Upper Mississippi River Water Quality Status and Trends

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Photo Credit: Ashley Posten, North Iowa Times

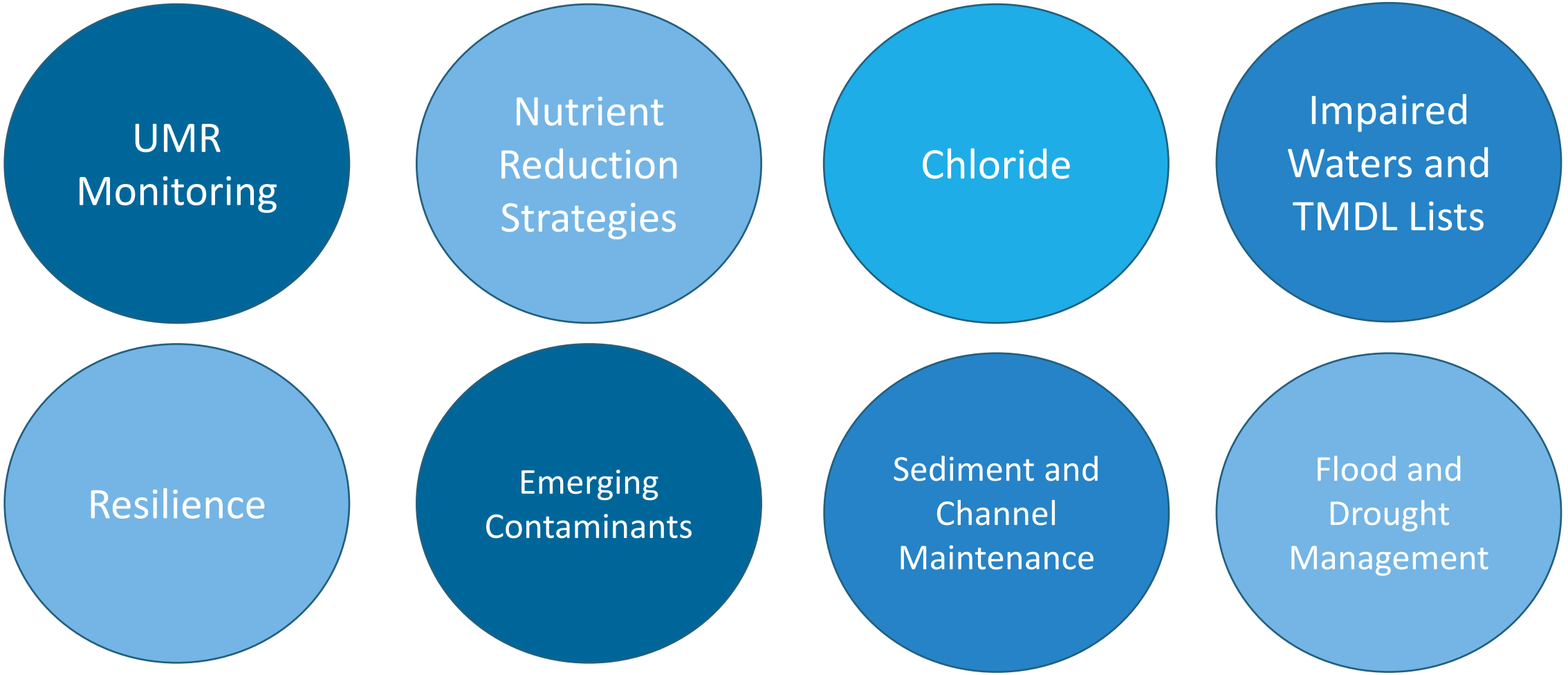
Upper Mississippi River Basin Association (UMRBA)

Governor-appointed interstate organization and joint interstate water quality entity

Facilitate cooperative action

- Cooperative planning, coordinated management
- Information exchange
- Regional positions
- Advocacy on states' behalf

Select UMRBA Focus Areas



State of the Science

Photo Credit: USFWS Midwest Region Flickr

State of the Science

- Water quality is complex on the Upper Mississippi River because of its many uses and types of habitat (main and side channels, backwater areas).

Photo Credit: USFWS Midwest Region Flickr

State of the Science

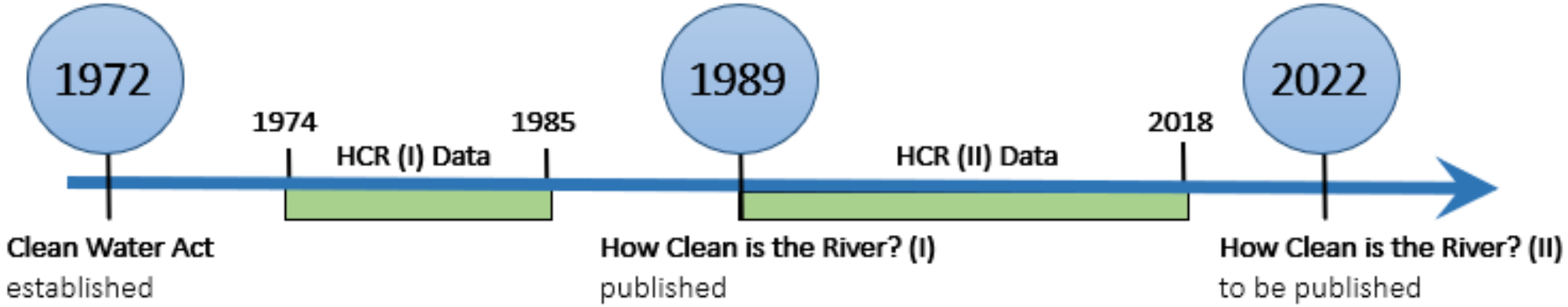
- The Clean Water Act has been successful at reducing phosphorus, metals, and sediment.

Photo Credit: USFWS Midwest Region Flickr

How Clean is the River? (2022)

40 years later….

- **Focus has changed**
  (Then: toxic pollutants and sediments | Now: nutrients and chloride)
- **Flow-adjusted trend analysis for the 1990s through 2018**

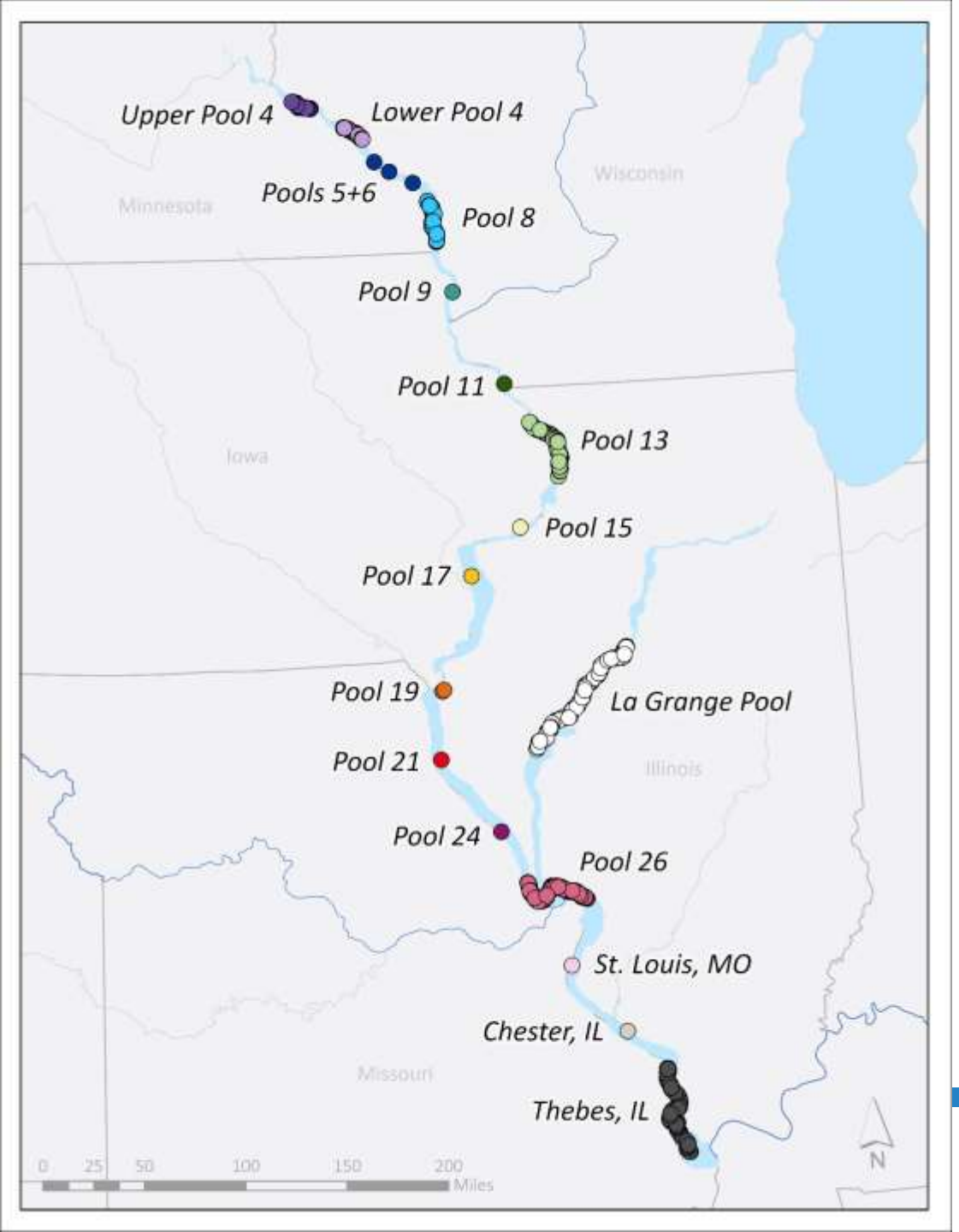


Data Sources

- Water quality data provided by:

- Flow records retrieved from:

US Army Corps of Engineers®
(for site at L&D 9)



Trending Sites

- 16 sites on the UMR
- 1 site on the Illinois River
- 9 USGS flow gages
- 1 USACE gage at L&D 9

Water Quality Parameters

Nutrients

- Total Phosphorus
- Total Nitrogen
- Ammonia
- Inorganic Nitrogen
- Chlorophyll-a

Biological

- Fecal coliform

Metals

- Arsenic
- Cadmium
- Copper
- Lead
- Zinc
- Mercury
- Aluminum

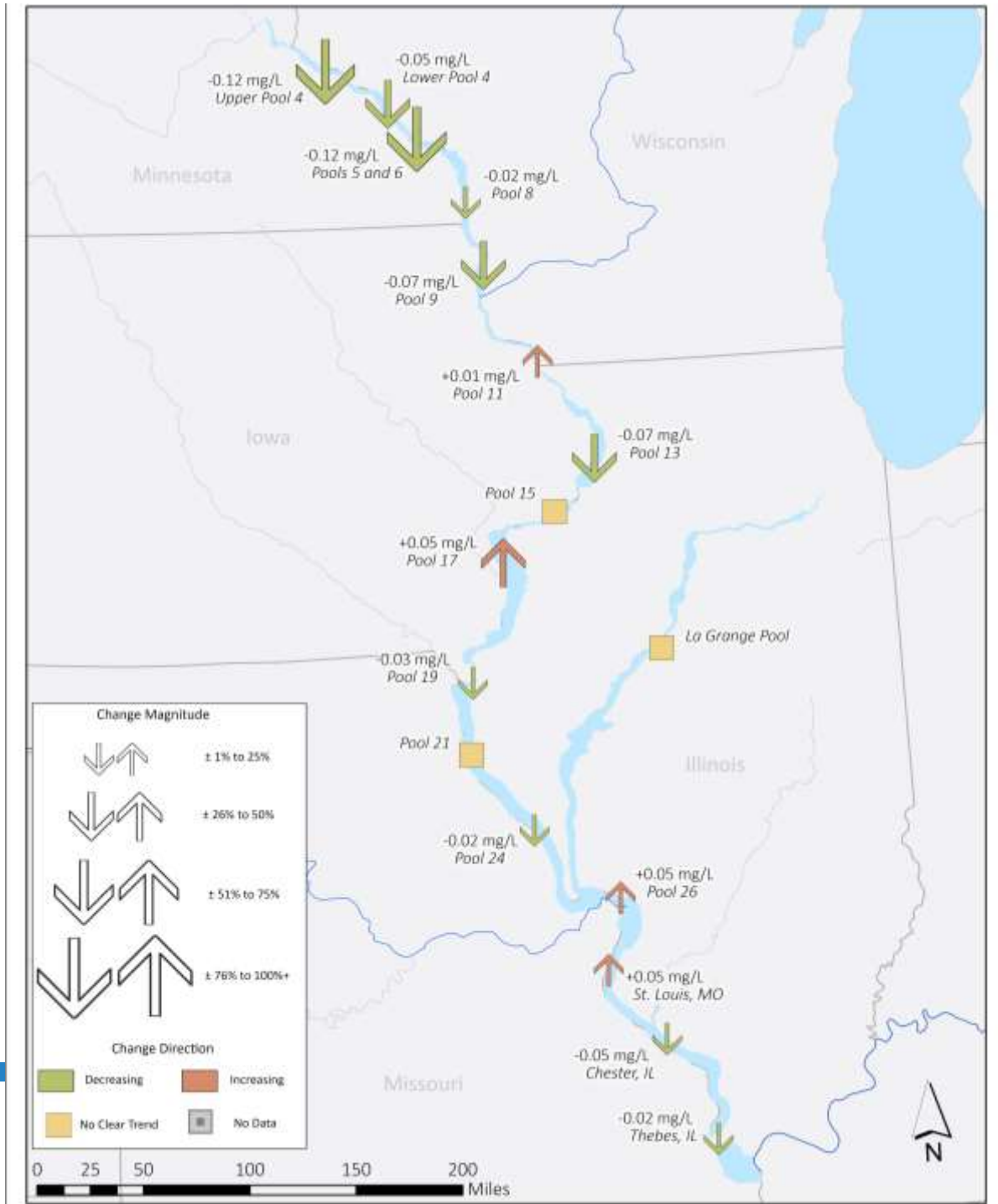
Physical

- Conductivity
- Dissolved Oxygen
- pH
- Total Suspended Solids

Sulfate & Chloride

Total Phosphorus

- Decreasing above Pool 13
- No Trend below Pool 13 and in the La Grange Pool, Illinois River



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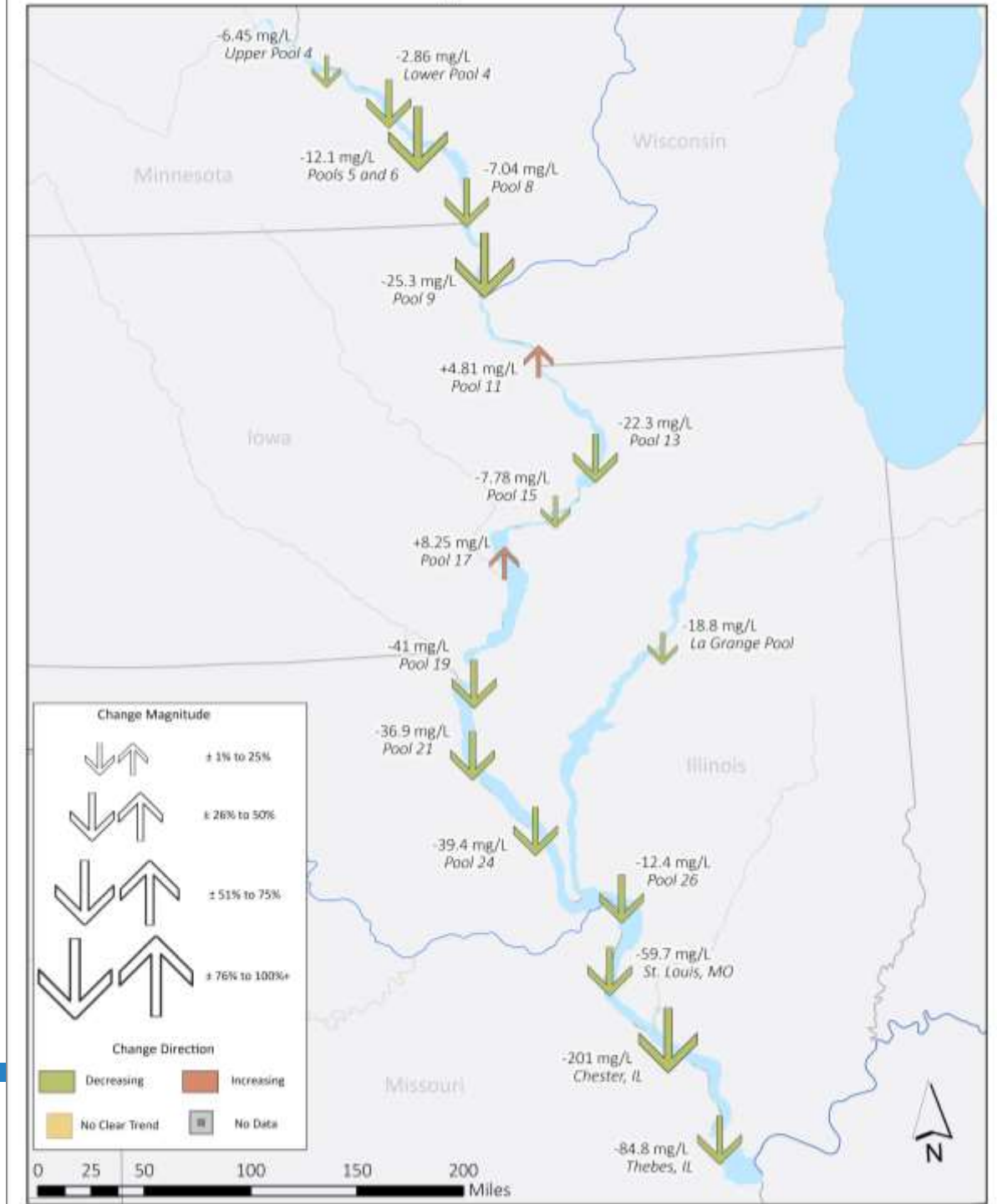
Total Suspended Solids

[Green arrow, decreasing trend]



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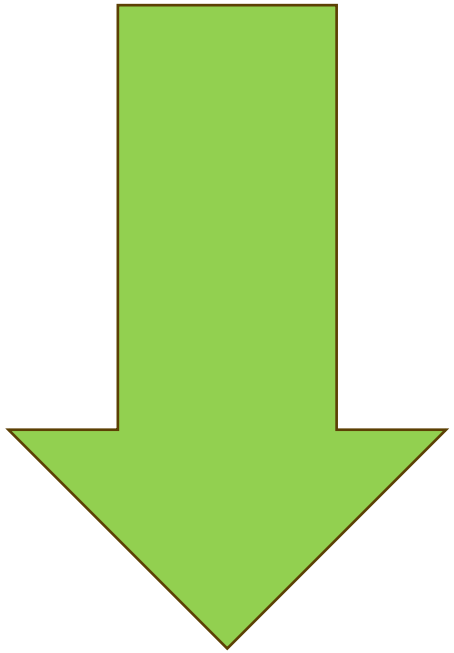
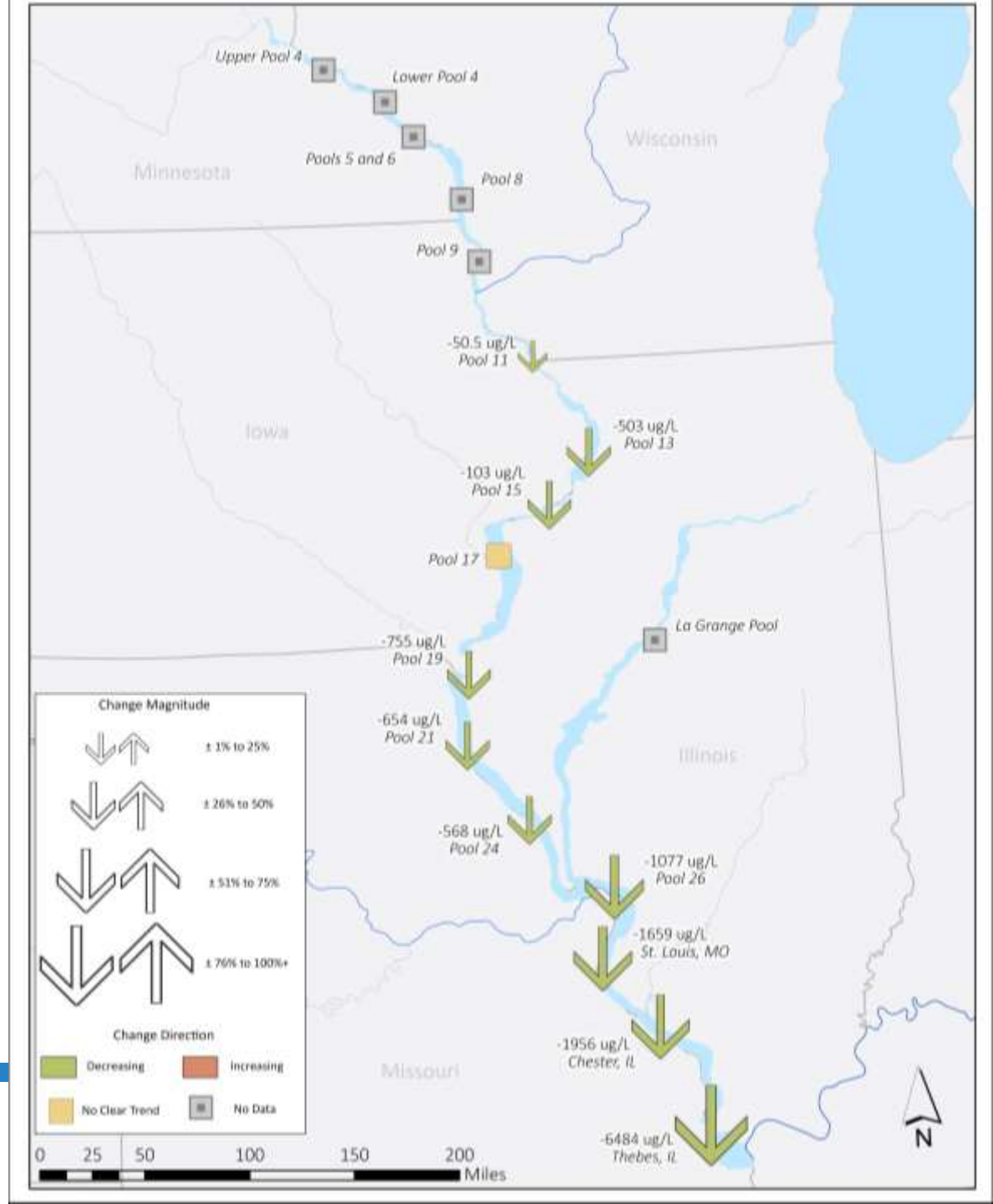
Aluminum

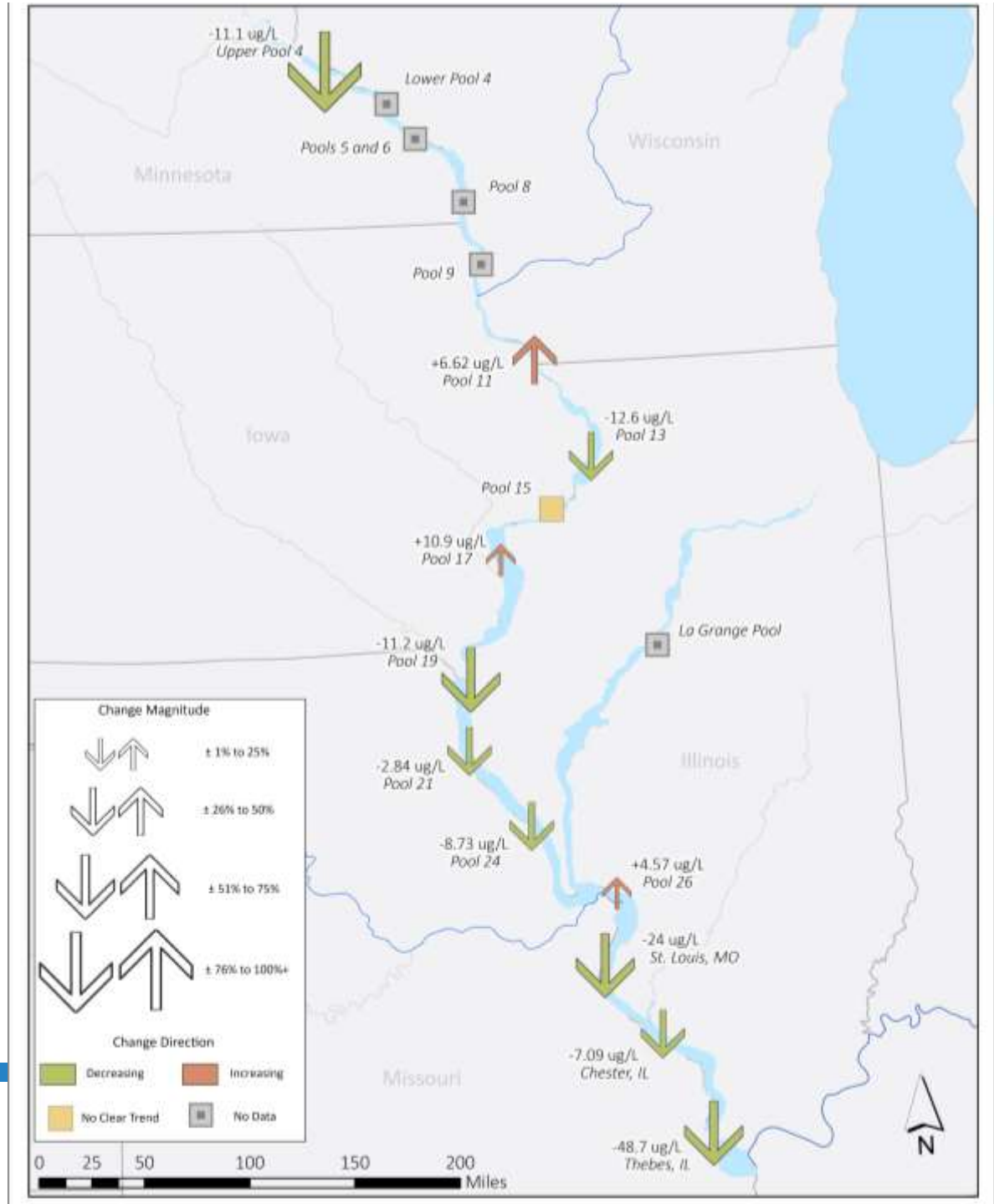


[Green arrow, decreasing trend]



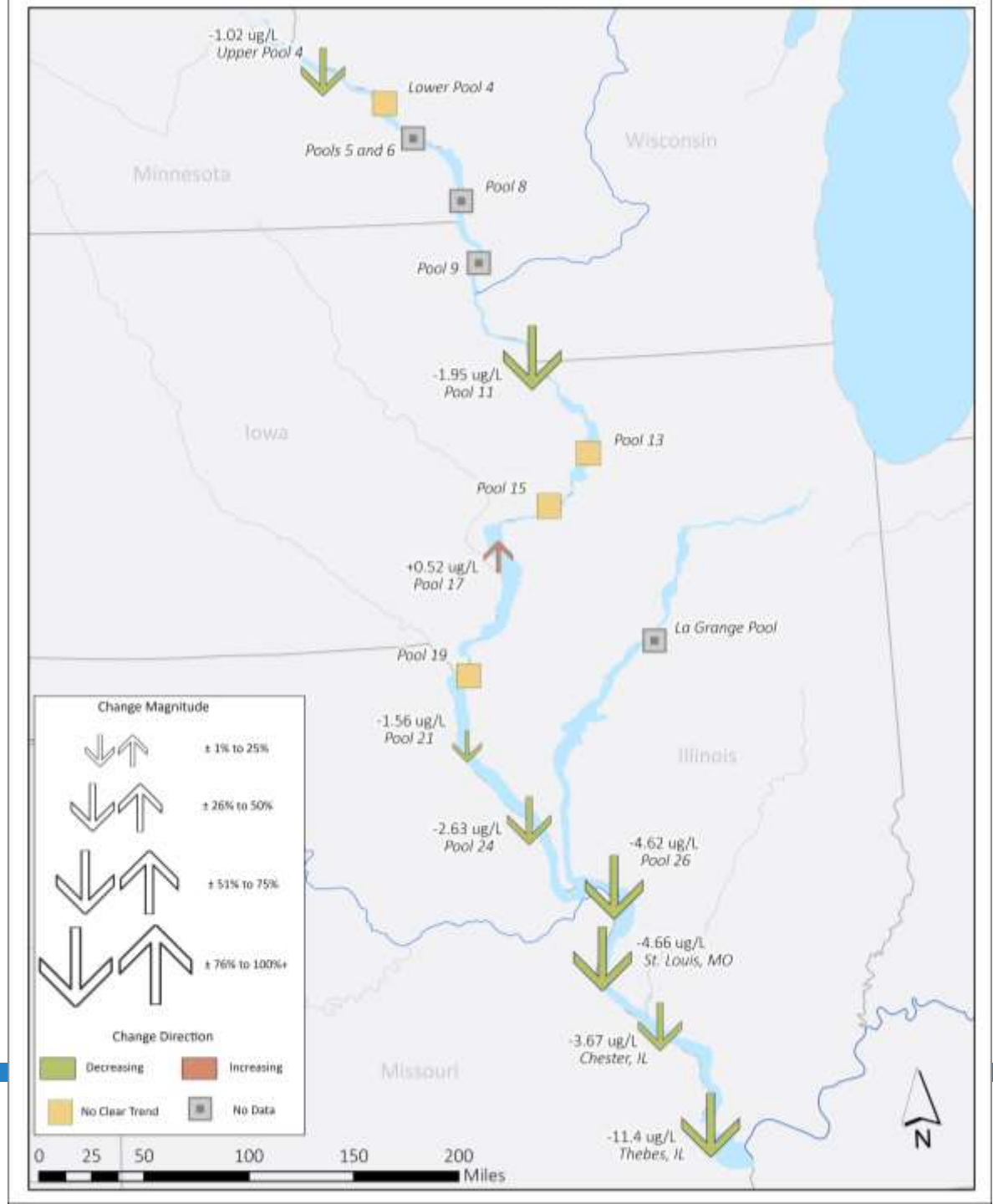
Zinc

[Green arrow, decreasing trend]



Copper

[Green arrow, decreasing trend]



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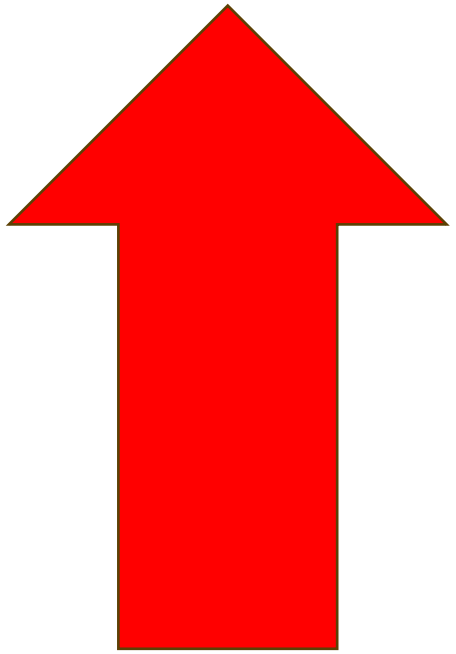
State of the Science

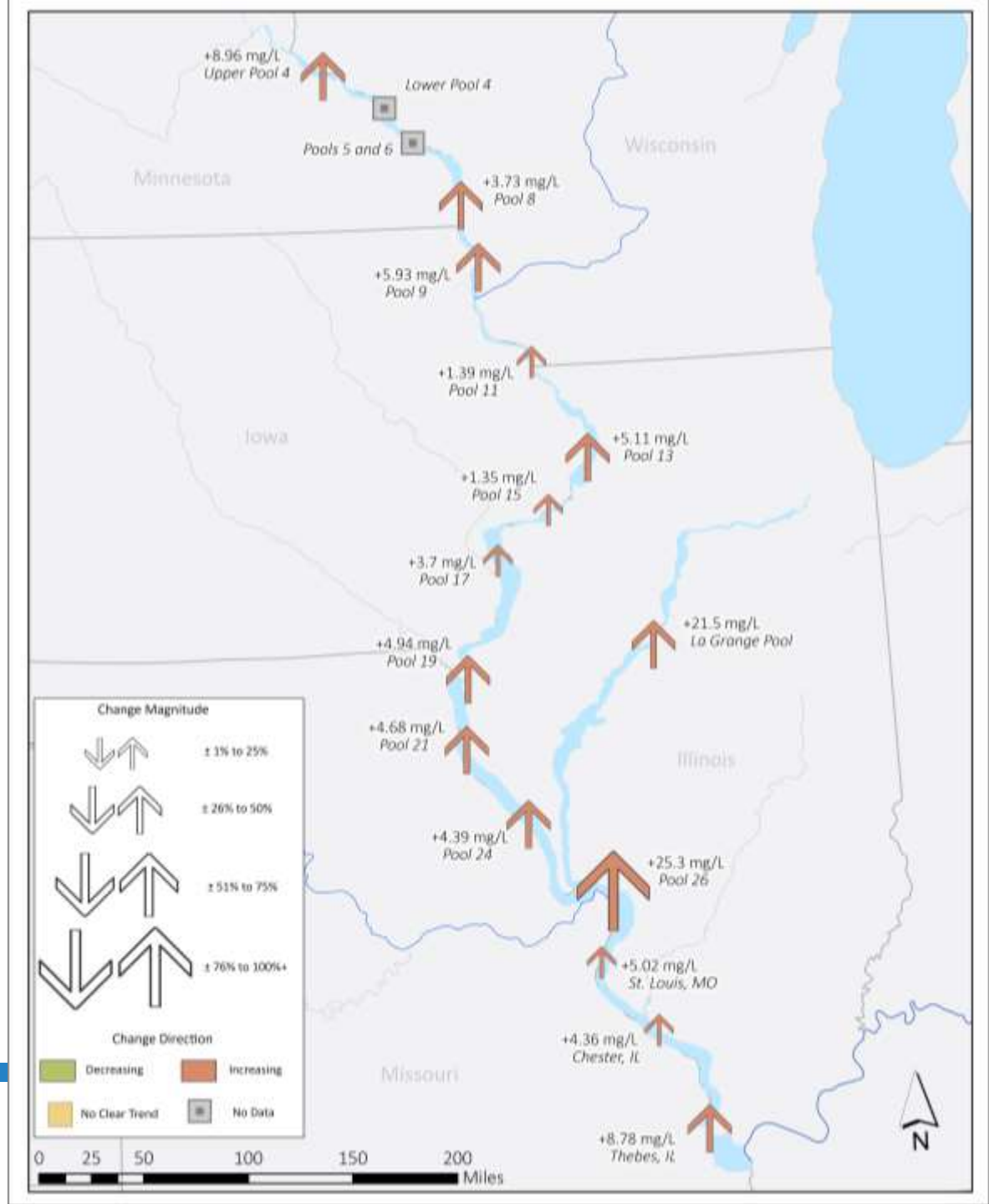
- Nonpoint source pollution, including chloride, nitrogen, and emerging contaminants remains a challenge.

Photo Credit: USFWS Midwest Region Flickr

Chloride



[Red arrow, increasing trend]



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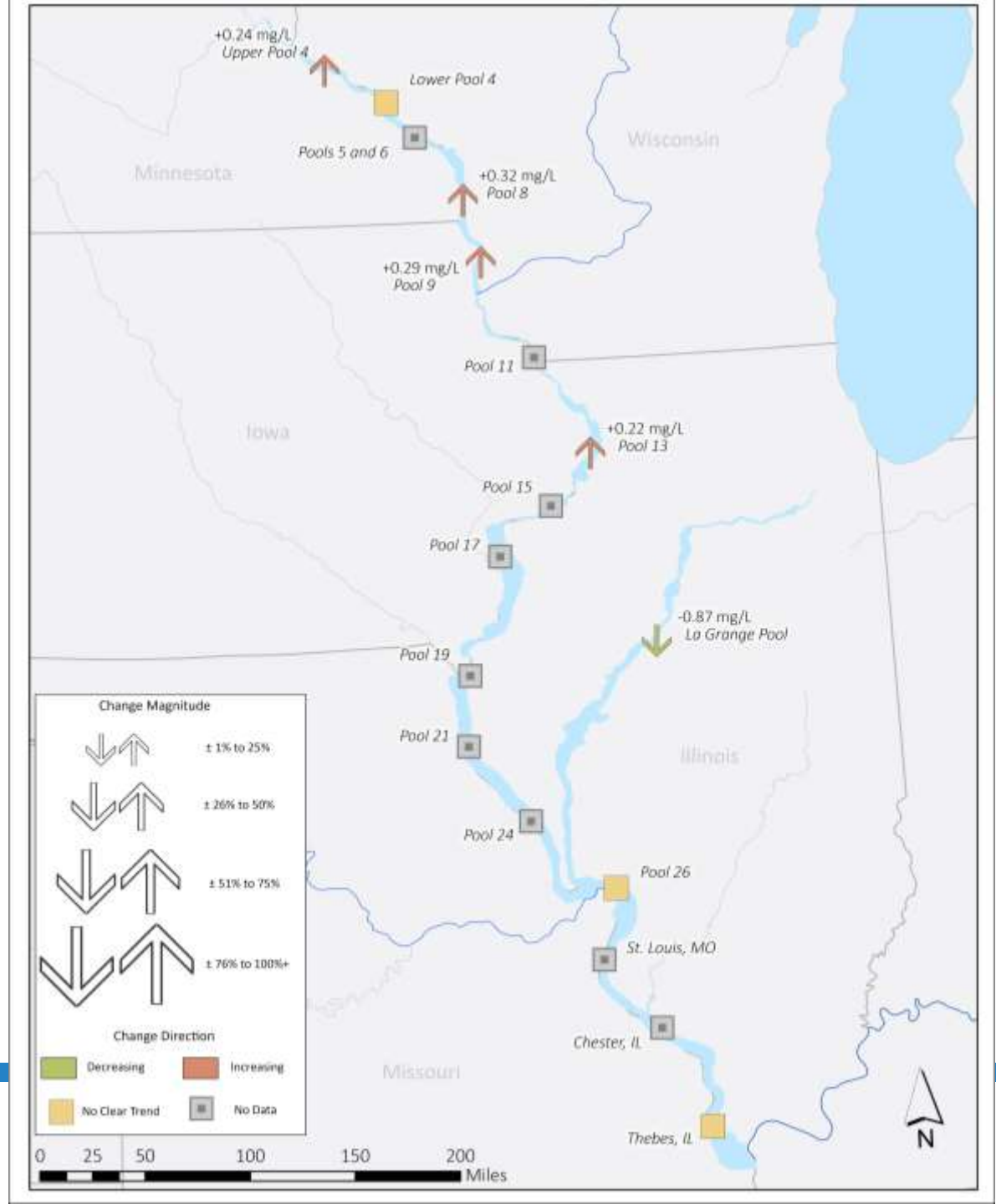
Total Nitrogen

- No Trend — Increasing
- Decreasing in La Grange Pool, Illinois River



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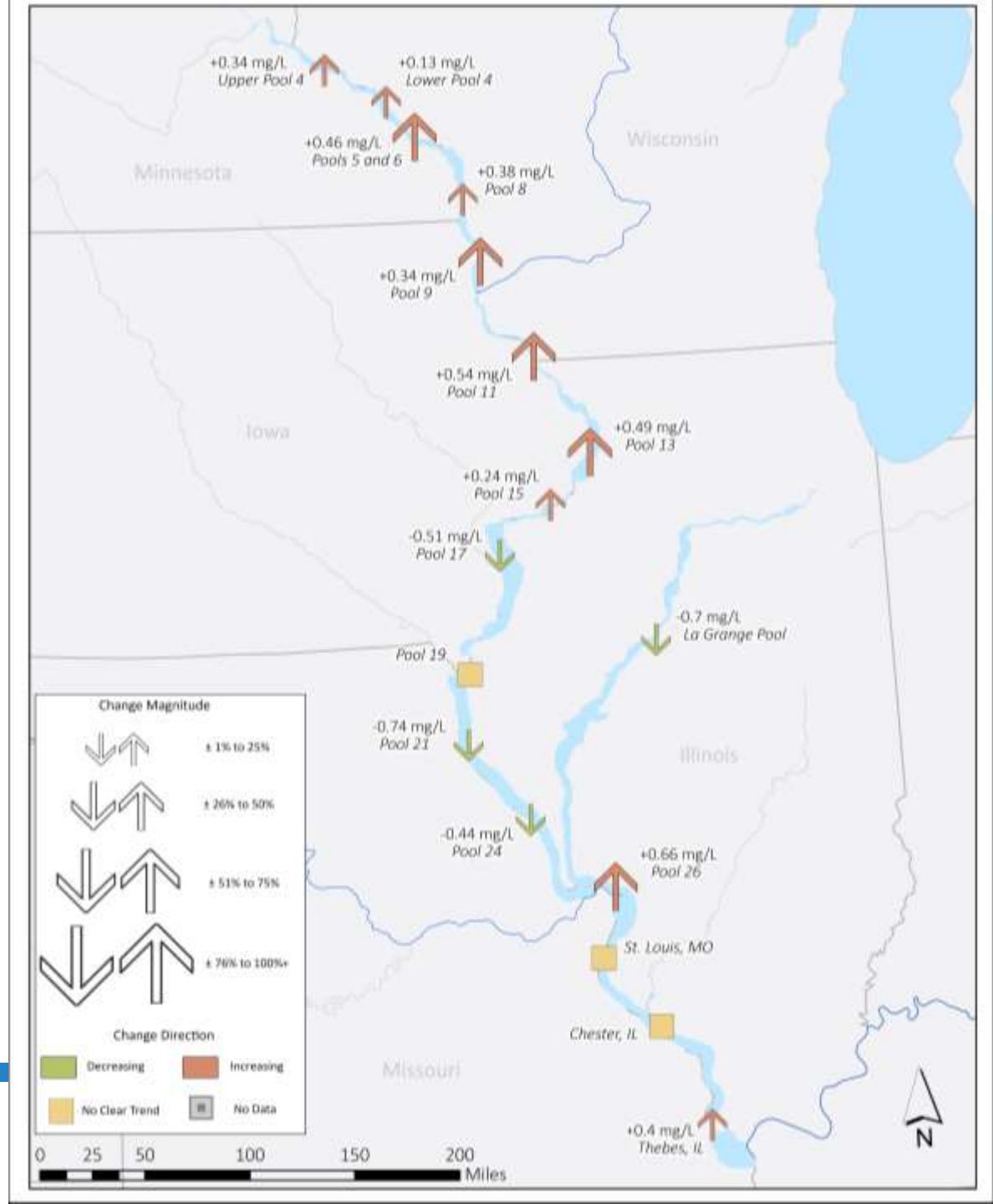
Inorganic Nitrogen

- No Trend — Increasing
- Decreasing in La Grange Pool, Illinois River



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PFAS

Raw (untreated) water samples collected at L&D 17 (New Boston, IL), L&D 19 (Keokuk, IA), and L&D 21 (Quincy, IL) between 2020 and 2021

Parameter	No. of Analyses	Maximum Detected Value	Units
Perfluoro 1 decanesulfonate (PFDS)	42	5.083	ng/l
Perfluoro 1 heptanesulfonate	42	5.083	ng/l
Perfluoro 1 nonanesulfonate (PFNS)	42	5.083	ng/l
Perfluoro 1 octanesulfonamide (FOSA)	42	5.083	ng/l
Perfluoro 1 pentanesulfonate (PFPeS)	42	5.083	ng/l
Perfluorobutanoate (PFBA)	42	25.417	ng/l
Perfluorobutyl sulfonate (PFBS)	37	5.083	ng/l
Perfluorodecanoate (PFDA)	42	5.083	ng/l
Perfluorododecanoate	42	5.083	ng/l
Perfluoroheptanoate (PFHpA)	41	5.083	ng/l
Perfluorohexanoate (PFHxA)	42	5.083	ng/l
Perfluorohexyl sulfonate (PFHxS)	42	5.083	ng/l
Perfluorononanoate (PFNA)	42	5.083	ng/l
Perfluorooctanoate (PFOA)	42	5.083	ng/l
Perfluorooctyl sulfonate (PFOS)	33	4.828	ng/l
Perfluoropentanoate (PFPeA)	42	25.417	ng/l
Perfluorotetradecanoate (PFTreA)	42	5.083	ng/l
Perfluorotridecanoate	42	5.083	ng/l
Perfluoroundecanoate	42	5.083	ng/l

State of the Science

- High water is occurring in the UMR more often and more of the time.
- The size and shape of the river is changing.

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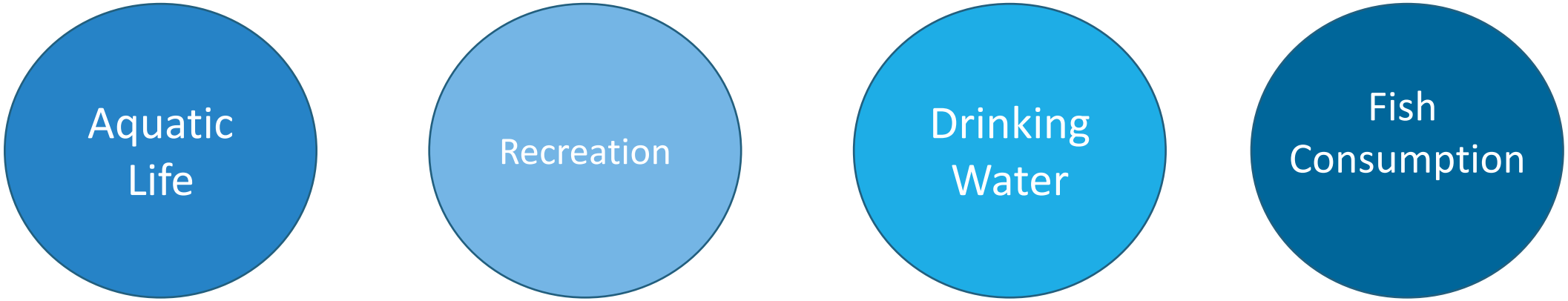
Research and Data Needs

Photo Credit: USFWS Midwest Region Flickr

Water Quality Data Needs

UMR Interstate Water Quality Monitoring Program

- Monitoring for designated uses
- Monitoring for emerging contaminants



Interstate Water Quality Monitoring Program

Anticipated Results

- Address information gaps
- Characterize the river's condition
- Identify problem areas
- Target management in river and watershed
- Aid public health and environmental justice
- Inform climate adaptation and resilience
- Track changes and improvements over time
- Improve down river conditions
- Leverage partnerships

Photo Credit: USFWS Midwest Region Flickr

Cyanotoxins Research Needs

- Cyanotoxin frequency
- Climate change and chloride impacts on blooms

Photo Credit: USFWS Midwest Region Flickr

Nutrients Research Needs

- Weather and climate influences
- Legacy nutrients
- Tradeoffs between conservation practices
- Social science to accelerate adoption

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Photo Credit: USACE MVP Flickr

Sediment Research Needs

- Sediment transport, erosion, and deposition
- Influences of those processes on the river ecosystem

Photo Credit: USFWS Midwest Region Flickr

Partnerships in the Upper Mississippi River Basin are key to our success.

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Photo Credit: Thomas Robertson Flickr

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