

WATER QUALITY IN RAMSEY COUNTY

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RAMSEY COUNTY LAKE MANAGEMENT WINTER MONITORING PROGRAM

- Dissolved oxygen monitoring/aerating
 - Como, Owasso, Island, Otter, Silver West, Beaver
- Chloride monitoring
 - Worked with MPCA to establish a state water quality standard for chloride. [TCMA Chloride Project Link](#)
 - A large number of lakes were categorized as impaired for aquatic life, or at high risk of becoming impaired.

Average chloride concentration when exceeding 230 mg/L

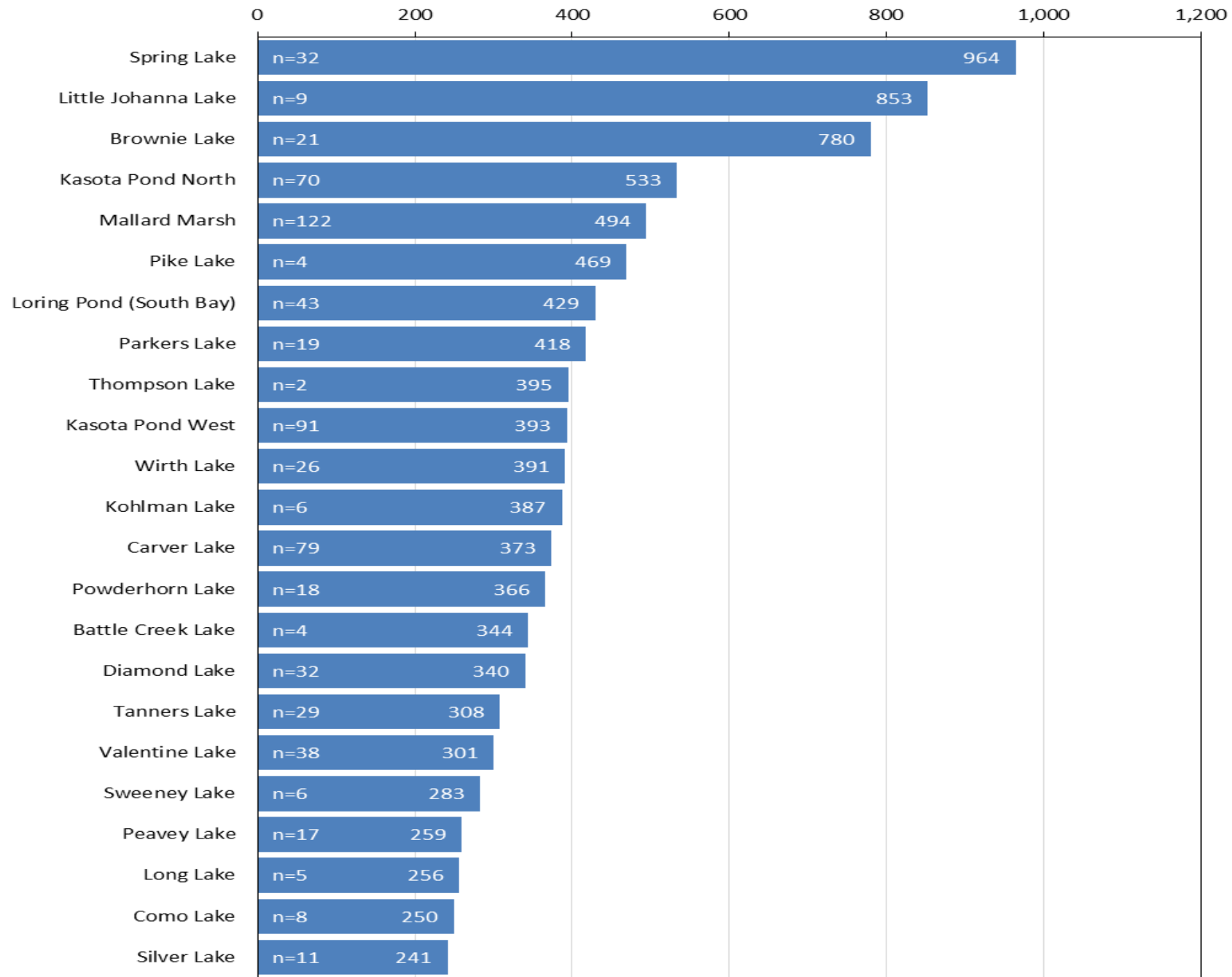
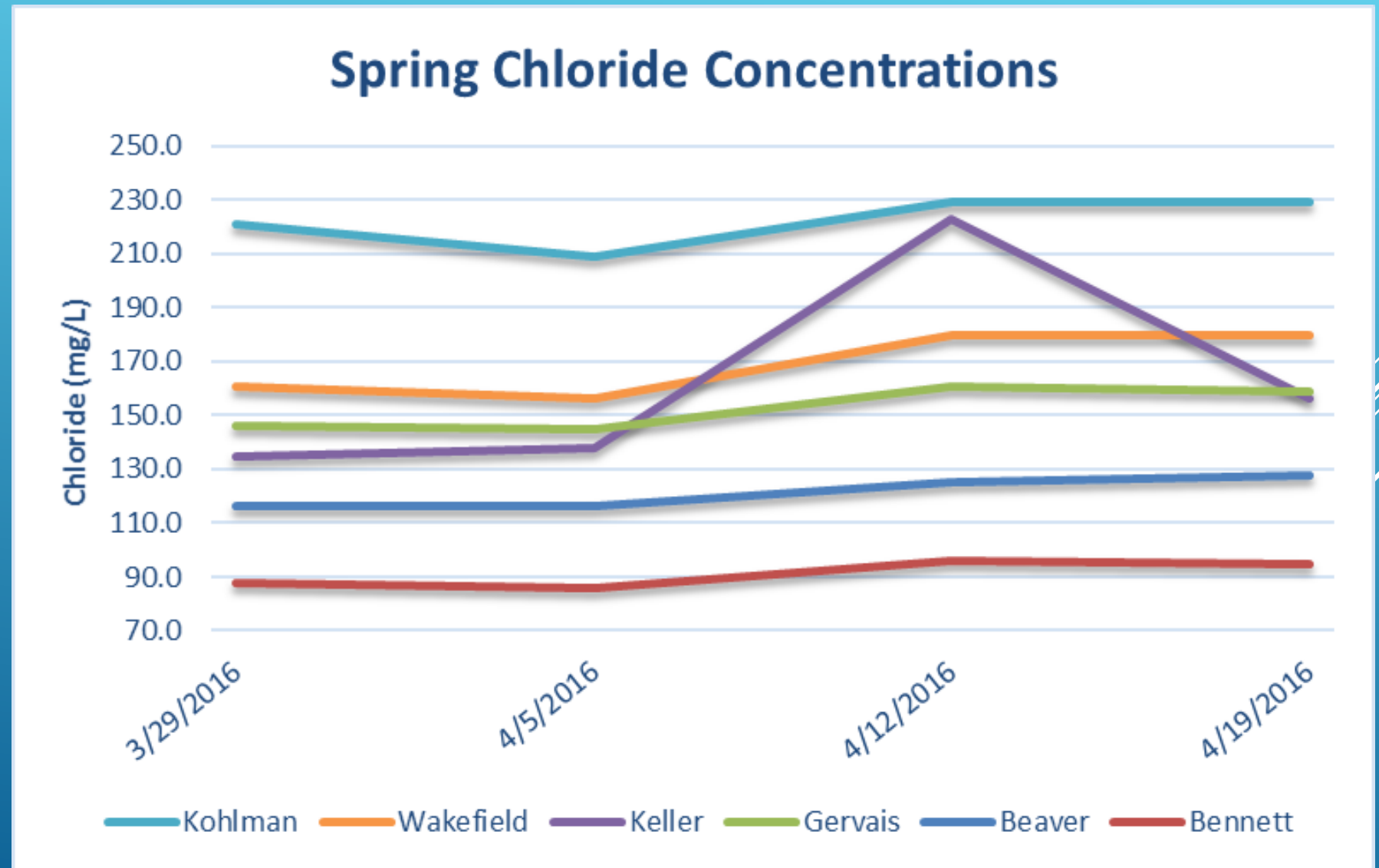


Table 2.TCMA Chloride Management Plan - MPCA 2015

LAKES WITH A HIGH RISK OF CHLORIDE IMPAIRMENT

- Beaver
- Bennett
- Crosby
- Gervais
- Johanna
- Keller
- McCarrons
- Wabasso
- Wakefield



WHERE DOES CHLORIDE COME FROM ?

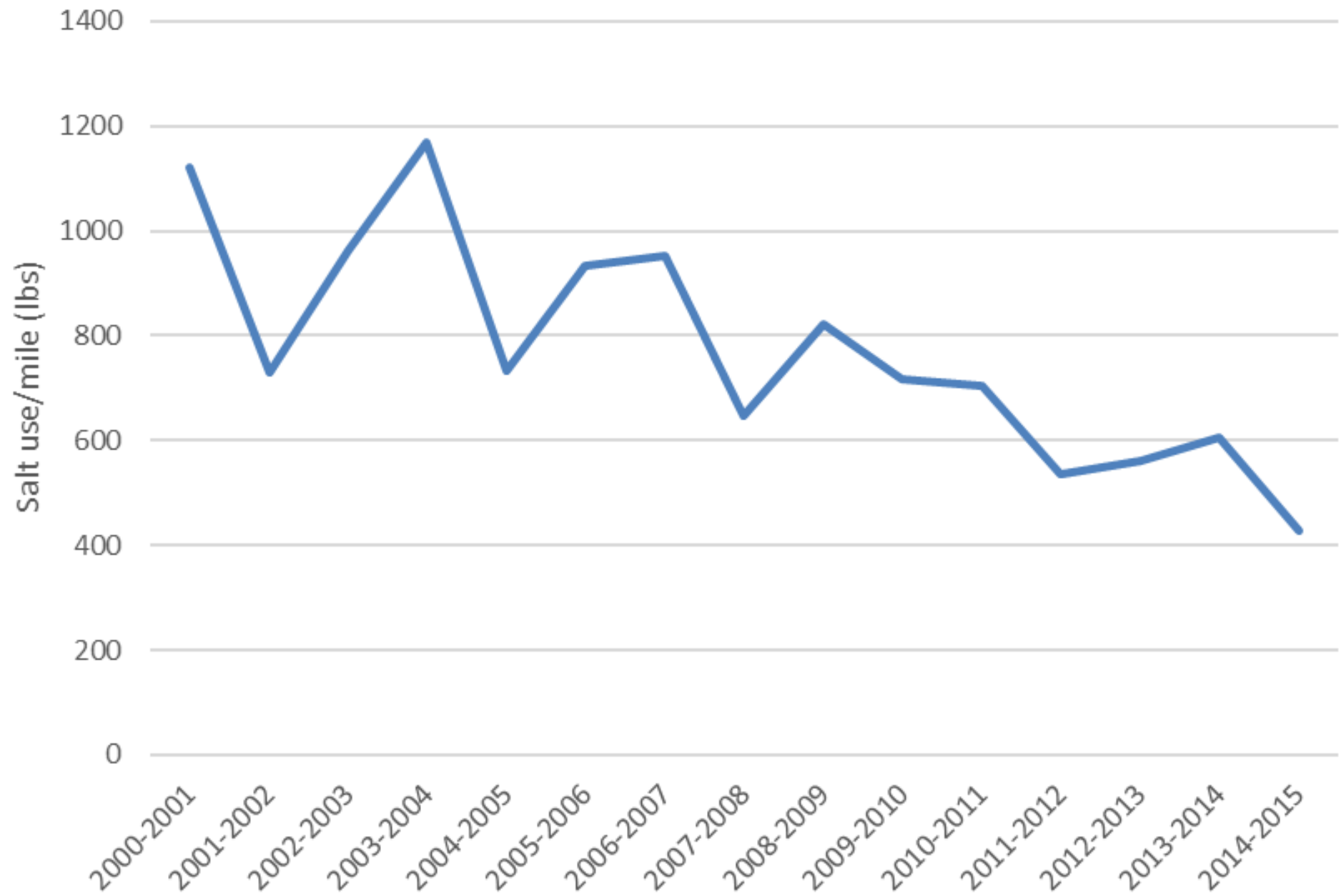
- Residential water softeners
- Winter maintenance of roads, sidewalks, and parking lots with rock salt
 - Ramsey County uses 16,000,000 lbs/year to deice roads
 - 700,000,000 lbs/year used in the Twin Cities Metro Area (1)

Table 1. Summary of annual road salt application amounts

| User | Use (Tons) | Use % |
|-----------------|------------|-------|
| MNDOT | 80,797 | 23% |
| Counties | 70,284 | 20% |
| Cities | 114,314 | 33% |
| Commercial Bulk | 66,349 | 19% |
| Packaged | 17,460 | 5% |
| Total | 349,204 | 100% |



Salt Used Per Event




WHY IS CHLORIDE SO BAD?

- 1 Teaspoon of road salt can permanently pollute 5 gallons of water.
- There's no easy way to remove salt from water.
- Causes osmotic stress to organisms
- Decreases the biodiversity of sediment organisms and plants(2)
- Increases the release and transport of heavy metals(3)

Winter Maintenance Assessment tool

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, set against a blue background.

RAMSEY COUNTY LAKE MANAGEMENT SUMMER MONITORING PROGRAM

- 30 lakes sampled at deepest point
 - Sampled 8 times between May 1st – September 30th
 - Samples taken for laboratory analysis
 - Depth profile taken
 - Dissolve Oxygen, Temperature, Conductivity, pH
 - Aquatic vegetation monitoring
 - AIS monitoring
- 

RAMSEY COUNTY LAKE MANAGEMENT LABORATORY

Phosphorus

Nitrogen

Chloride

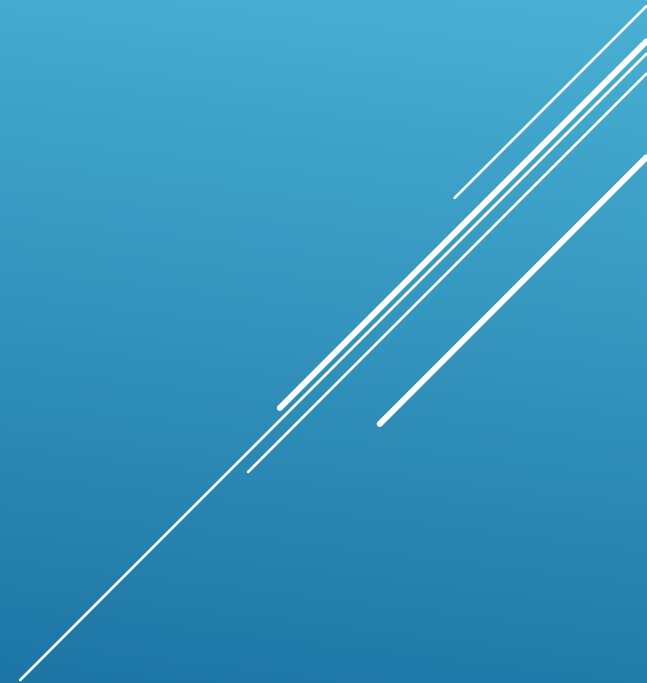
Chlorophyll A

Turbidity

Phytoplankton

Zooplankton

Zebra Mussel Veliger



| Lake | 2016 | 2015 | 2014 | 2013 | 2012 |
|------------------|------|------|------|------|------|
| BALD EAGLE | A | B | C | C | C |
| BEAVER | B | B | B | B | B |
| BENNETT | C | C | C | D | D |
| COMO | D | D | D | D | D |
| CROSBY | C | C | D | C | C |
| GERVAIS | B | B | C | C | C |
| ISLAND NORTH | C | C | B | B | N/A |
| ISLAND SOUTH | B | B | B | B | B |
| JOHANNA | B | A | B | B | B |
| JOSEPHINE | B | B | B | B | B |
| KELLER | B | B | C | B | C |
| KOHLMAN | B | B | C | C | C |
| Little Crosby | B | C | D | B | B |
| LOEB | A | B | B | A | A |
| LONG | D | D | D | D | D |
| LONG | B | C | C | C | C |
| MCCARRON | A | A | B | A | A |
| OTTER | A | A | A | A | A |
| OWASSO | B | B | B | C | C |
| PHALEN | A | A | B | B | B |
| ROUND(NR PHALEN) | A | B | C | B | B |
| SILVER E | C | C | C | D | D |
| SILVER W | C | B | C | C | C |
| SNAIL | A | A | A | A | A |
| TURTLE | A | A | A | A | A |
| TWIN | B | B | C | B | B |
| VALENTINE | D | D | D | C | C |
| WABASSO | A | A | A | A | A |
| WAKEFIELD | C | D | C | C | C |
| WHITE BEAR | A | A | A | A | A |



Silver Lake Carp Removal 2014 + 2015

73% reduction in the # of individuals

1,086 to 294

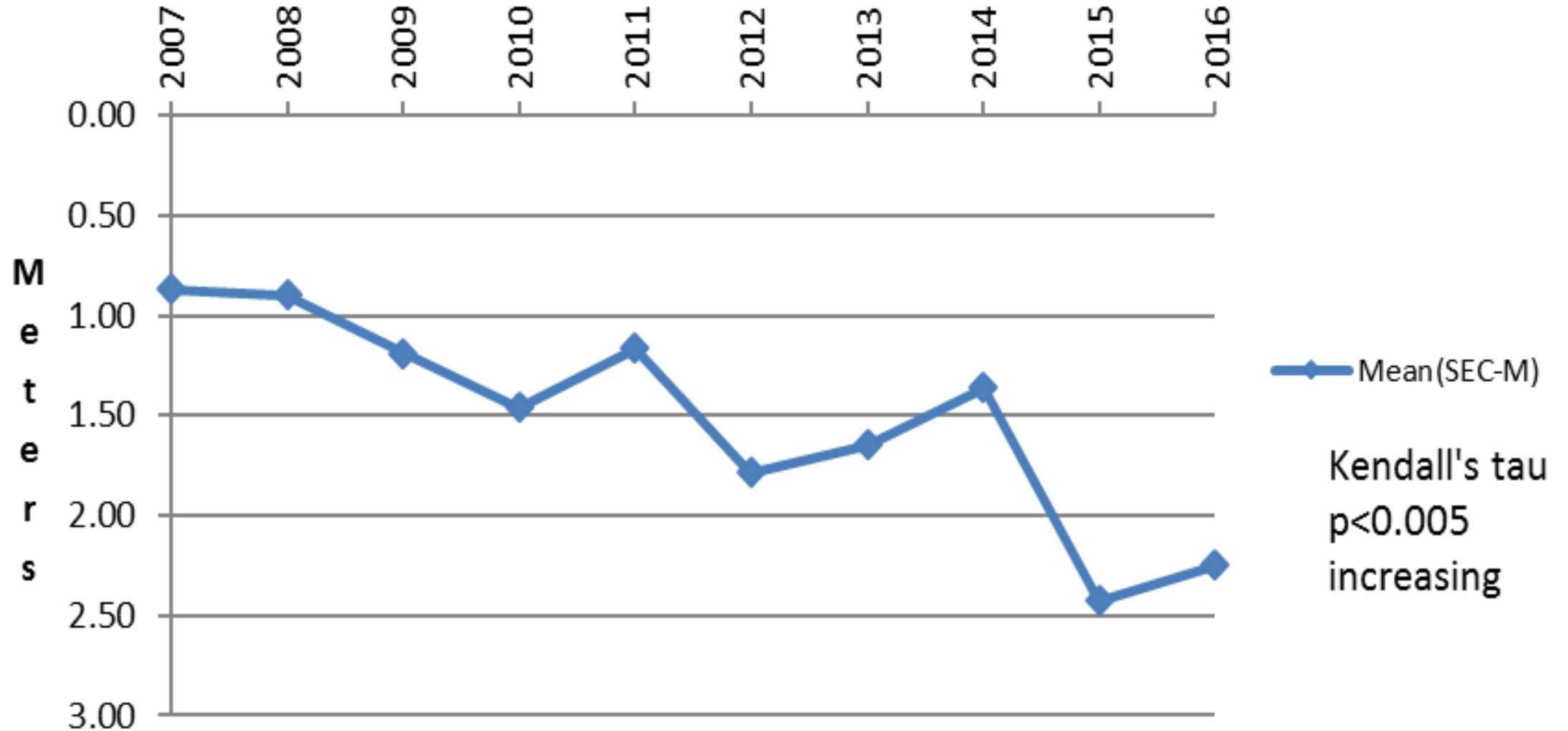
61% reduction in biomass

8,992 lbs to 3,498 lbs

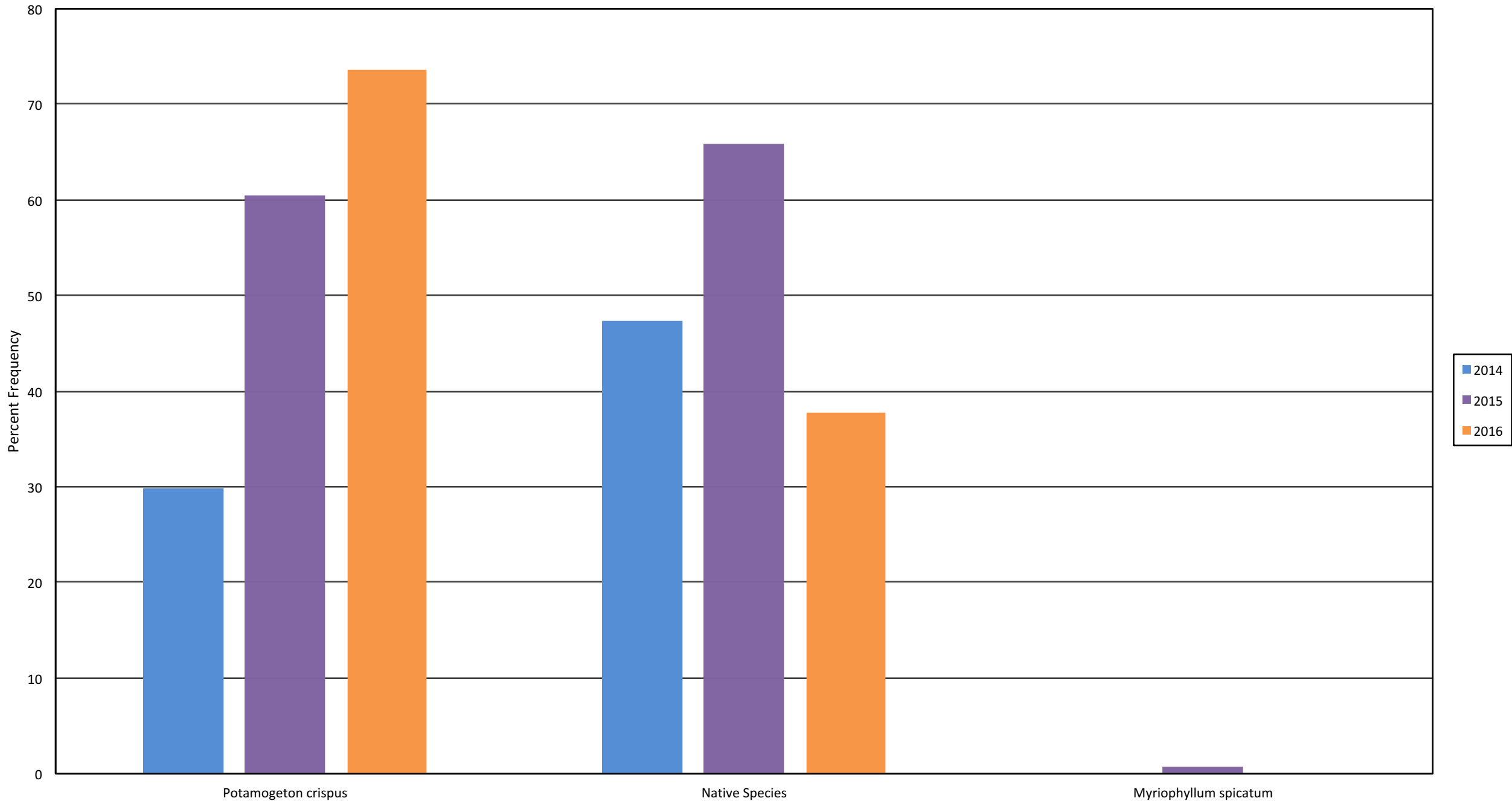
147 lbs/acre to 56 lbs/acre

AVERAGE SECCHI DISK READING

Silver West Lake Last 10 Years



Silver West Lake - Early Summer Aquatic Plant Survey



| Lake | 2016 | 2015 | 2014 | 2013 | 2012 |
|------------------|------|------|------|------|------|
| BALD EAGLE | A | B | C | C | C |
| BEAVER | B | B | B | B | B |
| BENNETT | C | C | C | D | D |
| COMO | D | D | D | D | D |
| CROSBY | C | C | D | C | C |
| GERVAIS | B | B | C | C | C |
| ISLAND NORTH | C | C | B | B | N/A |
| ISLAND SOUTH | B | B | B | B | B |
| JOHANNA | B | A | B | B | B |
| JOSEPHINE | B | B | B | B | B |
| KELLER | B | B | C | B | C |
| KOHLMAN | B | B | C | C | C |
| Little Crosby | B | C | D | B | B |
| LOEB | A | B | B | A | A |
| LONG | D | D | D | D | D |
| LONG | B | C | C | C | C |
| MCCARRON | A | A | B | A | A |
| OTTER | A | A | A | A | A |
| OWASSO | B | B | B | C | C |
| PHALEN | A | A | B | B | B |
| ROUND(NR PHALEN) | A | B | C | B | B |
| SILVER E | C | C | C | D | D |
| SILVER W | C | B | C | C | C |
| SNAIL | A | A | A | A | A |
| TURTLE | A | A | A | A | A |
| TWIN | B | B | C | B | B |
| VALENTINE | D | D | D | C | C |
| WABASSO | A | A | A | A | A |
| WAKEFIELD | C | D | C | C | C |
| WHITE BEAR | A | A | A | A | A |

BALD EAGLE ALUMINUM SULFATE TREATMENT



Project Engineer:



Contractor:



Treatment 1: 2014

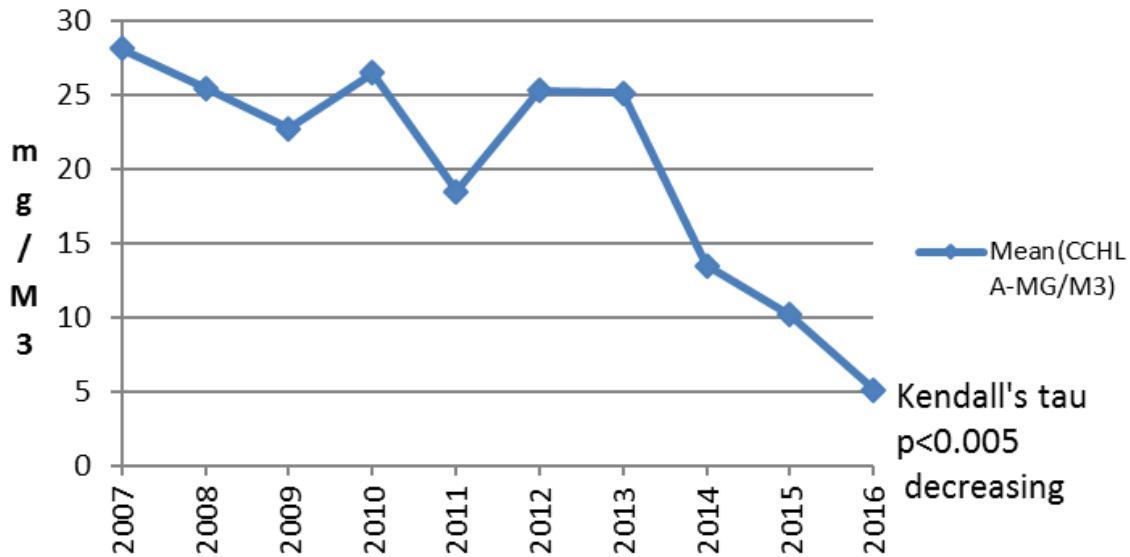
Treatment 2: 2016

The largest alum treatment in MN

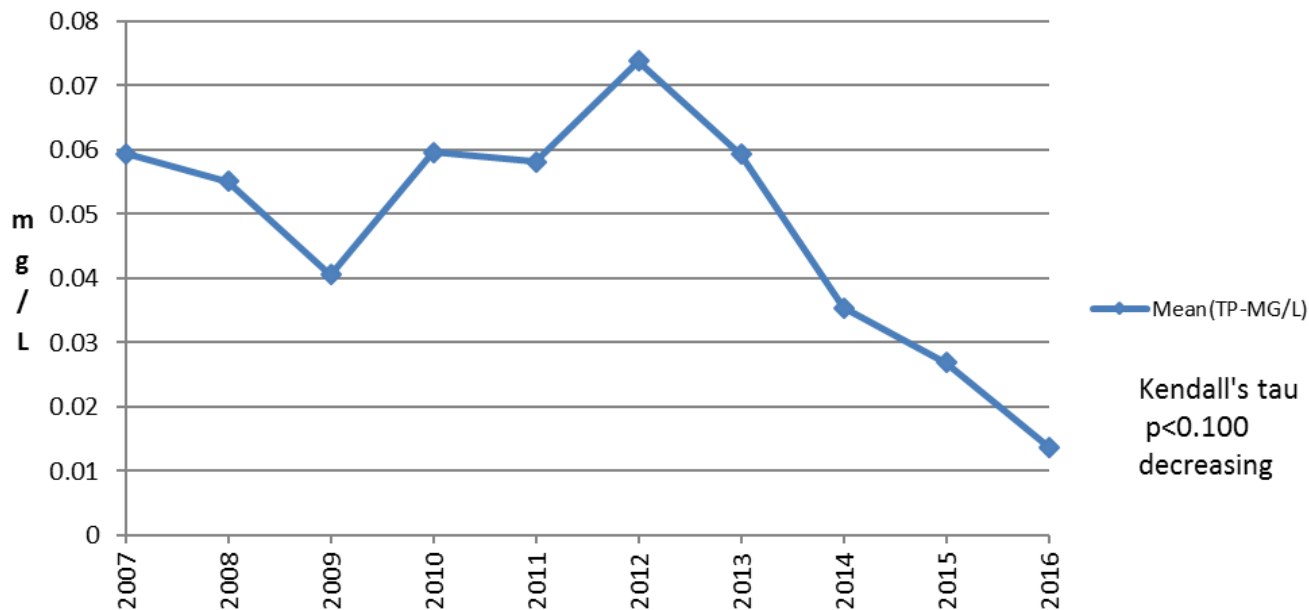




Bald Eagle ChIA

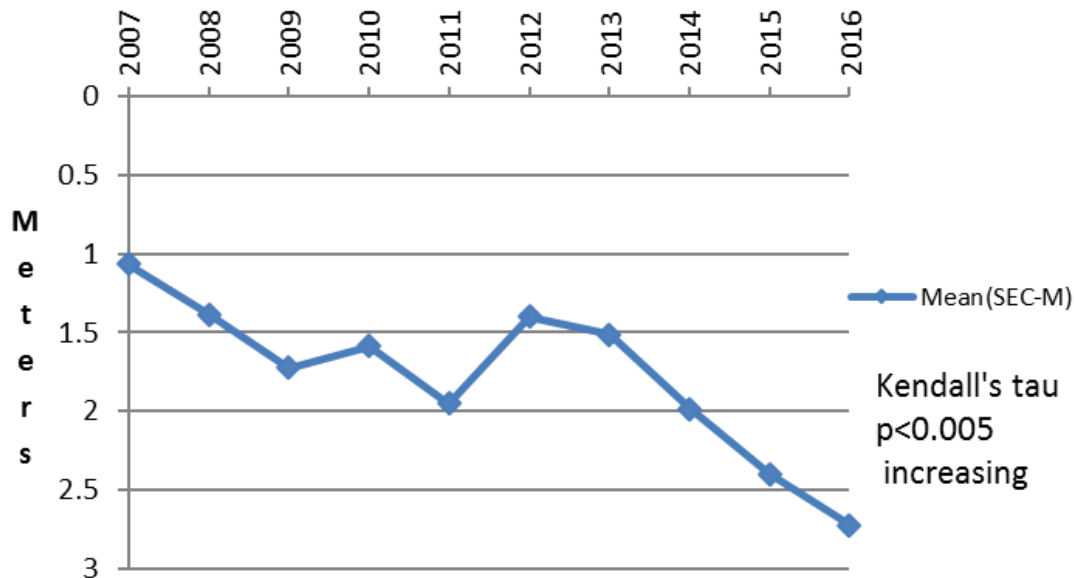


Bald Eagle TP



Note:2014 + 2016 Alum treatments

Bald Eagle Secchi



[Link to Alum Treatment Project Page](#)

House and Senate Omnibus bill

- Cuts funds to MN DNR AIS grants, and MAISRC
- Changes rulemaking authority and permitting processes
- Limits the buffer law

[Link to summary of proposed changes and a message template](#)



Great Online Resources

MN Key Water Info List

<http://es.metc.state.mn.us/KeyWaterList/#SurfaceWater>

Surface Water Data – MPCA

<http://cf.pca.state.mn.us/water/watershedweb/wdip/index.cfm>

Road Salt and Water Quality - MPCA

<https://www.pca.state.mn.us/water/road-salt-and-water-quality>

Improved Winter Maintenance: Good Choices for Clean Water

REFERENCES

1. Sander, A., E. Novotny, O. Mohseni, H.G. Stefan, (2007) "Inventory of Road Salt Uses in the Minneapolis/St. Paul Metropolitan Area". University of Minnesota, St. Anthony Falls Laboratory, Minneapolis, MN, Report No. 503, December 2007, 46 pp.
2. Talmage P J, Lee K E, Goldstein R M, Anderson J P, Fallon J D. Water Quality, Physical Habitat, and Fish-Community composition in Streams in the Twin Cities Metropolitan Area, Minnesota 1997-98. 1999; 18.
3. Novotny V, Muehring D, Zitomer D H, Smith D W, Facey R. Cyanide and metal pollution by urban snowmelt: impact of deicing compounds. Water Science and Technology 1998; 38: 223-230.