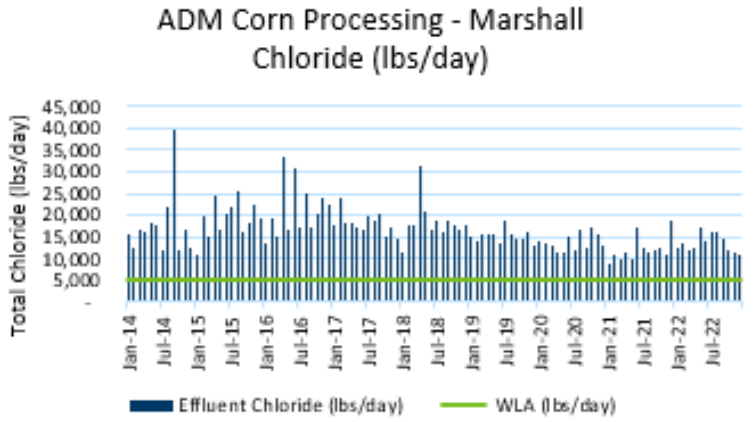
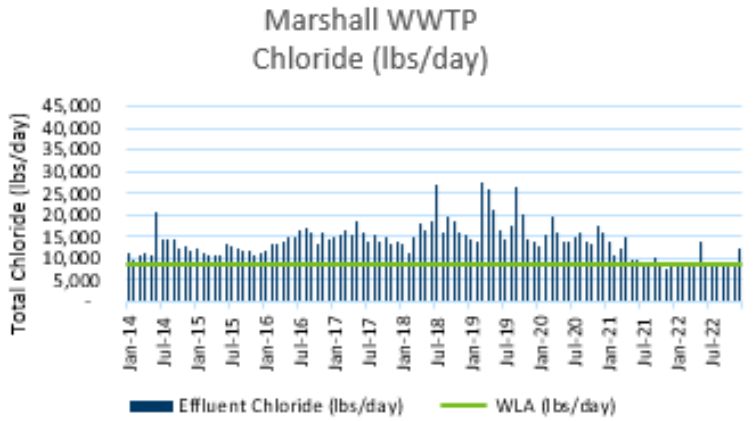


Table 32. Chloride TMDL summary for Redwood River Reach 502.

Chloride		Flow zones*				
		Very high	High	Mid-range	Low	Very low
Sources		Chloride load (lbs/day)				
Wasteload	ADM Corn Processing – Marshall (MN0057037)	5,064	5,064	5,064	**	**
	Lynd WWTP (MNG585030)	655	655	655	**	**
	Marshall WWTP (MN0022179)	8,632	8,632	8,632	**	**
	Russell WWTP (MNG585062)	1,124	1,124	1,124	**	**
	Magellan Pipeline Co LP – Marshall (MN0059838)	1,381	1,381	1,381	**	**
	Ruthton WWTP (MNG585105)	724	724	724	**	**
	Tyler WWTP (MNG585116)	2,091	2,091	2,091	**	**
	City of Marshall MS4 (MS400241)	18,304	5,588	1,753	**	**
	Total WLA	37,975	25,259	21,424	**	**
Load	**Total LA**	547,541	153,497	34,649	**	**
	MOS	30,817	9,408	2,951	926	458
	Total load	616,333	188,164	59,024	18,514	9,169
Existing maximum concentration (mg/L)* **		463				
Overall estimated percent reduction* **		50%				





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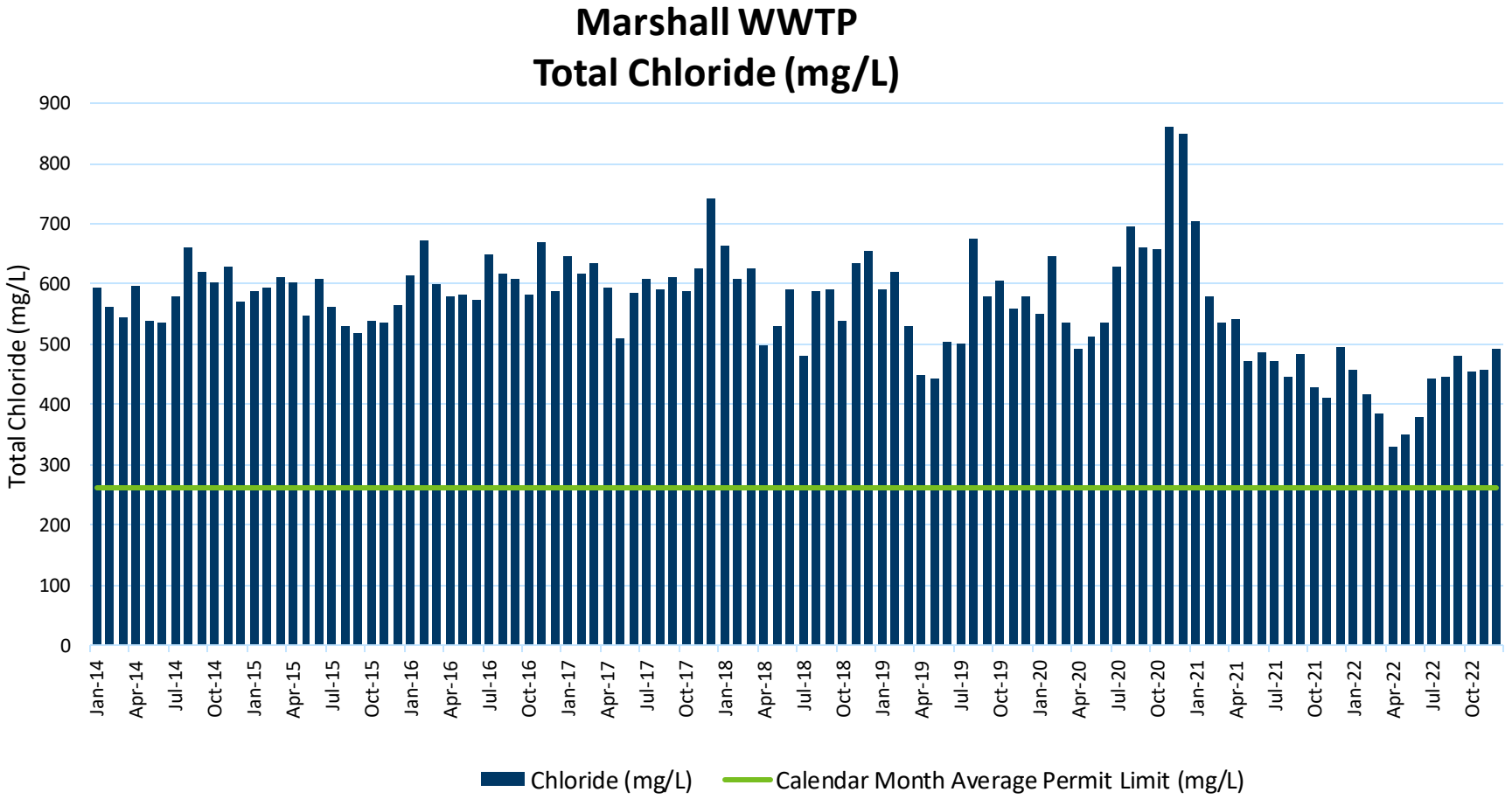
It’s complicated!



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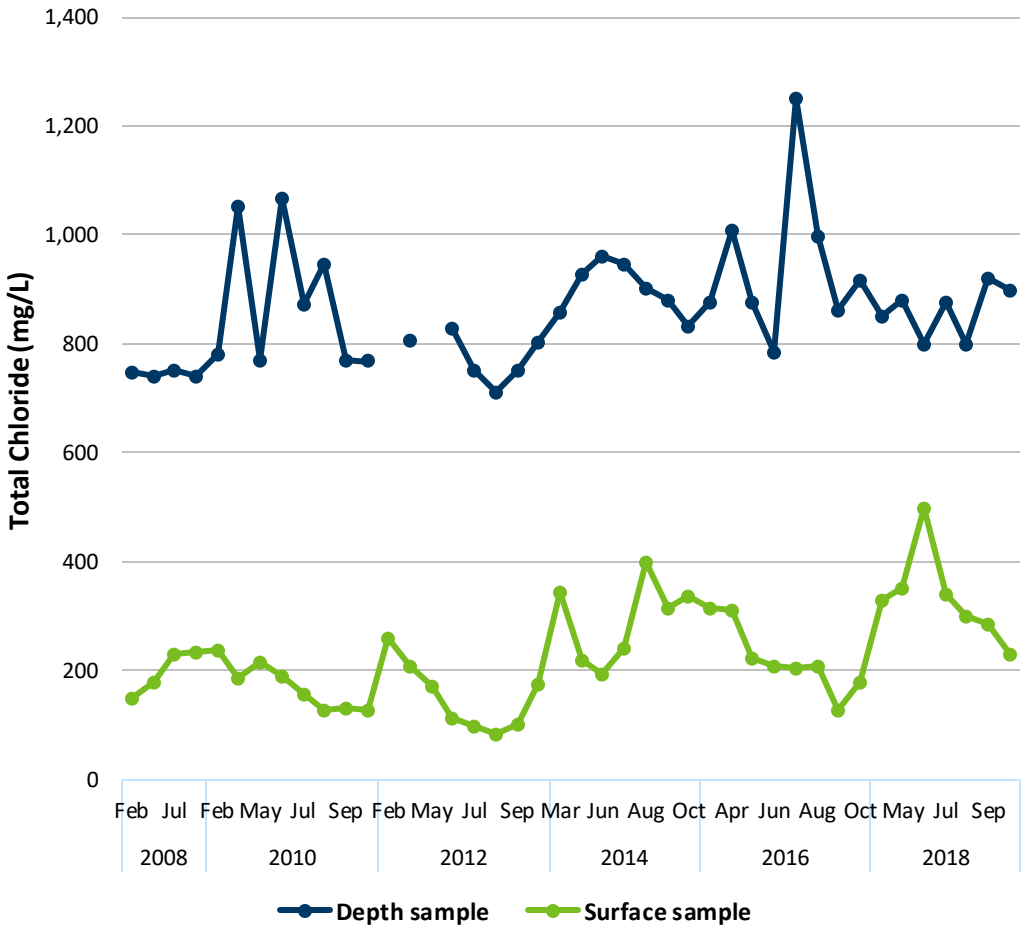
Brownie Lake – Minneapolis, MN



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Thank you

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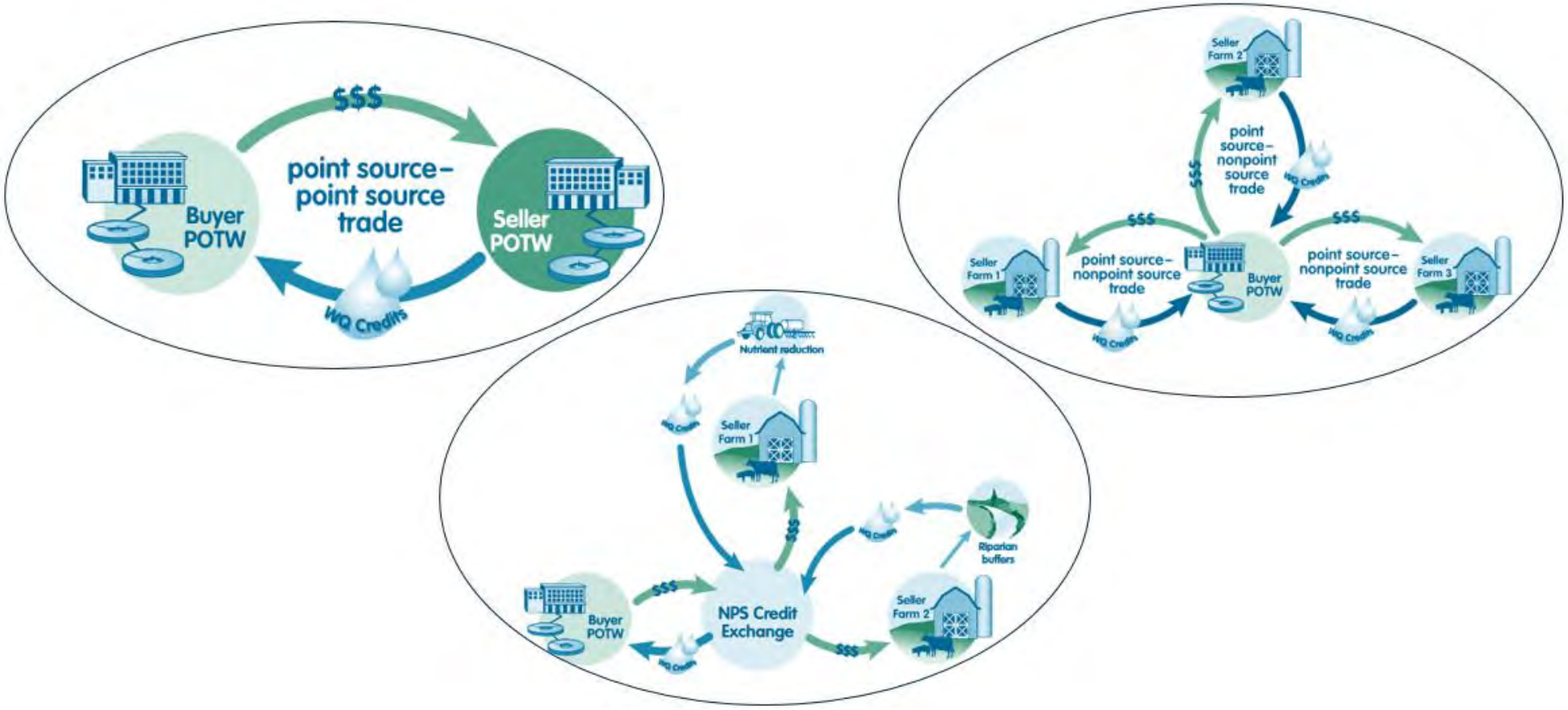
Water quality trading models



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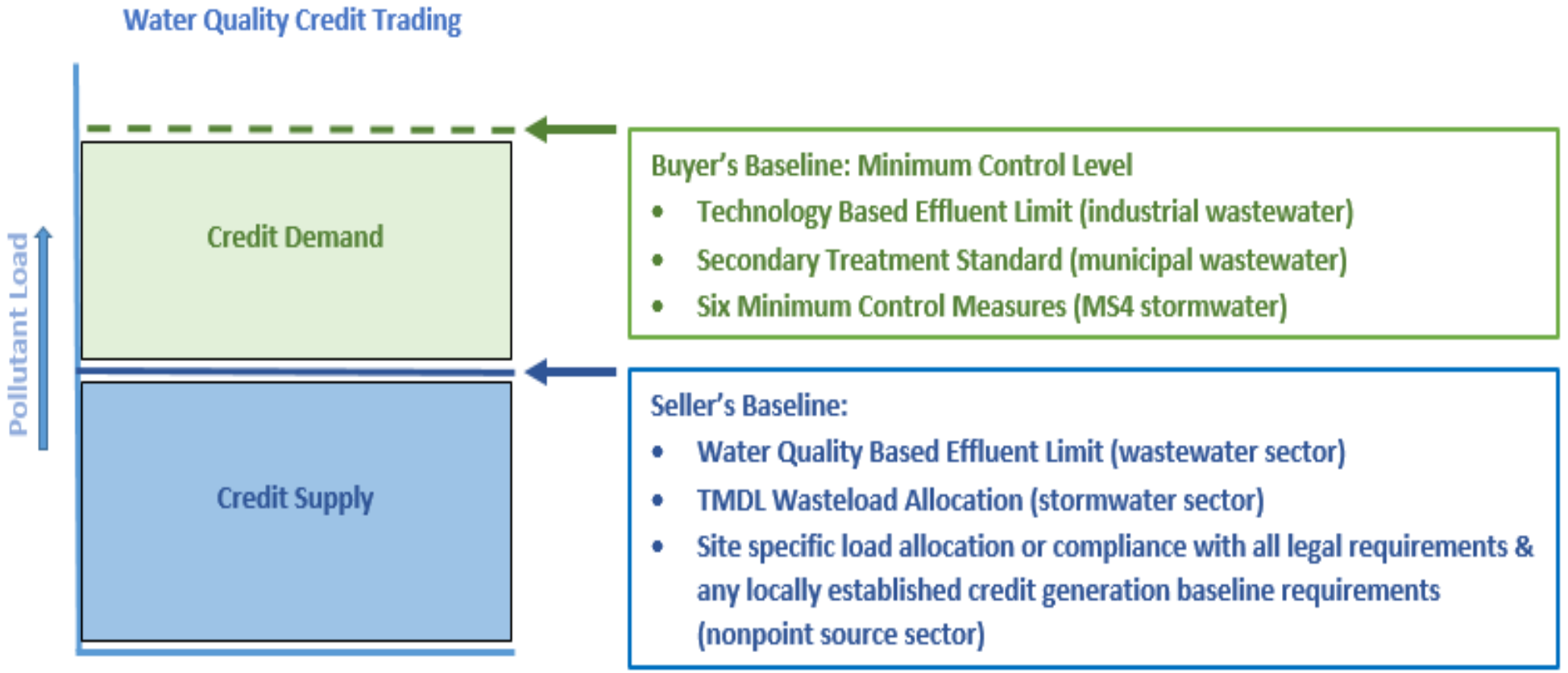
Water Quality Credit Trading
Pollutant Load
Credit Demand
Credit Supply
Buyer's Baseline: Minimum Control Level
• Technology Based Effluent Limit (industrial wastewater)
• Secondary Treatment Standard (municipal wastewater)
• Six Minimum Control Measures (MS4 stormwater)
Seller's Baseline:
• Water Quality Based Effluent Limit (wastewater sector)
• TMDL Wasteload Allocation (stormwater sector)
• Site specific load allocation or compliance with all legal requirements & any locally established credit generation baseline requirements (nonpoint source sector)

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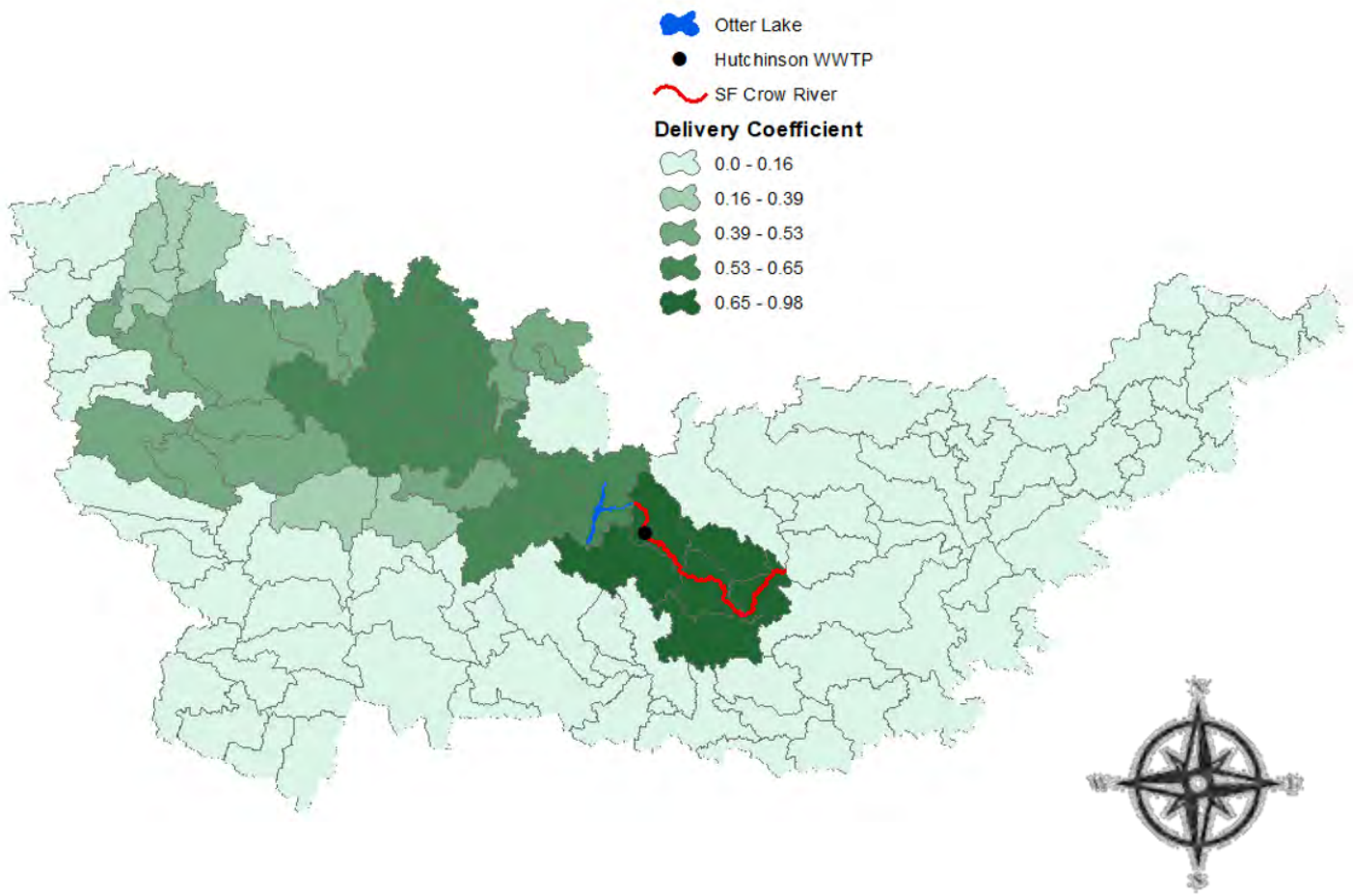

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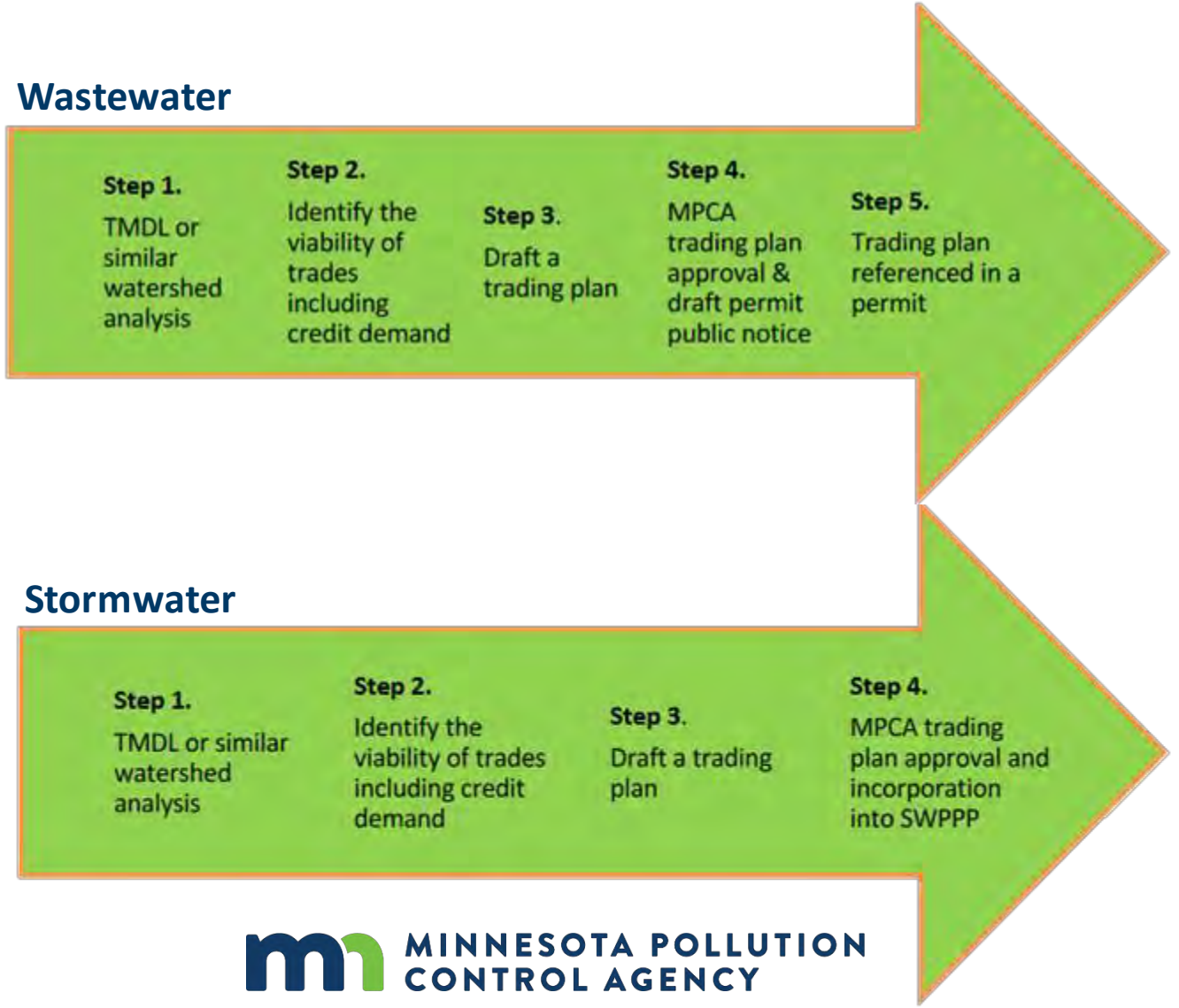

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