

# Dam Removal & River Restoration Projects in Northwest Michigan



Conservation  
Resource Alliance



# CRA Crew





# CRA's Workplan 2022-2024

Expertly caring for rivers &  
their tributaries throughout  
Northwest Michigan



RIVER CARE™

[www.rivercare.org](http://www.rivercare.org)

## 2022-2024 Workplan Map

### Carp Lake River Watershed

Prioritize Next Improvements or Restoration Needs

### Maple River Watershed

1. Van Creek & Bike Trail - Trail/Stream Crossing Improvement
2. E Branch Maple River & Douglas Lake Rd - Road/Stream Crossing Improvement
3. E Branch Maple River & Robinson Rd - **COMPLETED** Road/Stream Crossing Improvement
4. Lake Kathleen - Post Dam Removal and Monitoring

### Jordan River Watershed

5. Jordan River & Jordan River Rd - East and West Rd Road/Stream Crossing Improvement
6. Deer Creek & Fuller Rd - Road/Stream Crossing Improvement

### Boyer River Watershed

Prioritize Next Improvements or Restoration Needs

### Boardman Watershed

7. N Branch Boardman River & Broomhead Rd **COMPLETED** Road/Stream Crossing Improvement
- Prioritize Next Improvements or Restoration Needs

### Mitchell Creek Watershed

8. Mitchell Creek & GTRLC Property Instream Habitat Improvements

### Platte River Watershed

Prioritize Next Improvements or Restoration Needs

### Crystal River Watershed

- 9, 10 & 11. Crystal River & County Rd 675 Road/Stream Crossing Improvement
12. Tucker Lake Outlet Channel & County Rd 675 Road/Stream Crossing Improvement

### Betsie River Watershed

13. Betsie River & Haze Rd - Stream Crossing Improvement
- Prioritize Next Improvements or Restoration Needs

### Manistee River Watershed

14. Buttermilk Creek & N 39 Road/Stream Crossing Improvement **COMPLETED**
15. Buttermilk Creek & N 37 Road/Stream Crossing Improvement **COMPLETED**
16. Trib. of N. Branch Manistee & Grass Lake Road/Stream Crossing Improvement
17. Fletcher Creek & 4 Rd Road/Stream Crossing Improvement **COMPLETED**
18. Fife Lake Creek & County Line Road/Stream Crossing Improvement
19. Adams Creek & 14 Rd Road/Stream Crossing Improvement

### Bear Creek Watershed

Prioritize Next Improvements or Restoration Needs

### Pine River Watershed

Prioritize Next Improvements or Restoration Needs

### Little Manistee Watershed

Prioritize Next LMWCC Improvements or Restoration Needs

### Big Sable Watershed

Prioritize Next Improvements or Restoration Needs

### Pere Marquette Watershed

20. PM Railroad - Streambank Stabilization & Floodplain Restoration

21. Scottville Riverside Park - Streambank Stabilization **COMPLETED**

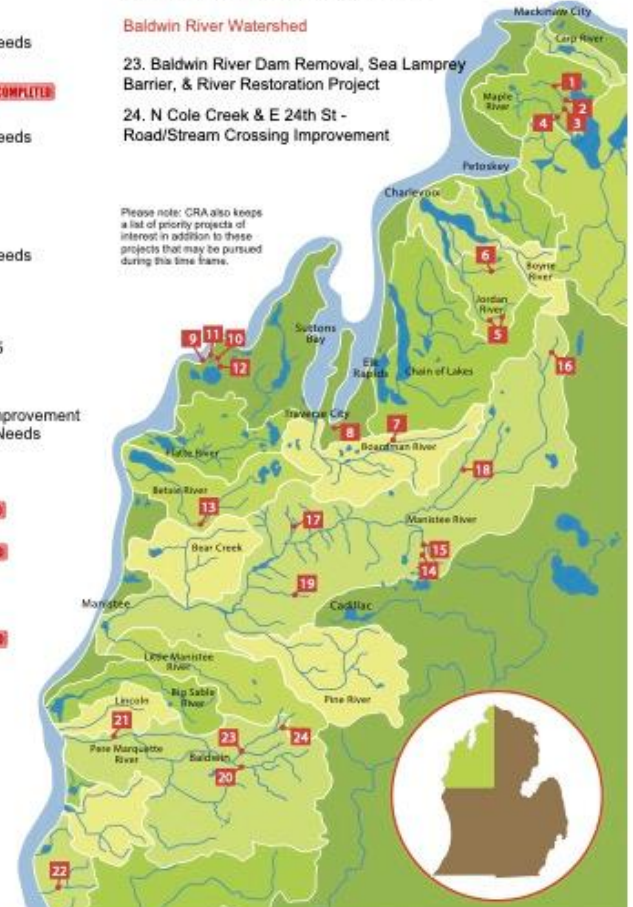
### Stony Creek Watershed

22. Stony Creek Marshville Dam Removal

### Baldwin River Watershed

23. Baldwin River Dam Removal, Sea Lamprey Barrier, & River Restoration Project
24. N Cole Creek & E 24th St - Road/Stream Crossing Improvement

Please note: CRA also keeps a list of priority projects of interest in addition to these projects that may be pursued during this time frame.



Conservation Resource Alliance

Contact us at 231-946-6817 or visit [www.rivercare.org](http://www.rivercare.org) for more information



WILD ROOTS™

Now a Permanent Program

[www.rivercare.org/wildroots/](http://www.rivercare.org/wildroots/)







Some completed dam removals in  
Northwest Michigan the last 15  
years.

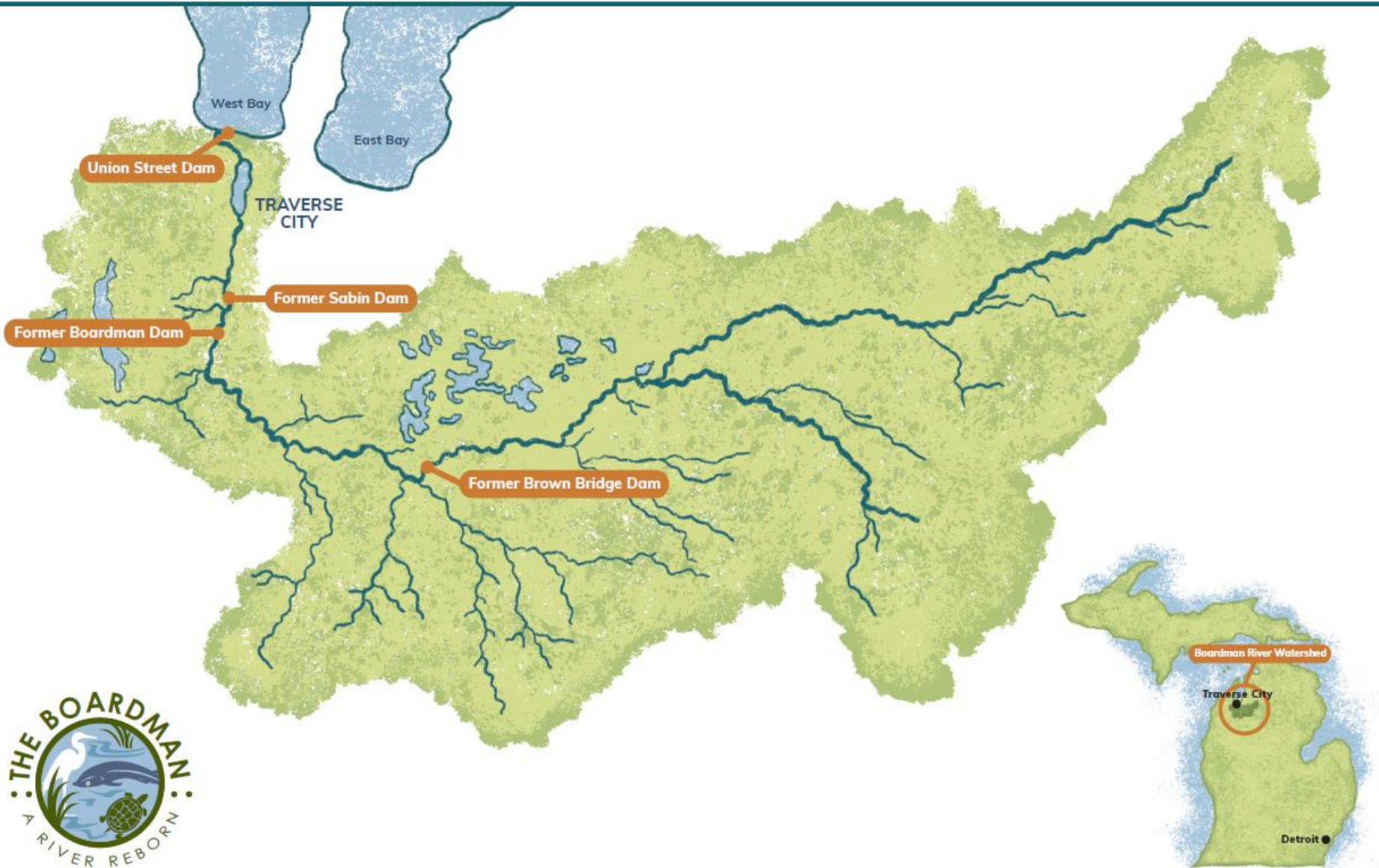


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# Boardman River Dams

3 removals & 1 modification

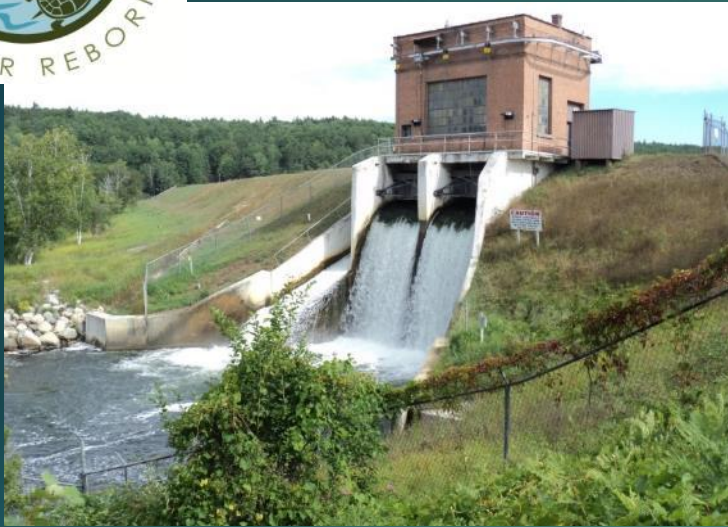






# Boardman River Dams

## 3 removals & 1 modification



#1 Brown Bridge



#2 Boardman & Cass Road Bridge



#3 Sabin



#4 Union Street



# Primary Benefits

## Environmental:

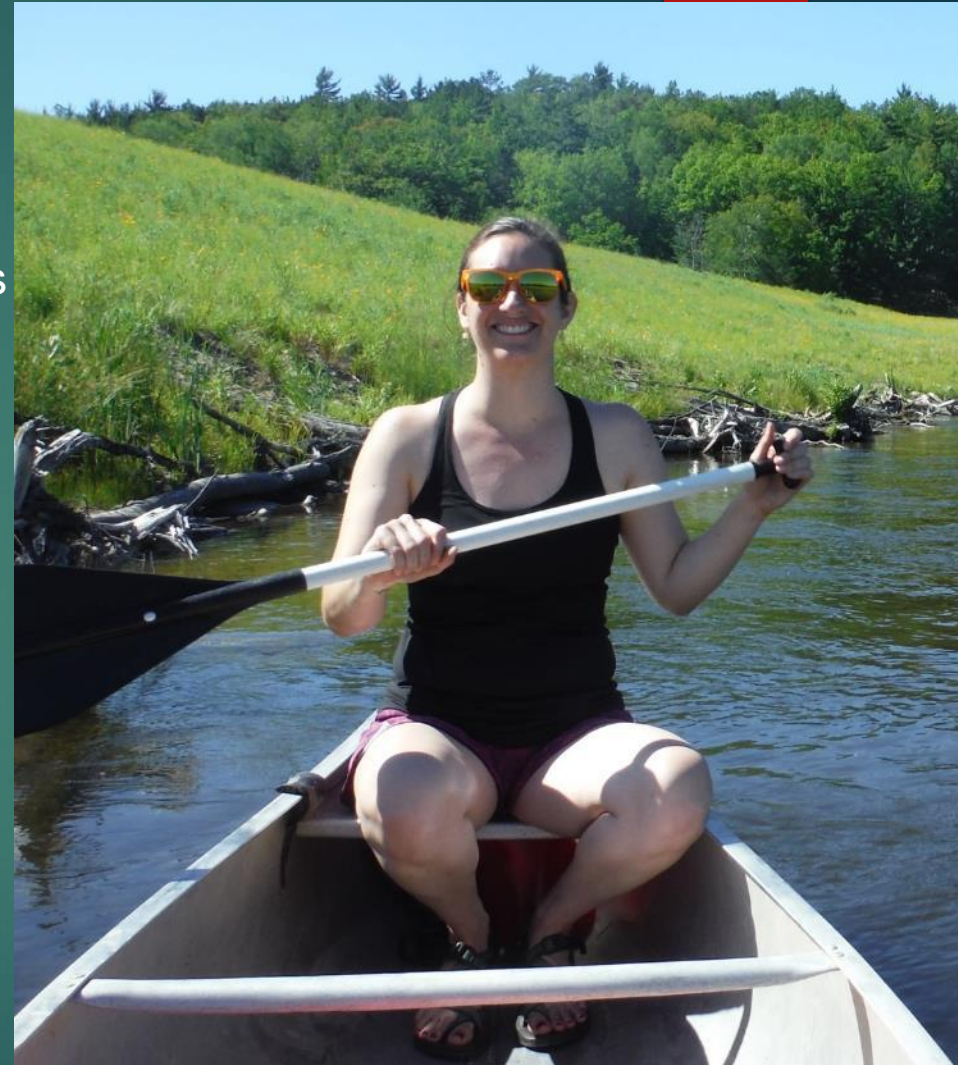
- ▶ Restore 5.1 miles of coldwater stream
- ▶ Reconnect 160 miles of high-quality river habitat to the Great Lakes
- ▶ Stable stream w/floodplain better handles climate impacts
- ▶ Remove threats of impounded excess sediment from washing downstream

## Community:

- ▶ Remove decommissioned, unsafe dams
- ▶ Promote ecological ethic, provide outdoor recreation opportunities

## Economic:

- ▶ Eliminate costly repair, maintenance & dredging expenses
- ▶ Support local tourism & businesses
- ▶ Provide jobs in engineering, construction, tourism, NGO sectors





# Project Team

## Implementation Team

- 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

## Ex-Officio IT & Partners\*

- Conservation Resource Alliance
- Grand Traverse Conservation District
- Grand Traverse County Road Commission
- US Army Corps of Engineers
- Natural Resources Conservation Service
- Watershed Center, Grand Traverse Bay
- Garfield Township
- TC Rotary Charities

*\* Various other partner groups, contractors, individuals are involved in related project activities.*



# The Team is Key to Success





Thank you, Grand Traverse Band of  
Ottawa & Chippewa Indians







Thank you local leaders & GLRI



# Project Cost over the 15-year effort, blended grants from 30 sources:

Feasibility Study/Planning	\$3,000,000
Brown Bridge Dam Removal	\$4,400,000
Boardman Dam Removal	\$10,500,000
Robbins Bridge (Cass Road)	\$3,310,000
Sabin Dam Removal	\$6,000,000
<hr/>	
Total Construction/Engineering	\$27,210,000

Non-Construction Tasks\*                      \$300-350K per year

\*Project management, grant and contract administration,  
monitoring, invasive plant species control, tree/shrub planting,  
communications and outreach



# Funders – Overall Project\*

- ▶ Bureau of Indian Affairs
- ▶ Great Lakes Fishery Trust
- ▶ National Fish & Wildlife Foundation
- ▶ U.S. Fish & Wildlife Service
- ▶ U.S. Environmental Protection Agency
- ▶ U.S. Army Corps of Engineers
- ▶ MDNR, EGLE & MDOT
- ▶ Grand Traverse Band of Chippewa & Ottawa
- ▶ Natural Resources Conservation Service
- ▶ USDA Forest Service
- ▶ Frey Foundation
- ▶ Oleson Foundation
- ▶ Brookby Foundation
- ▶ Traverse City Rotary
- ▶ City of Traverse City
- ▶ Grand Traverse County
- ▶ GT Road Commission
- ▶ Conservation Alliance
- ▶ DTE Energy Foundation
- ▶ Trout Unlimited
- ▶ Patagonia
- ▶ Grand Traverse Brownfield Redevelopment Authority

*\*Addl. funders involved in related activities in the Boardman watershed may not be listed.*



# Brown Bridge Dam built in 1921, earthen embankment was 1,650' long





Core wall was 46' high



Traverse City Municipal Dam,  
Maxfield, Mich.



# Former Brown Bridge Pond – 191 acres



John Russell - Great Lakes Images LLC



During removal – September 2012





River returned, 2.9 miles – October 2019





A wide river flows through a landscape, with a large, light-colored sediment wedge in the foreground. The river is surrounded by green and yellow trees, and a forested ridge is visible in the background under a blue sky with white clouds. The text "The 'sediment wedge.'" is overlaid on the image.

The "sediment wedge."



Ultimate sediment management, 277,000 cyds.





An aerial photograph showing a river meandering through a wide, green floodplain. The river is dark and narrow, curving from the upper left towards the lower right. The surrounding land is covered in lush green grass and yellow wildflowers. In the background, a dense, dark green forest stretches across the horizon under a cloudy sky. The foreground is framed by the tops of various trees, including pines and deciduous species.

Average river width 45',  
floodplain width 30'.



# Boardman Dam & Pond – October 2012



Photo by Jim Anderson

Core wall



Future bridge



Powerhouse





# Boardman Dam Removal – July 2017



Relic  
river  
location



# River Returned, October 2019





Neighboring infrastructure needs - first had to build a bridge at the relic river location.





# Bridge Under Construction - June 2016







After Robbins Bridge  
\$3.31M



# Dewatering – 14 gravity fed siphons & a concrete auxiliary channel





# Siphons taken off-site & auxiliary channel takes over





# Fabric encapsulated soil lifts





# Recessing & securing LWD into a streambank.



Timber piles

Root wads



# A stable river channel...



Large wood  
habitat  
protects  
banks

Floodplain



# Sabin Dam & Pond



Photo provided by John Russel  
October 2012



An aerial photograph of a river system, likely the Sabin River, showing a significant drawdown. The water is dark and flows through a series of meanders. Large areas of the riverbanks and the riverbed are exposed, appearing as light brown sandbars and mudflats. The surrounding landscape is lush with green trees and vegetation. In the distance, rolling hills and some buildings are visible under a cloudy sky.

Sabin drawdown

Photo provided by  
Brett Fessell, GTB  
August 2018



# Spillway Removal Sabin Pond




Photo provided by  
Brett Fessell, GTB  
August 2018



# River Returned, October 2019





A wide-angle photograph of a sandy riverbank under a clear blue sky. Two surveyors, wearing hard hats and high-visibility vests, are positioned in the middle ground. One is holding a tripod-mounted surveying instrument. The ground is sandy and uneven, with some scattered debris. In the background, there is a dense line of green trees. The text 'Staking the river channel.' is overlaid on the right side of the image.

Staking the  
river channel.



The forest that once was...







Relic channel – note leaning stumps on either riverbank



# Sediment management – moved 122,000 cubic yards of sediment





# Rainbow of sediment types (“muck machine”).





# Wood placement





# Daylighting creeks





# Creeks & seeps stabilized





Before - Historically, river bottom was dredged down 8' in this section.





# During - Channel construction & bank stabilization





After - Boardman Ottaway River is returned...







Tree  
planting  
since 2018 -  
multiple  
grants,  
GTCD has  
taken the  
lead



# Invasive plant species control



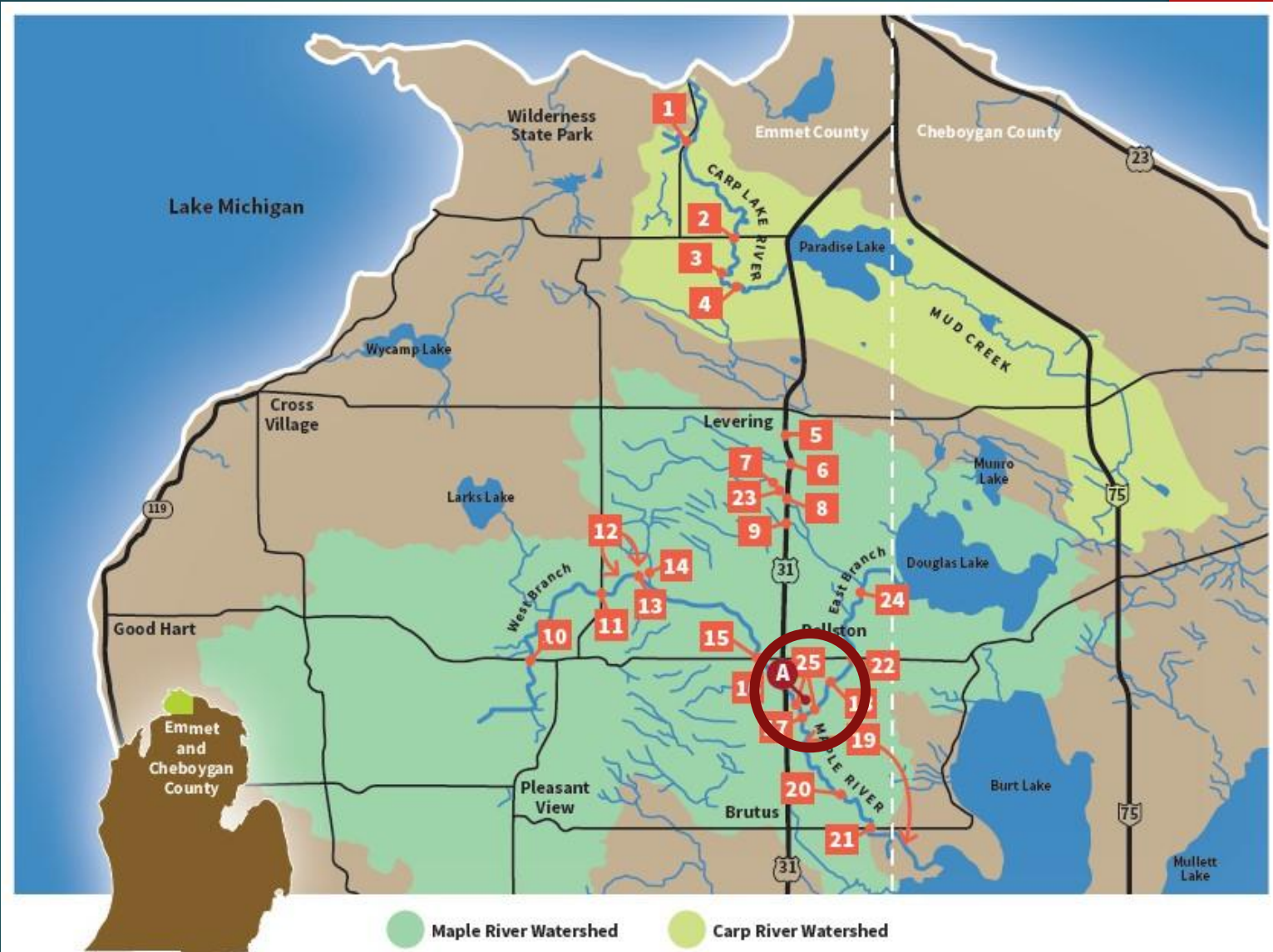


# Monitoring





# Lake Kathleen Dam Removal & Woodland Bridge Project on the Maple River



**River Care™ on the Maple & Carp Lake Rivers**



Lake  
Kathleen  
Dam  
Removal  
2018 for  
\$2.25M



Before 15'  
high dam  
& triple  
culverts



After – 32' x 70' span bridge



43 acre impoundment





Dam was built and re-built over the years.



*Maple River Dam near Pellston Mich  
Head 12' Capacity 190 K.W.*



Source: MSU Historical Archives



**PELLSTON, MICH.** The downstream wall (Bulkhead) of an open turbine penstock fell out into tail race in February, 1912. The bulkhead was badly designed and constructed. It had no reinforcing steel in it and the concrete was mixed of gravel and sand taken out of an old river bed. The plant was then in receiver's hands and has since been sold to the Cheboygan, Michigan, Light and Power Company and will be repaired this spring.

**PELLSTON, MICH.** Hydro-electric plant was partially wrecked in April, 1912, by the collapse of a concrete wall which served as the downstream bulkhead of the turbine chamber. Cause amateur engineering and criminally bad concrete.



Woodland Road  
prism just  
downstream of  
dam began to fail  
during spring high  
water 2014.



Neighboring  
pipeline crossing  
on the East Branch  
of the  
impoundment  
needed  
replacement.



Sediment management – in total estimated 90,000 cyds.





Drawdown  
& removal



Dewatering – gravity  
fed siphons



After - 1.3 miles of the Maple River  
returned & restored, 50 miles  
reconnected. Entire project took 7  
years.





# Partnerships are the Solution



- U.S Fish & Wildlife Service – Fish Passage Program, Great Lakes Fish and Wildlife Restoration Act and Great Lakes Basin Fish Habitat Partnership
- MDNR – Fisheries Habitat Grant Program
- MI-EGLE NPS
- Frey Foundation
- Scientific Anglers
- Emmet County Road Commission
- Petoskey-Harbor Springs Area Community Foundation
- Little Traverse Bay Bands of Odawa Indians
- Grand Traverse Band of Ottawa and Chippewa Indians EQIP
- National Fish & Wildlife Foundation-Sustain our Great Lakes Program (SOGL)
- Harry A. & Margaret D. Towsley Foundation
- Conservation Resource Alliance
- USDA – Natural Resources Conservation Service
- Krenn Timber Bridge Inc.
- Pat and Gill Clements Foundation
- Little Traverse Conservancy
- DTE Energy Foundation
- Walters Family Foundation
- Andrew R. and Janet F. Miller Foundation
- The George Fund
- Team Elmer's
- Spicer Group
- Holton Family
- Pierrepont Family
- Schiff Foundation
- Abrams Foundation



# Free Span the Maple River Funders – Thank you!

Baiardi Family Foundation	Grand Traverse Band of Ottawa & Chippewa Indians
Bay Harbor Foundation	
Challenge Chapter of Trout Unlimited	Rick Holton Sr./Holton Family Krenn Bridge Company
The Conservation Alliance	Little Traverse Bay Bands of Odawa Indians
Conservation Resource Alliance – River Care™	Michigan DNR Michigan EGLE
DTE Energy Foundation	Michigan Fly Fishing Club
Emmet County Road Commission	Miller Van Winkle Chapter of TU
Federation of Fly Fishers & Great Lakes Council	National Fish and Wildlife Foundation – Sustain Our Great Lakes
FishAmerica Foundation	Offield Family Foundation
Frey Foundation	Oleson Foundation
Harry A. & Margaret D. Towsley Foundation	Pat & Gill Clements Foundation
Henry E. & Consuelo S. Wenger Foundation	Petoskey-Harbor Springs Area Community Foundation
The James Family Charitable Foundation	Scientific Anglers
Kalamazoo Valley Chapter of TU	U.S. Department of Agriculture – Conservation Innovation Grant
USDA Regional Conservation Partnership Program with	U.S. Fish & Wildlife Service



Let's review a small dam removal on Dair Creek; those can also have challenges.



**Benzie County River Care™**



What: Dair Creek Dam  
Removal + 2  
road/stream crossings  
+ 1 road stabilization



Where: Tributary to  
the Betsie River,  
provide natural  
reproduction for  
salmon & steelhead



How: \$427,000 in 2009

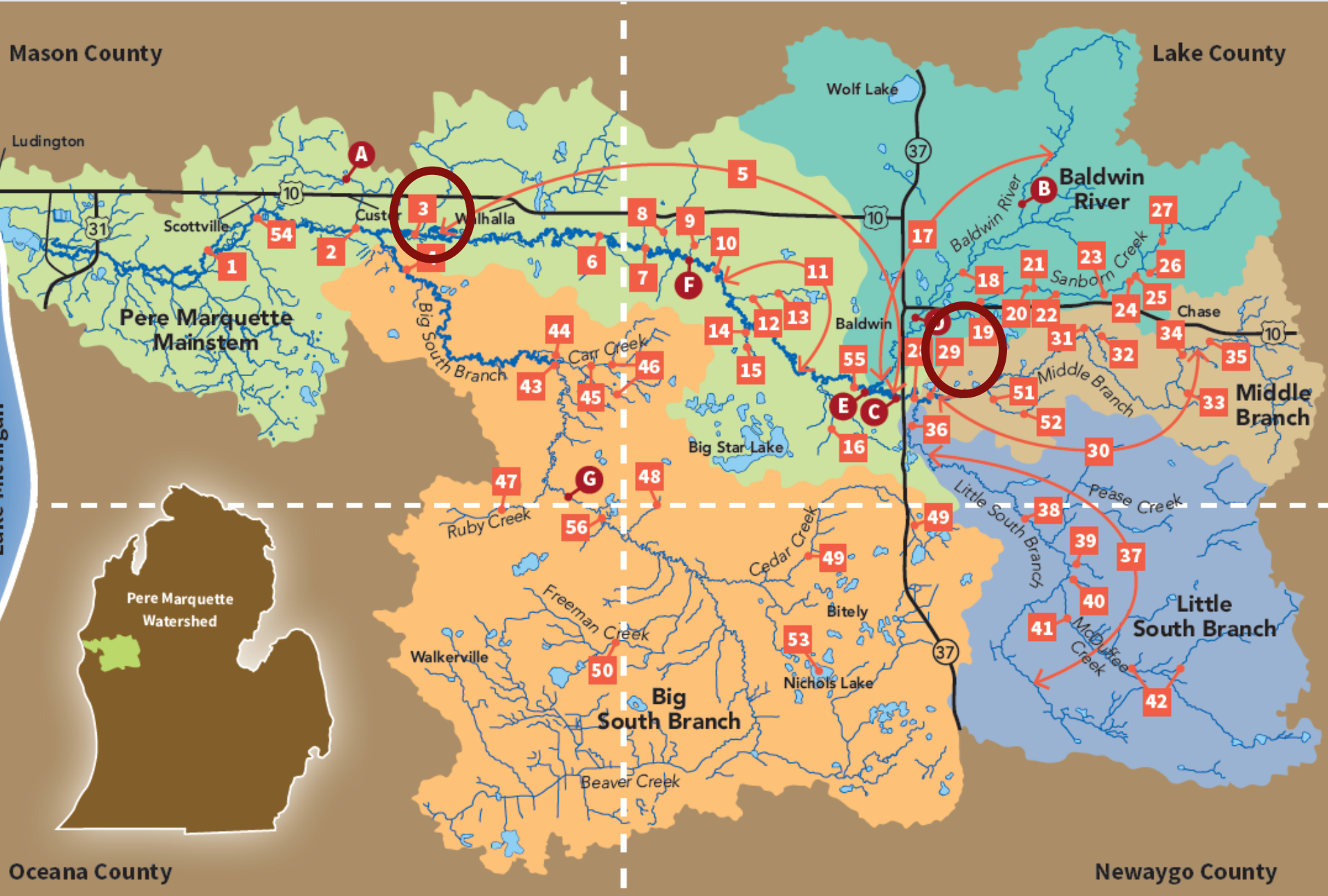
*15 funders*

Who:

- Great Lakes Fishery Trust
- Grand Traverse Band of Ottawa & Chippewa Indians
- Benzie County Road Commission
- National Oceanic Atmospheric Administration
- Environmental Protection Agency
- FishAmerica Foundation
- US Fish & Wildlife Service
- Trout Unlimited - Adams Chapter, Pine River Area Chapter, Elliott Donnelley & Martuch Chapters
- NRCS - Conservation Innovation Grant with Little Traverse Bay Bands of Odawa Indians
- MEGLE, MDNR
- Conservation Resource Alliance
- CRA's River Care Program
  - DTE Energy Foundation
  - The George Fund
  - Oleson Foundation







# Pere Marquette River Care™





Before

What: Tank Creek  
Dam, pond used  
for recreation  
purposes

Where: Tributary to  
the Pere Marquette  
River



After



Dam breached during spring high water in 2007.  
& washed 80 cyd. of sediment downstream,  
threatening a county-owned road & a RR  
crossing.



Privately owned dam &  
neighboring public  
infrastructure.





Before

How: \$264,000 in 2009  
Dam removal, stream  
restoration, 2  
road/stream crossing  
improvements.

### Funders & Partners:

- Natural Resources Conservation Service
- Conservation Innovation Grant
- US Forest Service
- Lake County Road Commission
- MDNR Inland Fisheries Habitat Program
- USFWS
- Pere Marquette Watershed Council
- Landowners, The Arnolds
- CRA's River Care Program



After



Floodplain before and after,  
reconnected 1.75 miles of  
Tank Creek to PM  
mainstem.



Combination of active &  
passive sediment  
management due in part to  
limited construction  
access.



# Dam removals in the planning stage.



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# What: Baldwin Dam on the Baldwin River in the Village of Baldwin





# Where: Tributary to the Pere Marquette River





Baldwin Dam started out as a grist and sawmill, then source of water for nearby RR, then hatchery.

*Trout Nursery, Baldwin Creek, Baldwin, Mich.*



"The Dam" ~ ~ ~

Baldwin Mich





1950s Aerial photo 1950s Baldwin Dam & State hatchery

**Not just a dam removal...**

- Removal of multiple dams
- Removal of fish raceways
- Removal of defunct buildings
- Retore a single stream channel
- Construct a seasonal sea lamprey barrier
- Repair or replace the State-owned RR/Trail bridge upstream







## Primary Steps:

- 1) Options Analysis & Build the Team (Done)
- 2) Design (partially funded)
- 3) Permitting
- 4) Construction
- 5) Post-Restoration & Monitoring
- 6) Fund development & communications with every step

## Partners & Funders to date:

- Conservation Resource Alliance
- Great Lakes Fishery Commission (provided \$94,800 to date)
- US Fish & Wildlife Service
- James Truxton, Owner
- Village of Baldwin
- Pere Marquette Watershed Council
- Mason-Lake Conservation District
- Michigan DNR (provided \$200,000 Fisheries Habitat Program)
- Michigan EGLE (provided \$115,000 Dam Risk Reduction Grant Program)
- Property Owners
- Pere Marquette River Restoration Committee
- West Michigan SRDC
- Engineering Team of AECOM, Fishbeck & InterFluve



# Upcoming design work for 2 small dams on a Boardman/Ottaway tributary.





The dams are collectively owned by 29 property owners & affect 2 miles of stream.





A dam removal going to  
construction in 2024.



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## Marshville Dam on Stony Creek in Oceana County

Started out as  
grist mill,  
converted into a  
dam in 1928.  
Owned by  
Oceana County.







Neighboring  
infrastructure is a  
County road.



## Main Partners:

- CRA
- West Michigan Regional Shoreline Development Council
- Oceana County
- Oceana County Road Commission
- USFWS
- MDNR & EGLE
- Engineering team of GEI



- Dam is currently in a state of disrepair and serves no use
- Approximately 3' drop across dam
- Dam inhibits fish passage and creates a potential safety hazard





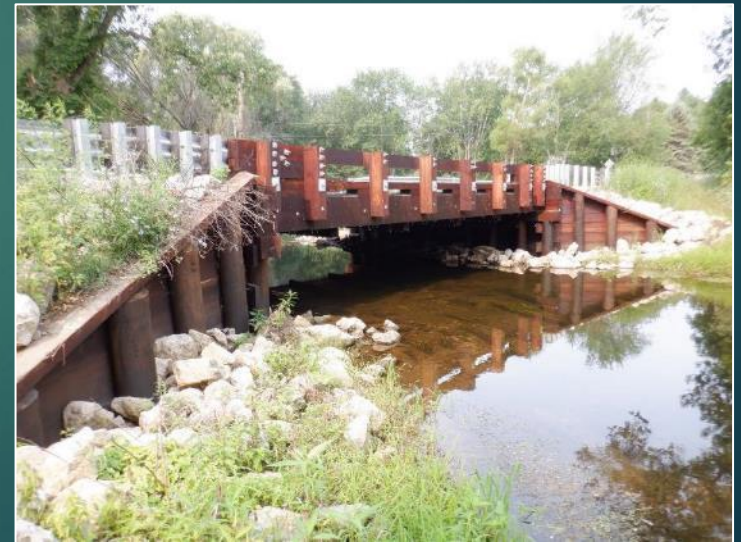
Downstream of the dam.



Downstream of the triple culverts.

Dams often have nearby infrastructure that need attention.

Dam removal, river restoration, recreation access & timber bridge project.



Typical timber bridge



# Upstream Creek Restoration

- Much of the creek upstream of the dam is too wide and shallow
- Lack of wood in upstream reach
- Use wood to narrow creek to create better in-stream habitat
- Design intent is to match downstream “reference reach”
- Provide fish habitat & fishing opportunities on this public land



Upstream of dam,  
sandy & wide



Downstream  
“Reference  
Reach”





# Funders to Date

Estimated Total Project Cost \$2.2M

- National Oceanic and Atmospheric Administration – Regional Partnership Grant
- United States Fish and Wildlife Service – National Fish Passage Program
- National Fish and Wildlife Foundation – America the Beautiful Challenge
- United States Forest Service – Great Lakes Restoration Initiative
- Great Lakes Fishery Trust – Ecosystem Health and Sustainable Fish Populations Habitat Protection and Restoration
- Michigan Department of Natural Resources – Fisheries Habitat Grant Program
- Great Lakes Fishery Trust – Access to the Great Lakes Fishery
- Oceana County Parks and Recreation Commission
- Oceana County Road Commission



A dam removal that is needed.



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Boyne Falls Dam on the  
South Branch of the  
Boyne River



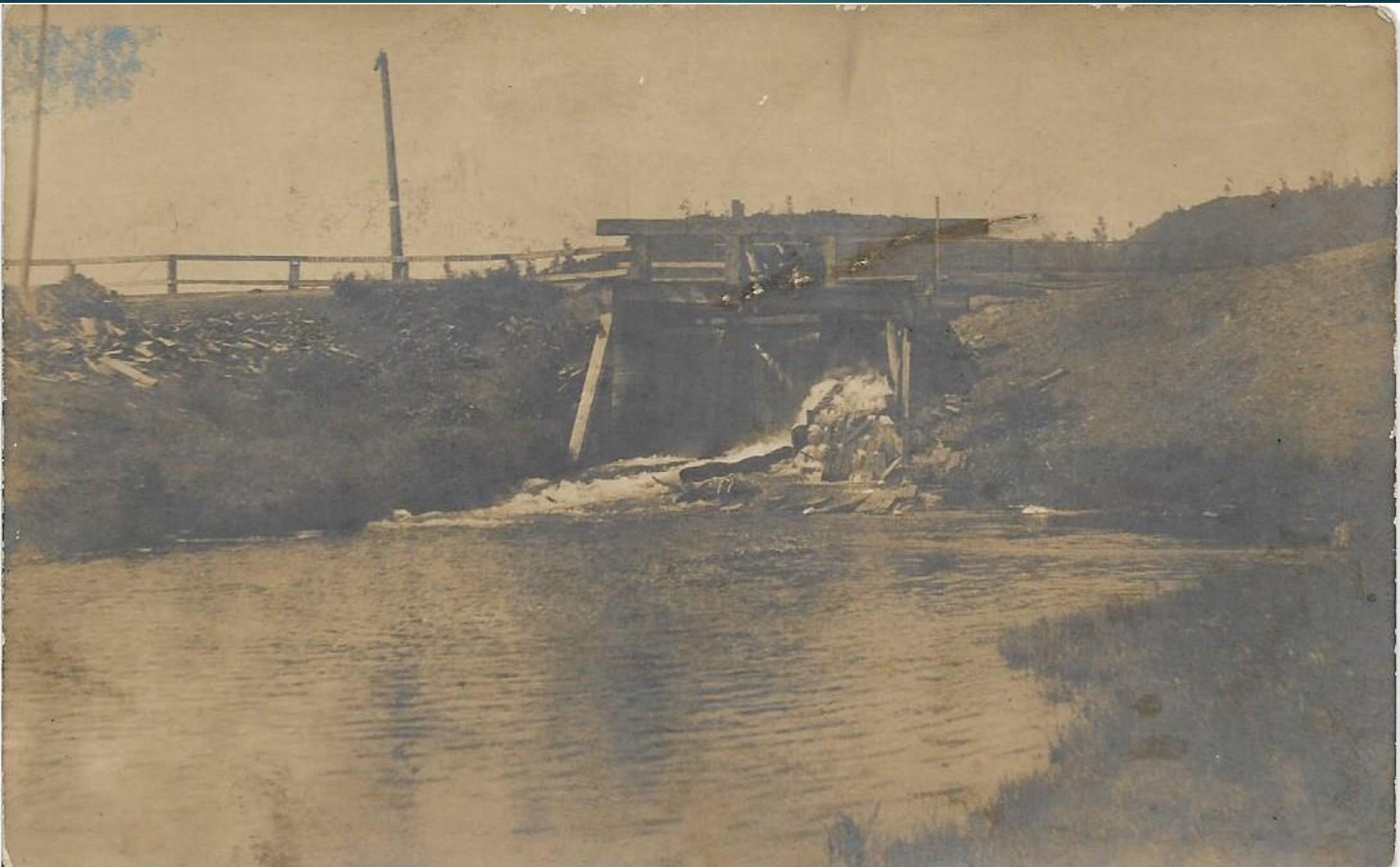


The 25-acre impoundment has an estimated 7 acres of open water & up to 200,000 cubic yards of sediment.





# Boyne Falls Dam – Village purchased for \$1 from Consumers Power in 1956





Current Boyne Falls Dam – fair condition, significant hazard potential rating, 41.62 miles US & 6.8 miles DS






Upstream former grist mill dam failed in 2020, connects to Boyne Falls Dam that used to be a sawmill.





A man wearing waders and a dark shirt is standing on the right bank of a stream in a forest. The stream is filled with a large pile of fallen logs and branches, creating a significant obstruction. The water is dark and still, reflecting the surrounding greenery. The forest is dense with various trees and undergrowth. The text "Abandoned relic channel to the west is intact" is overlaid on the lower part of the image.

Abandoned relic  
channel to the west is  
intact



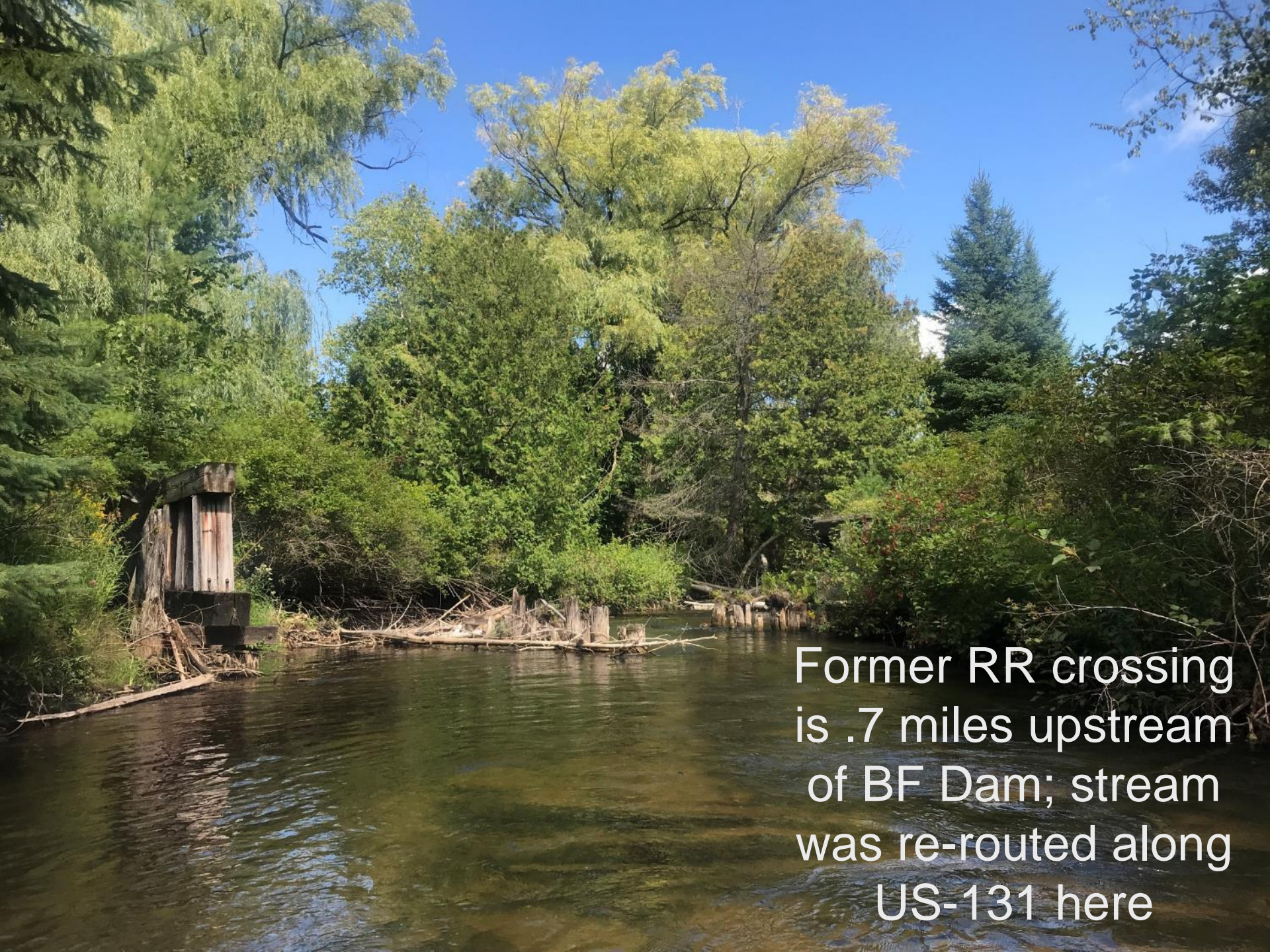


Neighboring infrastructure includes a trail crossing

Former hoop mill operation decking at the outlet







Former RR crossing  
is .7 miles upstream  
of BF Dam; stream  
was re-routed along  
US-131 here



# Dam removal benefits:

- Reconnect upstream to downstream reaches
- Restore access to habitat for native fish, reptile, amphibian, macroinvertebrate, mussel and wildlife species
- Restore native aquatic populations
- Restore natural stream temperatures
- Restore floodplain and adjacent uplands
- Eliminate the build up of sediment including sand flowing from upstream and production of mucky soils
- Long-term flood mitigation and prevention, eliminate costly emergency response
- Eliminate maintenance costs and efforts
- Removal of deteriorating infrastructure
- Eliminate safety and access problems
- Watershed-wide impacts!



# Some Key Highlights & Considerations of Dam Removals:

- Build a diverse partnership
- Federal, tribal, state, local, NGO, private entities
- Build the funding support
- Non-federal match is important
- Community outreach
- Neighboring infrastructure
- Sediment characteristics
- Sediment management
- Wetland impacts
- Where should the river go?
- Dewatering methods
- Floodplain connectivity
- Consistent revegetation efforts
- Invasive species control
- Maintenance and monitoring



Thank you!



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