

# FM PROJECT ENVIRONMENTAL IMPACTS, MONITORING, AND MITIGATION

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FM Project Environmental Manager

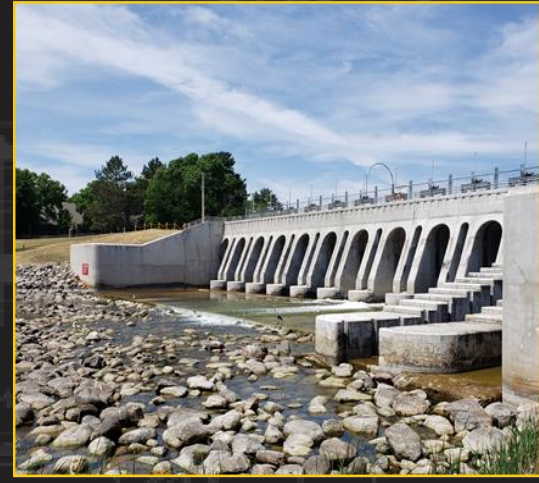
ND Water Resources Research Institute Conference  
August 19, 2024



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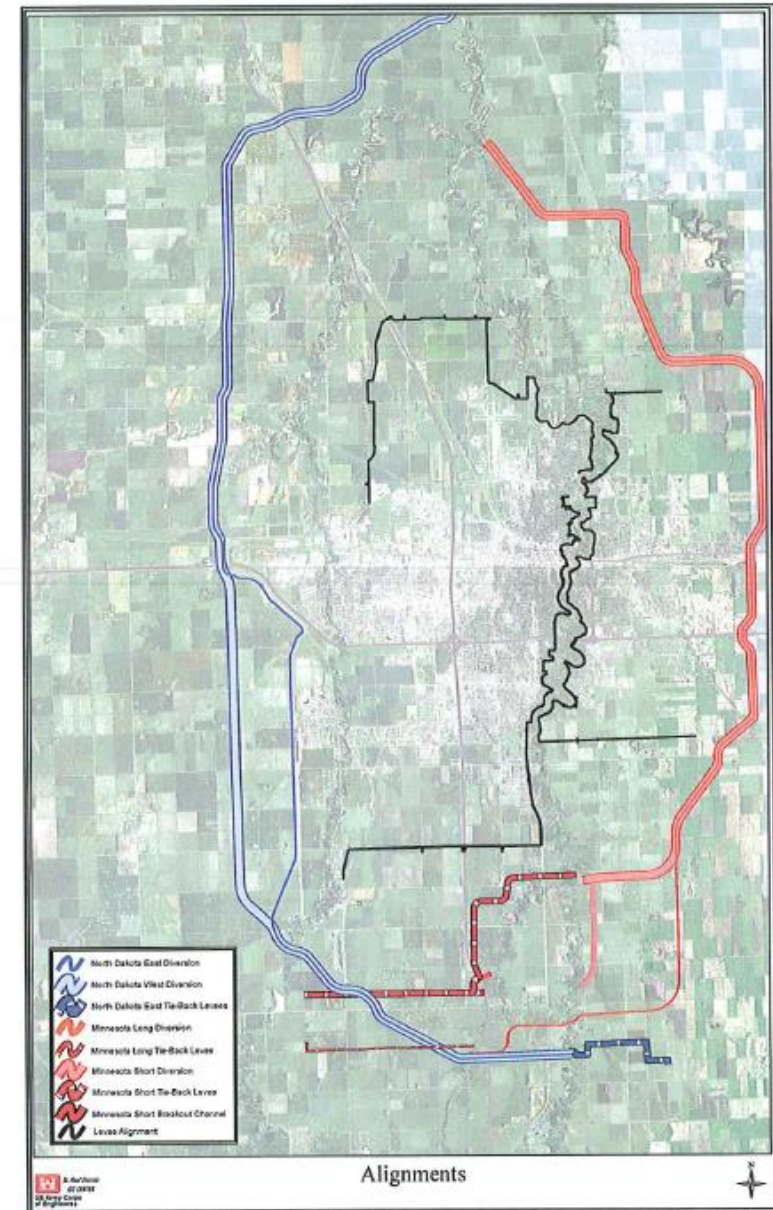


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# PROJECT FEASIBILITY

- Began in September of 2008
- Purpose: investigate flood issues in FM Area and identify flood risk management measures that could be implemented.
- Extensive analysis completed on 7 alternatives, including diversions in ND and in MN
- Feasibility Study was written as an integrated Environmental Impact Statement (EIS) to satisfy the requirements of NEPA.





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# INVENTORY AND FORECASTING

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- Impacts determined using existing data
- Identified data gaps and completed additional surveys. Some of these key areas included:
  - Fisheries/Aquatic Habitat
  - Wetlands
  - Forests
  - Water Quality
  - Geomorphology
  - Cultural Resources
- Adjusted alignment to avoid and minimize impacts



Cultural Resource Investigation Areas



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# IMPACTS

- Initial assessment completed with EIS in 2011
- Supplemental Environmental Assessments (SEAs) completed in 2013, 2019, and 2024
- Estimated environmental impacts:
  - Wetlands: 1444 ac
  - Forests: 149 ac
  - Aquatic Habitat: 71.5 ac
  - Aquatic Connectivity: At structures on rivers
  - Cultural Resources: Historic farmsteads
- Resources being monitored but not expected to be significantly impacted:
  - Water Quality
  - Geomorphology
  - Cultural Sites





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# AMMP

- The Adaptive Management and Mitigation Plan (AMMP) establishes a framework and adaptive approach to monitoring impacts and mitigation
- Includes performance standards and triggers
- Monitoring results, impacts, and mitigation are reviewed every 6 months by agency teams
- The AMMP is a living document that may be modified with consensus from regulatory and management agencies

## Fargo-Moorhead Metropolitan Area Flood Risk Management Project

### Adaptive Management and Mitigation Plan



April 2024

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St. Paul District



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# MITIGATION

- Several impacts could not be avoided, and mitigation is required
  - **Wetland Mitigation**
    - 1,095 acres in the Diversion Channel
    - 320 acres at the Drain 27 Wetland Restoration Site
    - 18.8 acres Oxbow Country Club Restoration
    - 6 acres Forest River Restoration (South of Briarwood)
    - 42 wetland credits purchased in ND and MN
  - **Forest Mitigation**
    - 300 acres of floodplain forest planting
  - **Aquatic Habitat Mitigation**
    - \$8.28M funding toward the Lower Otter Tail River in MN
    - Sheyenne River improvements in FM Area
  - **Aquatic Connectivity Mitigation**
    - Drayton Dam
  - **Cultural Resources Mitigation**
    - Documentation and structure relocation



*Oxbow Country Club Mitigation, Fall 2021*



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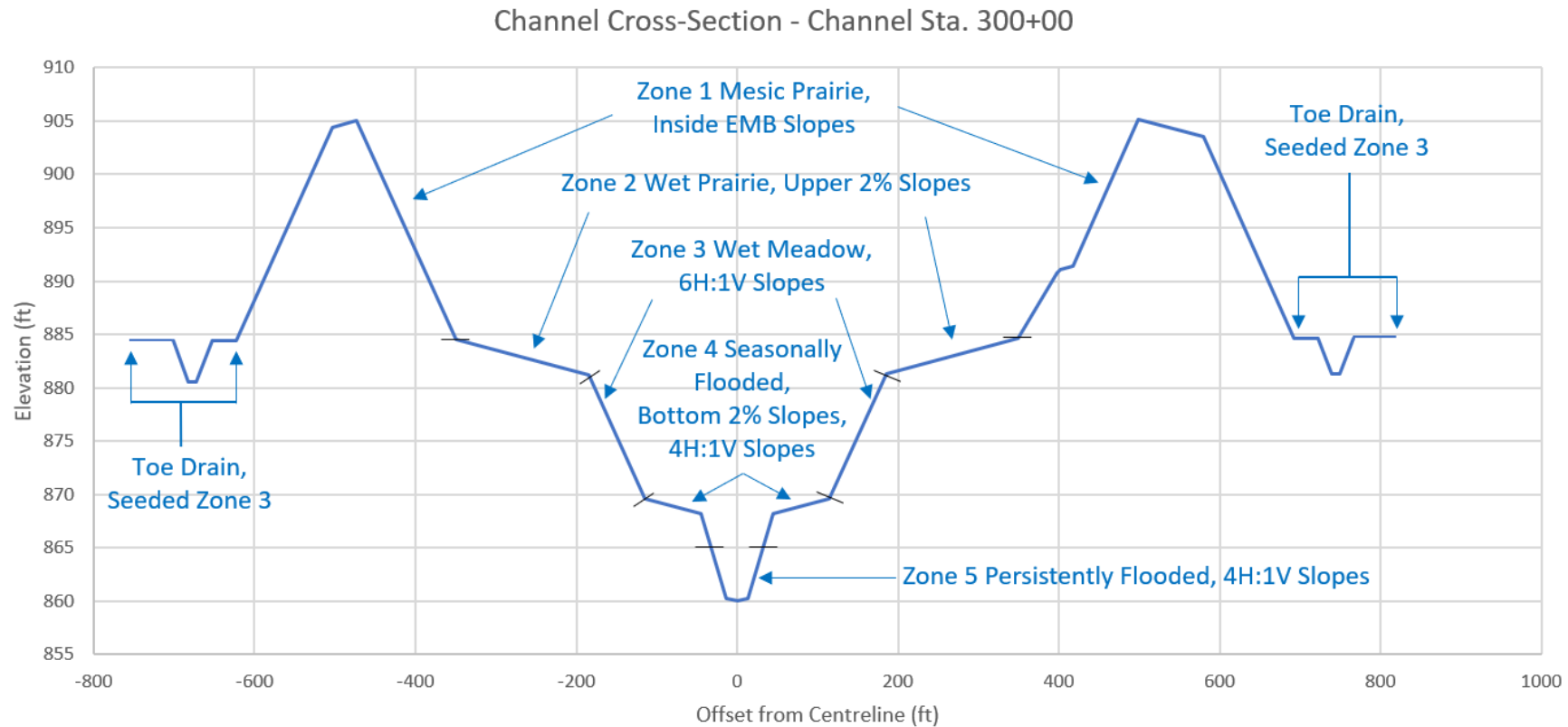


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# WETLAND MITIGATION

- Diversion Channel Mitigation
  - 1,095 ac required
  - Planted with native seed mixes





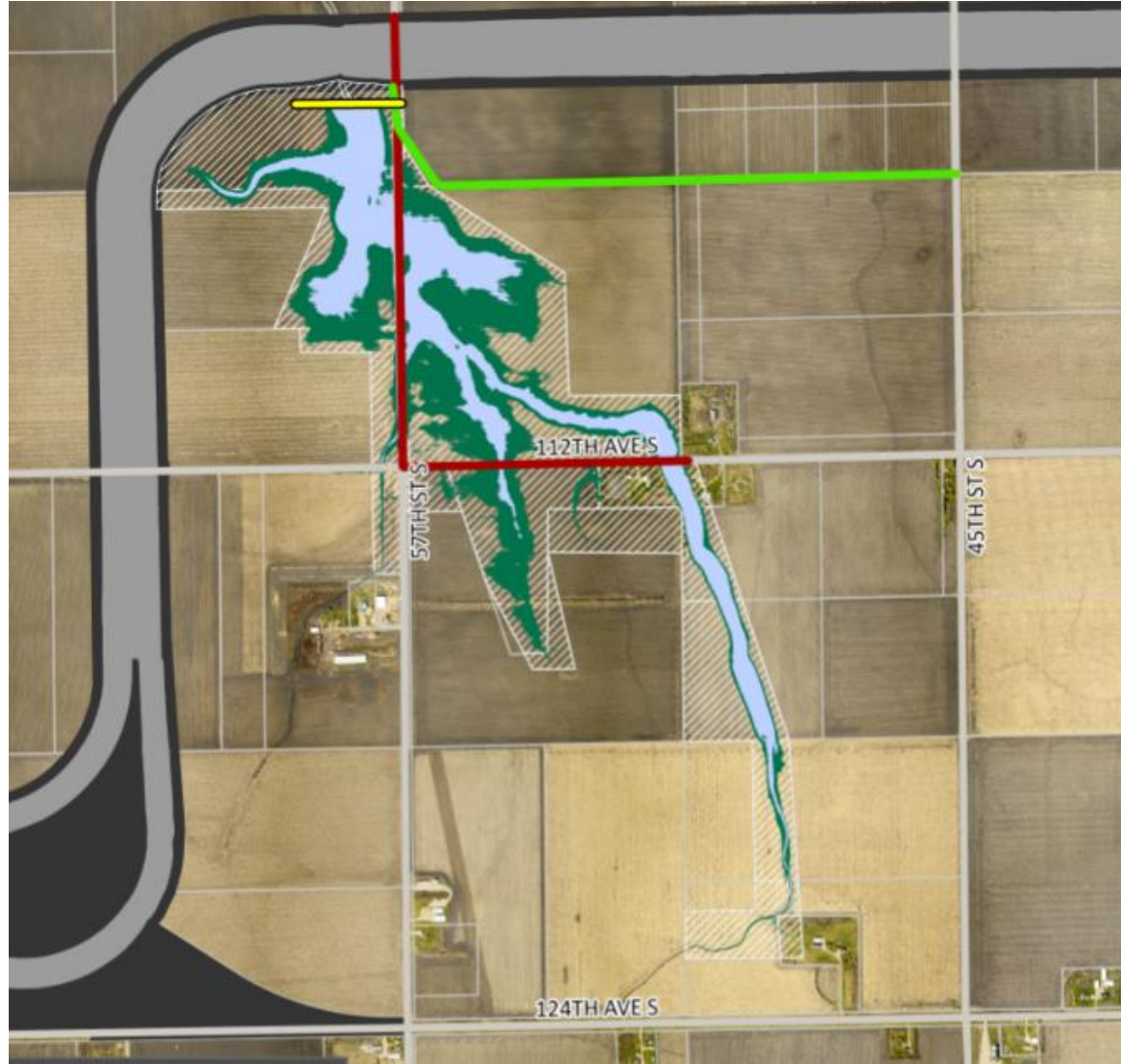
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# WETLAND MITIGATION







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# WETLAND MITIGATION



*Drain 27 Wetland, Fall 2022*



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# WETLAND MITIGATION



*Summer 2023*



*Summer 2024*



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# WETLAND/FOREST MITIGATION



*Oxbow Country Club Mitigation Site*



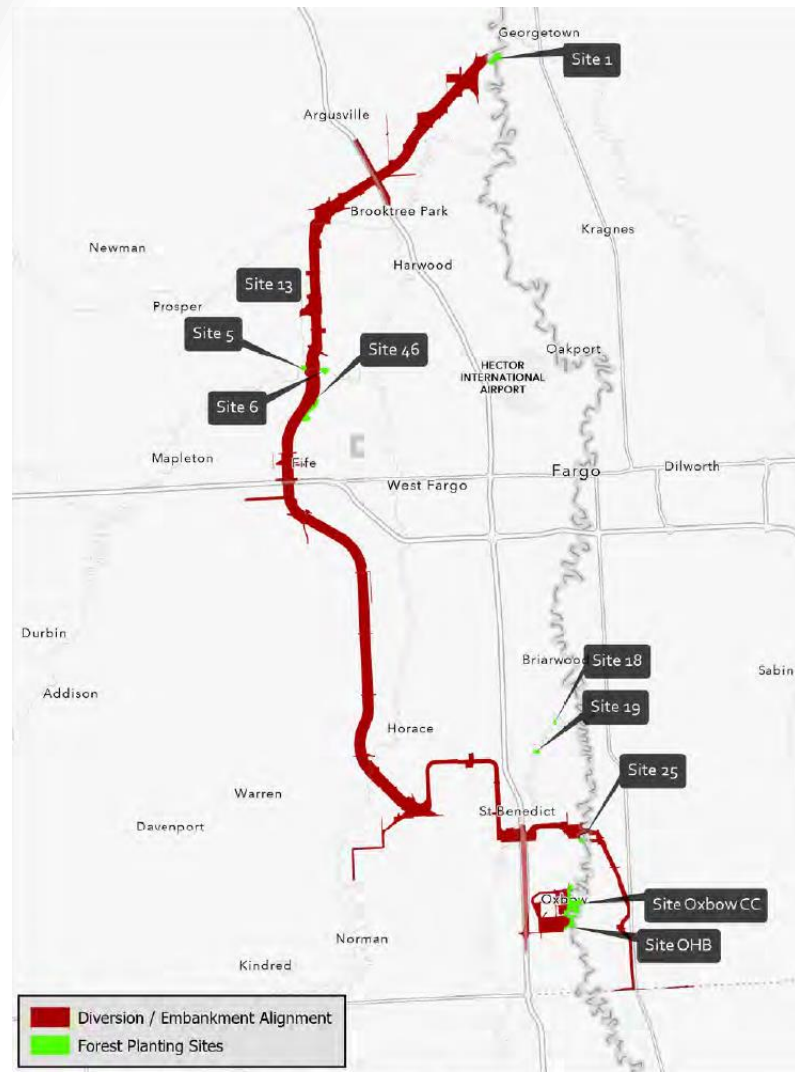
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# FOREST MITIGATION



*OHB Site, Summer 2023*

*Ongoing Forest Mitigation Efforts*



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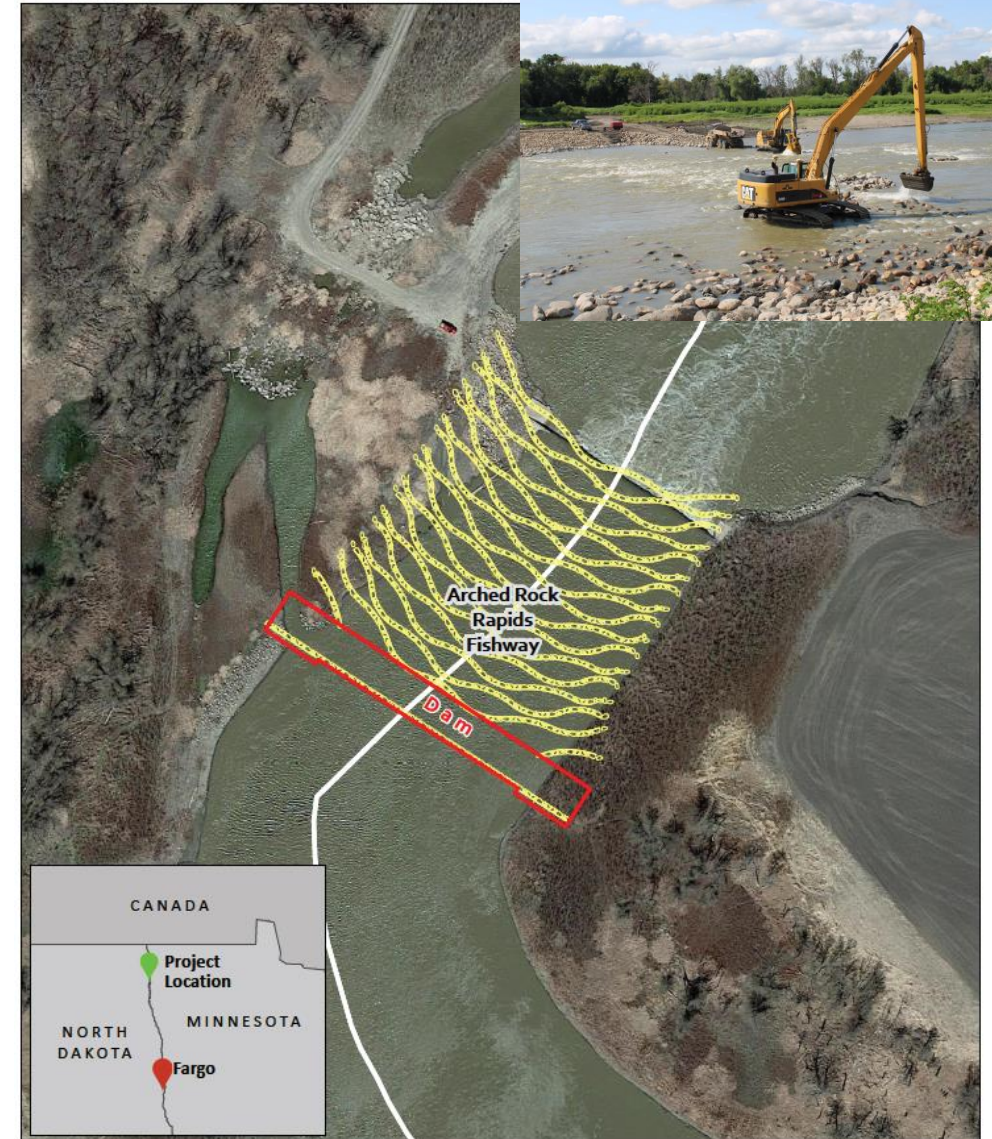
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# AQUATIC CONNECTIVITY MITIGATION

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- Drayton Dam
  - Willow planting all that remains
  - Last major impediment to fish passage on the Red River
  - Replaced dam with arched rock rapids fishway





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# AQUATIC HABITAT MITIGATION

- Lower Otter Tail River
  - \$8.2M of funding toward restoration
  - Will be administered by BRRWD
- Sheyenne River
  - Modify/remove structures in FM Metro Area
  - Construction after the FM Project is certified and operational





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# MONITORING

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- Project impact monitoring
  - Biotic
  - Water Quality
  - Geomorphology
  - Fish Stranding
  - Fish Passage
  - Cultural Resources
- Performance standards for mitigation
  - Wetlands
  - Forest





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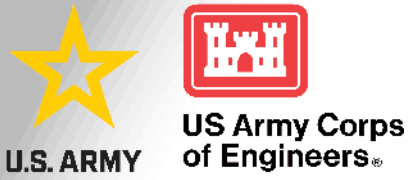
# BIOTIC MONITORING

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- Completed in 2011/2012 and 2017
- Sampling on the following rivers:
  - Red River
  - Wild Rice River
  - Maple
  - Sheyenne
  - Rush
  - Lower Rush
  - Wolverton Creek
  - Buffalo
- Include the following:
  - WQ
  - Aquatic Habitat Assessment
  - Macroinvertebrate Sampling
  - Electrofishing
  - IBI Calculation

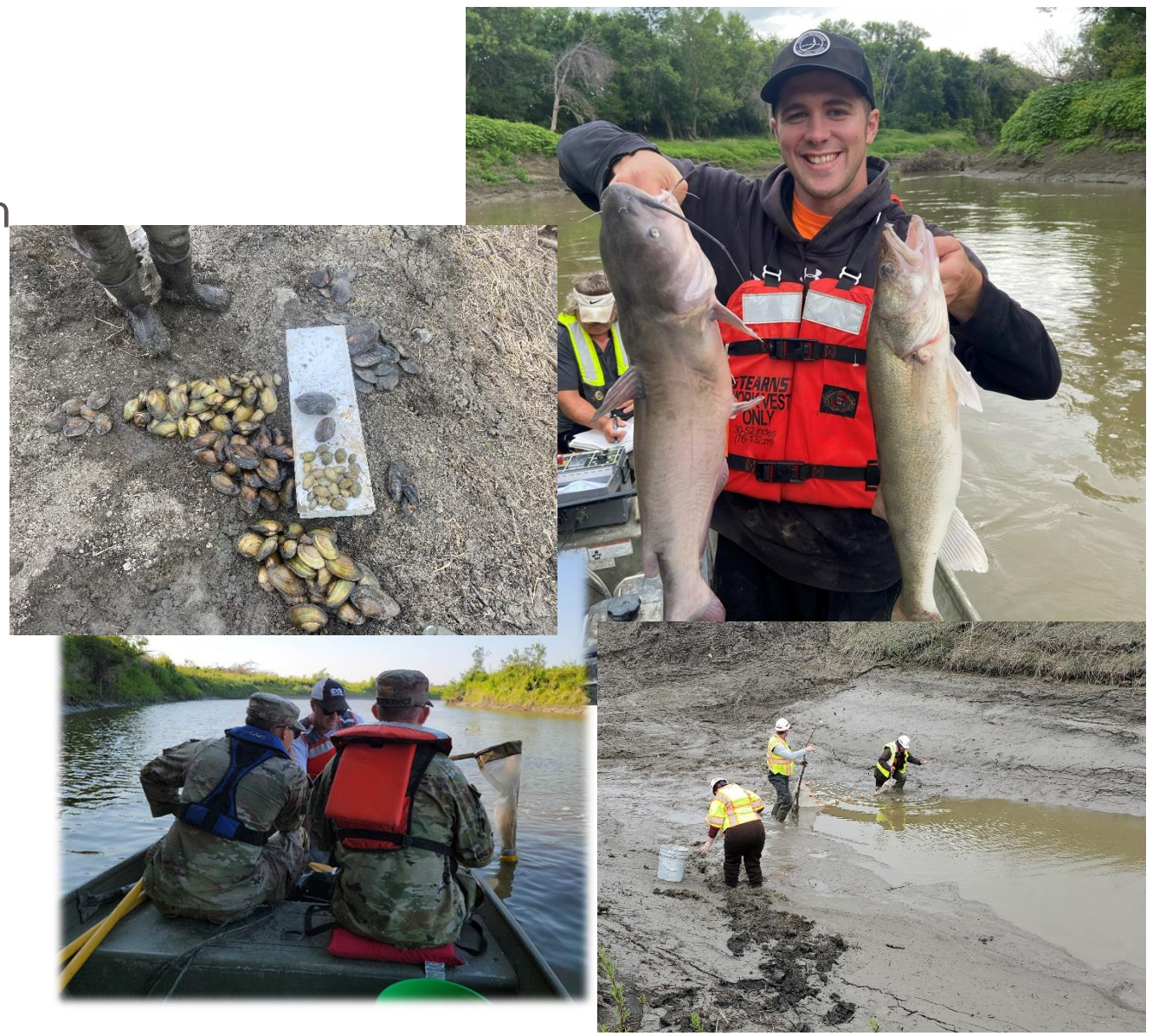






# OTHER BIOTIC MONITORING

- Recon in the Sheyenne River Diversion in 2022.
- Sampling at 5 locations on the Sheyenne in July 2023.
- Fish salvage/mussel relocation
  - Wild Rice River in 2023
  - 90 fish (6 species) and 154 mussels (9 species)
  - First time fragile papershell found in Red River Basin
  - Hoping to have similar efforts at the Red River Structure, Sheyenne and Maple Aqueducts



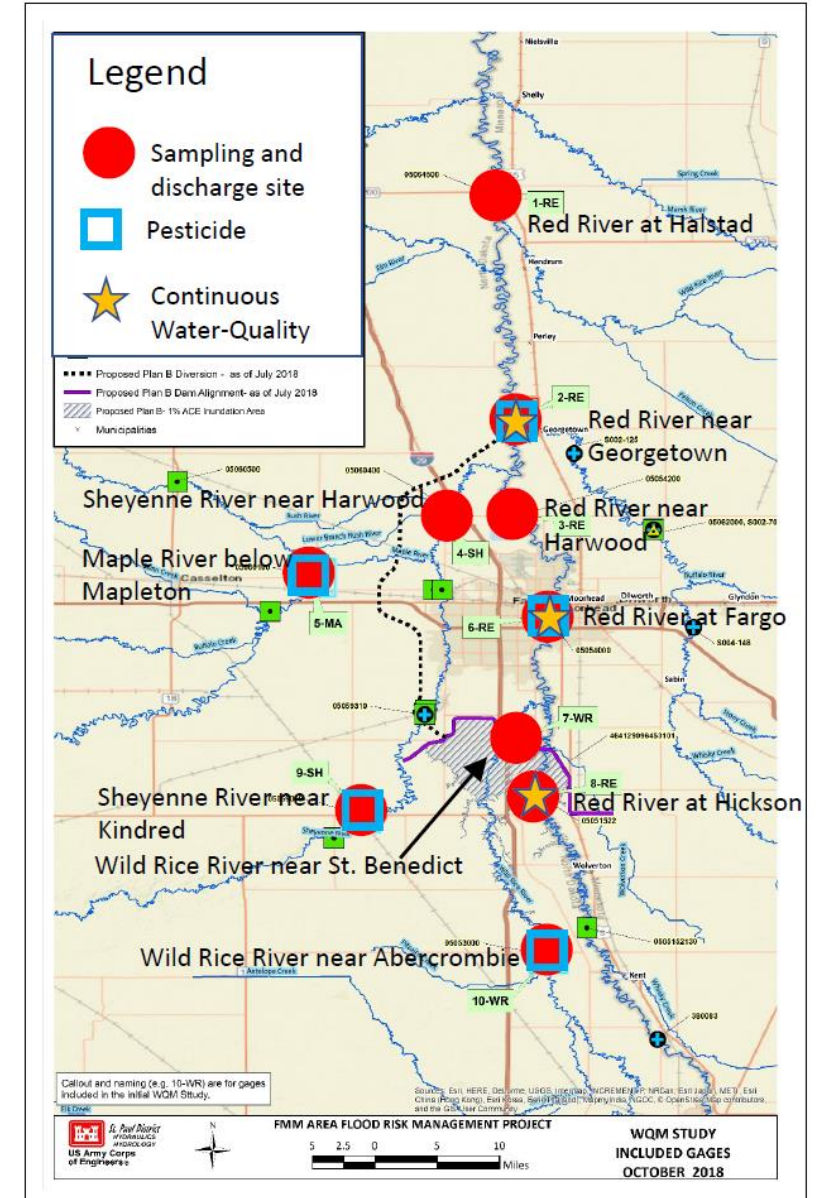


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# WATER QUALITY

- USGS was contracted to conduct additional monitoring to establish a baseline to compare against post-project conditions.
- 3 phases
  - pre-construction (2019-2022)
  - Construction (2022-2027)
  - Post-construction
- 10 monitoring stations
- Routine sampling and flood sampling
- Constituents analyzed
  - Total dissolved solids
  - Major ions
  - Trace elements
  - Nutrients
  - E. Coli
  - Suspended sediment
  - Pesticides





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# GEOMORPHOLOGY

- Evaluating how the river shape and location changes over time.
- Field work completed in 2011, 2018, and 2020
- Analysis includes:
  - Cross-sections
  - Thalweg profile
  - Soil samples
  - Aerial photo interpretation





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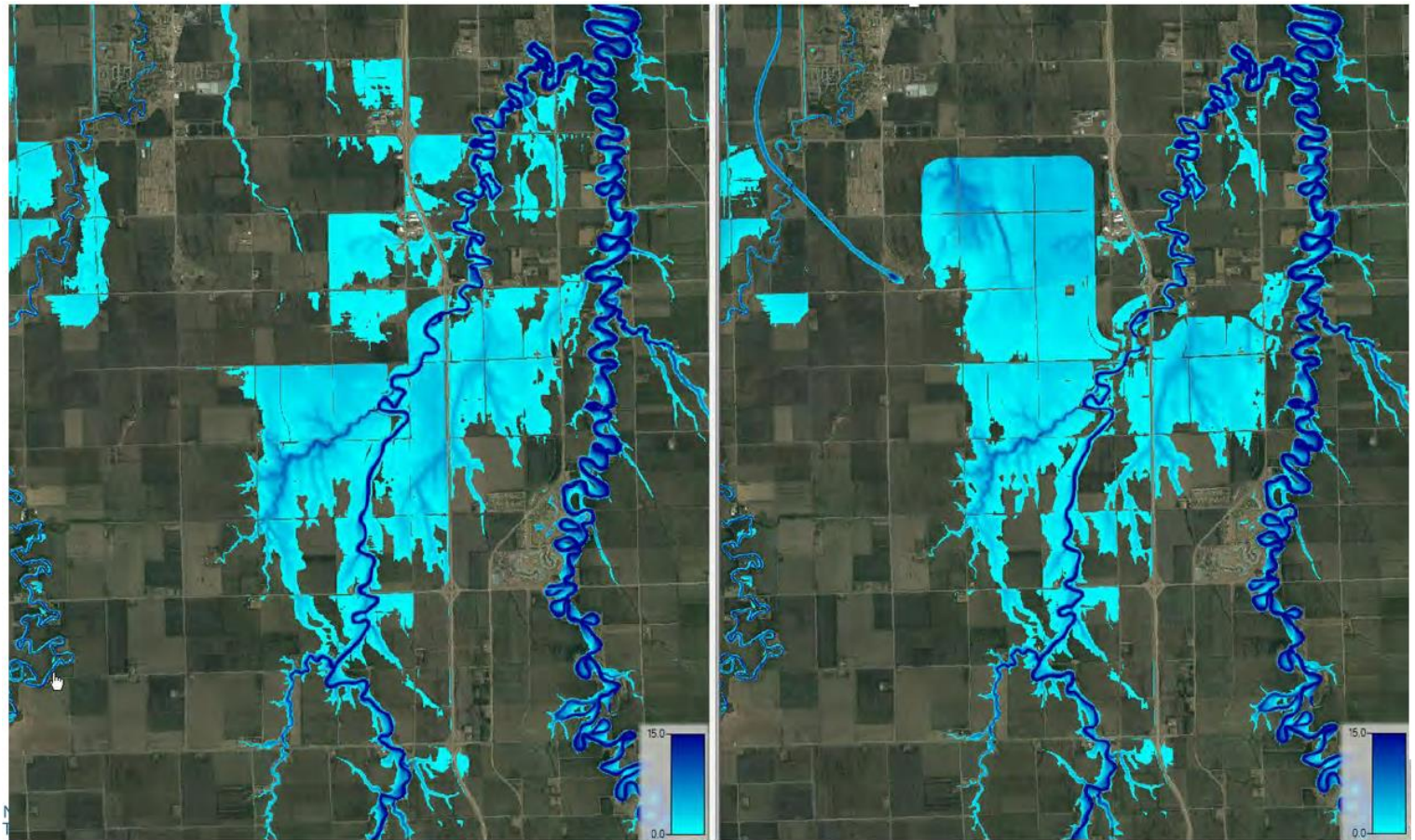


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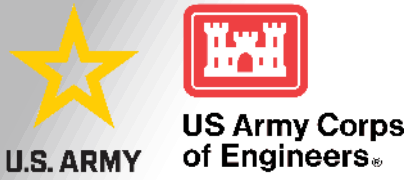


# FISH STRANDING

- How will the project impact fish stranding?
- Fish stranding in the staging area
- Fish stranding in the Diversion Channel

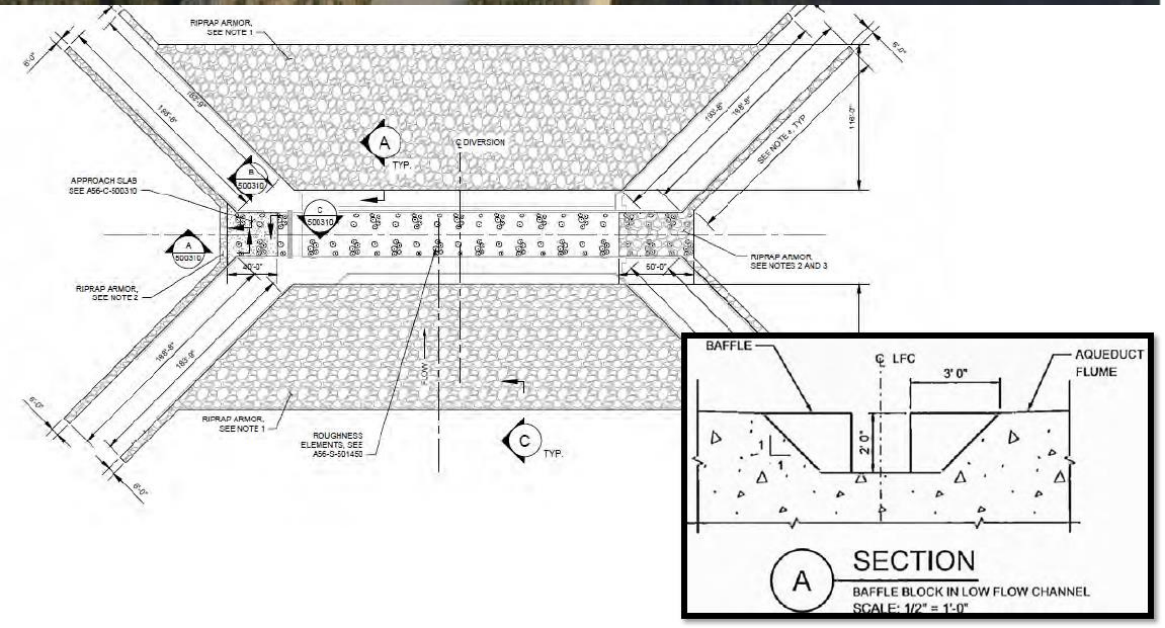
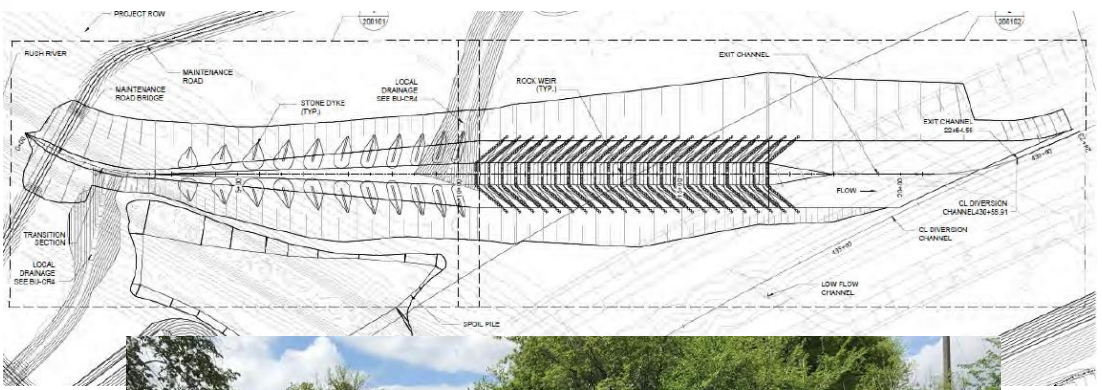


*Inundation of staging area for 20-year flood event. Pre-project (left) and post-project (right)*



# FISH PASSAGE

- How well is the fish passage working?
- Ongoing discussions with agency team on best approach to monitor passage





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# THANK YOU!

## Contact Info

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