

Shell Rock River WMC Meeting

March 16, 2023





Presentation Overview

Introductions

Planning Process Updates

Flood Risks & Resiliency Strategies (IFC & JEO)

Water Quality Concerns and Needs (DNR & JEO)

Recreation Opportunities (JEO)

Questions, Next Steps, and Homework

Please Ask Questions and Discuss

JEO CONSULTING GROU

Planning Process Update





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Project Schedule





Overview of Recent Work

Compiling and analyzing data

Developed "stakeholder engagement plan" (living document)

Website created

Prepping for today!

Thank you for your feedback to-date!

			Shell Rock River Lune	
			Shell Rock River WMC - Watershed Planning Project Existing Data Review and Collection Summary Owned	
			Existing Data Review and Collection Summary (Working Doc Organized by Data Source/Entity	
			Organized by Data Source/Entity	ument)
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Stakeholder Engagement Plan

SHELL ROCK RIVER WATERSHED MANAGEMENT PLAN SHELL ROCK RIVER WATERSHED MANAGEMENT FLAN FISCAL AGENT: BUTLER COUNTY

JEO Consulting Group (JEO) was selected by the Shell Rock River Watershed Management Coalition (SDDDAR) to conside rendered and periods to series to series in developing a Conversionation Watersheet Dise that will address flood realiency, water quality, and other resource concerns. Water quality concerns vial will example induit realist ruy, which querry, and us for resource us non-re-, views querry using the Will be focused on surface water issues, and pollutants of concerns limited to nutrients (nitrogen and phenotenes), and realisted, and E set beatering The project is primarily funded through the Iowa Department of Natural Resources (IDNR) Section 319 Ine project is primarily funded through the lowal Department of Natural Resources (LINR) Section 319 Program and will therefore follow the EPA nine elements for watershed planning. The project will also incrementate the true. Smart Disprint Directides when employede incorporate the lowa Smart Planning Principles when applicable. Origoing concerns with water quality and flood resiliency directly impact the livelihoods and quality of ungoing concerns wan water quarry and nood resistency areasy impact the ivelinoods and quarry of life for residents within the Shell Rock River Watershed. This watershed management plan allows the coalition the following opportunities to improve their watershed and the communities within it:

 Better educate and inform the public about water quality and flooding conditions across the Learn directly from cities, counties, and the public about their perceptions about flooding and

- water quality: educating the public on how these flooding and water quality issues impact Build relationships and cooperation between counties and cities across the watershed

Defining the Partners and Level of Participation Below is a review of each key partner within the SRRWMC watershed planning process. Additionally, a level of ended constitutioning level on the level and the second constitution of the level of the Destination (IADD). level of public participation based on the International Association of Public Participation (IAP2)

 SRRAMC: The Shell Rock River Watershed Management Coalition is a voluntary coalition of local counties, clies, and soil and water conservations districts within the watershed. This spectrum is also included for each group.

- group is spearheading the Watershed Management Plan. All decision-making authority lies with the SRRWWC.
- Technical Advisory Committee: The plan's technical advisory committee consists of partnering agencies outside those included in the SRRWMC that may assist in providing
 - technical analysis of the watershed and reviewing the final report. O Promise to look to the Technical Advisory Committee for advice and innovation in formulating solutions and incorporating their achieve and recommendations into the
- General public: The general public includes residents within the watershed and/or those with
 - interest in the planning process. This patter group will be consulted during the planning process, with outreach conducted to obtain feedback on the plan itself. Promise to keep public informed, listen to and acknowledge concerns and
 - Promise to NOCH public microsol, water to any ocurvenage outsidena and aspirations, and provide feesback on how public input influenced the decision as much as possible



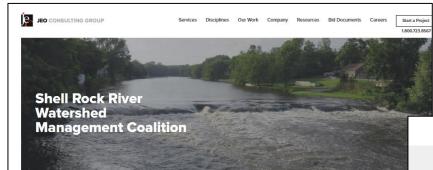
GROUP

CONSULTING

JEO

Project Website

https://www.jeo.com/shell-rock-river-wmc



About the Watershed

The Shell Rock River runs from Albert Lea, Minnesota to its confluence with the Cedar River a few miles north of Cedar Falls in Iowa.

- · The full watershed is approximately 691,000 acres, with a little more than three-fourths of that area (533,000 acres) in north central lowa
- The lowa portion includes partial areas of seven counties: Winnebago, Worth, Mitchell, Cerro Gordo, Floyd, Butler, and Bremer Counties.
- In 2021, several cities, counties, and soil and water conservation districts (SWCDs) voluntarily joined together to create the Shell Rock River Watershed Management Coalition (SRRWMC)
- · The SRRWMC's goal is to participate in the management and enhancem of the lowa portion of the watershed
- . In 2022 the SRRWMC received grant funding to begin the development of a voluntary watershed management plan. · The watershed planning process is focused on the following issues
- Water Quality Flooding
- Recreation
- · The watershed plan will identify and prioritize projects and activities to address watershed concerns
- · Implementation of the plan is based on voluntary cooperation between SRRWMC members, farmers, and other
- stakeholders

Latest Updates

OPEN HOUSE MEETING

Join us for our first public open house event!

Thursday, March 16, 2023 from 4:00 to 6:00 PM

Nora Springs City Hall | 45 N Hawkeye Ave, Nora Springs, IA 50458

Join the Shell Rock River Watershed Management Coalition (WMC) to learn more about the future Watershed Management Plan and how you can provide input on ways to address water quality and flood resiliency within the watershed. WMC members and the planning team will be available to discuss the plan and answer questions. No formal presentations are planned.

Meeting materials will be added here for download and review once available

Additional Links

Social Media

Shell Rock Twitter Shell Rock Facebool

- Links

- Floyd County, bylaws and officer information Worth County, copies of minutes and agendas
 Shell Rock River Watershed District (Minnesot
- Middle Cedar Watershed M
- Upper Cedar Watershed Man ment Authority (neig

Questions or Comments



The Watershed Plan

SRRWMC Members

webpage

Nora Springs

Northwood

Plymouth

Shell Rock

Cities

Bremer County

Butter County

JEO Consulting Group (JEO) has been hired by the Shell Rock River Watershed Management Coalition (SRRWMC) to assist in developing the watershed plan to address water guality, flood resiliency and other resource concerns within the watershed. This process will include the following steps

The SRRWMC was formed through the voluntary signing a of Chapter 28E Agreement, which is an interlocal agreement.

· The coalition meets on a quarterly basis - copies of meeting minutes can be viewed via links near the bottom

The SRRWMC does not have taxing authority and it may not acquire property through eminent domain.

between eligible entities within the lowa portion of the watershed.

Currently the following cities, counties, and SWCDs are members of the SRRWMC:

Counties

Bremer

Cerro Gordo

Butlor

Elovd

Worth

Mitchell

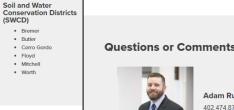
- Review and analysis of existing resource data
- · Facilitation of several stakeholder and public meetings, where input and feedback will be gathered
- Development of the draft watershed plan, which will then be refined based on stakeholder and public feedback
- Provide a finalized watershed plan for adoption by the SRRWMC

The watershed planning process is anticipated to be complete by the end of 2023. During this time, the public is invited to attend meetings, review draft materials, and provide input - links and resources for doing so are provided at the bottom of this webpage.

Currently, there are no draft materials available for review because the project is just beginning. However, materials will be uploaded here as they are developed.

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Status of Watershed Plan Document

Chapter	Status
Executive Summary	Last item to be completed
Chapter 1 – Introduction	Drafting
Chapter 2 – Watershed Inventory	Drafting
Chapter 3 – Current Conditions	Drafting
Chapter 4 – Goals	Drafting
Chapter 5 – Implementation Strategy	TBD
Chapter 6 – Education Plan	TBD
Chapter 7 – Action Plan	TBD
Chapter 8 – Funding	TBD
Appendices	TBD

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Today's Question

What should the focus (scope) of the watershed plan be?

- Flooding?
- Water Quality?
- Recreation?
- A mixture, or something else?





Worksheets

Feel free to:

- Take them home with you
- Get input from others

Complete them today, or send back before April 6th

COMMUNITY ISSUES AND INPUT SHELL ROCK RIVER WATERSHED MANAGEMENT COALITION (SRRWMC)	
SHELL ROCK RIVER TO JEO Project #: 210289.00	TION (SRRWMC) SHILL NOCK RIVER WATERINGD
JEO Project " · · · ·	MANAGEMENT COALITION
Introduction Thank you for taking the time to complete this worksheet. The Shell Rock River Watershed Management Coalition (SRRWMC) was formed in 2021 through voluntary agreements between dities, counties, and soil and water conservation districts (SWCDs). The WMC is currently diveloping a watershed management plan that reflects the values, concerns, and input of everyone in the watershed. The WMC has used grant funds to hire JEO Consulting Group to assist in this process. We ask that you return this worksheet via email or USPS to Adam Rupe with JEO by Management Construction of the state of the state of the state of the state of the state work April 6, 2023:	its tributaries)? Where? What
we ask that you return this workshoes	late flood risks?
	1000 11563:
(402) 322-05/7 1 1 (402) (402) 322-05/7 1 (402)	
JEO Consulting Global State 205 1615 SW Main St, Suite 205	
1615 SW Main St, Suite 205 Ankeny, IA 50023 Piease feel free to share this with your city council, board of supervisors, board of commissioners, or other local officials if you feel compiling all of your input would be valuable. Commissioners, or other local officials if you feel compiling all of your input would be valuable. The page any questions, please don't hesitate to call me at (641) 430-7420 or contact Adam commissioners.	e flooding at the watershed
Ankeny, IA 50023 Please feel free to share this with your city council, board of super volume the valuable commissioners, or other local officials if you feel compiling all of your input would be valuable if you have any questions, please don't hesitate to call me at (641) 430-7420 or contact. A super	
commissioner questions, please don't new	
commissioners, or outcome If you have any questions, please don't hesitate to came directly. Ken Nelson, Cerro Gordo SWCD Commissioner Board Chairperson – SRRVMC	
Stay Connected Wait the links below to learn more about the project, stay up-to-date with the planning process and Website: <u>WWW.lea.com/Shell:rock:Were Watershed Management Plan (when available)</u> . Bacebook: <u>www.facebook.com/ShellRockWitc</u> Twitter: @ShellRockRiver Community / Jurisdiction Information Name and title of person(s) filling out worksheet: Jurisdiction represented: Phone: Phone: Email: Phone: Page 1 of 3	aware of current water
kaffe *	
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Flood Risks and Resiliency Strategies







Overview and Resources



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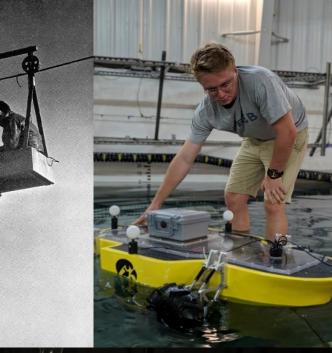


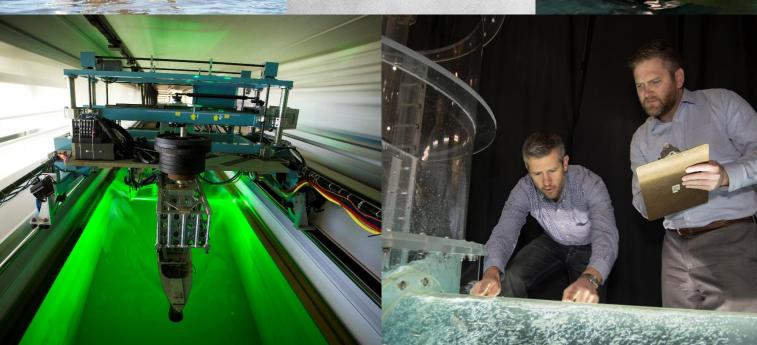
Serving lowans

IOWA

Kate Giannini *Program Manager*, Iowa Flood Center March 16, 2023







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2008 flood, Cedar Rapids

IOWA HOUSE FILE 822

DIVISION VI

Spring 2009



- 1. The state board of regents shall establish and maintain in Iowa City as a part of the state university of Iowa an Iowa Flood Center. In conducting the activities of this chapter, the center shall work cooperatively with the department of natural resources, the department of agriculture and land stewardship, the water resources coordinating council, and other state and federal agencies.
- 2. The lowa flood center shall have all of the following purposes:
 - a. To develop hydrologic models for physically based flood frequency estimation and real-time forecasting of floods, including hydraulic models of flood plain inundation mapping.
 - b. To establish community-based programs to improve flood monitoring and prediction along lowa's major waterways and to support ongoing flood research.
 - c. To share resources and expertise of the lowa flood center.
 - d. To assist in the development of a workforce in the state, knowledgeable regarding flood research, prediction, and mitigation strategies.

IFC has deployed 300 real-time bridge sensors

The network monitors water level in streams and rivers

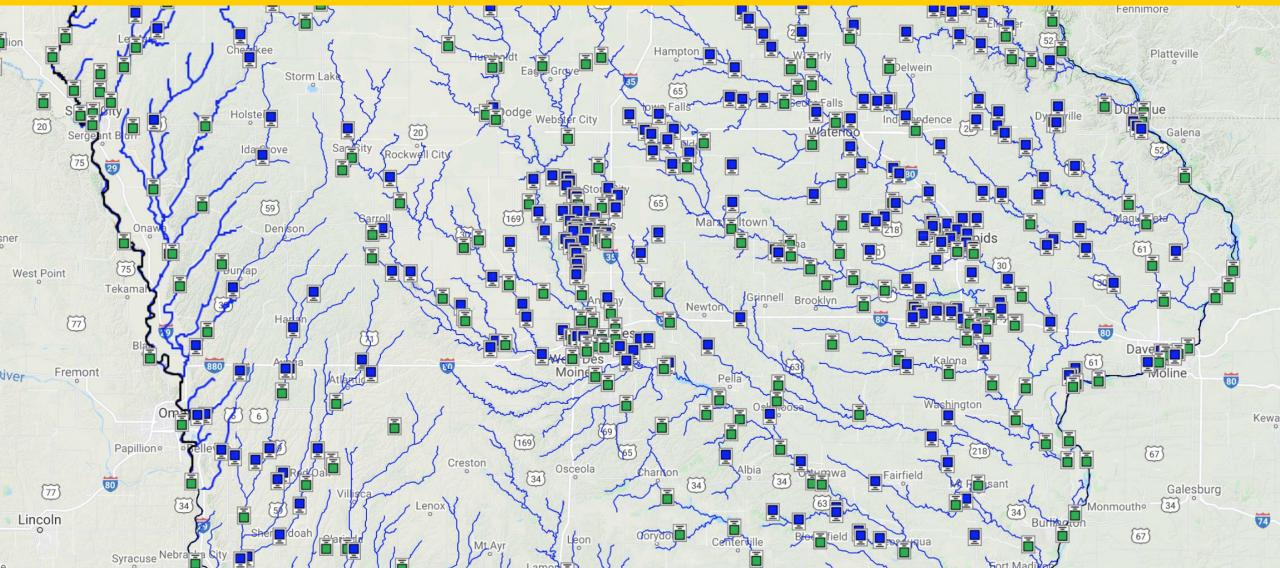
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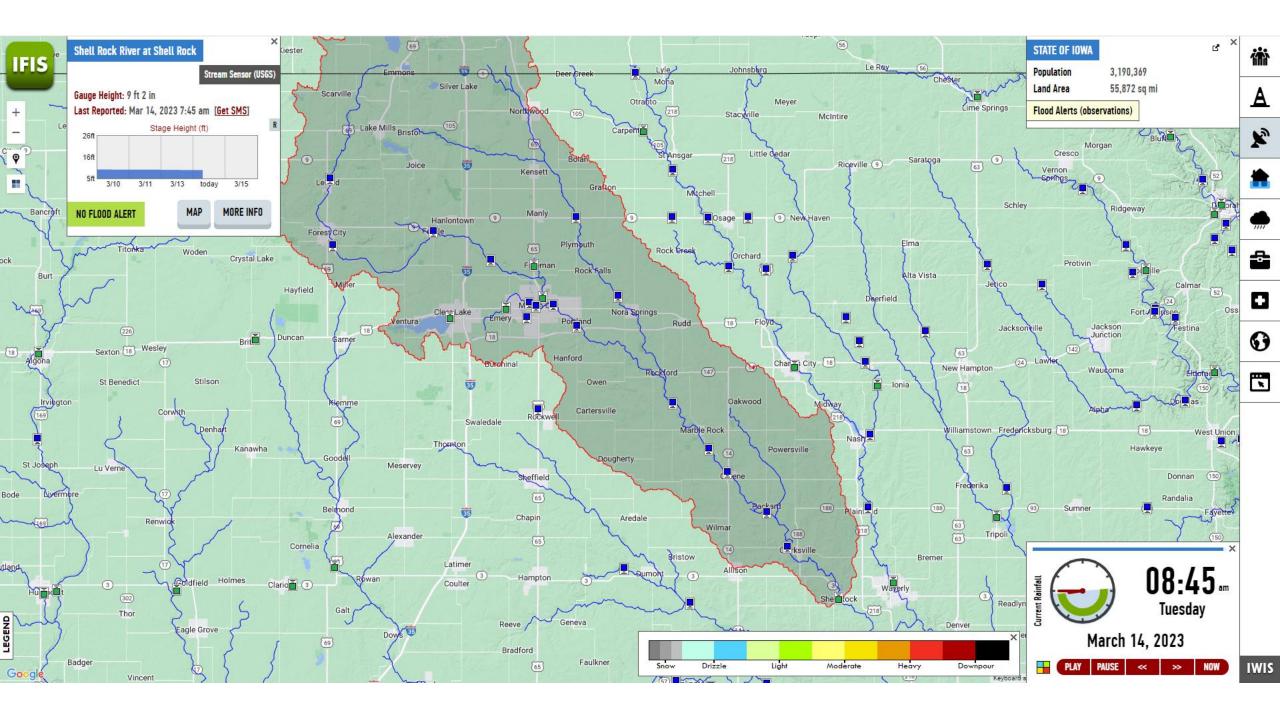
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Richland Center

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Developed flood inundation maps

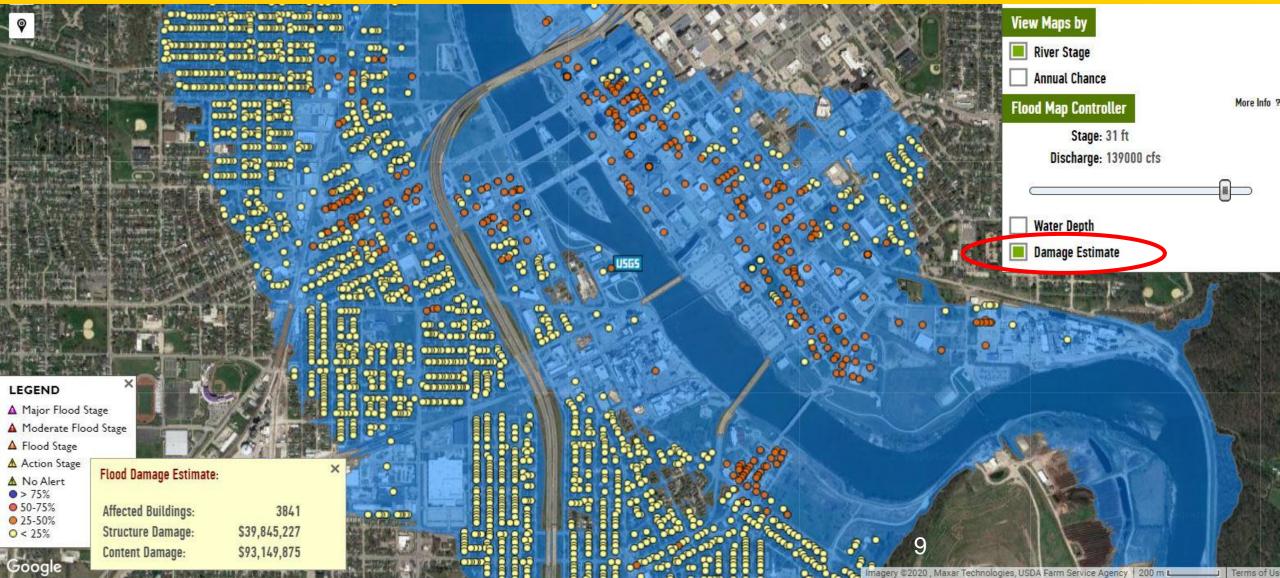


CEDAR RAPIDS

River: Cedar River Gauge ID: 05464500 (reference)

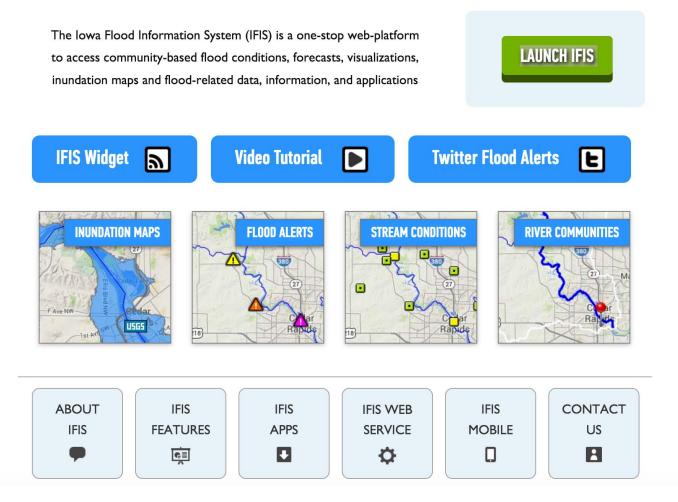
Community Scenario maps

IFIS



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IOWA FLOOD INFORMATION SYSTEM



"lowa really knows...They've modeled and mapped the state, they have great data visualization tools, and they have really effective outreach and communication. To really have a complete flood approach, you have to do all of those things."

Sam Marie Hermite, Texas Water Development Board





Clear Creek

West Nishnabotna East Nishnabotna

Soap Creek/Chequest Creek

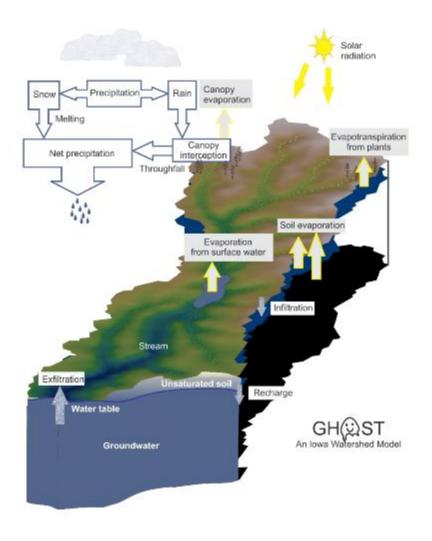
English River

A voluntary program that brings lowans together to build flood-resilient communities!

ANATERST BURGET

A vision for a more resilient Iowa

The Iowa Watershed Approach



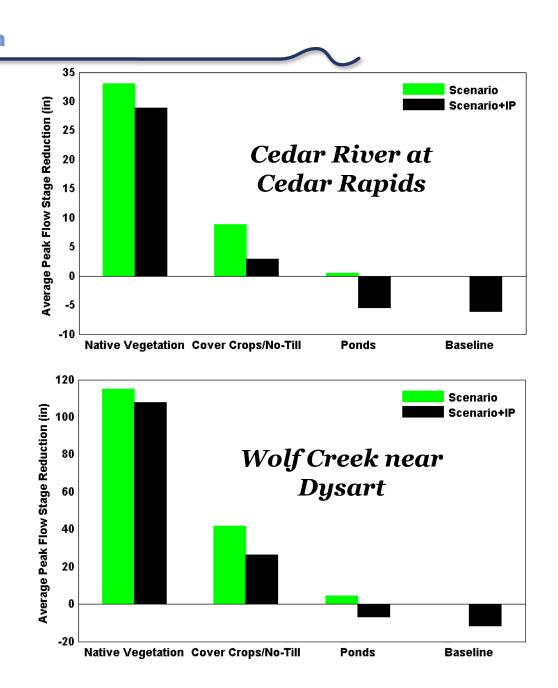
- Develop and run watershed-scale hydrologic models (GHOST) to estimate watershed responses to rainfall events
 - Modeler breaks the watershed down into manageable and representative user defined areas
 - Simulate hydrologic processes using a physically-based approach
 - Compare simulated results to observed hydrologic time series (e.g. streamflow) to assess model performance
 - Quantify the impact of existing and potential BMPs
- Watershed Scenarios

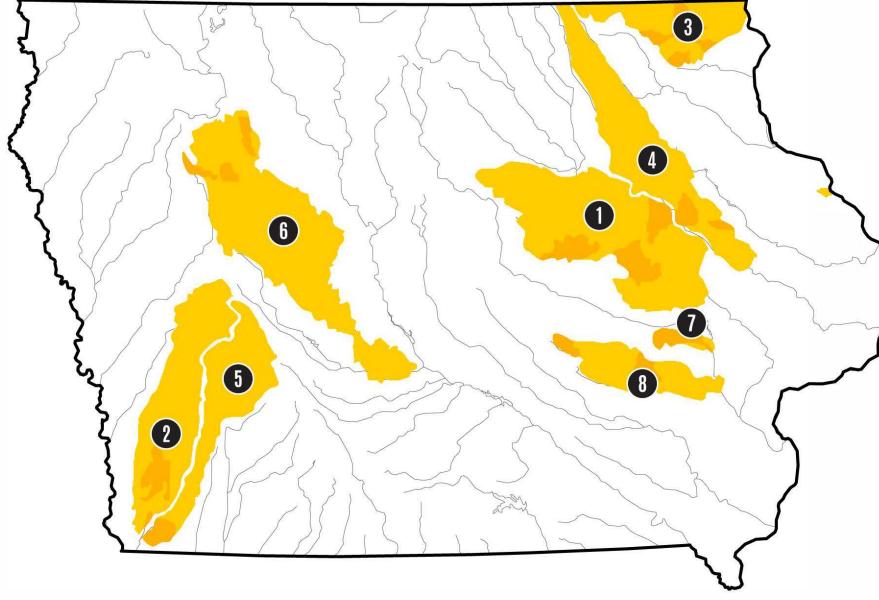


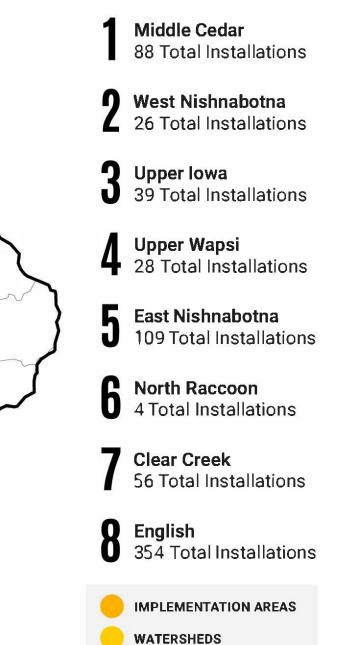
A vision for a more resilient Iowa The Iowa Watershed Approach

Middle Cedar Watershed Example Scenario Results/Summary

- Native Vegetation. 100% adoption.
- Cover Crops/Soil Health/No-Till scenario. 100% adoption.
- Distributed Storage. 684 ponds. 20 acre-ft. 12" outlet pipe.







- 90% Cost-share
- 700 projects constructed
- Nearly \$30 million allocated for naturebased solutions to flood mitigation

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I man in it was supplied

Jellison Wetland Middle Cedar Watershed Drainage Area: 1,336 acres Pool Area: 13 Acres Bid Cost: \$633,845



IOWA DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP

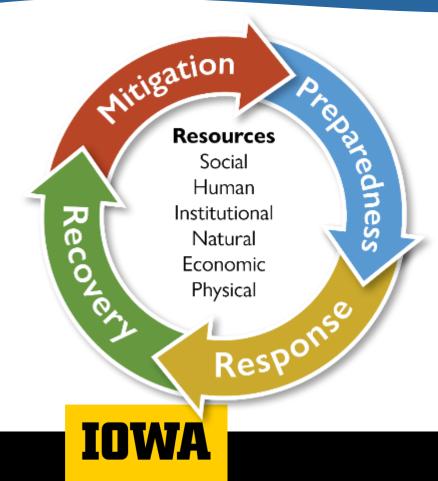
On-Road Structure Upper Iowa Watershed Drainage Area: 79 acres Pool Area: 2 acres Bid Cost: \$200,413

North Carolina/Iowa Flood Resiliency Exchange



What is Flood Resilience?

Flood resilience is the ability of a community within a watershed to plan and act collectively, using local capacities to mitigate, prepare for, respond to, and recover from a flood.





FLOOD RESILIENT VINTON



www.floodresilientvinton.com







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I pledge for a resilient future.

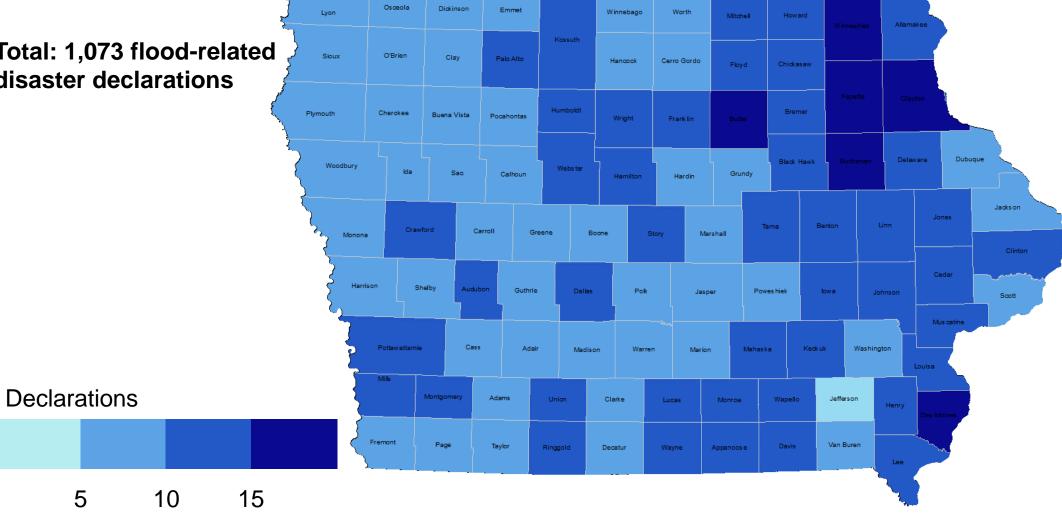
As a business, we commit to supporting our community during times of crisis.



Learn more at: www.floodresilientcoralville.com

Flood-related FEMA Disaster Declarations 1988-2022

Total: 1,073 flood-related disaster declarations



Property and Crop Losses by County (1988-2022)

Total: Over \$20 Billion in property and crop losses

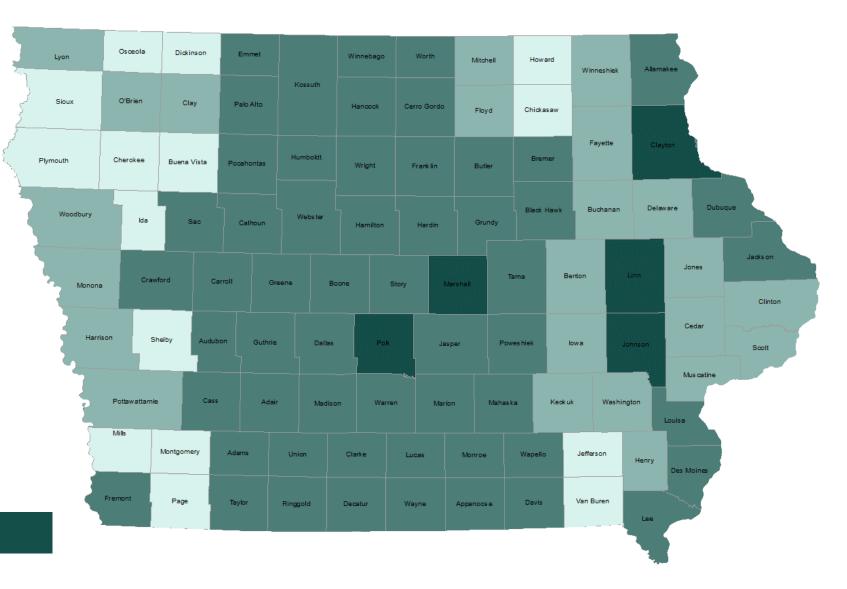
"The cost of doing nothing, is not zero." – Antonio Arenas, Associate Professor at ISU, and former IIHR Researcher

Million Dollars

20

50

150

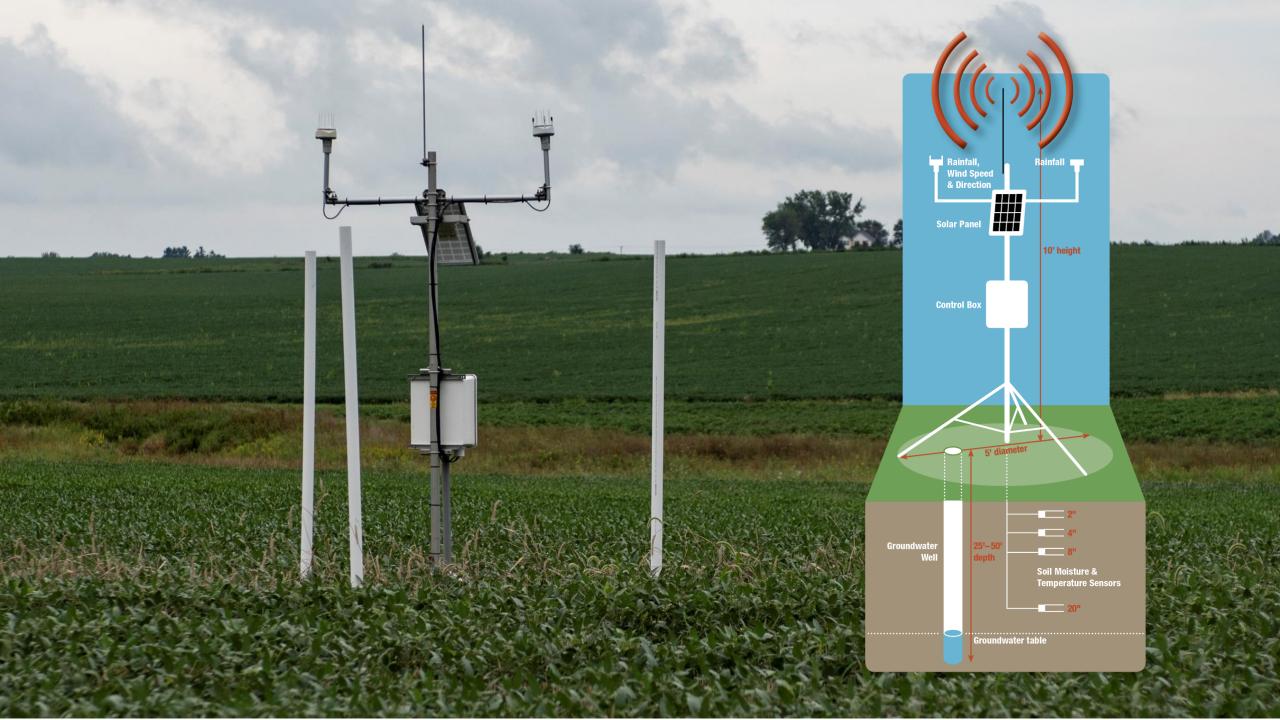




Rep. Hinson and Miller-Meeks Community Project Funding \$1M

- → Expand Hydrostation Network to Congressional Districts 1 & 2
- Hydrologic modeling for Maquoketa River and Lower Cedar WMAs
- →Modeling
 - HEC-HMS modeling framework
 - Investigate the effects of BMPs on flooding in the MR watershed under both current and future climate conditions
 - Results supplement the MR Watershed Plans (IISC 2021a, 2021b) to help guide watershed planning and management decisions
- → Future Communications





Iowa will have Congressional District 1 and 2 covered!



Rep. Hinson and Rep. Miller-Meeks Community Project Funding:

\$1M to advance monitoring, assessment, and flood and drought forecasting in Eastern Iowa.

*Blue indicates a hydrologic station exists

Iowa Flood Center The University of Iowa 100 C. Maxwell Stanley Hydraulics Laboratory Iowa City, IA 52242

VIIII

P: 319-384-1729 Website: www.iowafloodcenter.org

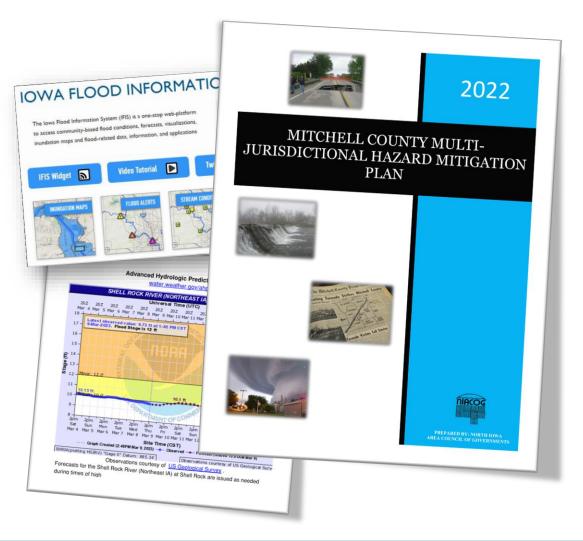


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Flooding Data Resources

Existing Data Sources

- County-level hazard mitigation plans
- Stream gaging (@ Shell Rock, IA)
 - IFC
 - USGS
 - NWS flood forecasting
- Mapping
 - IFC Flood risk/depth maps
 - FEMA Insurance/regulatory maps



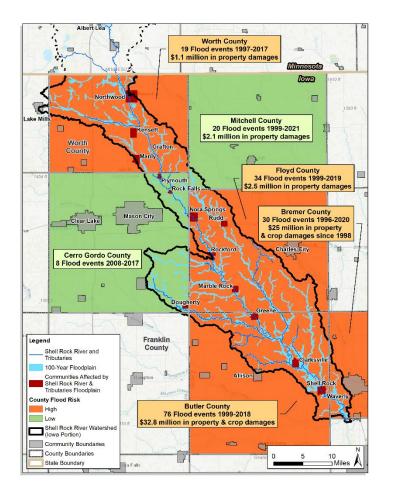
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Flooding Risk Assessment



Ongoing Work

• County-level data





Flooding Risk Assessment

Ongoing Work

- County-level data
- City-level risk review



DRAFT

<u>Cities</u>

- Northwood
- Manly
- Kensett
- Plymouth
- Rock Falls
- Dougherty
- Clarksville
- Greene
- Shell Rock
- Marble Rock
- Nora Springs
- Rudd

In 2012, "Flash flooding of the Shell Rock River led to the evacuations of Camp of the Woods Campground northwest of Rock Falls and Wilkinson Campgrounds in Rock Falls."

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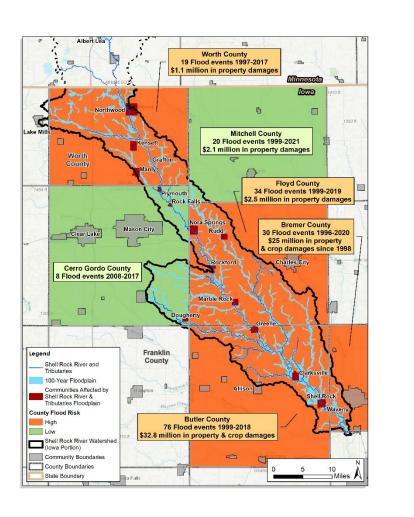
Flooding Risk Assessment

Ongoing Work

- County-level data
- City-level data

Next Steps

- Summarize data/study needs
- Review projects in HMPs
- Identify potential new watershed-level projects
- Integrate into watershed plan
- Integrate into HMPs



<u>Cities</u>

- Northwood
- Manly
- Kensett
- Plymouth
- Rock Falls
- Dougherty
- Clarksville
- Greene
- Shell Rock
- Marble Rock
- Nora Springs
- Rudd

GROUP

CONSULTING

JEO



Questions and Discussion



Flood Risks and Resiliency Strategies

- Have you experienced flooding from the Shell Rock River (or its tributaries)? Where? What were the impacts?
- What resources does your community or jurisdiction need to mitigate flood risks?
- Is your community/jurisdiction willing to work with others to solve flooding at the watershed scale (work across city and county lines)?



Watershed = We are all in it together

17

Pause for a Break?



Water Quality Concerns & Needs





19









SHELL ROCK WMC MEETING



Miranda Haes, Northeast Iowa Basin Coordinator

DNR Water Quality Improvement Section





What we'll go through today:

- Overview of DNR's role in WMC
- WMA's across the state
- History of Iowa's Water Quality Planning
- Overview of the Nutrient Reduction Strategy
- NRS goals and objectives
- How Shell Rock WMC fits into the statewide efforts
- New funding opportunity
- Questions?





Watershed Management Authorities (WMAs)

IOWA'S WATERSHED MANAGEMENT AUTHORITIES LYON 1 OSCEOLA 24 EMMET WINNEE Shell Rock KOSSUTH SIOUX ANCOCK **WMC** OBRIEN CLAY PALO ALTO 22 AHONTAS HUMBOLDT PLYMOUTH 2 CHEROKEE FRANKLIN 27 WMAs in WEBSTER WOODBURY HARDIN 18 lowa have MONONA CRAWFORD TAMA formed since MARSHALL 2012 14 POWESHIEK HARRISON JASPER 6 5 MARION MAHASKA KEOKUK WASHINGTON 27 17 CASS Neighboring LOUISA ADAMS CLARKE 21 JEFFERSON UNION WAPELLO WMA's HENRY DES MOINE 20 VAN BUREN TAYLOR RINGGOLD DECATUR WAYNE APPANOOSE DAVIS Upper Cedar * 4RA 11/4/20 LEE **River WMA** 1 Beaver Creek WMA 8. Headwaters of the South Skunk WMA 15. Middle Cedar WMA ** Middle 2. Boone River WMA 9. Indian Creek WMA 16. Mud Creek, Spring Creek & Camp Creek WMA 22. Turkey River WMA 23. Upper Cedar River WMA 3. Catfish Creek WMA 10. Ioway Creek WMA 17. North & Middle Rivers WMA Cedar WMA 4. Clear Creek Watershed Coalition 11. Little Sioux Headwaters Coalition 18. North Raccoon River Watershed Management Coalition 24. Upper Iowa WMA 5. East Nishnabotna Watershed Coalition 12. Lower Cedar WMA 19. Shell Rock River Watershed Management Coalition 25. Upper Wapsipinicon River WMA 6. English River WMA 13. Maquoketa River WMA 20. Soap Creek Watershed Board 26. Walnut Creek WMA

14. Middle-South Raccoon WMA

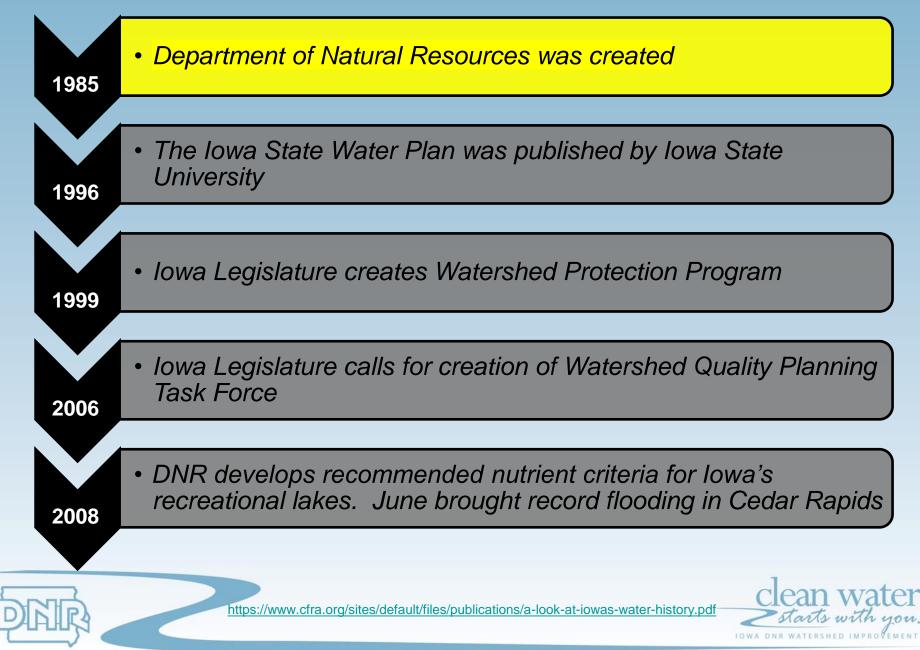
21. South Central Iowa Cedar Creek WMA

7. Fourmile Creek WMA

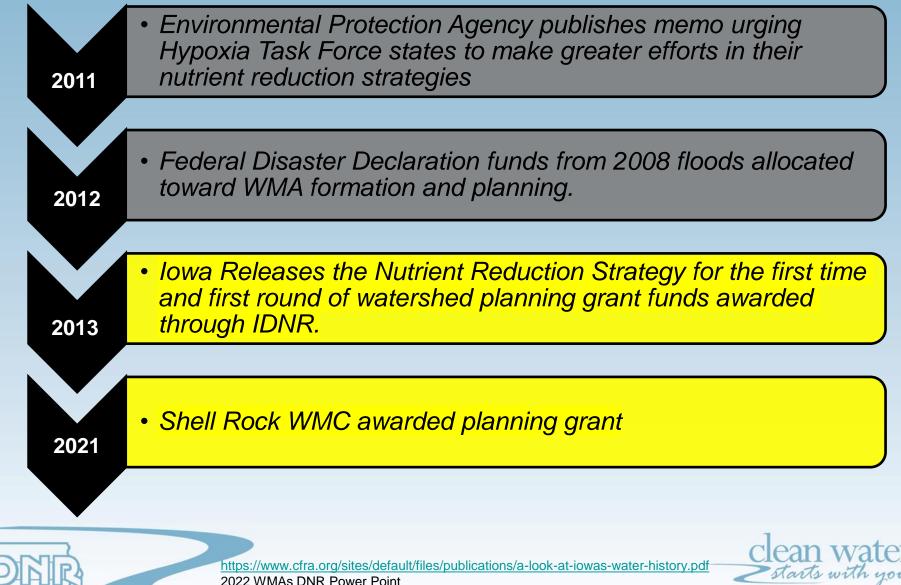


27. West Nishnabotna Watershed Coalition

History of Iowa's Water Quality Planning



History of Iowa's Water Quality Planning Continued



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OWA DNR WATERSHED IMPROVEMEN

"The lowa Nutrient Reduction Strategy is a science and technology-based framework to assess and reduce nutrients to lowa waters and the Gulf of Mexico. It is designed to direct efforts to reduce nutrients in surface water from both point and nonpoint sources in a scientific, reasonable and cost effective manner.



https://mississippiriverdelta.org/learning/explaining-the-gulf-of-mexico-dead-zone/

IOWA DEPARTMENT OF

AGRICULTURE &

The lowa strategy outlines a pragmatic approach for reducing nutrient loads discharged from the state's largest wastewater treatment plants, in combination with targeted practices designed to reduce loads from nonpoint sources such as farm fields. This is the first time such an integrated approach involving both point sources and nonpoint sources has been attempted."

https://www.nutrientstrategy.iastate.edu/

IOWA DEPARTMENT OF NATURAL RESOURCES

IOWA STATE UNIVERSITY



IOWA NUTRIENT REDUCTION STRATEGY

- Focused on Nitrogen and Phosphorus to the Mississippi River
 - Finalized in May 2013
 - Total TN & TP Reduction Goal: 45% for Non-Point Source (NPS) and Point Source (PS)
- Integrated Strategy
 - NPS: Science Assessment for NPS agricultural producers with voluntary implementation of conservation practices
 - PS: Technology Assessment for major wastewater treatment facilities
- Estimated Cost
 - NPS: Initial Investment Costs range from \$1.2 to \$4 billion
 - PS: Capital and operation costs over 20 years of approximately \$1.5 billion

Source Water Protection Efforts added to the NRS in 2014

Table 1. Estimated percent load contributions from point and non-point sources.

Estimated % of Loads and Load Reduction	Nitrogen	Phosphorus
% of Total Load from Point Sources	7	21
% of Total Load from Non-point Sources	93	79
% of Overall Load Reduction from Point Sources to meet	4	16
45% Total Load Reduction Goal		
% of Overall Load Reduction from Nonpoint Sources to	41	29
meet 45% Total Load Reduction Goal		







HOW DO WE ACHIEVE THESE GOALS?





NITROGEN PRACTICES

Nitrogen Management:

- → Timing
- → Source
- → Nitrogen Application Rate
- → Nitrification Inhibitor
- → Cover Crops
- → Living Mulches

Land Use:

- → CRP (Land Retirement)
- → Extended Rotations
- → Grazed Pastures

Edge-of-Field:

- → Wetlands
- → Bioreactors
- → Buffers
- → Saturated Buffers
- → Multi-purpose Oxbow

Iowa Strategy to Reduce Nutrient Loss: Nitrogen Practices

This table lists practices with the largest potential impact on nitrate-N concentration reduction (except where noted). Corn yield impacts associated with each practice also are shown as some practices may be detrimental to corn production. If using a combination of practices, the reductions are not additive. Reductions are field level results that may be expected where practice is applicable and implemented.

	Practice	Comments	% Nitrate-N Reduction*	% Corn Yield Change**
			Average (SD ⁺)	Average (SD [†])
		Moving from fall to spring pre-plant application	6 (25)	4 (16)
	Timing	Spring pre-plant/sidedress 40-60 split Compared to fall-applied	5 (28)	10 (7)
		Sidedress - Compared to pre-plant application	7 (37)	0 (3)
		Sidedress - Soil test based compared to pre-plant	4 (20)	13 (22)**
nt⁺	Courses	Liquid swine manure compared to spring-applied fertilizer	4 (11)	0 (13)
me	Source	Poultry manure compared to spring-applied fertilizer	-3 (20)	-2 (14)
Nitrogen Management [±]	Nitrogen Application Rate	Nitrogen rate at the MRTN (0.10 N:corn price ratio) compared to current estimated application rate. (<u>ISU Corn Nitrogen Rate Calculator</u> – http://cnrc.agron.iastate.edu can be used to estimate MRTN but this would change Nitrate-N concentration reduction)	10	-1
	Nitrification Inhibitor	Nitrapyrin in fall – Compared to fall-applied without Nitrapyrin	9 (19)	6 (22)
	0	Rye	31 (29)	-6 (7)
	Cover Crops	Oat	28 (2)	-5 (1)
	Living Mulches	e.g. Kura clover – Nitrate-N reduction from one site	41 (16)	-9 (32)
Land Use	Perennial	Energy Crops – Compared to spring-applied fertilizer	72 (23)	
		Land Retirement (CRP) - Compared to spring-applied fertilizer	85 (9)	
	Extended Rotations	At least 2 years of alfalfa in a 4 or 5 year rotation	42 (12)	7 (7)
La	Grazed Pastures	No pertinent information from Iowa – assume similar to CRP	85	
	Drainage Water Mgmt.	No impact on concentration	33 (32)	
	Shallow Drainage	No impact on concentration	32 (15)	
	Wetlands	Targeted water quality	52	
Edge-of-Field	Bioreactors		43 (21)	
	Buffers	Only for water that interacts with the active zone below the buffer. This would only be a fraction of all water that makes it to a stream.	91 (20)	
	Saturated Buffers	Divert fraction of tile drainage into riparian buffer to remove Nitrate-N by denitrification.	50 (13)	
	Multi-purpose Oxbow	Targeted water quality	42 (6)	

* A positive number is nitrate concentration or load reduction and a negative number is an increase.

- ** A positive corn yield change is increased yield and a negative number is decreased yield. Practices are not expected to affect soybean yield.
- [†] SD = standard deviation. Large SD relative to the average indicates highly variable results.
- 11 This increase in crop yield should be viewed with caution as the sidedress treatment from one of the main studies had 95 pounds-N/acre for the pre-plant treatment but 110 pounds-N/acre to 200 pounds-N/acre for the sidedress with soil test treatment so the corn yield impact may be due to nitrogen application rate differences.





* See Standard Practices (blue box) on page 2 of this publication.

Iowa Strategy to Reduce Nutrient Loss: Phosphorus Practices

Practices below have the largest potential impact on phosphorus load reduction. Corn yield impacts associated with each practice also are shown, since some practices may increase or decrease corn production. If using a combination of practices, the reductions are not additive. Reductions are field level results that may be expected where practice is applicable and implemented.

	Practice	Comments	% P Load Reduction*	% Corn Yield Change ^b
			Average (SD ^c)	Average (SD°)
Phosphorus Management [‡]	Phosphorus Application	Applying P based on crop removal – Assuming optimal STP level and P incorporation	0.6 ^d	0
		Soil-Test P – No P applied until STP drops to optimum or, when manure is applied, to levels indicated by the P Index ¹	17°	0
	Source of Phosphorus	Liquid swine, dairy, and poultry manure compared to commercial fertilizer – Runoff shortly after application [‡]	46 (45)	-1 (13)
		Beef manure compared to commercial fertilizer – Runoff shortly after application [‡]	46 (96)	
orus M	Placement of Phosphorus	Broadcast incorporated within 1 week compared to no incorporation, same tillage	36 (27)	0
hosphc		With seed or knifed bands compared to surface application, no incorporation	24 (46)	0
4	Cover Crops	Winter rye	29 (37)	-6 (7)
	Tillage	Conservation till – chisel plowing compared to moldboard plowing	33 (49)	0 (6)
		No till compared to chisel plowing	90 (17)	-6 (8)
Ð	Perennial Vegetation	Energy Crops	34 (34)	
Land Use Change		Land Retirement (CRP)	75	
		Grazed pastures	59 (42)	
rol	Terraces		77 (19)	
Conti	Buffers		58 (32)	
Erosion Control and Edge-of-Field	Control	Sedimentation basins or ponds	85	
Ero	Blind Inlet	Sediment control	50	

* A positive number is P load reduction and a negative number is increased P load.

^b A positive corn yield change is increased yield and a negative number is decreased yield. Practices are not expected to affect soybean yield.

• SD = standard deviation. Large SD relative to the average indicates highly variable results.

⁴ Maximum and average estimated by comparing application of 200 and 125 kilogram P₂0/hectare, respectively, to 58 kilogram P₂0/hectare (comsoybean rotation requirements) (Mallarino et al., 2002).

 Maximum and average estimates based on reducing the average STP (Bray-1) of the two highest counties in lowa and the statewide average STP (Mallarino et al., 2011a), respectively, to an optimum level of 20 ppm (Mallarino et al., 2002). Minimum value assumes soil is at the optimum level.
 I SU Extension and Outreach publication (PM 1888).

* See Standard Practices (blue box) on page 2 of this publication.

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PHOSPHORUS PRACTICES

Phosphorus Management:

- → Application
- → Source
- → Placement
- → Cover Crops
- → Tillage Practices

Land Use:

- → Energy Crops
- → Land Retirement (CRP)
- → Grazed Pastures

Erosion Control and Edge-of-Field:

- → Terraces
- → Buffers
- → Sedimentation basins or ponds
- → Blind inlet







HOW DOES SHELL ROCK WMC FIT?

Let's have a conversation...





NEW FUNDING OPPORTUNITY \$3M Underserved Farmer to Farmer Grant 2023-2027

- Goal: \$75,000 250,000 projects with water quality or quantity focus
 - No match requirements; must target "underserved" farmers or farm communities by USDA or Executive Order definitions
 - Flood resilience, nutrient reduction, and source water protection as main focus for lowa
- Eligible entities include: state or local government entities, including SWCDs and 28E entities (like Watershed Management Authorities); NGOs/Nonprofits; beginning or US Military Veteran farm groups; others
- Applications will be two-phase similar to IDALS Urban WQI:
 - Pre application phase, brief narrative and simple budget for competitive selection
 - Full application developed with DNR technical assistance to meet grant requirements

More details available starting March 1 on DNR website / press release







Thank you! Questions?

Miranda Haes, Northeast Iowa Basin Coordinator 515-204-3485; miranda.haes@dnr.iowa.gov





Water Quality Data Sources

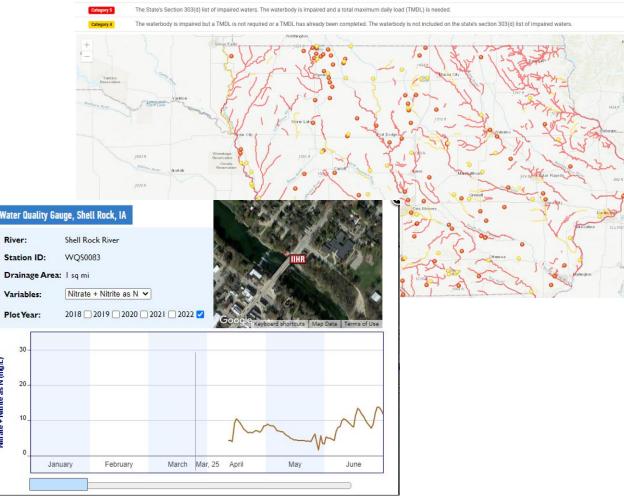
River

N (mg/ 20

DNR

- Ambient Stream Monitoring •
- Monthly measurements (1999-2022) •
- Integrated Report (Impaired Waters) •
- **AQuIA & ADBNet Websites** •
- TMDL studies •
- IFC Stream Sensors
 - Includes USGS data •
 - Daily measurements (2018-2022) •

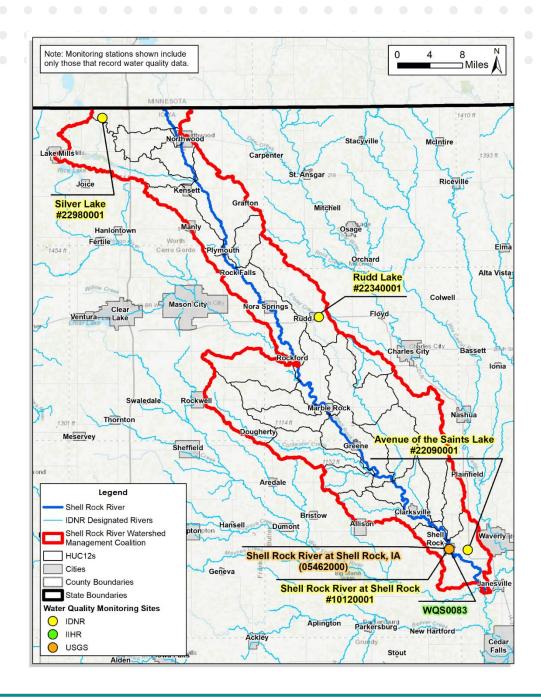
2022 Impaired Waters Map





Monitoring Sites

- Long-term stream data only available at Shell Rock, IA
- Pollutants of concern:
 - Nutrients
 - Sediment
 - Bacteria (*E. coli*)



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Water Quality Standards

Pollutant	Iowa Standard	Other Benchmarks (no regulatory significance)		
Nitrogen	No ambient WQ standard for Iowa streams Drinking WQ standard = 10 mg/L	*EPA recommendation = 2.18 mg/L		
Phosphorus	No ambient WQ standard for Iowa streams	*EPA recommendation = 0.7625 mg/L		
Sediment	No ambient WQ standard for Iowa streams	**TSS = 50 mg/L		
Bacteria (<i>E. coli</i>)	126 colonies/100 mL (chronic/long-term) 235 colonies/100 mL (acute/short-term)	n/a		
*EPA recommended criteria, based on ecological health (EPA, 2001)				

*EPA recommended criteria, based on ecological health (EPA, 2001)

** TSS used as surrogate for sediment sampling, based on stream support for a rich diversity of aquatic life (KDHE, 2020)

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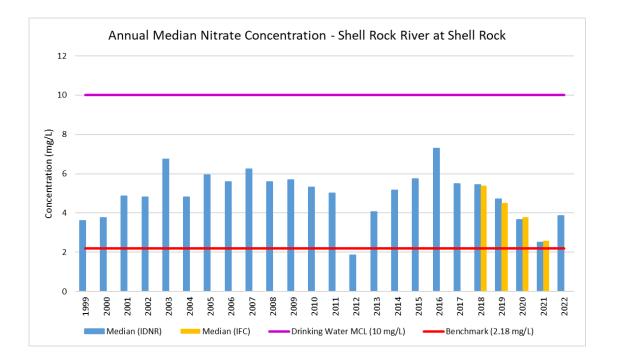
Nitrogen – Long Term Trends DRAF

Long-term concentrations are well below drinking water standards

Benchmark is consistently being exceeded

2012 = year of drought

DNR and IFC data appear to be consistent



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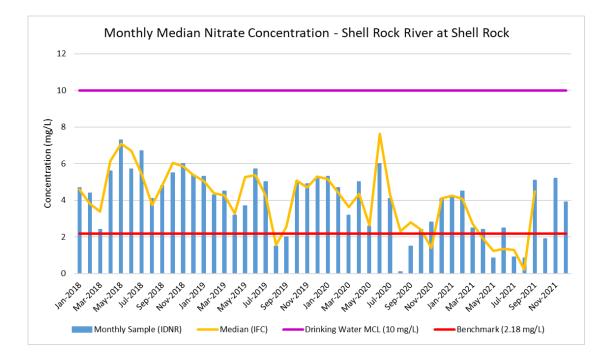
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Nitrogen – Short Term Trends DRAF

Seems to be a recent trend of decreasing nitrate levels

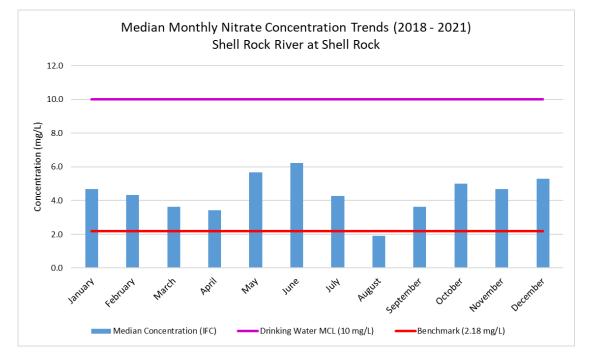
WQ modeling and/or a flow weighted analysis would be helpful next steps



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Nitrogen – Seasonal Trends

- Concentrations increase:
 - Spring/early summer
 - Fall
- Direct relationship with precipitation, run-off, and plant cover



DRAF1

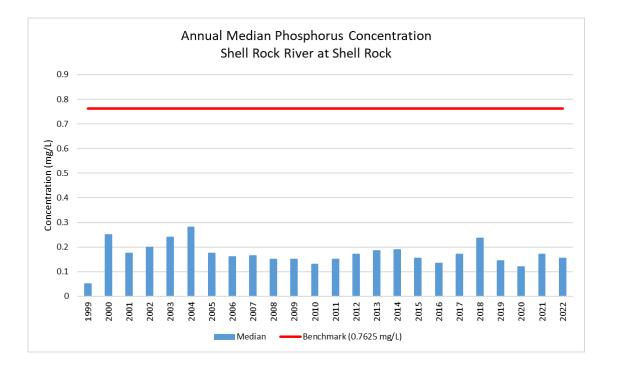


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Phosphorus – Long Term Trends DRAF1

- Long term trend is relatively steady
- Monthly grab samples likely underrepresents true total phosphorus loads
 - Phosphorus attached to sediment is missed
 - Statewide, 3%-38% of total phosphorus loads are from streambank erosion (Schilling, 2019)
 - A lot of sediment is transported during storm events





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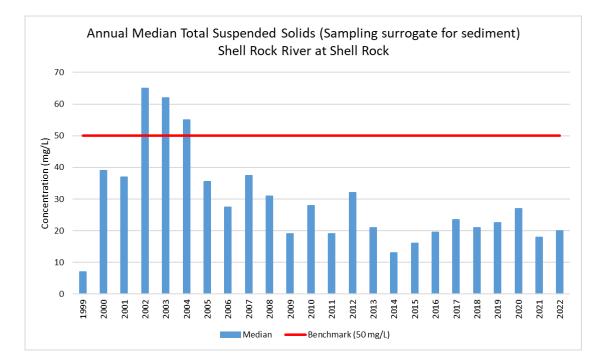
Erosion/Sediment – Long Term Trends

TSS used as surrogate

More recent trend looks relatively steady

Monthly grab samples likely underrepresents true sediment load

Additional erosion estimates will be developed



DRAF1

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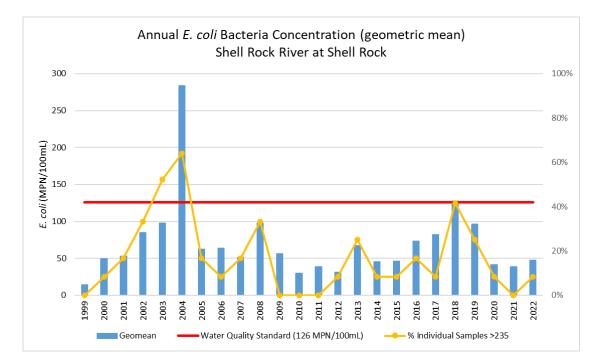
E. coli Bacteria – Long Term Trends DRAFT

Mixed trends

2004 & 2018 – exceed chronic standard

Acute standard (individual samples) has been exceeded regularly

More detailed review of DNR assessments needed



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Impaired Waters

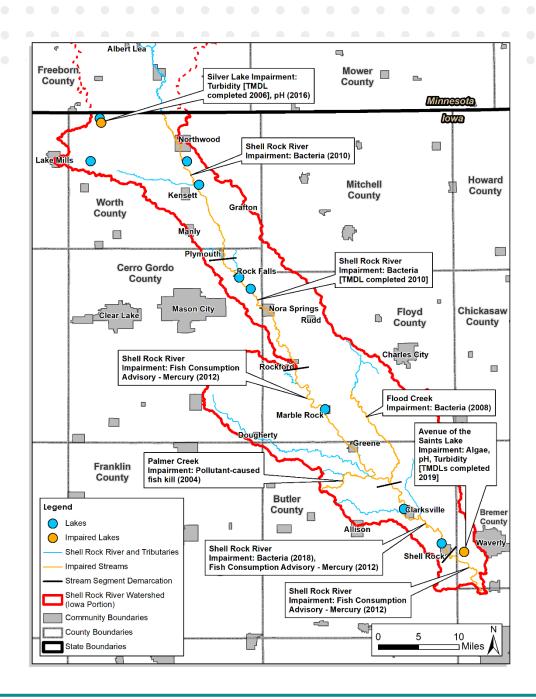
Do not meet state water quality standards

Several stream segments impaired due to E. coli bacteria

2 lakes are impaired, related to nutrients and sediment

TMDL completed in 2010

Other impairments (mercury, fish consumption advisory, fish kill) likely not related to watershed management





Bacteria Sources

From 2010 TMDL

- 1. Open Feedlot Runoff
- 2. Manure Spread on Cropground

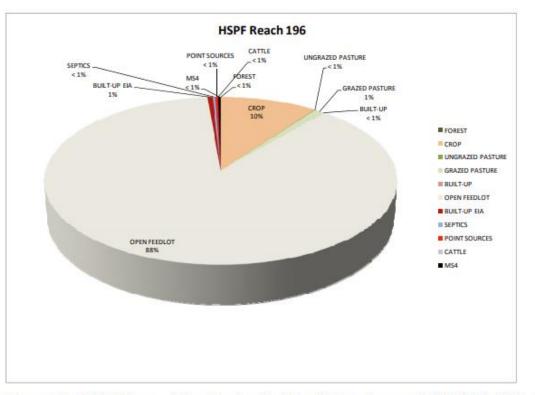


Figure 6-6. HSPF Source Allocation for Shell Rock River Segment IA 02-SHL-0020_1.



Summary of Water Quality



Overall WQ is not horrible

However, there are still some issues

Detailed sampling and modeling may help increase our understanding





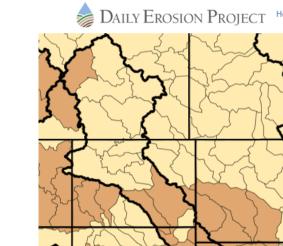
Water Quality Assessment

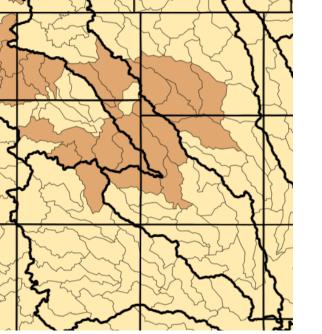
Ongoing Work

- Continue analyzing existing data
- Trend analysis for each pollutant

Next Steps

- Review loads vs concentrations
- Integrate into watershed plan
- Develop goals
- Summarize data/study needs





People



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Questions and Discussion



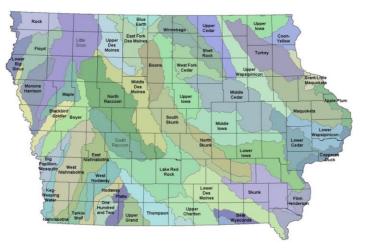
Water Quality Concerns and Needs

Is information on water quality in the River easy to obtain? Are you aware of current water quality conditions?

Is good water quality important to you, others in the watershed, or to economic viability of your community/jurisdiction? Why? In what way?

What activities do you think harm water quality the most?

What resources do cities, counties, farmers, or others need to help improve water quality across the watershed?



Everyone lives in a watershed

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Recreation Opportunities







Existing Facilities

Wildlife areas Skiing

Camping

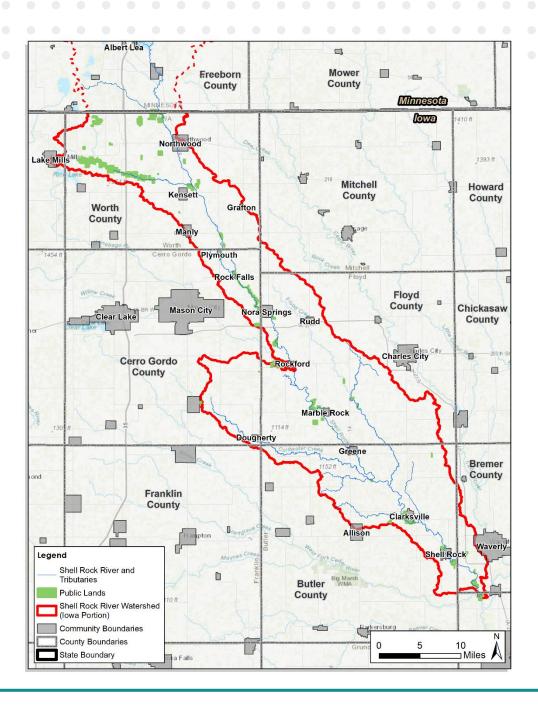
Picnicking

Hiking

Horse riding

Hunting Fishing Boating

Canoeing / Kayaking



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Questions and Discussion



Recreation Opportunities

- Is recreation important in the watershed?
- Are there any under served areas of the watershed?
- What new or additional types of recreation are needed?
- Would a designated water trail be beneficial?



Recreation areas can also provide benefits of reduced flooding, improved water quality, enhanced wildlife habitat, and education opportunities.

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Next Steps

Next meeting agenda (tentative)

- Review public feedback
- Review updated data analysis
- Working session: Develop draft goals for the plan
- Learning moment: Mary Beth Stevenson, Watersheds & Source Water Coordinator, Cedar Rapids

Homework

- Complete and return your worksheets by April 5th
- Get input from others on your worksheets
- Newspaper clippings requested
- Watershed pictures requested







Future Project Idea for the Shell Rock River??

Adam Rupe

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