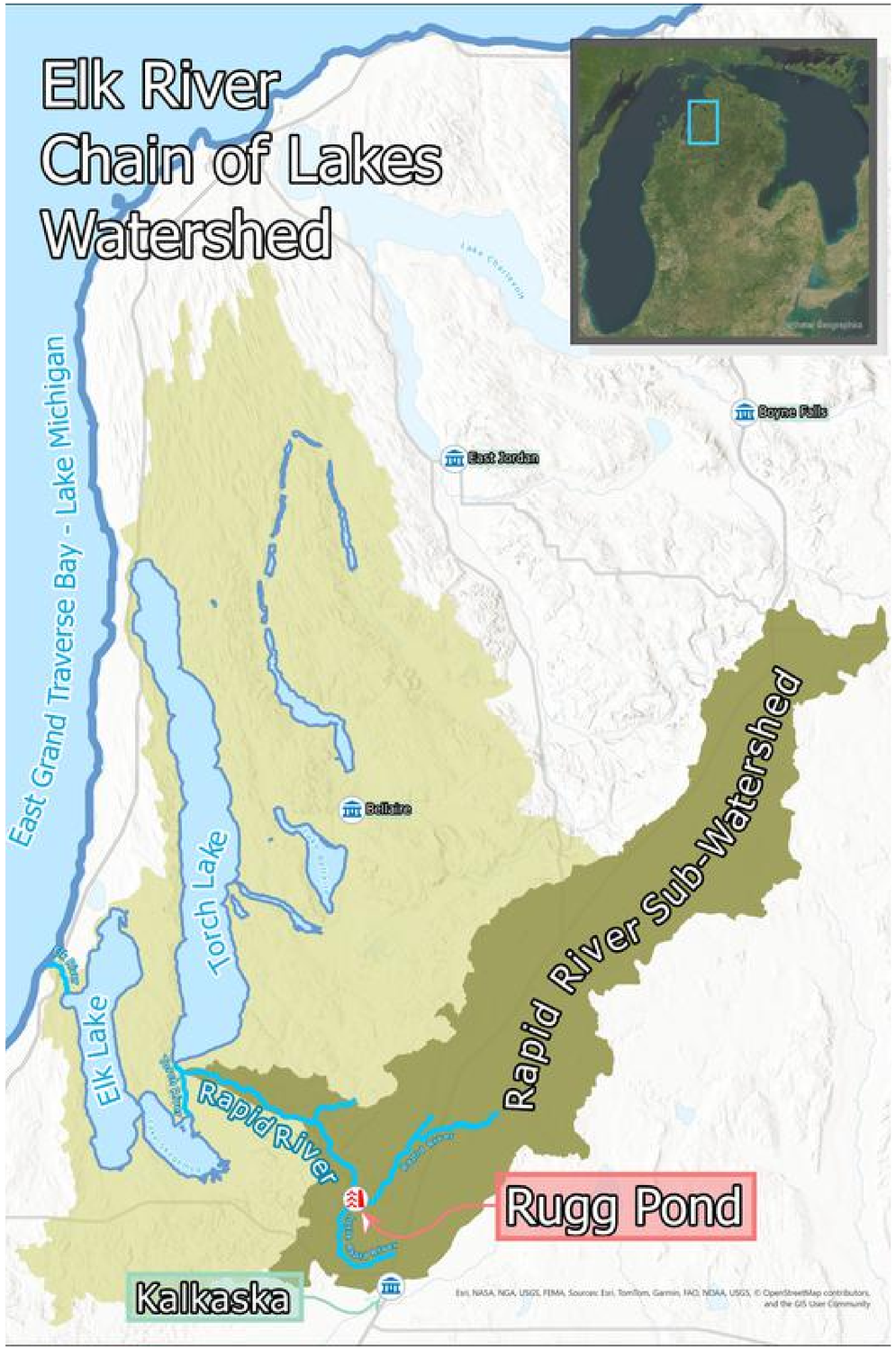
Rugg Pond Dam Removal & River Restoration Project

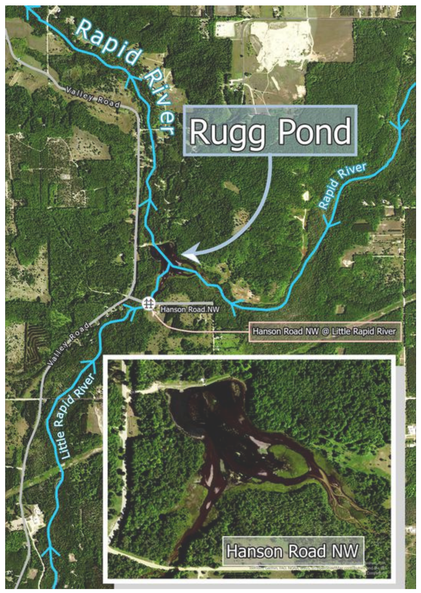
The Watershed




Rugg Pond Fall Colors Aerial


Rugg Pond Dam Spilways Aerial


Hanson Road Crossing



The Project

<u>Owner</u>
Kalkaska County

<u>Purpose</u>
- Eliminate risk of a dam failure
- Reduce long-term maintenance cost associated with dam repairs and dredging of the impoundment
- Restore approximately 1 mile of river channel
- Reconnect 21.6 miles of upstream habitat to 12 miles downstream, including the Torch River and Chain of Lakes

<u>Project Partners</u>
Kalkaska County (KC)
Conservation Resource Alliance (CRA)
Rugg Pond Steering Committee (KC appointed)
Kalkaska County Road Commission (KCRC)
Kalkaska Conservation District (KCD)
Rapid River Township
U.S. Fish & Wildlife Service (USFWS)
MI Department of Natural Resources (MDNR)
MI Department of Environment, Great Lakes & Energy (EGLE)
Grand Traverse Band of Ottawa and Chippewa Indians (GTB)
The Watershed Center Grand Traverse Bay (TWC)
Tip of the Mitt Watershed Council (TOMWC)
MI Trout Unlimited (MTU)
Lake Associations (Elk, Skegemog, Torch)

<u>Project Funders for the Enginnering Design Phase</u>
Kalkaska County
MDNR Fisheries Habitat Program
EGLE Dams Risk Reduction Grant Program
Great Lakes Fishery Trust Habitat Protection and Restoration
Rotary Charites of Traverse City SEEDS Grant

Rugg Pond Dam Removal & River Restoration Project

Timeline

2026:
- April highwater event initiated review of Emergency Action Plan due to hazards detected
- Repairs were required on the west spillway inlet and east spillway outlet to mitigate safety concerns
- Inter-Fluve Team (Wightman, Heimlich Consulting & MTC) contracted for engineering design through 2027

2030

2026
2024: Kalkaska County passed a resolution to pursue dam removal; CRA hired as project manager
2022: Spicer Group hired for alternatives analysis to address safety concerns

2020

2020: Pre-dredge sediment quality assessment completed (GLEC)
2019:
- MI EGLE Dam Safety Inspection rated dam in fair condition with a high hazard potential requiring an Emergency Action Plan and repairs
- Rugg Pond Dam Steering Committee reestablished to address dam safety concerns and repairs

2010

2000

1990

1990: Historical marker erected by Burea of History, MI Dept of State
1985: Dam repaired and the original powerhouse demolished
1983: Gosling Czubak Associates design for spillway rapairs and improvements
1982: Citizens form Save the Rugg Pond Natural Area Committee

1980

1980: US Army Corps of Engineers condemned the dam

1970

1960

Rugg Pond Natural Area open for public recreation

1960



1954 Aerial Rugg Pond (Source: USGS)

1953: Power generation discontinued - Kalkaska County purchased the dam and land for $1

1950

1950: Consumers Power purchased Kalkaska Light and Power

1940

1930

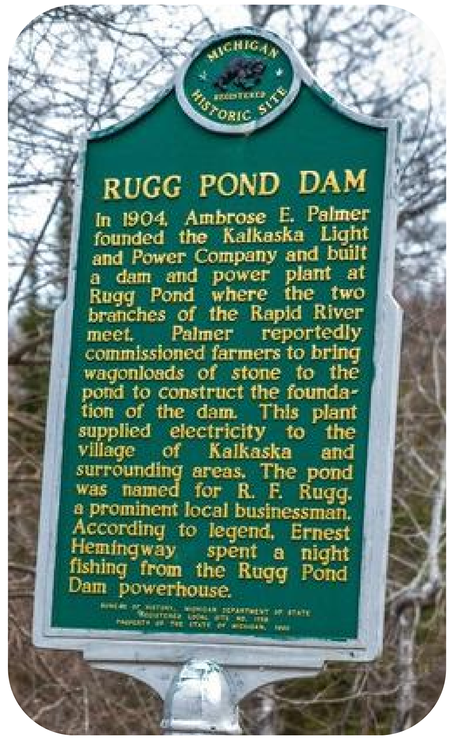
Kalkaska Light & Power generated electricity for the Village of Kalkaska and surrounding community

1920

1910

1904-1906: Rugg Pond Dam constructed

1900



State Historical Marker



Rapid - Below Dam (TADL)



Remnant railway during dam construction



Pile driving during construction of Rugg Pond Dam - Photo taken from west side of the dam (Source: Traverse Area District Library)



Dam construction looking west from the dam's eastern abutment (Source: Traverse Area District Library)

Project Scope

- Dam Removal
- River Restoration of the Rapid and Little Rapid River - approximate 1 mile
- Hanson Road Crossing Replacement

Engineering Design Team

- Inter-Fluve
- Wightman
- Heimlich Consulting
- Materials Testing Consultants (MTC)

Tentative Design Schedule

- Site Surveys - 2026 Field Season
- Sediment Sampling - Fall 2026
- Alternatives Assessment - Fall 2026
- 30% Design Phase - January 2027
- 60% Design Phase - Spring 2027
  - Sediment Management Plan
  - Permitting applications begin
- 90% Design Phase - August 2027
- Final Design - November 2027

Construction Schedule

- Fundraising dependent
  - ongoing throughout process

Rugg Pond Dam Removal & River Restoration Project

Project Benefits

- Elimininate dam safety risks & minimize ongoing maintenance expenditures
- Reconnect 21.6 miles of upstream habitat on the Rapid and Little Rapid Rivers to downstream reaches
- Restore ~1 mile of coldwater stream on the Rapid and Little Rapid Rivers
- Allow for natural fish migration to/from the Chain of Lakes (Elk, Skegemog, and Torch)
- Improve passage for aquatic organisms, in-stream wood, and nutrients
- Address degraded habitat within the dam's impoundment
- Restore stable in-stream habitat with connected floodplains
- Enhance recreational opportunites at the Rugg Pond Natural Area

Dam Effects

<u>Upstream Impact</u>

Reduced:
- Natural function, water quality, oxygen, turbidity, circulation, available habitat, river's ability to adjust horizontally and vertically (reduced resilience to change)

Increased:
- Pollutant accumulation, stratification, temperature, algae blooms

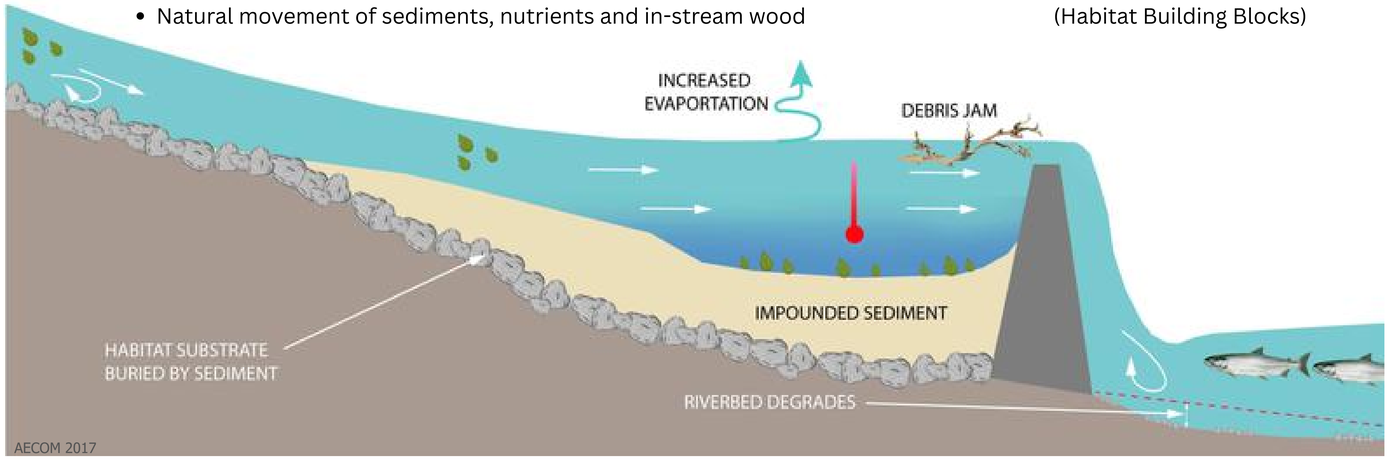
Loss of:
- Natural movement of sediments, nutrients and in-stream wood

<u>Downstream Impact</u>

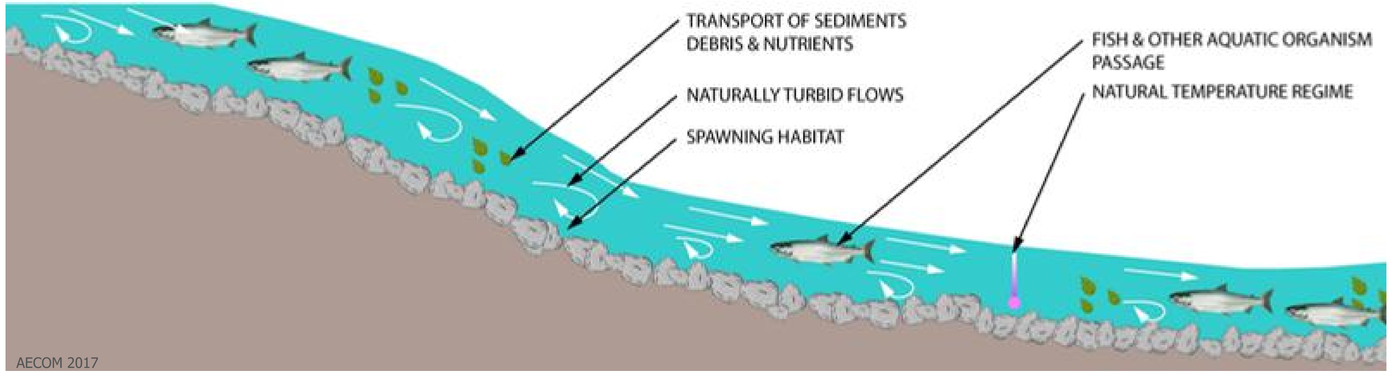
Reduced:
- Water quality & riverbed elevation

Altered:
- Flow regime & temperatures

Starved of:
- Sediment, nutrients & debris (Habitat Building Blocks)



Removal Benefits

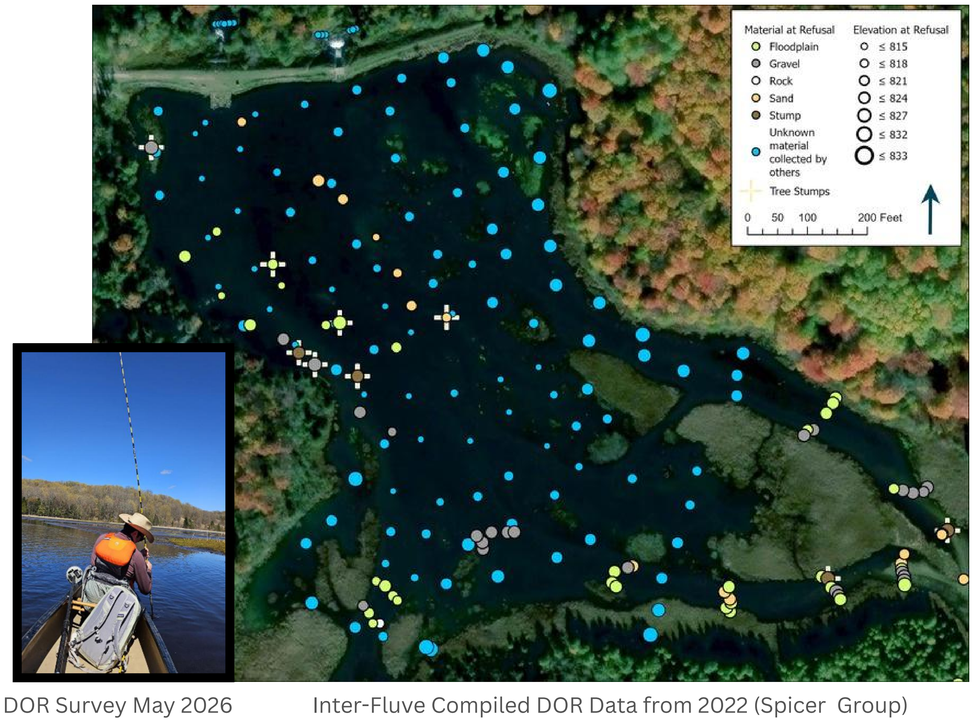


Impounded Sediment - Rapid River Delta



Depth of Refusal (DOR) Soil Probing Surveys

- To determine the elevation and location of pre-dam land features by probing to the buried channel and floodplain.



DOR Survey May 2026
Inter-Fluve

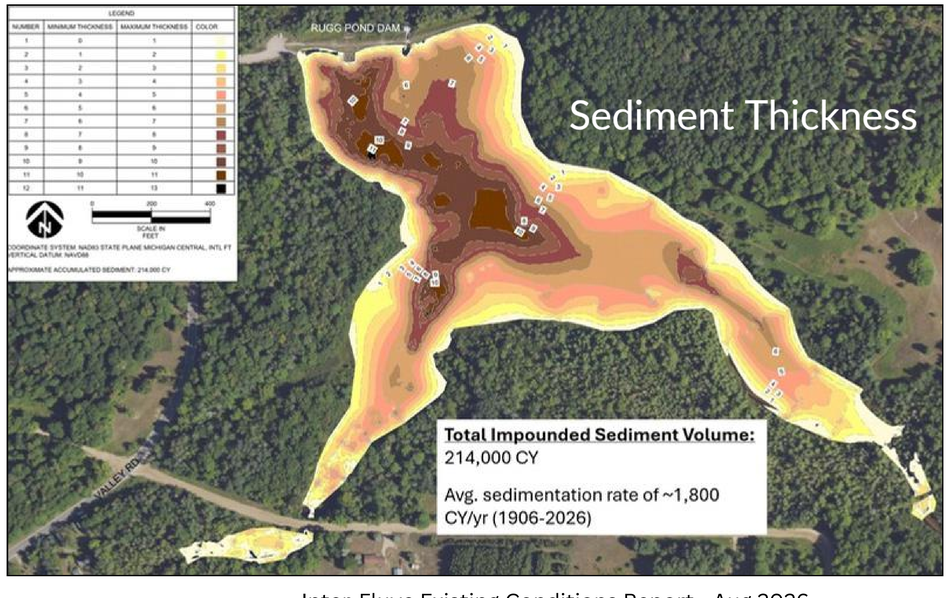
Inter-Fluve Compiled DOR Data from 2022 (Spicer Group) & 2026 (Inter-Fluve) - Aug 2026

Rugg Pond Dam Removal & River Restoration Project

Water Quality & Sediment Management

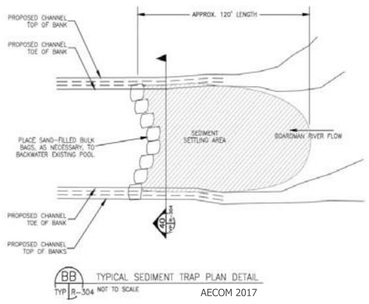
- Water quality benefits associated with dam removal include restoring coldwater habitat and natural transport of sediments, wood and nutrients.
- Sediments deposited in the impoundment will be managed in accordance with MI Department of Environment, Great Lakes, and Energy (EGLE) protocols and guidelines.
- Sediment samples were collected at 11 sites within Rugg Pond in 2020. Some of these samples had levels of arsenic, selenium, and PAH compounds above ecological and human health screening levels. Contaminated sediments will need to be managed properly to avoid impacts to humans and the environment. Further sediment sampling is planned for this fall to determine sediment management options compliant with state regulations.
- Sediment storage on-site is most cost-effective. Sediment spoil sites will target upland areas that would not otherwise become wetlands. Depending upon sampling analysis, mobilization of some sediment off-site may be considered, but can be costly.
- Sediments will be actively removed from the interpreted relic river channel and floodplains to historic pre-dam alignment.
- Temporary in-stream sediment traps will be installed within the impoundment area and downstream of dam berm to capture the majority of sediments mobilized during costruction.
- Highly erodible banks and slopes will be stabilized with natural measures such as large wood, soil wraps, seeding and plantings.

Existing Conditions



Inter-Fluve Existing Conditions Report - Aug 2026

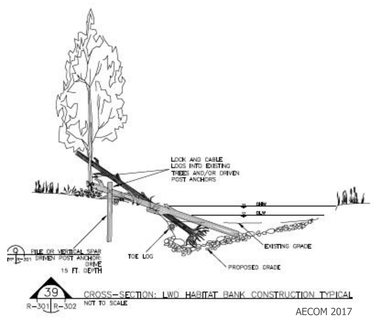
Sediment Traps





Sediment Trap
Boardman-Ottaway River Restoration
Boardman Dam Removal

Large Wood Debris

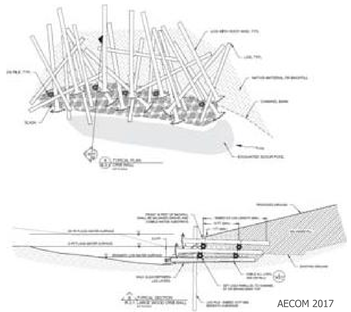




AECOM 2017

Large Woody Debris
Boardman-Ottaway River Restoration
Boardman Dam Removal

Log Crib Wall

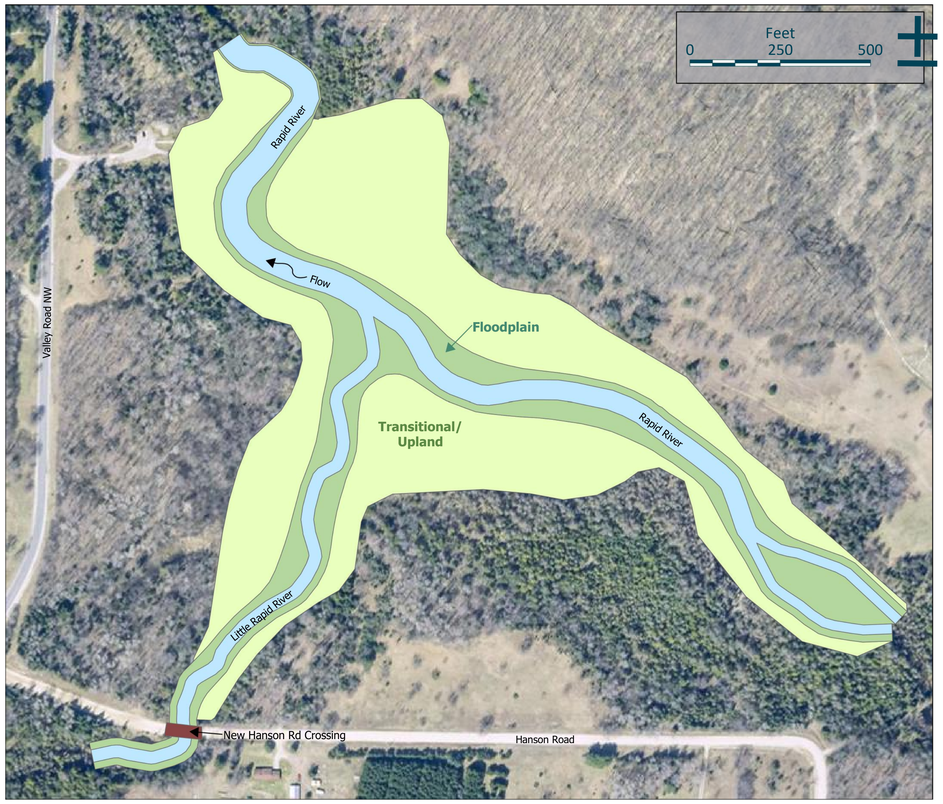


AECOM 2017



Log Crib Wall Construction
Boardman-Ottaway River Restoration
Brown Bridge Dam Removal

Interpreted Channel Alignment



Inter-Fluve - Aug 2026

Rugg Pond Dam Removal & River Restoration Project

Aquatic Habitat

- The Rapid River is a state-designated ‘premier’ trout stream that supports brook, brown, and rainbow trout and seasonal migratory fish runs from steelhead (rainbow trout) and Atlantic salmon resident of Torch and Elk Lakes.

- Rugg Pond Dam is the primary barrier on the Rapid River preventing aquatic passage from the Torch River and interconnected Chain of Lakes to 21.6 miles of upstream spawning habitat on the Rapid and Little Rapid River.

- Dams increase water temperatures and deplete oxygen levels, creating unsuitable habitat for coldwater fisheries.



CRA Backpack Electrofishing Surveys

Fisheries and Wildlife

- Dam removal will restore approximate 1 mile of river channel on the Rapid and Little Rapid River and creates interconnected wetland and upland habitat for both terrestrial and aquatic species.



Leopard Frog



Wood Turtle



MDNR Electrofishing Surveys



Rapid River Upstream of Rugg Pond - Brook Trout



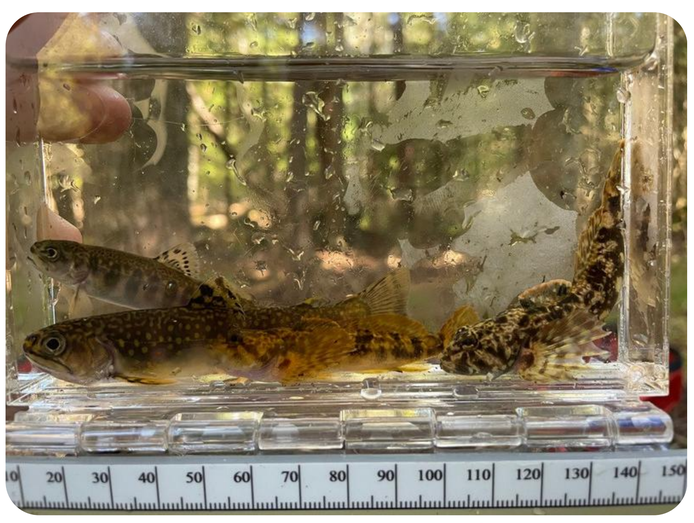
Caddis Fly Cases



Aquatic Stone Fly Nymph



MDNR Fisheries Biologist Heather Hettinger w/ Brown Trout



Brook Trout and Sculpin - Upstream of Rugg Pond



Fish Rescue Efforts During the Boardman-Ottaway Dams Removal Project

Rugg Pond Dam Removal & River Restoration Project

Hanson Road Crossing on the Little Rapid River

Existing Conditions

- Little Rapid River channel width is 35' wide
- Corrugated metal pipe culvert is 5' wide, 31' long, with timber headwalls
- Culvert has heavy corrosion, is undersized, and poses a challenge for fish passage
- Gravel road is prone to erosion from stormwater runoff



Hanson Rd Culvert - Upstream Inlet



Inter-Fluve Channel Survey Upstream of Hanson Rd



Hanson Rd Culvert - Pipe Corrosion Evident



Hanson Rd - View Downstream to Rugg Pond

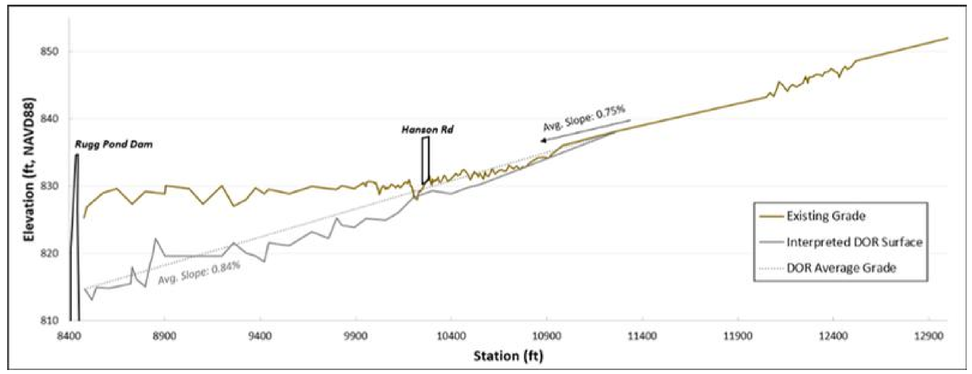


Hanson Rd Culvert - Downstream Outlet



MTC Geotechnical boring at Hanson Rd

Longitudinal Profile - Little Rapid River



Timber Bridge Considerations



Broomhead Rd Timber Bridge - N. Branch Boardman-Ottaway River



Jordan River Timber Bridge (WA-5)

Rugg Pond Dam Removal & River Restoration Project

Bottomlands Restoration & Riparian Habitat

- Early establishment of roots post channel construction is critical in mitigating erosion and stabilizing streambanks.
- Native grass and pollinator mixes will be seeded throughout the former impoundment and along riverbanks.
- Native tree and shrub planting will provide bank stabilization, reduce stormwater runoff, and enhance habitat.
- Natural reference reaches upstream and downstream provide indicators of naturally resilient native species.
- Control of invasive species is important to ensure success of native seeding and planting efforts.

Reference Reaches



Rapid River Upstream of Rugg Pond



Rapid River Downstream of Rugg Pond



Little Rapid River Upstream of Rugg Pond

Native Tree/Shrub Planting



Bare-root Seedling Planting on Floodplain



Planting Native Potted Stock



Planting Older Age Class Potted Stock

Native Pollinators/Grasses



Native Pollinators - Rudbeckia, Vervain, Boneset



Lance-leaf Coreopsis with Pollinator Bee



Diverse Native Pollinators & Grasses

Invasive Species



Aquatic Invasive Curly-leaf Pondweed
(Credit: www.minnesotawildflowers)



Invasive Phragmites

Invasive Purple Loosestrife
(Credit: www.minnesotawildflowers)

Rugg Pond Dam Removal & River Restoration Project

A Community Asset: Future Opportunity

Recreation & Access



Brown's Footbridge at Brown Bridge Quiet Area - Boardman-Ottaway River





Boardman-Ottaway River Trail - Sabin Bottomlands @ Former Powerhouse Location

Conceptual Channel Alignment & Trails



Inter-Fluve - Sep 2026

Educational Stewardship



Planting Stewardship with Students



Grasshopper Footbridge at Brown Bridge Quiet Area (Credit: Ratliff)



Native Forbs - Plug Planting - Au Sable Institute - Brown Bridge QA



Universal Access Boardwalk to Fishing/Viewing Platform
Post Marshville Dam Removal Project - Stony Creek



Interpretive Signage
Marshville Dam Removal Project - Stony Creek



Brown Trout (Credit M. Seefried)



Volunteer Tree/Shrub Planting
Brown Bridge Quiet Area - Boardman-Ottaway River