Protecting Upper Mississippi from Invasive Carp

Lock and Dam 5 Invasive Carp Deterrent Project Update

ML2024 Outdoor Heritage Fund Project

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USGS: Marybeth Brey & Andrea Fritts – Research Fish Biologists

USFWS: Amy McGovern – Fisheries Program Supervisor, Aquatic Invasive Species

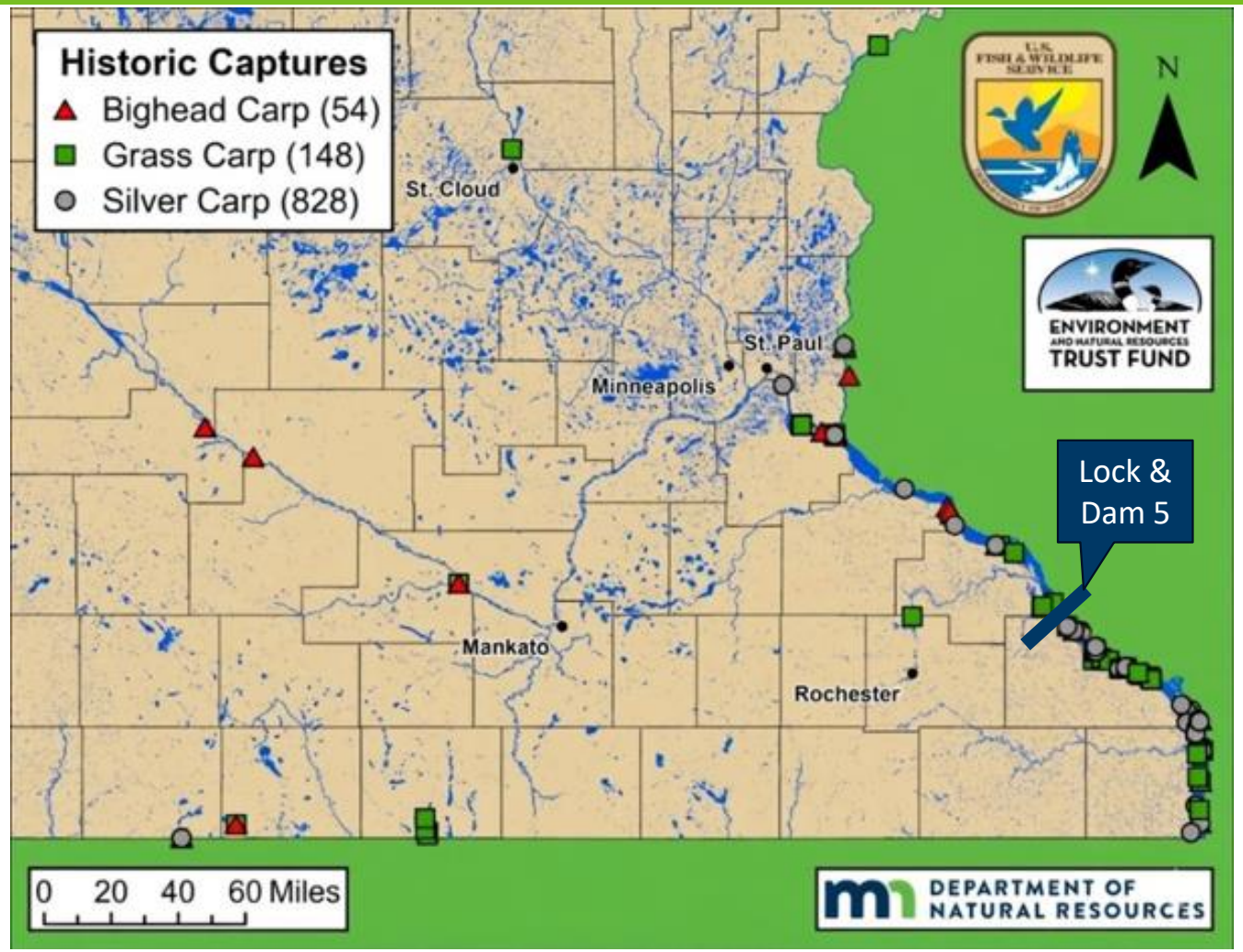
USACE: Nathan Wallerstedt – Project Management Branch Chief

ERDC: Dave Smith – Ecohydraulics Team Lead; Christa Woodley – Sr. Research Scientist

Update: Protecting Upper Mississippi River from Invasive Carp

- Invasive Carp Background
- Accomplishment Plan Overview
- Deterrent Updates: Interagency Project Team, Scoping, and Design Phases
- Upcoming Deterrent Activities: Design, Permitting, and Installation Phases
- Scoping Supporting Technologies

Invasive Carp in Minnesota



Silver, bighead and grass carp photos: MN DNR
Black carp photo: U.S. Geological Survey, Columbia Environmental Research Center

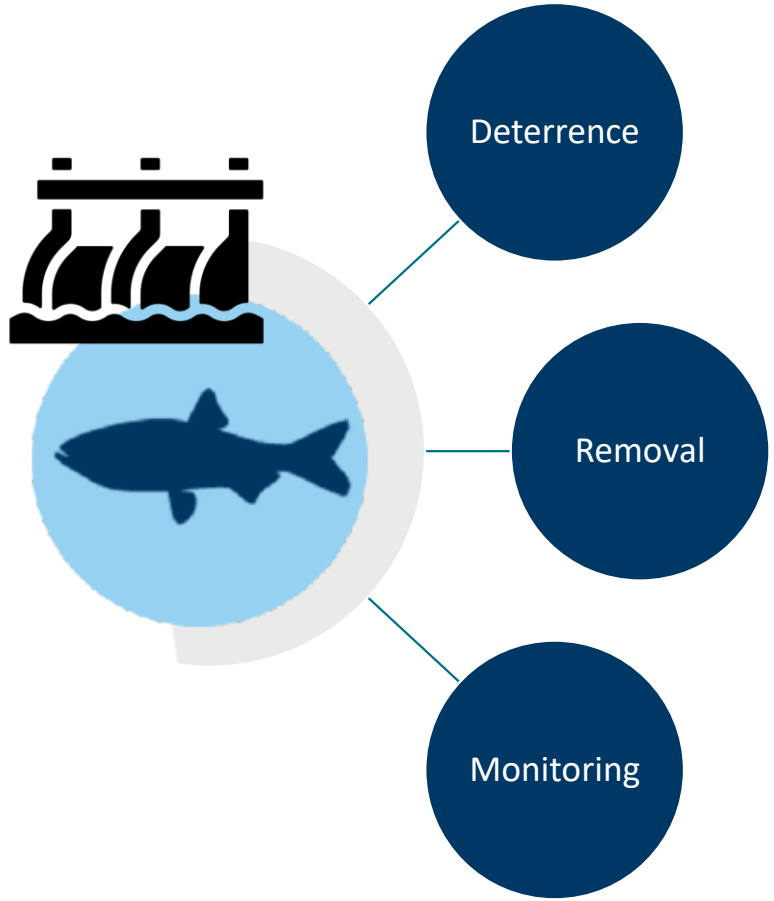
Accomplishment Plan Overview

Activities:
Interagency Project Plan → Scoping → Design → Permitting → Installation and Construction

Components:
Invasive carp deterrent at the lock

Strategies to support effectiveness of the deterrent:

- Dam gate deterrents
- Trap & sort system
- Monitoring and adaptive management



Interagency LD5 Workgroup

USGS science for a changing world

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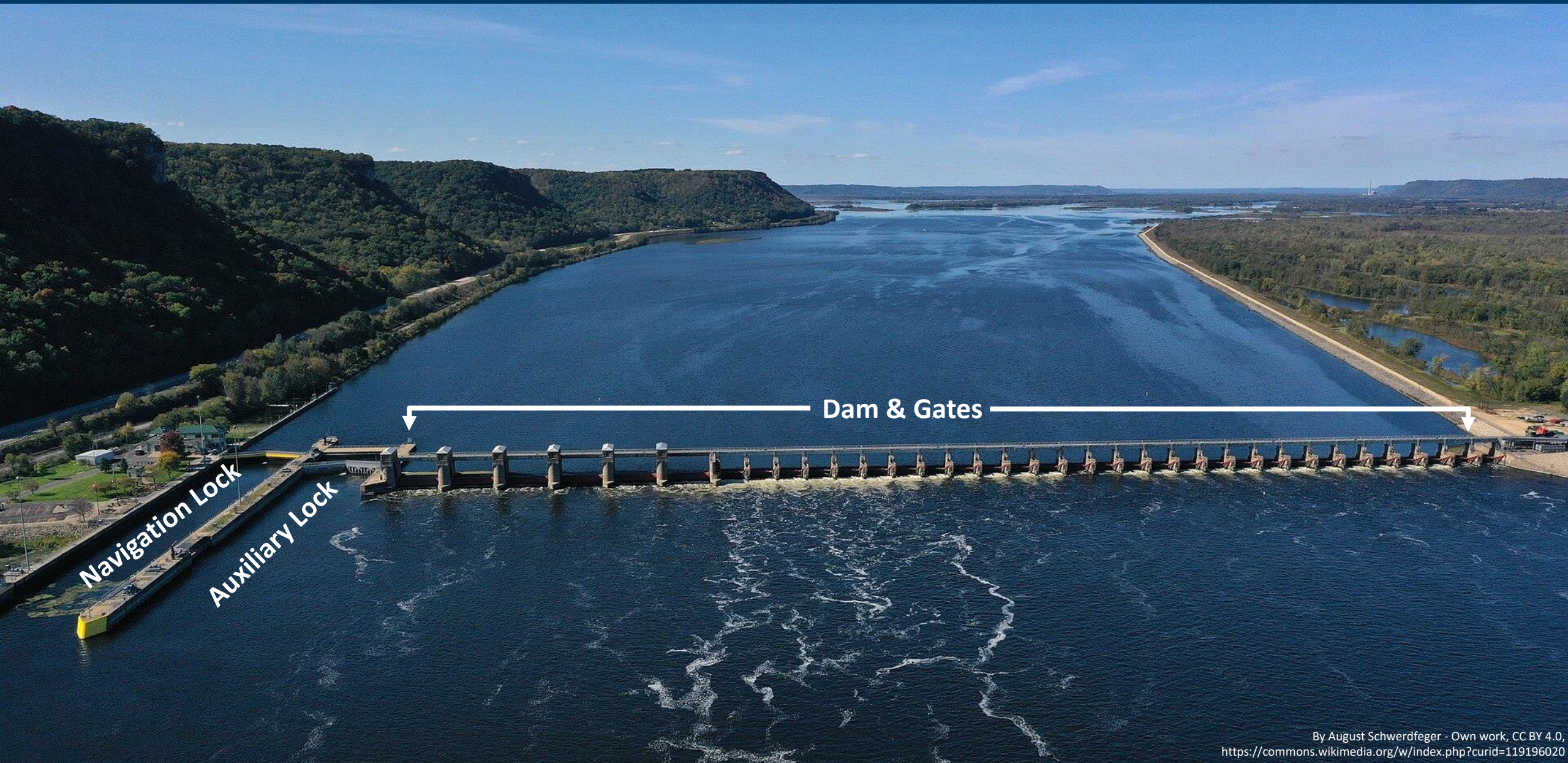
Lock and Dam 5 (LD5)

Lock and Dam 5



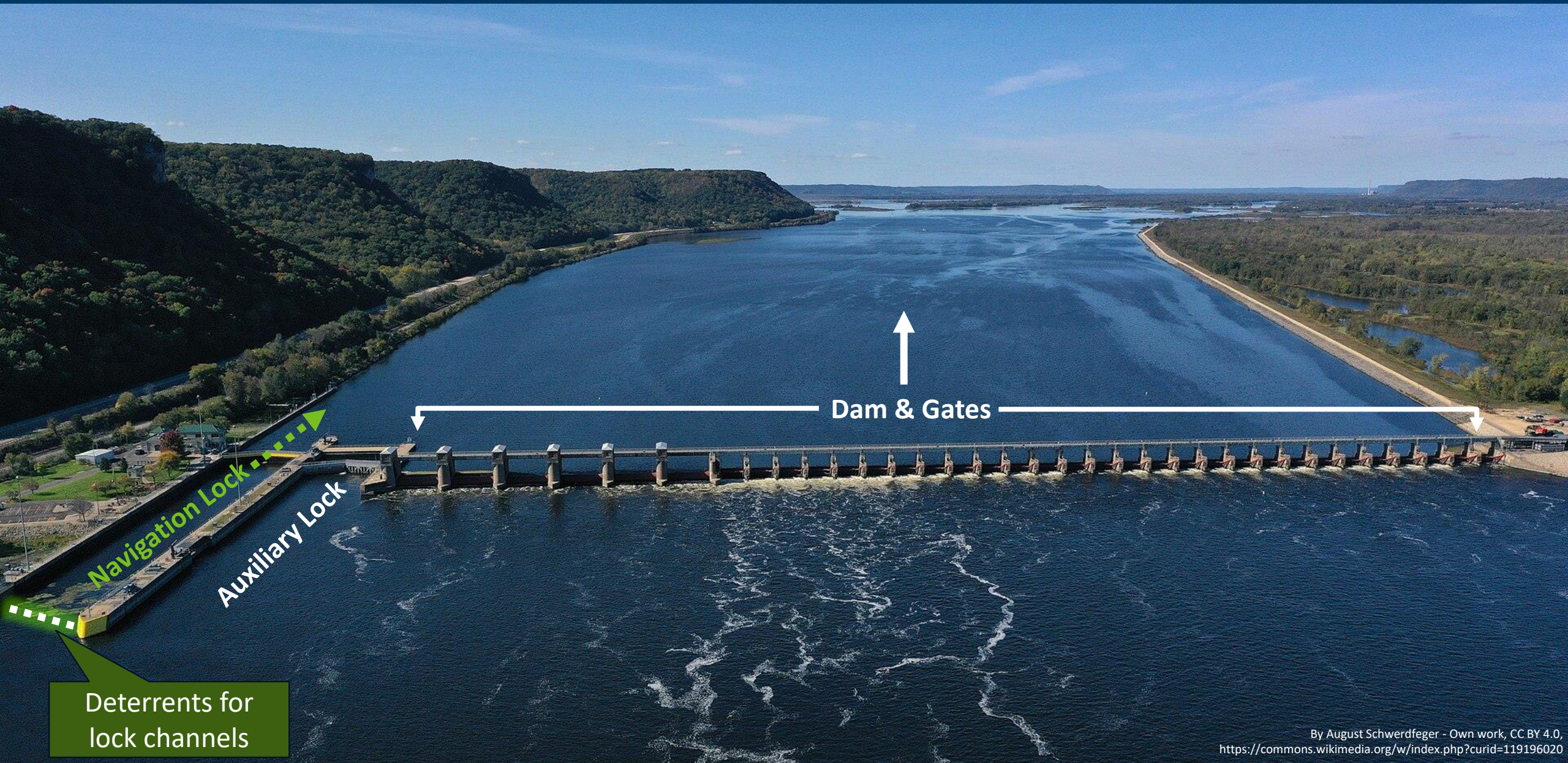
How can fish move upstream?

Navigation Lock

Auxiliary Lock

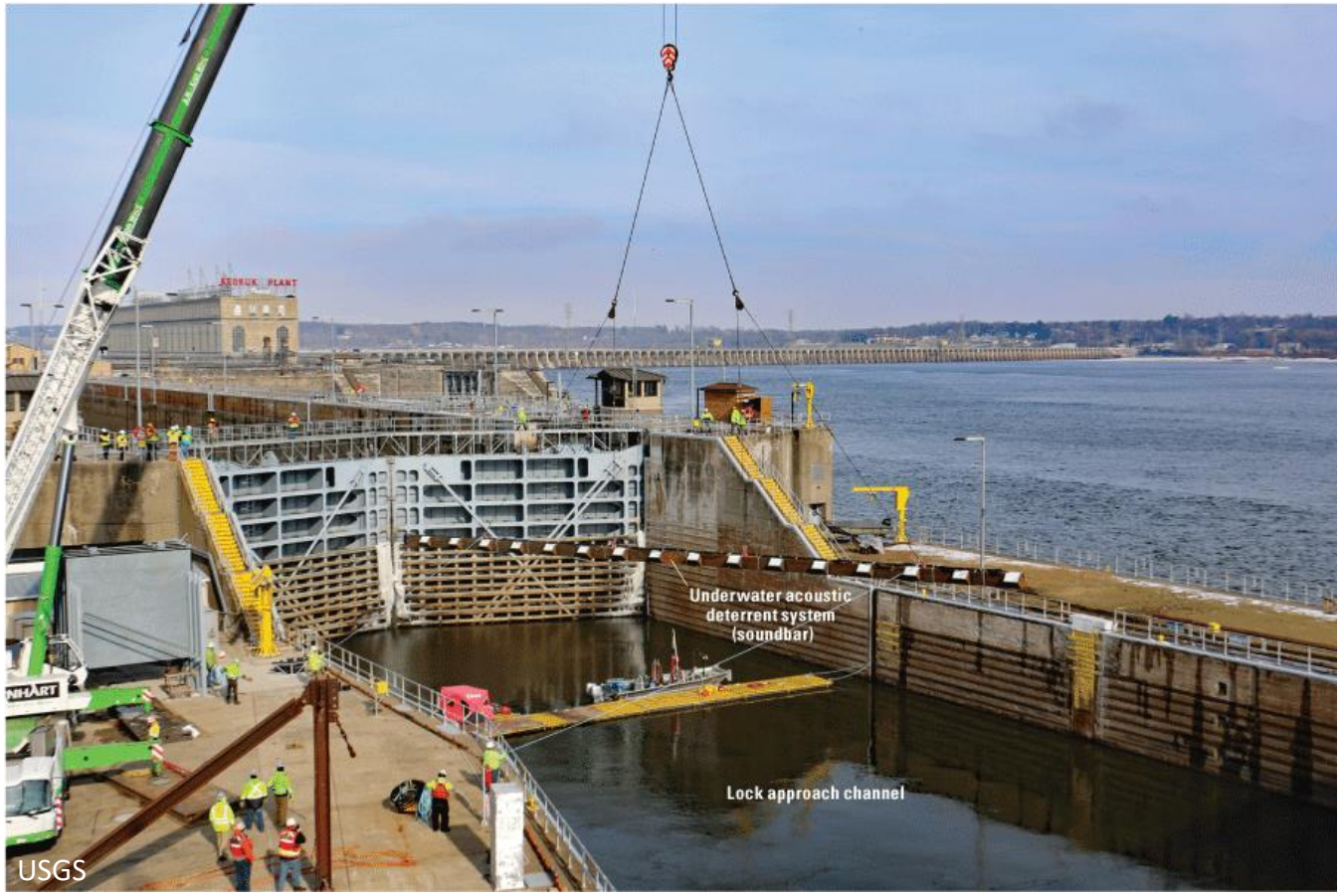
Dam & Gates

What tools are available to reduce upstream spread of invasive carp?



Acoustic Deterrents for Invasive Carp

- Two experimental installations of sound-based deterrents at lock and dams in the U.S.
- Both reduce invasive carp passage through the locks by ~50%, little to no impacts on native species studied
- Both deterrents are installed at locks of high-head dams where fish can ***only*** pass through the lock



Deterrent Updates: Scoping Phase

- Cooperative Research and Development Agreement (CRADA) with the U.S. Army Engineer Research and Development Center (ERDC)
- The CRADA will facilitate scoping, design, permitting and construction of the deterrent
- USACE – St. Paul District designing the deterrent

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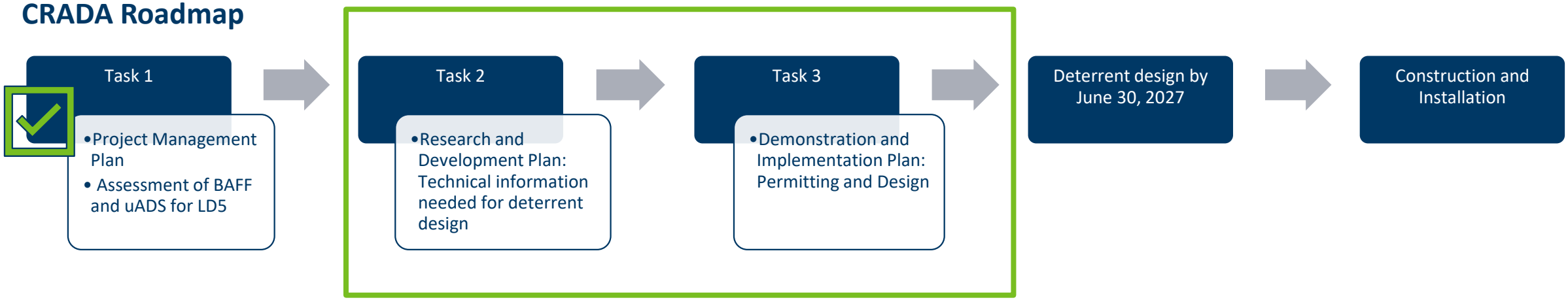
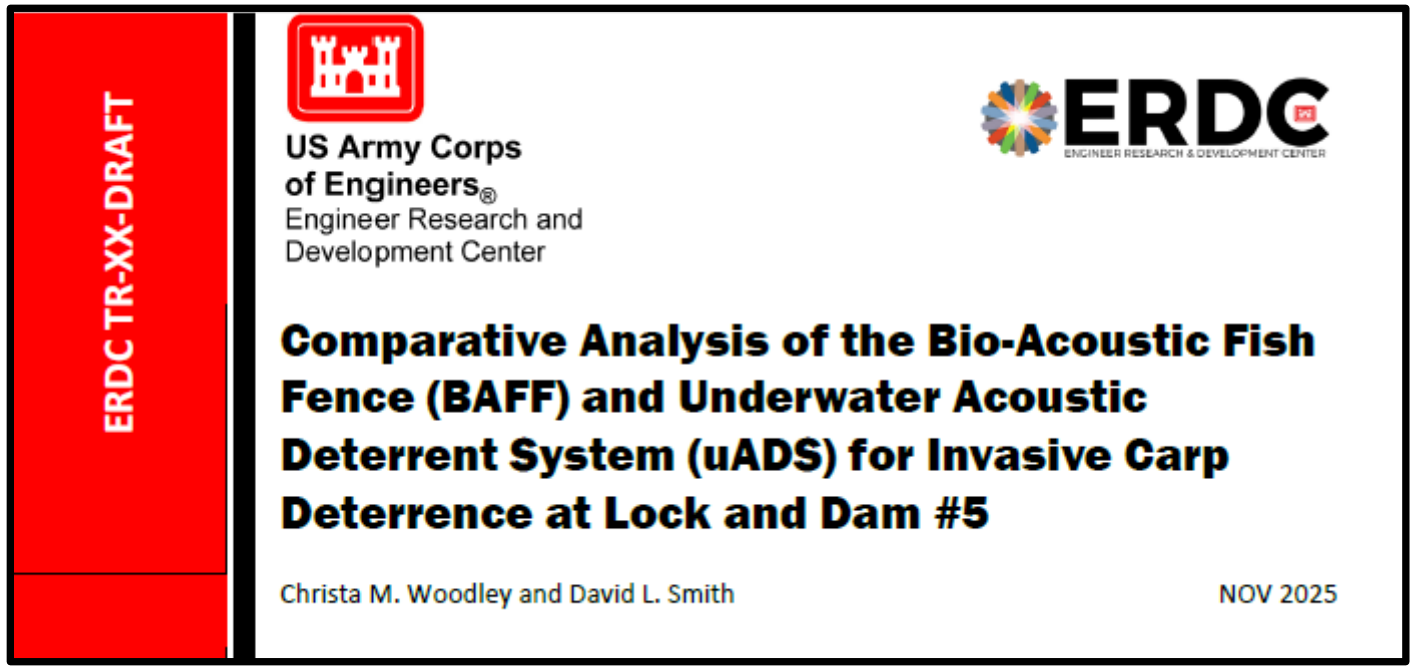
Deterrent Updates: Scoping Phase

CRADA Roadmap



Deterrent Updates: Scoping Phase


ERDC TR-XX-DRAFT

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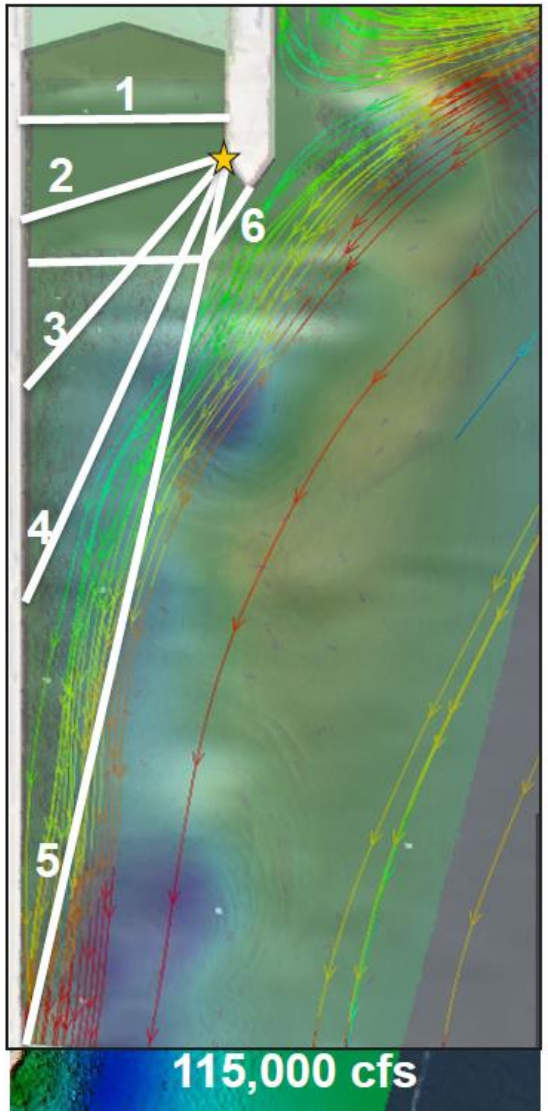
Comparative Analysis of the Bio-Acoustic Fish Fence (BAFF) and Underwater Acoustic Deterrent System (uADS) for Invasive Carp Deterrence at Lock and Dam #5

Christa M. Woodley and David L. Smith

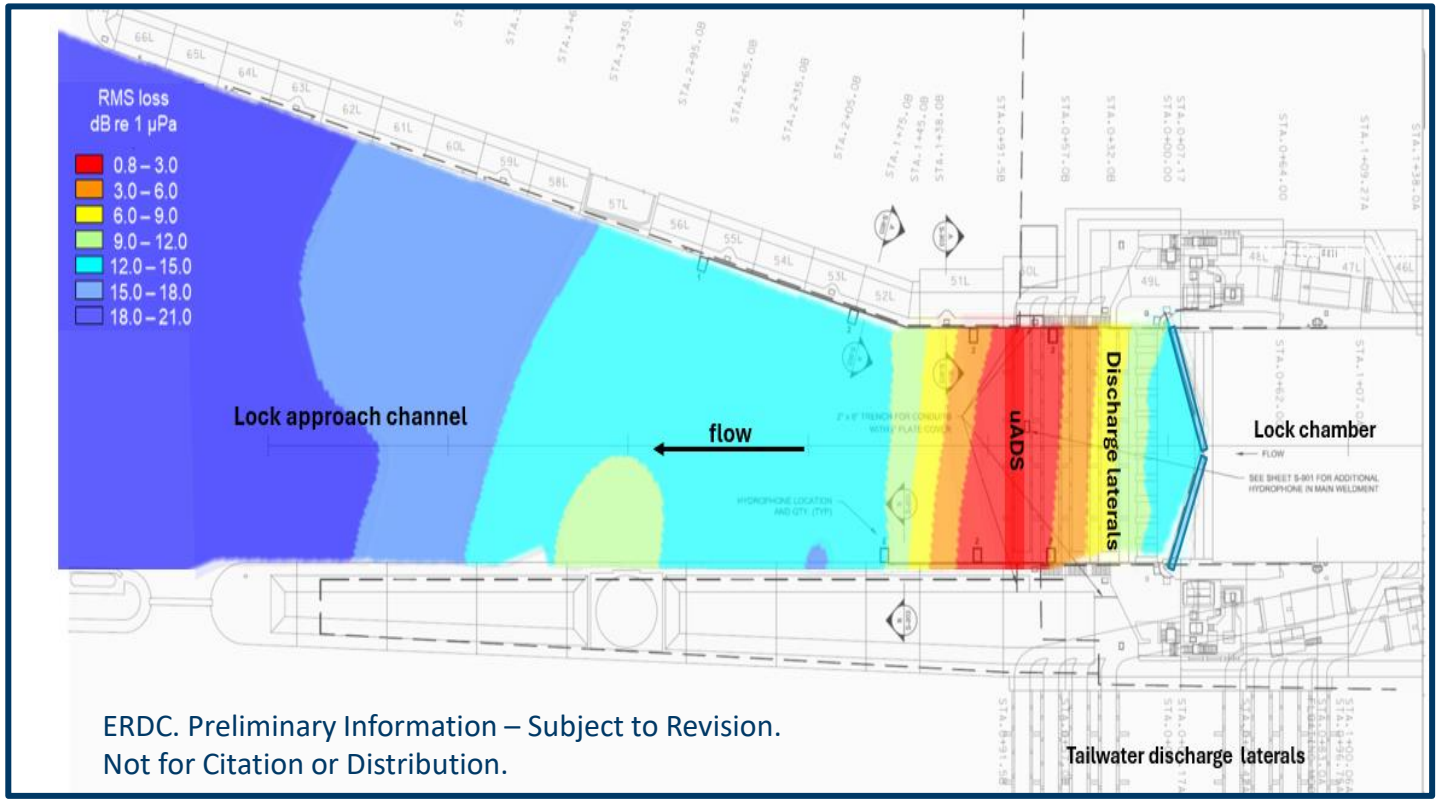
NOV 2025

- Lock discharge
- Bathymetry
- River flow
- Operational considerations
- Costs
- Interactions with navigation



Deterrent Updates: Scoping Phase

- Underwater Acoustic Deterrent System (uADS) selected for design



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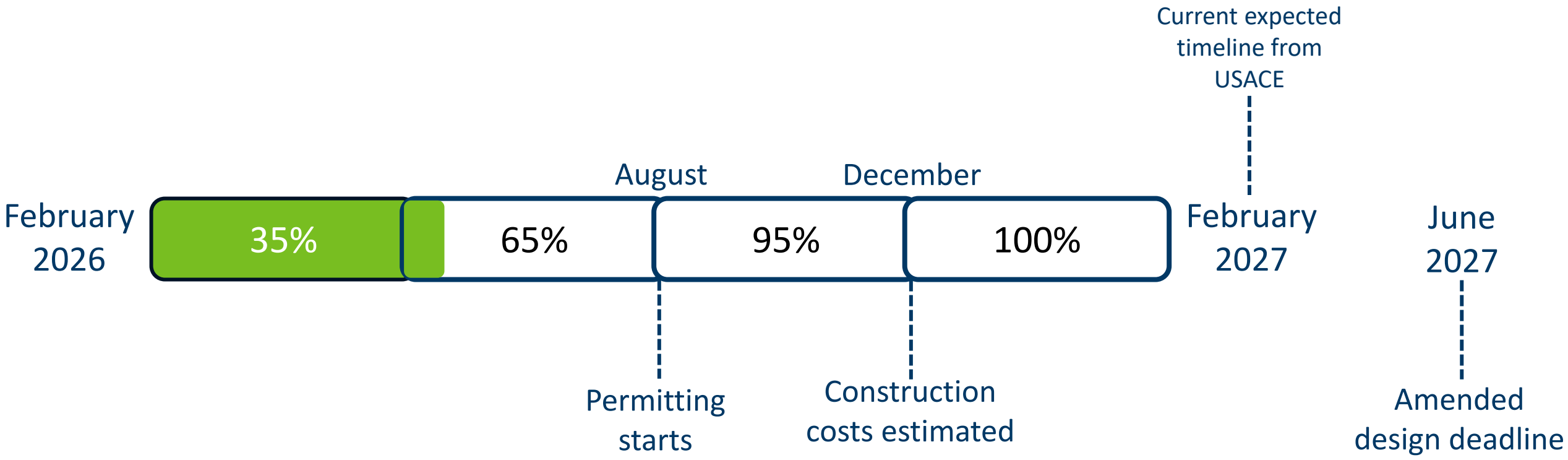
Deterrent Updates: Design Phase



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Deterrent Updates: Design Phase

35% Design

- Constructability
- Dam Safety
- uADS placement
- Support shed placement

Deterrent Updates: Design Phase

65% Design

Upcoming Project Phase: Permitting

Upcoming Project Phase: Construction & Installation

Anticipated completion	Back-up window
Winter 2027-28	Winter 2028-29

- Estimate for LD5 uADS available late 2026 at 95% design level
- From ERDC – extrapolated estimate to deploy based on Lock and Dam 19: **$3.502M**

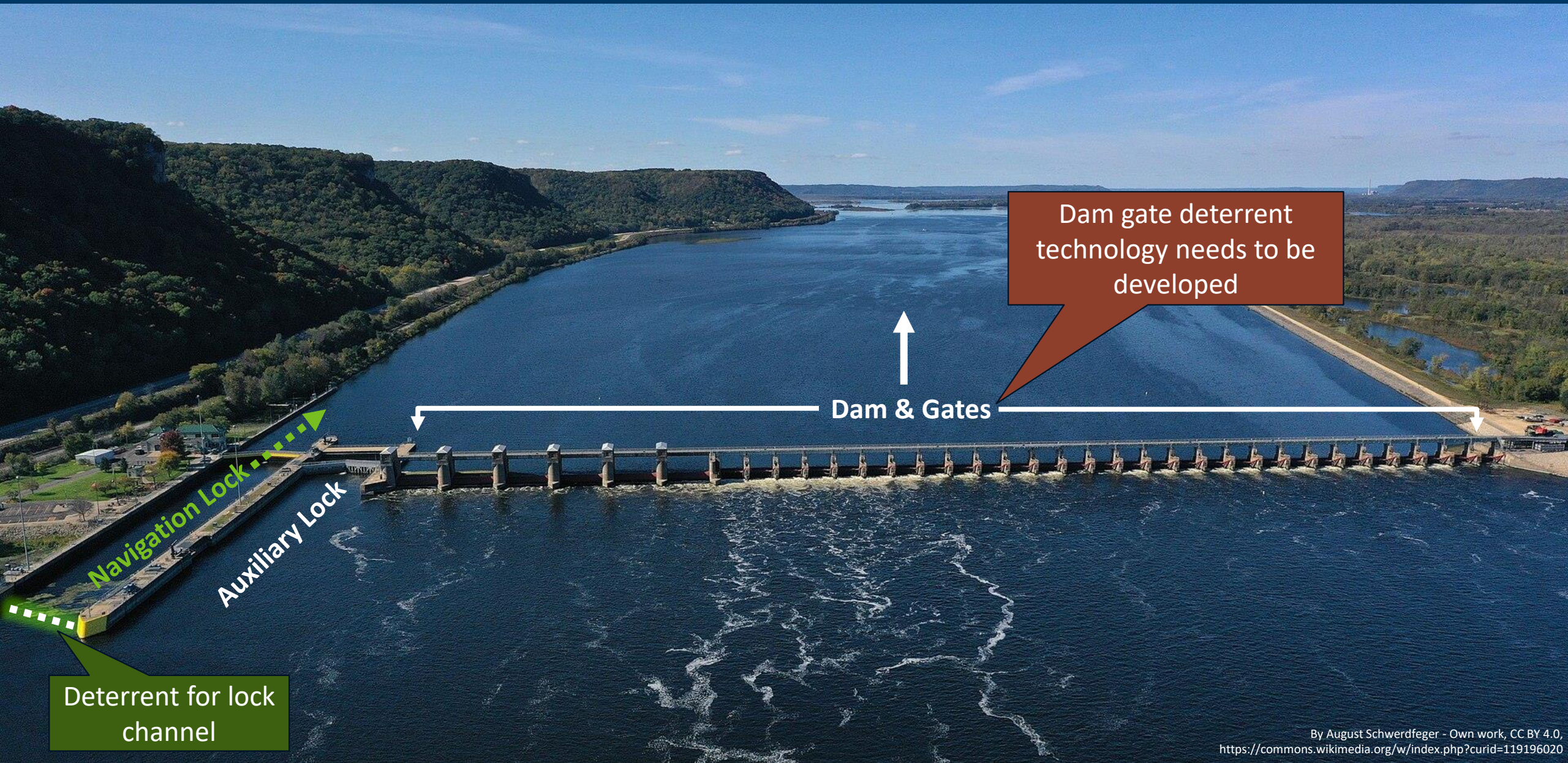
After Installation

Anticipated completion	Back-up window
Winter 2027-28	Winter 2028-29

- Appropriation available until **June 2029**
- Estimated annual operations and maintenance costs based on Lock and Dam 19 uADS: **$85,986**
  - Larger maintenance event every 5 years**: $580,992**

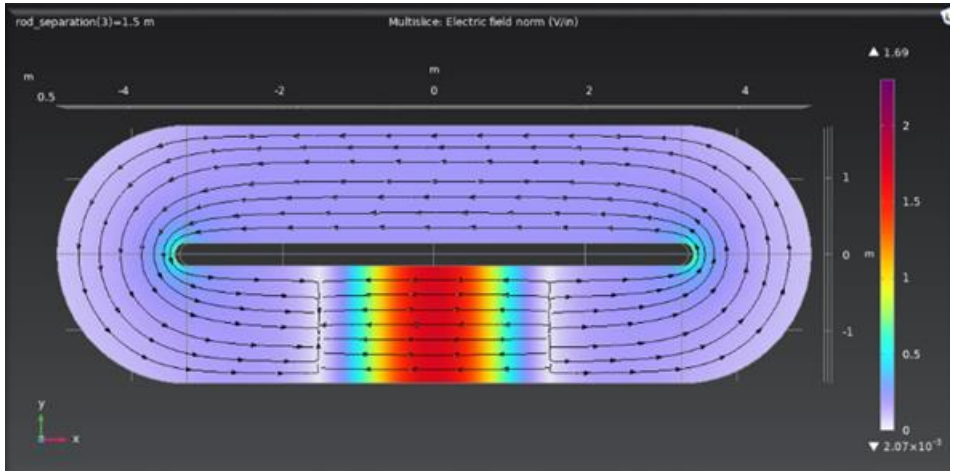

USACE-St. Paul District

What tools can support deterrent effectiveness at LD5?



Scoping: Dam gate deterrents

- Research and development needed



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What tools can support deterrent effectiveness at LD5?

Dam gate deterrent technology needs to be developed

Dam & Gates

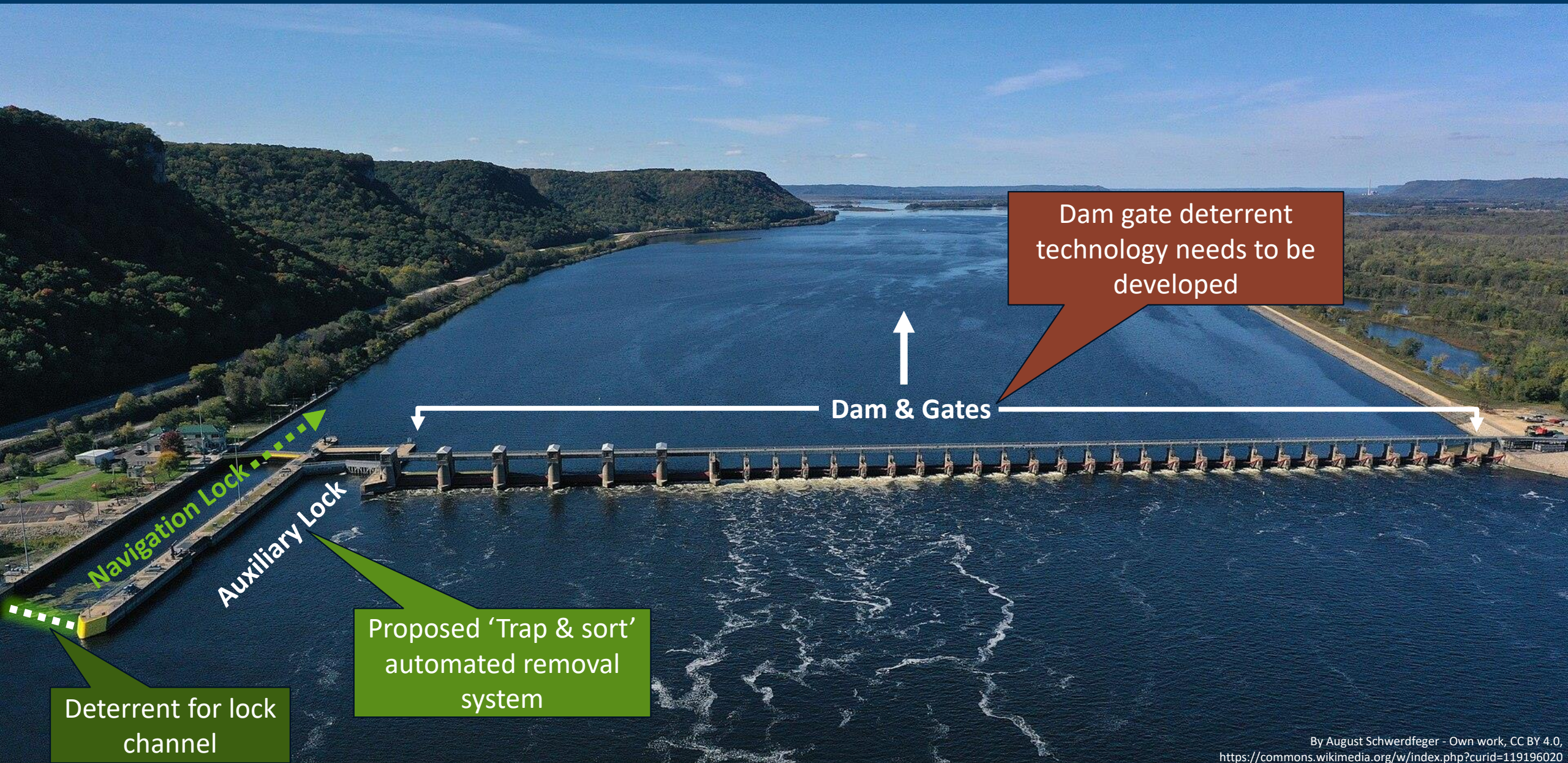
Navigation Lock

Auxiliary Lock

Removing invasive carp

Deterrent for lock channel

What tools can support deterrent effectiveness at LD5?

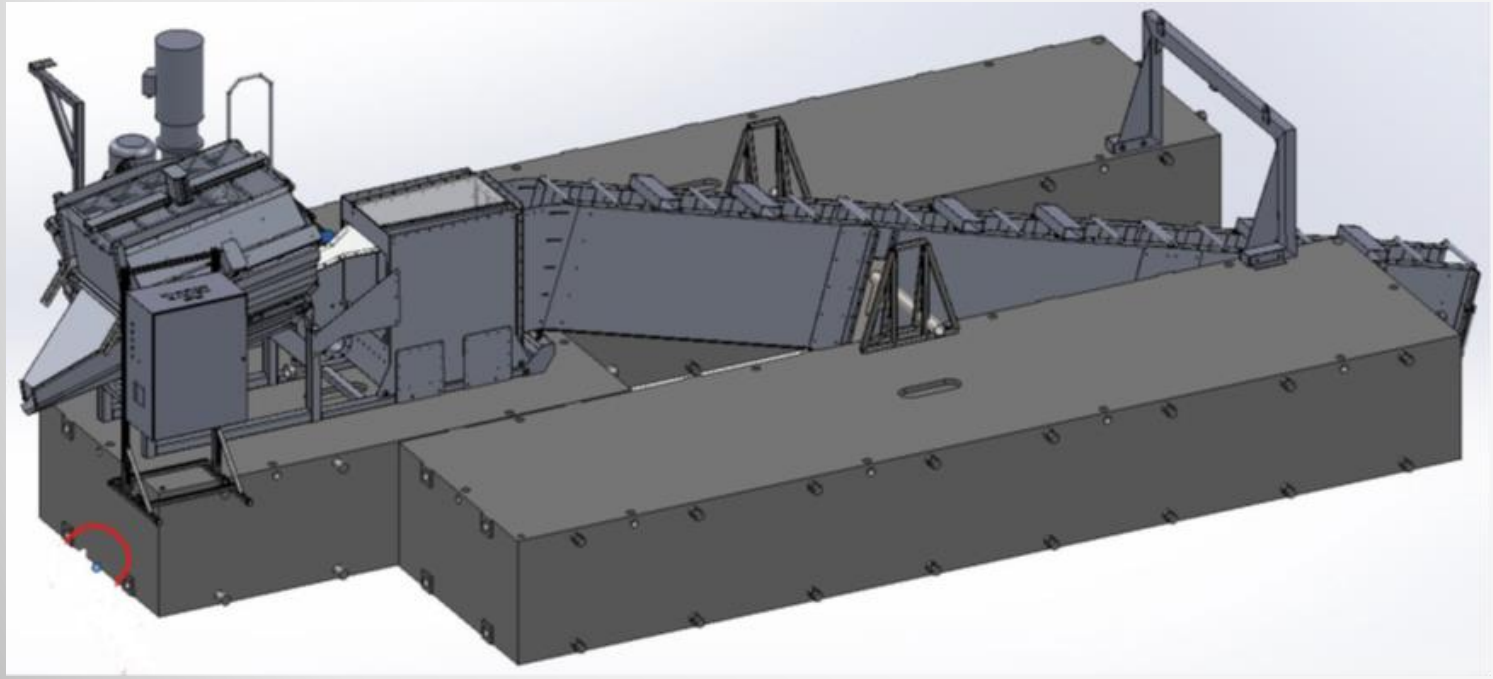


Scoping: Trap & Sort System

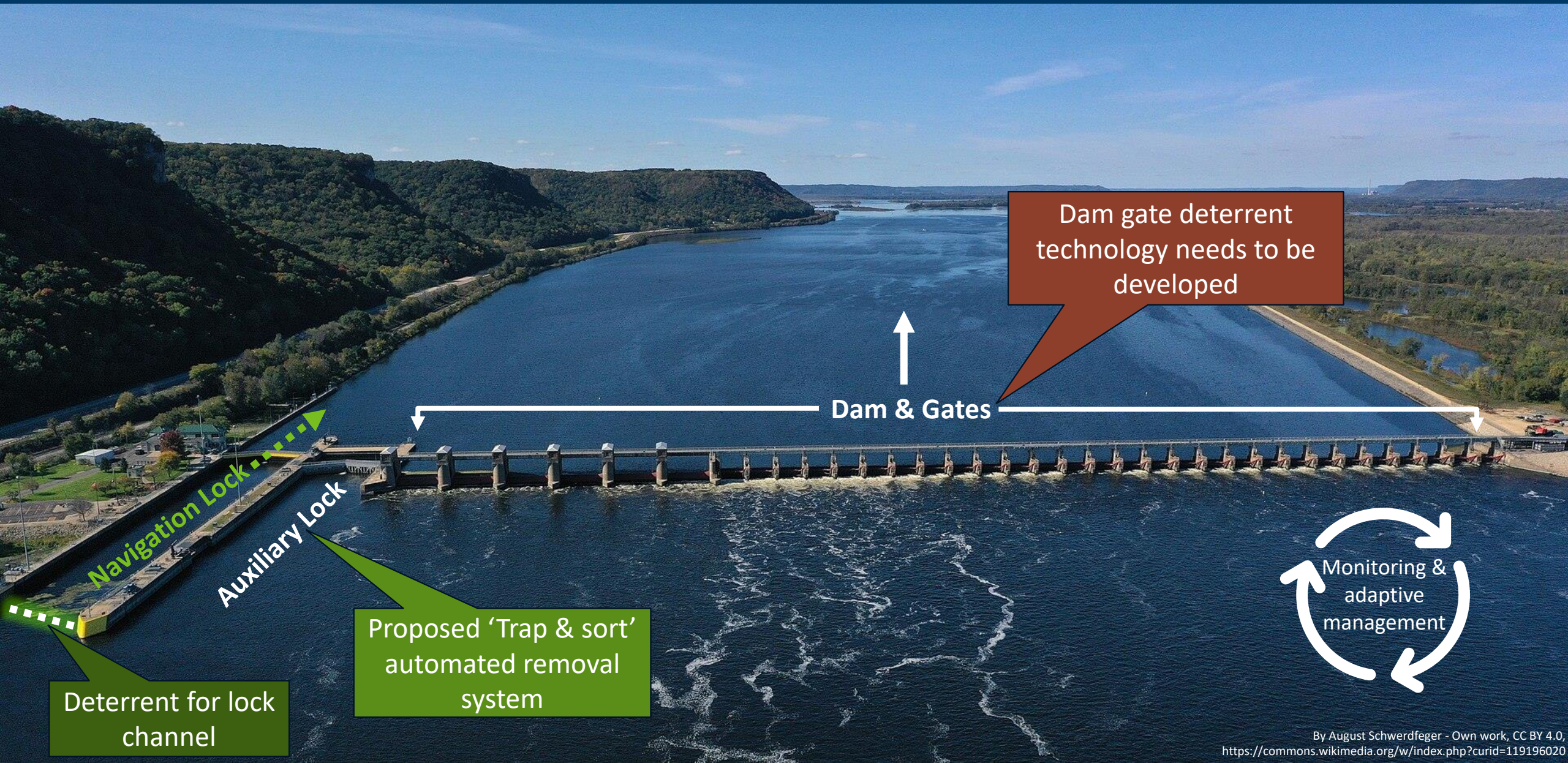
- Automated, passively operated system
- Trap and remove invasive carp from the river
- Support effectiveness of the lock deterrent
- Potential to incorporate native fish passage

Estimate of funds available for the Trap & Sort once deterrent reaches 95% design level

Illinois Invasive Carp Removal Research Project



What would an integrated system for invasive carp look like?



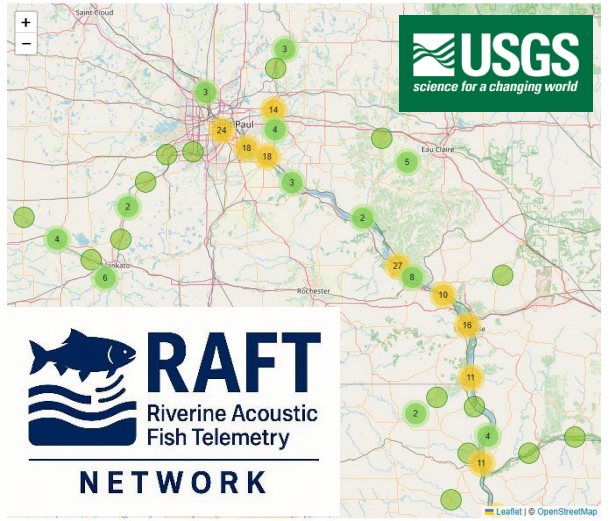
Monitoring

Acoustic Telemetry Study Species

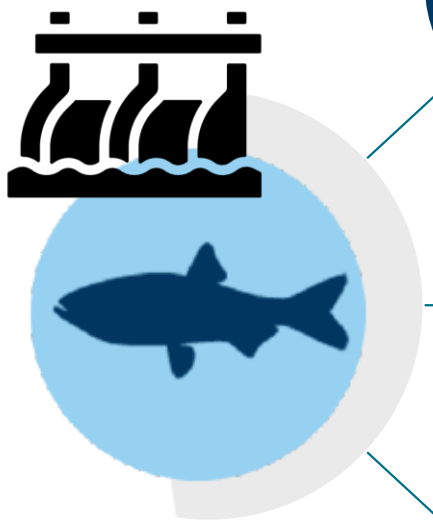
- Invasive carp spp.

Native fish

- Bigmouth buffalo
- Lake sturgeon
- Paddlefish
- White bass
- Redhorse spp.



Summary: Main Project Updates



Deterrence

- uADS design in progress

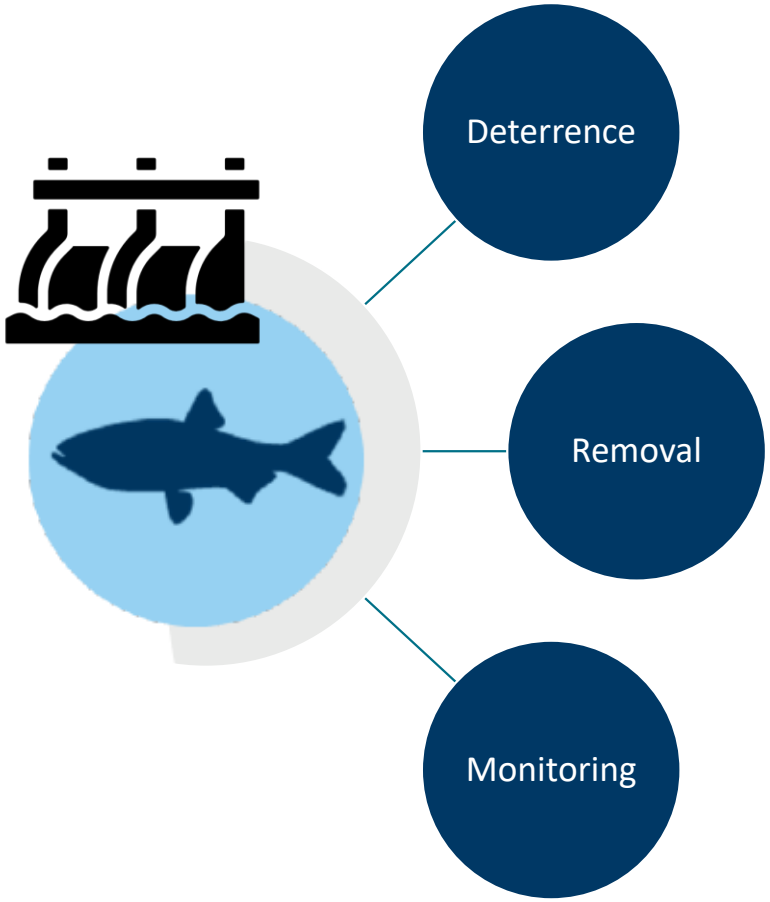
Removal

- Scoping a trap & sort system

Monitoring

- Pre-deterrent fish monitoring started

Integrated Approach to Invasive Carp



- **Slow spread**
- **Minimize impacts**
- **Reduce the likelihood of reproduction in Minnesota waters**

Thank you!

Carli Wagner | Lock & Dam 5 Invasive Carp Deterrent Project Coordinator

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Visit our project website @ mndnr.gov/LD5Carp

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