Boardman Dam Removal
Observations and Lessons Learned

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PROJECT PARTNERS

- U.S. Army Corps of Engineers
- Grand Traverse Band
- City of Traverse City
- Grand Traverse County
- Michigan DEQ
- Michigan DNR
- Michigan Hydro Relicensing Coalition
- Traverse City Light & Power
- U.S. Fish & Wildlife Service
- U.S. Environmental Protection Agency
- Conservation Resource Alliance
- Grand Traverse Conservation District
- Grand Traverse County Road Commission
- Rotary Camps & Services
- Watershed Center, Grand Traverse Bay
- Garfield Twp.
BOARDMAN DAM REMOVAL OBSERVATIONS AND LESSONS

• Project Overview
• Community Interaction
• Change Management
• Engineer Intent vs. Contractor Interpretation
• Recycle/Reuse – opportunities and challenges
• When It Rains, It Pours
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Boardman River Dams

Boardman River Watershed and Dams

- Union Street Dam
- Boardman Dam
- Sabin Dam
- Former Brown Bridge Dam

AECOM
Removal of Boardman Dam

PHASE 2
PROJECT OVERVIEW

- Dredged Intake Channel
- Powerhouse
- Delta
- Keystone Pond
- Earthen Dam (Proposed Breach Location)
River Restoration
River Restoration

- Bathymetry, DOR and historic survey/aerials used to identify alignment.
River Restoration

Channel & Floodplain Excavation
Channel and floodplain excavation will occur throughout the bankfull and near-bank full stage to reveal the pre-dam floodplain surface and mid-channel features. Excavation can proceed in the channel area first, then following drawdown, the floodplain can be removed as well.

Pleasant Plan Section (Native Material)

Bank Treatment
Channel banks will be allowed to self-stabilize. A beak bank, and Felix bank, design exists below the recession that will provide short term resistance to erosion. Major erosion is expected to occur, but not at levels to jeopardize project goals. Sensitive areas, such as the dam embankments or steep slopes, may be treated with large wood to provide immediate erosion resistance.

Restoration & Management
The floodplain corridor will be seeded. Installation of trees, shrubs, and other rooted stock will occur over time as funding and time allow. Upland areas will likely be seeded with cover crops, and rely upon recruitment of natives over the long term. Management of invasives will continue to be done by GIS.

Typical Details

Outfall Meander - constant 3:1 grade from top of bank to existing

Gradient Slope (Point Bar)

Large Wood Habitat

Pool

Typical Construction Section at Meander Apex

Existing Delta Surface

Spoils

Log Jam Habitat

Proposed Channel

Idealized Floodplain

Proposed Excavated Floodplain
Dam Removal / Breaching

- Bypass Siphon System
- Auxiliary Spillway
- Construction Access
2. Begin floodplain excavation and channel restoration in former impoundment area

1. Close Cass Road and begin building bridge. (Planned Spring/Summer 2016)

3. Construct downstream channel and begin drawdown

4a. Construct intermittent sediment traps and manage sediment migration throughout drawdown process. Excavate floodplain benches.

4b. Demolish existing bridge and spillway and fill channel

5. Complete floodplain bench excavation and install instream habitat and bank stabilization measures. Seed and plant live plantings.
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• Project Overview
• Community Interaction
  • Public Interaction
  • Turbidity
• Change Management
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• When it Rains, it Pours
Public Viewing
Public Viewing
Walking & Paddling
Walking & Paddling
Turbidity

RELATIONAL TRENDS OF FRESH WATER FISH ACTIVITY TO TURBIDITY VALUES AND TIME

- Fish abandon cover
- Avoidance behavior detected
- Fish start to show signs of stress
- Reduced growth rates detected
- Increased respiration
- Reduced feeding rates
- Delayed hatching rates
- Increases coughing rates
- Long-term reduction in feeding success
- Death

TURBIDITY (NTUs)

HOURS

DAYS

WEEKS

MONTHS

TIME

<10  200  1,500
BOARDMAN DAM REMOVAL OBSERVATIONS AND LESSONS

• Project Overview
• Community Interaction

• Change Management
  • Relic Structures
  • Evolving River Conditions
  • Design Flexibility

• Engineer Intent vs. Contractor Interpretation
• Recycle/Reuse – opportunities and challenges
Relic Structures – Cass Bridge
Evolving River Conditions
Evolving River Conditions
Evolving River Conditions
Evolving River Conditions
Design Flexibility
Design Flexibility

Primary Cofferdam Detail

Cross Section A-A
(Typical intermediate weir opening for dewatering.)

Cross Section C-C
(Through Boulder Basin)
Design Flexibility
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• Engineer Intent vs. Contractor Interpretation
  • Siphon
  • Dewatering and sediment management
• Recycle/Reuse – opportunities and challenges
• When It Rains, It Pours
SIPHON SYSTEM

TEMPORARY SIPHON DEWATERING SYSTEM PLAN
SIPHON SYSTEM
SIPHON SYSTEM
SIPHON SYSTEM
DEWATERING & SEDIMENT MANAGEMENT
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Peak on 10/25/17 – 900 cfs
10-yr = 1,200 cfs
100-yr = 1,700 cfs
THERE’S ALWAYS SOMETHING YOU WEREN’T PLANNING FOR
QUESTIONS?