

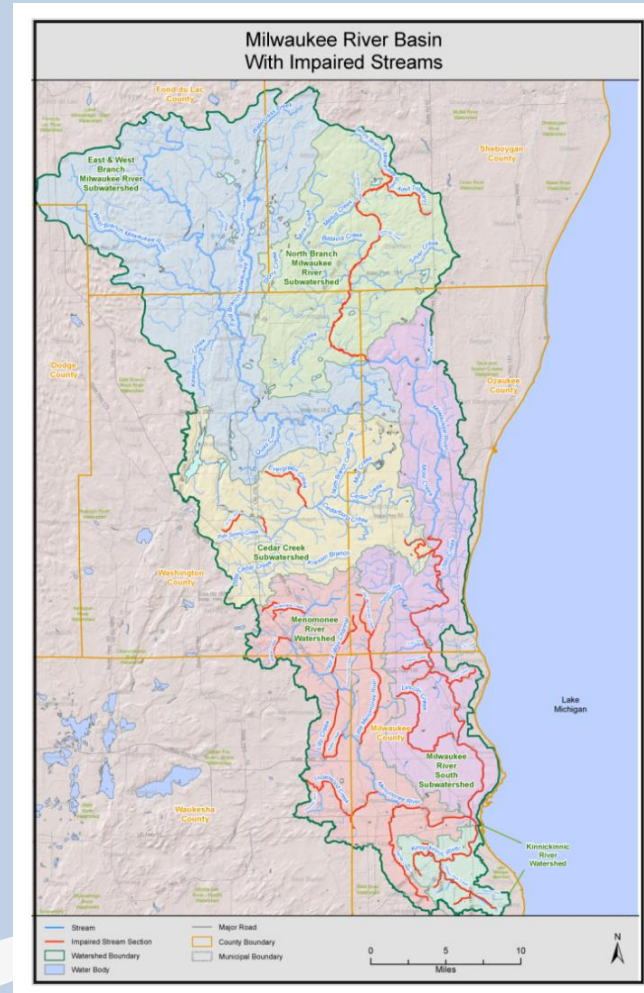
State of the Rivers



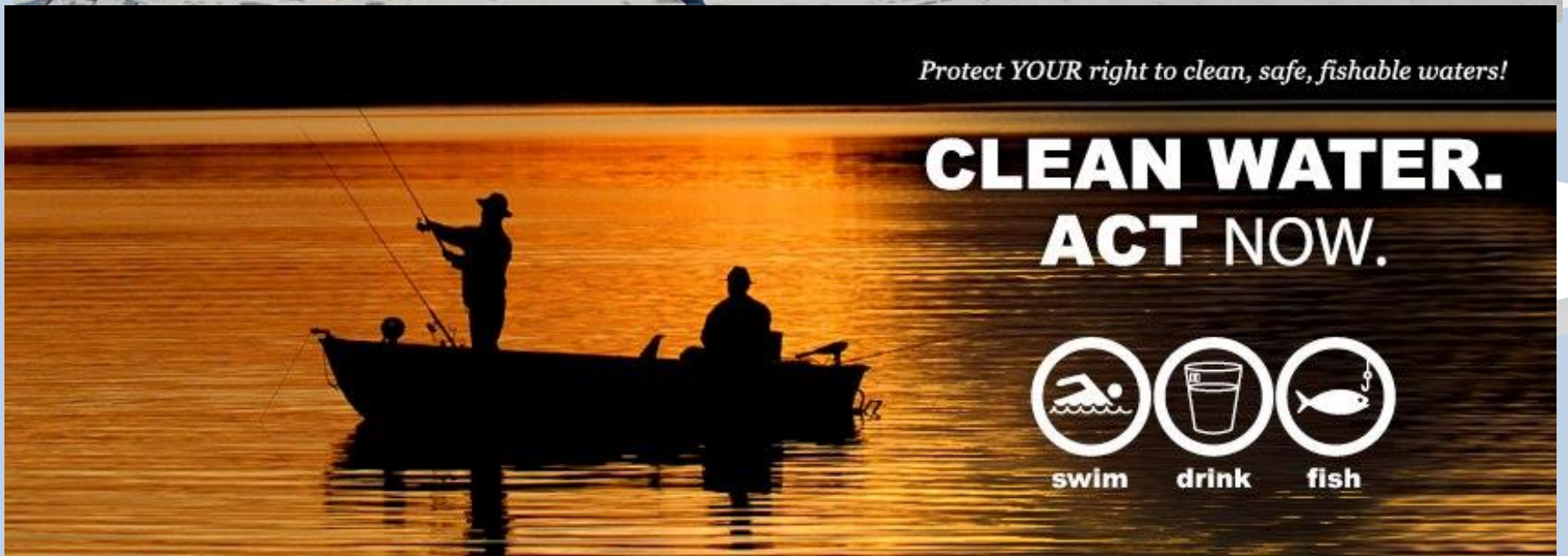
Cheryl Nenn



Mission: Protect, improve and advocate for water quality, riparian wildlife habitat, and sound land management in the Milwaukee, Menomonee, and Kinnickinnic River Watersheds.



Our Vision



We are the Milwaukee Riverkeeper®

- One of 340+ Waterkeepers in 43 countries licensed by the Waterkeeper Alliance, based in New York
- An independent watchdog for the river
- Responds to citizen concerns and complaints
- Finds solutions to environmental problems
- Physically patrols river, conducts pro-active monitoring, and expands citizen monitoring network



www.milwaukeekeeperiverkeeper.org



Problems Facing our Rivers and Streams

- Point source pollution
- Non-point pollution
- Trash
- Aesthetics
- Flooding
- Hydrologic alterations
- Depleted biodiversity
- Toxics (Mercury, PCBs)
- Water diversions and over consumption
- Lack of public access



What we do



Monitor



Paddle



Cleanup



Patrol

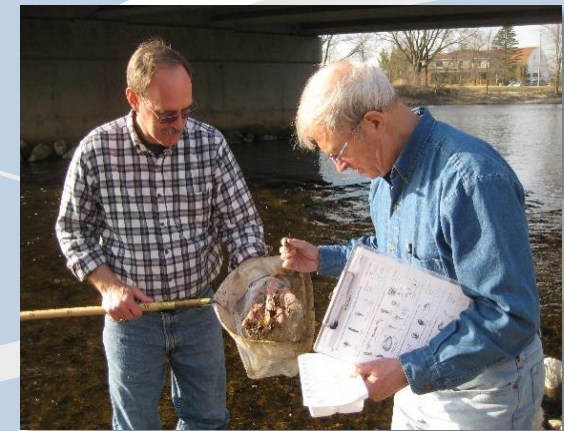


Educate



Advocate

Volunteer Stream Monitoring



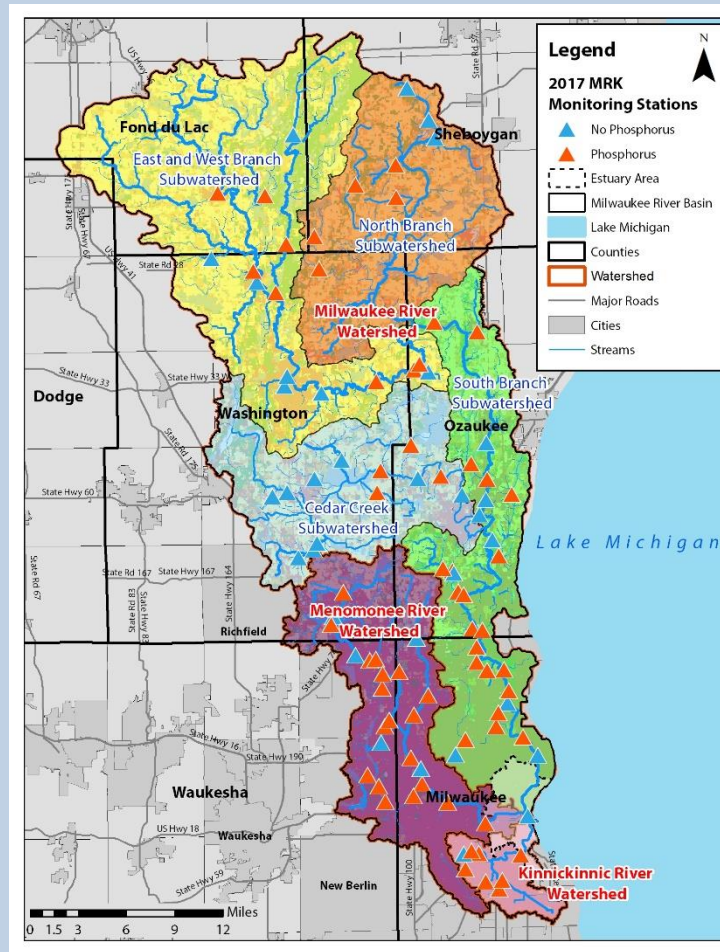
What data do collect?



Dissolved Oxygen
Turbidity
Water Temperature
Phosphorus
pH
Conductivity
Chloride
Macroinvertebrates



Where do WE monitor?



River Report Card

Combine Data



Compare to Standards

Targets And Goals

Dissolved Oxygen	≥ 5.0 mg/L
Water Temperature	< 31.7°C
Total Phosphorus	
Large Stream	< 0.1 mg/L
Small Stream	< 0.075 mg/L
pH	6 - 9
Turbidity	≥ 54.7 cm
Conductivity	150-500 µS/cm
Chloride	
Chloride (Acute)	< 860 mg/L
Chloride (Chronic)	< 230 mg/L
Bacteria	
Fecal coliform	< 200 CFU/100 mL
<i>E. coli</i>	< 235 CFU/100 mL
Macroinvertebrates	"Good"

Assign Grades

A

All water quality indicators meet desired targets 90 - 100% of the time. Streams or river segments have "good" water quality, which are capable of supporting fish and other aquatic life.

B

Most water quality indicators meet desired targets roughly 80 - 89% of the time. Quality of these streams and river segments tend to be good. Most areas are capable of supporting fish and other aquatic life.

C

There is a mix of healthy and unhealthy water quality indicators or indicators are only meeting water quality targets 70 - 79% of the time. Water quality of these waters tends to be fair, as well as have fair conditions for fish and most aquatic life.

D

Few water quality indicators meet desired targets or only meet water quality targets 60 - 69% of the time. Water quality and wildlife habitat of these waters tend to be poor.

F

Very few water quality indicators meet desired targets or meet water quality targets below 60% of the time. Quality of these streams and river segments are very poor and most often lead to poor conditions for fish and aquatic life.

2018 River Report Card

Milwaukee Riverkeeper's 2018 Water Quality Program by the numbers:

82
volunteers

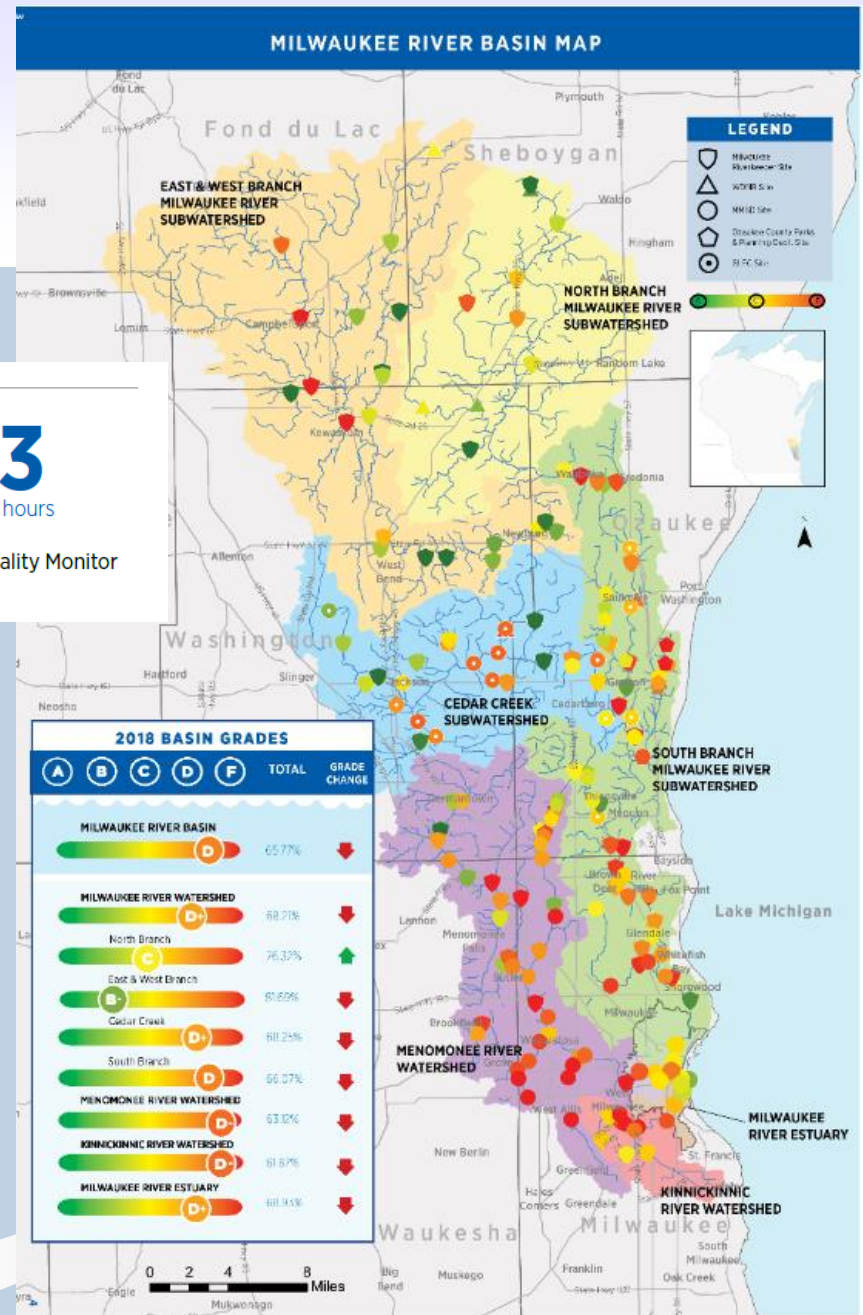
97
sites monitored



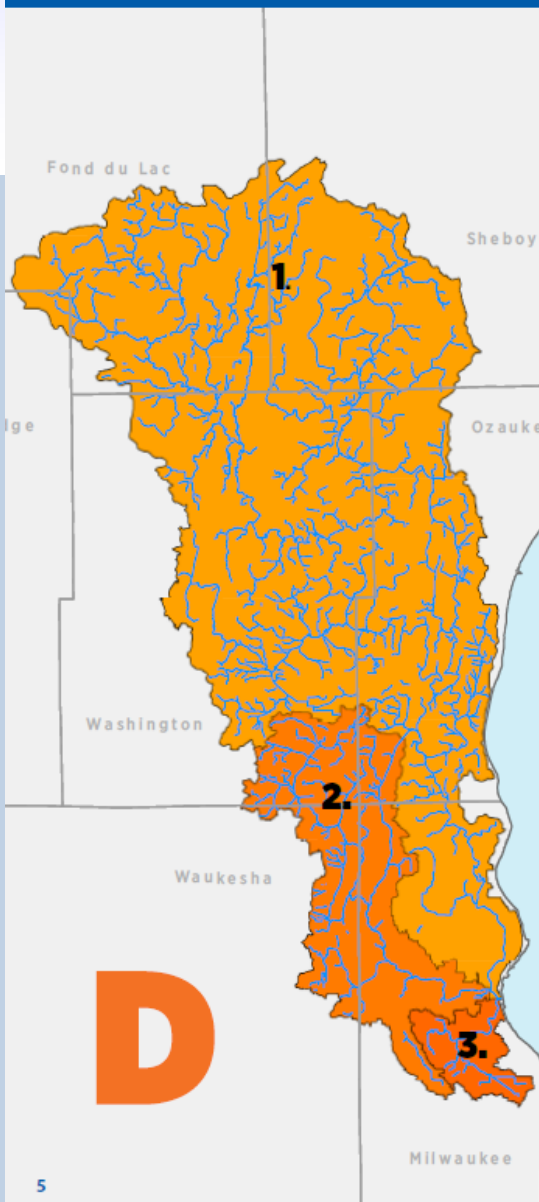
542
site visits

813
volunteer hours

To learn more about Milwaukee Riverkeeper's Monitoring Programs, or to become a Water Quality Monitor and help contribute to this report, visit: milwaukeekeeper.org/protect



MILWAUKEE RIVER BASIN | D



QUICK FACTS

RIVER MILE FACTS



875 mi.
total miles

18 mi.
of trout streams

403 mi.
of impaired waters

2018 BASIN SUMMARY

1. MILWAUKEE RIVER WATERSHED (68.21%)
2. MENOMONEE RIVER WATERSHED (63.12%)
3. KINNICKINNIC RIVER WATERSHED (61.87%)

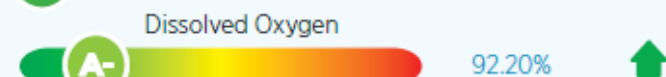
BASIN-WIDE CHALLENGES:

- **CHLORIDE:** 9.23% drop in grade (A- to B-)
- **BACTERIA:** 12.51% drop in grade
- **PHOSPHORUS:** All three watersheds failed to meet phosphorus standards for the 3rd year

The Milwaukee River Basin received an overall grade of a **D (65.77%)** based on Milwaukee Riverkeeper's analysis of water quality data from the Milwaukee, Menomonee and Kinnickinnic River Watersheds. Phosphorus, chloride and bacteria exceedances continue to persist as major issues in the Basin. Land use practices, failing infrastructure, and other human activities send pollutants to surrounding rivers and streams in both rural and urban areas. The Basin saw a grade decline of 5.63% from 2017 to 2018. A large contributor to the decline could be the historic amount of rainfall the Milwaukee area received. For reference, 2017 was a rather dry year, compared to 2018, which was the wettest year on record since 1877.

2018 BASIN PARAMETER GRADES

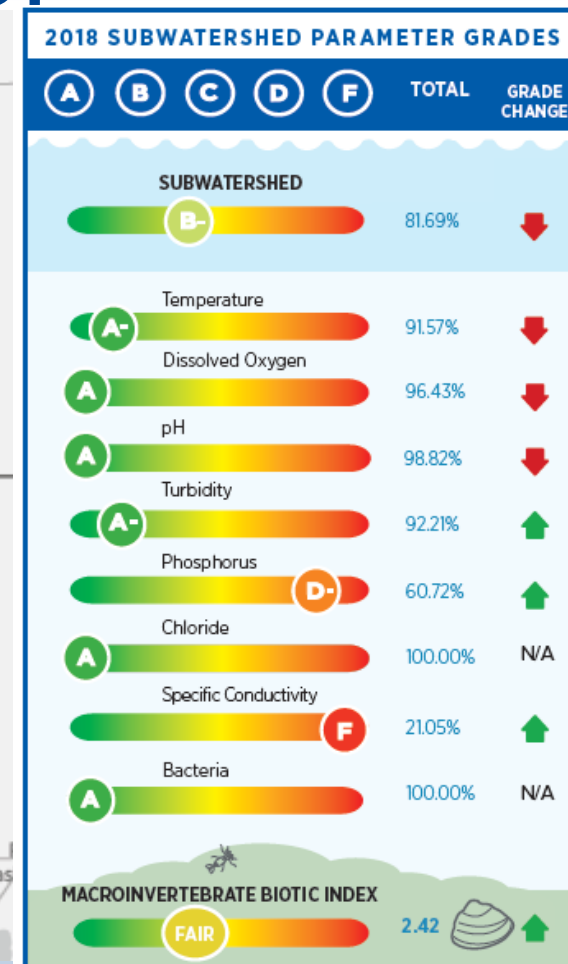
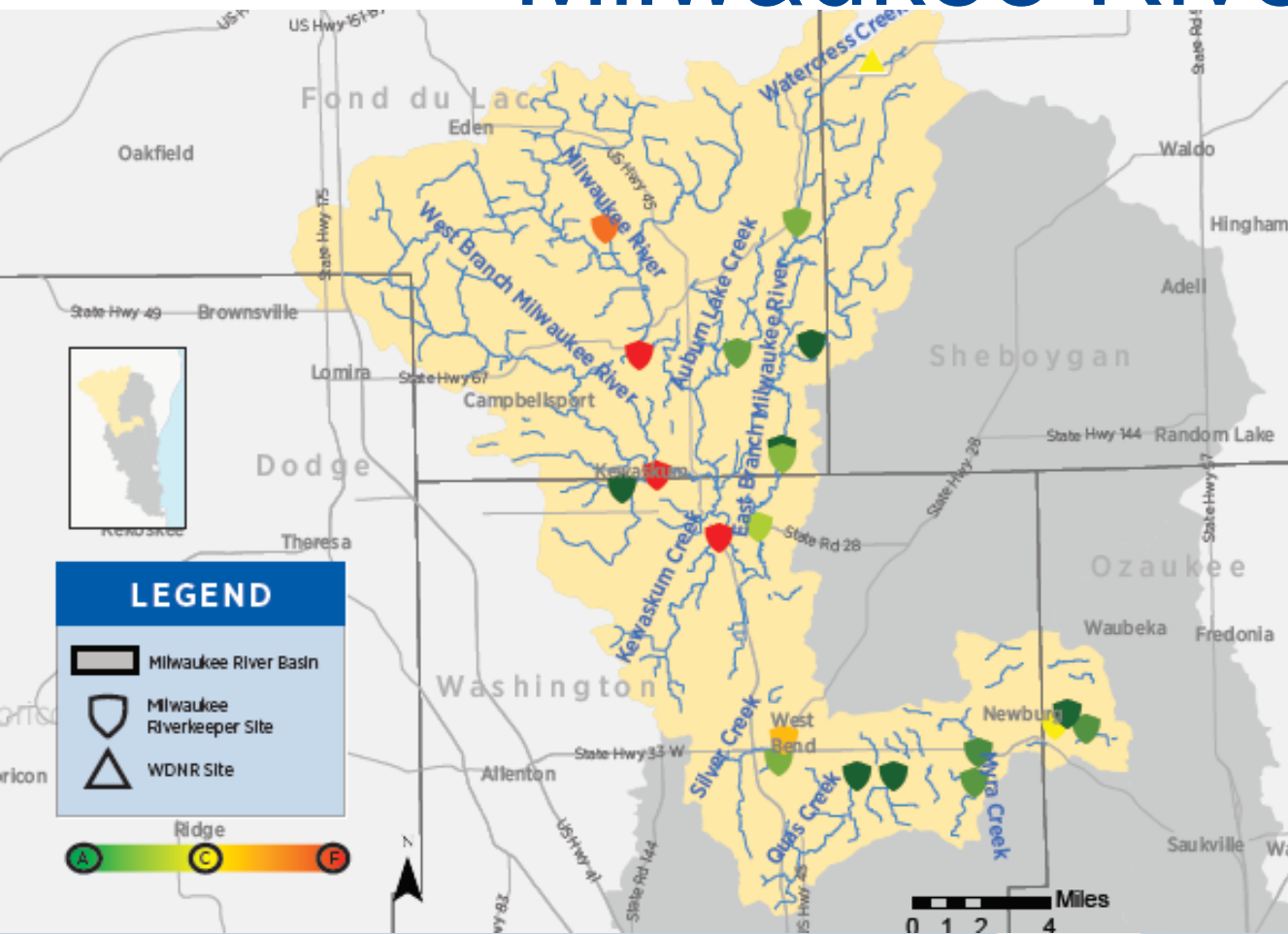
A B C D F TOTAL GRADE CHANGE



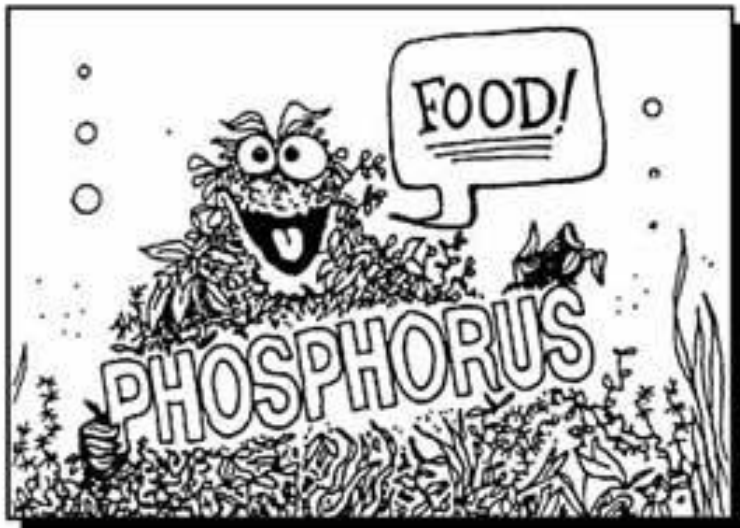
MACROINVERTEBRATE BIOTIC INDEX



East and West Branch Milwaukee River



Phosphorus



lakegeorgeassociation.org



<http://evidenceanderror.blogspot.com/>

Phosphorus Inputs



Crop Production, Livestock

Stormwater, Wastewater

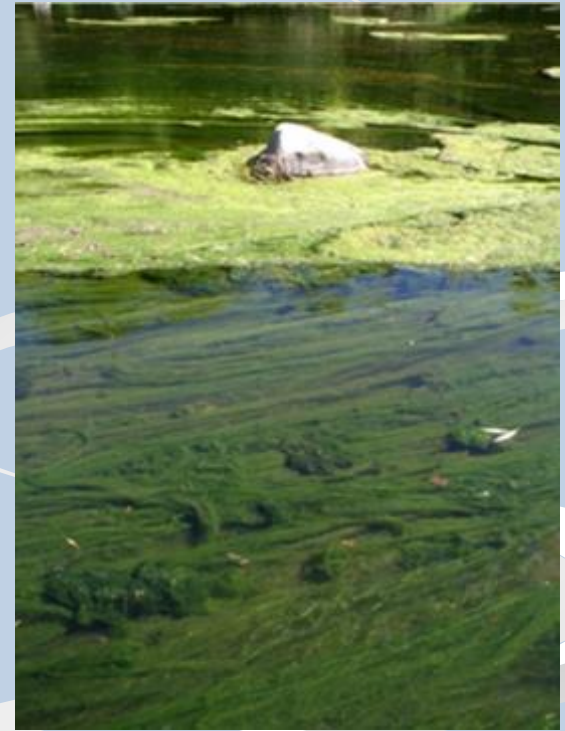


Photo credit - Will Wawrzyn

Phosphorus and Water Quality Standards

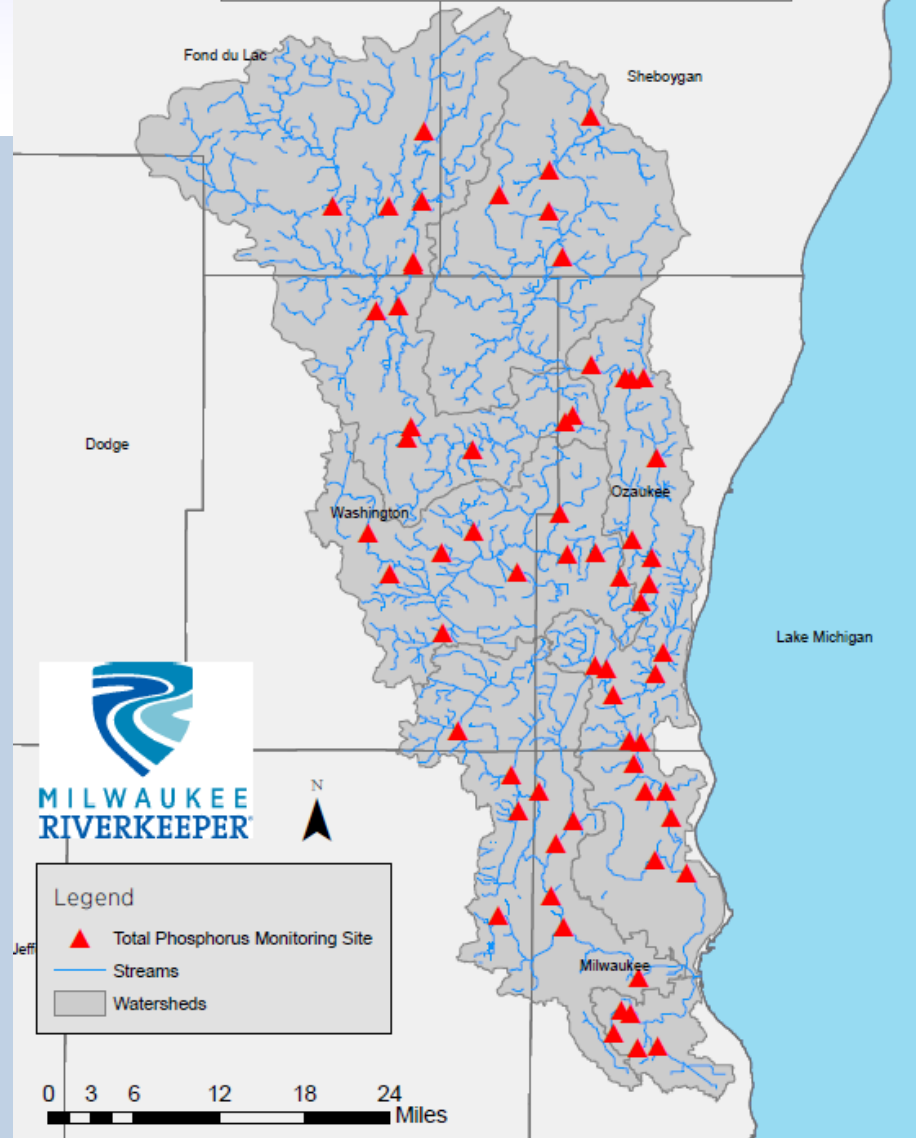


Large Rivers
TP < 0.1 mg/L



Small Rivers
TP < 0.075 mg/L

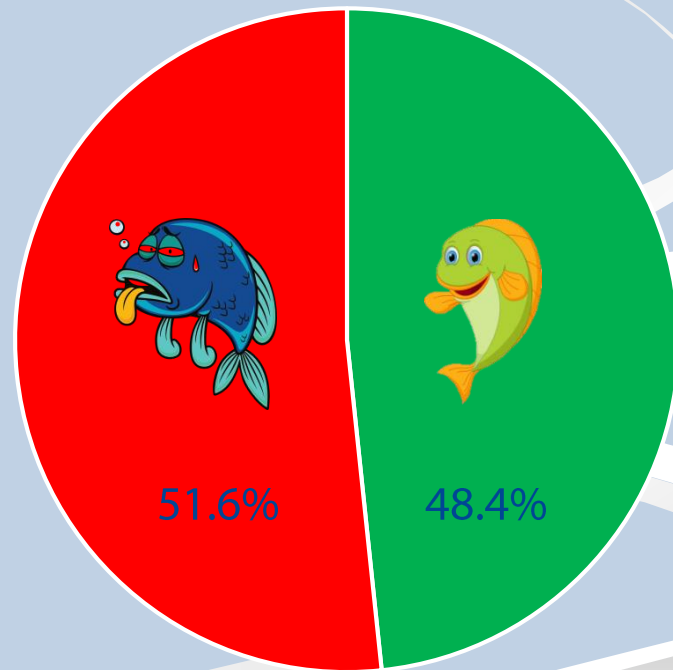
2019 Milwaukee Riverkeeper Phosphorus Monitoring Locations



Phosphorus in the Milwaukee River Basin

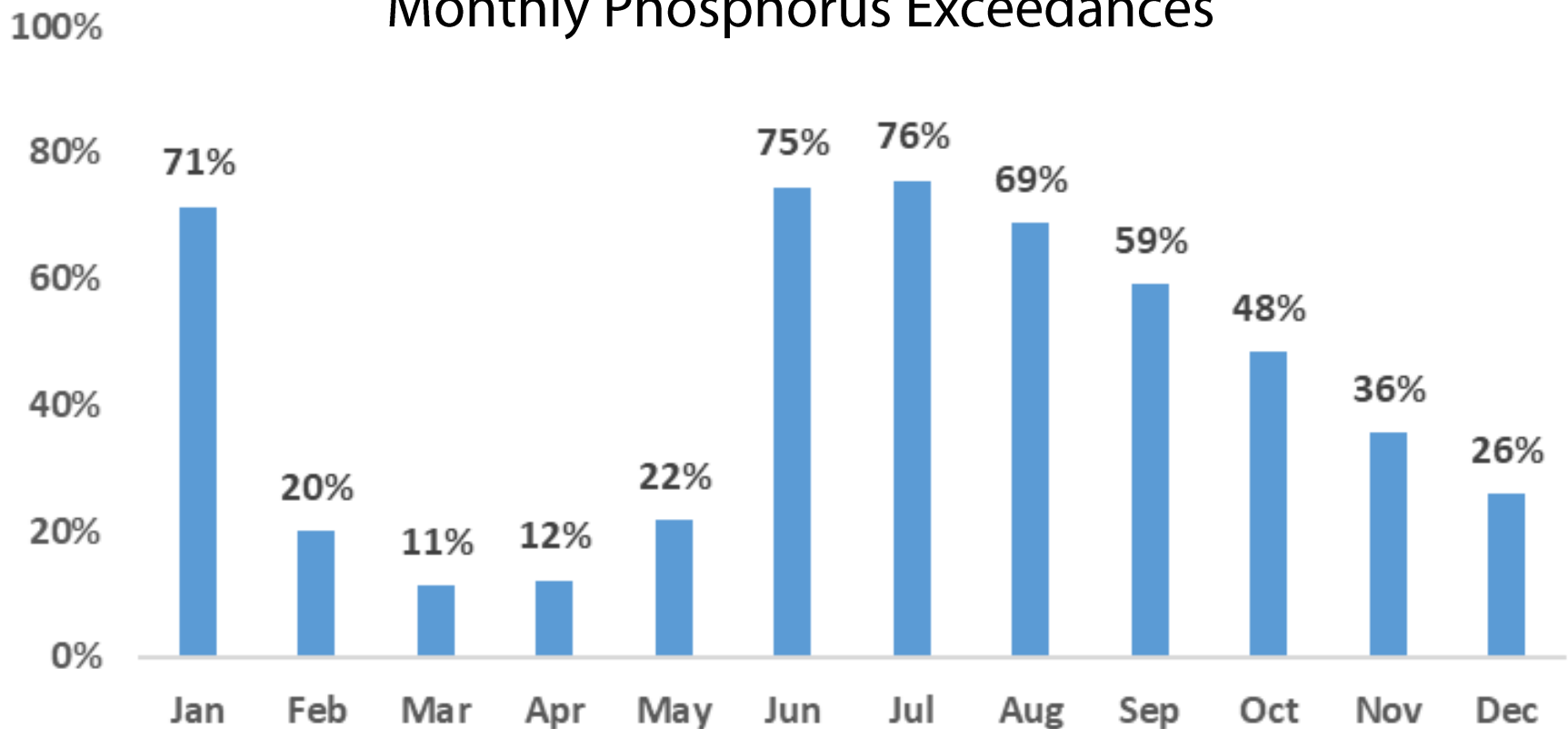
- In 2017, 1229 samples were taken.
- 51.6% exceeded water quality standards.
- 48.4% met water quality standards.

2017 Total Phosphorus Data Summary

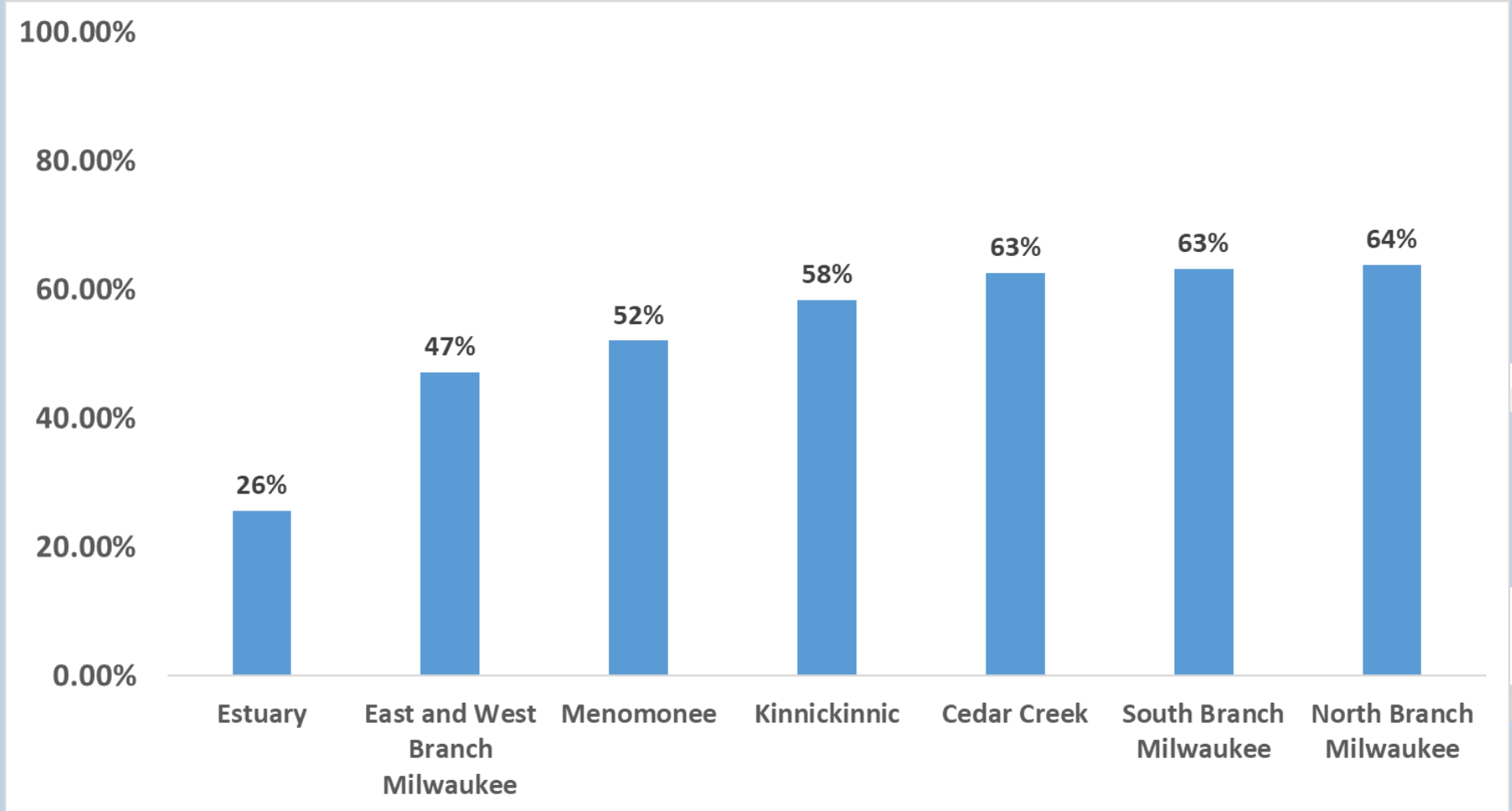


Seasonal Trends

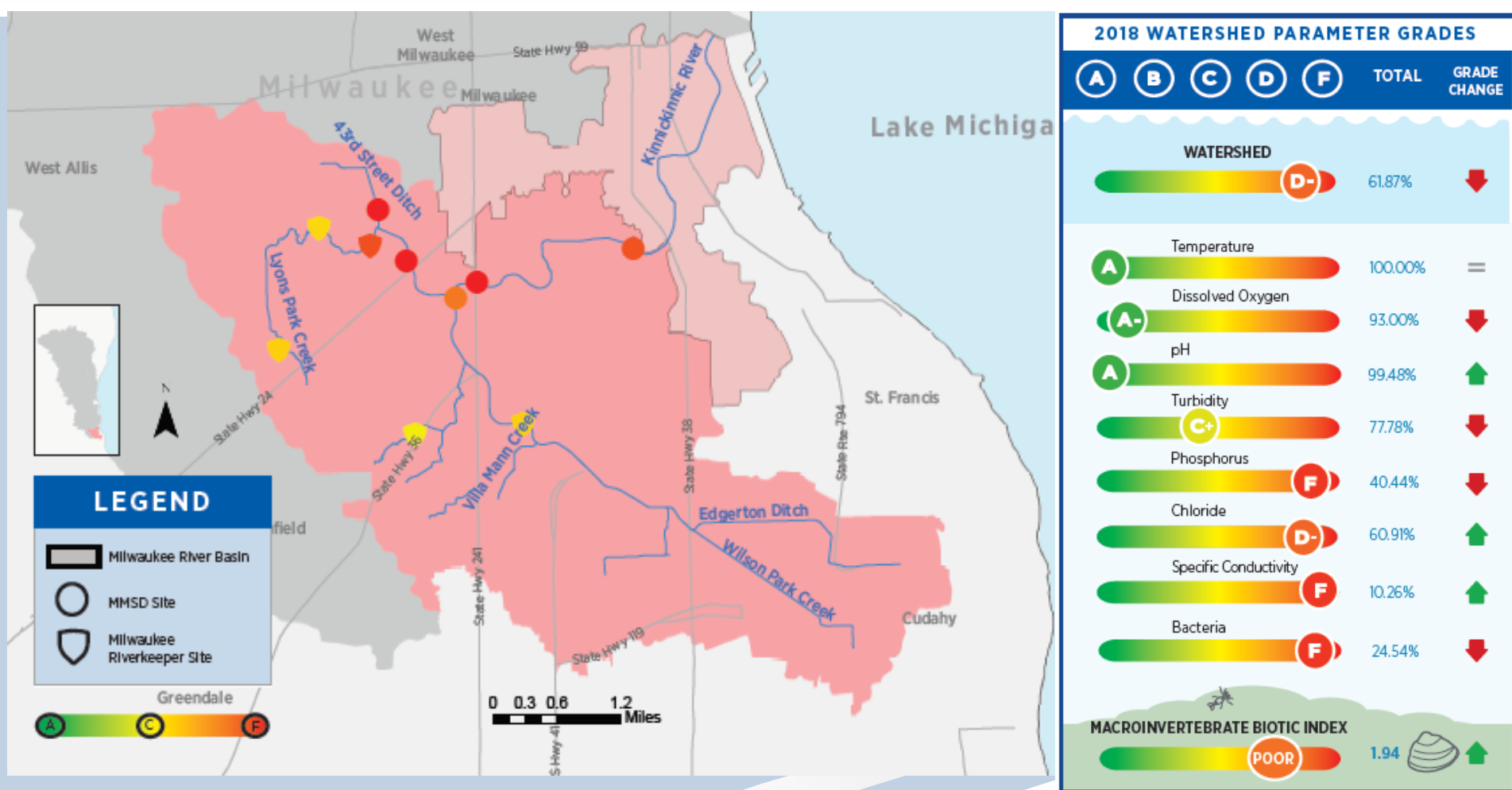
Monthly Phosphorus Exceedances



Spatial Variation-Percent Exceedance



Kinnickinnic River



Road Salt and Chloride

- The shift to road salt application began around the mid- 1950's, and has been studied since 1964 in southern Wisconsin.
- Chloride levels in surface water have been increasing rapidly. Recorded chloride levels in 2006-2010 were double that of data from 1990-1994.

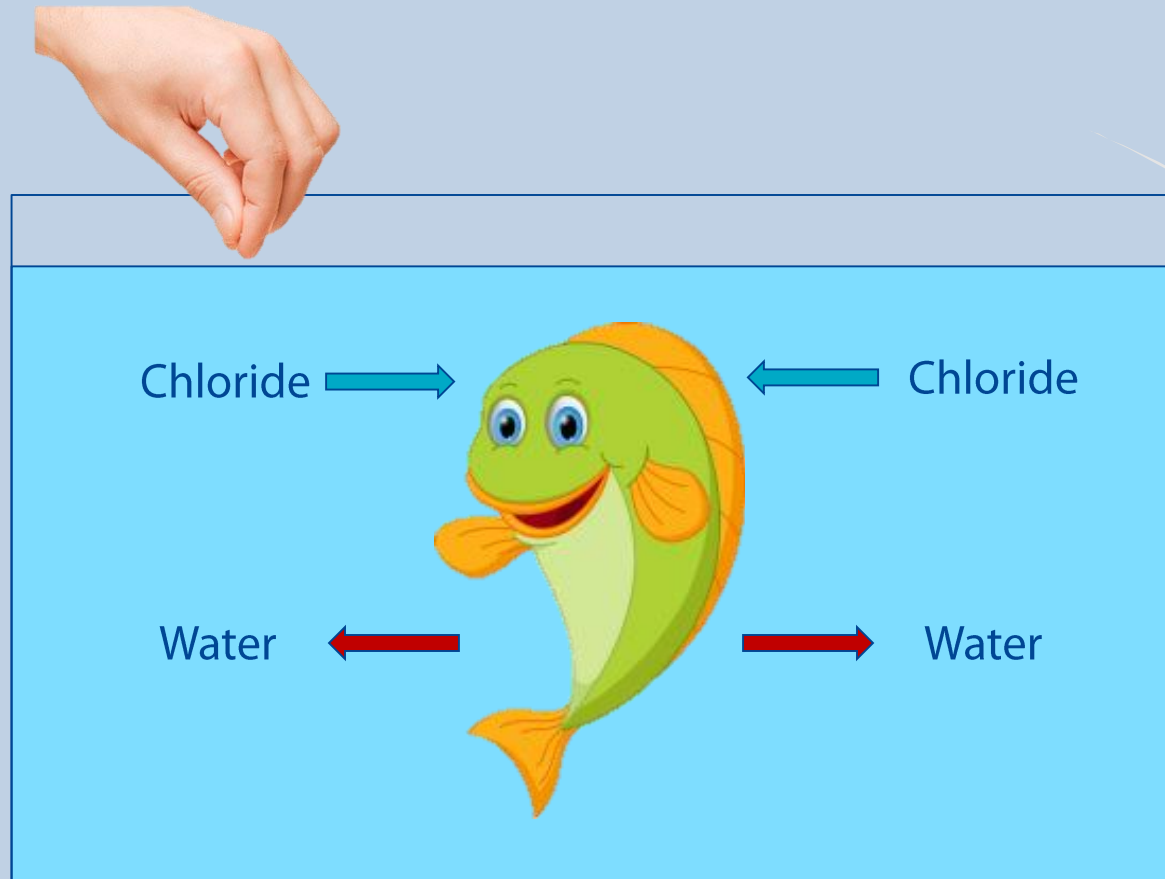


Runoff
→
Snow Melt

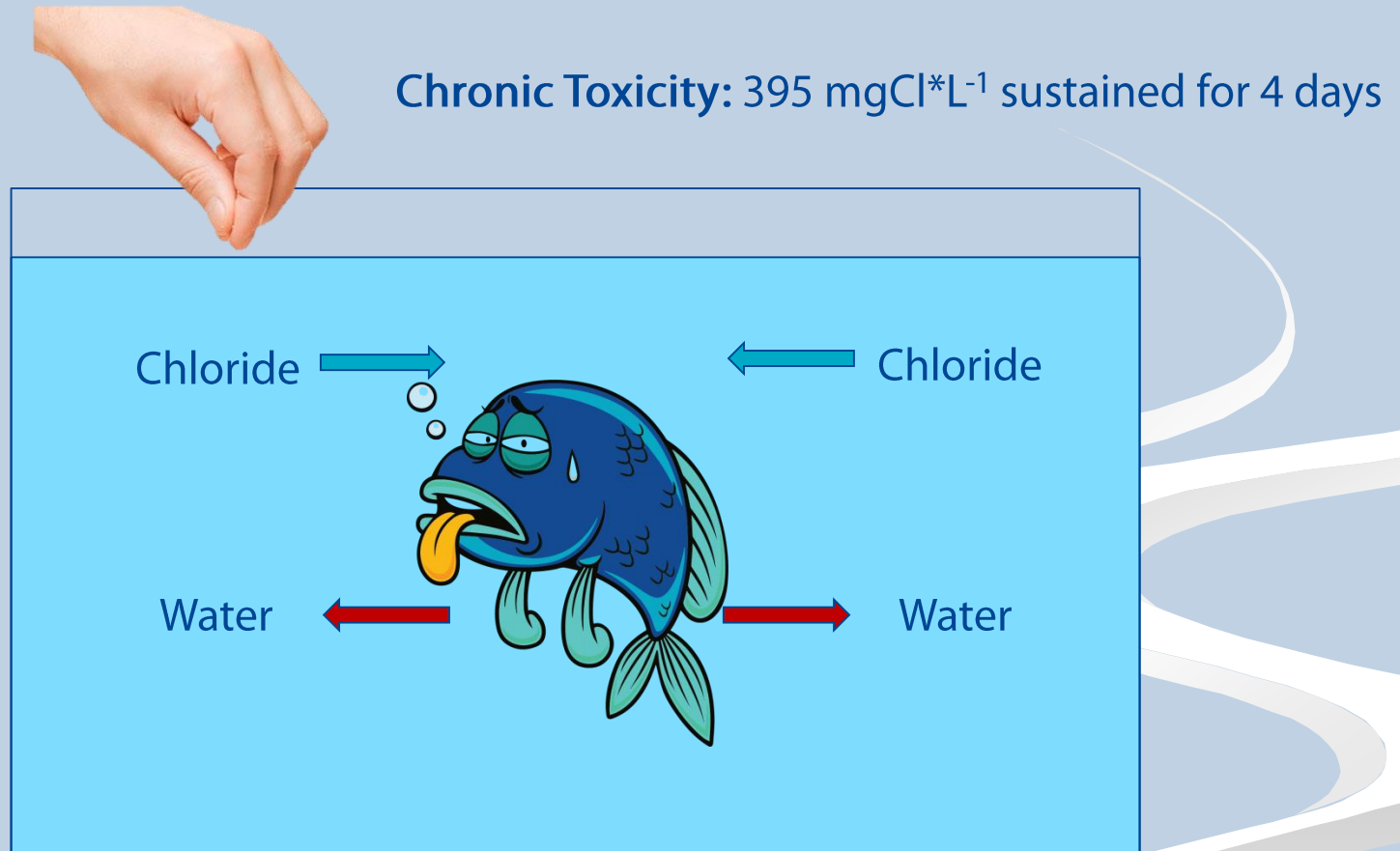


Photo Credit John December

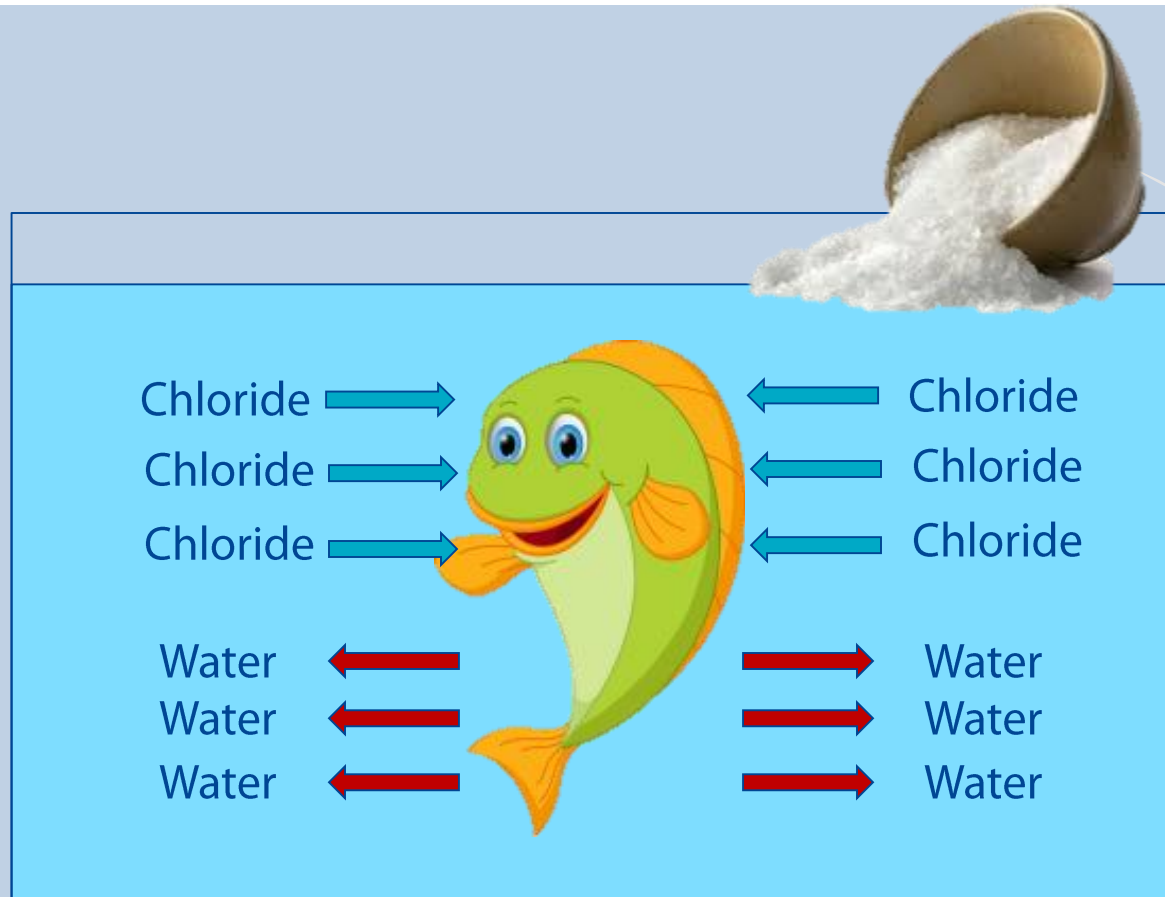
Chloride: Fish and Wildlife



Chloride: Fish and Wildlife

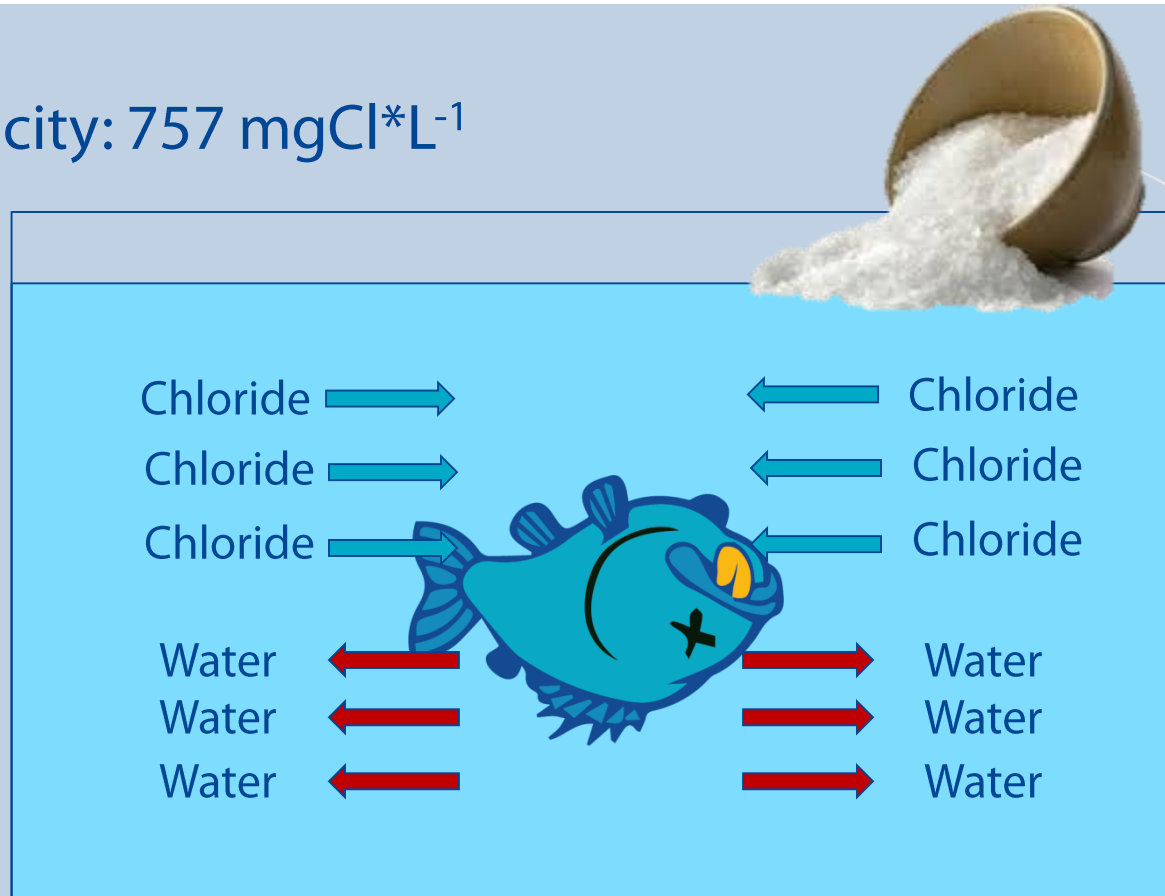


Chloride: Fish and Wildlife



Chloride: Fish and Wildlife

Acute Toxicity: $757 \text{ mgCl}^* \text{L}^{-1}$

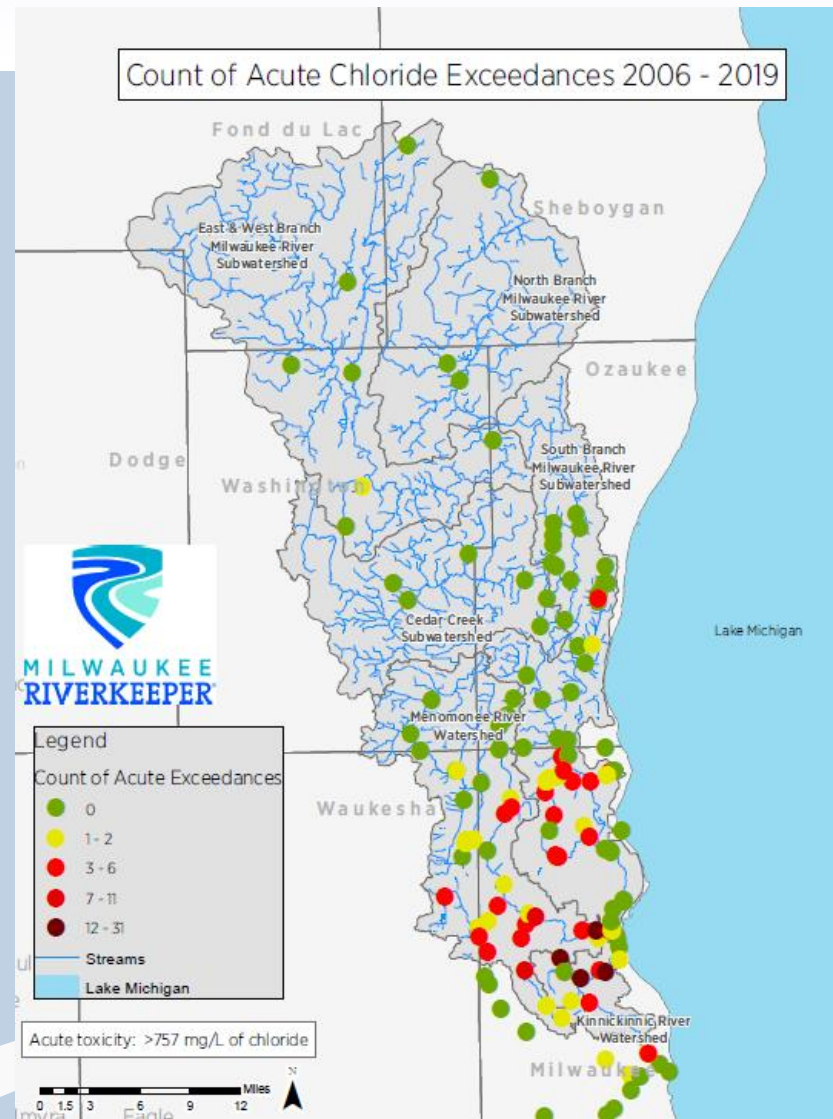


Road Salt and The Milwaukee River Basin?

- Are chloride concentrations reaching toxic levels within the Milwaukee River Basin?
- When and where are chloride concentrations the highest?

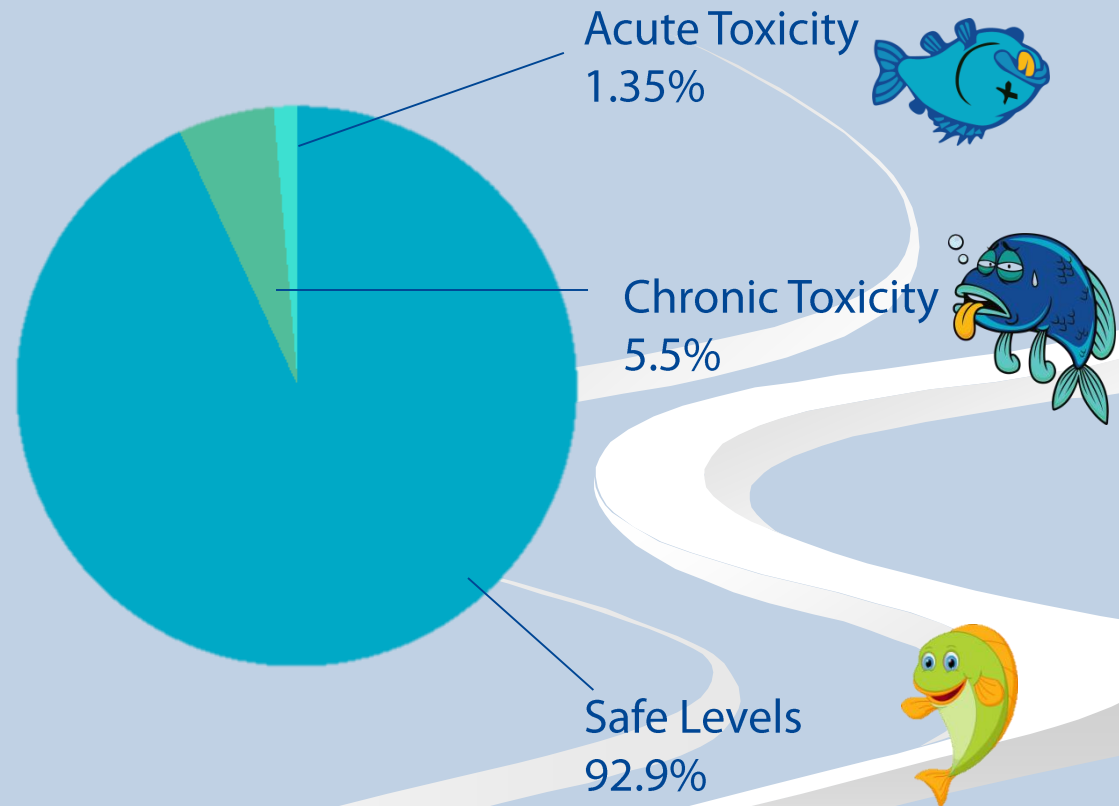


Chloride Data



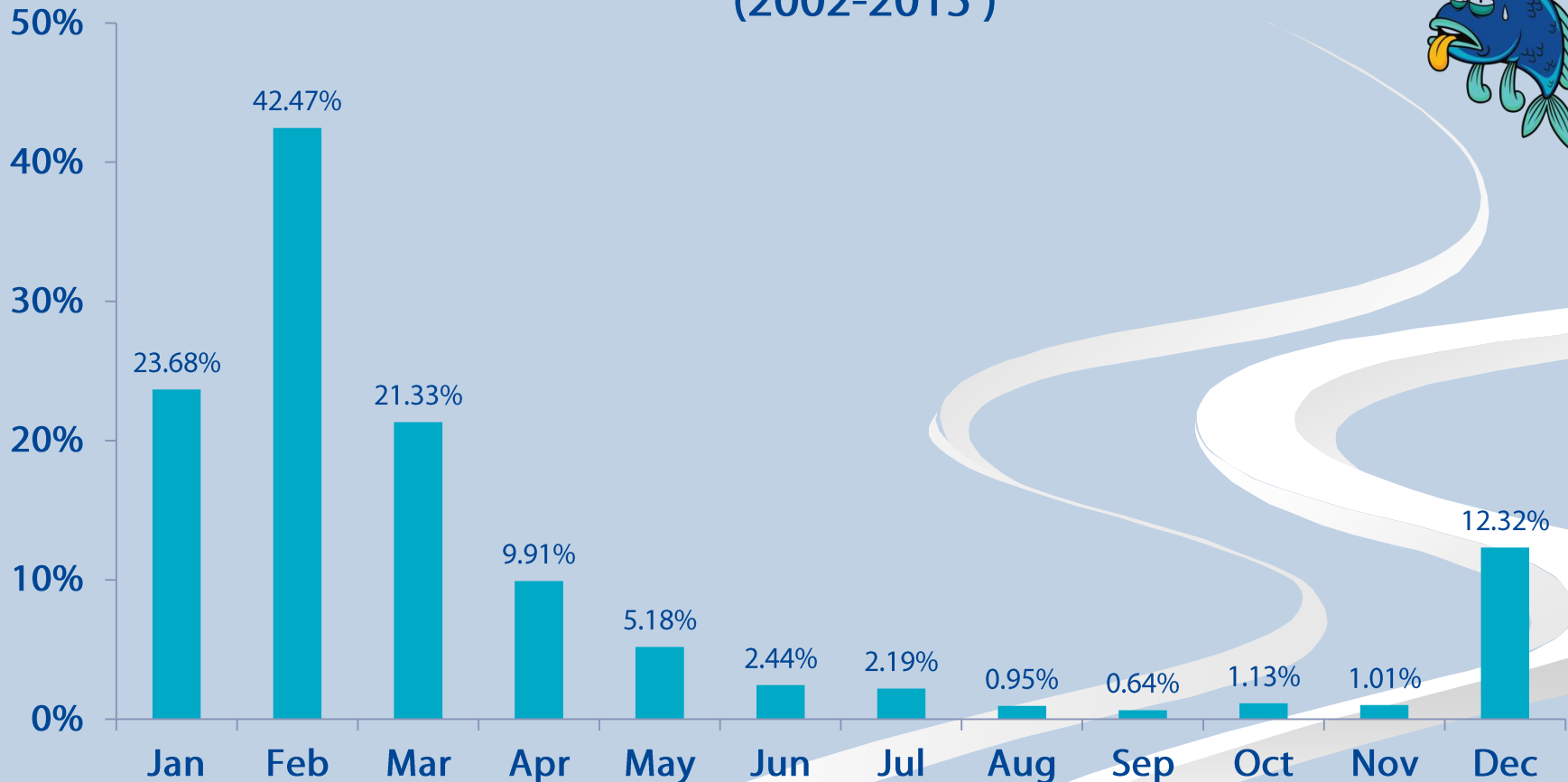
Milwaukee River Basin Chloride Levels (2002-2015)

Milwaukee
Riverkeeper and
Milwaukee
Metropolitan
Sewage District
(MMSD) Historic
Chloride Data



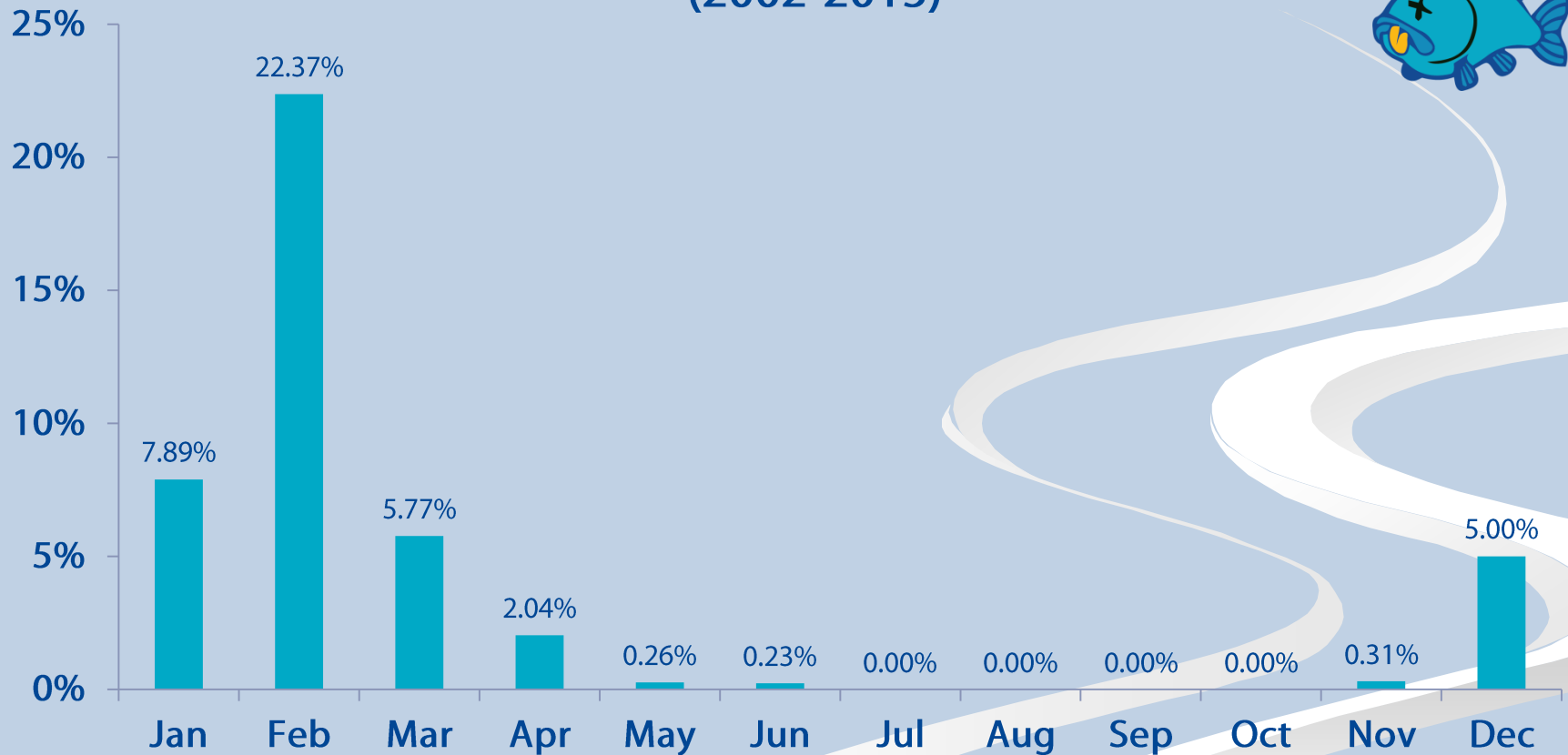
When are chloride levels the highest?

Percentage of Samples Exceeding Chronic Standards
(2002-2015)



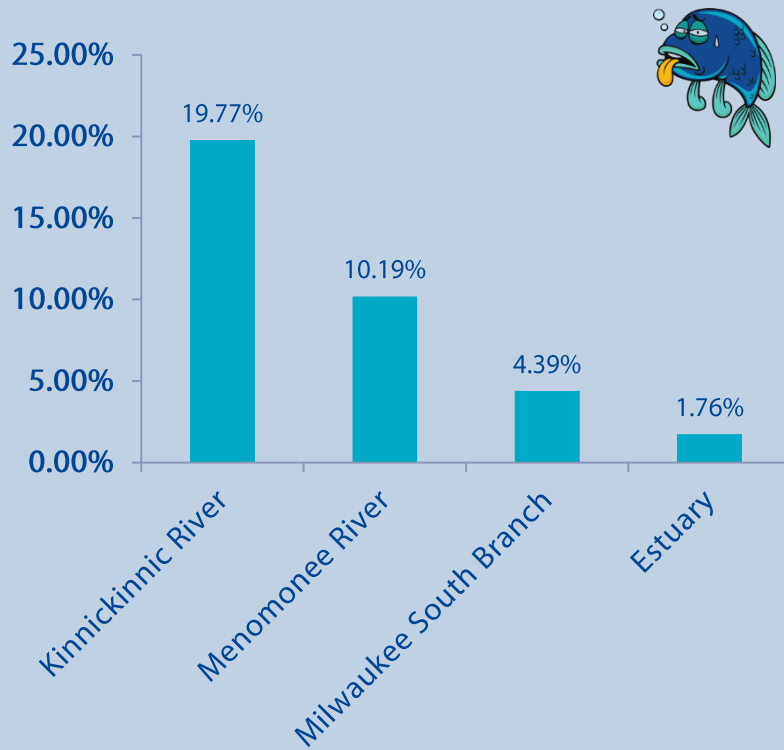
When are chloride levels the highest?

Percentage of Samples Exceeding Acute Standards
(2002-2015)

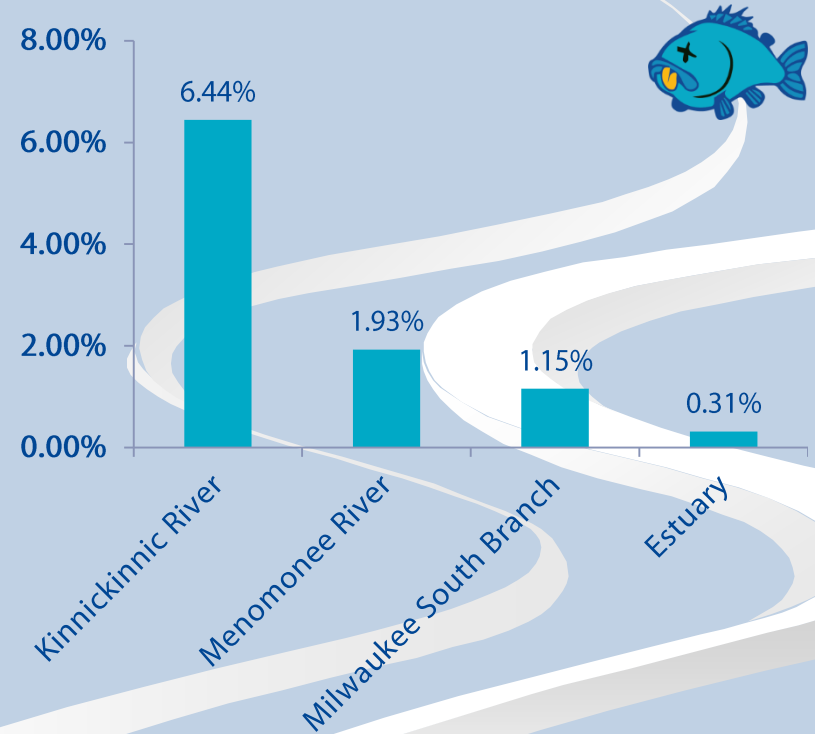


Where are Chloride Levels the Highest?

Percentage of Samples Exceeding Chronic Standards
(2002-2015)

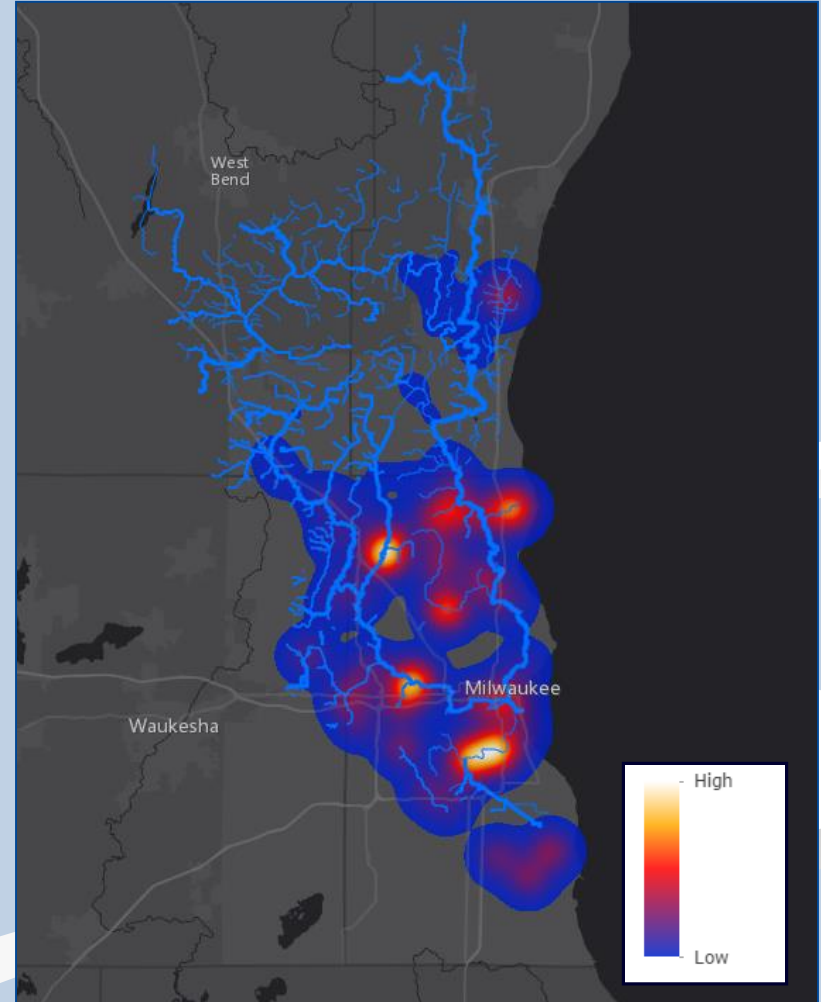


Percentage of Samples Exceeding Acute Standards
(2002-2015)



Where are Chloride Levels the Highest?

Max Observations Compared to Seawater



Data Summary

- Chloride levels are reaching toxic levels within the Milwaukee River Basin.
- Levels are highest during the winter.
- Kinnickinnic River has the highest levels.

What can we do?

Shovel early and often



Reduce Salt Usage



Sweep excess salt



Road Salt Best Practices Training

- Open to Private Applicators
- Date: August 2020
- Location TBD
- Certified 30 private contractors/companies and several municipalities and counties in 2017/2018
- Certified 62 contractors in 2019
- Dr.Strifling/MN/VT work on liability shields

FORTIN
CONSULTING, INC.
serving the environment



Stormwater Monitoring-MN

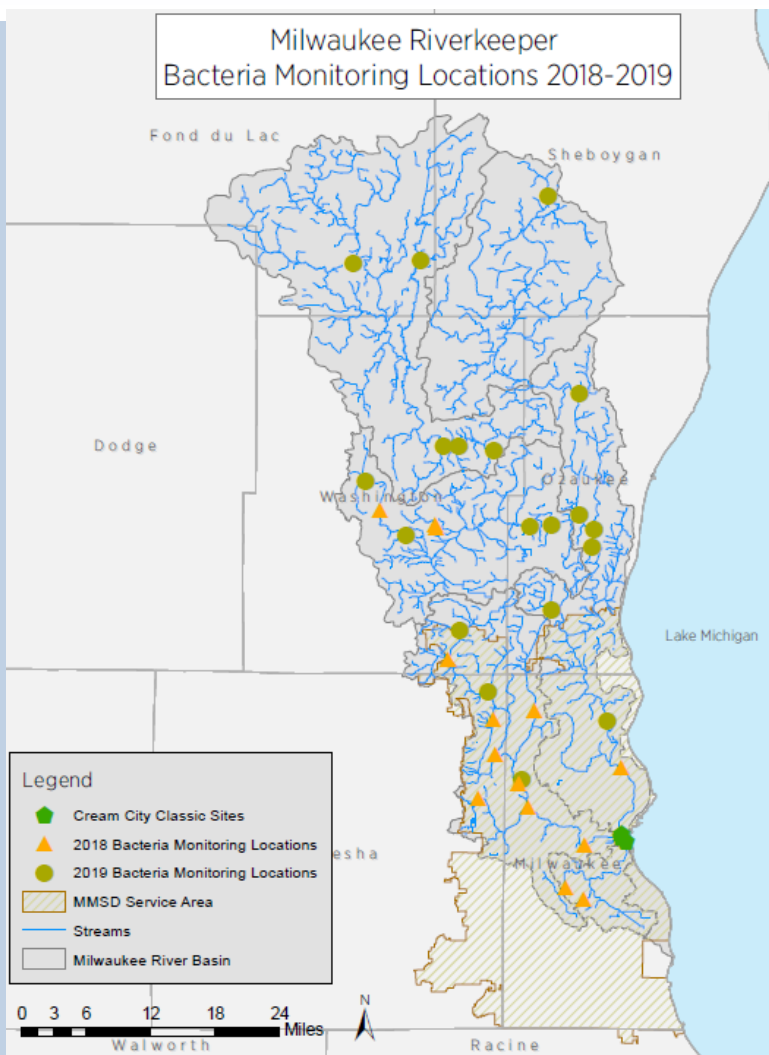


Must Increase Find and Fix Efforts

- Sewer dye & smoke testing
- Pipe televising
- New IDDE testing protocols for human discharge
- Sewage sniffing dogs!
- Need innovative ways to fund infrastructure improvements

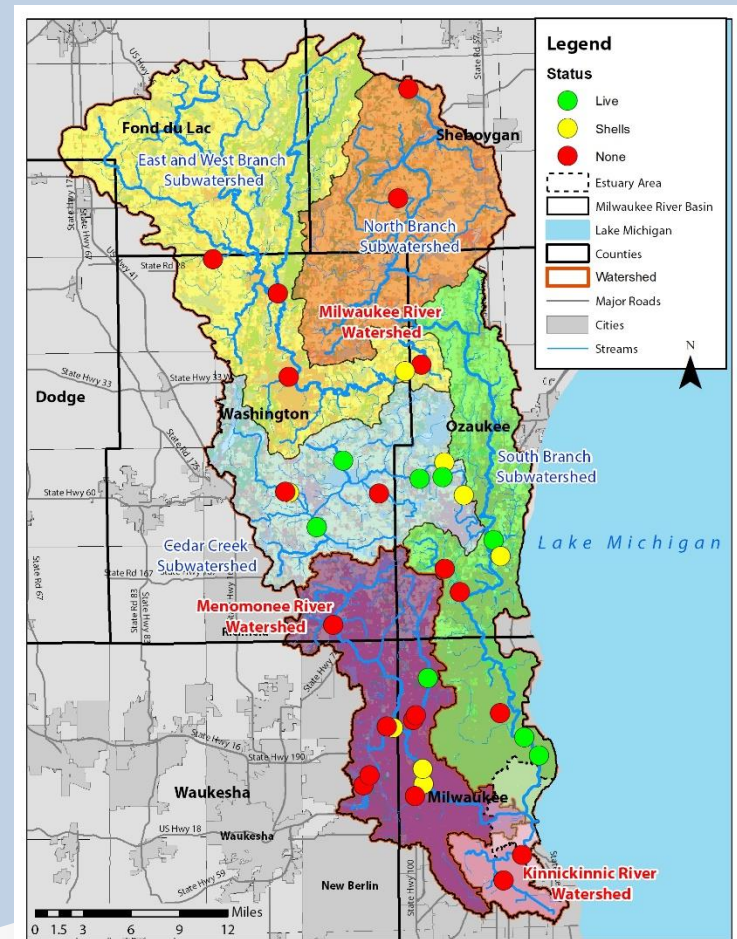


Bacteria Data

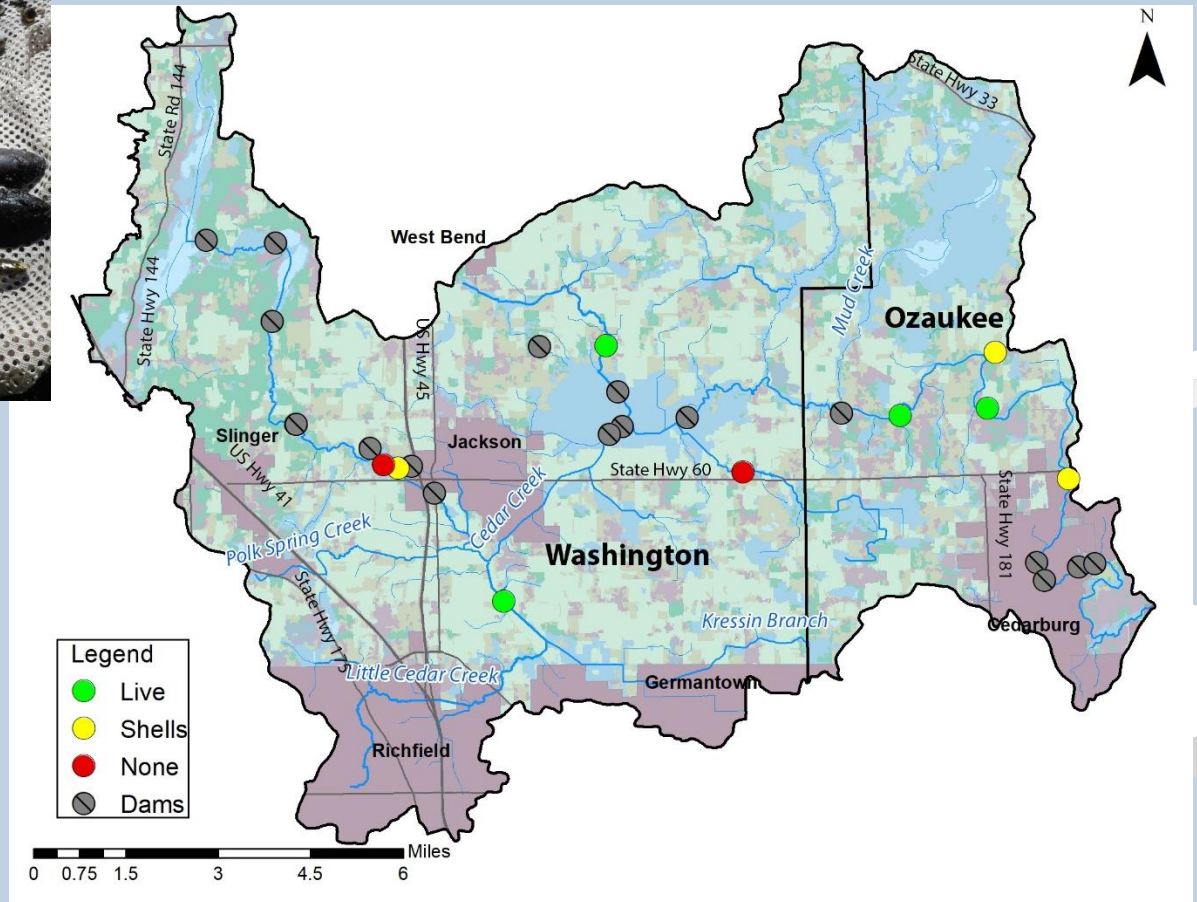


Mussel Survey Results 2017

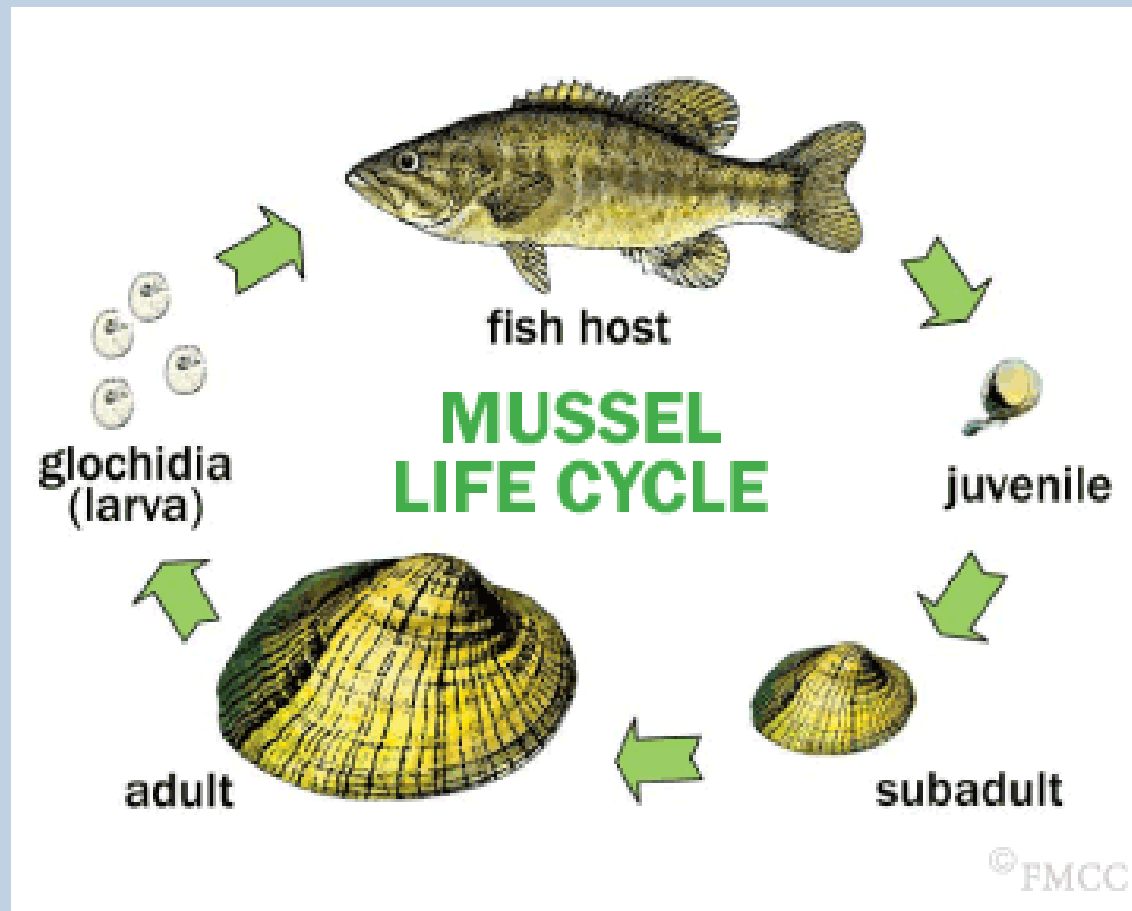
- 37 Sites searched.
- Surveys conducted basin wide.
- Results
 - Live - 24.3%
 - Shells – 21.6%
 - None – 54.1%



Cedar Creek Surveys



Mussel Life Cycle



Common Mussels Observed

White Heelsplitters



Wabash Pigtoes



Fluted Shell



Less Common Mussels

Elipse



Elktoe



Slippershell



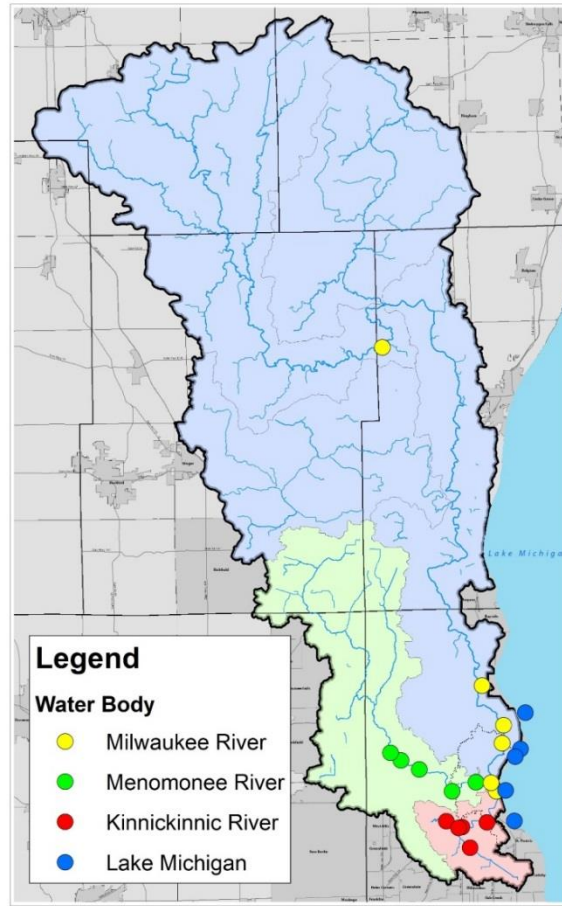
Emerging Contaminant Sample Sites

3 Rivers

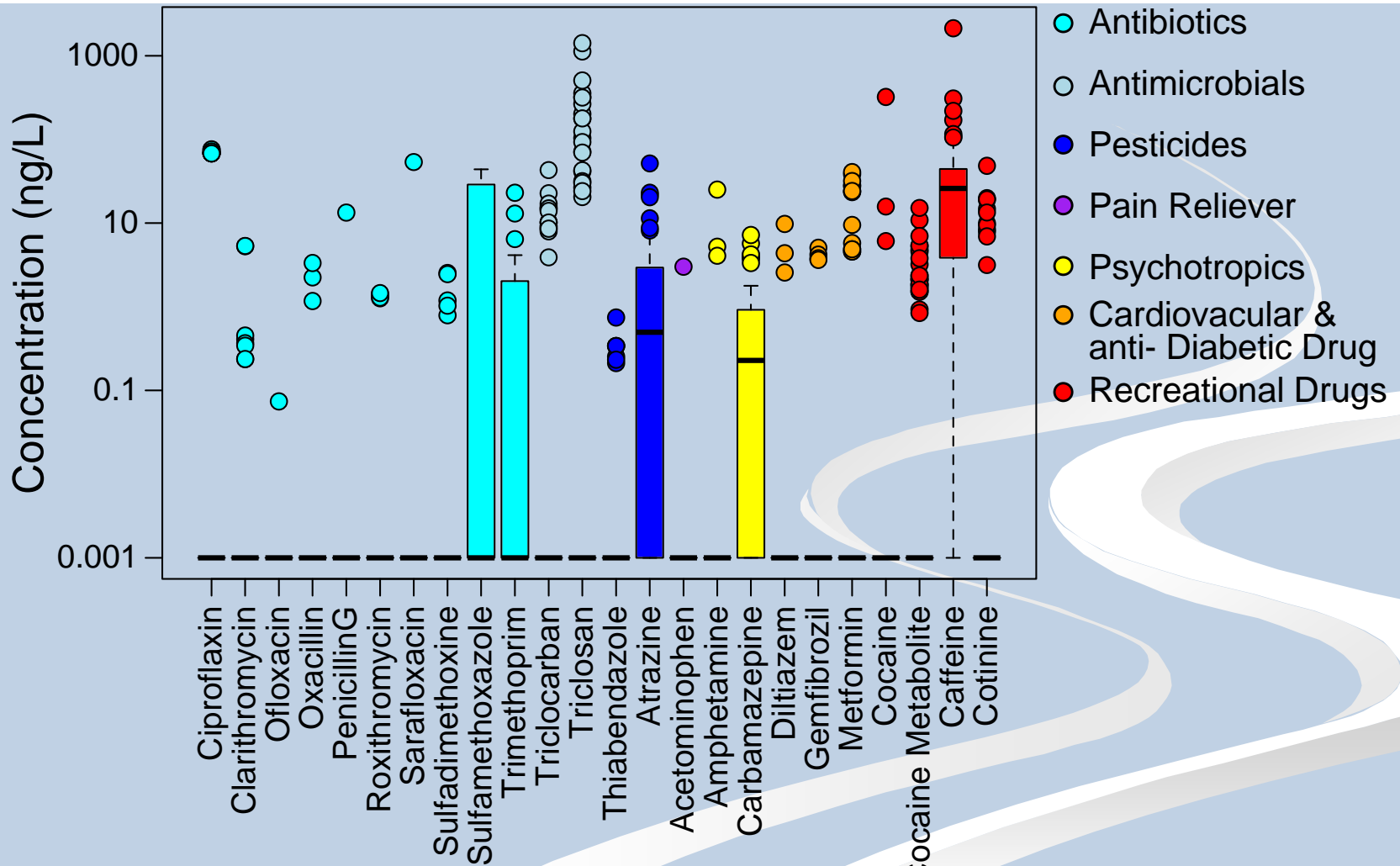
- Milwaukee (5 sites)
- Menomonee (6 sites)
- Kinnickinnic (5 sites)

16 River Sampling Sites

4 Harbor & Lake Michigan Sites

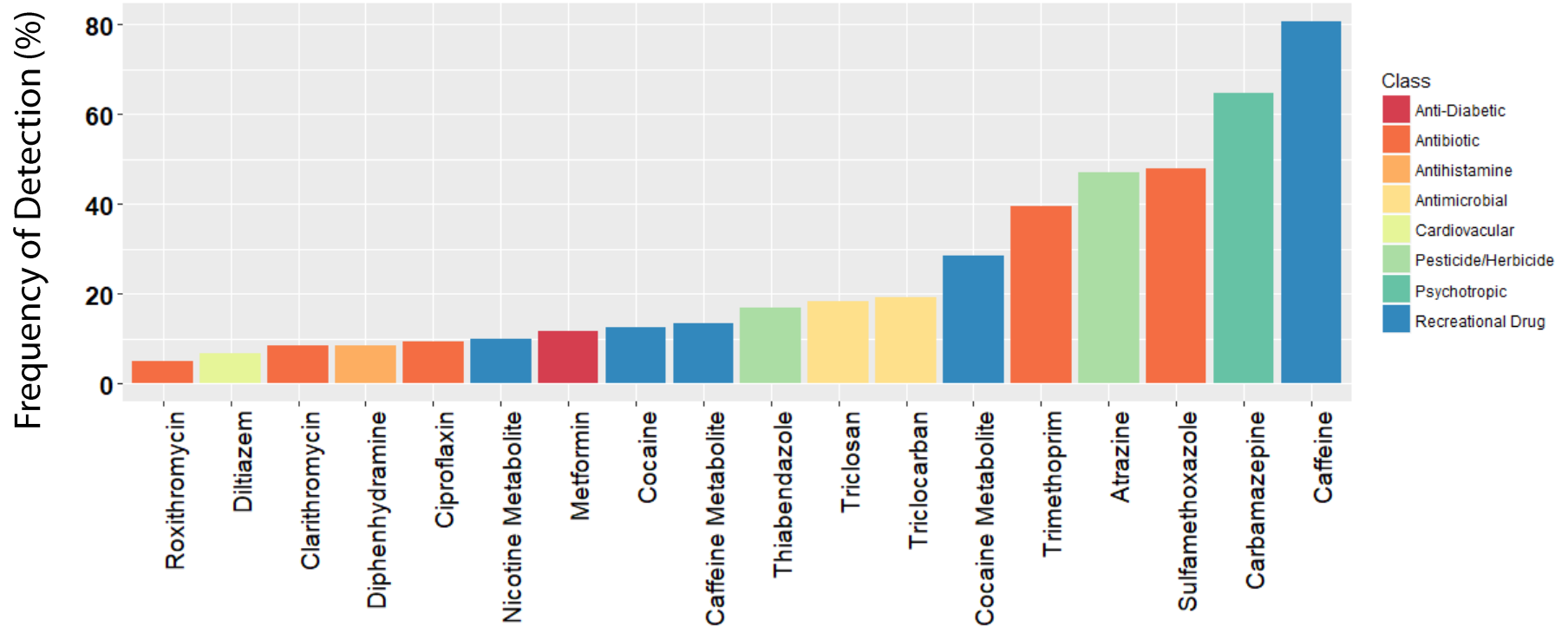


Anthropogenic Waste Indicators in the Milwaukee Estuary



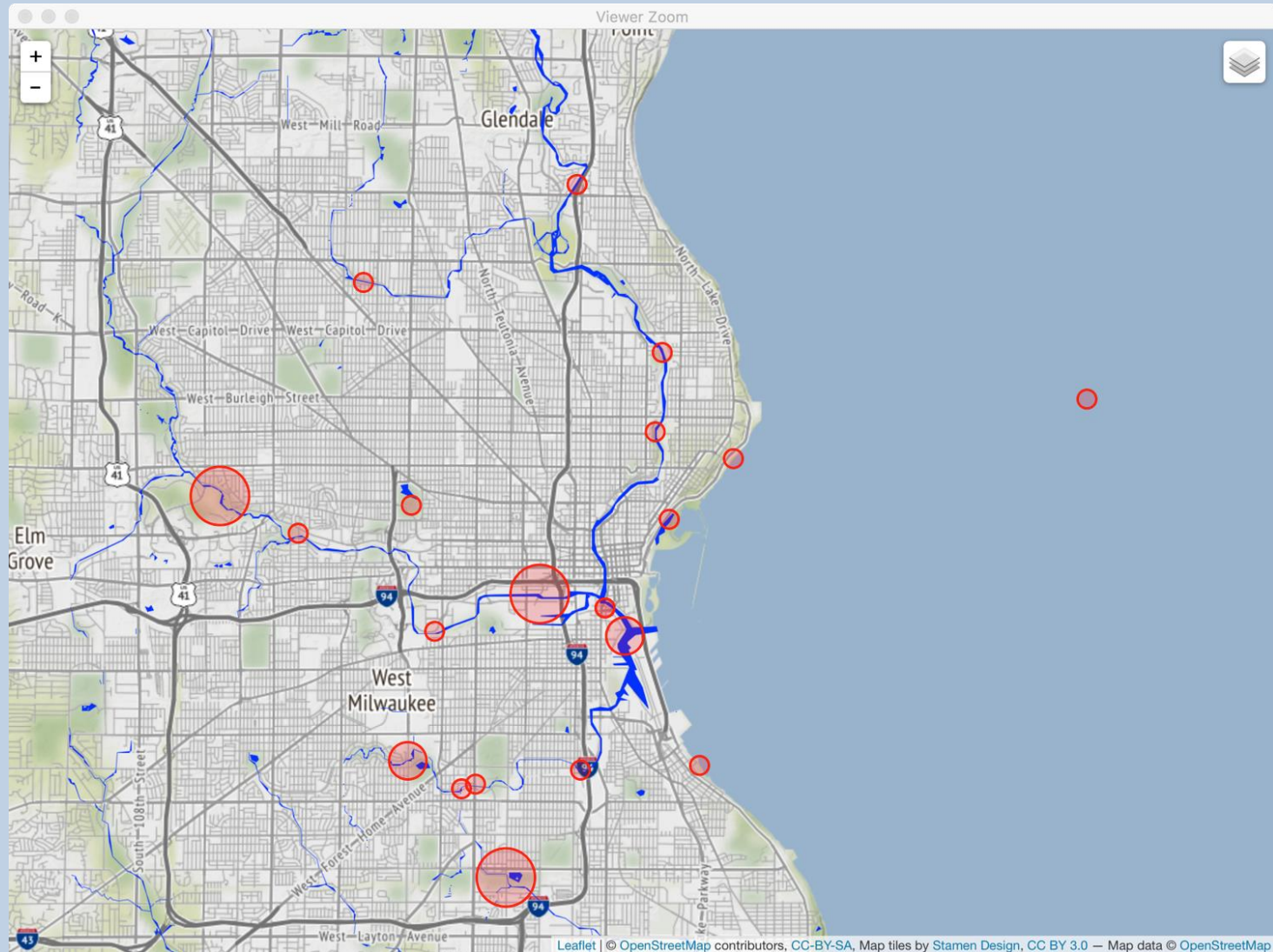
Emerging Contaminant Results

Most Commonly Observed Compounds



Atrazine

(Common Herbicide)



Effects of Pesticides on Wildlife

- Can cause cancer, endocrine disruption, reproductive effects, neurotoxicity, kidney and liver damage, birth defects, and other developmental changes
- Can cause behavioral changes
- hormone-mimicking pesticides classified as endocrine disruptors can cause deformities and reproductive issues in fish, amphibians, and molluscs



