



Lessard-Sams Outdoor Heritage Council

Restoration of Norway Brook connectivity to the Pine River
Laws of Minnesota 2019 Final Report

General Information

Date: 07/28/2022

Project Title: Restoration of Norway Brook connectivity to the Pine River

Funds Recommended: \$2,267,000

Legislative Citation: ML 2019, 1st Sp. Session, Ch. 2, Art. 1, Sec. 2, subd, 5(m)

Appropriation Language: \$2,267,000 the first year is to the commissioner of natural resources for an agreement with the city of Pine River to restore and enhance riverine habitat in the Pine River and provide fish passage by removing the dam and modifying and installing structures at the Norway Lake dam site.

Manager Information

Manager's Name: Mike Hansen

Title: Public Works Director

Organization: City of Pine River

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Location Information

County Location(s): Cass.

Eco regions in which work will take place:

- Northern Forest

Activity types:

- Restore
- Enhance

Priority resources addressed by activity:

- Habitat

Narrative

Summary of Accomplishments

The Norway Lake Dam was removed and replaced with a rock-arch rapids in 2022 by the City of Pine River. Replacing the high hazard dam with a rock riffle enhanced fish passage, biological connectivity, habitat, safety, aesthetics, fishing, and recreational access to the river. The riffle pools and channels enhanced recreational opportunities wading, fishing, paddling and other water-based fun. This work restored fish passage and connectivity between the Whitefish Chain of Lakes and reconnected 134 lakes (11,338 acres) and 80 miles of river and stream corridors benefitting fish, mussels and many game and non-game animal species.

Process & Methods

The Norway Lake Dam was removed and replaced with a rock-arch rapids in 2022 by the City of Pine River. Work in preparation for the project included environmental review, surveying, engineering (civil, geotechnical, structural and water resources), landscape architecture and water/wetland permitting (Wetland Conservation Act, DNR Public Waters and Dam Safety, Corps of Engineers, NPDES Construction Stormwater). Landscape architectural drawings were helpful to convey project concepts to citizens and funding partners. A sheet pile weir was installed within the rock-arch rapids and was useful for bypassing flow and in the dewatering of the construction site. Removal of the dam and construction of the rock rapids was done in the winter. Flows in the river were low but the cold and snowy conditions also added construction complications. The contractor's use of GPS survey equipment allowed precise boulder placement which helps to evenly distribute flow throughout the riffle.

How did the program address habitats of significant value for wildlife species of greatest conservation need, threatened or endangered species, and/or list targeted species?

Removal of the dam and construction of the rock riffle has restored fish passage and connectivity between the Whitefish Chain of Lakes and 134 lakes and 80 miles of rivers and streams. This work has restored the ecological connection between Outstanding Lakes of Biological Significance for fish community-Whitefish Chain and upstream Lake Hattie as well as additional Outstanding Lakes of Biological Significance in headwaters: Lizzie, Brockway, Lind, Bowen, Pine Mountain, Beuber and Deep Portage. Removing the dam and reconnecting these high quality, diverse habitats and stream corridors benefits fish, mussels and many game and non-game animal species. Riffle habitat has been constructed in a 325-foot length of boulder-arch rapids. Long-ear Sunfish, Northern Sunfish, Silver Redhorse, Sand Shiner and Black Sandshell (mussel) are present below the dam but have not been found upstream of the Pine River Dam. Northern Sunfish (special concern) are found downstream of the dam but have not been found upstream. Restoring fish passage enables Northern Sunfish to expand their range in the watershed. Pugnose Shiner (threatened), Least Darter (special concern), and Hornyhead Chub (species of greatest conservation need) are found in the Pine River system both upstream and downstream of the rock riffle. Populations of these fish will benefit from the reestablished connectivity between the middle and upper reaches of the Pine River and the associated lakes and streams of the watershed. Black Sandshell mussel (special concern) were found below the dam prior to the project but not upstream. Upstream fish passage may allow Black Sandshells to expand upstream as larval mussels are carried upstream by Bluegill and Largemouth bass hosts. Blandings Turtle (threatened) have been found in the area around the City of Pine River and any turtles moving along the river will now be able to move through the rock riffle instead of crossing the dam and road as required before the project. The aquatic plant, Olive-colored Southern Naiad (special concern) has been found within the Whitefish Chain of Lakes.

How did the program use science-based targeting that leveraged or expanded corridors and complexes, reduced fragmentation, or protected areas in the MN County Biological Survey.

The Norway Lake dam was a fish barrier for 112 years (1910-2022) and created a significant fragmentation of aquatic habitat. Removal of the dam and replacement with a rock-arch rapids has restored fish passage and connectivity between the Whitefish Chain of Lakes and the 149 square mile watershed above the dam. This reconnected watershed includes 134 lakes with surface areas totaling 11,338 acres and 80 miles of rivers and streams ranging from 1st order to 4th order. Twenty-seven lakes exceed 100 acres, with the largest-Pine Mountain Lake-having 1,622 acres. The removal of the dam and the reconnection of these high quality, diverse habitats and stream corridors benefits fish, mussels and many game and non-game animal species.

Explain Partners, Supporters, & Opposition

The City of Pine River lead this project with assistance and support from the Minnesota Department of Natural Resources (Ecological and Water Resources, Dam Safety, Fish and Wildlife); Minnesota Department of Transportation; Cass County and the Lessard Sams Outdoor Heritage Council. The project received support from the community. Norway Lake residents expressed concerns that the riffle project not adversely affect water levels on Norway Lake. Community support has been high following the completion of construction although some have voiced concerns about the increased noise level of the water flowing through the riffle.

Exceptional challenges, expectations, failures, opportunities, or unique aspects of program

MNDOT replaced the highway bridge prior to construction of the rock riffle which required the riffle contractor to work under the new bridge--adding to the construction complexity and cost. One of the bridge beams was hit by an excavator during riffle construction but not seriously damaged. A low flow channel was included in the design as a tube, canoe and/or kayak feature, but flows have not been concentrated enough for these uses.

What other fund may contribute to this program?

- Other : DNR Dam Safety Program has provided a \$200,000 grant for engineering and design services.

How were the funds used to advance the program?

DNR Dam Safety has provided \$200,000 in funding for engineering and design services to remove the high hazard dam and replace it with a rock-arch rapids. The City of Pine River has provided \$89,000 for the fishing pier, benches and ADA compliant walks and railings.

What is the plan to sustain and/or maintain this work after the Outdoor Heritage Funds are expended?

The City of Pine River will maintain the rock riffle features. The project will be monitored to determine that it works as planned. The rock riffle incorporates natural channel features which are sustainable and don't typically require significant maintenance. Native plantings will be inspected and maintained as necessary while the vegetation becomes established.

Actions to Maintain Project Outcomes

Year	Source of Funds	Step 1	Step 2	Step 3
Annually	City of Pine River-local tax levy	Inspect rock riffle	Determine whether boulder weirs, base rock and habitat features are performing adequately.	Perform maintenance to remove debris and adjust or maintain the riffle.

1 year following construction	City of Pine River-local tax levy	Inspect native plantings	Maintain native plantings, reseed as necessary and control invasive plants as native vegetation becomes established.	-
1 year following construction	DNR Fisheries	Perform fish survey	Determine whether fish passage is improved and species populations are responding to reconnected habitats.	-
5 years following construction	DNR Fisheries	Perform fish survey	Determine whether fish passage is improved and species populations are responding to reconnected habitats.	-
10 years following construction	DNR Fisheries	Perform fish survey	Determine whether fish passage is improved and species populations are responding to reconnected habitats.	-
Annually	City of Pine River-local tax levy	Perform recreational user survey	Determine recreational use of the rock riffle and adjoining parks. Report on numbers of people fishing, kayaking and using adjoining park spaces.	-

Budget

Totals

Item	Requested	AP Amount	Spent	Antic. Leverage	Received Leverage	Leverage Source	Original Total	Final Total
Personnel	\$36,000	\$36,000	\$4,800	-	-	-	\$36,000	\$4,800
Contracts	\$2,011,000	\$1,990,000	\$1,990,000	\$89,000	\$89,000	City of Pine River	\$2,100,000	\$2,079,000
Fee Acquisition w/ PILT	-	-	-	-	-	-	-	-
Fee Acquisition w/o PILT	-	-	-	-	-	-	-	-
Easement Acquisition	-	-	-	-	-	-	-	-
Easement Stewardship	-	-	-	-	-	-	-	-
Travel	-	-	-	-	-	-	-	-
Professional Services	\$220,000	\$241,000	\$240,600	\$200,000	\$200,000	\$200,000 DNR Dam Safety Program	\$420,000	\$440,600
Direct Support Services	-	-	-	-	-	-	-	-
DNR Land Acquisition Costs	-	-	-	-	-	-	-	-
Capital Equipment	-	-	-	-	-	-	-	-
Other Equipment/Tools	-	-	-	-	-	-	-	-
Supplies/Materials	-	-	-	-	-	-	-	-
DNR IDP	-	-	-	-	-	-	-	-
Grand Total	\$2,267,000	\$2,267,000	\$2,235,400	\$289,000	\$289,000	-	\$2,556,000	\$2,524,400

Personnel

Position	Annual FTE	Years Working	Funding Request	Antic. Leverage	Leverage Source	Total
Project Manager	0.05	2.0	\$4,800	-	-	\$4,800
City Clerk	0.03	2.0	-	-	-	-

Explain any budget challenges or successes:

Total Revenue: \$0

Revenue Spent: \$0

Revenue Balance: \$0

Of the money disclosed above, what are the appropriate uses of the money:

Output Tables

Acres by Resource Type (Table 1)

Type	Wetland (AP)	Wetland (Final)	Prairie (AP)	Prairie (Final)	Forest (AP)	Forest (Final)	Habitat (AP)	Habitat (Final)	Total Acres (AP)	Total Acres (Final)
Restore	0	0	0	0	0	0	6	6	6	6
Protect in Fee with State PILT Liability	0	0	0	0	0	0	0	0	0	0
Protect in Fee w/o State PILT Liability	0	0	0	0	0	0	0	0	0	0
Protect in Easement	0	0	0	0	0	0	0	0	0	0
Enhance	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	6	6	6	6

Total Requested Funding by Resource Type (Table 2)

Type	Wetland (AP)	Wetland (Final)	Prairie (AP)	Prairie (Final)	Forest (AP)	Forest (Final)	Habitat (AP)	Habitat (Final)	Total Funding (AP)	Total Funding (Final)
Restore	-	-	-	-	-	-	\$2,267,000	\$2,235,400	\$2,267,000	\$2,235,400
Protect in Fee with State PILT Liability	-	-	-	-	-	-	-	-	-	-
Protect in Fee w/o State PILT Liability	-	-	-	-	-	-	-	-	-	-
Protect in Easement	-	-	-	-	-	-	-	-	-	-
Enhance	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	\$2,267,000	\$2,235,400	\$2,267,000	\$2,235,400

Acres within each Ecological Section (Table 3)

Type	Metro / Urban (AP)	Metro / Urban (Final)	Forest / Prairie (AP)	Forest / Prairie (Final)	SE Forest (AP)	SE Forest (Final)	Prairie (AP)	Prairie (Final)	N. Forest (AP)	N. Forest (Final)	Total (AP)	Total (Final)
Restore	0	0	0	0	0	0	0	0	6	6	6	6
Protect in Fee with State PILT Liability	0	0	0	0	0	0	0	0	0	0	0	0
Protect in	0	0	0	0	0	0	0	0	0	0	0	0

Fee w/o State PILT Liability												
Protect in Easement	0	0	0	0	0	0	0	0	0	0	0	0
Enhance	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	6	6	6

Total Requested Funding within each Ecological Section (Table 4)

Type	Metro / Urban (AP)	Metro / Urban (Final)	Forest / Prairie (AP)	Forest / Prairie (Final)	SE Forest (AP)	SE Forest (Final)	Prairie (AP)	Prairie (Final)	N. Forest (AP)	N. Forest (Final)	Total (AP)	Total (Final)
Restore	-	-	-	-	-	-	-	-	\$2,267,000	\$2,235,400	\$2,267,000	\$2,235,400
Protect in Fee with State PILT Liability	-	-	-	-	-	-	-	-	-	-	-	-
Protect in Fee w/o State PILT Liability	-	-	-	-	-	-	-	-	-	-	-	-
Protect in Easement	-	-	-	-	-	-	-	-	-	-	-	-
Enhance	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	\$2,267,000	\$2,235,400	\$2,267,000	\$2,235,400

Target Lake/Stream/River Feet or Miles

Outcomes

Programs in the northern forest region:

- Improved aquatic habitat indicators ~ *Improved aquatic habitat indicators: This project has restored and enhanced habitat within a Public Water by reconnecting a disconnected river reach and restoring fish passage and biological connectivity between the Whitefish Chain of Lakes and 134 lakes and 80 miles of rivers and streams and in excess of 11,000 acres of aquatic habitat. Future lake and stream surveys will confirm improvements in species diversity and populations. The project has also provided enhanced recreational opportunities for fishing, wading, and other uses which will be tracked through City Park use.*

Parcels

Sign-up Criteria?

No

Restore / Enhance Parcels

Name	County	TRDS	Acres	Est Cost	Existing Protection
94-340-0220	Cass	13829231	0	\$90,600	No
94-340-0210	Cass	13829231	0	\$90,600	No
94-339-0001	Cass	13829231	0	\$113,200	No
94-338-1110 to 0260	Cass	13829231	0	\$396,300	No
94-337-1830	Cass	13729206	0	\$254,700	No
94-337-1820	Cass	13729206	0	\$106,400	No
94-337-1810	Cass	13729206	0	\$283,000	No
94-231-3404	Cass	13829231	0	\$566,100	No
94-231-3401	Cass	13829231	1	\$566,100	No

Parcel Map



- Protect in Easement
- ▲ Protect in Fee with PILT
- Protect in Fee W/O PILT
- ★ Restore
- ✕ Enhance
- ⊕ Other