Welcome to *The Current*, the North Central Region Water Network's Speed Networking Webinar Series

Partnering to Mitigate Harmful Algal Blooms across the Midwest and Beyond: 2PM CT

1. Submit your questions for presenters via the chat box. The chat box is accessible via the purple collaborate panel in the lower right corner of the webinar screen.
2. There will be a dedicated Q & A session following the last presentation.
3. A phone-in option can be accessed by opening the Session menu in the upper left area of the webinar screen and selecting "Use your phone for audio".

This session will be recorded and available at northcentralwater.org and learn.extension.org.

Today's Presenters:

- **Lois Wolfson**, Water Quality Senior Specialist, Department of Fisheries and Wildlife and Institute of Water Research at Michigan State University
- **Melissa Miller**, Associate Director, Iowa Water Center
- **Chad Cook**, Land and Water Outreach Program Manager, University of Wisconsin-Madison Division of Extension

Follow @northcentralh2o and #TheCurrent on Twitter for live tweets!

Lois Wolfson

Dr. Lois Wolfson is a Water Quality Senior Specialist with the Department of Fisheries and Wildlife and Institute of Water Research at Michigan State University. She also serves as the MSU Extension state representative to the North Central Region Water Network. Her outreach work focuses on educational programming in lake ecology and management, emerging water issues, such as PFAS, invasive species, and harmful algal blooms. She teaches a techniques course in lakes and streams and is currently working on a wetlands project for reducing phosphorus from drain tile. Dr. Wolfson received her MS in Botany and PhD in Fisheries and Wildlife from Michigan State University.

Harmful Algal Blooms: No Introduction Needed

Lois Wolfson, PhD
Fisheries and Wildlife, Institute of Water Research and MSU Extension
Michigan State University

The Current Webinar Series

Partnering to Mitigate Harmful Algal Blooms Across the Midwest and Beyond

July 10, 2019

Between 243 and 233.23 million years ago

~470 million years ago

Between 243 and 233.23 million years ago

~470 million years ago

~3500 -2500 million years ago

EPA NLA: Microcystin detected in 39.3% of 43,955 lakes tested (C.I.: 33.2-45.4%)

Various Types of Harmful Algal Blooms (HABs)

- Certain types of microscopic algae/blue-green bacteria that undergo mass reproduction (~20,000-100,000/ml)
- Can be freshwater species or marine species
- Can produce dangerous toxins in fresh or marine waters

Freshwater HAB: Cyanobacteria

Marine HAB: Red Tide (but not always red)

The Cyanobacteria (blue-green bacteria)

aka: blue-green algae

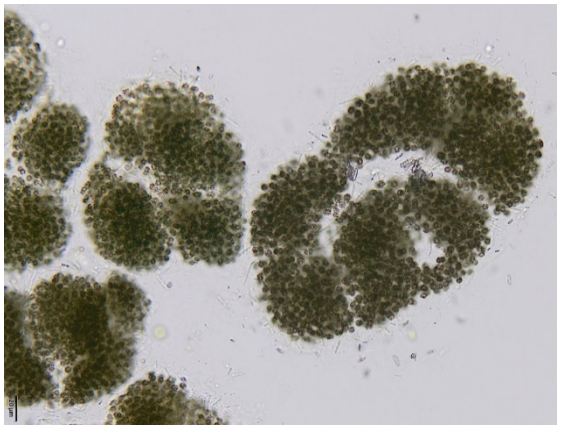
HAB Problems:

Ecological

- Can block out the sunlight from other organisms
- Can lead to depleted oxygen levels

Economic/Recreational

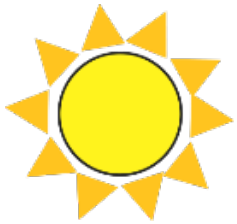
- Cause odor and aesthetic problems
- Loss of recreation
- Decline in property values



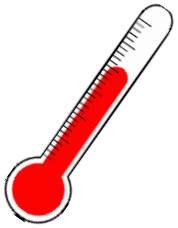
Health

- Many produce toxins

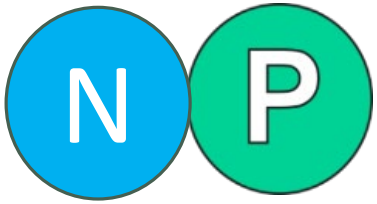
Why are Cyanobacteria Successful?



Buoyancy
Accessory Pigments



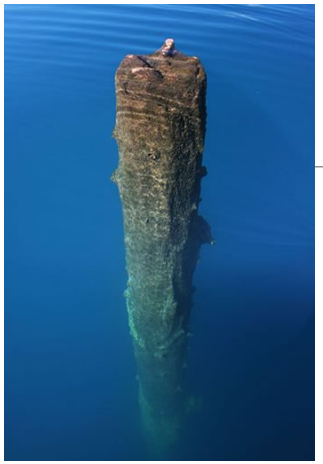
Wide Temperature Tolerance



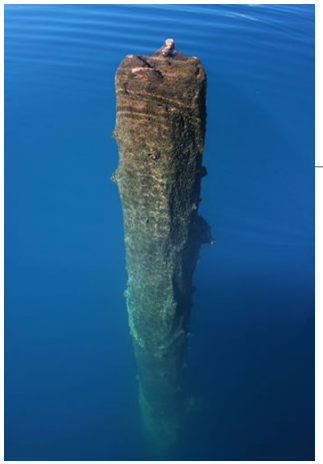
Nitrogen Fixation
Affinity for Phosphorus

Not readily consumed

Lakes may go from this



Lakes may go from this



to this

& maybe even this

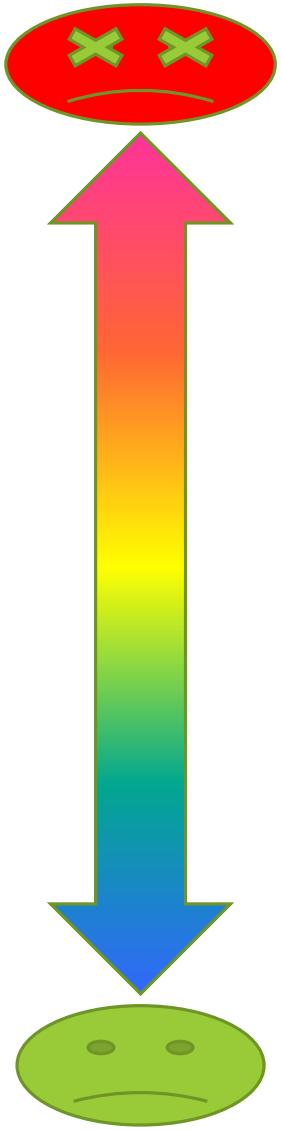
Harmful Algal Blooms Toxins

- Neurotoxins
  - Affects the nervous system
- Hepatotoxins
  - Affects the liver, other internal organs, and can cause gastrointestinal illness
- Dermatoxins
  - Affects the skin and can cause rashes

Other Symptoms

- Numbness of lips; tingling
- Dizziness; headache
- Diarrhea, vomiting
- Respiratory arrest
- Longer term – liver damage
- In pets: staggering, convulsions

How Toxic are the HAB Toxins?



- Dioxin (0.000001 mg/kg-d*)
- Microcystin LR (0.000003 mg/kg-d) (hepatotoxin)
- Saxitoxin (0.000005 mg/kg-d) (neurotoxin)
- PCBs (0.00002 mg/kg-d)
- Cylindrospermopsin (0.00003 mg/kg-d) (hepatotoxin)
- Methylmercury (0.0001 mg/kg-d)
- Anatoxin-A (0.0005 mg/kg-d) (neurotoxin)
- DDT (0.0005 mg/kg-d)
- Selenium (0.005 mg/kg-d)
- Botulinum toxin A (0.001 mg/kg-d)
- Alachlor (0.01 mg/kg-d)
- Cyanide (0.02 mg/kg-d)
- Atrazine (0.04 mg/kg-d)
- Fluoride (0.06 mg/kg-d)
- Chlorine (0.1 mg/kg-d)
- Aluminum (1 mg/kg-d)
- Ethylene Glycol (2 mg/kg-d)

*EPA's maximum acceptable oral dose

How are people exposed?

- Ingestion and inhalation during recreational activities
- Consumption of contaminated fish or drinking water


Flickr_Algal Wake

What can we control to reduce HABs?

Contact Info:
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Photo: NOAA Satellite Image

NORTH CENTRAL REGION
WATER NETWORK

Melissa Miller

Melissa Miller is the associate director of the Iowa Water Center, part of the National Institutes for Water Resources (NIWR). In this role, she works throughout the state, region, and the NIWR network to advance water research, education, and outreach needs for the state of Iowa. Miller holds an MS degree in community development with an emphasis in natural resource management.

Partnering to Mitigate Harmful Algal Blooms in the North Central Region of the United States

How We Did It and What We Found

Background: Water Resources Research Institutes

- Created in 1964 — Water Resources Research Act
- U.S. Geological Survey administers 54 Institutes
- Address water resources issues through:
  - Research
  - Outreach
  - Education
- Maximizing impact with a regional focus

NIWR
THE NATIONAL INSTITUTES FOR WATER RESOURCES

Background: Project Genesis

- North Central Region Water network call for proposals

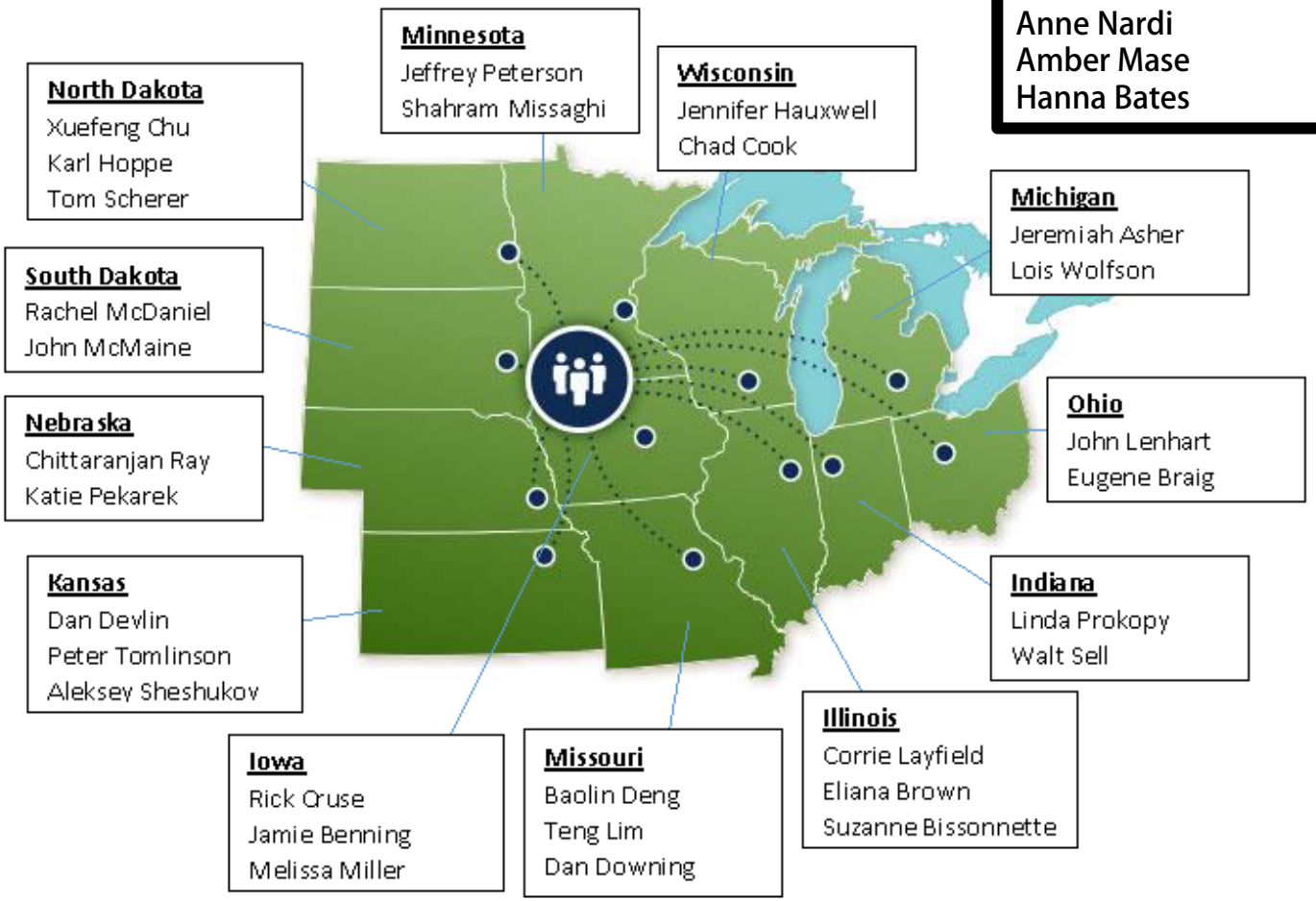
> The Network is providing a small number of competitive mini-grants to facilitate progress toward these goals. **For this year's request for applications, the Network is partnering with Water Resource Research Institutes in the North Central Region and the Lower Mississippi River Basin to strengthen research and extension education on harmful algal blooms (HABs). Projects that contribute to HAB prevention or improved public health and safety outcomes associated with HABs will be given the highest priority for funding.**

- Goals: inventory WRRI-funded HABs projects, inventory Extension products, and make recommendations for regional products

Project Partners

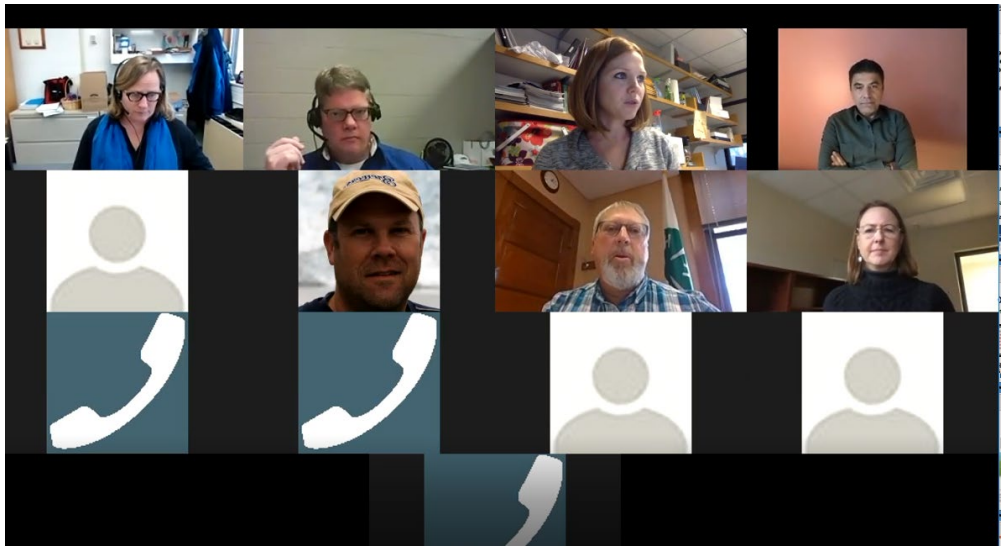
Support Team Members:

Rebecca Power
Anne Nardi
Amber Mase
Hanna Bates



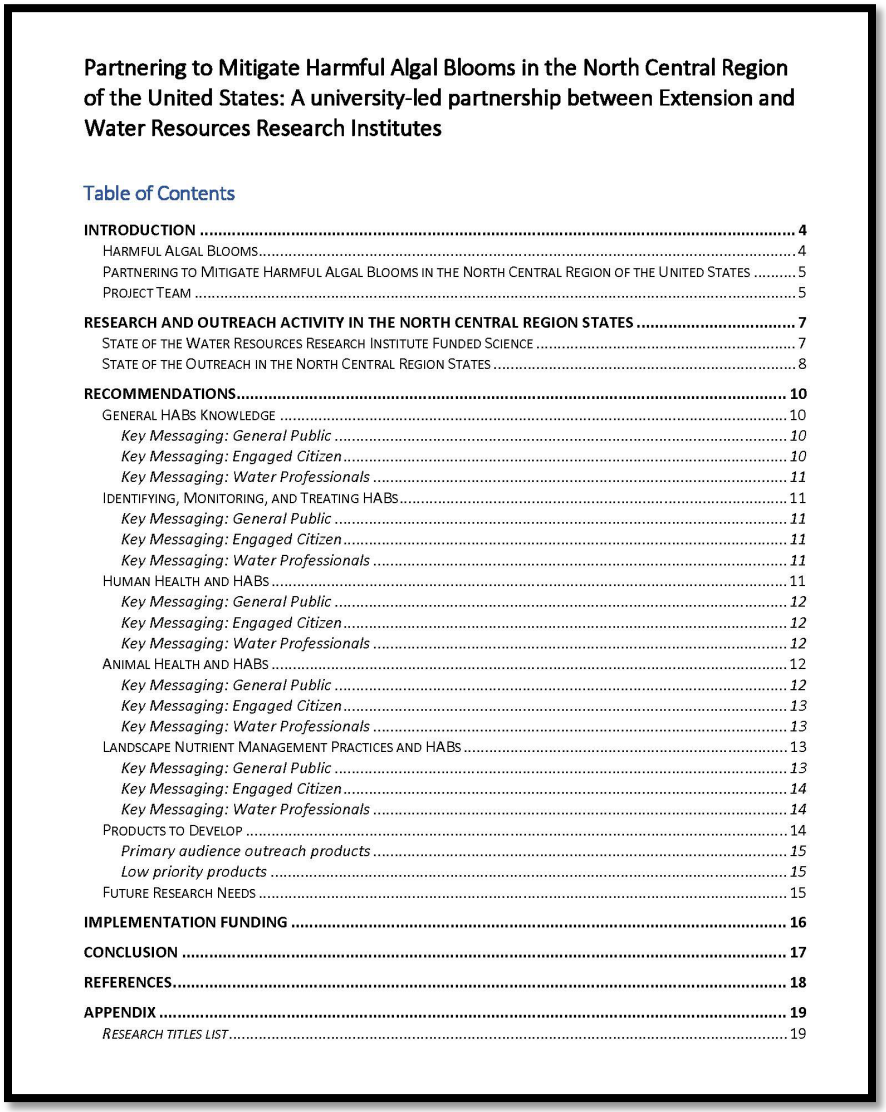
The Process

- Funding notice!
- Extension inventory
- Monthly team meetings
- North Central Region One Water Action Forum



The Process

- More team meetings
- WRITE
- EDIT
- Share!



Partnering to Mitigate Harmful Algal Blooms in the North Central Region of the United States: A university-led partnership between Extension and Water Resources Research Institutes

Table of Contents

Findings: Research Inventory

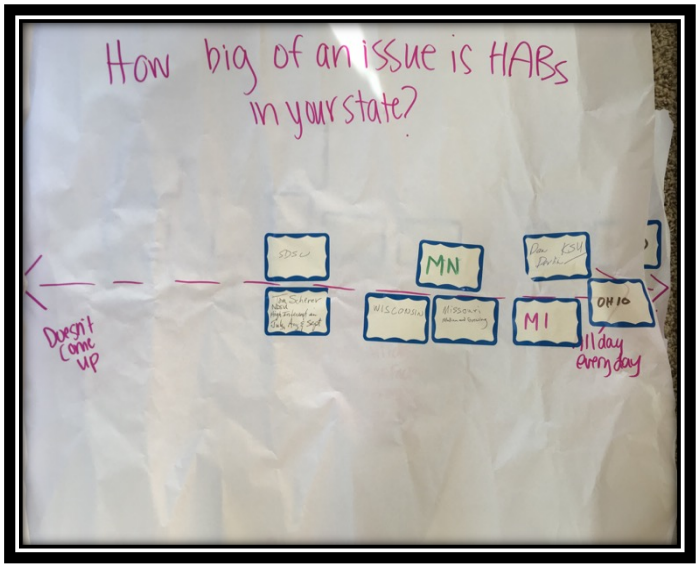
- 2014 — 2017: 15 HABs projects
- 2018: 15 HABs projects

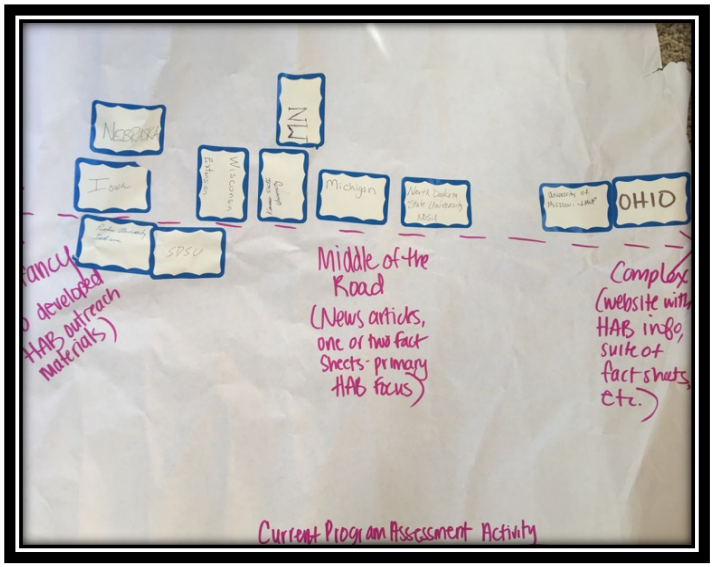
Topic	Number of projects
Animal Health	2
Human Health	1
Identifying, Monitoring, and Treating	5
Landscape Nutrient Management	5
Prediction/Source Detection	15
Other (Economics; HAB Effect on Environment)	2

Caveats

- Twelve North Central States ONLY
- Projects with outcomes explicitly tied to HABs ONLY

Findings: Extension Inventory





- Focus of materials varied by region
- Impetus for most = human and animal health
- Many products not "longstanding"

Recommendations

- Five key areas
  - General HABs Knowledge
  - Identifying, monitoring, and treating HABs
  - Human health and HABs
  - Animal health and HABs
  - Landscape nutrient management practices and HABs

General Public

Engaged Citizen

Water Professional

Key Messaging Example: Human Health and HABs

- Key Messaging: General Public
  - You cannot tell if an algal bloom is producing toxins just by looking at it
  - Keep out of the water if there are visible scums or the water looks highly colored green, blue-green, red or pink. Also, keep your pets from drinking or playing in the water.
  - If you were exposed to HABs and are now experiencing symptoms, you should contact a Poison Control Center or your doctor.
  - Use HAB forecasting system where available to plan activities in or near water bodies that contain HABs.

Key Messaging Example: Human Health and HABs

- Key Messaging: Engaged Citizen
  - Post signage around your lake concerning HABs and health-related concerns.
  - Talk with your neighbors about best management practices for reducing HABs.
  - Establish monitoring programs to help identify where blooms are occurring.

Key Messaging Example: Human Health and HABs

- Key Messaging: Water Professionals
  - Encourage legislators to develop recreational and drinking water standards for HAB toxins
  - Hold programs to teach people about HABs and human health issues.
  - Share methods and protocols with other professionals for dealing with HABs.
  - Participate in discussions, workshops, and seminars to learn latest research and activities to reduce and manage HABs.

What's Next?

- Extension product recommendations
- Lessons learned

Chad Cook

Chad is the land and water outreach program manager for the University of Wisconsin-Madison Division of Extension. In this role he oversees the programming in the Natural Resource Institute and works extensively with a broad network of partners to identify and address current and emerging education and outreach needs related to a wide range of land and water topics. Chad holds an MS degree in water resources management from the University of Wisconsin-Madison.

White Paper…in progress

- Products to develop
  - Social media toolkit
  - Regional webinar series for sharing HABs research and resources

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  - In-person workshops on state-of-the-science HABs-related topics
  - HABs resource website with regional resources, research, and tools
  - HABs videos for use in programming
  - Media toolkit

Lessons Learned

- Connection between WRRI and Extension. What started as secondary goal turned into a major impact of the project.

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"Perfect is the enemy of good."

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- Limited amount of in-depth HABs knowledge in our group. Is that a bad thing?
- In-person would have been helpful initially to develop the group relationship.
- Without pre-existing relationships, harder to get buy-in and focus. No one was being paid and often other issues/tasks take precedence.


Herding Cats
1
2
3
4
5
6
7
It CAN be done
ICANHASCHEEZBURGER.COM

Question and Answer Session

We will draw initial questions and comments from those submitted via the chat box during the presentations.

Today's Speakers

Lois Wolfson – wolfson1@msu.edu
Melissa Miller – millerms@iastate.edu
Chad Cook – chad.cook@wisc.edu

Thank you for participating in today's *The Current*!

Visit our website, northcentralwater.org, to access the recording and our webinar archive!