Multi-element Fingerprinting for Monitoring Water and Sediments

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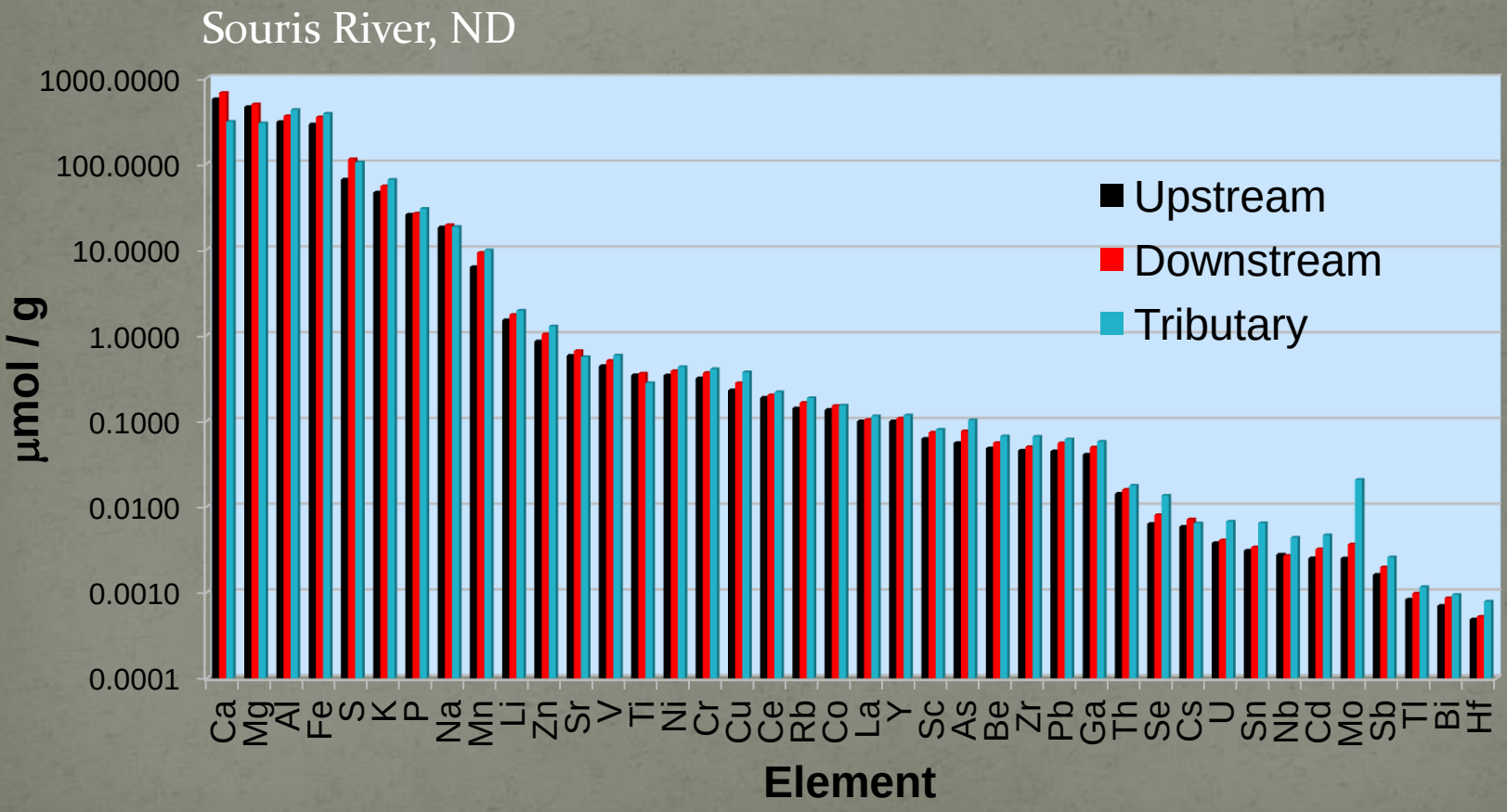
Outline

- What is multi-element fingerprinting?
- Examples
  - I. Shallow lakes of MN
  - II. Prairie potholes, ND, MT, SD
  - III. Riparian corridors in ND
- Conclusions
- Acknowledgements

Multi-element fingerprinting



Shallow lakes of MN

Question

- What makes them shift from clear to turbid, and *vice versa*?

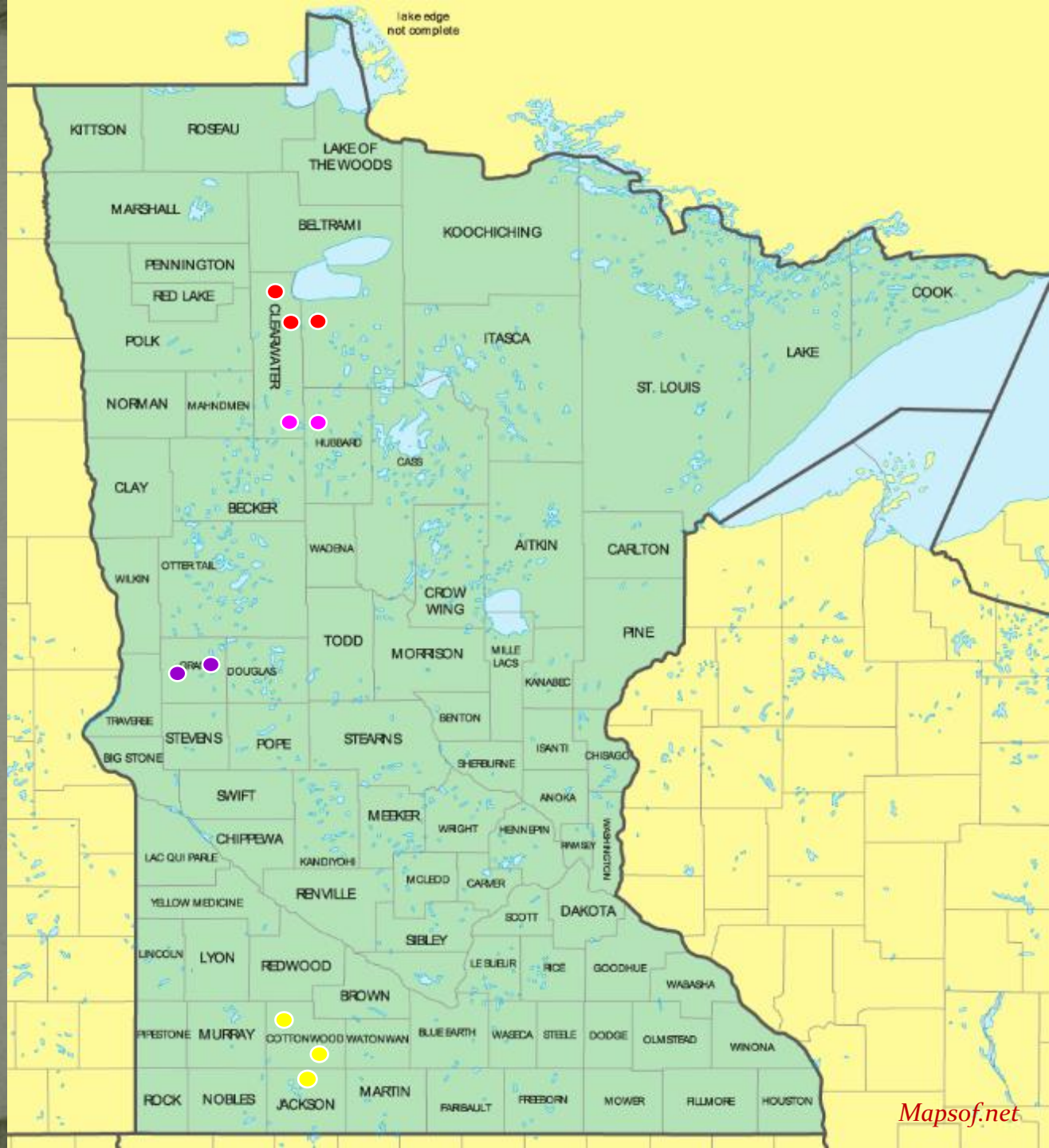
Status

- Lots of info on fish, ducks and major nutrients.
- Very little info on plants and biogeochemistry

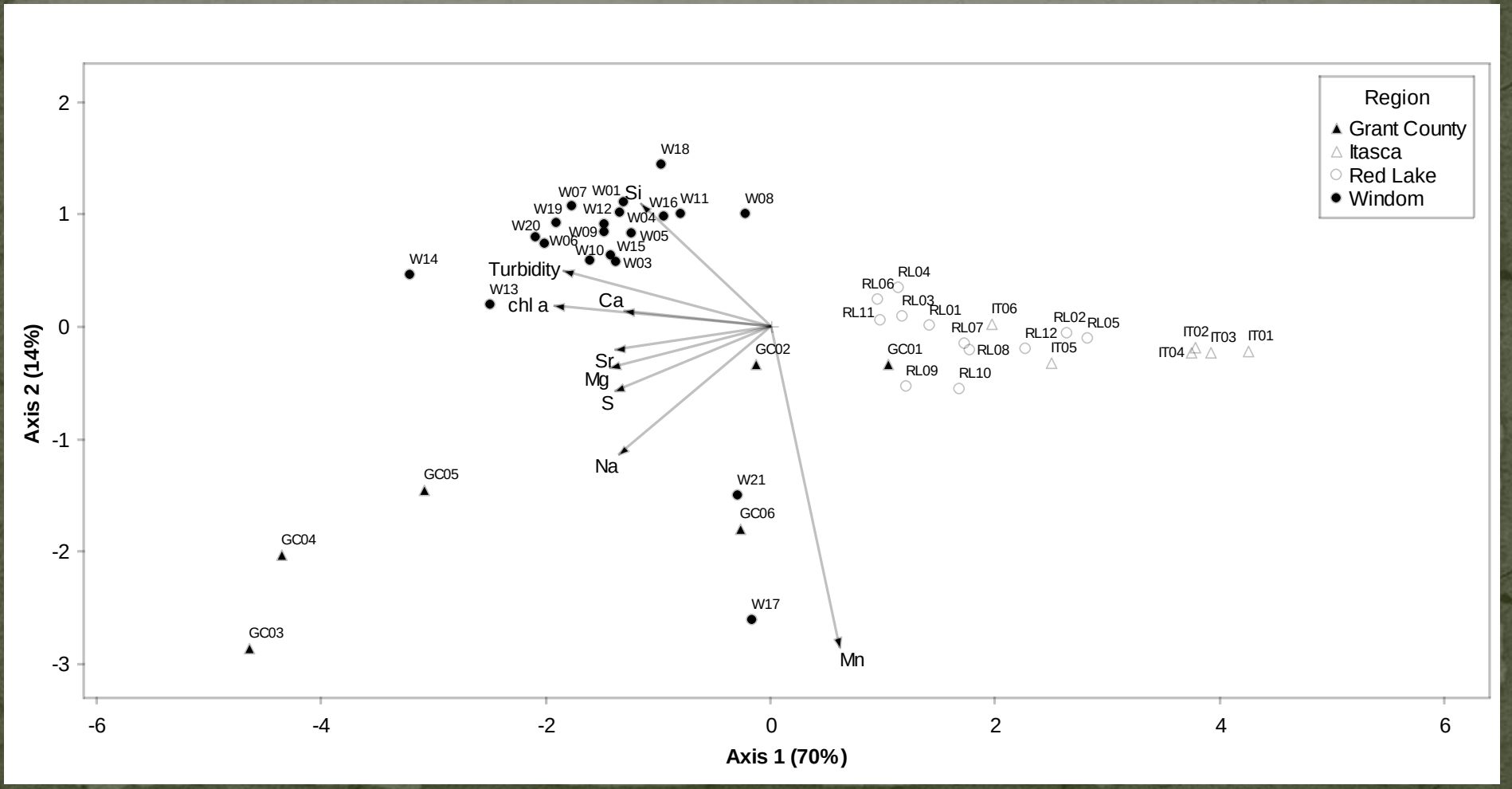
Approach

- Survey plants, and fingerprint water and sediments

- Grant County (6)
- Itasca (6)
- Red Lake Reservation (12)
- Windom (21)



Shallow lakes of MN



Prairie Potholes

Question

- Does wetland quality relate to chemical composition of soil?

Status

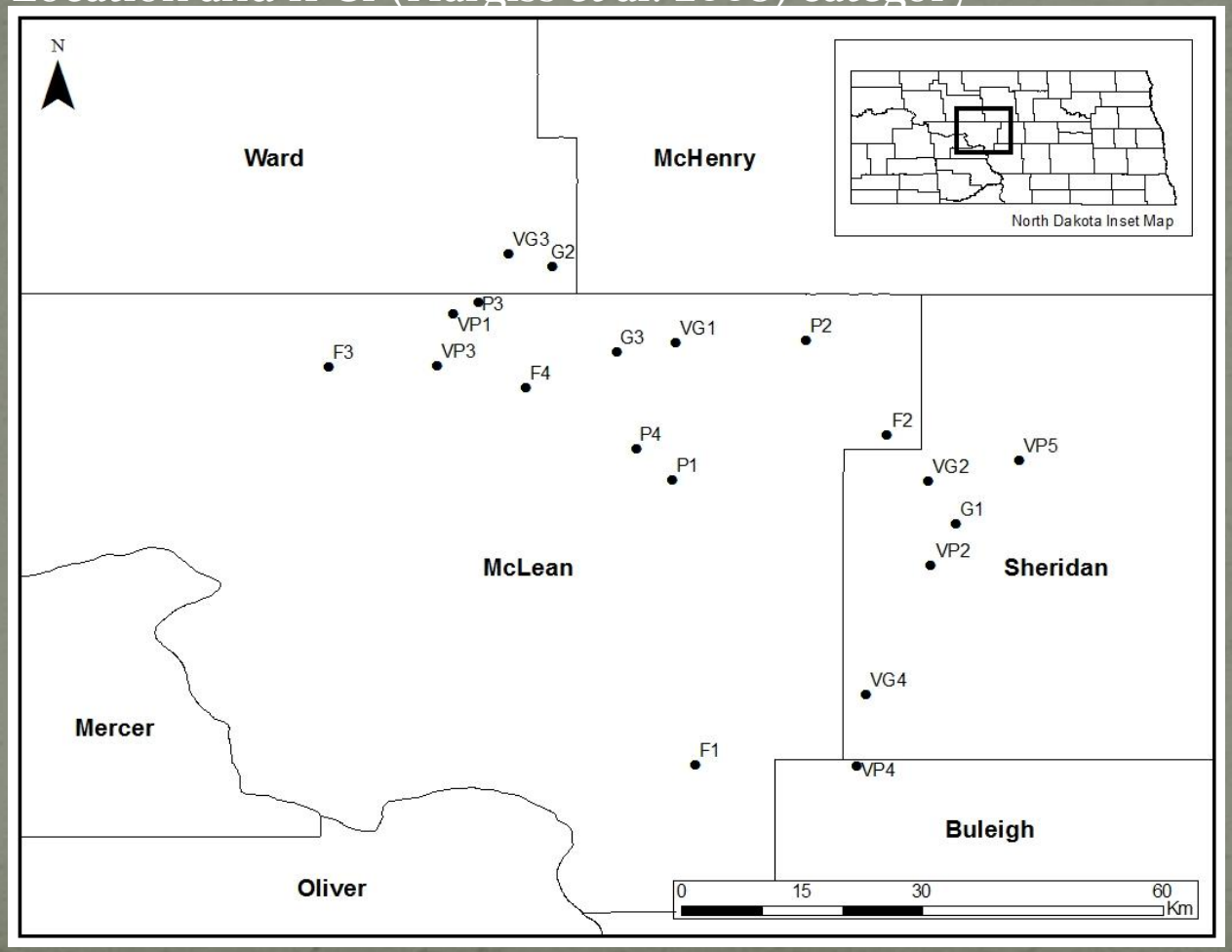
- Most quality assessments based on vegetation
- Little info on biogeochemistry

Approach

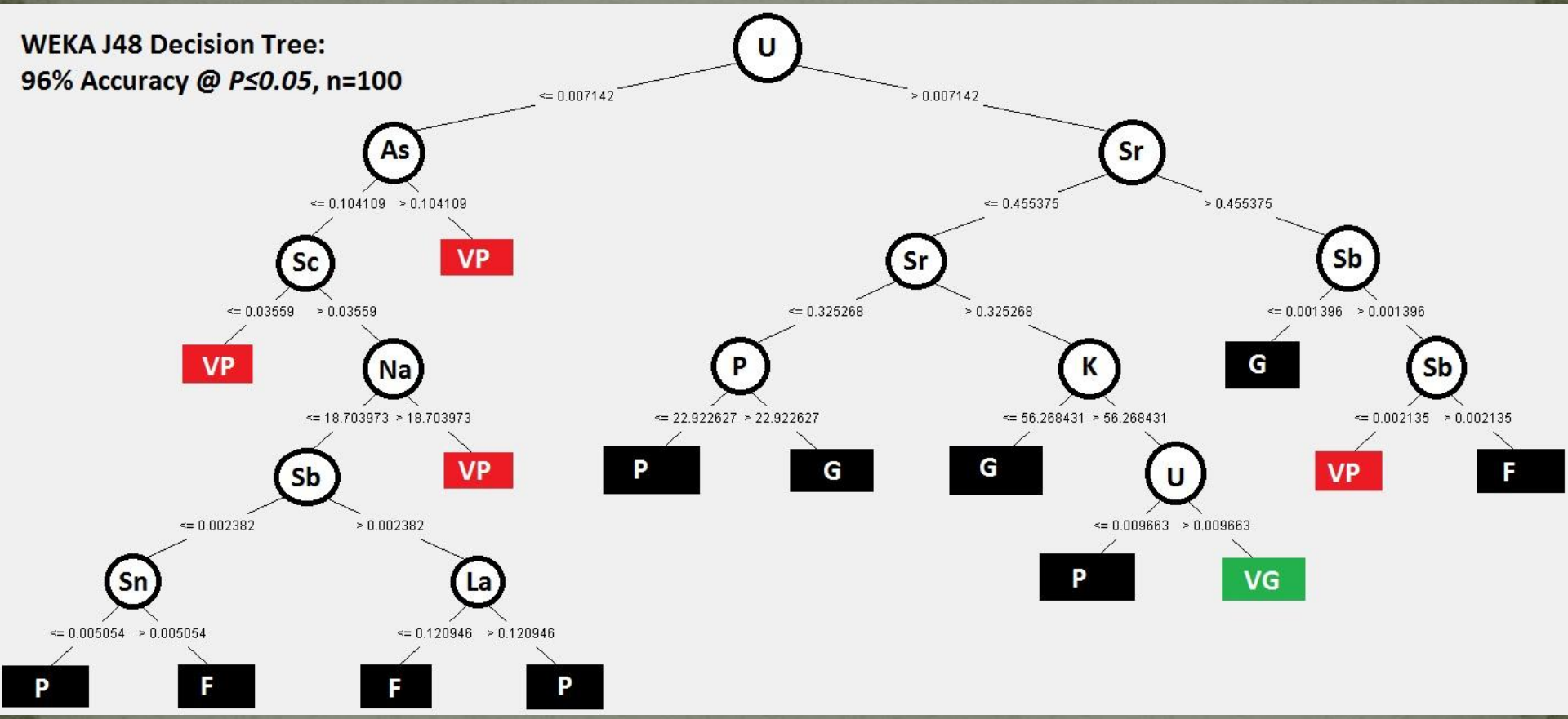
- Fingerprint prairie pothole soils across the region

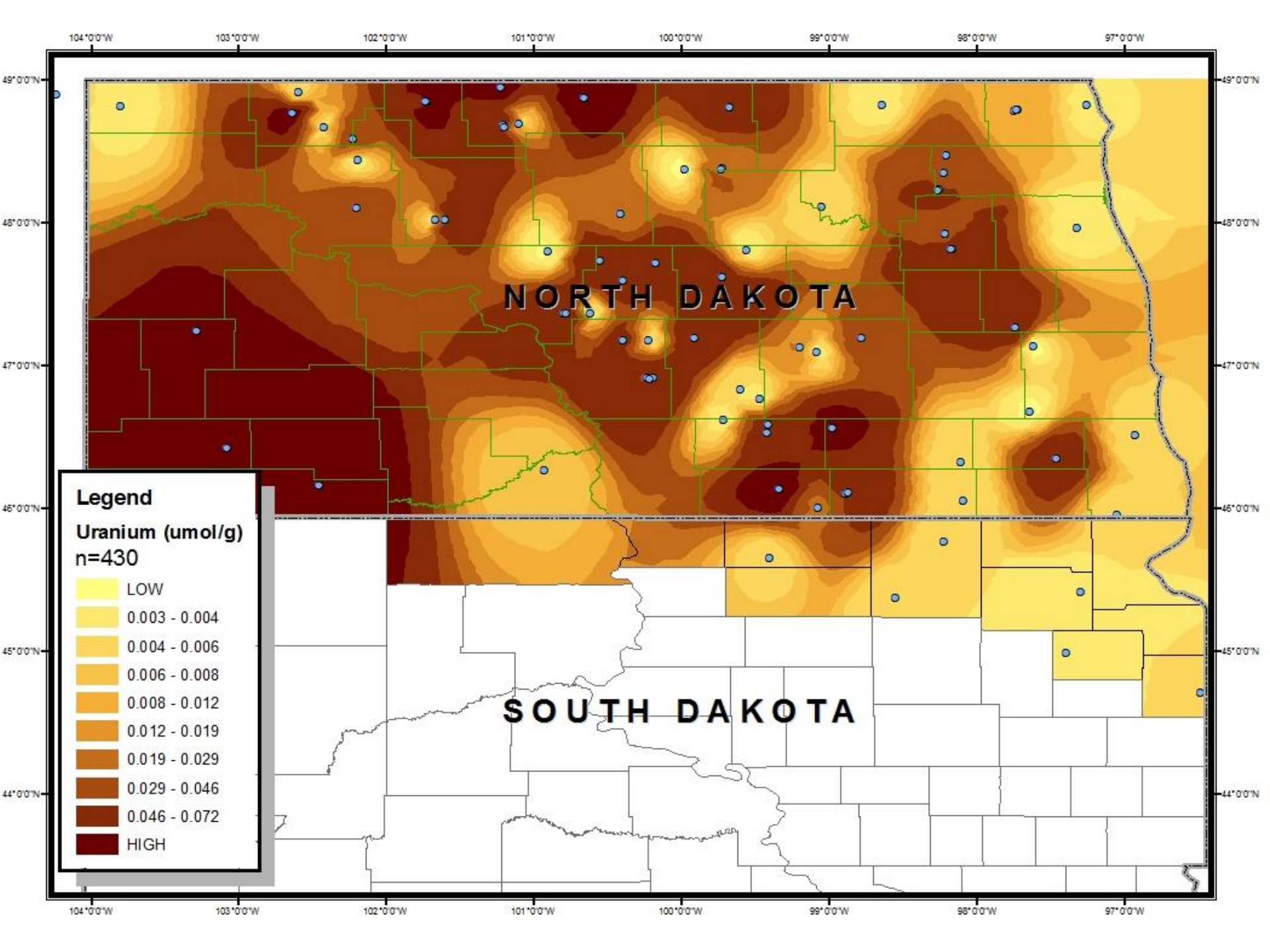
Prairie Potholes

Location and IPCI (Hargiss et al. 2008) category



Prairie Potholes

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97°0'0"W
49°0'0"N
48°0'0"N
47°0'0"N
46°0'0"N
45°0'0"N
44°0'0"N
NORTH DAKOTA
SOUTH DAKOTA
Legend
Uranium (umol/g)
n=430
LOW
0.003 - 0.004
0.004 - 0.006
0.006 - 0.008
0.008 - 0.012
0.012 - 0.019
0.019 - 0.029
0.029 - 0.046
0.046 - 0.072
HIGH

Riparian Corridors in ND

Question

- How do multi-element fingerprints of sediments vary with and between rivers?

Status

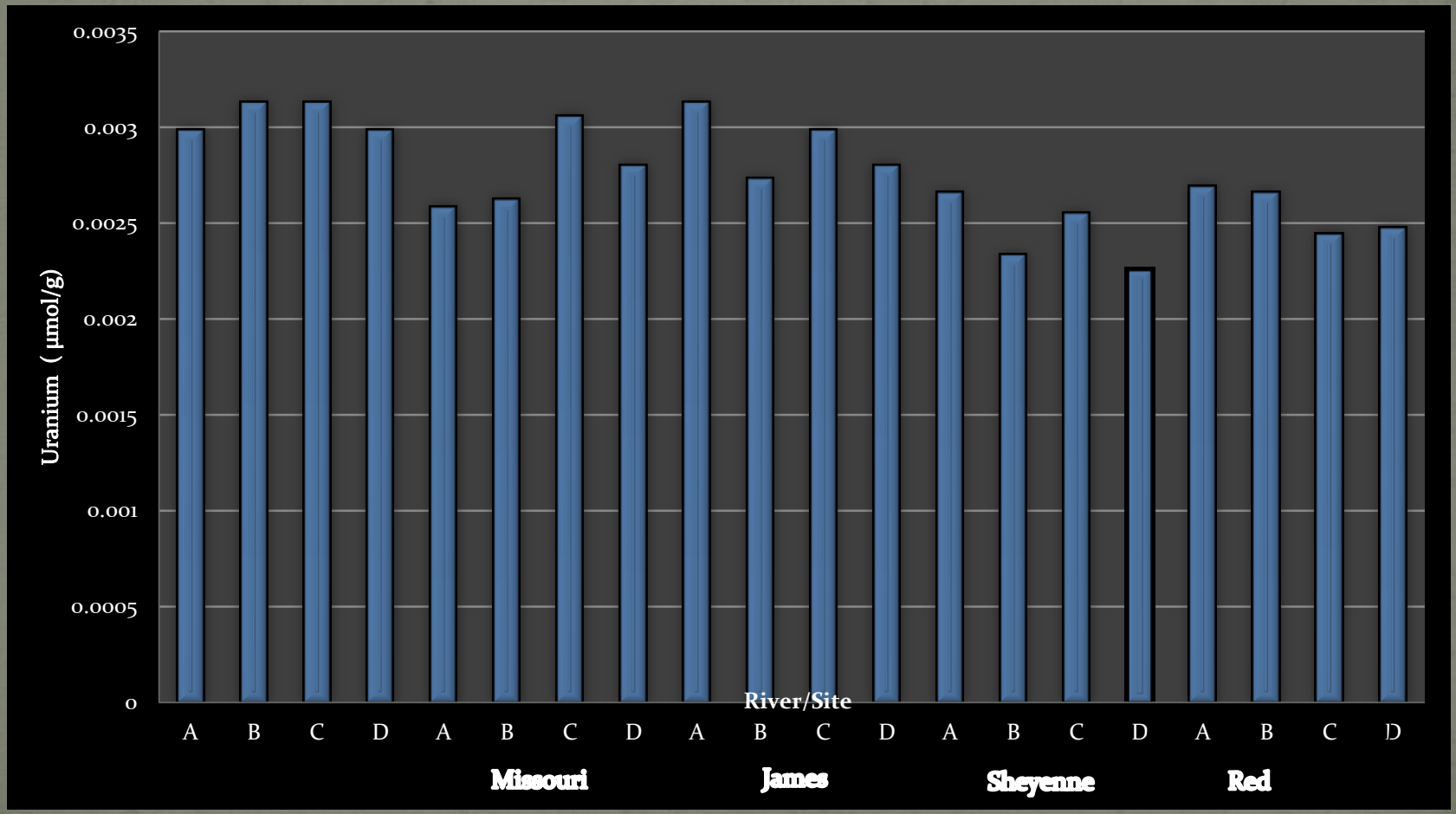
- Very little known, except for where fingerprints have been used for identification of sediment sources and sinks

Approach

- Fingerprint sediments from major ND rivers

Riparian Corridors in ND

Uranium in ND river sediments of riparian corridors



Conclusions

Multi-element fingerprinting is a powerful method to, for example:

- Identify sediment sources and sinks
- Study cycling of elements through ecosystems
- Identify natural enrichments, pollutants, and their sources
- Assess ecosystem quality and integrity

Acknowledgments

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