

An aerial photograph of a large, multi-story brick building complex, likely a university or government facility, situated along a river. The building has a prominent central tower and several wings. The river is in the foreground, and the background shows more trees and a road with a few cars. The overall scene is dimly lit, suggesting dusk or dawn.

IOWA

Chris Jones, Research Engineer, IIHR Hydroscience and Engineering

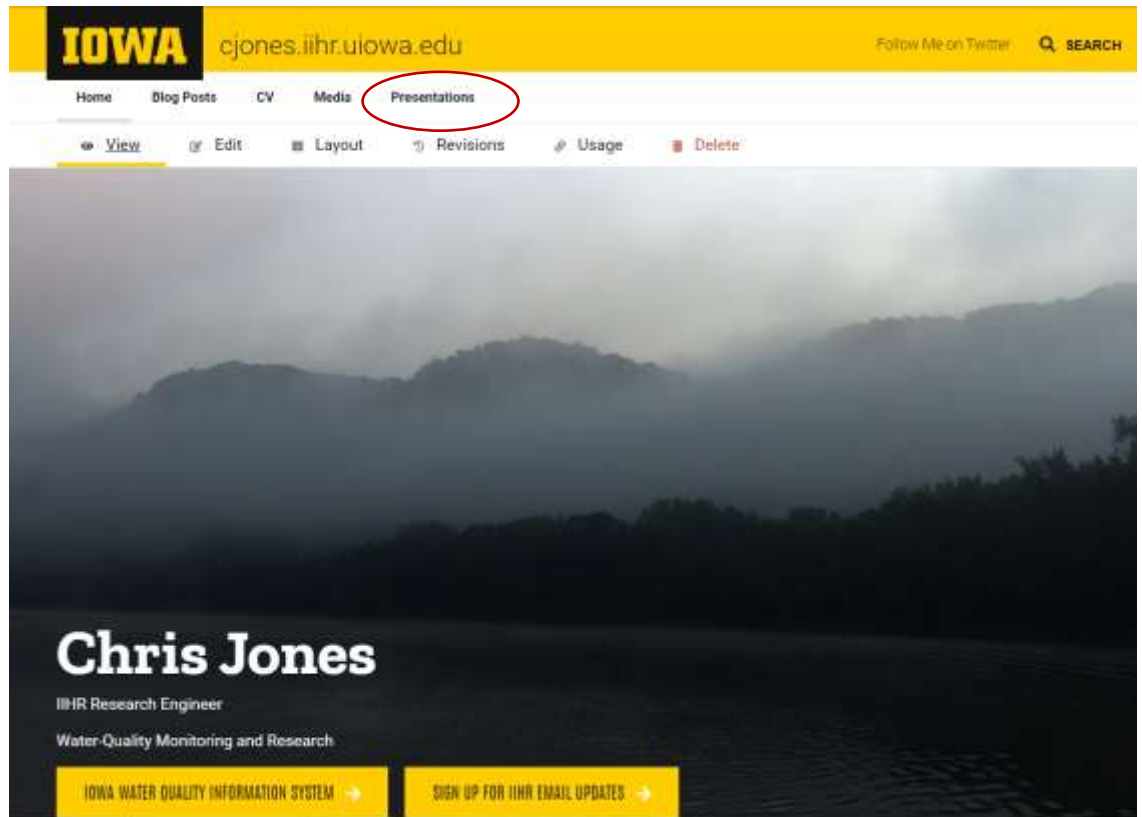
Cedar River Geological Overview

March 23, 2023

Ecosystem Health of the Cedar River Watershed in Iowa and Minnesota

Slides Available at:

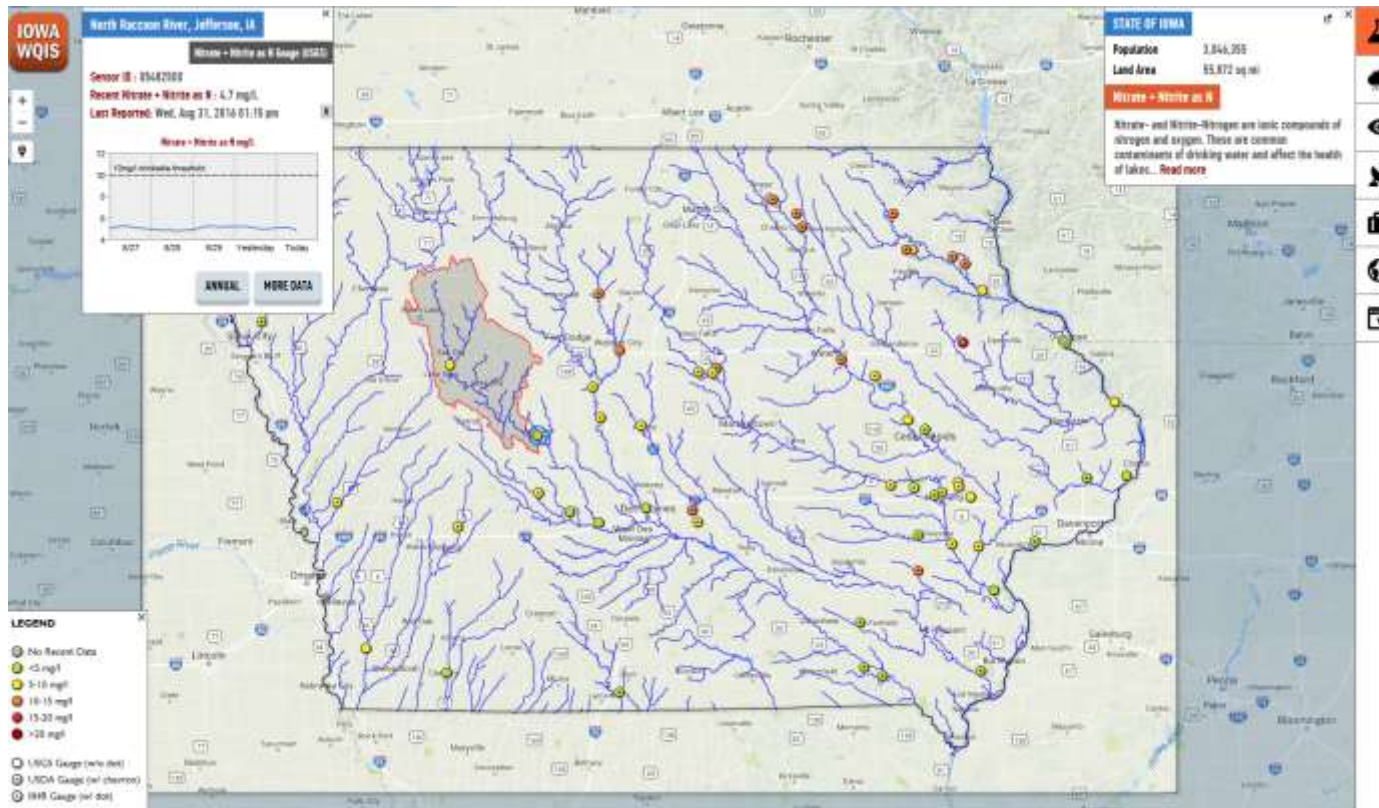
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IIHR Water Quality Sensor Network



Iowa Water Quality Information System



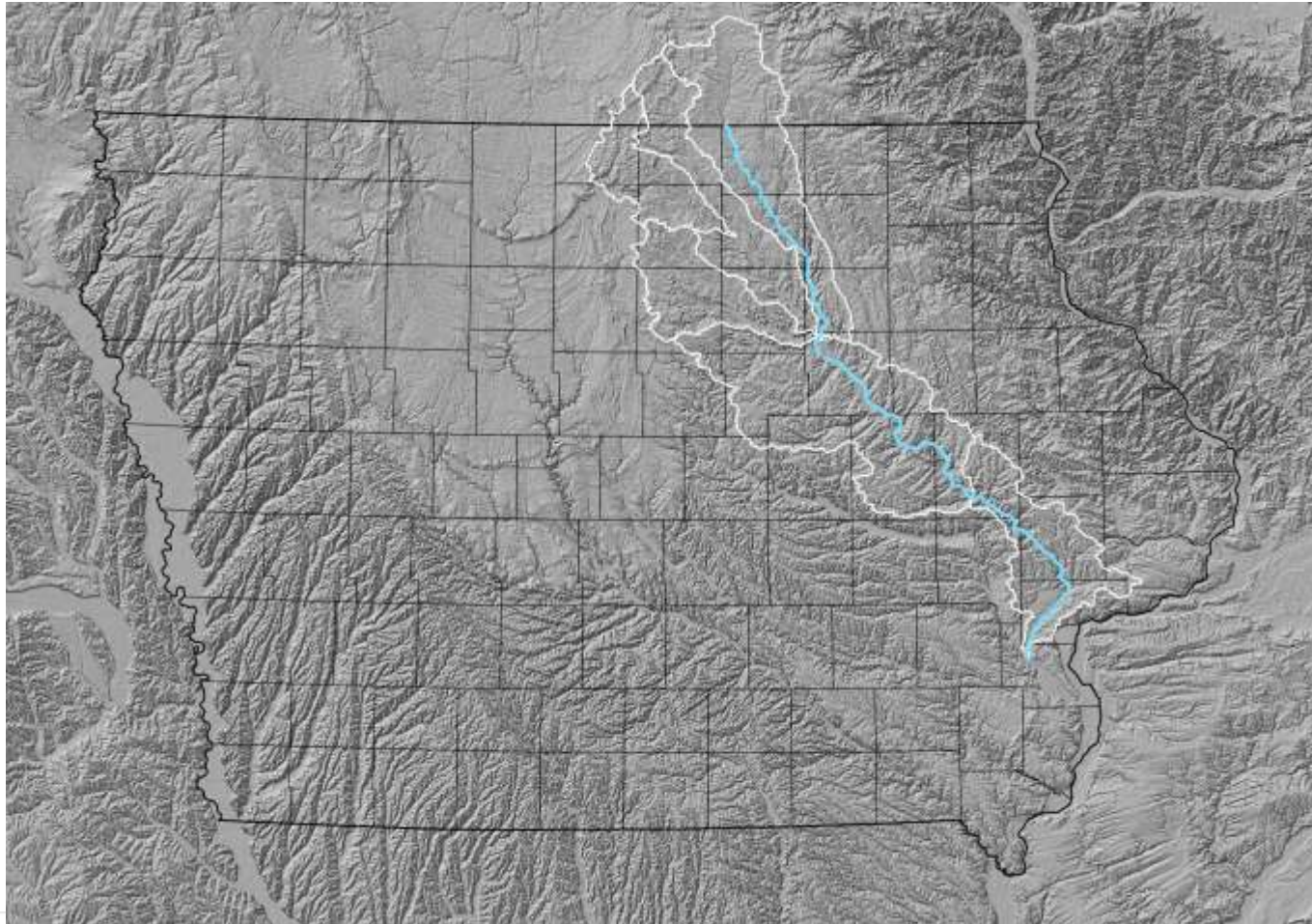
iwqis.iowawis.org/

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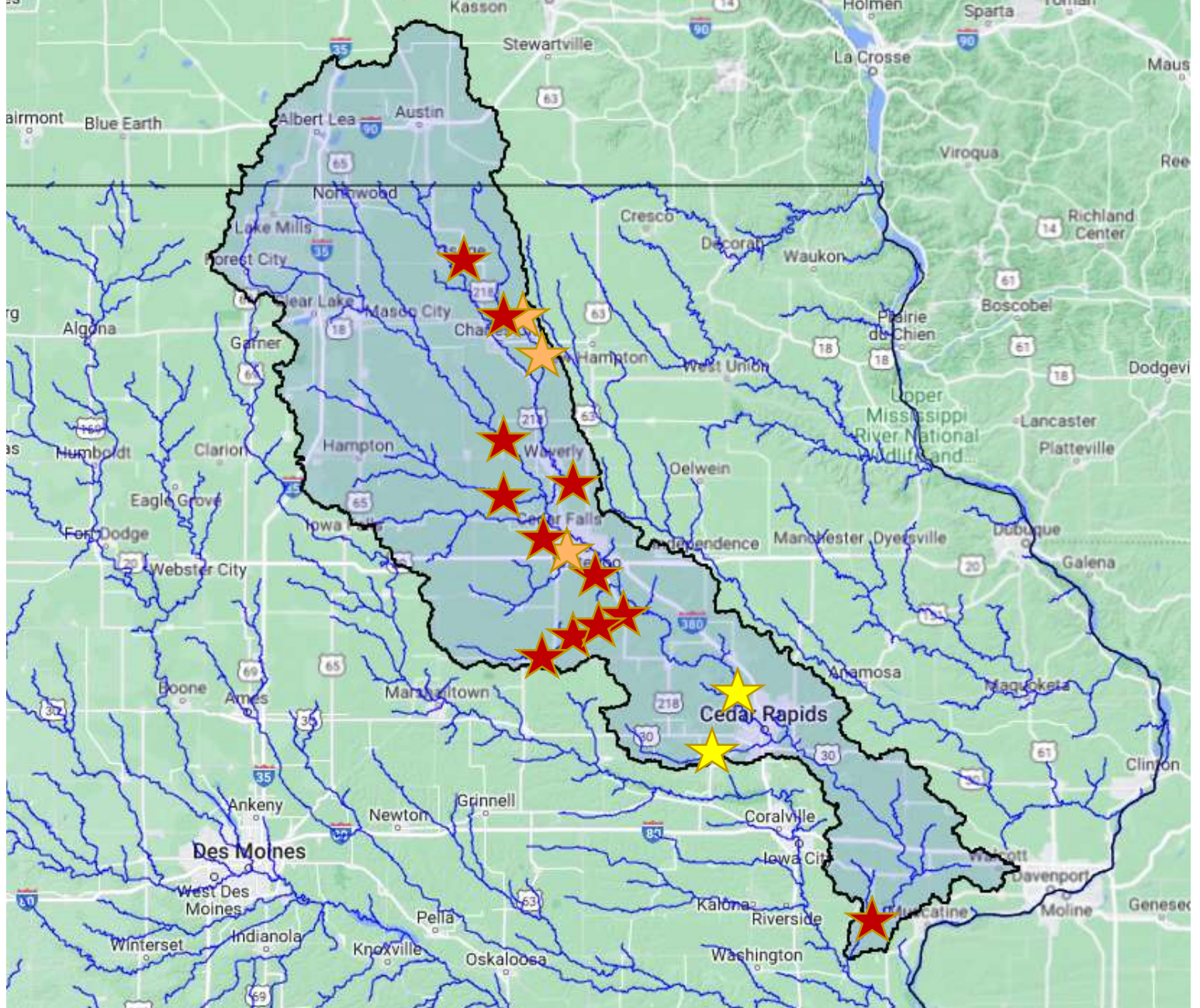
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Cedar River and basin (HUC 8s)



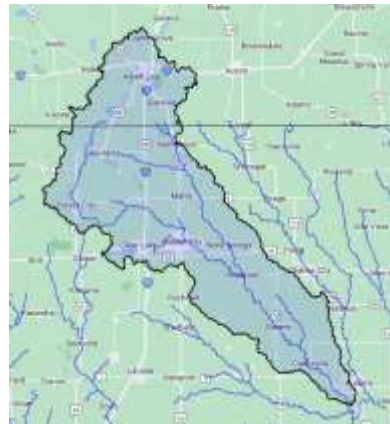
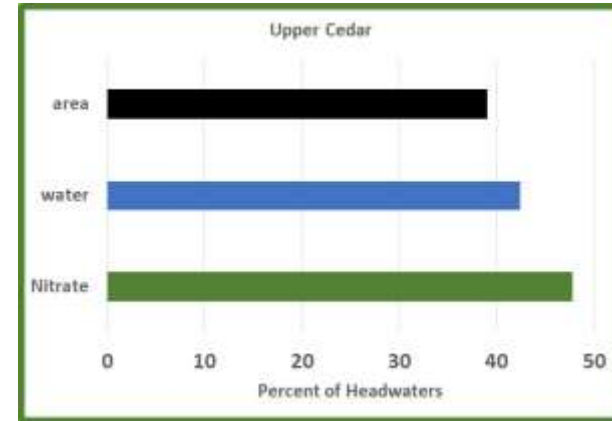
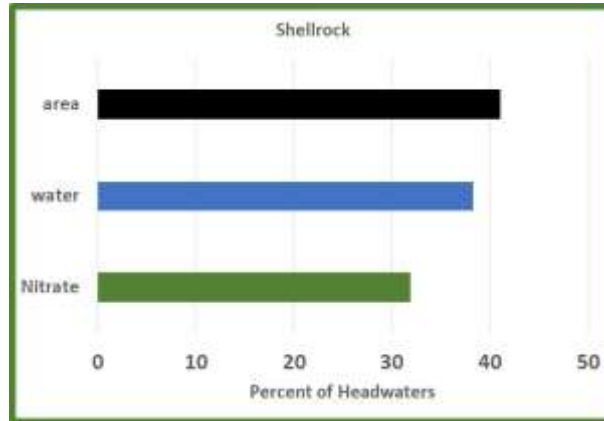
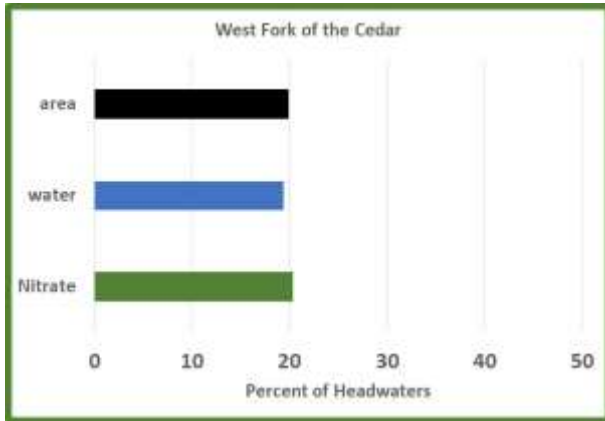
Slide credit: Phil
Kerr, IGS



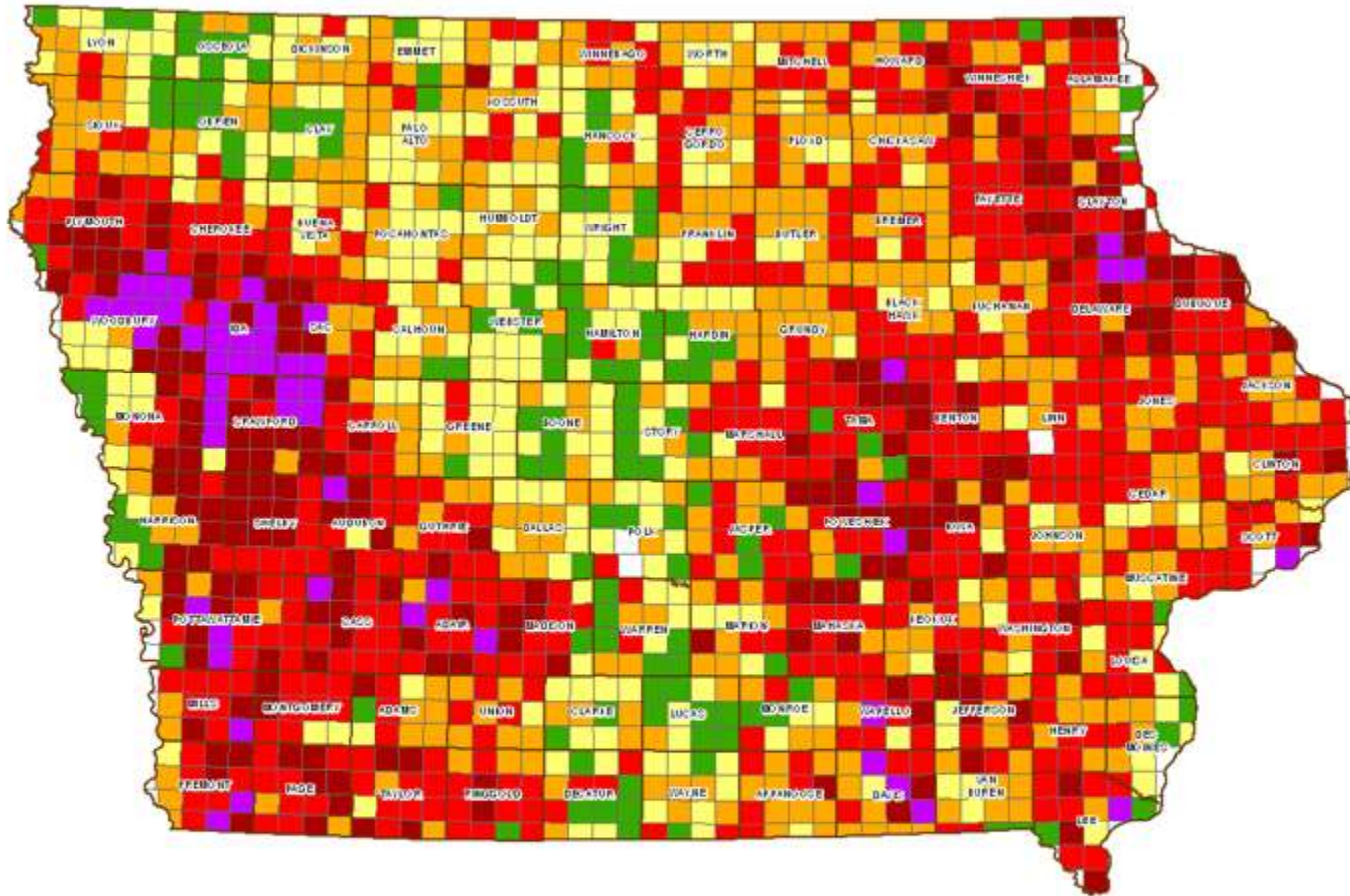
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Cedar Headwaters



Soil loss is still very high

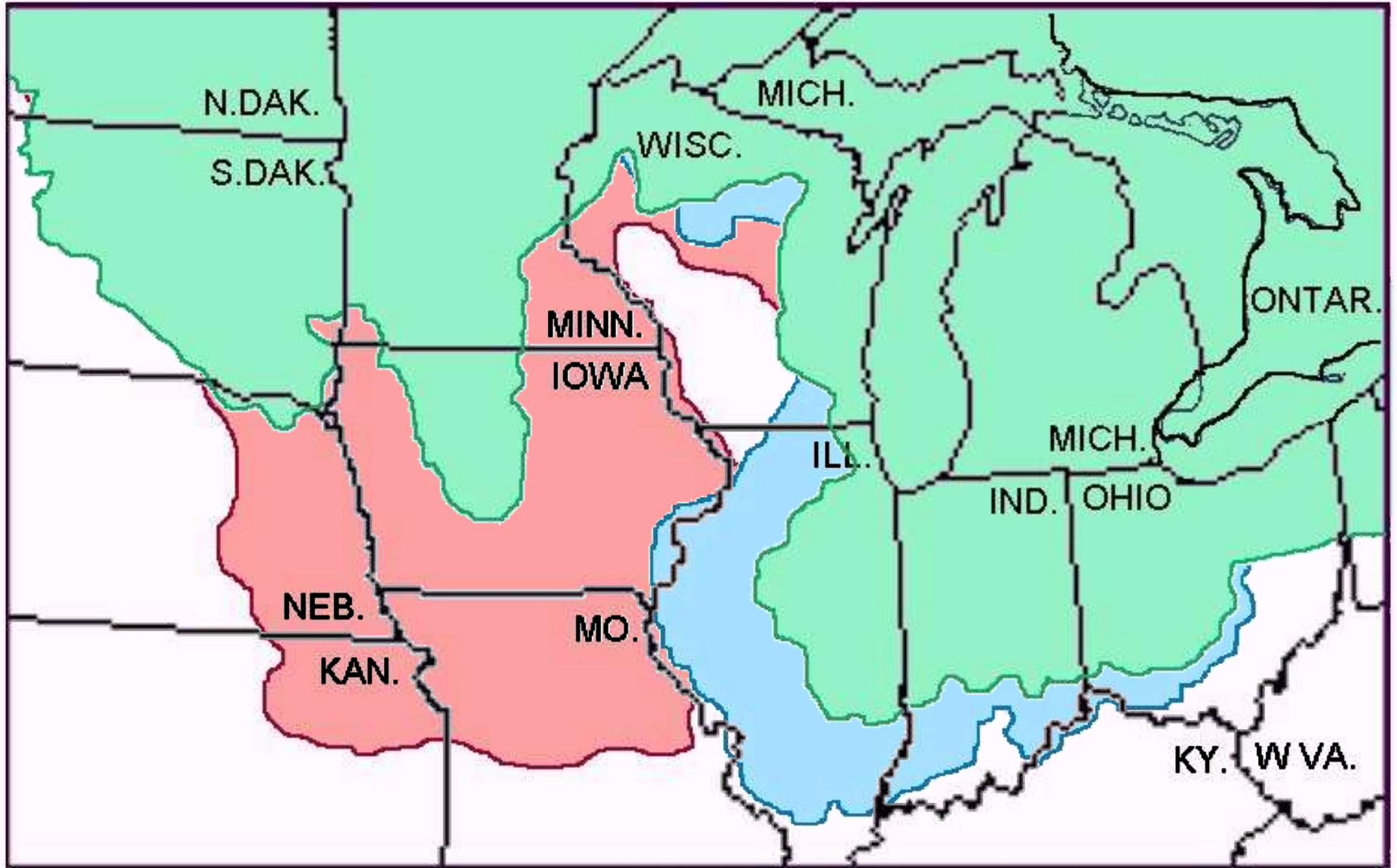


Source:
EWG

Average Soil Erosion (tons/acre)

○ No Data ● 0 - 5.0 ● 5.1 - 10.0 ● 10.1 - 20.0 ● 20.1 - 50.0 ● 50.1 - 100.0 ● Greater than 100

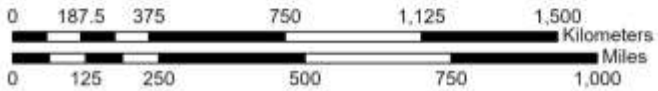
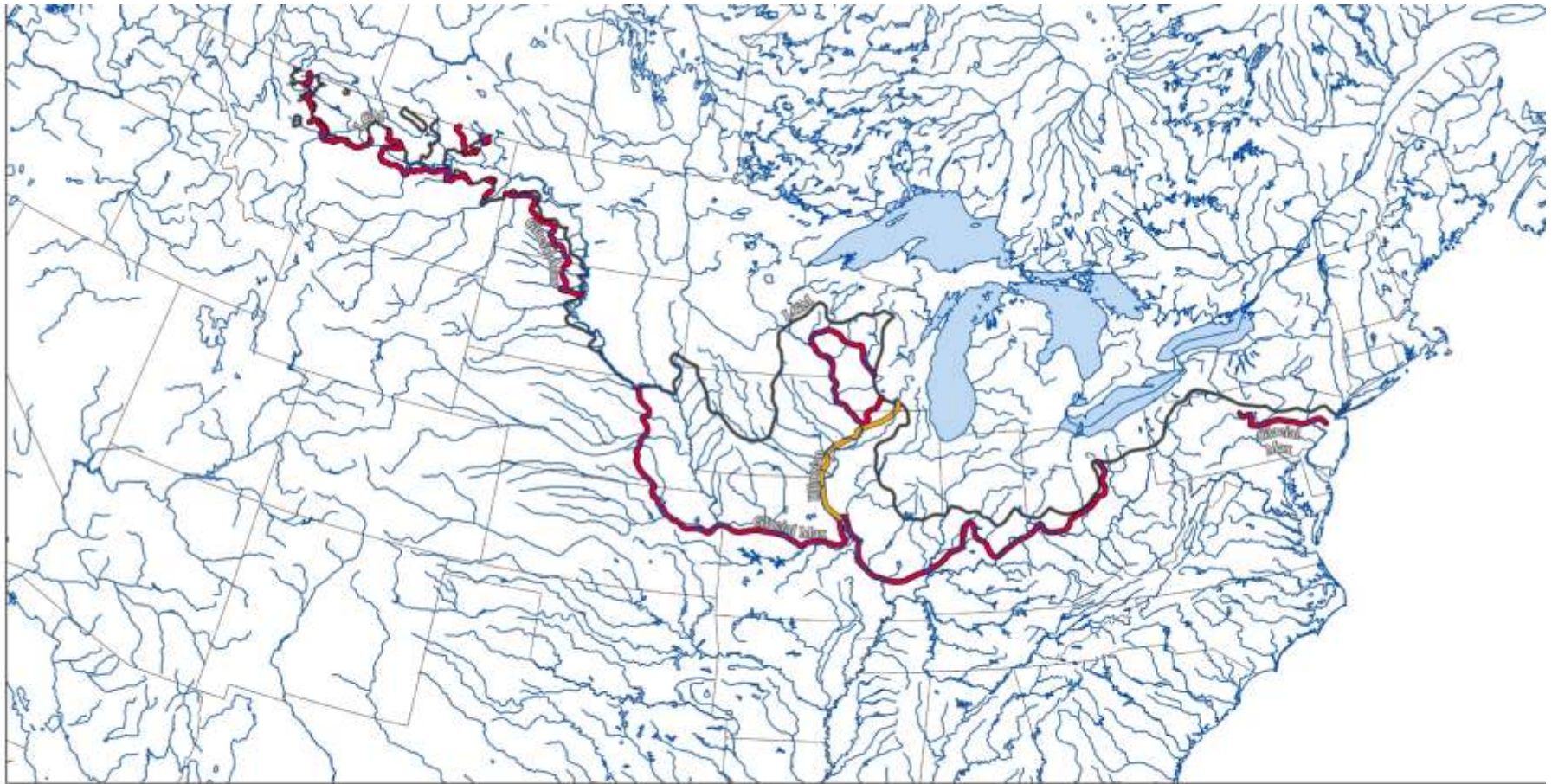
30,000 – 10,500 years



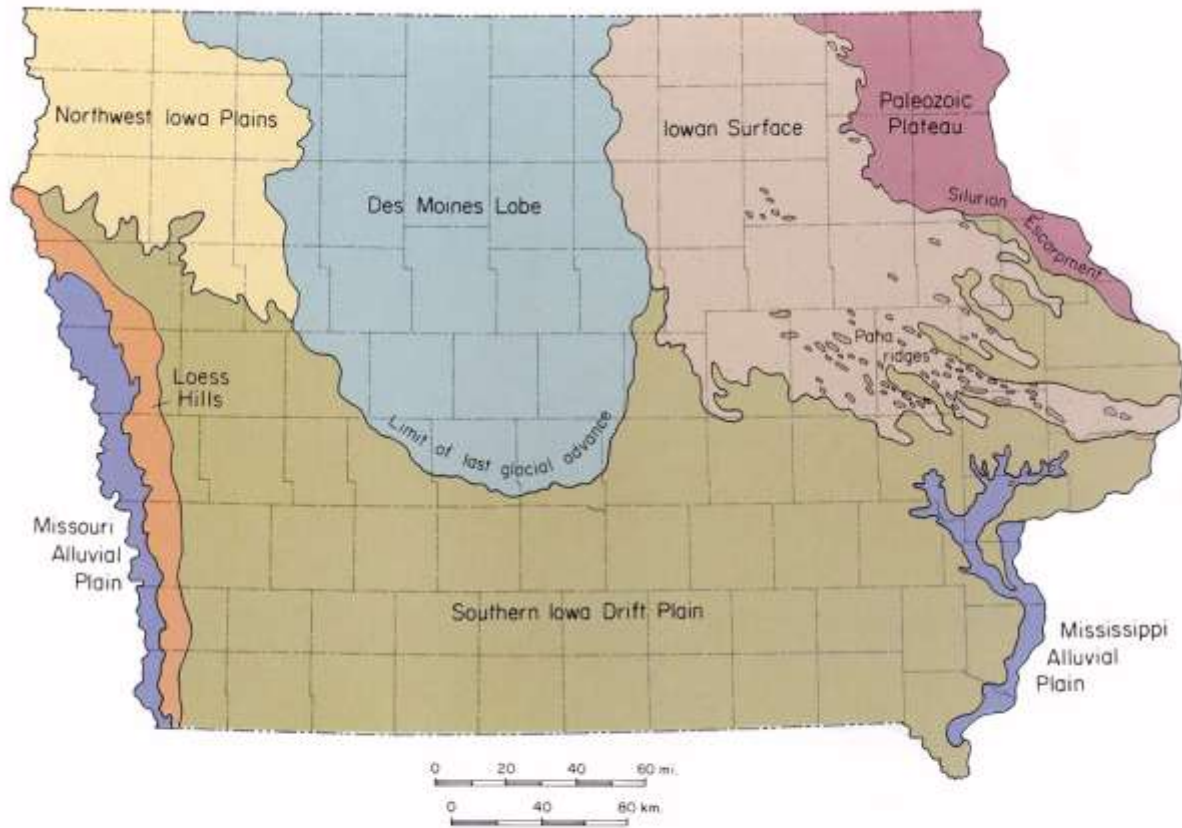
Pre-Illinoian Till

Illinoian Till

Wisconsinan Till



Slide credit: Phil
Kerr, IGS

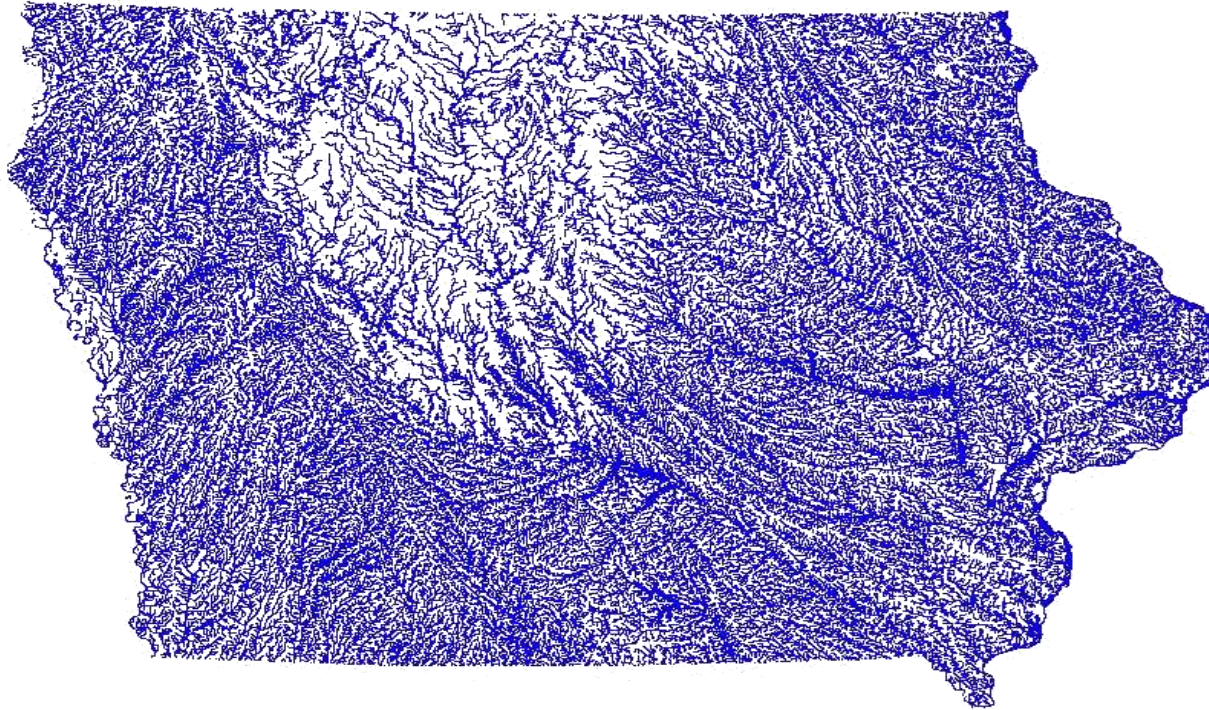


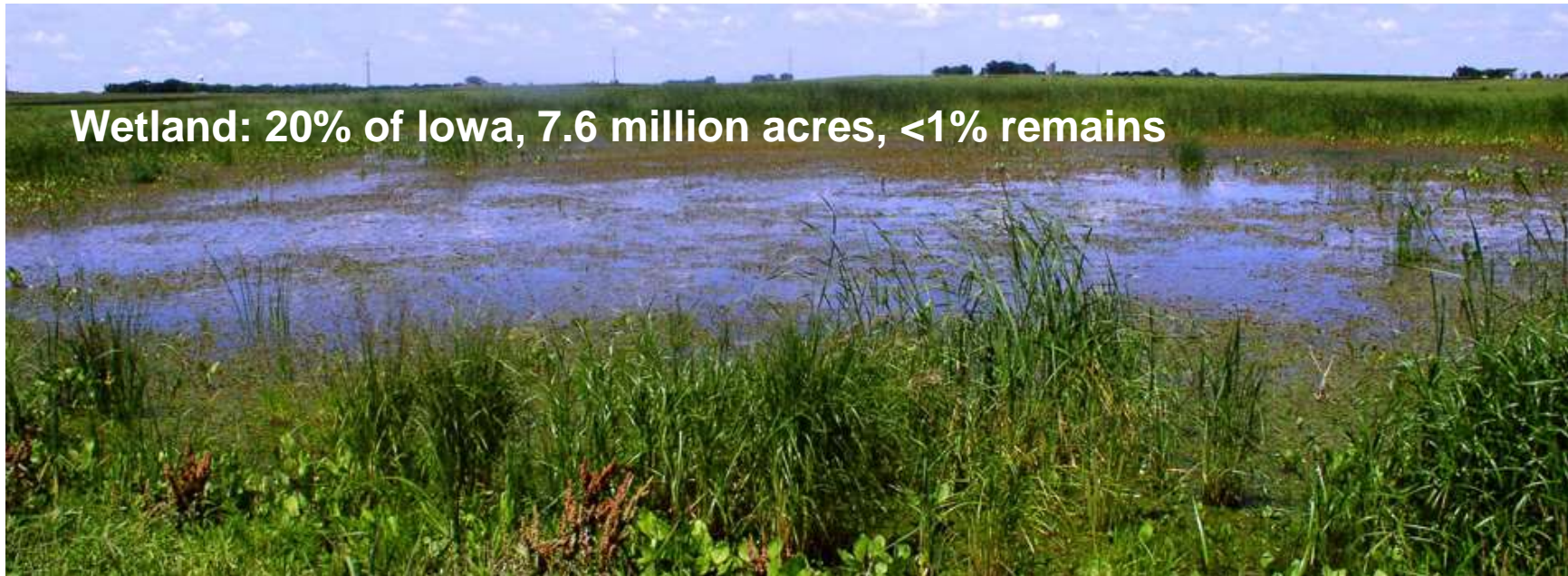
Landform Regions of Iowa

EXTENT OF PLEISTOCENE ICE SHEETS IN THE NORTHERN UNITED STATES



Stream Density low on Des Moines Lobe





Wetland: 20% of Iowa, 7.6 million acres, <1% remains



Oak Savannah: ~5%, < 1% remains



Prairie: 70%, 0.1% Remains

Breaking the prairie

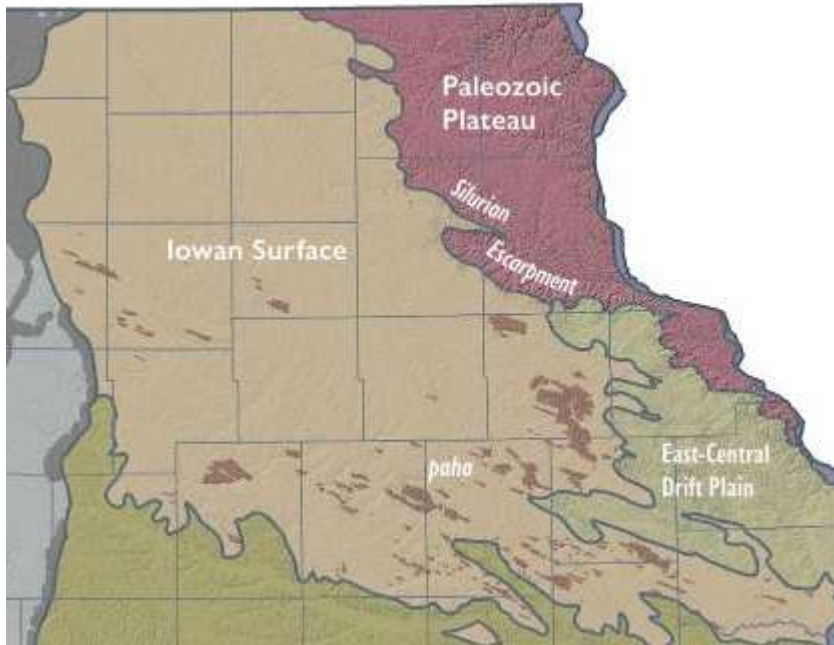


Hydrological Modification: 1860s-1910s

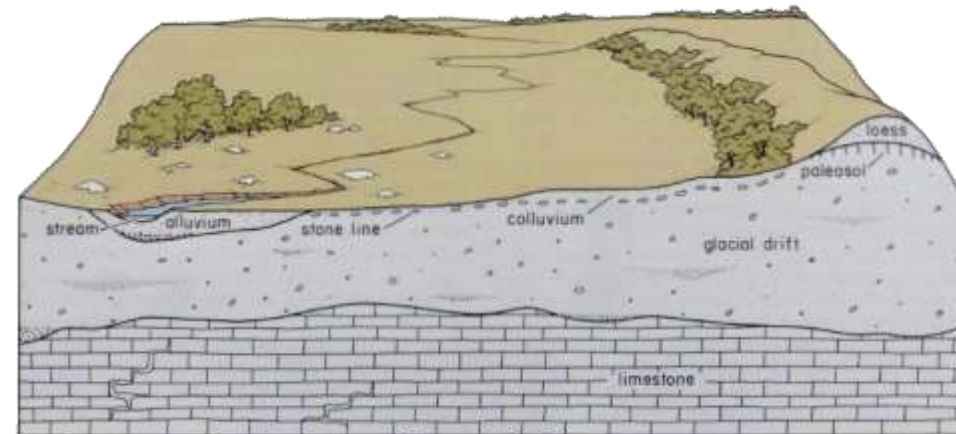




Iowan Surface



- Thin loess over glacial drift
- Bedrock near the surface
- Approximately level but rolling
- Glacial erratics

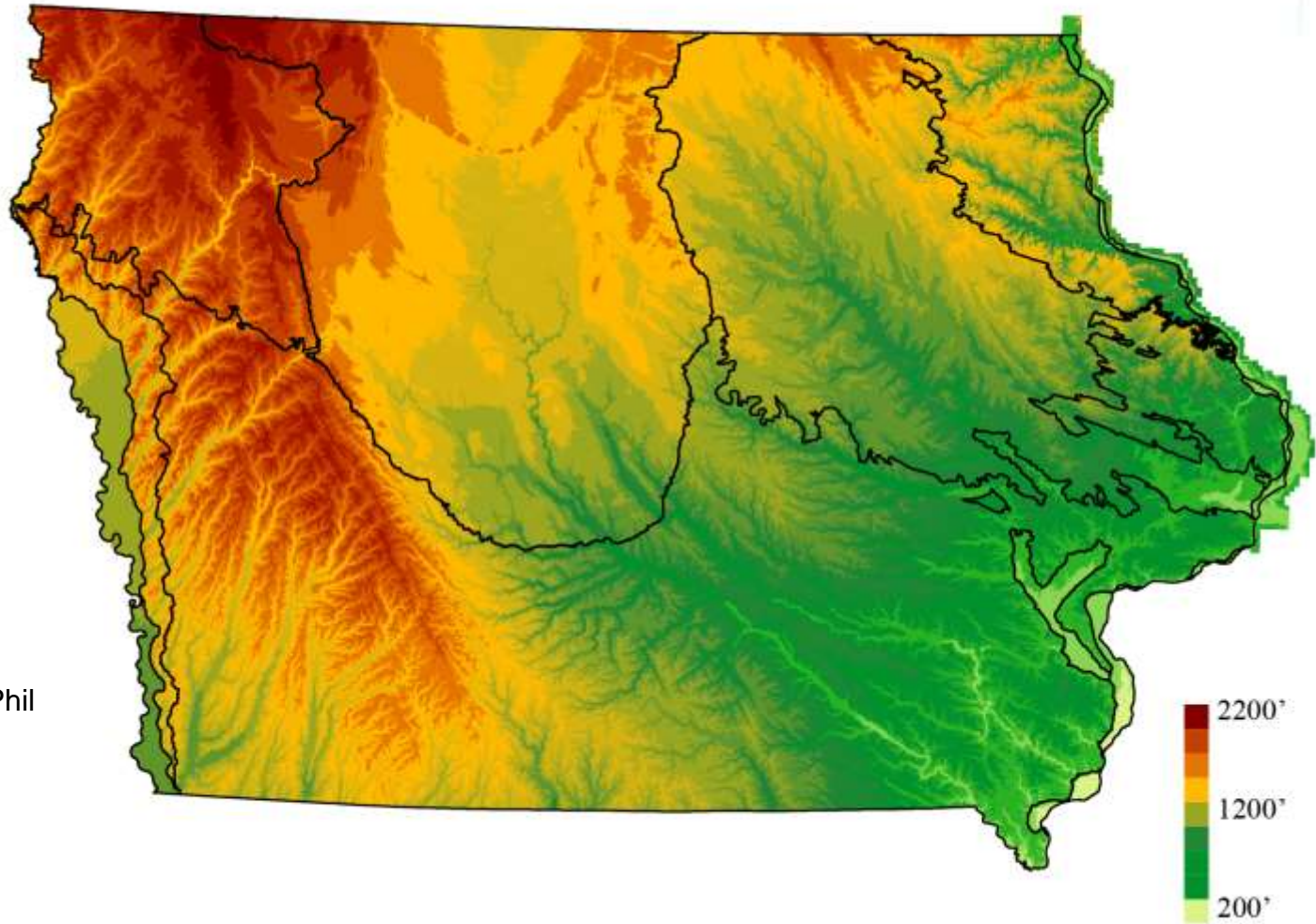


Loess and sand, till, bedrock

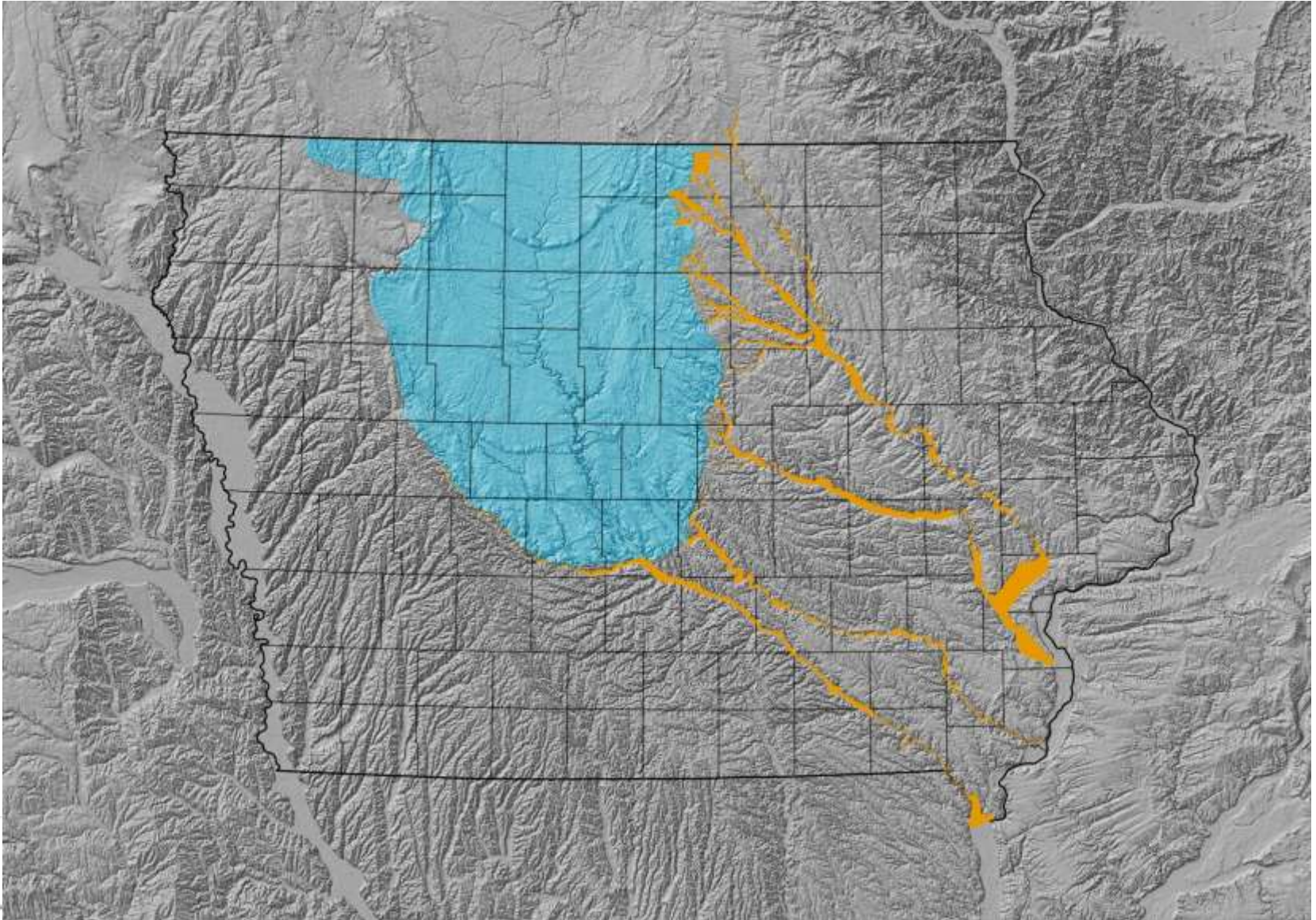


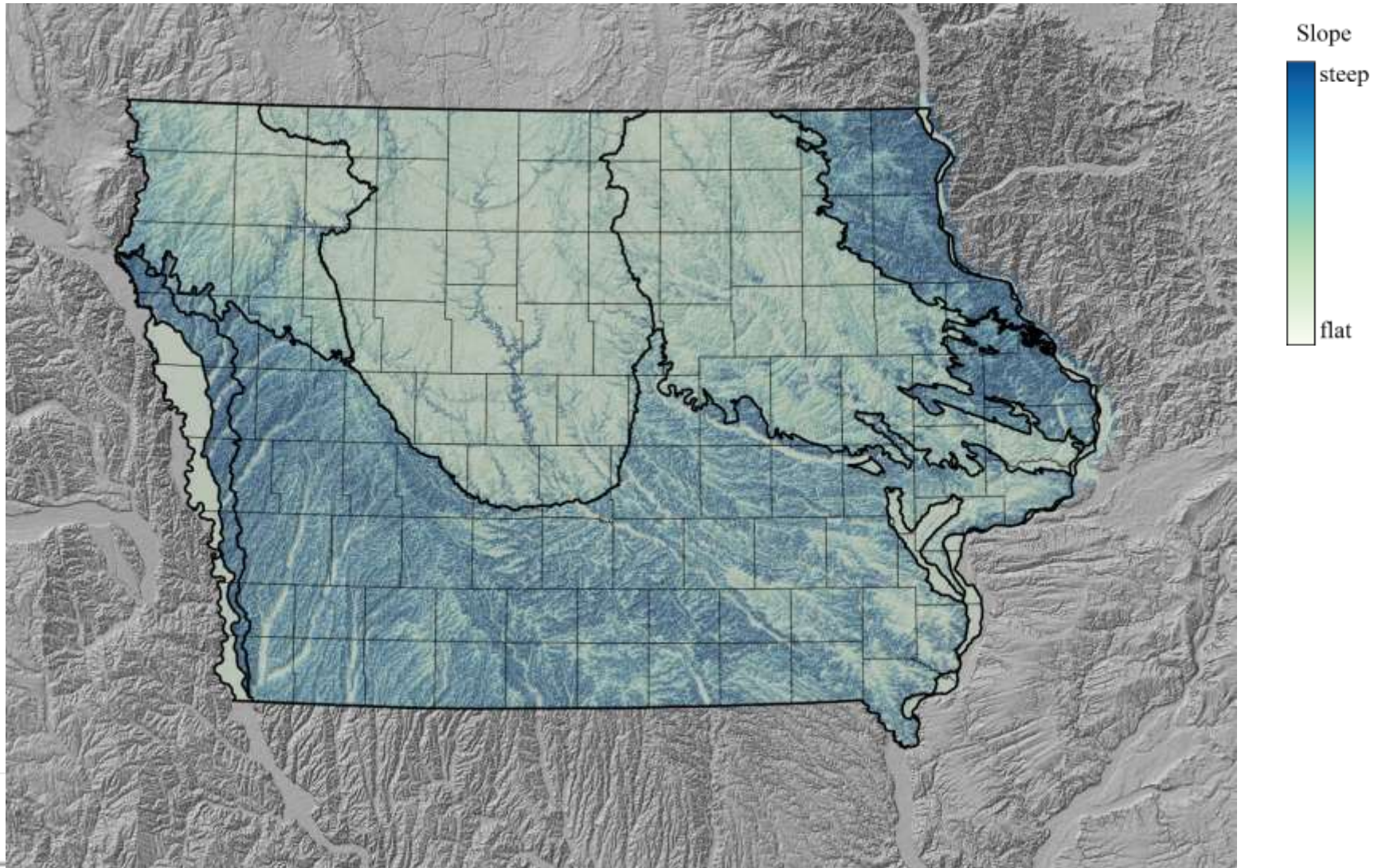
Slide credit: Phil
Kerr, IGS

Elevation and landforms

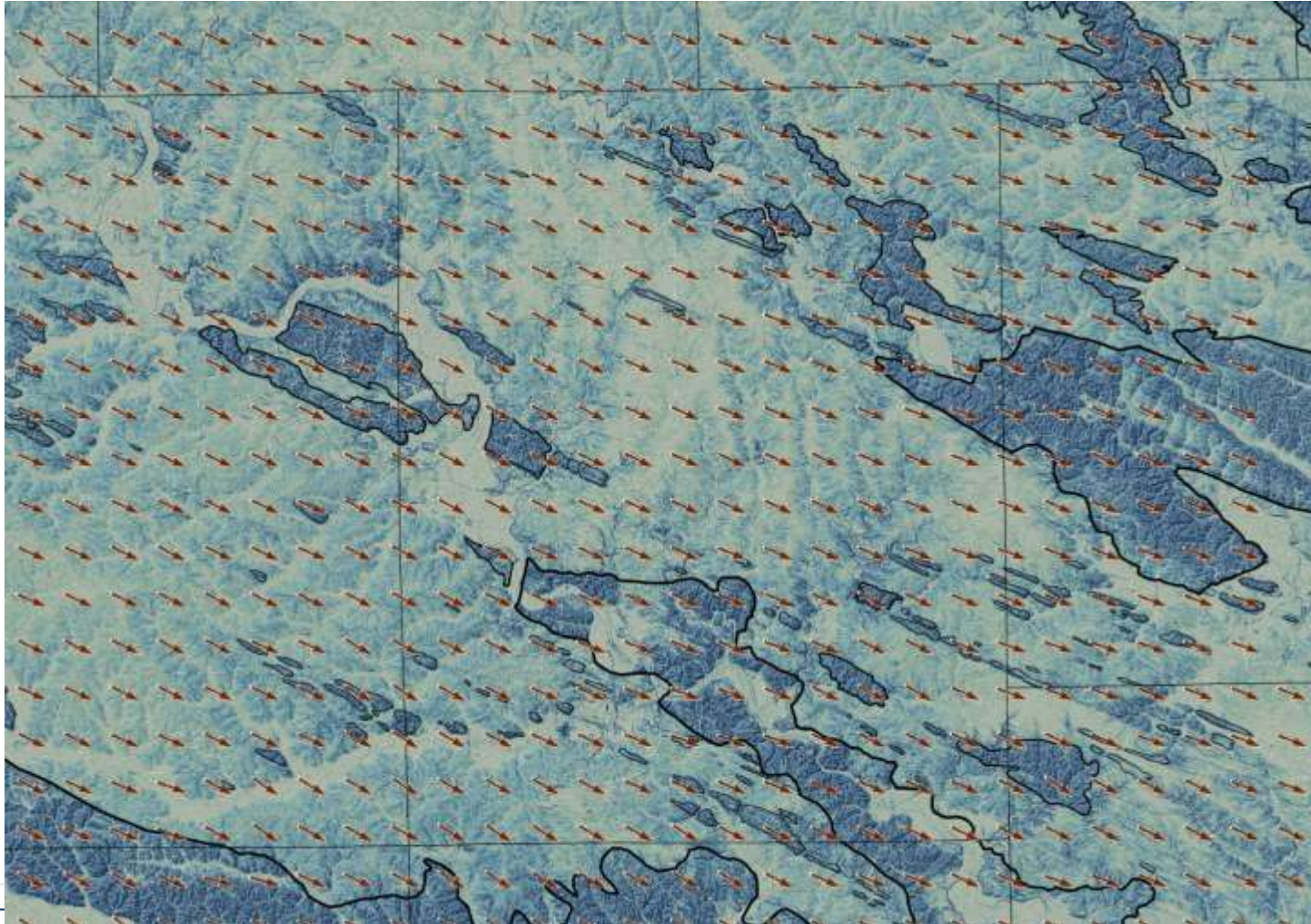


Slide credit: Phil
Kerr, IGS

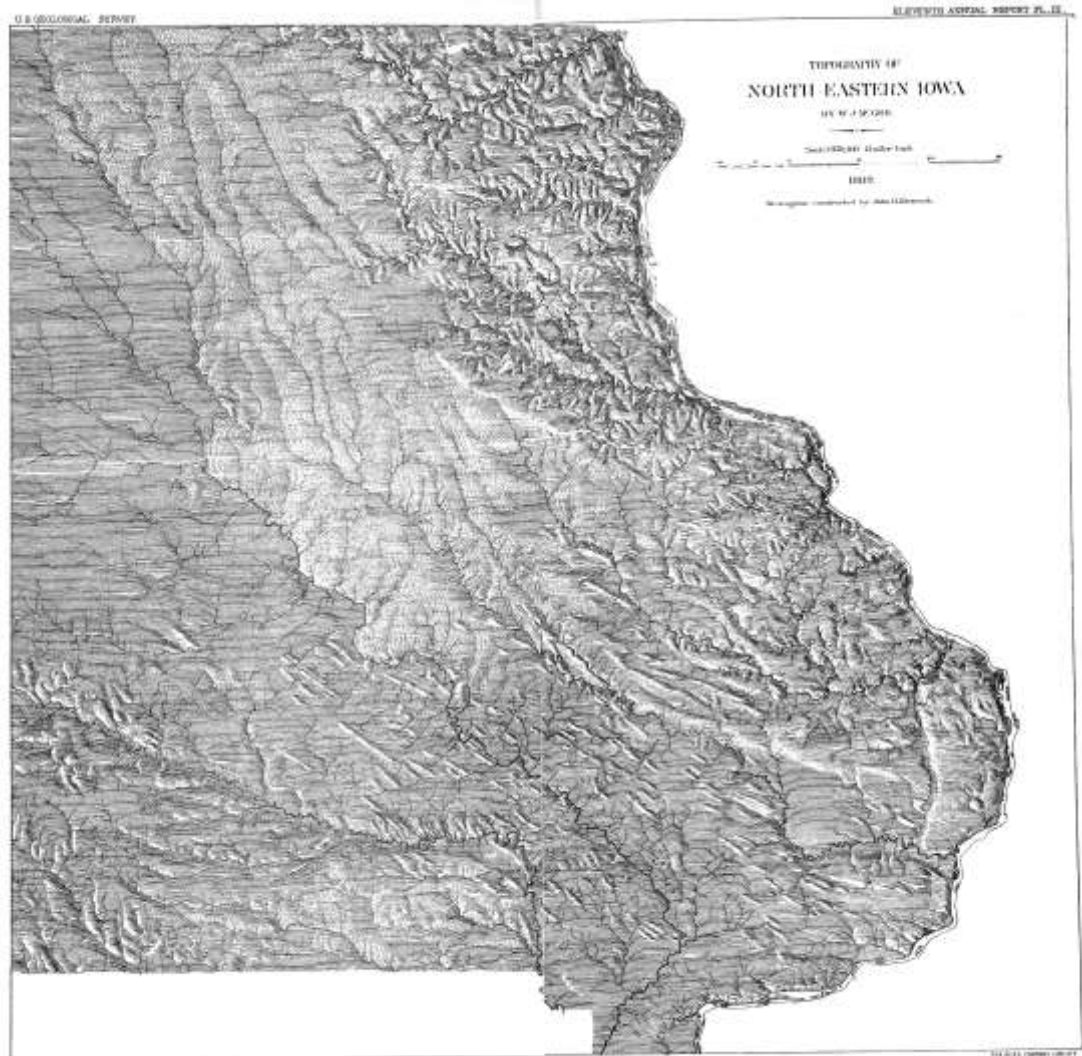




Wind Direction



Pahas (McGee 1899)



Slide Credit: Phil Kerr,
Iowa Geological Survey

Glacial Erratics



Photo credit: Katharine McCarville,
Upper Iowa University

Glacial Erratics

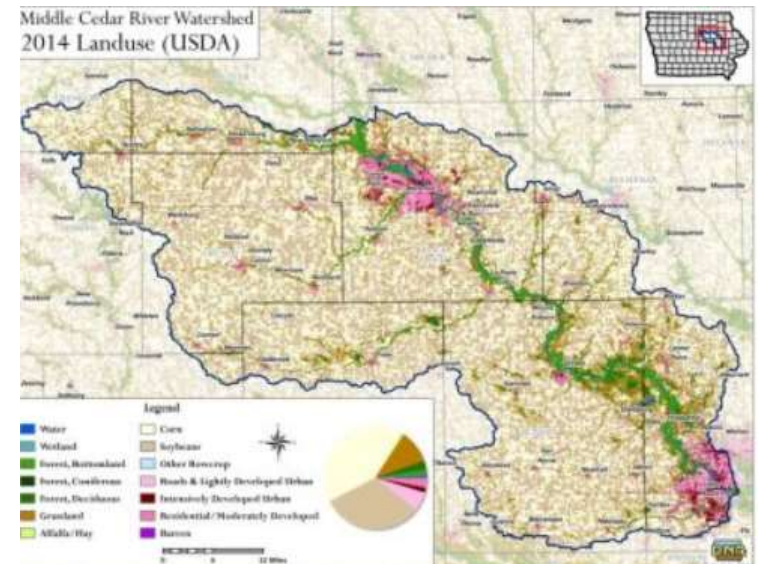
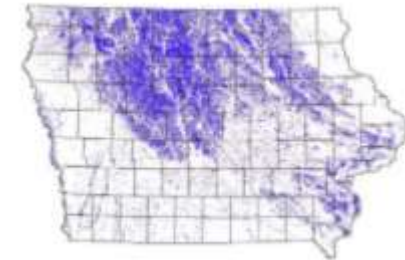




Landform	% of Iowa's Area	\$/year spent on new tile
Iowan Surface	16.9	\$24,500,000
Des Moines Lobe	21.4	\$5,845,000
Northwest Iowa Plains	8.3	\$2,272,545
Paleozoic Plateau	4.6	\$3,580,862
Southern Iowa Drift Plain	41.3	\$33,837,580
Total	92.5	\$70,064,878



2 million miles of tile in Iowa



1200 miles new tile/year!

Economics of N loss

Cost of Nitrogen: today about \$0.86/lb

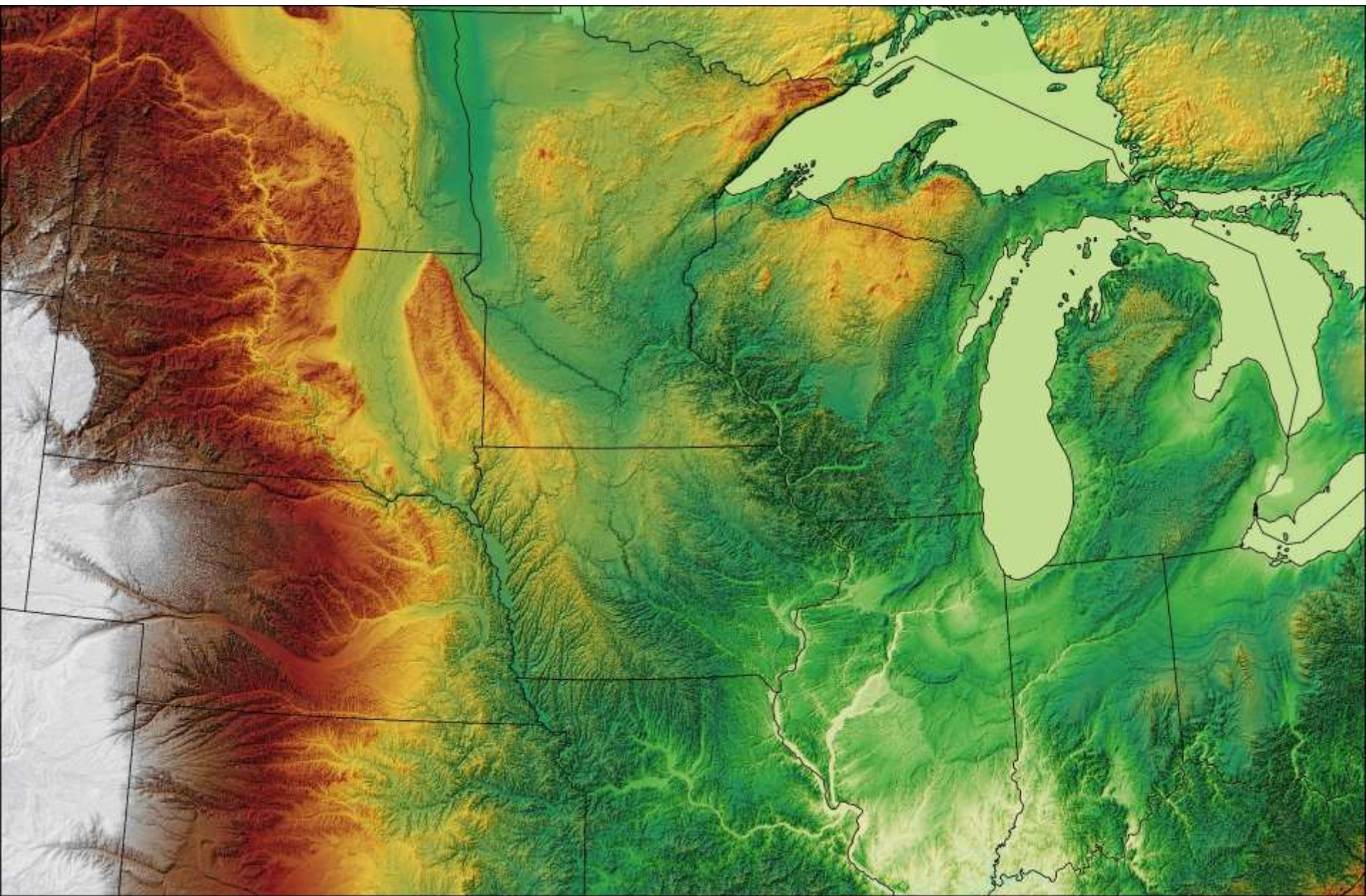
Cost to remove nitrogen using BMPs: \$2–\$10/pound

Average statewide load: 600 million lbs

45% reduction = 270 million lbs/year

\$540M to \$2.7B/year





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