

Road salt impacts on water quality in stormwater ponds

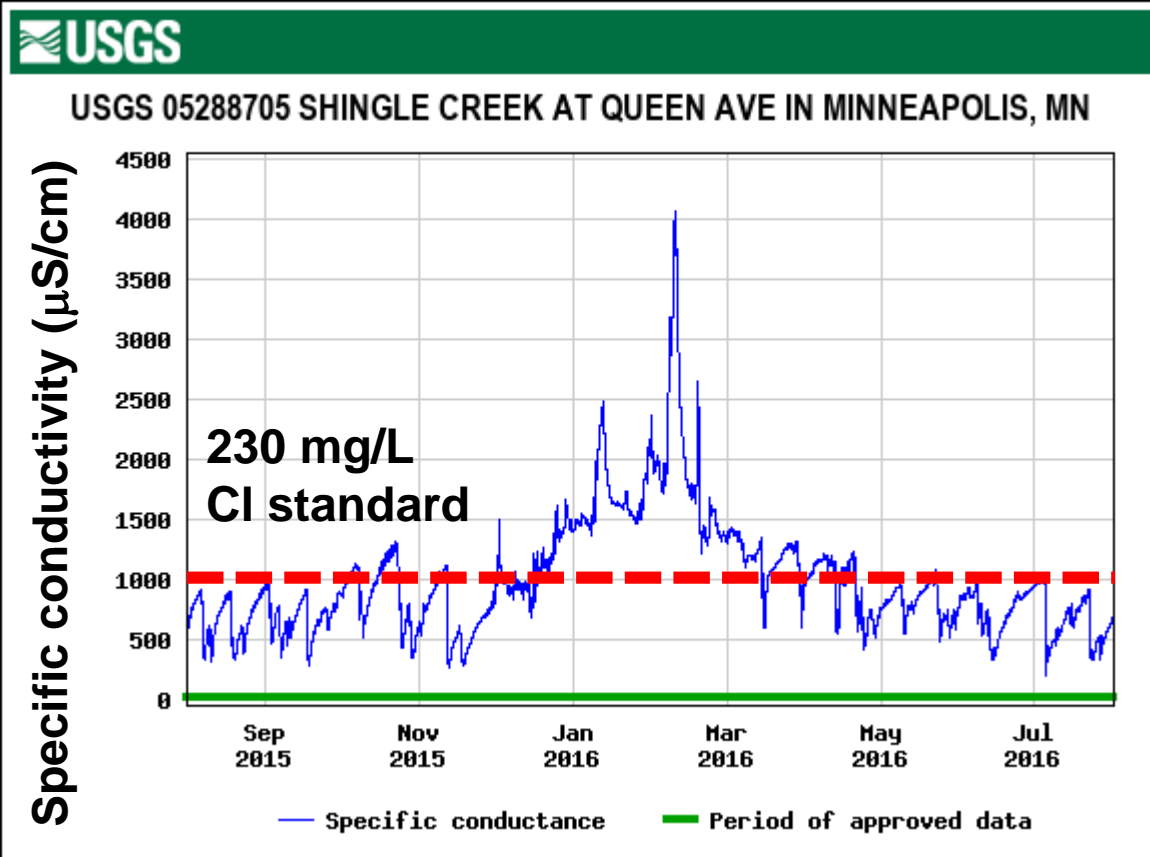
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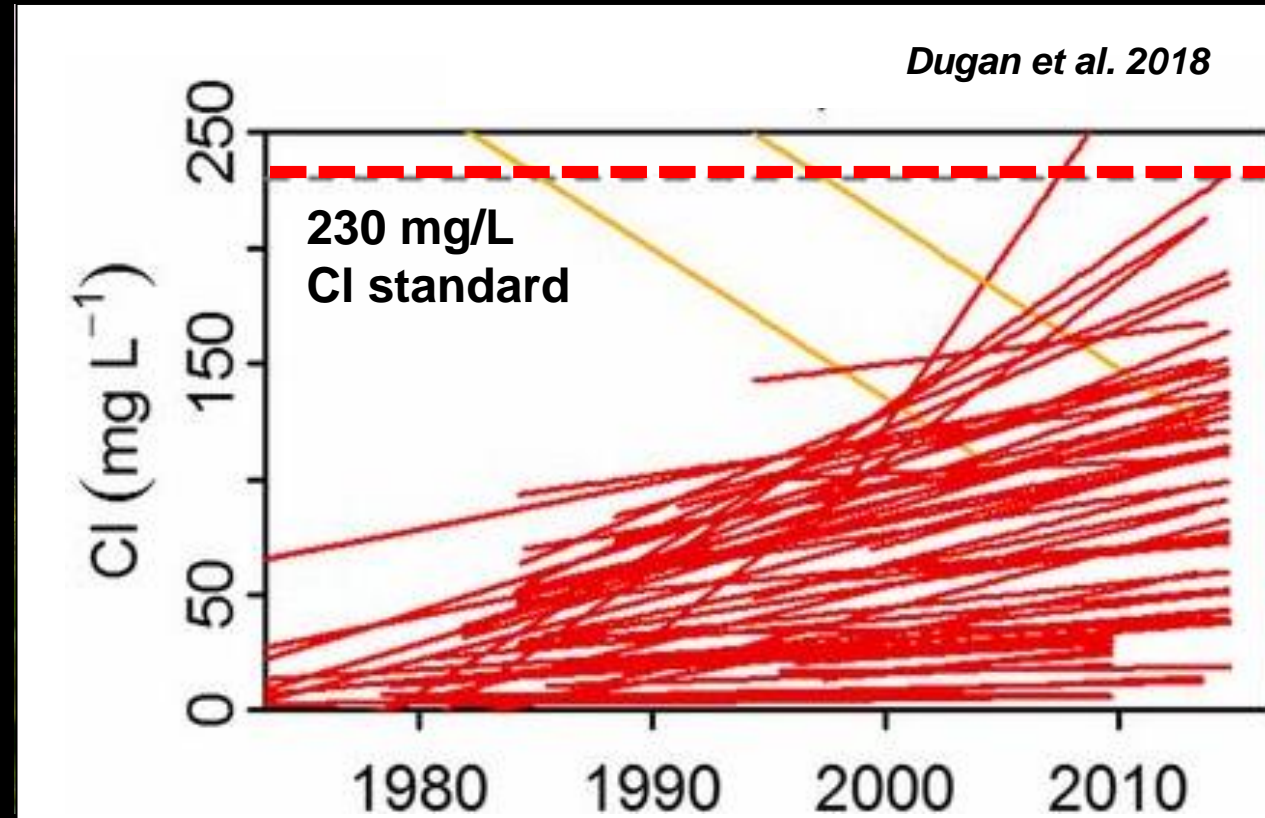


UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Road salt in Minnesota's freshwaters



Shingle Creek



Minnesota lakes

Stormwater Ponds & Wetlands

Numerous

City ponds ~13,000

City wetlands ~15,500

MPCA

Primary functions

Water quality
& flood control



Green ponds



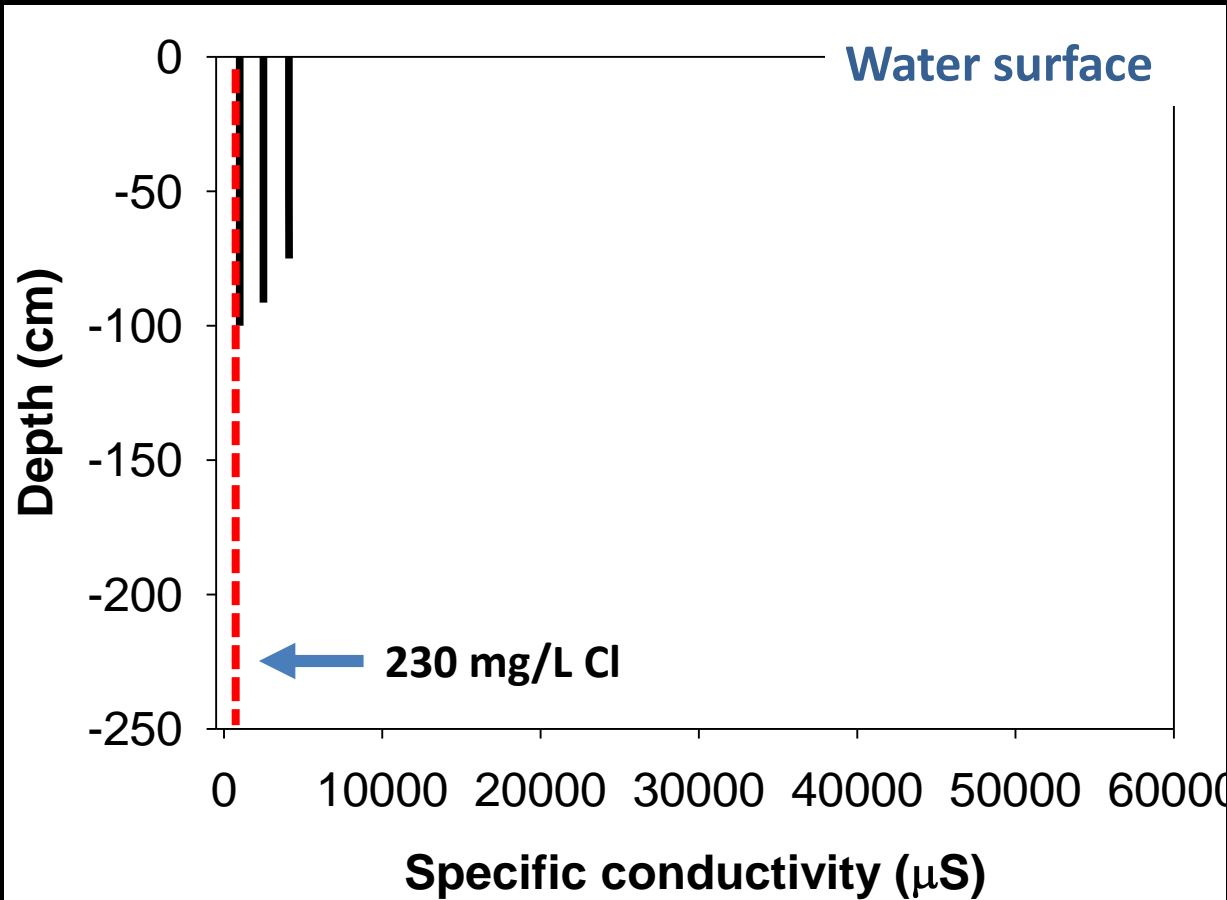
Como Lake

Green lakes

Roadmap

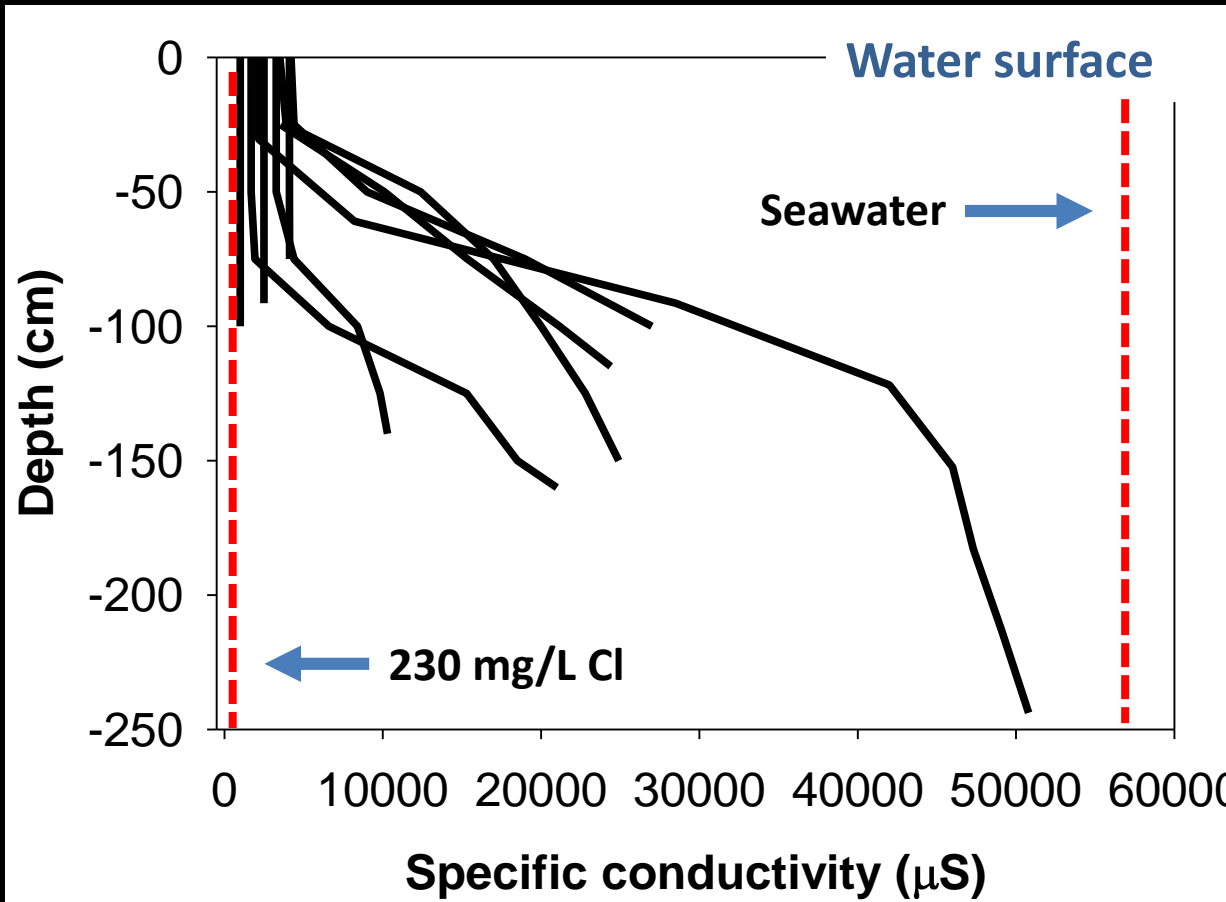
- 1) Road salt in stormwater ponds
- 2) Connections to water quality
- 3) Management ideas

Distribution and persistence in ponds and wetlands



Mid May, 2018

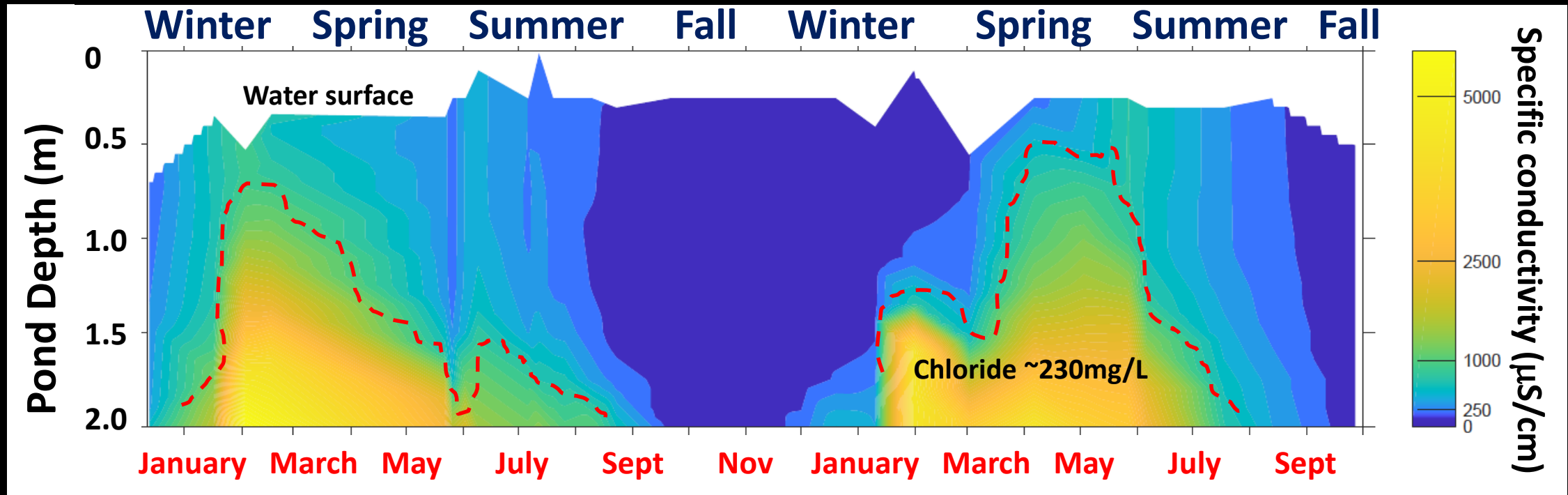
Distribution and persistence in ponds and wetlands



Mid May, 2018
High road salt areas

6 “deep” ponds
Max Cl 18 grams/L

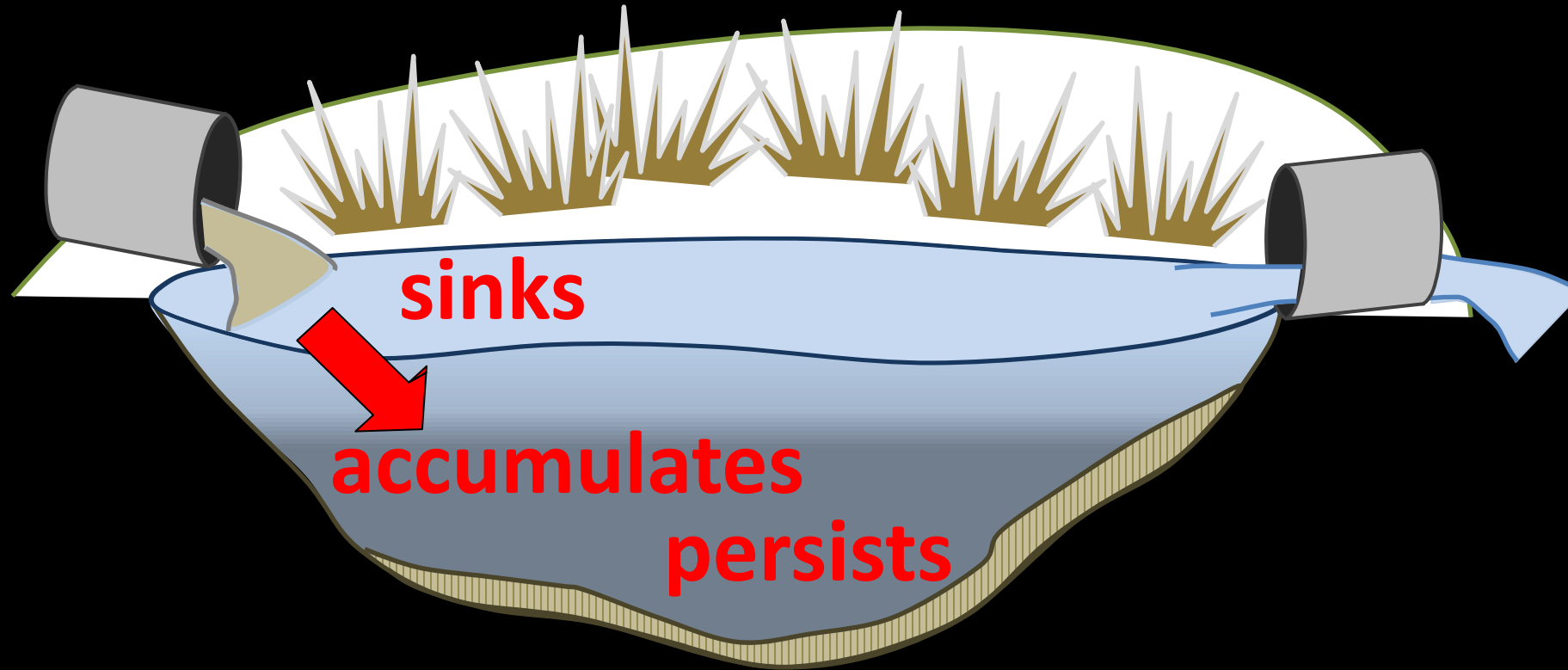
Seasonal patterns of salt accumulation and flushing



2017

2018

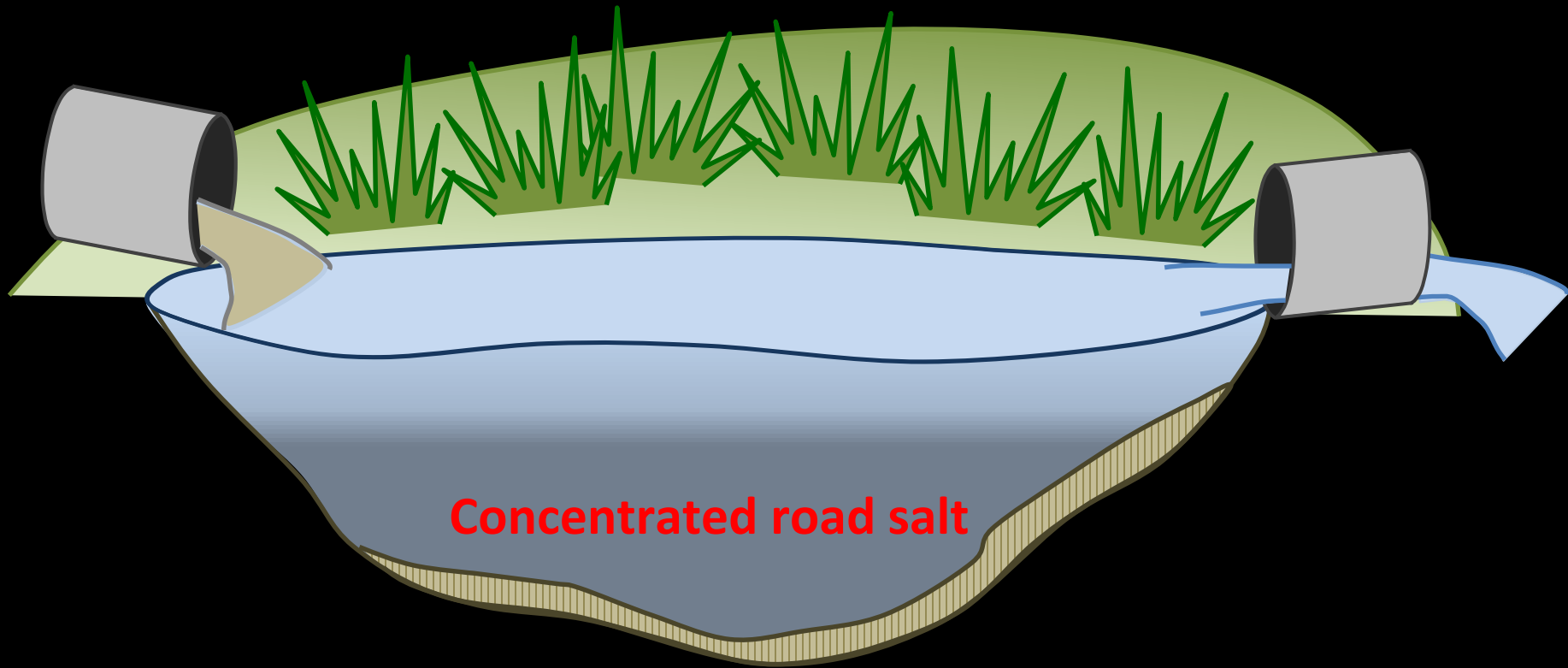
Winter salt runoff enters...



...into summer, if water depth >3ft

Part 2: Water quality implications

How does road salt impact stormwater ponds?



Road salt impacts

Chloride toxicity 

Heavy metal concentrations 

Mixing & oxygen 



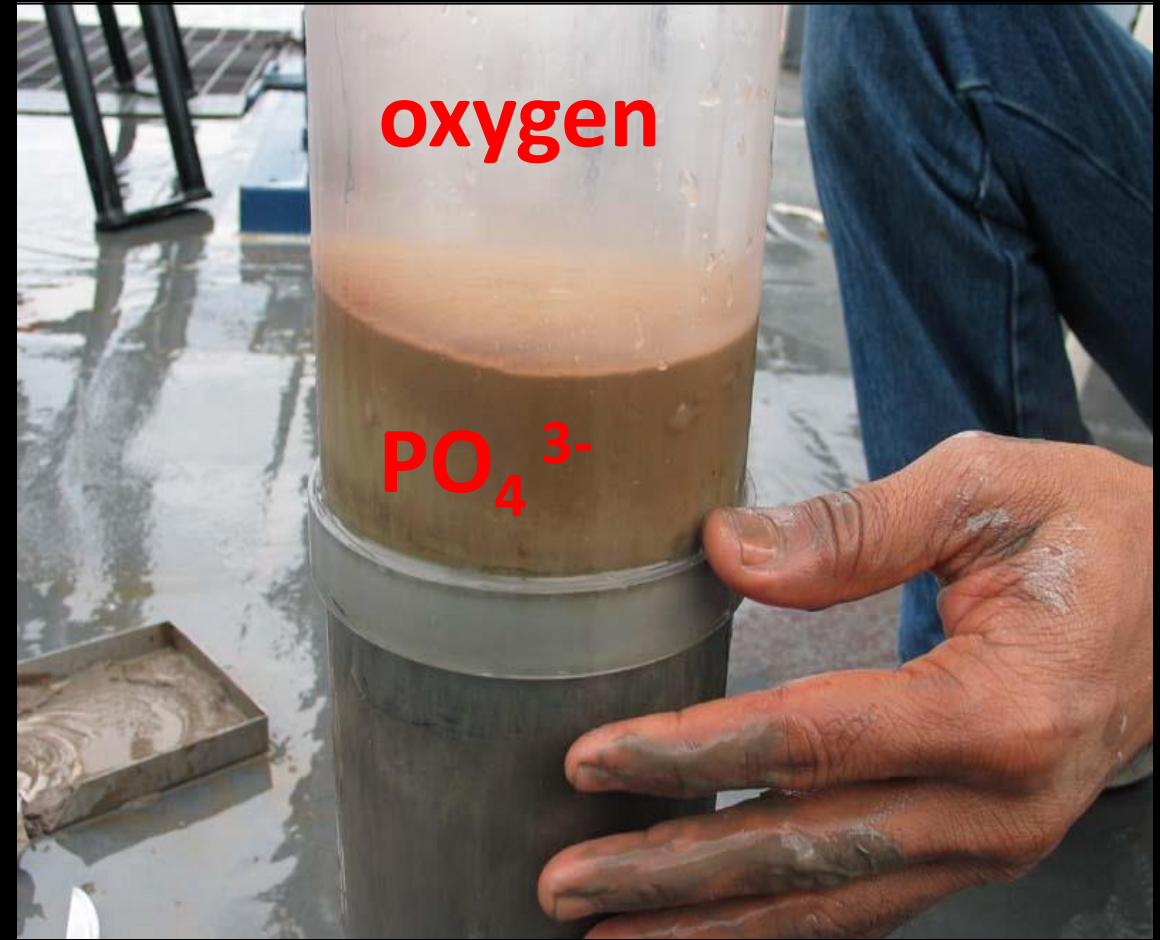
Northern leopard frog (MNDNR)



Implications for water quality
1) “Ecological traps” for organisms



Northern leopard frog (MNDNR)



Implications for water quality

- 1) “Ecological traps” for organisms
- 2) Phosphorus release from sediments



Northern leopard frog (MNDNR)



Implications for water quality

- 1) “Ecological traps” for organisms
- 2) Phosphorus release from sediments

Can we address the problem?



Identify sensitive ponds
Manage roads to reduce input

Manage ponds

Most are “old”
20-40+ yrs

Modify to promote
flushing existing ponds

Replace with
other BMPs





**Stormwater
capture**

**Low road
salt inputs**

Shallow

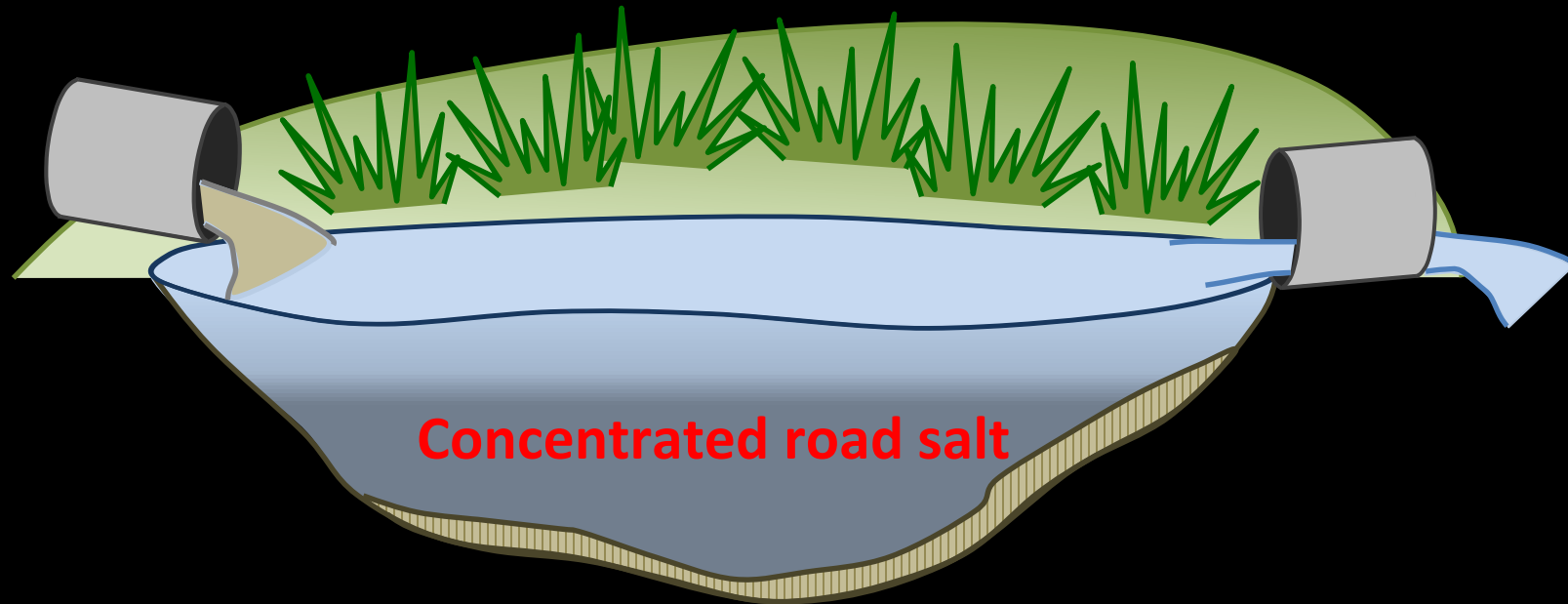
Bell Museum, 2018

Salt and ponds don't mix

Urban ponds accumulate salt and retain it into the summer

Salt has diverse, poorly known impacts on ponds and wetlands

Phosphorus and metal release from salty sediments



Critical need - Research and engagement

ACKNOWLEDGEMENTS

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THANK YOU

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