

Lessard-Sams Outdoor Heritage Council

Fiscal Year 2020 / ML 2019 Request for Funding



Date: May 29, 2018

Program or Project Title: Pine River Fish Passage Project 2020

Funds Requested: \$1,246,000

Manager's Name: Beth Hippert

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County Locations: Crow Wing

Regions in which work will take place:

- Northern Forest

Activity types:

- Restore
- Enhance

Priority resources addressed by activity:

- Habitat

Abstract:

The future of three state listed fish are at risk in 30 miles of the lower Pine River between Crosslake and the confluence of the Mississippi. IBI scores indicate a dam, in place since 1970, is affecting these populations. The dam blocks them from migrating to essential habitats and has degraded spawning substrate. Results of 2012 MPCA sampling on the river indicate these populations may be absent upstream of the dam. This project will reverse the affects and support fishery goals. It will reopen fish passage to interdependent communities in feeder streams and shallow and deep water habitats.

Design and scope of work:

Two issues are at hand; one is the threat the rock dam structure has on the health and diversity of aquatic organisms and migratory fish in the Pine River, Big Pine Lake, and upstream waters; and second is the fragile condition of the dam structure. The proposed design solves both issues; reconnect up and downstream communities and remove the dam. A series of five rock riffle structures will be installed in 40 ft intervals along the stream channel at a slope and depth that will effectively restore connectivity and stability. The design is based off a natural channel design method pioneered by Dave Rosgen P.H., Ph.D. and successfully tested on 17 dam replacement projects by DNR Division of Ecological Resources Stream Habitat Program. Based on current research the effects of barriers on aquatic biodiversity and fish distributions up and downstream of dams are clear. A DNR study evaluating 32 barrier dams on mainstem or tributaries of Minnesota rivers showed on average, the number of species declined 41% (MNDNR Barrier Effects on Native Fishes of Minnesota. 2015). Furthermore, intolerant, stream-dependent, imperiled species were the most likely to be absent upstream of barriers. Findings of a 2012 Minnesota Pollution Control survey of the Pine indicated sensitive populations above the dam are declining. Although this reach passed the Fish Index of Biological Integrity, the score was low. Comparatively, the downstream reach scored good and supported a diverse fish community, including greater redhorse a sensitive species, and two rare species, the pugnose shiner a state threatened species, and the least darter, a species of special concern. Pugnose and least darter utilize habitat in slow moving streams and lakes. Habitat loss and degradation are the greatest threats to least darter populations (MNDNR). Big Pine Lake, located upstream of the rock dam is listed as a Biological Significant Lake for Outstanding Plant Community (MNDNR). Reconnecting this downstream stretch with upstream habitat in Big Pine Lake will open up spawning habitat for this species, as well as associated aquatic organisms and fish dependent on diverse aquatic plant communities. The dam is 48 years old and riddled with leaks despite regular maintenance. The design life of a typical dam is 50 years (Powers 2005). Dam failures are often precluded by seepages

which increase and eventually cause the dam to fail. The effects would be devastating, draining over 400 acres of Big Pine Lake impacting acres of high quality vegetation and aquatic habitat. The low water levels would also affect fisheries, loon nesting, and recreational use of boats, canoes and kayaks.

Stakeholders have committed more than \$350,000 of non-state in-kind and cash dollars towards this project. More than \$300,000 from the City of Crosslake, \$17,000 from Crow Wing County, and up to \$75,000 from a subordinate district fund which taxes riparian owners on the upstream lake. Funds from a 2016 CPL grant were used towards repairs and streambank protection in Phase I of the project. The dam will be replaced in Phase II.

Which sections of the Minnesota Statewide Conservation and Preservation Plan are applicable to this project:

- H3 Improve connectivity and access to recreation
- H6 Protect and restore critical in-water habitat of lakes and streams

Which other plans are addressed in this proposal:

- Long Range Plan for Fisheries Management
- Outdoor Heritage Fund: A 25 Year Framework

Describe how your program will advance the indicators identified in the plans selected:

This project will permanently open a 20 mile aquatic corridor, plus tributaries in the watershed between the confluence of the Mississippi and the Crosslake Dam (H3). More than a mile of public land that flanks the project area will be leveraged to enhance benefits, it is also linked to 4000 acres of woodlands, open prairies, and wetland complexes. The 5 riffle structures replacing the dam will create deep pools, and substrate of gravel, cobble, and rock replacing degraded stream bed with critical spawning habitat (H6). This aligns with Fishery goals to engage local partners, make recreational fishing as good as it can be in the present and future and to conserve, maintain, enhance, or rehabilitate Minnesota's aquatic resources to serve environmental, social, and commercial purposes.

Which LSOHC section priorities are addressed in this proposal:

Northern Forest:

- Protect shoreland and restore or enhance critical habitat on wild rice lakes, shallow lakes, cold water lakes, streams and rivers, and spawning areas

Describe how your program will produce and demonstrate a significant and permanent conservation legacy and/or outcomes for fish, game, and wildlife as indicated in the LSOHC priorities:

Protect shoreland and restore or enhance critical habitat on wild rice lakes, shallow lakes, cold water lakes, streams and rivers, and spawning areas.

Fishery health is influenced by low oxygen levels, degraded river basin substrate, and blocked migration channels. According to the 2016 MPCA stressor ID report the Pine River has a low but passing FIBI score for the reach upstream of the rock dam, indicating a decline. Replacing the rock dam structure with the riffle structures will support aquatic inverts, eggs, and fry plus oxygenate the waters. Shallow pools will restore natural stream hydraulics and dynamics of the fluvial system along the protected riparian corridor connecting migratory species, like greater redhorse; a species of greatest concern that requires interconnected systems to fulfill all life stages (USDA Forest Service) to the meandering reaches up and downstream. Furthermore, downstream species will have access to upstream Big Pine Lake, Biological Significant Lake for Outstanding Plant Community. Success will be measured by water chemistry and future FIBI scores. The MPCA has a permanent chemistry and flow data station below this site and will revisit FIBI sampling in 2022. Increases in oxygen would indicate a positive correlation to the riffle structure.

Describe how the proposal uses science-based targeting that leverages or expands corridors and complexes, reduces fragmentation or protects areas identified in the MN County Biological Survey:

Diversity in this reach is declining. A comparison of IBI scores for fish and mussels above and below the dam show upstream numbers are up to 40% lower than downstream of the dam. Similar differences in IBI scores were found for inverts. According to Aadland, MNDNR, the health and vigor of these sensitive species is at risk and will preclude further declines to the Pine River's physical and biological health and diversity. This project will increase IBI scores in the upstream reach by as much as 60% within a few years of restoration (Aadland. Barrier Effects on Native Fishes of Minnesota. 2015). Increased spawning habitat and Pine Lake, listed as a Biologically Significant Lake for Outstanding Plant Community is located 1 miles upstream, expanding on resources needed to reach that goal and increasing diversity and populations of state listed fish species; greater redhorse, a sensitive species, pugnose shiner a state threatened species, and least darter, a species of special concern. Stream health is also closely linked to land use changes. Forested lands cover 56% of this watershed (HUC 12). It has been well documented that stream health begins to decline when cover

dips below 50% (Verry.The Hydrology of Minor Watersheds. 2016). Along a mile long corridor of this project area forest cover is 100% which will help rebuild stream health and recovery of all sensitive species. These are ecologically diverse lands in public ownership sustainably managed (FSC and FSI certified) for timber expanding benefits to other fish, game, and wildlife as well as to outdoor enthusiast (2017 MN 97A.056). The adjacent land is also linked to more than 4000 acres (8 sq mi) of unbroken connections between woodlands, open prairies, and wetlands. Restoring fish passage maximizes the equity of these lands expanding ecological health and functional benefits to protected riparian upland, wetland complexes, shallow, and deep lake systems.

How does the proposal address habitats that have significant value for wildlife species of greatest conservation need, and/or threatened or endangered species, and list targeted species:

Diversity in this reach is declining. A comparison of IBI scores for fish and mussels above and below the dam show upstream numbers are up to 40% lower than downstream of the dam. Similar differences in IBI scores were found for inverts. According to Aadland, MNDNR, the health and vigor of these sensitive species is at risk and will preclude further declines to the Pine River's physical and biological health and diversity. This project will increase IBI scores in the upstream reach by as much as 60% within a few years of restoration (Aadland. Barrier Effects on Native Fishes of Minnesota. 2015). Increased spawning habitat and Pine Lake, listed as a Biologically Significant Lake for Outstanding Plant Community is located 1 miles upstream, expanding on resources needed to reach that goal and increasing diversity and populations of state listed fish species; greater redhorse, a sensitive species, pugnose shiner a state threatened species, and least darter, a species of special concern. Stream health is also closely linked to land use changes. Forested lands cover 56% of this watershed (HUC 12). It has been well documented that stream health begins to decline when cover dips below 50% (Verry.The Hydrology of Minor Watersheds. 2016). Along a mile long corridor of this project area forest cover is 100% which will help rebuild stream health and recovery of all sensitive species. These are ecologically diverse lands in public ownership sustainably managed (FSC and FSI certified) for timber expanding benefits to other fish, game, and wildlife as well as to outdoor enthusiast (2017 MN 97A.056). The adjacent land is also linked to more than 4000 acres (8 sq mi) of unbroken connections between woodlands, open prairies, and wetlands. Restoring fish passage maximizes the equity of these lands expanding ecological health and functional benefits to protected riparian upland, wetland complexes, shallow, and deep lake systems.

Identify indicator species and associated quantities this habitat will typically support:

Greater Redhorse: species of greatest concern, Least Darter: special concern, Pugnose shiner:threatened
 These are species sensitive to turbidity, vegetation removal, and eutrophication. None of these species were surveyed upstream of the dam while 8 Least Darter, and 8 Pugnose Shiner were counted downstream. They area will be surveyed by MPCA again in 2022, results will be used to measure project success.

Outcomes:

Programs in the northern forest region:

- Healthy populations of endangered, threatened, and special concern species as well as more common species *Greater Redhorse: species of greatest concern, Least Darter: special concern, Pugnose shiner:threatened* have been documented below the dam but not above. These are species sensitive to turbidity, vegetation removal, and eutrophication. The area will be surveyed again by the MPCA in 2022; results will be used to measure project success.

How will you sustain and/or maintain this work after the Outdoor Heritage Funds are expended:

The Crow Wing County Highway Department will maintain the installed project features. This project will be monitored by the Crow Wing Soil and Water Conservation District to ensure it is functioning as designed, is stable and effective. Significant long-term maintenance costs are not expected because it follows natural channel design principles, which create habitat conditions that are self-sustaining (Aadland, DNR). However, dollars to fund maintenance will come from Big Pine Lake Subordinate Services District (SSD) fund administered by Crow Wing County Highway Dept. The SSD has been in place since 2010 for maintenance. Approximately 97 riparian landowners on Big Pine Lake are assessed \$200.00 annually per property.

Explain the things you will do in the future to maintain project outcomes:

Year	Source of Funds	Step 1	Step 2	Step 3
Annually	Big Pine Lake Subordinate District	Inspect rock riffle structure and vegetation establishment on shoreline and stream banks	Perform maintenance and repairs as needed	
2022	MPCA	Fish, mussels, habitat, and macroinvert surveys	Report IBI scores	

What is the degree of timing/opportunistic urgency and why it is necessary to spend public money for

this work as soon as possible:

This project was funded by a 2016 CPL grant award of \$400,000. Project cost was estimated at \$450,000. Today, costs exceed the CPL cap. Emergency repairs, delays, and rising costs of rock have increased cost by more than \$800,000 with contingencies. In June 2017, \$70,000 was expended for repairs when it became clear permitting delays would be economic and environmentally costly. A breach was plugged and the bank permanently stabilized. Cost, not including project management, technical, and engineering was \$70,000. Phase II of the project has been permitted and bid but low bid exceeds the CPL cap. Funding this project today is ecologically and economically prudent. Permits are secured and it has stakeholder support. Funding the proposed project capitalizes on technical and financial resources already expended and will rebuild ecological health; enhance stream and lake habitats, and protect sensitive aquatic species from decline.

How does this proposal include leverage in funds or other effort to supplement any OHF appropriation:

This project is shovel ready. Plans are permitted and partners secured. The City of Crosslake and the Big Pine Lake Association have pledged \$400,000 of cash and in-kind to ensure the Pine River Fish Passage Project 2020 is completed. In June 2017, \$70,000 was expended for repairs when it became clear permitting delays would be economic and environmentally costly. A breach was plugged and the bank permanently stabilized, however fish passage has not been restored and the dam is unstable. Construction cost was \$70,000. Phase II of the project has been permitted and bid but low bid exceeds the CPL cap. Funding this project today is ecologically and economically prudent as costs will only continue to rise.

Relationship to other funds:

- Clean Water Fund

Describe the relationship of the funds:

The Crow Wing Soil and Water Conservation District was awarded a \$400,000.00 2016 CPL grant for this project. Construction of the project was delayed due to a dam failure that required emergency repairs. The project was broken into two phases. Repairs and streambank protection were completed in Phase I of the project. Phase II bids exceeded the amount allowed by the CPL grant so could not be used to complete the project. Funding from the OHF will allow for Phase II completion.

Per MS 97A.056, Subd. 24, Any state agency or organization requesting a direct appropriation from the OHF must inform the LSOHC at the time of the request for funding is made, whether the request is supplanting or is a substitution for any previous funding that was not from a legacy fund and was used for the same purpose:

This project was awarded a 2016 CPL grant of \$400,000. Plans were revised and the project phased for emergency repairs phased at a cost of more than \$100,000. Completion of Phase II was abandoned when bids exceeded CPL project cap of \$550,000.

Describe the source and amount of non-OHF money spent for this work in the past:

Not Listed

Activity Details

Requirements:

If funded, this proposal will meet all applicable criteria set forth in MS 97A.056 - **Yes**

Will restoration and enhancement work follow best management practices including MS 84.973 Pollinator Habitat Program - **Yes**

Is the restoration and enhancement activity on permanently protected land per 97A.056, subd 13(f), tribal lands, and/or public waters per MS 103G.005, Subd. 15 - **Yes (County/Municipal, Public Waters, State Forests)**

Do you anticipate federal funds as a match for this program - **No**

Land Use:

Will there be planting of corn or any crop on OHF land purchased or restored in this program - **No**

Accomplishment Timeline

Activity	Approximate Date Completed
Begin Construction	October, 2019
Complete Construction	December, 2019
Project maintenance inspection	January 2019

Budget Spreadsheet

Total Amount of Request: \$1,246,000

Budget and Cash Leverage

BudgetName	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Personnel	\$70,000	\$0		\$70,000
Contracts	\$1,123,000	\$75,000	Big Pine Lake Subordinate District Fund	\$1,198,000
Fee Acquisition w/ PILT	\$0	\$0		\$0
Fee Acquisition w/o PILT	\$0	\$0		\$0
Easement Acquisition	\$0	\$0		\$0
Easement Stewardship	\$0	\$0		\$0
Travel	\$3,000	\$0		\$3,000
Professional Services	\$50,000	\$0		\$50,000
Direct Support Services	\$0	\$0		\$0
DNR Land Acquisition Costs	\$0	\$0		\$0
Capital Equipment	\$0	\$0		\$0
Other Equipment/Tools	\$0	\$0		\$0
Supplies/Materials	\$0	\$0		\$0
DNR IDP	\$0	\$0		\$0
Total	\$1,246,000	\$75,000		\$1,321,000

Personnel

Position	FTE	Over # of years	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Project management	0.50	1.00	\$60,000	\$0		\$60,000
Administration	0.10	1.00	\$10,000	\$0		\$10,000
Total	0.60	2.00	\$70,000	\$0		\$70,000

Amount of Request: \$1,246,000

Amount of Leverage: \$75,000

Leverage as a percent of the Request: 6.02%

DSS + Personnel: \$70,000

As a % of the total request: 5.62%

Easement Stewardship: \$0

As a % of the Easement Acquisition: -%

Does the amount in the contract line include R/E work?

Yes, all of it.

Does the amount in the travel line include equipment/vehicle rental? - No

Explain the amount in the travel line outside of traditional travel costs of mileage, food, and lodging:

none

Describe and explain leverage source and confirmation of funds:

The Big Pine Lake Association has pledged up to \$75,000.00 from the Subordinate District Fund

Does this proposal have the ability to be scalable? - No

Output Tables

Table 1a. Acres by Resource Type

Type	Wetlands	Prairies	Forest	Habitats	Total
Restore	0	0	0	1	1
Protect in Fee with State PILT Liability	0	0	0	0	0
Protect in Fee W/O State PILT Liability	0	0	0	0	0
Protect in Easement	0	0	0	0	0
Enhance	0	0	0	0	0
Total	0	0	0	1	1

Table 2. Total Requested Funding by Resource Type

Type	Wetlands	Prairies	Forest	Habitats	Total
Restore	\$0	\$0	\$0	\$1,246,000	\$1,246,000
Protect in Fee with State PILT Liability	\$0	\$0	\$0	\$0	\$0
Protect in Fee W/O State PILT Liability	\$0	\$0	\$0	\$0	\$0
Protect in Easement	\$0	\$0	\$0	\$0	\$0
Enhance	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$0	\$0	\$1,246,000	\$1,246,000

Table 3. Acres within each Ecological Section

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	Northern Forest	Total
Restore	0	0	0	0	1	1
Protect in Fee with State PILT Liability	0	0	0	0	0	0
Protect in Fee W/O State PILT Liability	0	0	0	0	0	0
Protect in Easement	0	0	0	0	0	0
Enhance	0	0	0	0	0	0
Total	0	0	0	0	1	1

Table 4. Total Requested Funding within each Ecological Section

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	Northern Forest	Total
Restore	\$0	\$0	\$0	\$0	\$1,246,000	\$1,246,000
Protect in Fee with State PILT Liability	\$0	\$0	\$0	\$0	\$0	\$0
Protect in Fee W/O State PILT Liability	\$0	\$0	\$0	\$0	\$0	\$0
Protect in Easement	\$0	\$0	\$0	\$0	\$0	\$0
Enhance	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$0	\$0	\$0	\$1,246,000	\$1,246,000

Table 5. Average Cost per Acre by Resource Type

Type	Wetlands	Prairies	Forest	Habitats
Restore	\$0	\$0	\$0	\$1,246,000
Protect in Fee with State PILT Liability	\$0	\$0	\$0	\$0
Protect in Fee W/O State PILT Liability	\$0	\$0	\$0	\$0
Protect in Easement	\$0	\$0	\$0	\$0
Enhance	\$0	\$0	\$0	\$0

Table 6. Average Cost per Acre by Ecological Section

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	Northern Forest
Restore	\$0	\$0	\$0	\$0	\$1,246,000
Protect in Fee with State PILT Liability	\$0	\$0	\$0	\$0	\$0
Protect in Fee W/O State PILT Liability	\$0	\$0	\$0	\$0	\$0
Protect in Easement	\$0	\$0	\$0	\$0	\$0
Enhance	\$0	\$0	\$0	\$0	\$0

Target Lake/Stream/River Feet or Miles

12 miles

I have read and understand Section 15 of the Constitution of the State of Minnesota, Minnesota Statute 97A.056, and the Call for Funding Request. I certify I am authorized to submit this proposal and to the best of my knowledge the information provided is true and accurate.

Parcel List

Explain the process used to select, rank and prioritize the parcels:

Not Listed

Section 1 - Restore / Enhance Parcel List

Crow Wing

Name	TRDS	Acres	Est Cost	Existing Protection?
Pine River Fish Passage Project 2020	13727233	1	\$1,321,000	Yes

Section 2 - Protect Parcel List

No parcels with an activity type protect.

Section 2a - Protect Parcel with Bldgs

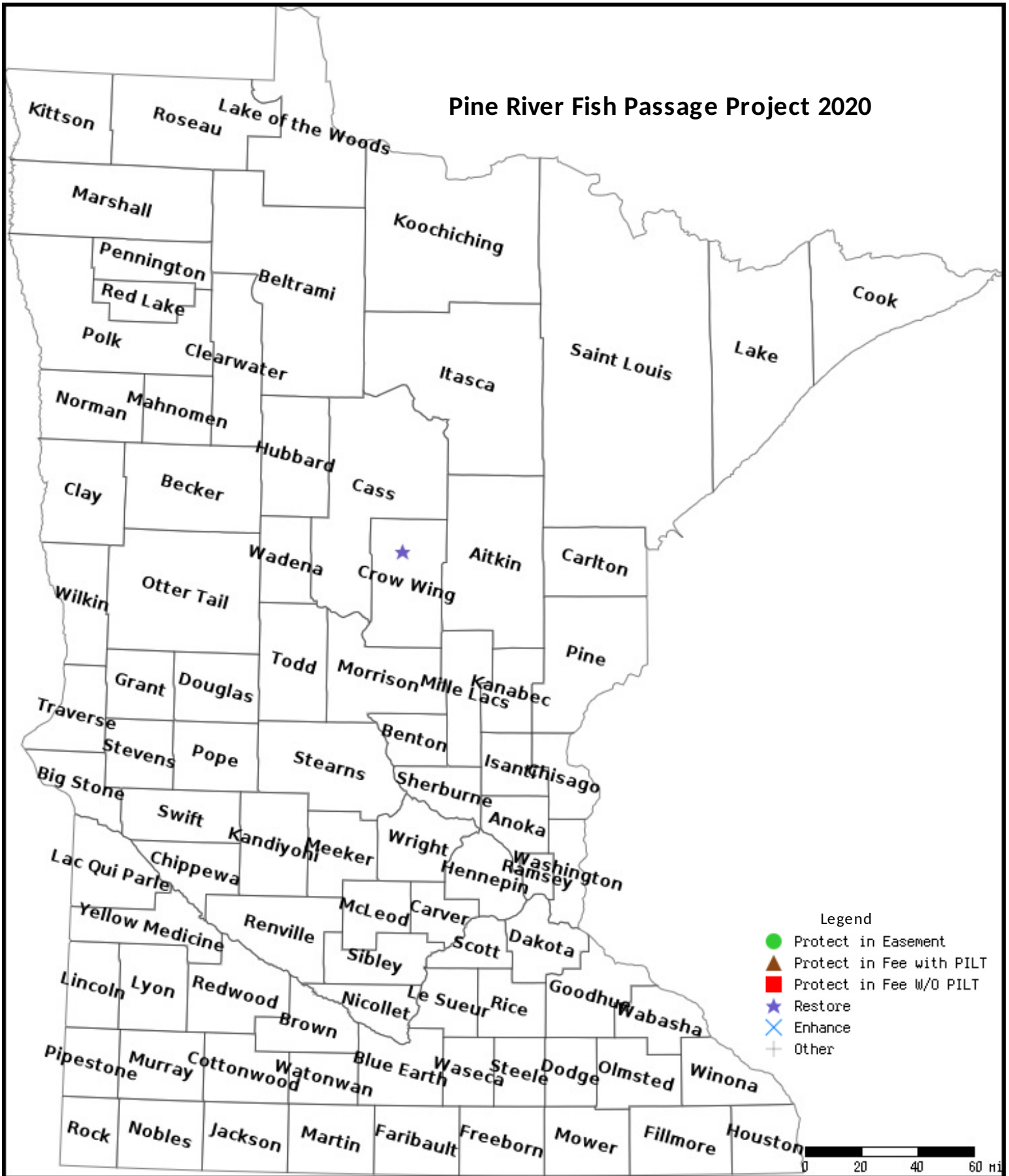
No parcels with an activity type protect and has buildings.

Section 3 - Other Parcel Activity

No parcels with an other activity type.

Parcel Map

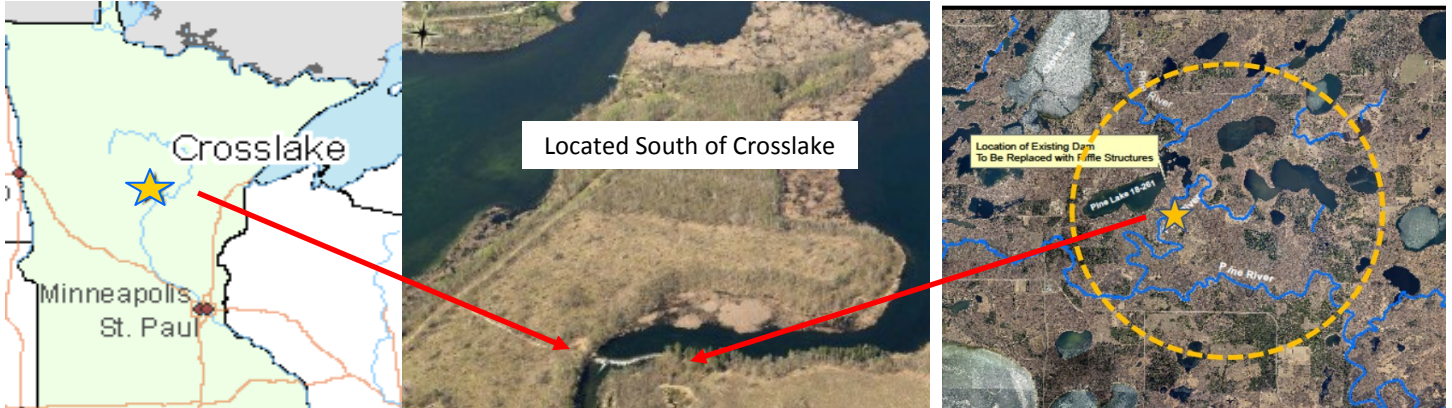
Pine River Fish Passage Project 2020



Data Generated From Parcel List

Pine River Fish Passage Project 2020

Improve and enhance aquatic health, riparian stability, and recreational use



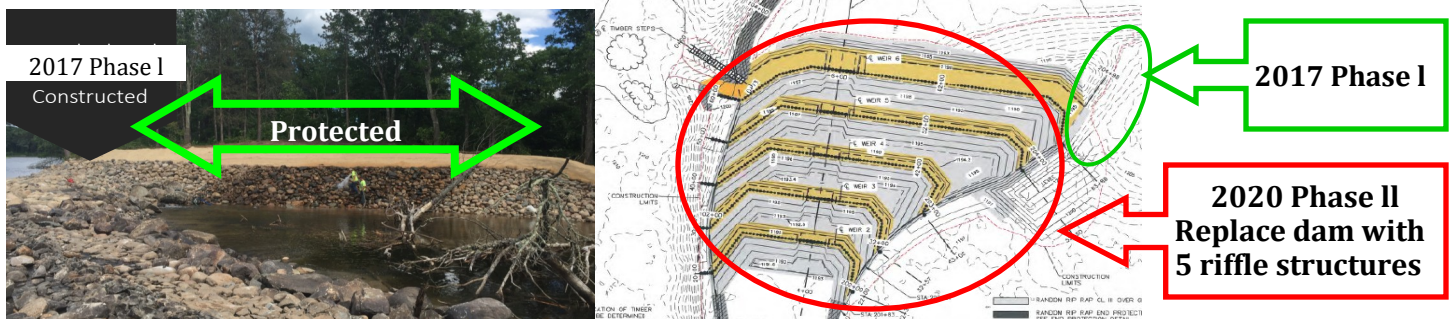
Economically Prudent

Dam is at end of life evident by seepage in dam structure, indicative of weakness, and at risk for failure.



Project phased to minimize ecological and economic cost

Jan 2017, riffle structure design completed to replace dam. East side of dam fails causing 500 cubic yards of forested shoreline to wash downstream. Project phased to expedite permitting and completion of emergency repairs in June 2017



Partner Supported

- City of Crosslake
- Riparian Landowners
- MNDNR: Fisheries
- Crow Wing County
- The Nature Conservancy

More than
\$400,000
in-kind and
cash match

Shovel Ready

Plan Permitted
Low bid pending



Ecologically Prudent

Dam blocks three State Listed Species

State Threatened Species:

Pugnose Shiner



Special Concern:

Least Darter

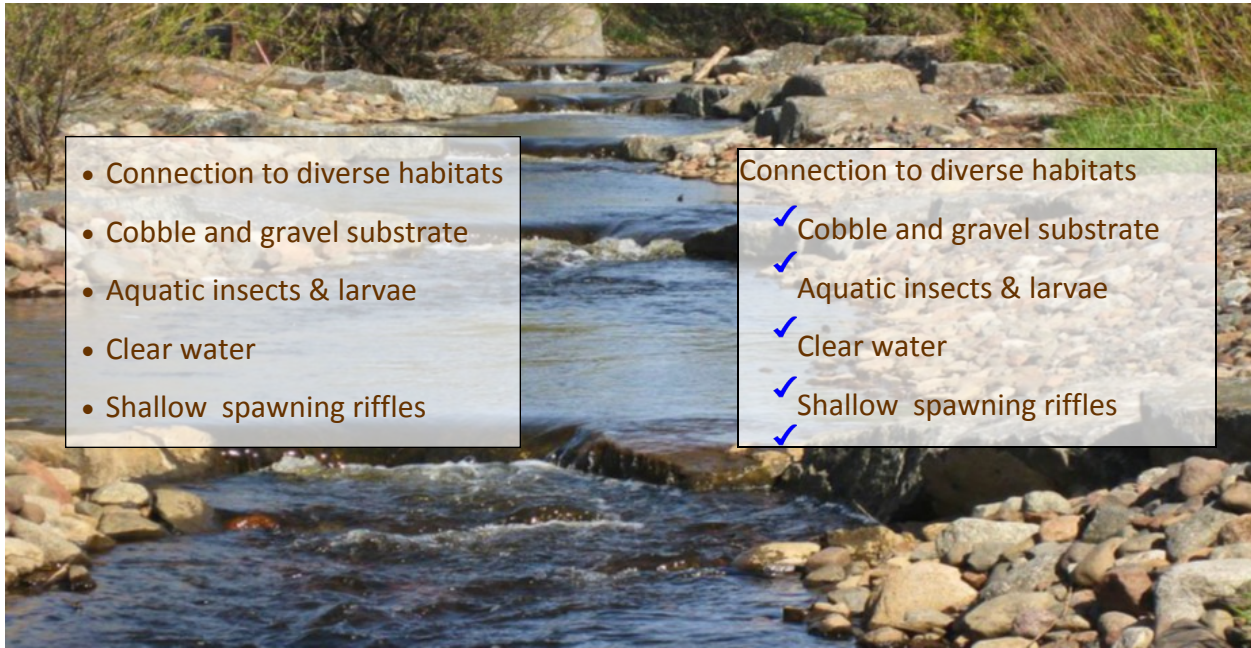


Sensitive:

Greater Redhorse



Supports Fisheries: Restore Connectivity, Rebuild Fishery Health



- Connection to diverse habitats
- Cobble and gravel substrate
- Aquatic insects & larvae
- Clear water
- Shallow spawning riffles

- ✓ Connection to diverse habitats
- ✓ Cobble and gravel substrate
- ✓ Aquatic insects & larvae
- ✓ Clear water
- ✓ Shallow spawning riffles

Recreationally & Economically Valuable

Proposed design: State access improved portage optional!



- 125,000 tourist/year
- \$219 million CWC Tourist Industry
- 63,000 CWC residents
- \$23 million Property value Big Pine Lake
- \$150,000 average 154 parcels
- Sustainable recreational sports