



A vision for a more resilient Iowa

The Iowa Watershed Approach

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IIHR—Hydrosience & Engineering

Celebrating 100 years of expertise in 2020!



IIHR is a unit of the University of Iowa's College of Engineering. At IIHR, students, faculty members, and research engineers work together to understand and manage one of the world's greatest resources—water.





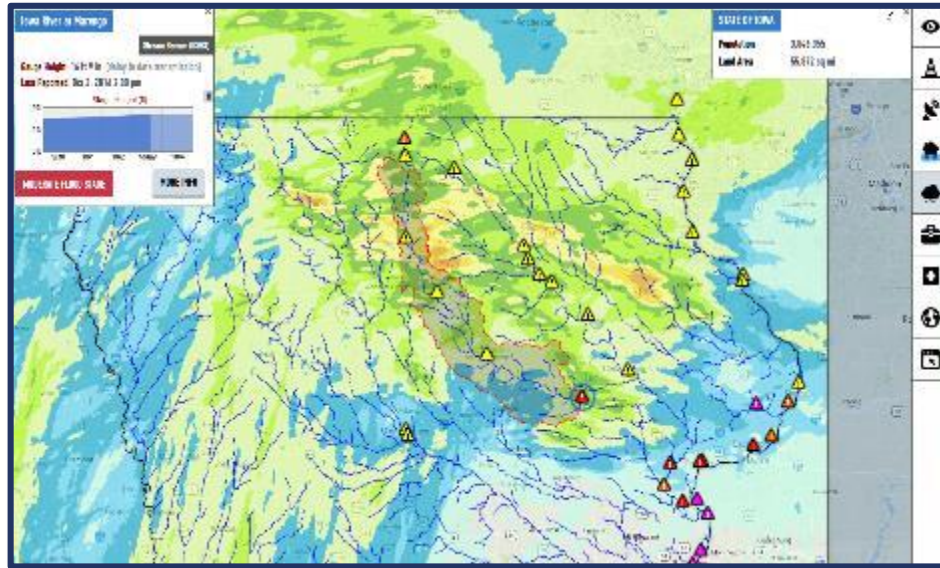
Cedar Rapids, June 2008



Coralville Reservoir, June 2008

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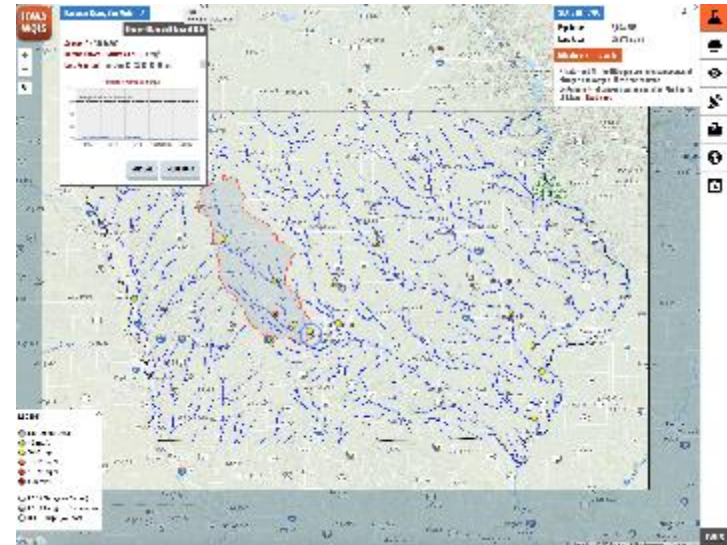
Iowa Flood Center



- Provide accurate, science-based information to help Iowans better understand flood risks
- Develop hydrologic models for physically-based frequency estimates and real-time flood forecasting
- Establish community programs to improve flood monitoring
- Develop strategies to mitigate and prevent future flood damage
- Develop Iowa's workforce in flood-related fields

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Iowa Nutrient Center



- Over 65 sensors (along with 17 additional USGS sensors) measure:
Nitrate, pH, Specific Conductance, Turbidity, Dissolved oxygen, Temperature
- Near real-time data, sampled every five minutes, are relayed to the center every 15 minutes and displayed online: [Iowa Water-quality Information System \(IWQIS\)](#)
- Forty percent of all real-time nitrate sensors in the nation are in Iowa



IOWA FLOOD INFORMATION SYSTEM

The Iowa Flood Information System (IFIS) is a one-stop web-platform to access community-based flood conditions, forecasts, visualizations, inundation maps and flood-related information, visualizations and applications



ABOUT



FEATURES



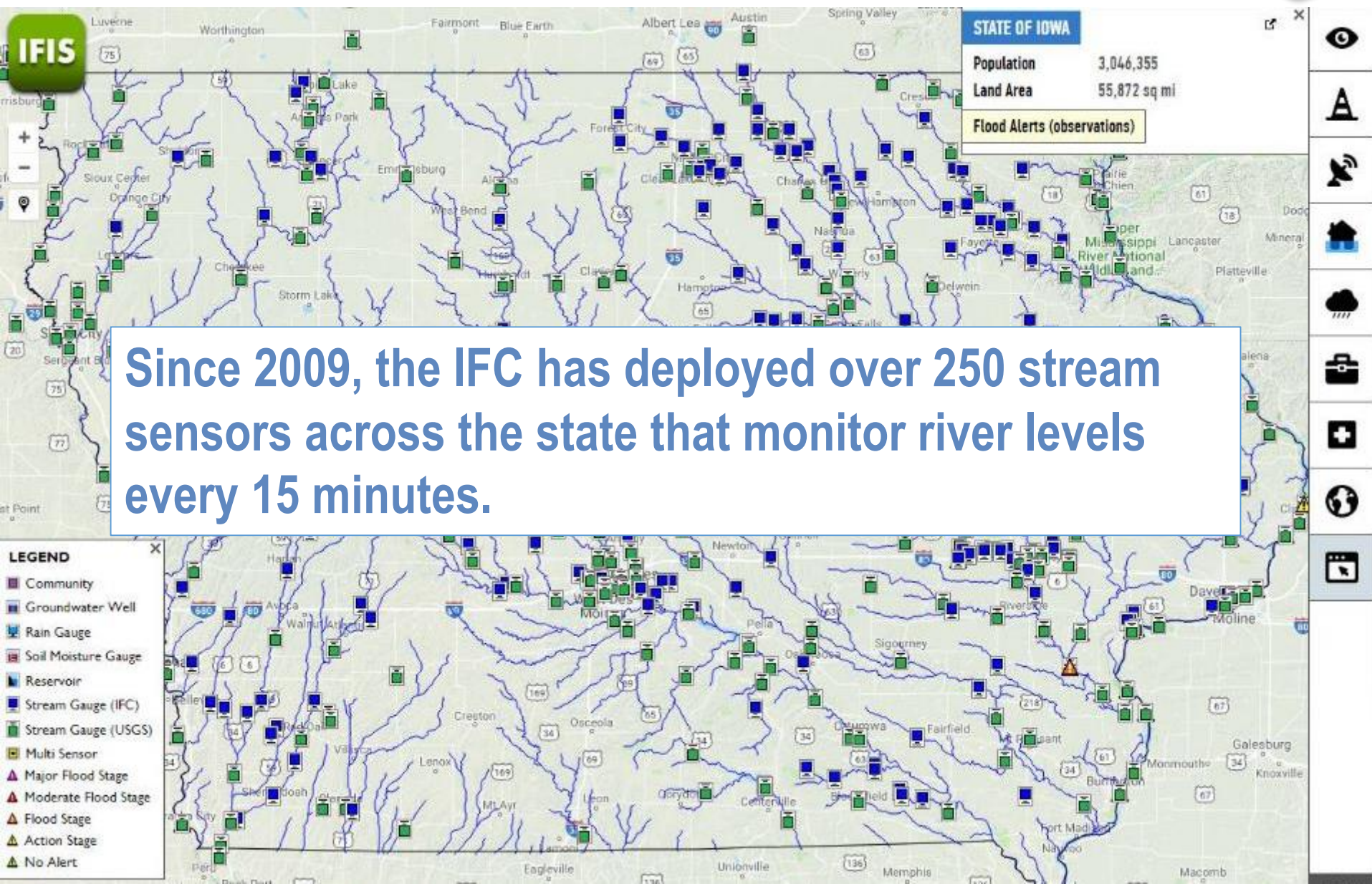
TOOLS



RESOURCES

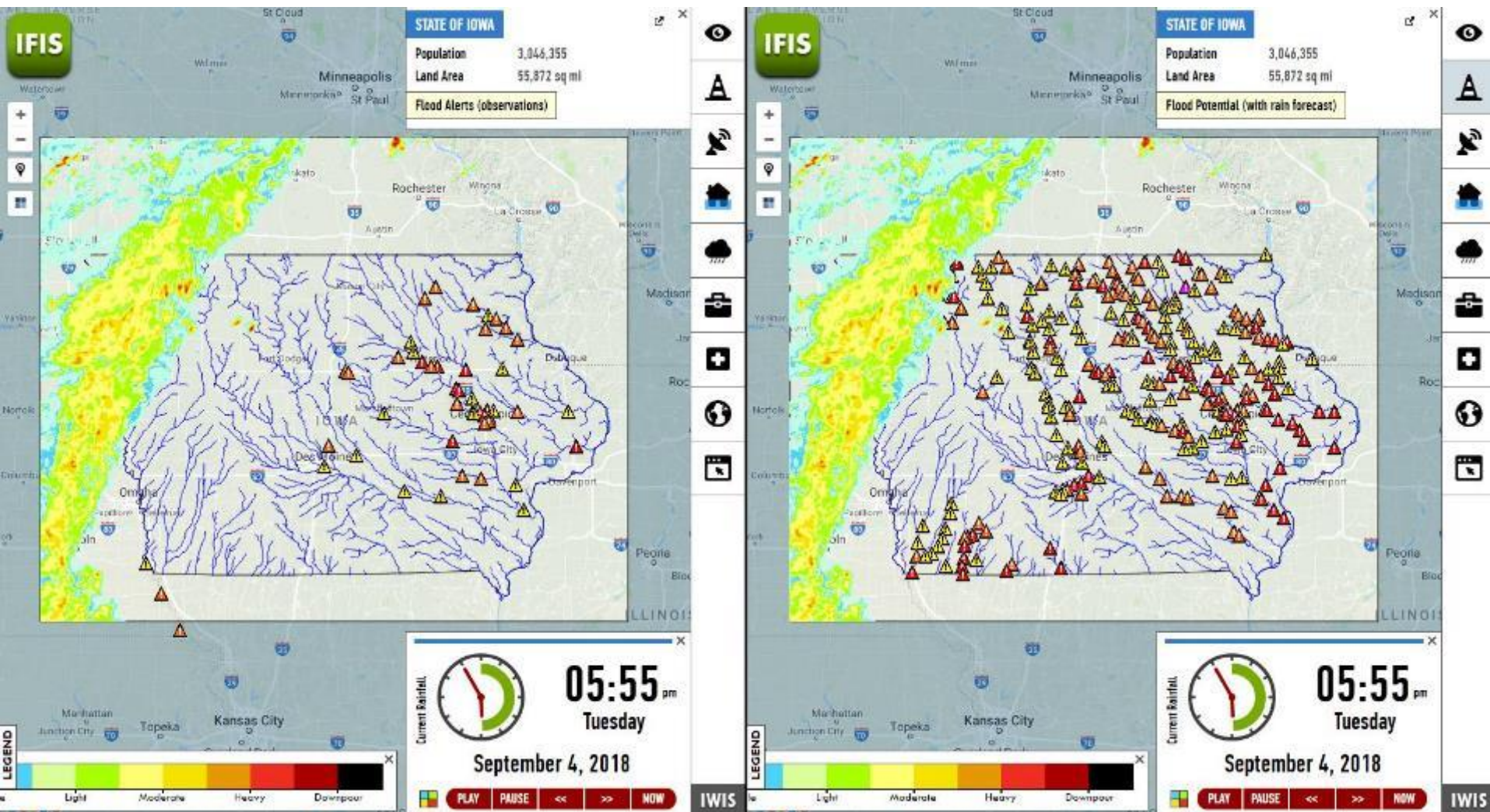
<http://ifis.iowafloodcenter.org/ifis/en/app/>

Find YOUR stream sensor!

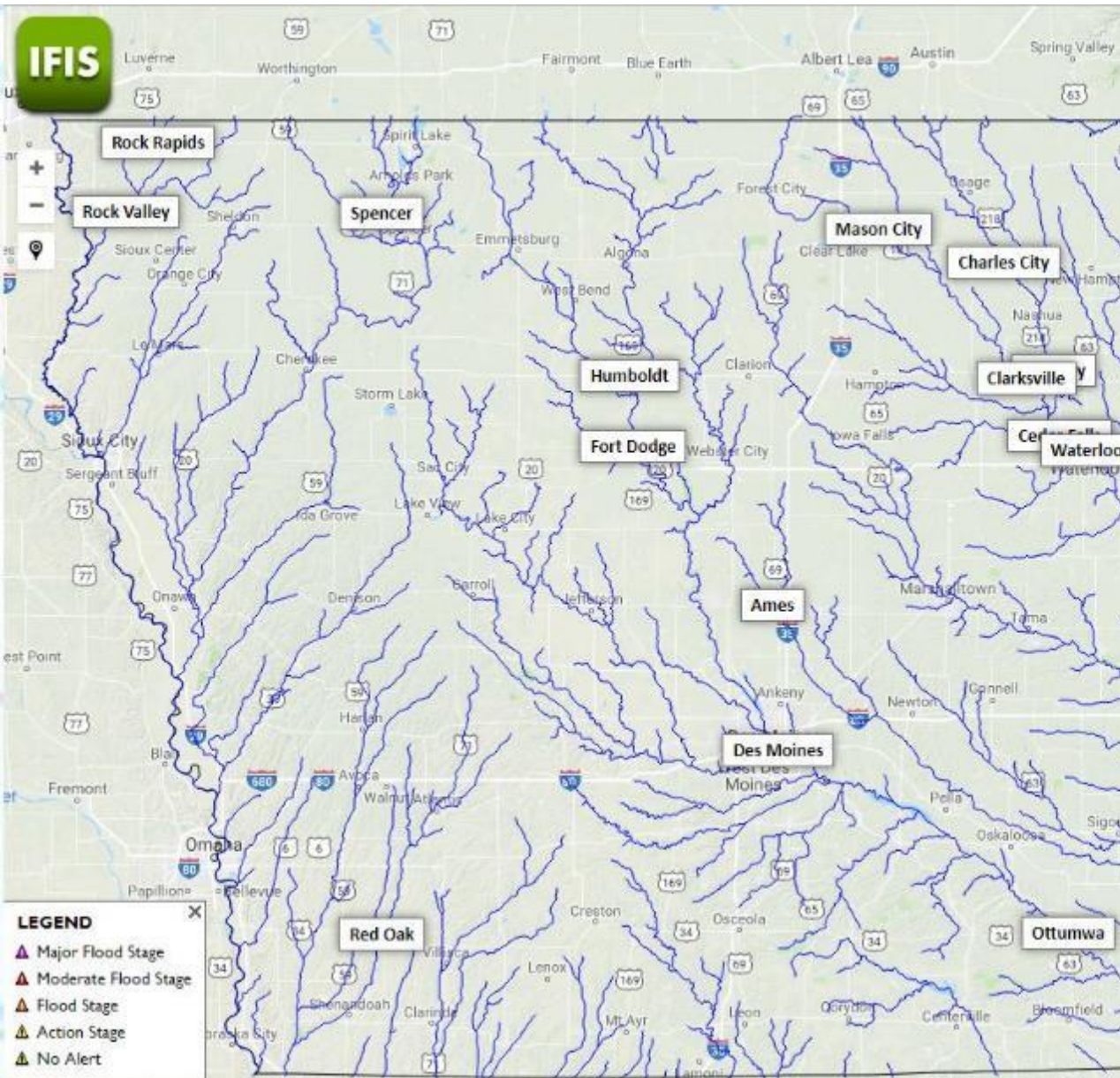




Flood Alerts & Forecasts for 1,000 locations



26 Community Inundation Maps!



FLOOD MAPS

- ☐ Current Conditions
- ☒ Community Scenarios

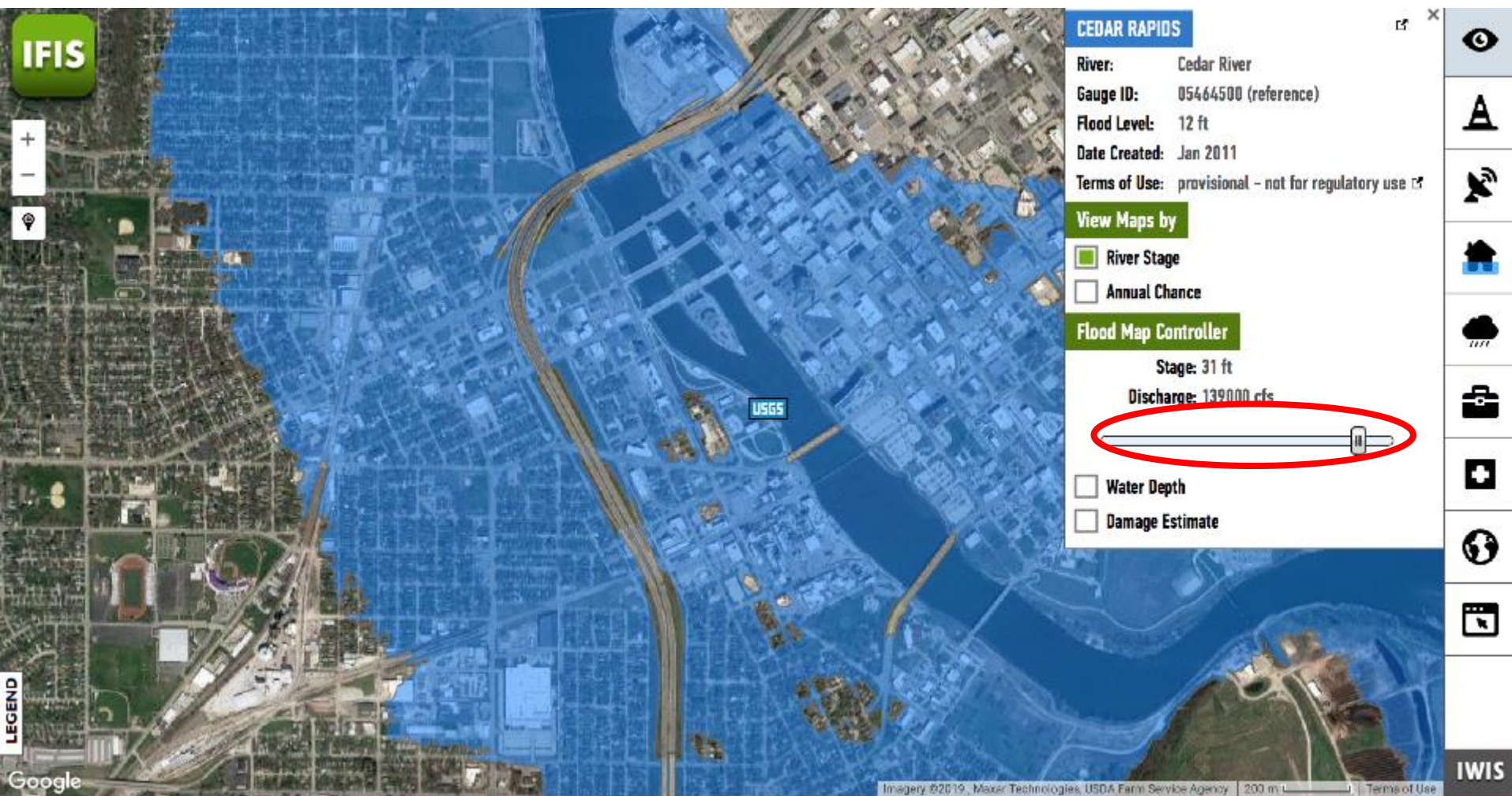
- ☐ Charles City
- ☐ Clarksville
- ☐ Columbus Junction
- ☐ Des Moines

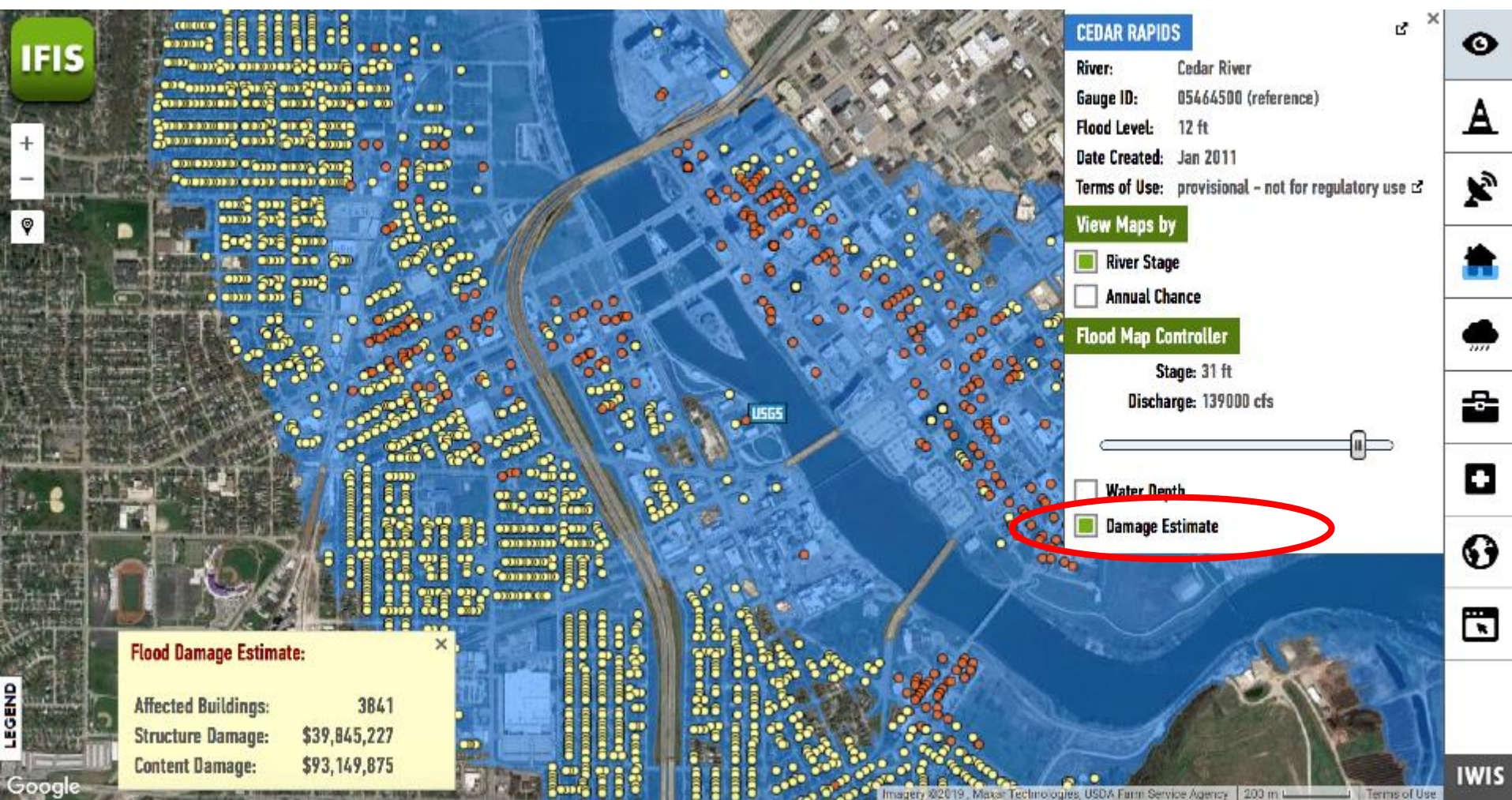
- ☐ Reservoir Releases
- ☐ State-wide Inundation

MAP RESOURCES

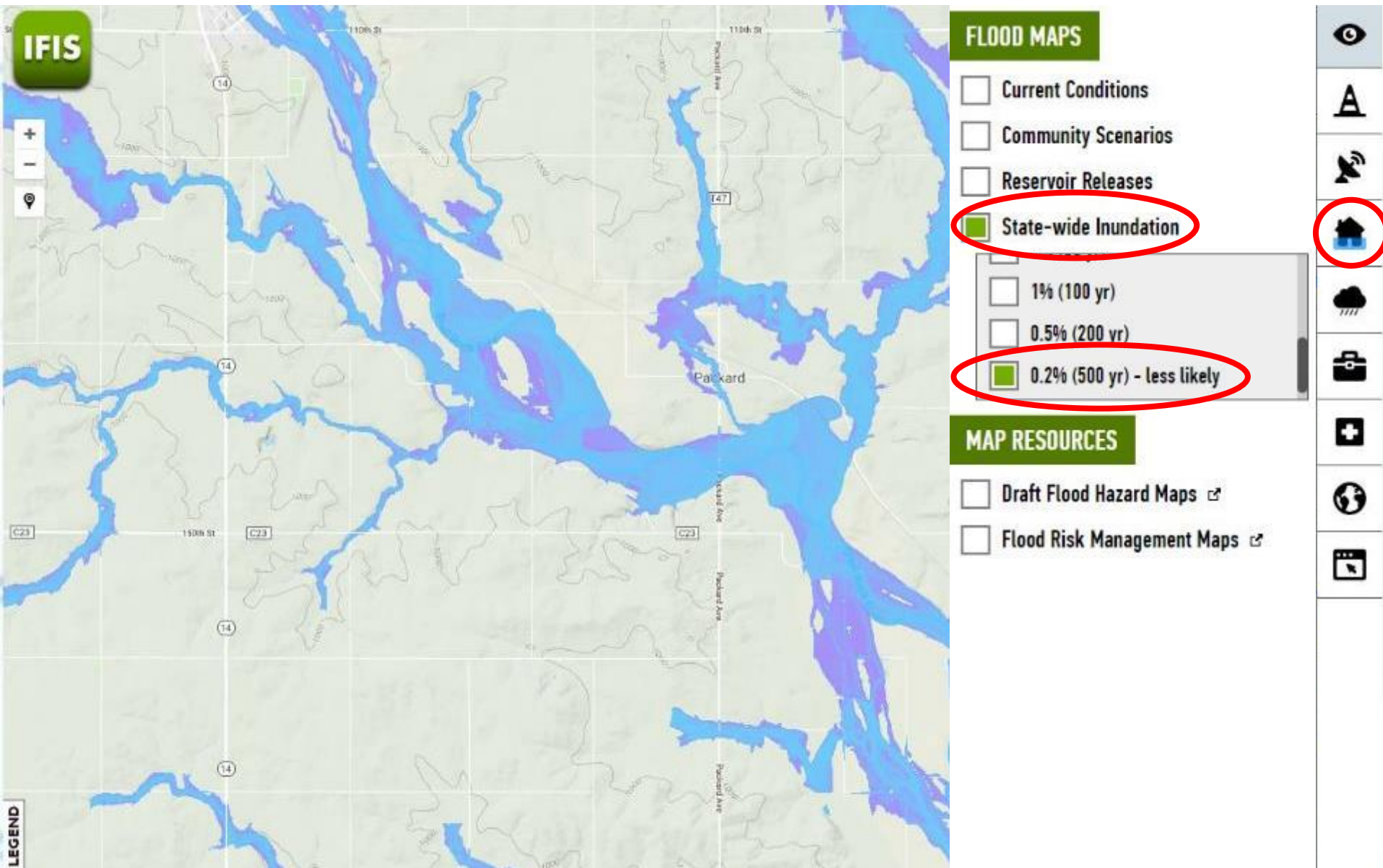
- ☐ Draft Flood Hazard Maps [↗](#)
- ☐ Flood Risk Management Maps [↗](#)







Statewide Flood Inundation Maps





- Over 3.3 million page views!
- Over 150,000 visitors during the 2018 fall flooding
- Average visit duration: ~18 minutes

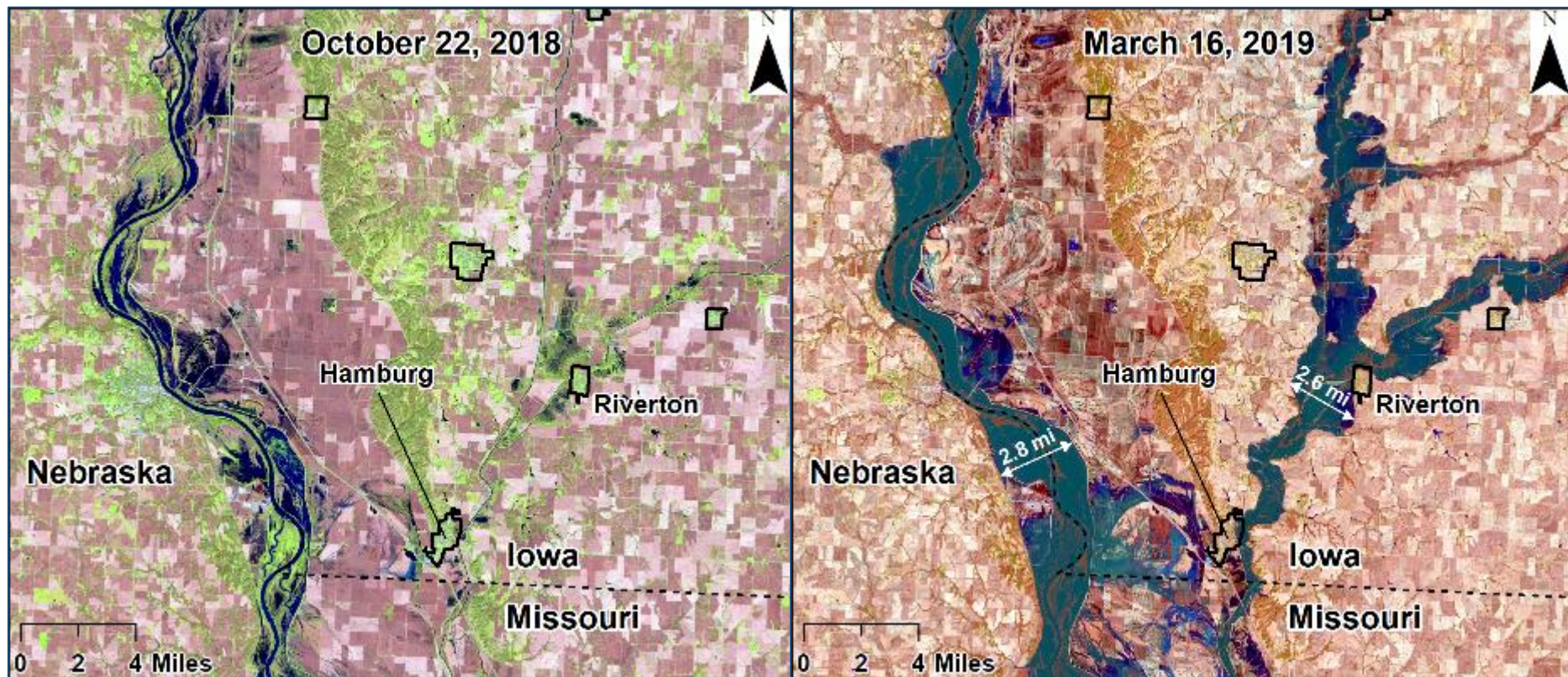


2018 Rainfall

- Second wettest year on record
- Statewide average precipitation was 10 in. above normal
- 27 counties in northern Iowa experienced their wettest year
- Third wettest fall on record

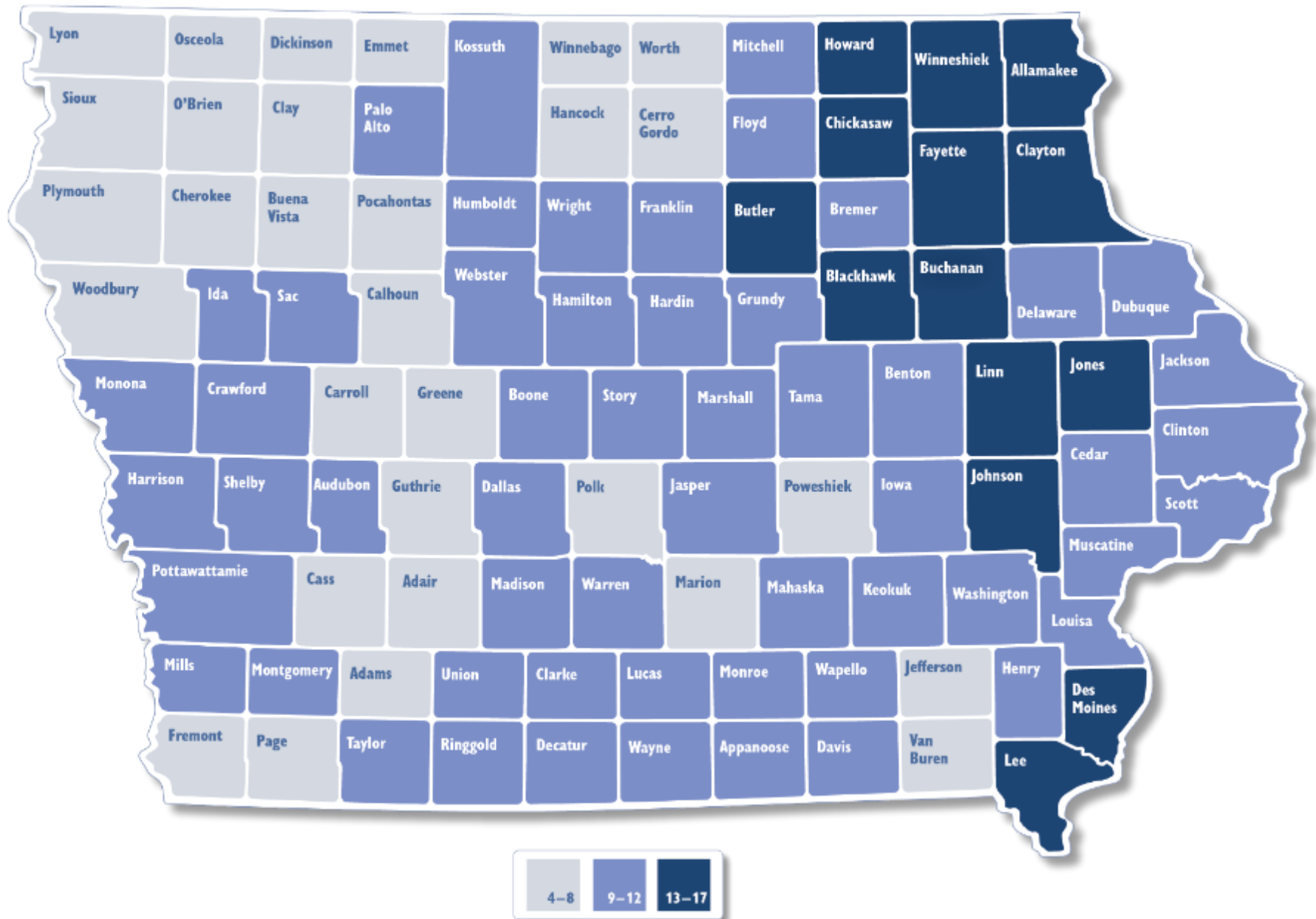


Hamburg, IA 2019



FLOOD-RELATED PRESIDENTIAL DISASTER DECLARATIONS

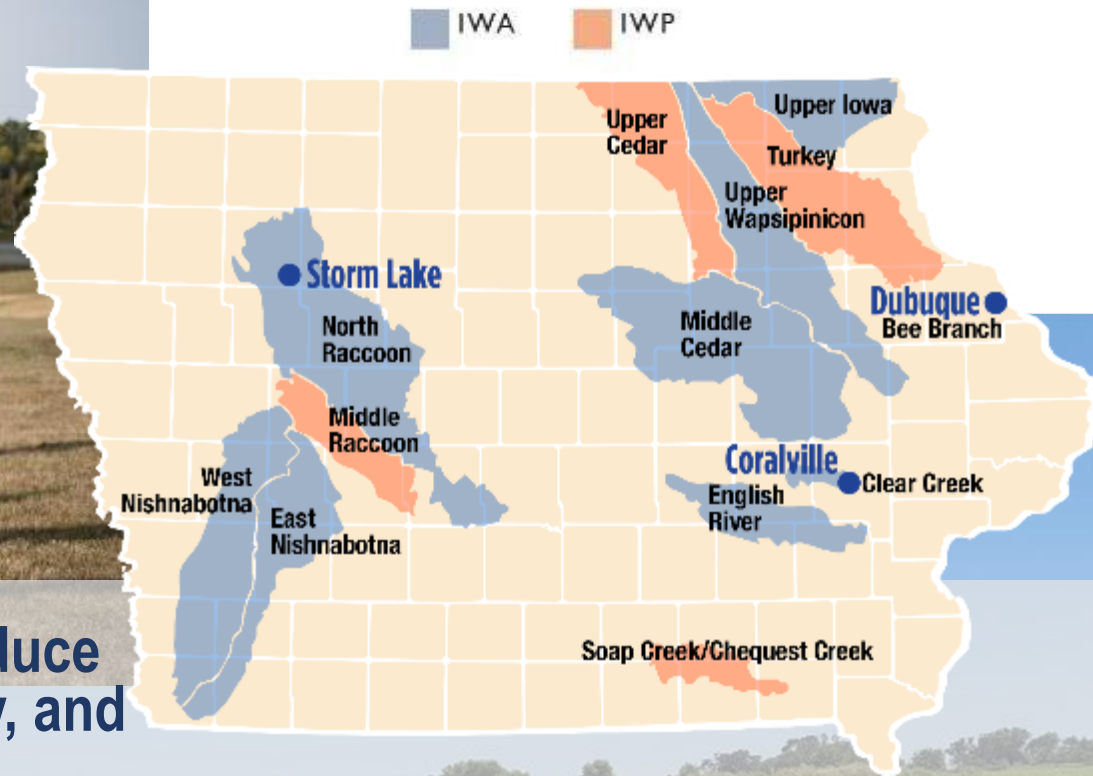
1988–2016 (TOTAL: 951)



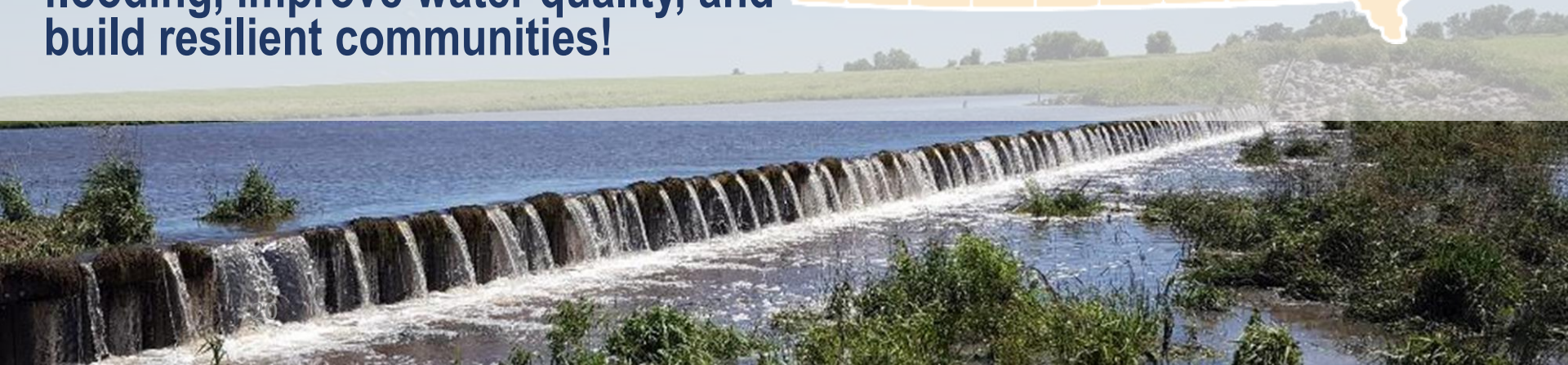


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Iowans working together to reduce flooding, improve water quality, and build resilient communities!





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National Disaster Resilience Competition (2016-2021)

- Funder: US Dept. of Housing and Urban Development, in collaboration with the Rockefeller Foundation
- Funding level: \$1B; CDBG; Superstorm Sandy
- **Out of 14 applicants, Iowa received the 4th largest grant award totaling \$96,887,177**
- Applicant: State of Iowa, Iowa Economic Development Authority (IEDA)
- Iowa Watershed Approach program developed by IFC in consultation with many, many partners



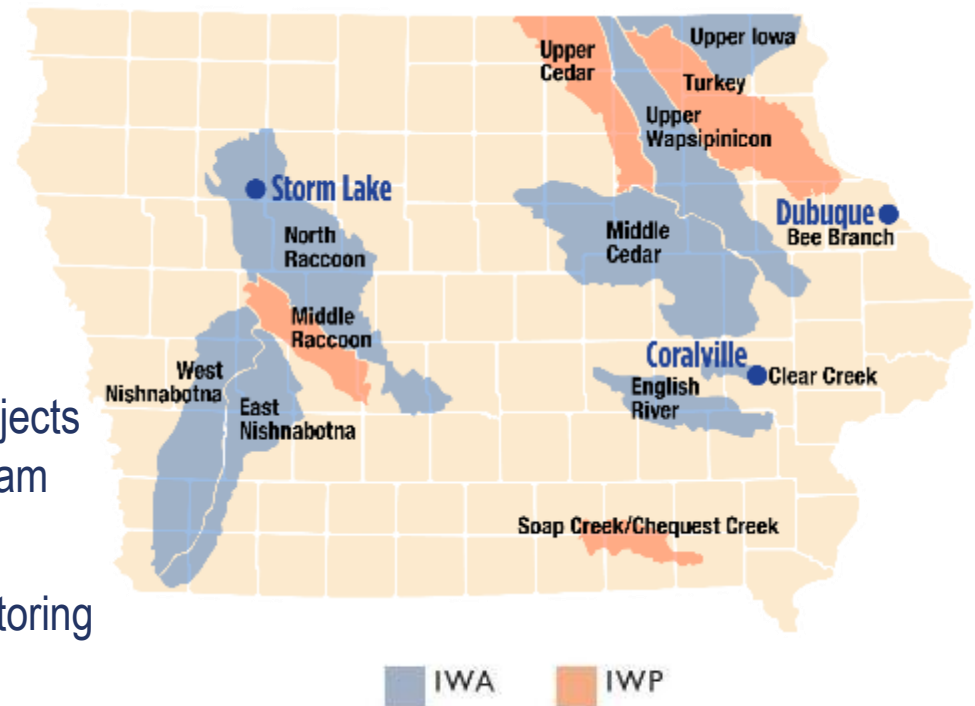


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IWA Program Description

- Establish a WMA
- Develop a hydrologic assessment and watershed plan
- Deploy monitoring equipment
- Work with **project coordinators** and volunteer landowners to implement projects that reduce the magnitude of downstream flooding and improve water quality
- Assess project benefits based on monitoring and modeling data





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Hydrologic Assessment

- Iowa's Flood Hydrology & Water Quality
- Conditions in each IWA Watershed
 - Hydrology
 - Geology & Soils
 - Topography
 - Land Use
 - Instrumentation/Data Records
- BMPs: Existing vs. Potential
- Hydrologic Model
- Watershed Scenarios
 - Ex. row crop to tall-grass prairie, row crop using cover crop, distributed ponds/wetlands



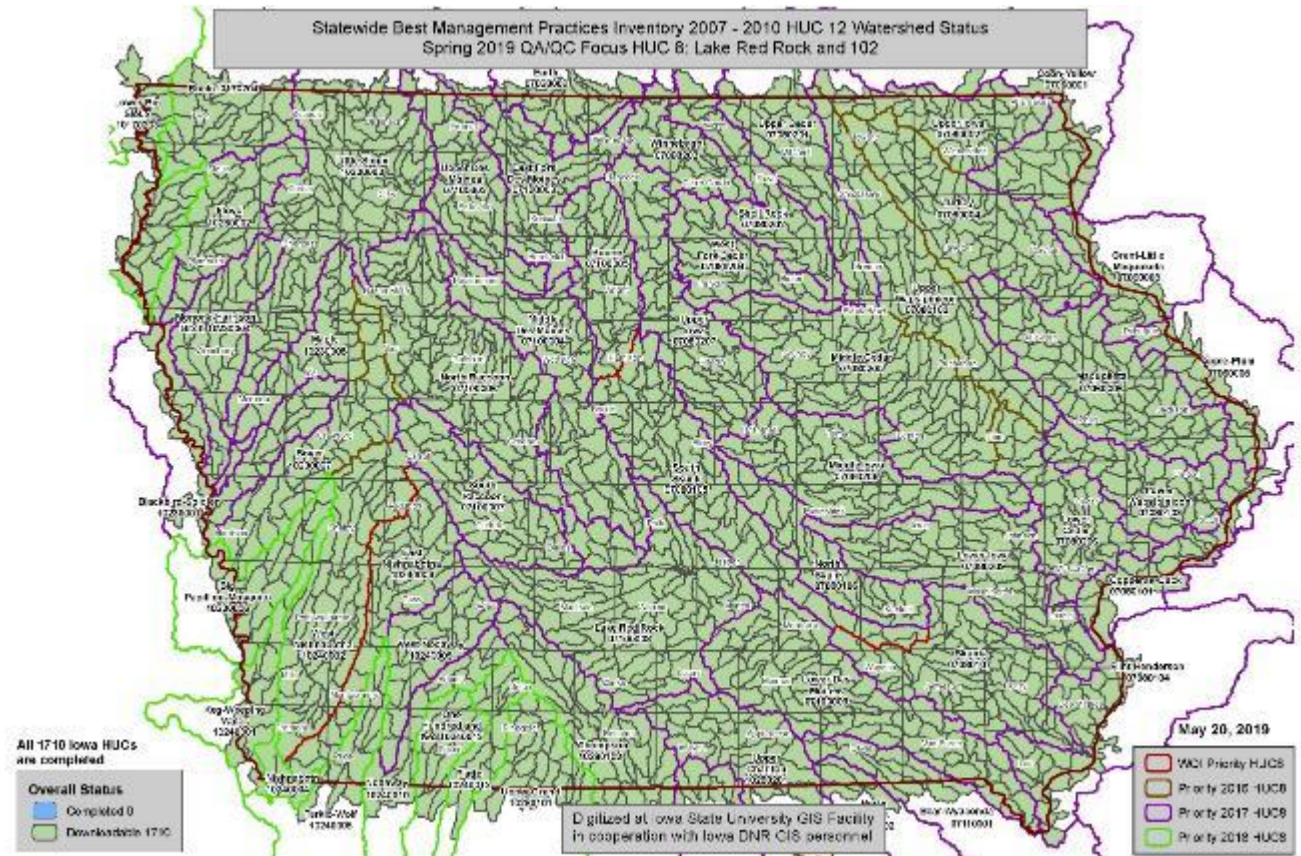


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Iowa BMP Mapping Project

- Iowa State University
- Iowa Department of Natural Resources
- Iowa Department of Agriculture and Land Stewardship
- National Laboratory for Agriculture and the Environment
- Iowa Nutrient Research Center (ISU)
- Iowa Nutrient Research and Education Council

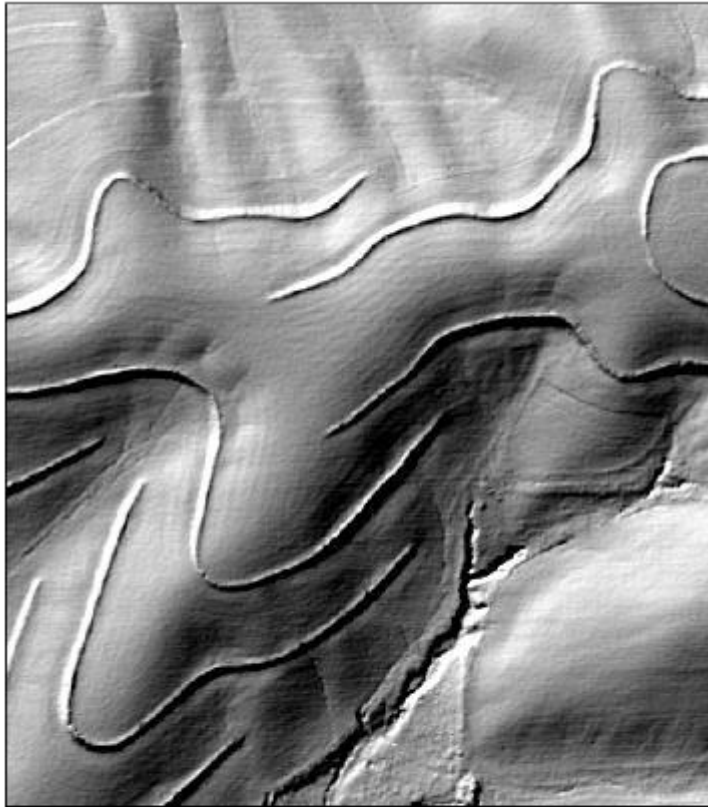




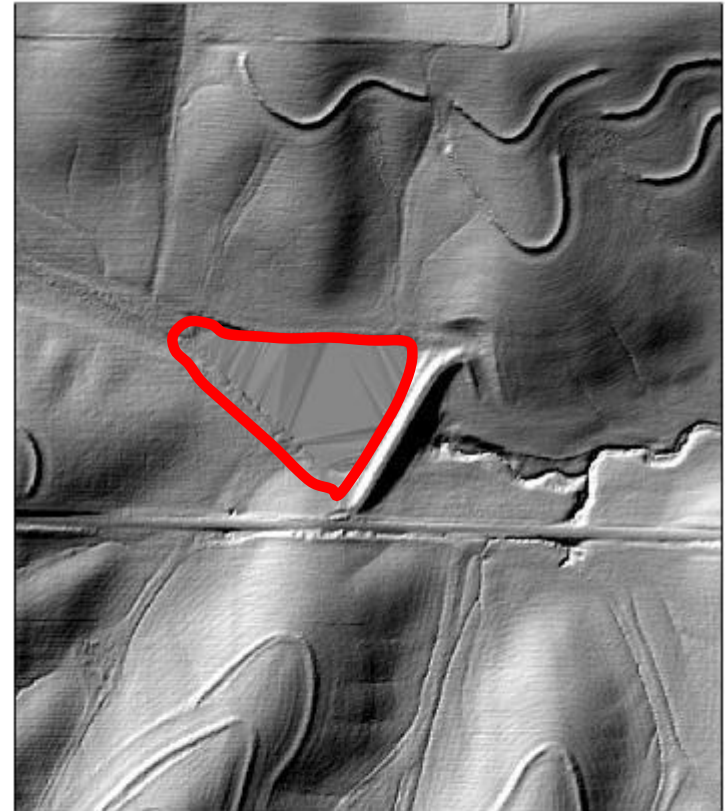
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Iowa BMP Mapping Project



Hillshade showing narrow base terraces



Pond dam on hillshade



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Iowa BMP Mapping Project



Contour buffer strips with grassed waterways



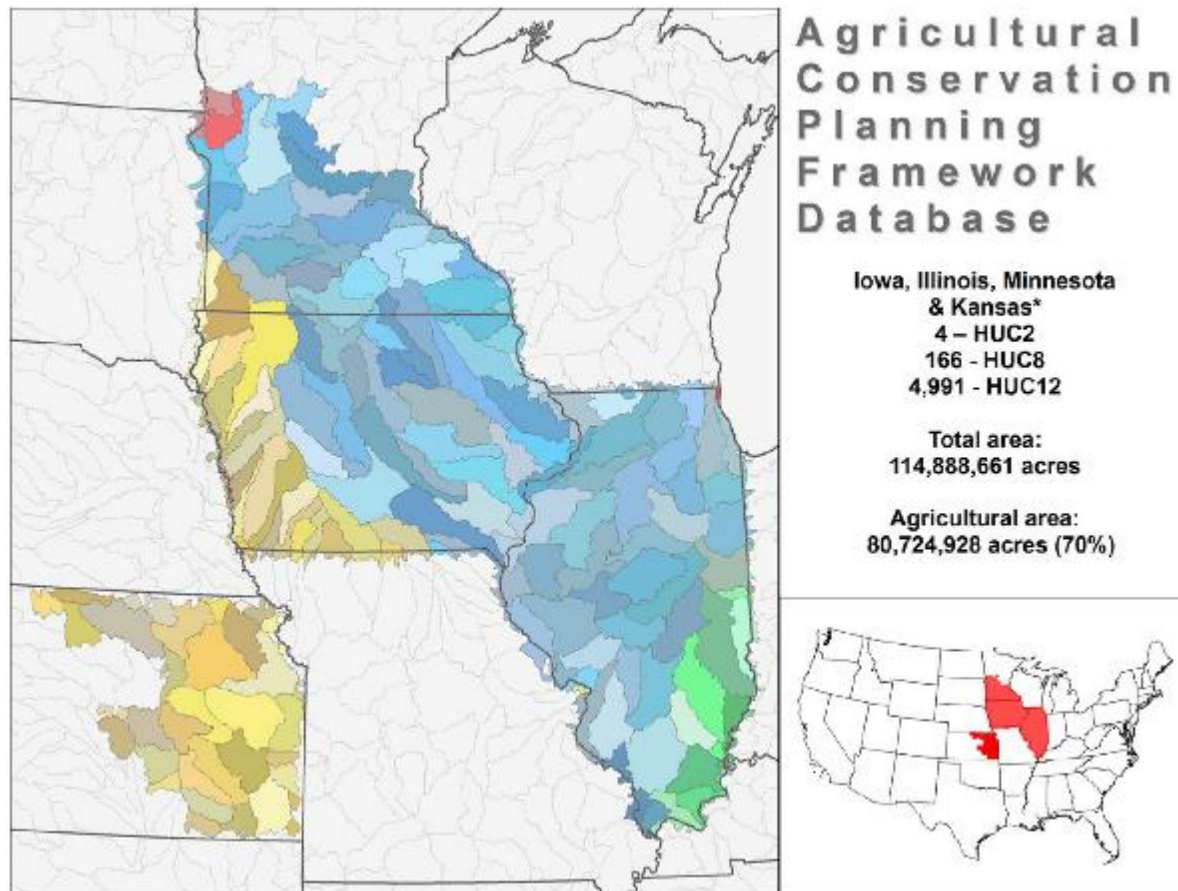
Contour strip cropping with grassed waterways



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Agricultural Conservation Planning Framework (ACPF)



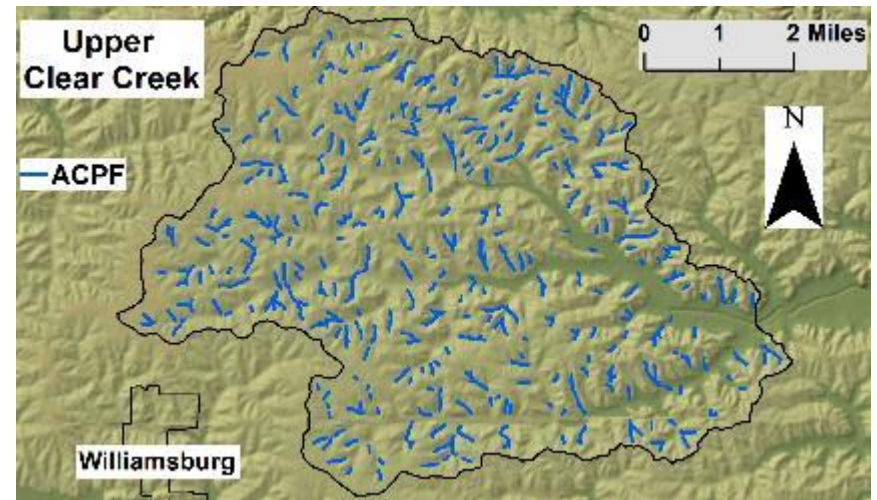
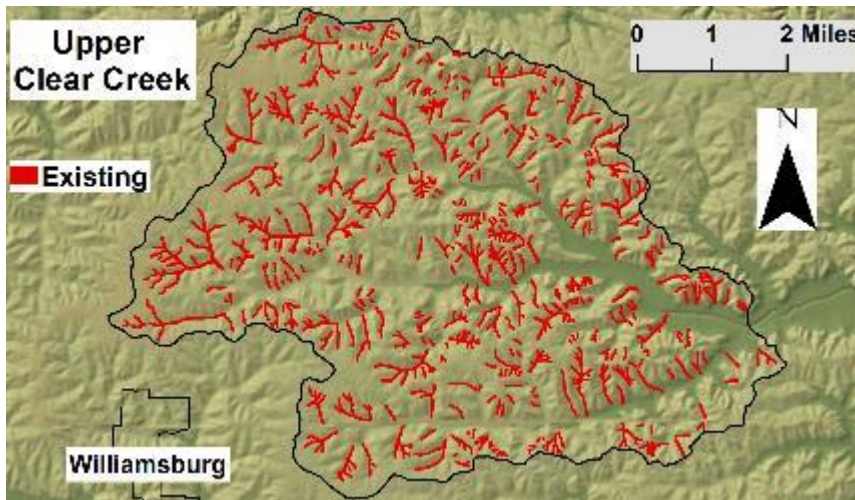
<http://northcentralwater.org/acpf/>



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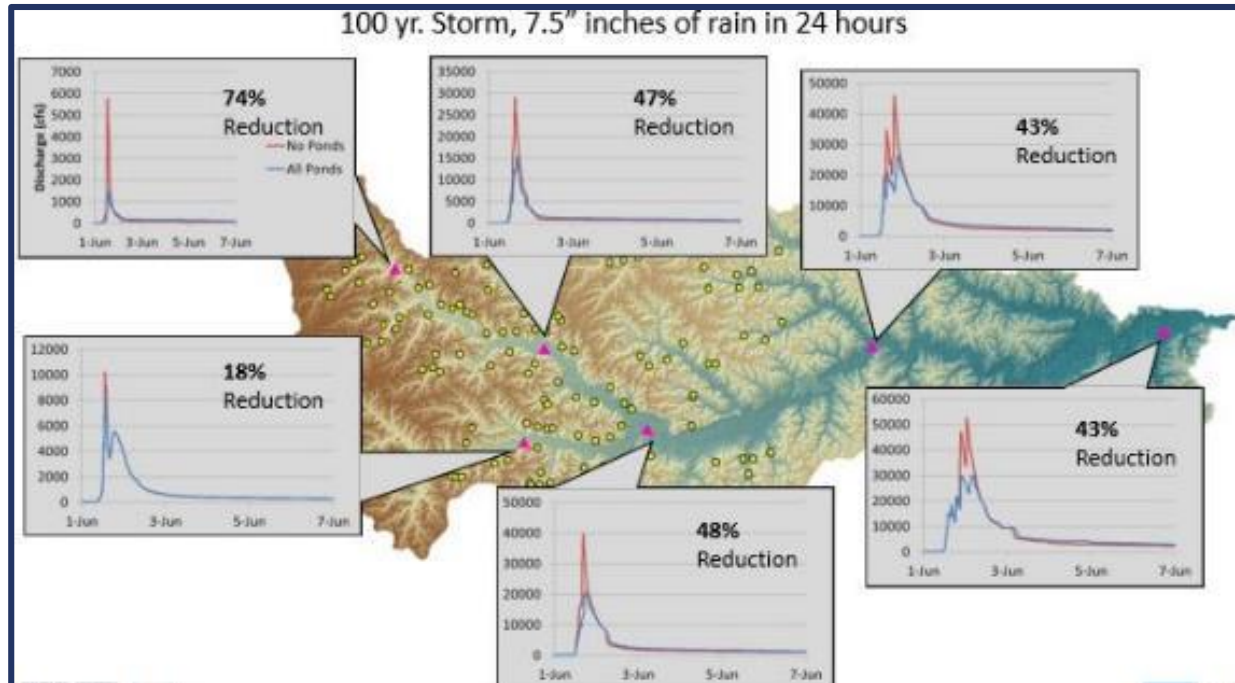
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BMP Mapping + ACPF



Grassed Waterways	Distance (miles)
Existing	131.7
ACPF	62.0
Potential	30.3

Case Study: Soap Creek Watershed



1986 – Formation of Soap Creek Watershed Board – 28E

1988 – Study identifies 154 project locations to reduce flooding

2012 – 132 watershed projects complete



Implement Flood Mitigation Practices

- 90% Cost-share
- 500+ projects sited and under design



Soap Creek Pond Structure from IWP





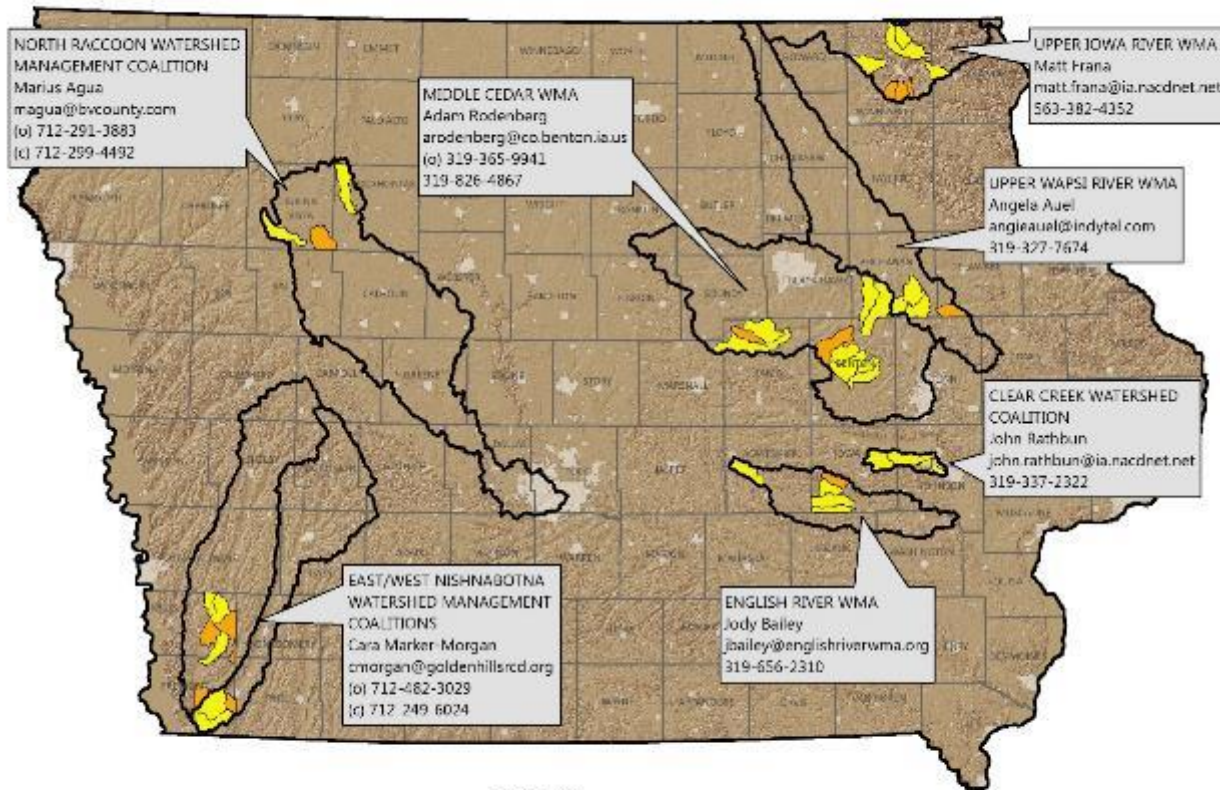


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Priority subwatersheds

NDR - IWA BMP IMPLEMENTATION AREAS



Legend

- MID-URN Environmental Area
- Original BMP Implementation Area
- MID-URN Infrastructure Area
- BMP Implementation Area Added 8/2/2018





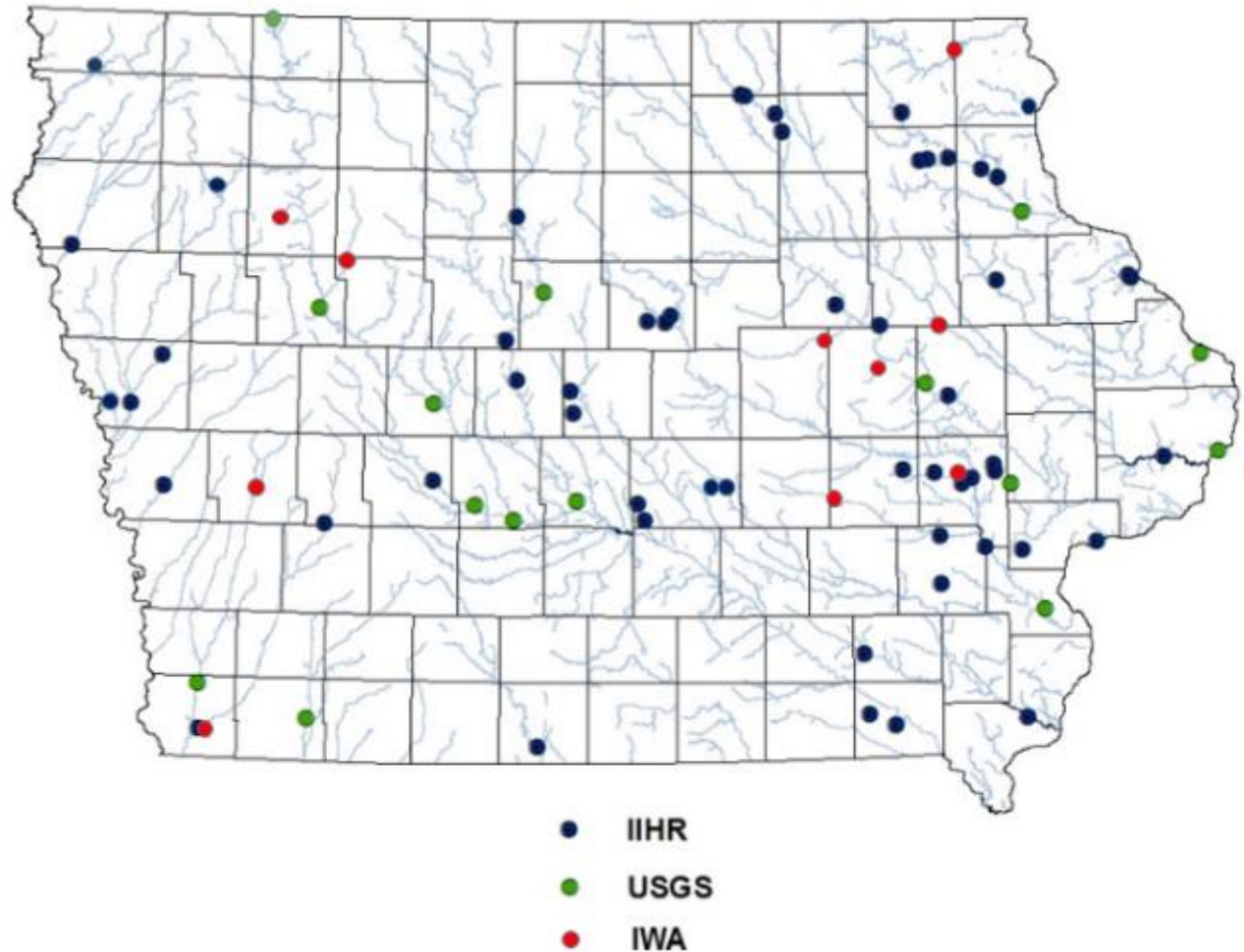
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Sites

80+ sites Nitrate-N

20-25 sites

- Temperature
- pH
- SC
- DO
- Turbidity



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**IIHR Water Quality
Sensor Setup**

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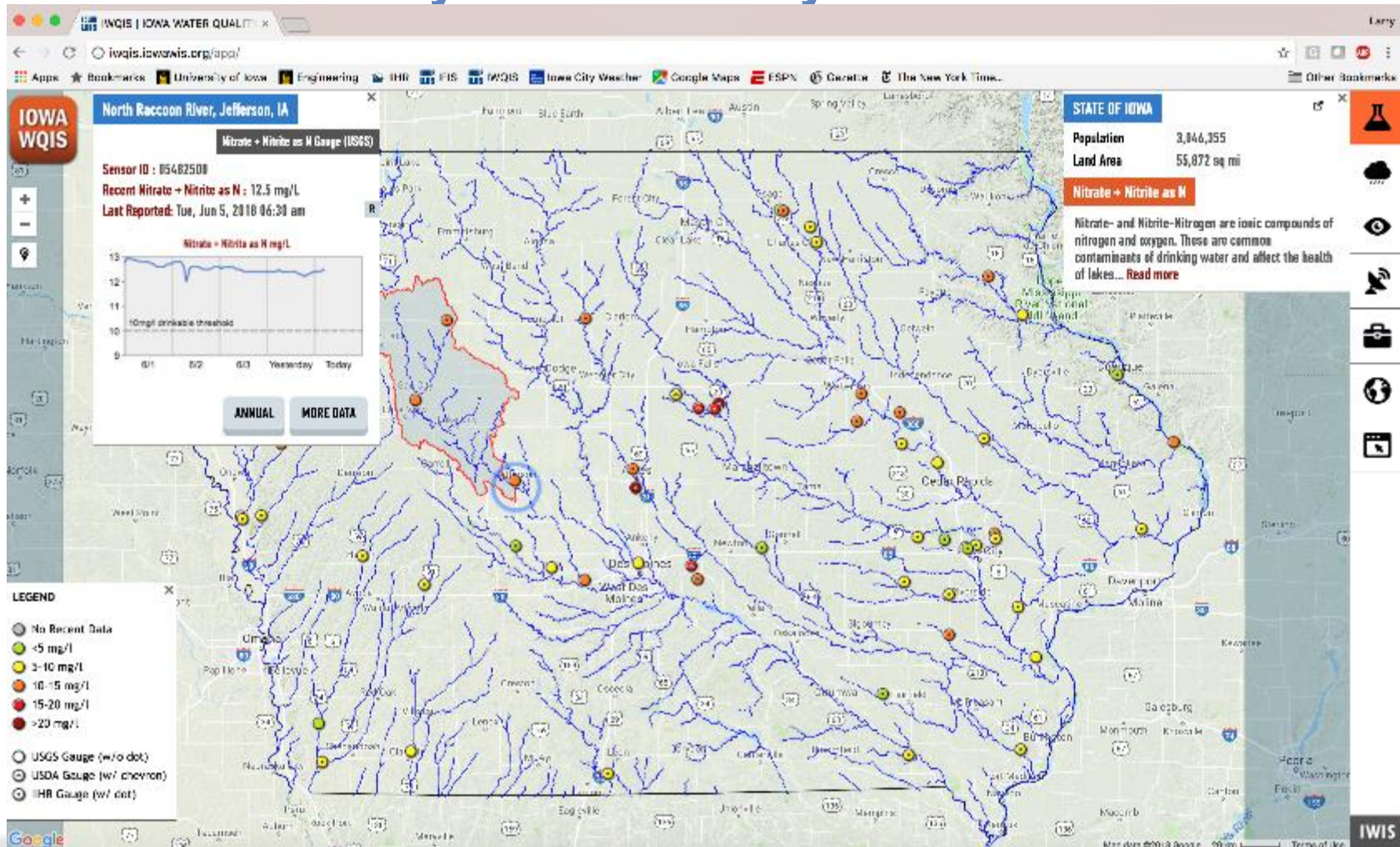
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Constructed Wetland Monitoring



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Iowa Water Quality Information System

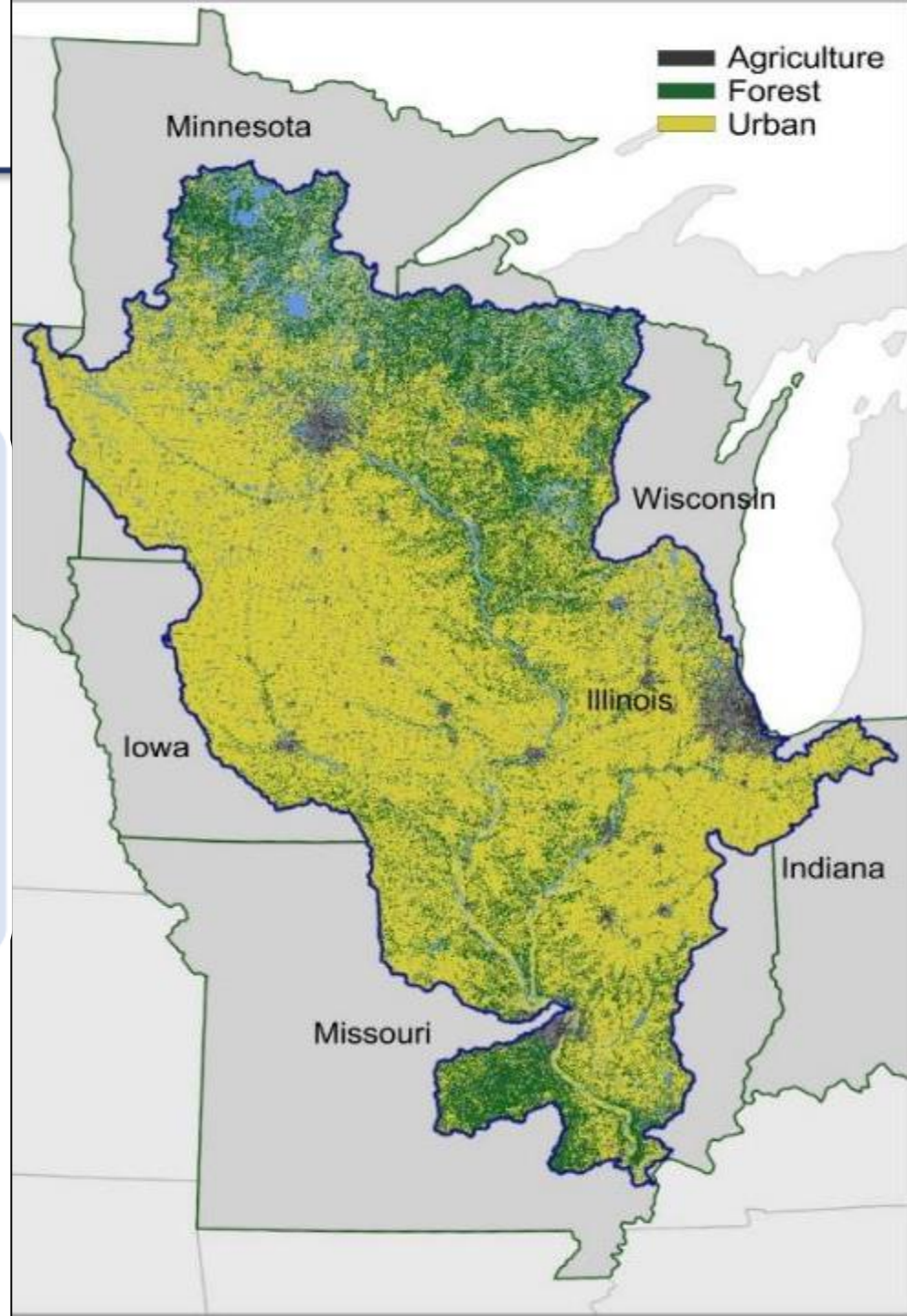
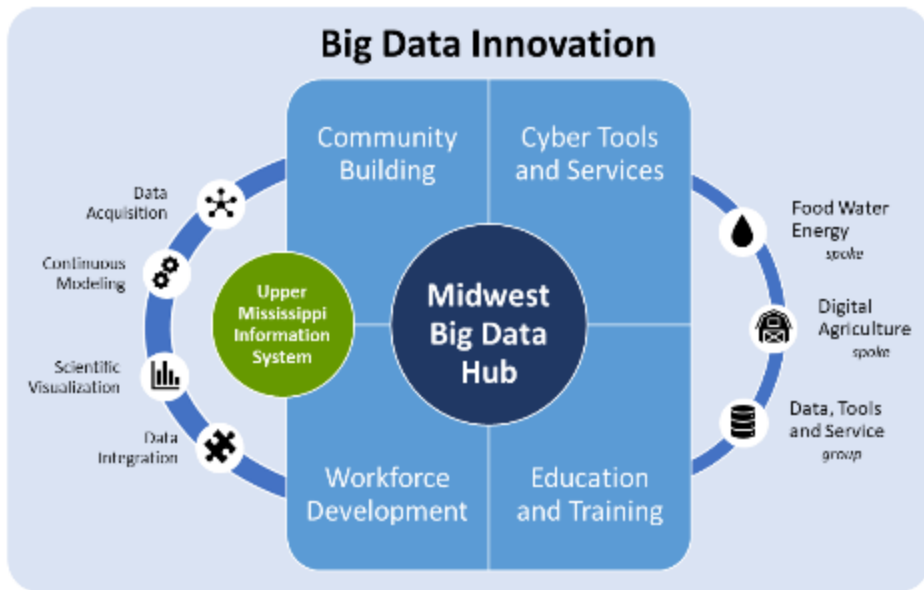


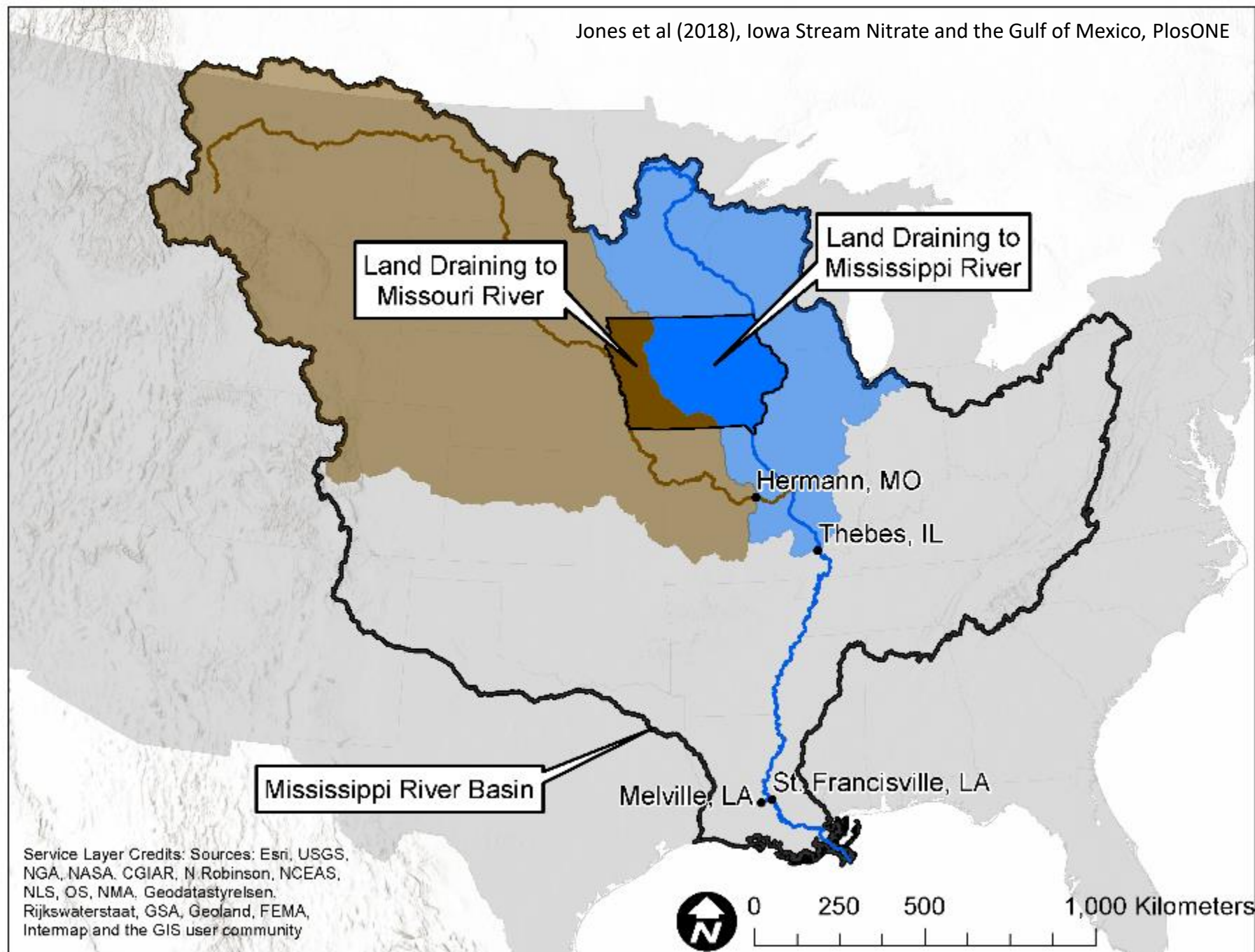
<http://iwqis.iowawis.org/app/>

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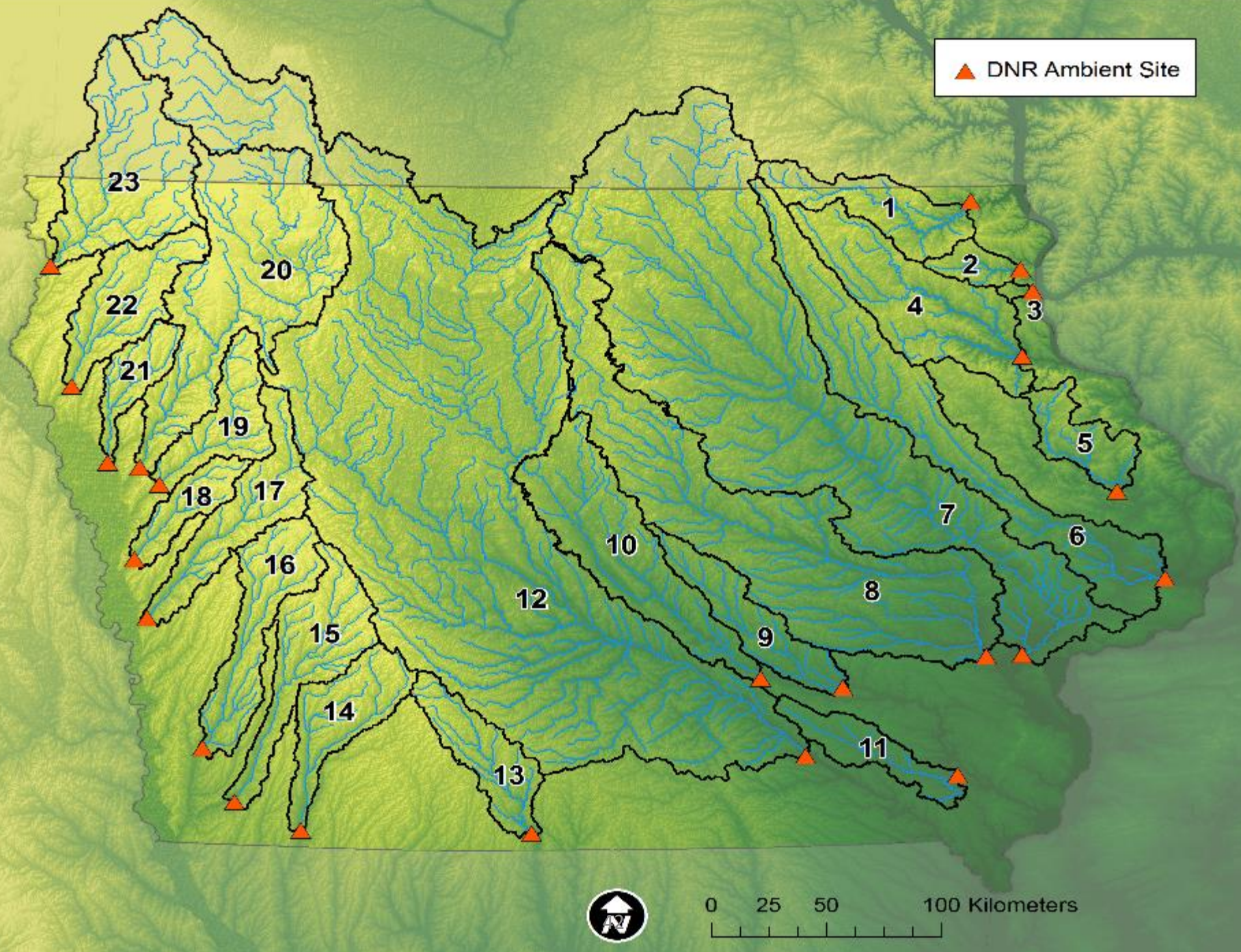
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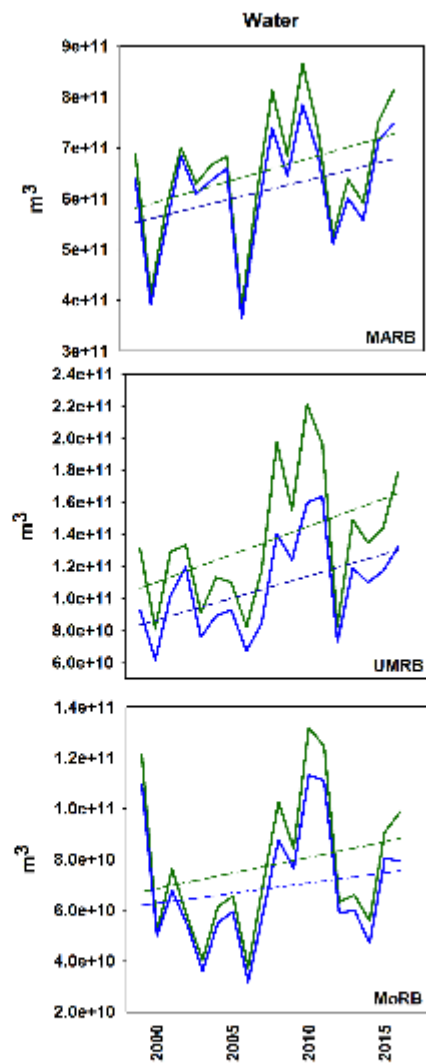
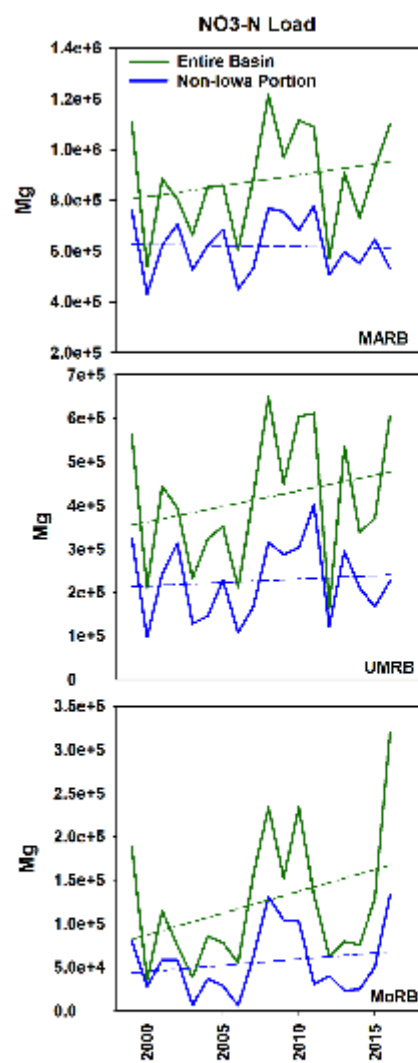
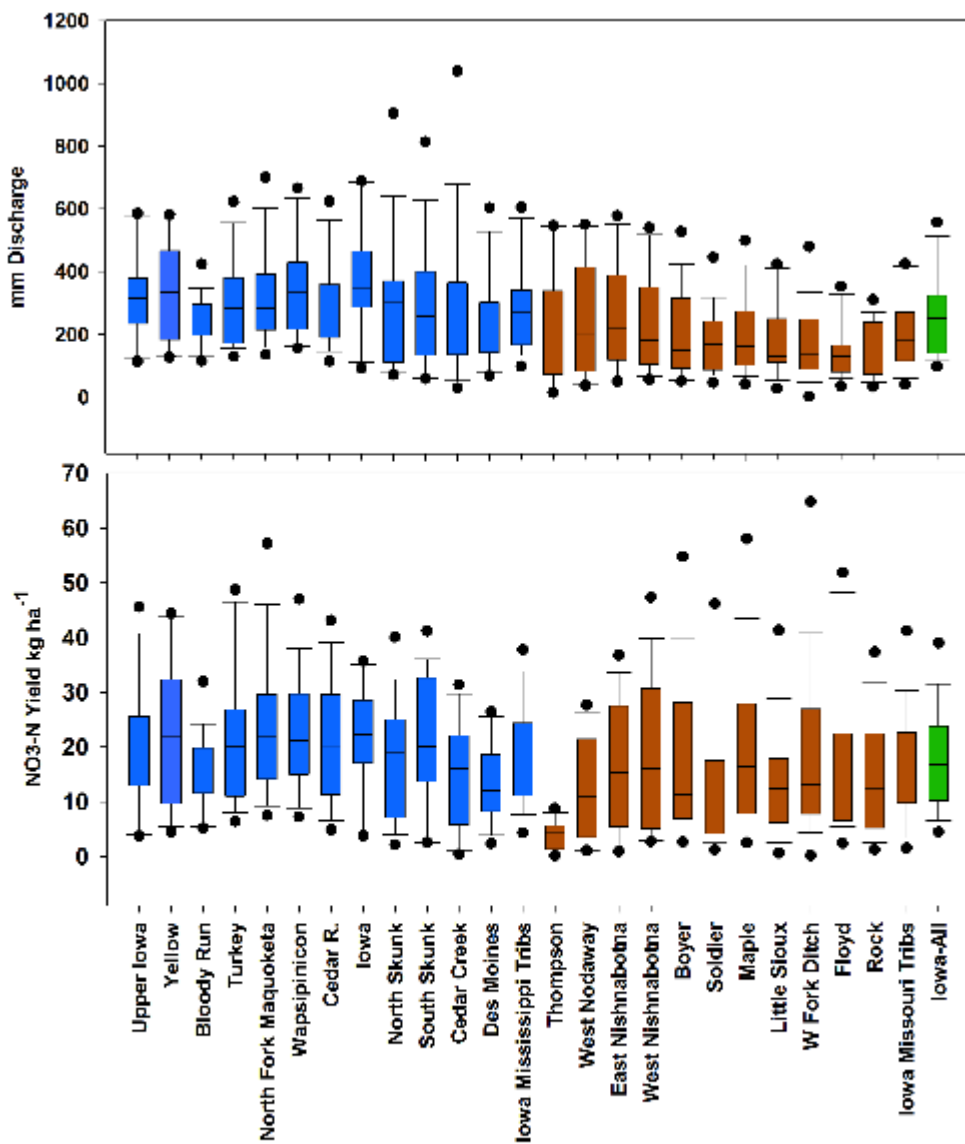
Upper Mississippi River Water Quality Information System



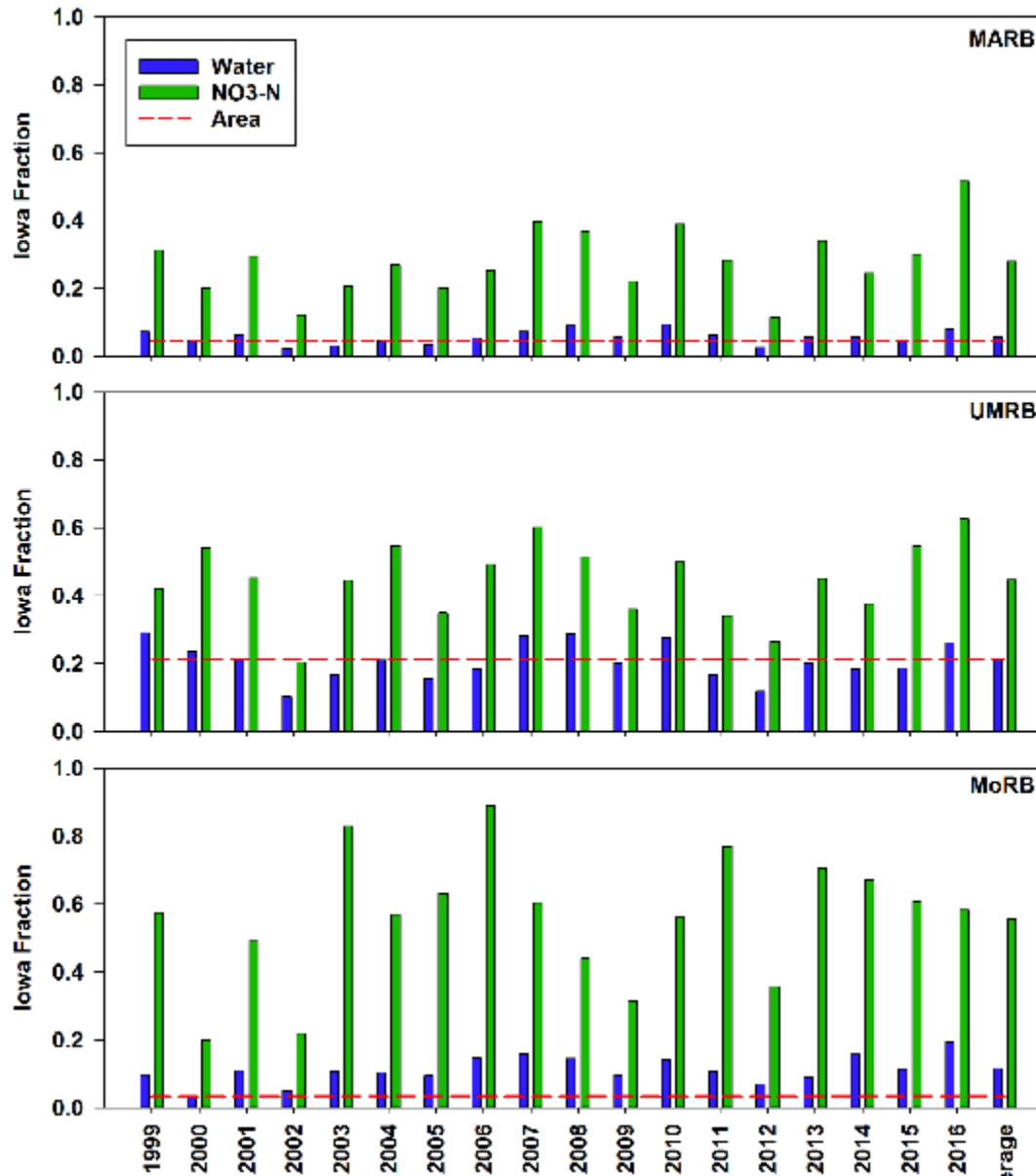


▲ DNR Ambient Site





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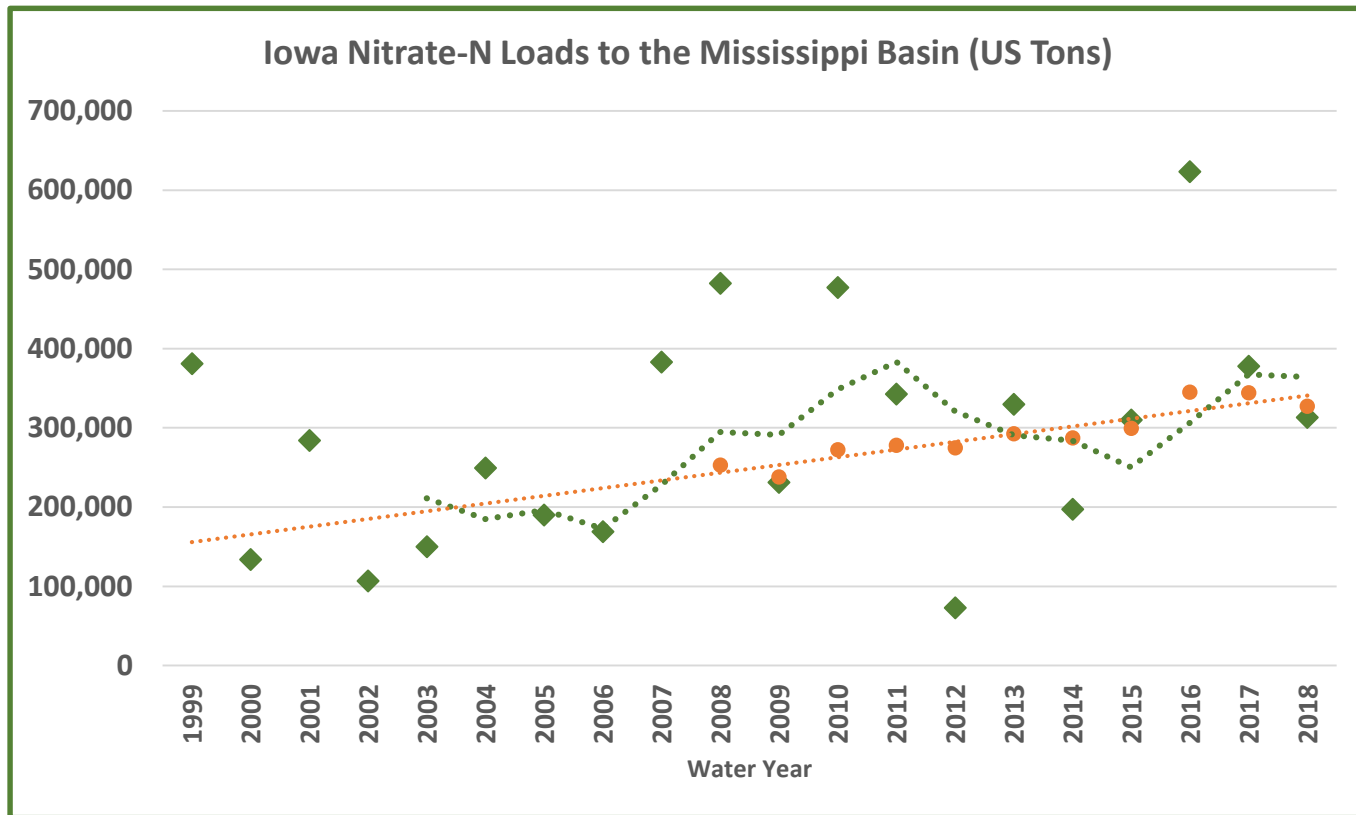


NO3-N
Range 11-52%
Ave: 29%

NO3-N
Range 20-63%
Ave: 45%

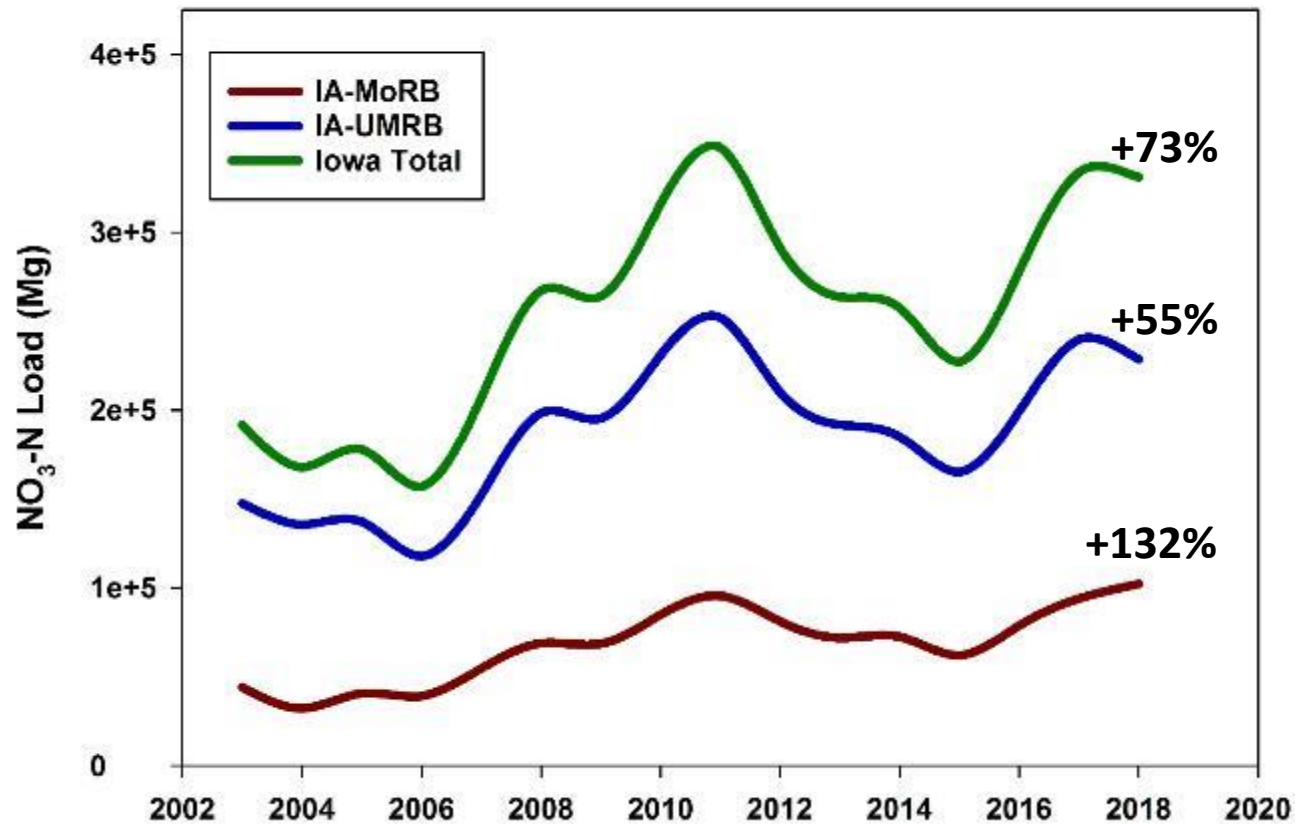
NO3-N
Range 20-89%
Ave: 55%

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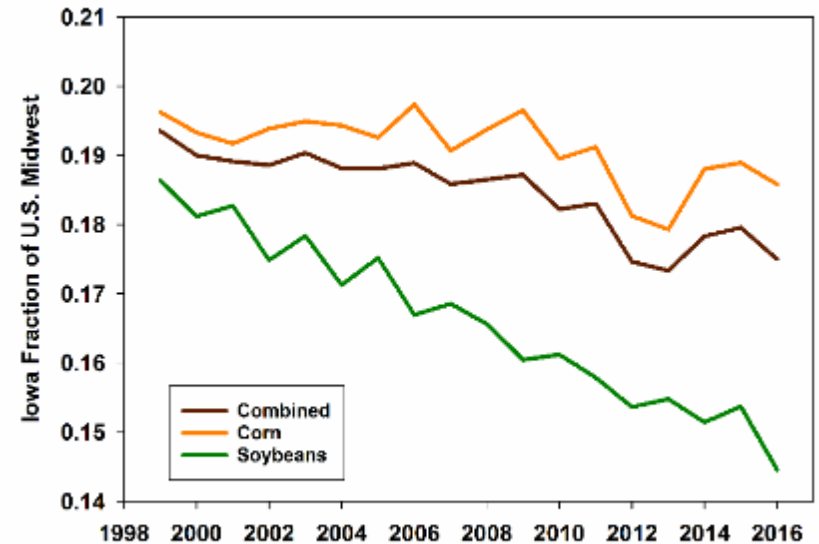
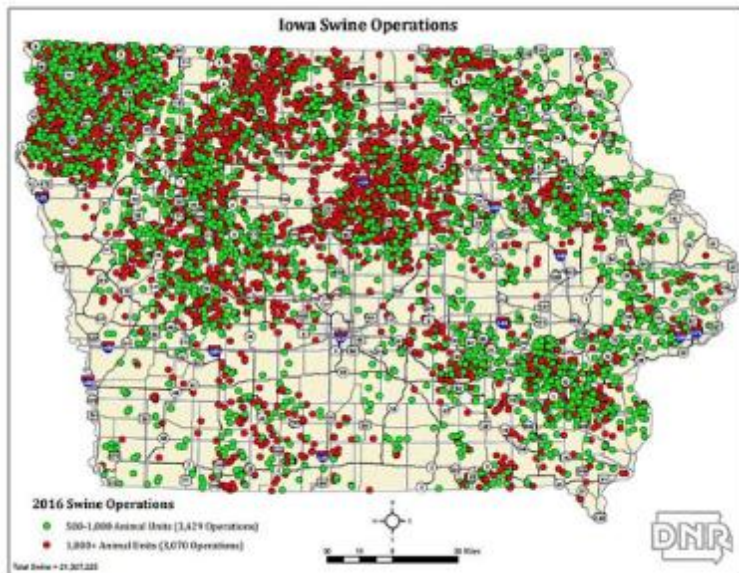
5-Year Running Annual Average N Load



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Why?

- Crop Acres? 4% increase in Iowa since '99; 21% increase in the rest of the corn belt
- Tiling? Hard to tell but.....Middle Cedar Watershed has added 1,200 miles / year for the last 7 years!
- Livestock?



Omaha World-Herald

REAL. FAIR. ACCURATE.

Jan 14, 2013

More ag drainage tile installed in Iowa during the past two years than in any other comparable period.

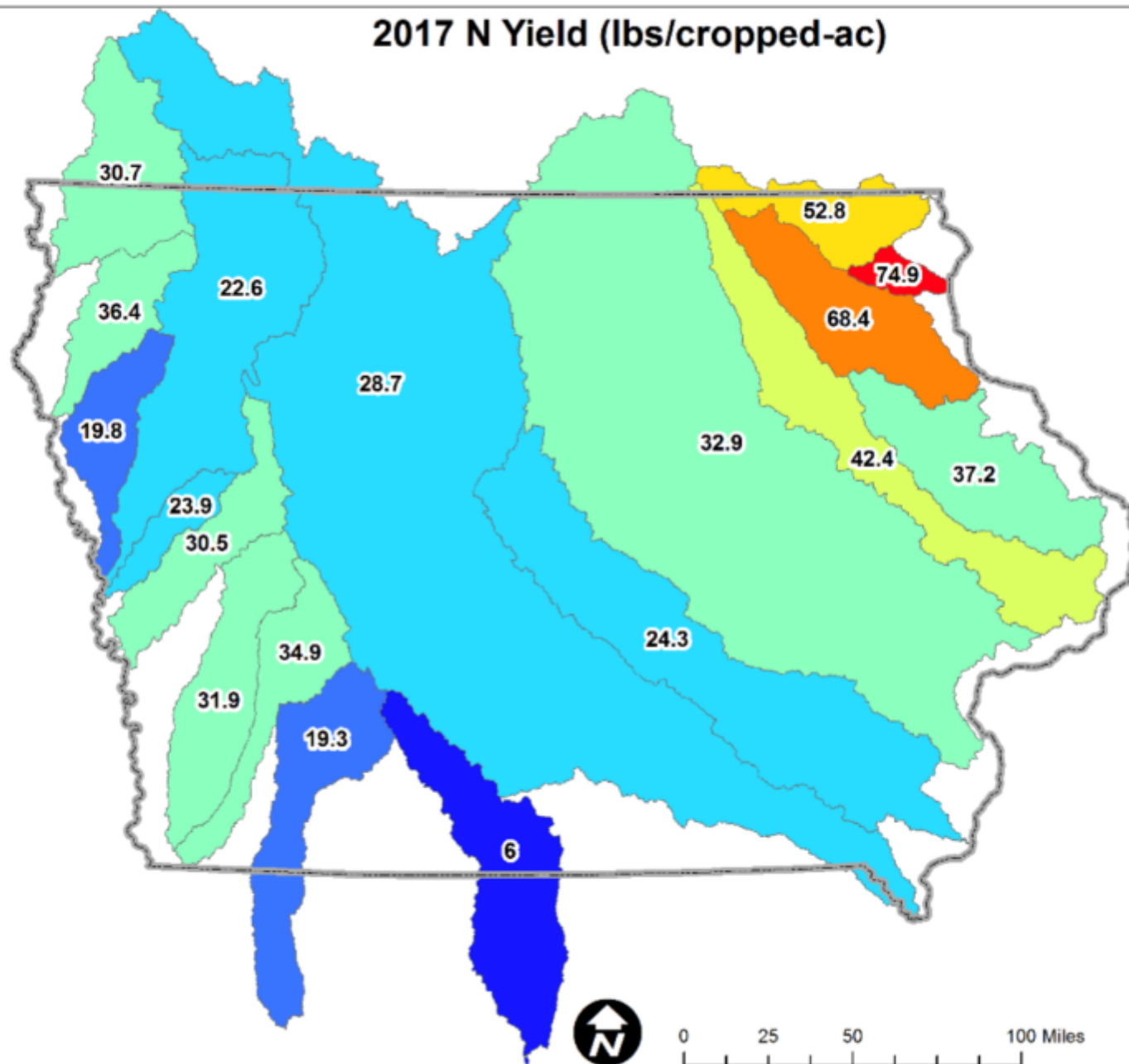
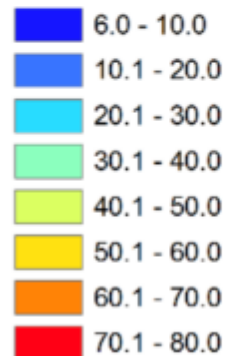
[illegible]

2017 N Yield (lbs/cropped-ac)

Legend

2017 N Yield
(cropped
acres)

lbs/cropped-ac



The Iowa Watershed Approach

To Strive for greater balance between Agriculture, Economic, Water, Natural and Human Resources, I Recommend:

- **Fund Iowa's Water and Land Legacy while preserving the formula**
- **Adopt Nutrient Standards for Lakes and protect our lakes after Lake Restoration programs.**
- **Require that N application rates accurately account for Manure-N, and in total, do not exceed 110% of MRTN rates, or alternatively, apply a luxury tax to fertilizer in excess of the MRTN.**
- **Develop a digital, geospatial system to map land in manure management plans, and thereby reduce the number of field parcels in multiple plans.**
- **Eliminate fall application of anhydrous ammonia and fall tillage on soybean stubble.**
- **Discontinue row crop production on 100,000 acres of the 2-year flood plain (275,000 acres).**
- **Moratorium on new CAFOs and tile drainage upgrades until N-Loads show reduction.**

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***Far and away the best prize that life has to offer
is the chance to work hard at work worth doing***

— Theodore Roosevelt

